# Overview Dept. of Nat. Resources 1-18-93

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January 17, 1993

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From Governor Walter J. Hickel's

# WHO OWNS AMERICA?

*(Beyond Partisan Politics)*

Book 1. How to become an endangered species

p. ix Son of a tenant farmer . . . I've written this book for the young of all ages, the young of thought who refuse to be locked into the past, who do not fear the challenge of change and who anticipate the hope of the future.

We are at a time in our national history when mistrust of the responsiveness of government to the popular will has reached a critical point - a point at which increasing numbers of Americans feel denied and even robbed of the power to influence public policy; a point at which the cry is "return it to us." This mood is not the property of any age or class, and it can be a good and healthy thing if those in government will listen. But if no one will listen, the lack of communication causes frustration and fear. Fear leads to hate, and hate leads to violence.

What Americans want "returned to us" is a sense of care, a sense of ownership. We want renewed assurance that we have some control over our physical assets and our spiritual destiny. We want to know that the important decisions affecting our life styles, and our very existence, will not be made by an anonymous "them" who may have no suitable consideration for our wishes. The public is asking for a larger role in the direction of its fate.

. . . Sometime in the 1960's a political and economic era came to an end in this country. The rough-and-tumble of economic survival and growth failed to provide the satisfaction that was supposed to come with the accumulation of glitter. We discovered that economic prosperity without due consideration for the needs of the mind and spirit left us with a society where the "good life" was measured in tangibles rather than those intangibles, such as friendship and service, that can make life a joy to live.

We need a truly national approach to government, and we must have men in government who will have the courage to accept responsibility for planning and implementing the policies that will lift us as a nation into the next century. This government must be visionary in nature and be prepared to "return to us" both the physical things that only national government can give back - clean rivers and unpolluted air and land - and those human things of hope and heart.

p. 38 . . . I never was much of a joiner, and I am not even sure how I got into the Republican Party. Nor do I really know how I came be a member of President Nixon's Cabinet for twenty-two months. I am a free-thinking and impatient man, and I do not always go by the book.

p. 40 . . . We heated the Grizell house and cooked our meals with wood and coal; for light, we hand two-mantled Coleman lamps, which burned ordinary low-octane white gasoline, plus those old-fashioned kerosene lamps. The house was not wired for electricity until 1938. I do not recall when we first got a telephone, but naturally it was a hand-crank wall instrument on a party line, which was great for those days.

p. 41 . . . It finally dawned on me that we would never own the home we were living in. Somehow it could never be for sale — to us. This was a crushing realization.

p. 42 . . . I was milking cows when I was five years old. I was in the field behind four head of horses and a gang plow when I was eight.

p. 43 . . . The greatest thing I got out of my childhood was not formal schooling but religious training and a sense of confidence in whatever I had to do. Mother used to say, "Walter knows no fear."

p. 45 . . . I remember going down to a little creek to sit on the bank and dream.

p. 45 . . . I loved every bit of the natural state. There were still opossums and badgers to trap, along with a few muskrats. When the dew was on the fields, there was a sort of mist on the ground. Then I would go to plow in the fields, and as I watched the soil turn over it all seemed so great - so human. The gulls would follow me and squawk, and every once in a while their droppings would fall on my head and I would swear at them in a boy's cussword language.

p. 57 . . . I knew that Alaska was going to be "my country" before I stepped off the S.S. YUKON in Seward.

p. 58 . . . For most of the Western world, 1940 was a year of fear and pessimism.

This was not the case in Alaska, which then had a population of 72,000. The only atmosphere I can recall from 1940 was one of optimism. And in my case the feeling was a little more than optimism. It was pure happiness, a feeling that every new day was going to be the greatest day of my life. At no time was there ever a fleeting thought in my mind that I had made the wrong choice in picking a new home.

p. 83 . . . In fact, I had no big business or industrial support at all. I had put together a people's campaign and won the election as a free man.

I had an attitude in mind: the people who would serve in the State government had to be people who wanted to do a job, not merely get a job. Furthermore, whether you were a Native fisherman in a remote bush village or the president of an oil company, my door in Juneau was open. Everyone had an audience, but no one had a claim.

Book 2: Return it to us . . .

p. 115 . . . The American people, so proud of their private ownership, are largely unaware of their public obligation for the care and use of those things they will always own in common - millions of acres of public land, including national parks, wilderness and recreation areas as well as the Continental Shelf, not to mention the water and the air. Think it out clear on down the line: Who owns the Mississippi River, or any of our great rivers? The water runs out of a mountain down to the sea. It belongs to no individual. Each has the right to use it, but it really belongs to the public.

p. 127 . . . I cherish the beauty of my north country, Alaska's "resource of the heart and soul." And I never would have given the Alaska pipeline my support if I were not absolutely certain, on the basis of facts rather than emotion, that it could be designed and constructed without endangering this resource of beauty. Americans realize that we cannot "stop the world and get off." Nor can we simply turn off the ignition of America. To do so would be to plunge our nation into economic, political and industrial darkness. The key is to do the job right.

p. 129 . . . Resources must be developed and used; homes and office buildings must be built. But it is inexcusable to do these things without considering the impact they have on the heart and soul and spirit of the American people. Industry and architects have proved that all these things can be done with proper respect for the environment. The question is: Do we care enough about our land to see that they are done in that way?

p. 136 . . . The sea covers more than 70 percent of our earth, but less than 5 percent of this vast expanse has been charted for man's use, much less properly catalogued to show the wealth of resources. The most important part of this watery kingdom is the Continental Shelf, which comprises about 9 percent of the total area of our seas. This shelf is the relatively shallow submarine plain extending from the coasts of the continents to the steeper slopes plunging off into the deep water of the oceanic abyss. The Continental Shelf is the womb of our ocean resources.

p. 141-2 . . . Is the cry of the whale trying to tell man something? Is the cry of the whale really the cry of life? And if that cry falls on deaf ears, will the cry of our fellow man fall on deaf ears as weli?

The person who has no heart for the value of a living creature such as the whale has no heart for his fellow human. He does not hear the depth of the cry of man, pleading for help - whether in Biblical times when it took a Moses to free the people, or in the present with the violence of some and the frustration of others who reject violence. They are crying out. The cry of the smallest child in the ghetto forgotten in the crowd, or the cry of the greatest animal forgotten in the vast open sea - these are both part of the same fabric of life.

p. 146-7 . . . As we begin to understand the fragile web of life, of which we are but a precious part, we become aware that man is the only species that willfully damages that web for reasons of greed, hatred or ignorance. Our scientists have warned us that, unless we stop now, one too many species of wildlife soon may be wiped out; one two many lakes or rivers fouled beyond redemption.

p. 157 . . . But most important, as man evolves to the realization that other creatures and other values may be as important as he is, we suddenly feel the need for our companions on this planet. The inescapable challenge we face at this moment is whether we will hear the cry of the whale and the other animals in time for future generations to be able to enjoy and appreciate all the creatures of our animal world - and whether heeding that cry will teach us to listen also to the cry of man in all corners of the earth.

p. 158 . . .Love of land and nature is more deeply embedded in the heart and soul of the American Indian than in any other people in our country. While some say the Indian has a lot to learn, I think he has much to teach.

p. 159 . . . The word "Native" is used in Alaska to identify any descendant of the first Alaskans, which include not only Indians but also the Eskimos and the Aleuts, a distinct ethnic group descended from the original habitats of the Aleutian Island Chain.

p. 161 . . . One of my first acts was to create the Rural Affairs Commission, an agency designated to deal directly with Native needs. I approached the Alaska Federation of Natives (A.F.N.) and asked its leaders for a list of individuals they felt should be appointed to this commission, which consisted of more than thirty members. In almost every instance we accepted those nominated by the A.F.N.

p. 163 . . . The key to our success was that we did not pay lip service to the theory that the Native peoples can become involved, contribute positive thoughts and resolve their own problems. We accepted the theory as fact and provided the means and encouragement for the Natives to seize opportunities and prove themselves.

p. 170 . . . On July, 1970, President Nixon delivered a message on Indian affairs to Congress.

p. 171 . . . The story of the Indian in America is something more than the record of the white man's frequent aggression, broken agreements, intermittent remorse and prolonged failure. It is a record also of endurance, of survival, adaptation and creativity in the face of overwhelming obstacles. It is a record of enormous contributions to the country - to its art and culture, to its strength and spirit, to its sense of history and its sense of purpose.

p. 172 . . . When I testified before the Senate subcommittee on an Indian Trust Council Authority, I stated that the white man, on issues relating to Indian rights, had indeed spoken "with a forked tongue." The Authority would bring this to an end.

p. 178 . . . In early July 1970 I accepted the invitation of the leaders of the Crow Indian Nation to visit their rugged and beautiful ancestral land near Billings, Montana. Nine months after I had been heralded as Custer reincarnate, the Indian people demonstrated to me their gratitude for the direction we were beginning to take on federal Indian policy.

After welcoming me to the reservation, the Crow leaders took me to a secluded spot isolated from human habitation. Unfolding blankets, we sat together on the ground in reverence and solitude as Crow Indian prayers were recited. They offered the pipe of peace, first to "the One Above, the First Person, and First Maker"; then to "Mother Earth so that our moccasins may follow the trail of beauty forever"; followed by "the East from whence Grandfather Sun brings us daylight; the South, where eternal summer lives; the West where the Sun wraps his scarlet robes around him"; and finally to "the North, where eternal winter lives."

Barney Old Coyote spoke: "This ground is sacred ground. It is here that we return our blessings to nature. We did not attempt to control it. We lived in harmony with our surroundings.
I was adopted into the tribe and given the name of Pipe Carrier.

p. 181 . . . Above all, and I concluded my remarks to the Indians with these words, "Let's provide the vision for our young people, of all races of America, so that they can look forward to the future with eager expectancy and can demonstrate a promise for the rest of the world of how men are meant to live.

p. 183 . . . What we are dealing with in the world, as I see it, is the environment of the mind, tied into the environment of the soul. The problem is not just money. It is not just education; it is not just security; it is not even the problem of a job. It is the combination of these problems that causes a man to become depressed.

p. 183-4 . . . How do we free Americans from their enslavement to road transport? What kind of transport is in the best interests of this country for moving people? The answer lies in high-speed mass rapid transit, elevated and electrified over long and short distances. The technology is there. It has been there for at least 20 years, but it has been almost totally ignored by this country.

p. 185-6 . . . We ought to be merging the various modes of transport - air, necessary short-haul trucking, long-distance elevated rail - in a balanced and coherent system regulated at the federal level. Such mergers should not only be permitted but encouraged.

p. 188 . . . I had in mind the coordination of all overland transport inside "corridors" that could make manageable the delivery of goods and people to their destination. It would also provide a practical system for millions of Americans to see and enjoy the scenic grandeur of this vast area - the finest kind of development and conservation.

p. 188-9 . . . Washington showed its usual lack of interest in Alaska, and oil companies who could have used the railroad to carry their produce in

and out showed no interest at all. Had the railroad been extended, an enormous area of northern Alaska would have been opened up wisely for its highest and best use, and many of the environmental dangers mentioned in the argument about the building of an Alaska pipeline from Prudhoe Bay to Valdez would have been avoided.

p. 191 . . . I put my staff to work developing similar types of conveyances to operate in great parks such as Yellowstone. I visited Yellowstone personally and toured it by horseback. It seemed to me that visitors ought to be able to leave more freely the tiny ribbon of asphalt to which they are now restricted and move out into the wild and wilderness to enjoy the refreshing character of nature in its raw state.
This was unfinished business when President Nixon fired me as Secretary of the Interior. I still believe that public conveyances can be built and operated in parks such as Yellowstone. People who are limited in time could then get in and out of remote areas of beauty in a single day.

p. 193 . . . The urban problem has as its central core the fact that people need to live with reasonable access to their work but still crave the open spaces of country living. The inner-city problem is created when we force a man to come into a metropolitan area for his economic survival - and live there unhappily.

p. 193 . . . The same American technology that made it possible to land men on the moon can make it possible to take other men to and from their work efficiently. The answer to part of our urban crisis lies in a transit system that will move the worker from his home, fifty or even seventy-five miles away, . . . .

p. 200 . . . To turn your mind off from your heart when you make a decision affecting human lives is to isolate yourself from reality and morality.

p. 200 . . . A strong Cabinet system is essential for American government, because people have more faith in decisions they know have been debated and thoroughly thrashed out at that level.

p. 201 . . . It is not my nature to fit old solutions to new problems, so in the Cabinet I was always looking ahead, not back. I won some of my battles and lost some. As an adversary, I thought of myself as one of the President's truest and most loyal friends. The adversary nearly always is a friend, because within the house he usually has a greater love for the structure than anyone else. He cares enough to communicate, and he wants to preserve the house that others merely want to use as long as it stands.

p. 213-4 . . . We were about to propose an ongoing program that would eliminate the guesswork. When a city - any city - needed a secondary

sewage treatment plant, it would automatically go ahead and design it, knowing full well that when the community went to sell its bonds, the federal government would be responsible for capital repayment. And this repayment, scheduled over a period of twenty years, would be guaranteed right on the face of the bonds. All the local taxpayers had to do was pay interest to the bondholders during the same span of time. For example, a million-dollar city sewage treatment plant would cost the federal government only $50,000 a year for twenty years. I called this the FHA of pollution financing. There was virtually a fifty-fifty proposition - finest kind of "revenue sharing." We could start cleaning up the nation's dirt rivers immediately, avoid escalating construction costs and have the use of the facility while we were paying for it.

p. 222 I was aware of these springtime rumblings in Washington, and I was conscious that some of them concerned the complicated problem of Vietnam. That sorry conflict had lasted a decade. The cost in American lives was approaching that of World War I. This is not the place to go into the rights and wrongs of the Vietnam argument. But there must have been a time when we could have adopted Senator George Aiken's suggestion that we announce we had "won" and then go home. Instead, the war went on, and half a million American combat troops were committed to a conflict that had large elements of a purely civil war. The physical destruction of a small country by the armed might of the world's greatest power became repugnant to more and more Americans. This was particularly true among American youth, as the 1968 Democratic Party convention in Chicago and subsequent events during the presidential campaign should have made clear.
I thought this was as clear to President Nixon as it was to me.

p. 223 . . . I really had no worries about Vietnam on the afternoon of April 30. The Nixon Administration had taken office pledged to wind down the Vietnam war, and I thought the President was doing an excellent job - in an admittedly difficult situation - to fulfill this pledge. I genuinely thought we had turned the corner in Vietnam.

p. 223 . . . Almost everyone can remember precisely where he was, whom he was with, and what he was doing on certain dates.
Such a date, for me, was April 30, 1970.

p. 224 . . . We did not have long to wait. The President walked in. Then he announced the decision to use American troops in South Vietnam to invade Cambodia.

I listened with horror. I had knots inside my stomach. Over and over - but only in my mind - I kept saying: No, Mr. President. No, No, No! I thought we had turned that corner. Don't say it. Please don't say it!

He said it. When I walked out of that room, I was screaming inside.

p. 230 . . . In December 1969 the first Earth Day was being organized for the following April. I called John Whitaker at the White House and suggested that Earth Day be declared a national holiday by the President. John thought it might be a good idea, so I said, "Does it merit writing a letter to the President?" He did not have a comment one way or the other, so on December 16 I wrote:

. . . Dear Mr. President:

To demonstrate your commitment to the fight to preserve and protect our Nation's environment, and to acknowledge youth's role in that fight, I strongly recommend that you declare April 22 - the date of the Environmental Teach-In - a National Holiday. This need not be a Holiday in the sense of releasing employees, closing banks, etc., but rather one that clearly demonstrates your understanding of the problems of the environment and your appreciation for the commitment and concern shown by young people. In addition, an executive order might direct all pertinent government agencies to aid the Teach-In, something most offices are already doing as part of their information function.

This action would be beneficial not only to our fight for environment, but also to our continued efforts to involve people in national concerns.

Respectfully yours,

Walter J. Hickel
Secretary of Interior

p. 233 . . . My interest in direct youth involvement has been a continuing pattern in life both in business and government. I have always believed that if you want to discover the truth you should ask the young or the very old. The very young are completely uninhibited in saying what they think. They are the most punishing of people because they will say it exactly like it is. Old people have nothing to lose. They no longer have to worry about who cares. So the truth of the world comes from the very young; the wisdom of the world comes from the very old.

p. 233 . . . Surrounding yourself with young-thinking people is essential in government if you are to make the right decisions in a world changing at the pace it is today. Your mind has to be open to all alternatives. If you or your staff are locked in to the ways of the past, you are likely to suppress the vitality of the new and the original, which have been the lifeblood of the American experiment. Both in Juneau and Wash-

ington I hired young talent. But I made sure they were competent as well as creative. My theory is always to hire "up" to find those staff members who in their areas are more able than I.

p. 247 . . . Dear Mr. President:

I believe this Administration finds itself, today, embracing a philosophy which appears to lack appropriate concern for the attitude of a great mass of Americans - our young people.

Addressed either politically or philosophically, I believe we are in error if we set out consciously to alienate those who could be our friends.

Today, our young people, or at least a vast segment of them, believe they have no opportunity to communicate with Government, regardless of Administration, other than through violent confrontation. But I am convinced we - and they - have the capacity, if we will but have the willingness, to learn from history.

p. 265 . . . One of my greatest hopes, as a private citizen, as Governor of Alaska and as Secretary of the Interior, has been to alert the United States to the potential of its Arctic areas. The Soviet Union, the Scandinavian countries and the Canadians have far greater knowledge of their Arctic areas than we do. They could teach us much.

p. 287 . . . I believe people are looking for something new in leadership. They are fed up with being represented by those who only play the partisan political game, using their position for personal benefit. Politics as we have known it is becoming more and more out of touch with the people. It is less and less able to respond to the opportunities of the times we live in.

The frustration felt by Americans - whether airline pilots, plumbers or housewives - stems from the fact that they are busy coping with their own problems. They can only hope, as far as government is concerned, that someone will care enough to see that the country is run properly.

Our world changes at the speed of global electronic communication. This demands a new breed of national leader, a "searcher" who ferrets out and explores the new and the never-tried-before. He never puts a ceiling on his expectations, and he refuses to let his thought become inflexible and locked into the past. A searcher is a man who want to improve upon the solutions for problems he finds while searching.

p. 280 . . . My schedule was very busy for Wednesday, November 25, the day before Thanksgiving. I had an early-morning staff meeting lasting until ten o'clock, followed by a long and tough session with Mitch Melich, Bill Pecora and a group of Justice Department lawyers regarding an oil pollution case. At noon I met with Ambassador Glenn Olds, United States Representative to the United Nations Economic and Social Commission. At one o'clock Hilton drove me to the Luxembourg Embassy at Massachusetts Avenue for a reception honoring the Apostolic Delegate, Archbishop Raimondi.

p. 281 . . . Finally I agreed to be at the White House at four o'clock.

p. 281 . . . I walked in. Nixon was there with John Ehrlichman. I shook hands with the President. He sat down. I drew my chair up close to the President's desk.

p. 282 . . . He said he wanted a quiet transition. I did not know what he meant by that; how can you quietly fire a man?

p. 282 . . . I got up to leave. I did not shake hands with the President, but not out of bitterness. I didn't think of it. I felt so clean and totally free.

p. 284 . . . The President terminated me about two hours ago - and there's really nothing I can say to help the situation - and nothing I would say to hurt it. Given the hostility toward me when I first arrived - and some of those incredible decisions I had to make immediately thereafter - and trying to do a job for the President and all Americans and still survive as an individual - I had to do it my way.

p. 288 . . . "There is only one thing we need - people to come to Alaska who care. My definition of a searcher is a man who, no matter what he accomplishes or what he might do, isn't satisfied. He is a combination of the dreamer and the doer, the contented man and the ambitious man, all molded into one."

p. 290-1 . . . It may be time for the people's party to emerge every four years to offer an alternative candidate for President, to break the hammerlock that the leaders of the two major parties now have on presidential candidate selection. It could breathe new life into the entire system. In effect it would be a third party within the two-party system. The Senate and the House would still be organized in the customary manner, but the President would be the nonpartisan representative of all the people. I believe that instead of receiving the hate or opposition of

alternatives, not between compromises. But this kind of compromise can be achieved with justification, only at the last stage of the administrative decision or the legislative process.

p. 297 . . . People respect a noncompromising leader - if he keeps an open mind. The distinction is very fine, but it is a great and important one. At the highest level of government, a President should always remember the difference between stubbornness and strength. The mark of a man who lacks an open mind is the lack of confidence, and a man without confidence does not want criticism. A person who has great confidence, and who is guided by his conscience, finds it invigorating to hear criticism. He is eager to learn from it. Only those who really fear themselves get isolated.

p. 298 . . . The protest that marked the end of the 1960's and the beginning of the 1970's would have occurred with or without the war in Vietnam. The basic protest we have witnessed was not so much against an event as against ar. attitude. It was a protest against the exclusion of the public from decision-making. This was the same reason for our stimulated concern for the environment, or almost any other area of public interest that we might mention. It just happens that the war was the obvious issue.

p. 299 . . . I will always consider government's major job to be the setting and administering of regulations. But this should come only after the public has had a full opportunity to comment. If the public understands that it is locked in, not locked out, then people will have confidence. But if they have not chance to make an input, they will be totally frustrated.

p. 301 . . . If you are going to do a job for America and do it right, do it with a sense of style. Perhaps it sound corny when we are surrounded today by so much "cool" and cynicism, but I believe most Americans not only want good government - they want exciting government.

p. 302 . . . Laughter has its place in government, and we provided our share, sometimes accidentally.

p. 304 . . . The kind of leader who is a searcher does not need to play old-fashioned party politics. The searchers are the young of all ages. They are not afraid of changing attitudes. They want to find solutions for problems regardless of whose idea the solutions might be. They want

the opposition to become just as involved as the Administration itself. They put the burden of proof upon those who want to solve problems for humanity with goals that are attainable. And a leader who really wants to face the challenge of doing what is right will find the majority of Congress with him, regardless of political party, because the momentum of the public will be devastating to those who oppose solutions for the living of life.

Our leaders, both in government and in the private sector, must be willing to say: "We cannot make decisions just for partisan or monetary reasons, or for short-term gain. These decisions must be great beyond our lifetimes and not just for the moment." These men must be bold enough to face the challenge of change.

p. 306 . . . Hope is what people really count on from the time they are small children until they die. The searchers see life as an opportunity to care for people. Their job is people! If you treat humans as humans, instead of as votes, the great heart of America will respond. American will awaken; she will shake off her frustration and fear. And we will demonstrate to the world that it is possible to care for all the needs of all the people.

. . . The searchers will not get lost in a backwater of history by trying to change society without using the tools of government. The system can work. It is a great system, and those elements in it, like bureaucracy, can be made to work for the good of the public if they are directed by men of vision at the top. The searchers - the challengers and dreamers of all ages - openly question the values that have been the guidelines for generations before us. They want to make human values the guiding force in their lives of public service.

p. 309 . . . I want America to be the conscience of the world again. I want Americans to lead the world in showing that the human being is the most important thing in existence, and perhaps we are just the people to do it. We are a Mongrel people.

p. 310 . . . The belief that we have too much government has been accepted without question by what must be a majority of Americans of all political persuasions. I totally disagree. There may be too many people in government, or government may be misdirected, but I will argue until I die that there is not enough government in those areas where life is being choked from living: transportation, the cities and the general environment.

What we must now realize for the first time in America is that it is really a collective world, but one in which we live so privately. Without concern for the other person, for his desires and wants, activities for strictly private gain become destructive not only to others but eventually to oneself. No matter how great, how vast or how simple individual ownership might be, it must be looked upon as a passing thing. What good would it be if one owned it all and left an emptiness in passing? In reality, one has but a lease on ownership during one's lifetime. The success or failure of how something is used depends on how it is left.

p. 314 . . .We cannot turn off the ignition of the world. Our concern is how we can better utilize the energy we have. The whole direction of utilizing energy has to be viewed on a national basis. This means the government is going to have to get involved in how this energy is used for the advancement of 200 million Americans.

p. 315 . . . We must have government that cares for the total, that sees the nation as a whole in order to solve the problems on the broadest level.

p. 316 . . . There are very few purely private decisions anymore. Increasingly every private decision related to our society must also be considered a public decision, which cannot be undertaken without regard for its effect upon others. Continued indifference to the public today can only burden more severely the public of tomorrow.

p. 317 . . . Our nation fosters the concept that all men are created equal and should be so treated by their government. But too often government, on one level or another, has ignored the long-term good of one segment of its people to enhance the political advantage of another, thereby creating inequality of the worst sort.

p. 318 . . . The question is: Can heart power deal with the dirt and grime of pollution, the power and greed of certain vested interests, the lawlessness and crime in our cities? Personally, I believe no force can stand up to that power of the heart in people when it is wedded to tough, practical men of commitment in government.
When people care, there is hope and anticipation. Since the beginning of man, every person who ever lived on earth has lived his whole life "today." He goes through hardships knowing what happened yesterday. But anticipating a better tomorrow is what motivates him to solve the problems of today.

p. 320 . . . We must not cool the spirit, cool the anticipation of hope, cool the desire to care, cool the ambition to make society better. Men must be free, free to work and free to try something new. **Only the small and fearful want a controlled society.** They prostitute patriotism and morality in a futile attempt to keep the lid on what they do not understand - the new, the original, the unique. Change does not frighten a people or a nation that is youthful, growing and learning. Great leadership does not suppress change but welcomes it, guides it and directs it.

p. 321 . . . This awakening brings an awareness that the individual cannot live without his neighbor. Life styles of consumption and extravagance must change, and the individual can no longer remain isolated. His personal decisions affect his neighbor. His neighbor's decisions affect him. Even when the community you live in is absolutely free of air and water pollution, if your neighbor is prejudiced the "atmosphere" in your neighborhood is in a very real sense polluted.

p. 322-3 . . . We confused free enterprise with free society. But free enterprise is only part of the wheel. Enterprise means some kind of business, and that is right and good. But business is not the total man - 75 percent of most people's time is not devoted to earning a living.

Free enterprise left alone without government regulation can destroy itself. It can dominate the rest of the wheel of life. In a completely unregulated competitive system, the most economical approach is to put everyone into slavery, feed them a little less each day, and when they die throw them to one side. Total freedom to exploit can lead to total slavery. This is why the free enterprise system needs tough government guidelines from the top.

p. 323 . . . The day of being able to solve the world's problems in the board rooms of the money establishment is over.

p. 324 . . . Something is very wrong about a free enterprise system in which we bail out a huge corporation with enormous sums of government money, but a poor fisherman often cannot go to the bank and get $500 to repair his boat.

The people who make a practice of belittling the bureaucracy and inefficiency of government, the people who criticize government most, are the same people who always come back to government with their hand out for financial help. Meanwhile they say: "The poor should help themselves, but our companies should be helped by the govern-

ment because it's in the national interest." Bullshit! In the long run the laziness of a million-dollar "bailout" might open up less opportunity then the liveliness of a one-buck loan.

p. 326 . . . The credibility of a nation is at stake when it tries to justify at the same time both war and peace, setting a priority on neither and losing both.

p. 328 . . . The challenge of freedom still ahead of us is to break out into the freedom of the heart, the mind and the soul. This is a great nation. But a great nation, standing still, decays and falls under its own weight. If we pause now to bathe in the glory of our rhetoric, then we are on the road to failure. That need not happen.

. . . With big dreams we can achieve big things and little things, but with little dreams we can only achieve little things.



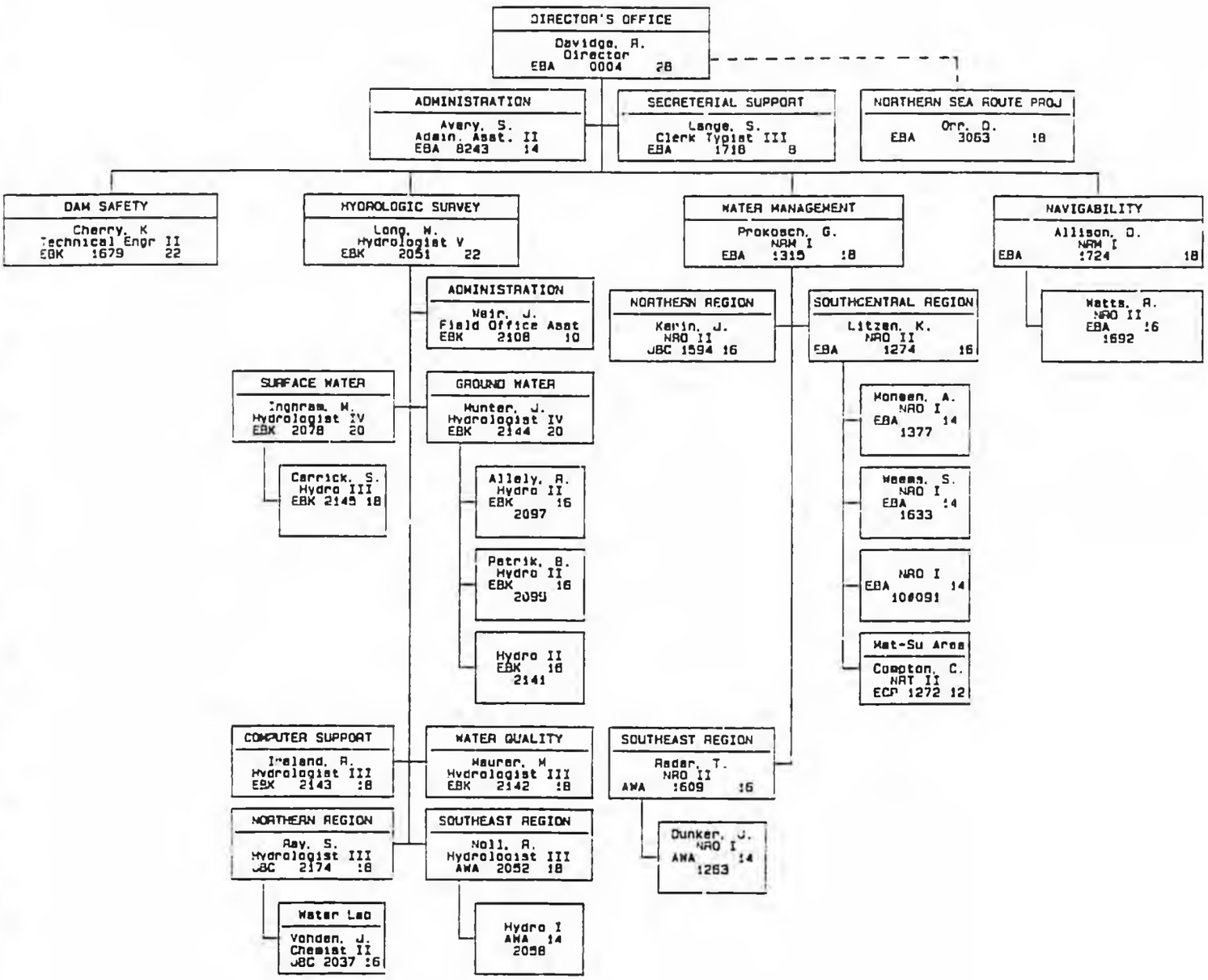

# THE DIVISION OF WATER

The Alaska Division of Water manages an estimated 40% of our Nation's free (not frozen) fresh water resources including over 3 million lakes larger than 50 acres and an estimated 11,000 streams. These responsibilities include the State Water Policy and Water Management Strategy; issuing water rights; administering the dam safety program; rendering and reviewing administrative navigability determinations, asserting ownership and management of submerged lands; surveying, collecting and distributing water resource data related to the quantity and quality of surface, ground and coastal waters of Alaska; coordinating water related data collection and management activities with other agencies; providing support to the State Water Board; advocating responsible water development including water exports. The Director of the Division represents the Governor at the Western States Water Council consisting of 17 western states.

In addition to the Office of the Director, the Division of Water is comprised of four sections; The Alaska Hydrologic Survey which includes the State Water Lab, Water Management, Navigability, and Dam Safety and Construction. The Division has offices in Anchorage, Fairbanks, Juneau and Wasilla.

DEPARTMENT OF NATURAL RESOURCES

# DIVISION OF WATER




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September 18, 1992

D R A F T

# A L A S K A

# WATER EXPORTS & SALES

A discussion paper of key issues involved in moving bulk quantities of water from Alaska to the southwestern states and Mexico using marine transport.


Developed by

**Ric Davidge**

Director of Water
Department of Natural Resources
State of Alaska


November 9, 1992

D R A F T

*Under review by a number of experts in specific areas*

# ALASKA

# WATER EXPORTS & SALES

*(One Acre Foot = 325,851 gallons or 1,360 short tons)*

With legislative approval in 1992, the Division of Water is moving forward, with a sense of urgency, to finalize regulations that facilitate Alaska's first bulk water sale. Although Alaska is already exporting water and ice to American and foreign markets, the notion of bulk water sales by the state is the next logical step in responding to market demand. To assist those with interest in the development of this resource, we provide this general discussion of the key issues affecting Alaska bulk water exports and sales. This is not a feasibility report, however the Division is aware of a number of private and public efforts to study the economic feasibility of these concepts. This report has been successful is assisting interested parties understand the basic concepts, some of the history, and some of the socio-political, economic and environmental issues involved. For specific information, copies of applicable source materials, or contacts with experts relied upon in the development of this paper, you may contact the Director of Water, Department of Natural Resources, State of Alaska (907) 762-2294.

Based on proven marine transport technologies such as large tankers and evolving technologies such as coated nylon fabric bags, discussed in this paper, the Division of Water believes the bulk transport of water from Alaska to markets in the southwestern states and northern Mexico to be economically viable. The development of this resource will not only generate significant new annual revenue to the state treasury it will stimulate new economic activity creating new jobs in southeastern Alaska. With the use of bag technology for storage and/or transport, many small communities can directly participate in this industry creating new revenue sources with little or no capital risk.

**The storage, transport technologies and other concepts discussed in this paper could also be applied to address some of Alaska's rural drinking water problems.**

If you desire more information on this new and exciting resource development opportunity please contact John Dunker or Rick Noll at the Division of Water in Juneau at 465-3400 or Ric Davidge, the Director of Water, in Anchorage, at 762-2294.

# DEMAND/MARKET

Based on our continuing research the most attractive water export markets are southern California, southern Nevada, and the northern regions of Mexico including Baja California. These areas are most vulnerable to drought (now in its 6th year) and rapidly growing population pressures.

Highest probability for delivery points are California coastal communities not directly connected to a subsidized surface water delivery system (California Water Project) plus northern Mexico including Baja California. The Division of Water continues to research and maintain communication with all apparent markets.

Manufacturing interests in this market area that are very dependent on large quantities of high quality water are:

- Breweries - The Anheuser Busch Plant in the San Fernando Valley is the largest single commercial water user in the Metropolitan Water District of Southern California.
- Computer manufacturing
- All water-based products such as beverages

"Made in Alaska", "Clear Glacier Water", "Alaska Ice Water", and the image or mystique of Alaska are very attractive marketing tools.

### Inland States and Water Transfers

Many land-locked western states, particularly Nevada, are interested in augmenting their existing water supplies. Discussions with officials of the Colorado River Commission, and others involved in such sources as the Colorado, Columbia and Sacramento Rivers, have developed interest in water imports through exchanges or "wheeling" agreements as a possible solution. This would work in the following way: If Nevada interests wished to purchase new water they could contract for a volume of water from Alaska. The actual delivery, which Nevada interests would arrange, would be to a coastal community in California, allowing that community to "transfer" its downstream appropriation from the Colorado River to southern Nevada in exchange for the imported Alaskan water. Nevada users pay the cost of the import, receive more water from an existing source, and the California community would receive the benefit of fresh Alaska water. These types of water transfers or "wheeling" agreements are very common in the western United States.

These concepts have opened an entire new area in the market. In discussions at the Western States Water Council (17 western states), a number of states have expressed an interest in exploring this concept as they prepare their Drought Contingency Plans required under new federal law.

## Foreign Interest

Although the Division of Water has been contacted by groups from South Korea and Norway, other than in northern Mexico the interest has been limited to bottled water. Japan was purchasing water from WETCO (an Anchorage based company) for use in manufacturing perfume, but this would not qualify as a bulk sale for the purposes of this discussion.

The South Korean interest is focused on value-added bottled wate water for beverages. This recent interest is a result of a decision in January 92 by South Korea to lift restrictions on water imports.

## Bottled Water

Alaska has several bottled water and beverage industries with plants located in Anchorage and Juneau. WETCO bottles water under the name Beluga Water with a large share of the shelf space in Anchorage retail outlets. WETCO products are also delivered to other areas of the state. Alaska's Best Water of Anchorage supplies drinking water to many office buildings in Anchorage in five-gallon bottles. Alaska Pure Water Products and Alaska Pure Mountain Spring Water of Juneau, also supply drinking water in various size bottles to local markets with limited exports.

The Municipality of Anchorage has a limited contract to supply water to Alaska Glacier from the Eklutna Water Project, that is truck tankered on barges to Washington state for bottling in a test market. This is a back-haul using milk tank trucks from the Seattle area. If this market proves out, the owners will consider opening a bottling company near the Eklutna Water Treatment Plant.

Alaska Aquaculture, Inc. (Burnett Inlet Hatchery), in southeast Alaska, has a permit to export one million gallons of water a week from the Burnett River system to RainMaker, a firm in California. A small tanker will be used for transport, and they anticipate 52 shipments a year for a total export of 52 million gallons or 159.6 acre feet. The hatchery will charge as much as 1 cent a gallon at the point of transfer. This income will pay off the debt (state loan) on the hatchery.

A group of businesses involved in the tourism market in SE Alaska have advanced the concept of bottling local water as a souvenir. This may prove to be a successful enterprise focused initially at a very limited market, however, with development and experienced marketing this approach may open new markets outside of Alaska.

Test-markets by private companies using Alaska bottled water have been very successful. The cost of shelf space and an economically viable delivery system are the greatest challenges to developing markets outside of Alaska. These are the same challenges faced by most in the bottled water industry.

**Glacier Ice**

The harvesting and export of glacier ice continues to increase. Currently there are 26 permitted harvesters and a number of pending applications. The market demand for glacier ice continues to be predominately Japan and Hawaii. We have seen a recent increase in the level of interest in glacier ice exporting and in use for domestic tourism markets. The last reported wholesale price for "clean" glacier ice is $500 per ton.

# SUPPLY/SOURCES

Two dozen high quality developable sources of water in southeast Alaska that are potentially viable for export development have been identified. General criteria developed in selecting these sources include water quality, large drainage areas, adequate precipitation, storage volume, VLCC class tanker access, and existing delivery systems. Consistent with new state law, the Division of Water plans to select some of these sources and file applications for water appropriations to the state for the purpose of sale and export. Approval of these applications will require a reservation of water for fish habitat as required under statute. The drainages of these sources receive from 150 to 400+ inches of precipitation a year. Although monthly/seasonal fluctuations in discharge are of management concern, during those periods of low flow (winter) export demand is also low. The level of precipitation of these sources is very significant and to many in our market area unbelievable. It does make water from this area a vast and renewable resource. As some in southeastern Alaska say, "It's like living under water without really being there."

Six sources are already developed with hydroelectric facilities, a couple have old pipelines, or in-use delivery systems at tidewater. These existing developments greatly reduce initial capital risk, minimizing further environmental impacts, and decreasing delivery delays associated with undeveloped sites.

The water quality of many sources is expected to be very high. Many were surveyed for fish hatchery development due to very low levels of organic and mineral constituents making the water attractive for high-tech manufacturing and beverages.

**Desalination** (desal)

Most analysts agree that the most direct competition for water imports to this market is desalination. Meetings with government officials in Mexico revealed they had received seven desal proposals and only one import proposal (Sun Belt Water, Inc.). One of the difficulties with desal is the representation of delivery price versus real cost. As discussed below under Price, the only real example we have is the new $30 million desal plant in Santa Barbara, that after three months was shut down due to rain. This plant is the only one of its size operating in the United States and many experts claim it is underpriced to encourage further desal development in the market. The contract price for desal water from the Ionics plant in Santa Barbara plant is $1965 per acre foot with annual delivery of only 3200 acre feet to Santa Barbara and a total capacity of 7500 acre feet a year. One VLCC class tanker can deliver 8,000 acre feet a year at 225 acre feet per trip with 35 trips.

One other interesting fact: With the Santa Barbara plant now on long-term standby, under the contract with Ionics, the city must continue to pay $1231 per acre foot against 3200 acre feet a year with **no water being produced**.

In addition to the technological and cost limitations of desal, four specific variables favor water imports. First, all existing technologies for desal are greatly dependent on low energy cost. Desal consumes energy to a point that many argue against it due to environmental costs. Consumption of energy also creates fuel storage and delivery and air quality concerns. A delivery price for desal water based on low energy cost is misleading. After the capital plant is developed, a buyer is vulnerable to raising energy costs and constrained by energy inefficient technology. With any significant increase in the cost of energy or associated environmental regulations, the price of desal water will escalate directly. The use of VLCC tankers to transport water from Alaska to southern California use less than half of the energy desal does with little or no impact on local air quality. Ocean going tugs, pulling bags would use less than a third of the energy of desal.

Second, the processes used to desalinate water generate a couple of waste streams. In addition to the concentrated brine, depending on the technology used, one must dispose of large volumes of arsenic and other chemicals. No one anticipates the cost of waste stream management to go down, and most expect it to increase. Recent studies on the ecological impacts of large-scale concentrated brine discharges offshore have raised serious questions about impacts on aquatic life. The Santa Barbara plant was permitted under a declared water emergency, allowing it to come on-line without the normal stipulations and permitting review requirements. It is, therefore, difficult to make an informed analysis of the environmental questions and permitting costs that will surround other desal proposals.

# COMPETITORS

## Other Sources

More than three years ago those interested in importing water by marine transport to southern California looked first at sources in northern California, Oregon, Washington, British Columbia, and Panama before coming to Alaska.

Legal limitations, political concerns, and environmental permitting problems, as well as some technical engineering difficulties attended to some sources in northern California, Oregon, and Washington, quickly convinced private industry to look further north. Although about a dozen contracts were negotiated with sources in British Columbia, a sudden change in attitude with a subsequent change in political leadership in the B.C. government imposed a moratorium on all bulk water transfers. This moratorium was to be for one year, however, it has been extended for a total of three years. This action and the economic uncertainty it established caused a number of ventures to lose significant investment, time, and delivery contracts - and for many the courage to proceed with the concept. Recent discussions with some of the parties impacted by the B.C. moratorium report litigation and investigations underway or being developed further raising question with the certainty and stability of this competing source even if the moratorium is eventually lifted.

The next source investigated was Panama. Even an Alaskan firm explored the notion of exporting water from Panama to southern California and northern Mexico. Difficulties included greater distance, running against coastal currents and prevailing winds while under load, and political uncertainty. One by one the firms left Panama although Sun Belt Water, Inc. reports they still retain contracts for a number of Panamanian sources.

Although Alaska was often discussed, its vast water resource export potential was not actively explored until 1990. Other than the additional cost in transport time, the concern that Alaska would not politically be open to such a venture changed with the election of Walter Hickel as Governor. Efforts by members of the City Council of Los Angeles to import water from Alaska by pipeline encouraged industry to explore the notion. Sun Belt Water, Inc., which was involved for over three years in efforts in British Columbia and Panama, commissioned a private study of sources in southeast Alaska and entered into direct contact with the new Division of Water within days of its creation by the Governor. These discussions resulted in two applications for water from two sources in Southeast for a total of 350,000 AFY using marine transport technologies.

Third, how much salt do you want in your water? A single stage reverse osmosis seawater desal plant does not remove all salt from the water. Desal is allowed up to 800 PPM total dissolved solids (TDS) in its delivered water. This standard has more to do with taste than health concerns. Informed sources claim that over 90% of the TDS from desal is salt. What are the long-term human health concerns of this large unnatural consumption of salt? We have not been able, at this point, to satisfactorily resolve this question. There are reports of medical problems in the middle east where desal has operated for long periods of time, but we have yet to receive independent confirmation of those reports. However, in discussions of the choices between desal and fresh Alaska water, the question is often asked, "Do you know of any health professionals that recommend putting more salt in your water?" Most health experts recommend serious reduction of salt intake.

Four, is the demand for very expensive coastal property. Small to intermediate sized desal plants for sea water use high value coastal zone land, which in general, is already over-utilized. Few sites are available for such applications that would not be competing with existing users. Siting of large scale facilities may be less controversial when associated with electrical power generation plants. Nevertheless, marine transportation, by contrast, can be implemented in a way that will have little onshore land use and cost impact.

# FEASIBILITY

### Delivery Systems

### Tankers/Bags

The most promising, immediately available, water transfer technology is the use of single-hull VLCC (Very Large Crude Carrier) or ULCC (Ultra Large Crude Carrier) class tankers with near shore temporary storage. With the change in petroleum tanker regulations requiring double hulls following the Exxon Valdez spill, dozens of single-hull tankers are on the wholesale market at prices from $6 - $10 million for used tankers to $80 - $85 million for new, never used single-hull tankers.

The VLCC class tanker is most attractive because its size allows it to access many sources in southeast Alaska and provides sufficient volume to make it economical. A VLCC class tanker has the capability of carrying 225 acre feet per trip, with a turn around time of 10-11 days depending on source and delivery point. This class of tanker has two large pumps that allow it to be filled within 20 hours, considered the maximum load time. These tankers currently have significant tonnage that can be eliminated as the extra equipment is for the transfer and control of hydrocarbons and associated emergencies and not necessary for hauling fresh water. The day-cost of a new VLCC, fitted for water transfer, is about $30,000 per day. This includes an

assumption of 20 year debt service and capitalization, crew cost of about $5,000 per day and fuel cost of about $5,000 per day.

One concern with tankers is ballast water discharge in Alaska, especially if the ballast is collected in polluted coastal waters off California. Ballast tanks are not the same tanks used for cargo transport. Tanker engineers advise that almost all ballast is discharged prior to docking and, if there is a "contamination" issue, standard operating procedure is to exchange ballast in the open ocean after leaving the harbor. Regardless, any discharge is subject to appropriate federal and/or state permitting.

**Bags/Tugs**

Bag technology was originally developed by Dunlap Rubber in Great Britain, for the oil transport industry in the '60s to allow the capture of oil spills from tankers. The technology, at this point in development, was not acceptable due to cost, material used and technological limitations. Research and development continued and adaptation for water transfers was explored by UNITOR, in Norway; Avon Rubber, United Kingdom; Yokahoma Rubber, Japan, and Medusa Corporation, Inc., in Alberta, Canada. Extensive tank testing of a patented design has been conducted by Medusa Corp. at the University of British Columbia, Vancouver (tow testing for drag and stability) and at The National Research Council in Ottawa, which has the largest wave basin in Canada to study wave interactions. Simply stated, the bag is streamlined, relatively shallow with large flat areas on the top and bottom. It is constructed of a commercially available industrial coated (both sides) nylon fabric with reinforced stress diffusing straps. The bags have an expected life of 10 years when used for storage and 7 to 8 years when towed.

The bags can be used for offshore storage or transport. The offshore storage application (at pick-up or point of delivery) is now available. A 225 acre foot bag (sufficient to fill a VLCC tanker) would be 500 feet in diameter and 50 feet deep in a lozenge shape. For storage purposes bags can be constructed in sizes up to one million tons (812.3 acre feet) according to James Cran, President of Medusa Corporation in Canada. Extensive testing has provided solutions for tug operator concerns with "fish-tailing". Solutions include speed reduction, rudders, and other design modifications.

The use of a tug and bag configuration for storage and transport greatly reduces the day-cost of transporting water. Transport time is lengthened to about 14 days when traveling south under load with return (north) in 4 to 5 days depending on distance and weather. This means that one bag/tug configuration could make 20 trips a year at a cost of about $75,000 per trip. Assuming a sale price of $800 per acre foot, using a 225 acre foot bag the profit would be in excess of $100,000 per trip.

For ocean going tugs at 5-6,000 horsepower, the day cost is estimated to be about $5,000 with a 225 acre foot bag. These vessels are generally 180 feet with a crew of 6. In the event larger bags are used, tugs with 10-15,000 horsepower capabilities, 250-300 feet and larger crews are necessary. However, even the most expensive configuration using tugs and bags can provide water at very competitive prices with significant profit margins. The use of bags is far less environmentally intrusive due to the limited upland impacts required than the use of VLCC class tankers with traditional onshore pipelines and pumping stations.

Other than the interest of southwestern states for the transport of fresh water, there is also interest in using bags for transporting treated sewage for deep ocean disposal. This is now being explored by some communities in southern California. Other applications are under negotiation in the middle east hauling water from Turkey to Israel according to the Wall Street Journal.

The application of bag technology for offshore storage offers Alaska a number of very attractive solutions to storage, flow rate and transfer problems, and environmental concerns. One challenge in using tankers is the need for sufficient on-site storage that allows the tanker to fill/load within 20 hours. This requires a flow rate (approximately 150 cfs) that exceeds the natural year-round flow of many accessible sources. With the use of storage bags, 225 acre feet can be accumulated over a few days using natural flow rates and a collection point, at discharge, that should not require onshore pumping, pipelines, or large service camps, thus significantly reducing permitting complexity, environmental impact, and cost. Design parameters are dependent on scale and location. For example, if VLCC class tankers are used for transferring water from Alaska to the market, the size of the bag would need to be a little greater than 225 acre feet. Depending on the area used for storage and tidal fluctuations, the bag can have the shape of a flat hot dog, or a hockey puck.

Bags float just below the surface, allowing them to absorb wave and wind action. They can be filled by a low technology collection mechanism and tankers can load using their own pumps and existing single mooring applications.

The application of this technology makes it attractive to small communities and villages with existing tidewater delivery systems that have a surplus of potable water. With little or no investment risk and few permitting concerns a community could either acquire a storage bag and contract with a transport firm for a scheduled stop once 225 acre feet are available, enter into a joint venture with a purchaser of water whereby the purchaser provides the bag, or enter into a cooperative venture with the state and a private venture. There are a number of variable approaches to small community participation in the development of this resource.

The use of bag technology for offshore storage greatly reduces cost and risk, environmental concerns including ballast, tidal and upland impacts, permitting costs and delays, and opens new opportunities to small communities in southeast Alaska to participate in a new revenue source. The application of bag technology for storage and transport may also serve as a solution to rural Alaska domestic drinking water needs as well as emergency needs in the event of a natural disaster.

**Price**

The price of water in the market area is highly variable due to location, quantity, quality, government subsidies, source, precipitation, time of delivery, and type of water. It is recognized that there are areas in the southwest where Alaska water imports may not be competitive, however even in some of these locations a mixing of Alaska water with local supplies ensures a greater confidence of supply in times of drought.

Since 1989 the price of water in many countries, for example Australia, Italy and Britain, has increased substantially faster than each country's rate of inflation. This is a function of governments reducing subsidies as they face revenue difficulties. In many cases this phased reduction of subsidization has resulted in prices raising as much as 20% in a year. As the southwestern states and northern Mexico look at the real cost of water, passing it on to customers, the competitive edge of Alaska water imports to this region is sharpened.

The target price for delivered water to this market must be <u>less</u> than the current price of desalination (about $2,000 per acre foot) if we are to compete with desal. To compete with other new sources of water we need to deliver water for less than $1500 per acre foot. Alaska, in cooperation with transport industries, can provide higher quality water with greater delivery volume and little or <u>no capital risk</u> to the customer, with <u>significant flexibility</u> in volume and delivery points and schedules.

The contract price for desalinated water (desal) from the newest plant in the market area (Santa Barbara) is $1965 per acre foot for delivered water and $1312 per acre foot when on short-term stand-by, and $1231 per acre foot on long-term stand-by against a 3200 acre foot total delivery contract (with no water being produced). The capital cost of the plant was about $30 million and the plant has shut down after operating for less than 3 months due to an oversupply of natural water (rain) in the area. With real-time depreciation, start-up, and all other costs included, some report that the actual cost of delivered desal from this plant for the first three months was in excess of $5000 per acre foot. This has not been independently confirmed. Other cost factors that impact desal such as energy dependence, waste stream management and land use are addressed in the section on competition in this paper.

Formal proposals to Santa Barbara by such firms as Sun Belt Water, Inc. offered delivered water at under $2000 per acre foot for ten years. Proposals to northern Mexico, now under development, are attempting to deliver water for less than $2000 per acre foot using a ULCC class tanker under a 20 year contract.

The application of bag technology, depending on the scale of bags used for towing and pickup or delivery locations, may bring delivery cost down to $800 per acre foot.

Existing prices for water in the southwestern states are difficult to compare due to significant, long-standing subsidies by the Federal government (Bureau of Reclamation and the Army Corps of Engineers) and state governments. Capitalization, amortization, and depreciation of extensive and expensive surface delivery and storage systems are rarely totally passed on to the consumer in the delivered price of water making it difficult to establish a market based value.

Other than desal, known prices/costs for water in the market area are:

Average cost of delivered water to coastal communities tied into the State Water Project is about $500 per acre foot. It is not clear if this cost includes the value of all subsidies (capital and operating).

Average cost of reclaimed water (treated sewage) with delivery is $700 to $1,400 per acre foot. As a source of drinking water, California has not had good success, however, there is a willingness to use reclaimed water for agricultural use. This will require significant capital investment as most reclaimed water is in coastal communities and most agriculture is inland.

The California Water Bank purchased water from agricultural water right holders for $125 per acre foot in 1991 and $75 per acre foot in 1992, and in most cases reallocated that water to urban users connected to existing delivery systems.

A new water pipeline for Santa Barbara connecting it to the state water system delivering 70,000 AFY, is reported (by Ionics) to cost $5400 per acre foot, however the State claims the cost to be closer to $1200 per acre foot.

**The Marginal Cost of Water**

By blending high cost Alaska water with existing sources in the market area the economic impact on end users is significantly reduced. For example, if Alaska water is delivered at $2000 per acre foot and mixed with a source in the market area at a cost of $100 per acre foot the end "marginal" cost is $1100 per acre foot. When you consider the absolute and unimpeachable reliability of water from Alaska you can argue that this cost is the price of "insurance".

### Costs/Economics

When the notion of using existing tanker technology to transport water from Alaska to southern California and northern Mexico was first proposed to the Division of Water, we were skeptical of its economic feasibility. A commodities economist familiar with Alaska and shipping costs was brought in to review the numbers. His conclusion was that the concept is not only economically feasible but should be very attractive to investors based on profit margin. Application of bag technology for storage and especially for transport bring the economics of this application in competition with reclaimed water as well as desal and even some conventional land-based delivery systems. The application of bag technology not only makes Alaska water more competitive it raises potential profit margins with far less environmental impact than traditional tanker technologies.

The important cost variables considered in marine transport systems are:

Length of contract (depreciation, amortization)
Volume of water (annual)
Distance of delivery
Capital cost (purchase of tankers or tugs/bags)
Onshore facilities at source and delivery point
Permitting and compliance at source and delivery point
Operation day-cost of transfer technology (tankers or tugs/bags)
Quality of water

Of these variables one of the most significant is the length of contract. Capital amortization and depreciation of initial capital investment over a ten-year contract versus a twenty-year or longer contract is a significant factor in cost per acre foot. Operation and maintenance is generally static depending on the use of tankers or bags/tugs. The quality of the water is a variable depending on its end use/market. If it is of very high quality with few organics and few minerals, it is very attractive to manufacturing uses such as computers and bottled products.

## LIMITATIONS

### The Jones Act

Delivery of water from Alaska, other that from the Yukon River, to California is subject to the Jones Act. This federal Act requires that cargo transported from one American port to another must use vessels constructed in the United States and operated by American crews increasing the cost of capital investment and labor. The use of dozens of existing single-hull tankers built by other nations allows a far less risky capital investment. Some of those investigating large water transfers from one

American port to another advocate a specific exemption in the Jones Act for the transport of fresh water. With the use of towable bags, it is our understanding that only the tugs are affected by the Jones Act. Water deliveries from Alaska to Mexico do not fall under the Jones Act.

### Public Perception

*"Water from Alaska?" "You got to be kidding!" "Get real!"* The general public, both in Alaska and in the southwestern states, thinks of the viability of water imports from Alaska as an *exotic* notion. Limited public appearances by the Director of Water in southwestern communities while attending Western State's Water Council meetings, before the Association of California Water Agencies (ACWA), and the Metropolitan Water District of Southern California have had some impact on this disbelief, but this effort is greatly limited by the budget of the Division. We have found that, once the technologies and economics are explained and technical questions addressed directly and understandably, the audience is receptive to the notion of water imports by tanker or bag and willing to investigate this concept further.

### The Political Water Infrastructure of Southern California

For decades the politics of water in southern California have dominated state and local power struggles. Massive bureaucracies and political systems have developed to support various distribution schemes. Despite all the environmental and technological problems of desal and with major communities spending millions researching the use of desal - getting these groups to open their minds to consider an external solution is difficult. When you also understand that desal cannot produce the volume or quality of water that marine transport can with little or no municipal capital exposure or long-term debt, and far less environmental damage, it is even more frustrating. Thousands of engineers are now employed by governments at all levels to "design" solutions; but they are all looking inward when, at least a part of the solution, may be outside of their experience or perspective.

### The Price of Water and Conservation

One of the issues raised in discussions of the transport of water from Alaska to southern California and Mexico, is water conservation and the question of local responsibility. Some would argue that it is philosophically wrong to encourage greater growth in the southwest by providing new water. That the availability of water is a "natural" limitation on population and economic growth in the area and to import water into this region delays local public policy decisions that should have been addressed years ago. When these questions are considered only in the context of southern California, which is often the case, this is a fair point. However, when considered in a broader context the reality of shortages of water, food, shelter, and space are evident in many corners of the world. Is it humane to simply tell starving

people in regions of Africa, for example, that it is more responsible to not send them food or means of creating food because their environment can not support them? Is it humane to tell developing nations and struggling communities that they can not reach for economic independence because "we" believe their dreams should be limited by "their" local environments?

For centuries humankind has moved commodities found in large natural supply in one region to areas of the world with high demand and short supply. This is true for energy, food, construction materials, ice, and water. History has found that people will live where they want to live based on many factors including economic vitality and employment opportunities, weather, and life style and will adjust their expectations based on these same considerations. The projections of population increases in the southwest are built on the trends of significant immigration from outside of the United States. Persons immigrating to southwestern states find economic opportunity and life styles offered there are far more attractive than those they left. This perception may not be shared by some in the middle or upper economic classes, but they are real and vary attractive to families climbing out of poverty or socio-political oppression.

The economics of water are greatly effected by price. Some reports claim that Los Angeles County reduced its water consumption by 25% as a result of drought ordinances alone. According to the Metropolitan Water District of Southern California this increased the cost per acre foot further encouraging conservation. Studies on price and consumption clearly establish a relationship between greater conservation as a result of higher price. The study conducted by the Bay Area Economic Forum (October 1991) Using Water Better: A Market-Based Approach to California's Water Crisis is one of the most far thinking studies done of the relationship of price to consumption and is critical of continued government subsidies for infrastructure as well as operation and maintenance that do not encourage conservation.

Due to the cost of transportation, Alaska water is generally more expensive than southwestern supplies. But local supplies are simply not sufficient to meet demand, even if every effort by state and local governments is successful. According to the Secretary of Natural Resources of the State of California, if every water option is successful - and it rains, southern California alone is facing a 4 - 6 million acre foot a year water deficit. They still need **new** water. In considering the development of new water we must look at all economic and environmental costs to make informed, rational and sustainable public policy decisions. In our opinion, based on significant research, importing Alaska water to the southwestern states is economically and environmentally more attractive than many of the other alternatives especially desalination.

Alaska believes it is very appropriate to offer this vast resource to the world. Alaska is blessed with natural resources at a scale unknown in many regions of the planet. As a sister state and a member of nation states, Alaska believes it responsible to offer our excess water to people in need. Alaska is also in need of new revenue sources as it faces a serious decline in oil and gas production. The sale and export of water from Alaska is a sound economic and environmental decision endorsed by the State Legislature and the Governor.

**Technology/Scale**

Only so many vessels can move so much water from feasible sources through transport routes annually. We believe a target of 2 million acre feet a year may be realistic given these limitations. Bag technology may allow this target to be increased depending on the scale of bags used, however, that is only speculation. The driving cost limitation is capital risk, amortization and the day-cost of transport - with the operation of tankers using bags for offshore storage or a bag/tug storage and transport system. Eventually serious discussion of other transport mechanisms such as a pipeline will take place. It just depends on how thirsty people and their economies get and how much they are willing to pay for water. With the market or population base in the southern California area - for the price of a soft drink a day per person, a water pipeline could be built.

# STRATEGY

With the signature of the first contract and delivery of the first shipment transferring water from Alaska to southern California or northern Mexico, the world will change. Those who have objectively examined marine transport (tanker or bag) as a mechanism to bring new water to this market agree that once it is real, once a contract is signed and delivery begins, it will become a dominant force in the market.

The Division of Water understands that the export of water from Alaska by itself will not solve the major water deficit problems of southern California, the southwestern states or northern Mexico. Alaska water can be a part of a broader array of solutions to these problems. Price and security of source are, and will continue to be, the cornerstones of buyer and seller decisions.

Our focus right now is Baja California. (Rosa Rito Beach, Tijuana and Ensenada) They have an immediate need that can be satisfied within months with a single tanker. Once this relationship is established additional tankers or bags can be added to meet demand. Discharges in Baja are not subject to the Jones Act limitations, allowing lower capital and operating cost. The Baja government has stated that they will build whatever is necessary for delivery systems on their shores, on their own peso, thus reducing risk to investors and quickening the pace. Delivery to Baja also

means that we do not have the political or permitting problems faced in southern California.

We have raised important questions in the minds of Baja officials on the long-term economic and environmental viability of the desal proposals they have received. Continuing discussions indicate that the Baja government is willing to work with Sun Belt Water, Inc. and find a contract approach beneficial to both and to Alaska.

Another approach is a direct contract between Alaska and the buyer of the water, other than through a transport company. The buyer, the Baja government, then arranges its own transport. Discussions on this approach have usually been short once the customer realizes the value of what private companies such as Sun Belt Water, Inc. and its subsidiary Sun Belt Marine, Ltd. have already contributed in knowledge and investment. The Division of Water is willing to enter into negotiations with any qualified party interested in securing a purchase contract for water.

# PENDING APPLICATIONS

### Alaska Aquaculture, Inc. (Burnett Inlet Hatchery)

In an effort to pay off outstanding state loans for the development of the fish hatchery at Burnett Inlet and provide some operating capital, Alaska Aquaculture, Inc. applied for and the Division issued a Temporary Water Use Permit to export up to one million gallons a week from the Burnett River system. Using a small tanker this water is to be sold as potable water for no more than one cent a gallon to RainMaker Resources in Corte Madera, California. This temporary permit has been issued.

### Sun Belt Water, Inc. & Sun Belt Marine, Ltd.

These California-based firms are pioneering the marine transport of water to southern California and Mexico. Originally formed by a group of former oil company executives and experts in marine transport to bid on the Santa Barbara RFP/contract in 1990, they have continued to develop water transport opportunities. Their senior executives, Board of Directors, and legal counsel represent very high profile, experienced, and creditable talent. Sun Belt has local representation in Juneau and Anchorage and has sent senior executives to Alaska to meet with the Division of Water as well as all other state and federal permitting agencies. The same executives met with representatives of major environmental groups in 1991 in Anchorage to discuss any concerns they may have. At the request of the Division of Water, Sun Belt withdrew one application when it was discovered the source was located in a federal wilderness area.

Although the Division of Water often receives calls and visits from individuals, firms, and groups, other than the Burnett Inlet Hatchery application approved in 1991, Sun Belt Water, Inc. is the only firm to have actually filed applications with the state for water for the purpose of export. In the absence of competing applications, the Division of Water is working with Sun Belt on their two applications for the export of 350,000 acre feet a year. The division is working closely with the Division of Governmental Coordination and the Attorney General's Office to ensure these applications are processed according to existing statutes and regulations.

# THE FUTURE

Given the expectations of growth in the southwestern United States, and a variety of developments impacting existing and potential local sources of water such as new listings of instream dependent species under the Endangered Species Act and new directions in Congress for the Bureau of Reclamation that require more local water to be dedicated to fish and game, market demand will continue to grow - even if it rains. State officials in California predict a water deficit of 4 to 6 million acre feet a year in just their area, not including northern Mexico or inland states such as Nevada. Although political leaders and professional water managers in the market area are making every effort to solve their water deficits with local sources, conservation, reclamation, and even desal, many have already come to the realization that it cannot be done. New sources of water must be found and the importation of water from Alaska can be a part of the solution to this challenge.

A number of communities in northern Mexico (Rosa Rita Beach and Ensenada) currently do not have enough water to meet their needs, let alone future demands. Efforts by the State of Alaska, in cooperation with the private sector, can cost-effectively meet these immediate needs. The first and still most difficult hurdle to overcome is believability. In this area we are making slow but noticeable progress.

# ALASKA

## 40% OF OUR NATION'S FRESH WATER RESOURCES

Superior quality fresh water can be provided by the private sector, on a turn-key basis, with zero capital funding by California water buyers. By using marine transport the buyers of quality Alaskan water allow themselves total flexibility in the rate of delivery at minimum cost.

**THE MARINE TRANSPORT OF SUPERIOR QUALITY WATER FROM SOUTHEAST ALASKA TO SOUTHERN CALIFORNIA IS ECONOMICALLY MORE VIABLE AND ENVIRONMENTALLY MORE RESPONSIBLE THAN MANY OTHER ALTERNATIVES**

**Major Advantages of Marine Transport Compared to Desalination**

Uses approximately 33% less energy, most of which is used outside of California. Reduces future energy dependence and impacts on California air quality.

* Significantly less expensive, both in real dollars and environmental costs.

* Requires no significant on-shore land use thus minimizing the impact on sensitive coastal areas.

* Involves no toxic chemicals or expensive waste-stream management.

* Has no waste discharge thereby minimizing impacts on marine environments.

**Secure So ces**

Over 25 la ge lakes in Southeast, Alaska with watersheds that average annual precipitation between 150 to 400+ inches, many without fish, and are easily accessed by marine transport. Applications now being processed by the State of Alaska for annual deliveries in excess of 350,000 AFY.

**Cost Estimates**

Assuming a minimum of 15,000 AFY for 10 years with delivery to the Central Coast of California, $1,500 to $1,900 per acre foot. With bag technology the delivery cost is less than $1,000 per acre foot. Using single hull VLCC tankers, delivery is in multiples of 15,000 AFY. Direct tie-in with existing water delivery and storage systems allows mixing with lower cost sources, reducing economic impact.

**Mitigation of other Environmental Concerns**

Allows exchange with inland states, such as Nevada, for existing water appropriations from Colorado or Sacramento Rivers as well as inland California agriculture with coastal communities.

Allows more inland water to meet growing endangered species demands.

# CALIFORNIA

**If we are able to achieve every success, every advantage, in conservation, water reclamation (sewage/water recovery), redistribution, groundwater management, water marketing, new sources, expanded storage, and population control we will still be short 4 to 6 million acre feet a year by 2010 - if it rains.** So said Douglas Wheeler, Secretary of Natural Resources for California at the Global Cities Project Water conference in San Francisco (3/20/92).

## Population Increase

The experts agree that by the year 2010 the population of Southern California will increase by one third. That is if no-growth ordinances continue in place.

## The Colorado River

As a result of court decisions the State of Arizona has begun claiming their priority right to water from the Colorado River; efforts by federal agencies to protect threatened or endangered species that depend on this river system; international demands will cause more, clean, water to be passed to Mexico - each of these facts will significantly reduce the amount of water available to Southern California.

## The Sacramento River

California will become very familiar with the Endangered Species Act over the next decade. Some California groups openly claim to have dozens of species, which are instream dependent, ready for "listing". This coupled with seismic, water quality and wetland concerns and the delays and exponential costs of new storage and diversions make more water from this source very problematic.

## Economic Impacts

California newspapers are full of stories of businesses leaving. Some businesses are already spending significant dollars to cleanup the water they receive for manufacturing. Sources are less and less dependable. Importing water from Alaska; it is a simple economic decision if you need dependable, low cost, high quality water.

## Desalination

Although the contract price for desal in Santa Barbara was $1965 per AF, the current cost is reported to be much greater. After 3 months of operation the $30 million plant was shut down, but the city is still paying $1200 per acre foot against 3200 acre feet a year and no water is being produced. Desalination costs will escalate because they are dependent on very large quantities of energy. As the cost of energy increases so will the cost of desal water. Desalination also produces a huge waste stream. Existing discharge and waste stream management costs will increase with more restrictive environmental laws and regulations. Due to low volume production, dozens of large plants will need to be located on the California coast.

December 1990

# Policies and Procedures on OWNERSHIP AND MANAGEMENT OF NAVIGABLE AND PUBLIC WATERS

State ownership of the beds of navigable waters is an inherent attribute of state sovereignty protected by the United States Constitution. *Utah v. United States,* 482 U.S. 193 (1987). Under the doctrine that all states enter the Union on an equal footing with respect to sovereign rights and powers, title to the beds of navigable waters in Alaska vested in the newly formed State of Alaska in 1959. In addition, under the Alaska Constitution and the public trust doctrine, **all waters** in the state are held and managed by the state in trust for the use of the people, regardless of navigability and ownership of the submerged lands under the Equal Footing Doctrine.

The purpose of this paper is to describe the State of Alaska's policies and procedures for identifying and protecting the state's title to the beds of navigable waters. In addition, this paper outlines the legal and policy considerations which guide the ownership and management of submerged lands and public waters.

## Identifying and Protecting State Title to the Beds of Navigable Waters

Identification and management of the beds of navigable waters is an important policy of the State of Alaska. In 1980, the state established a comprehensive navigability program to respond to federal land conveyances and land management activities under the Alaska Statehood Act, the Alaska Native Claims Settlement Act (ANCSA) and the Alaska National Interest Lands Conservation Act (ANILCA). Pursuant to the provisions of those acts, the federal government has issued navigability determinations for thousands of lakes, rivers and streams throughout the state in an effort to determine whether the state or federal government owns the submerged lands. Navigability determinations are also made prior to many state land disposals to insure that adequate public use easements are reserved.

The basic purpose of the state's program is to protect the public rights associated with navigable waters, including in particular the state's title to the submerged lands. Because state and Native land selections and federal conservation units blanket the state, navigability questions have arisen for rivers, lakes and streams throughout Alaska. The navigability of many of those waterbodies has already been established. There are hundreds of others, however, where navigability is not yet determined.

To help resolve these navigability disputes, a major goal of the state's navigability program is to identify the proper criteria for determining title navigability in Alaska and to gather sufficient information about the uses and physical characteristics of individual waterbodies so that accurate navigability determinations can be made as disputes arise. Other important aspects of the program include monitoring federal land conveyance and management programs to identify particular navigability disputes, seeking cooperative resolution of navigability problems through negotiations and legislation, and preparing for statewide navigability litigation.

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Alaska Department of NATURAL RESOURCES

## Riparian Rights and Statute of Limitations

Disputes over ownership of submerged lands in Alaska have arisen under a variety of circumstances. The principal source of the disputes in Alaska is the survey and acreage accounting system used by the federal government for conveying land to the state and Native corporations.

The standard procedures for surveying and conveying federal land are found in the *Manual of Instructions for the Survey of the Public Lands of the United States*, generally known as the *BLM Manual of Surveying Instructions*. Under those procedures, consistently used in every public land state except Alaska, only uplands are surveyed and conveyed in fulfillment of acreage entitlements, not submerged lands. The survey rules require that all lakes 50 acres or larger and rivers and streams three chains (198) feet in width or wider, regardless of navigability, be meandered and segregated (excluded) from the surveyed public lands. Only the surveyed uplands are conveyed. The acreage of meandered rivers, lakes and streams is not included in computing the amount of land involved in the conveyance.

In Alaska, however, the federal government has not consistently followed these survey rules. Until 1983, the federal government treated submerged lands the same as uplands. All bodies of water that were considered non-navigable by the federal government, regardless of size, were surveyed as though they were uplands and the acreage of submerged lands was charged against the total acreage entitlement.

Because of these conveyance procedures, the navigability of waterbodies in Alaska has been an issue of contention since the enactment of the Alaska Statehood Act and ANCSA. In addition to the problems caused by a lack of information about many waterbodies, the situation was exacerbated by the narrow definition of navigability used by the federal government. Hundreds of rivers, lakes and streams considered navigable by the state were determined non-navigable by the federal government.

In 1983, following years of negotiations, lawsuits and legislative attempts to solve the navigability problems created by the unusual survey and conveyance procedures in Alaska, the State of Alaska, the United States Department of the Interior and the Alaska Federation of Natives (AFN) agreed that the standard rules of survey should be followed for land conveyances in Alaska. The effect of that decision was to treat Alaska surveys and land conveyances like federal land surveys and conveyances in other states. The recipients of conveyances from the federal government are charged only for the amount of public land that is calculated by the survey, which does not include the areas of meandered rivers, lakes and streams.

The use of these survey procedures has eliminated many of the problems associated with the federal land conveyance programs in Alaska. Submerged lands are no longer being conveyed to fulfill acreage entitlements. With the exception of lakes smaller than 50 acres and streams narrower than 198 feet, navigability determinations are no longer being made prior to federal land conveyances. Determinations of ownership of submerged lands can be put off until a natural resource use or conflict requires resolution, such as issuance of an oil and gas lease, mining claim or a gravel sale.

Through the joint efforts of the State of Alaska, AFN and the Department of the Interior, the 1983 decision to use the standard survey procedures for land conveyances in Alaska was legislatively approved in August of 1988 when the United States Congress passed legislation (94 Stat. 2430) amending section 901 of the Alaska National Interest Lands Conservation Act, codified at 43 U.S.C. 1631. The 1988 amendment, sometimes referred to as the Alaska Submerged Lands Act, requires that the standard rules of survey in the *BLM Manual of Surveying Instructions* be used for all federal surveys under the Alaska Statehood Act and ANCSA. The 1988 amendment also repealed the Section 901 statute of limitations that would have required the state to file a lawsuit within a very short period of time in order to preserve its title to the beds of navigable waters conveyed to Native corporations by the federal government as a result of erroneous navigability determinations, poor maps, surveys or whatever.

Even with this legislation, a major problem concerning navigability decisions made by the federal government under the old system remains unresolved. At issue are the hundreds of erroneous non-navigability decisions and the resulting submerged land conveyances made to ANCSA cor-

porations in previous years. In addition, to comply with the meandering requirements of the *BLM Survey Manual*, the federal government is still required to make navigability determinations for lakes smaller than 50 acres and rivers or streams narrower than 198 feet in width to determine if these waters must be meandered.

## Navigability Criteria

The greatest hurdle to overcome in the state's efforts to identify and manage navigable waters has been the long-standing differences of opinion between the State of Alaska and the United States regarding the application of the test for determining title navigability. Navigability is a question of fact, not a simple legal formula. Variations in waterbody use that result from different physical characteristics and transportation methods and needs must be taken into account. There are many legal precedents for determining navigability in other states based upon the particular facts presented in those cases. In Alaska, though, we are just beginning to get the final court decisions that are necessary to provide legal guidance for accurate navigability determinations.

The physical characteristics and uses of a waterbody used by the state for asserting navigability, commonly referred to as navigability "criteria", are based upon legal principles that have been established by the federal courts. These criteria are applied to rivers, lakes and streams throughout the state and take into account Alaska's geography, economy, customary modes of water-based transportation and the particular physical characteristics of the waterbody under consideration.

The federal test for determining navigability was established over a hundred years ago. In the landmark decision of *The Daniel Ball*, 77 U.S. (19 Wall.) 557, 563 (1870), the Supreme Court declared:

> Those rivers must be regarded as public navigable rivers in law which are navigable in fact. And they are navigable in fact when they are used, or are susceptible of being used, in their ordinary condition, as highways of commerce, over which trade and travel are or may be conducted in the customary modes of trade and travel on water.

Although *The Daniel Ball* test is accepted as the correct standard for determining navigability, there has been a lot of disagreement over application of many of the terms and phrases used in *The Daniel Ball* test to the specific uses of Alaska's lakes, rivers and streams. The State of Alaska uses the following interpretation of that test as the basis for its navigability program.

### The Waterbody Must Be Usable as a Highway for the Transportation of People or Goods.

Interpreting the requirement that navigable waterbodies be used or usable as "highways of commerce", the courts have ruled that the central theme of title navigability is that the waterbody be capable of use as a highway which people can use for transporting goods or for travel. Neither the types of goods being transported nor the purpose of the travel are important in determining navigability. Transportation on water associated with recognized commercial activities in Alaska, such as mining, timber harvesting, and trapping, is evidence of navigability. The use of waterbodies for transportation in connection with natural resources exploration or development, government land management, management of fish and game resources, or scientific research is also evidence of navigability. Travel by local residents or visitors for the purpose of hunting, fishing and trapping, or as a means of access to an area can be used to establish navigability. The same holds for recreational transportation, including personal travel and professionally guided trips.

### Waters Which Are Capable of Being Used for Transporting Persons and Goods, Although Not Actually Used, Are Navigable.

It is not necessary that a waterbody be actually used for transportation to be found navigable. It is enough that it is susceptible, or physically capable, of being used. Whether a waterbody is susceptible of use for transportation depends upon the physical characteristics of the water course such as length, width, depth and, for a river, current and gradient. If those physical characteristics demonstrate that a waterbody could be used for the transportation of persons or goods, it is legally navigable.

The susceptibility element of title navigability is very important for the identification of navigable waterbodies in Alaska. Because of Alaska's sparse population and lack of development, there are

hundreds of remote rivers, lakes and streams where there is little or no evidence of actual use. Because of their physical characteristics, however, many of these remote waterbodies could be used for transporting people or goods if the need were to develop. Under these circumstances, they are considered legally navigable.

### Transportation Must Be Conducted in the Customary Modes of Trade and Travel on Water.

A finding of navigability does not require use or capability of use by any particular mode of transportation, only that the mode be customary. The courts have held that customary modes of transportation on water include all recognized types and methods of water carriage. Unusual or freak contrivances adapted for use only on a particular stream are excluded. Customary modes of trade and travel on water in Alaska include, but are not limited to, barges, scows, tunnel boats, flat-bottom boats, poling boats, river boats, boats propelled by jet units, inflatable boats, and canoes. In places suitable for harvesting timber, the flotation of logs is considered a customary mode of transportation.

The mode of travel must also be primarily waterborne. Boats which may be taken for short, overland portages qualify. The courts have ruled that the use of a lake for takeoffs and landings by floatplanes is insufficient, in and of itself, to establish navigability.

Without expressly rejecting the claim, at least two court decisions in Alaska have suggested that winter travel on the surface of a frozen river or lake is probably not evidence of navigability. The rivers involved in the two adjudicated cases were both found navigable based upon summer use by boats, however, and it appears likely that most waterbodies in Alaska that are used as highways in winter can also be travelled by at least small boats in the summer. Because of this, the state may not need to rely upon winter travel to support navigability.

### Waters Must Be Navigable in their Natural and Ordinary Condition.

A waterbody which can be used for transportation only because of substantial man-made improvements to the condition of the watercourse is not navigable for title purposes. However, if transportation does or could occur on the waterbody even without the improvements and the improvements would only make transportation **easier** or **faster** or possible for **larger boats** (e.g., dredging), it is still considered navigable for title purposes.

The presence of physical obstructions to navigation (rapids, falls, log-jams, etc.) does not render a waterway non-navigable if the obstruction can be navigated despite the difficulties or if the obstruction can be avoided by other means, such as portaging, lining, or poling. A waterbody is also navigable even if seasonal fluctuations do not allow it to be navigated at all times of the year. However, a waterbody which is only navigable at infrequent and unpredictable periods of high water is not normally considered navigable. The fact that a waterbody may be frozen for several months of the year does not render it non-navigable if it is navigable in its unfrozen condition.

### Title Navigability Is Determined as of the Date of Statehood.

To be considered navigable for title purposes, the waterbody must have been navigable in 1959 (when Alaska became a state). This element of the navigability test focuses on the physical characteristics of the waterbody and whether those characteristics have changed significantly since statehood. Most waterbodies have not physically changed enough since statehood to alter their navigability. Assuming there have been no significant changes in the physical characteristics of the waterbody, a waterbody that is navigable today would be considered legally navigable in 1959 as well. Exceptions might include the creation, by natural or man-made causes after statehood, of a totally new lake, river or canal now used for navigation. Such a waterbody would not be considered navigable for title purposes. Conversely, a waterbody which was navigable in 1959 but, because of natural or man-made physical changes, is no longer navigable in fact would still be considered navigable for title purposes.

## Navigability Criteria Disputes

Because of differing legal interpretations of court navigability decisions, several aspects of the criteria used by the state to determine navigability have been disputed by the federal government. As a direct result of these criteria disputes, many waterbodies considered navigable by the state have been determined non-navigable by the federal government.

The major criteria dispute has been over the type or purpose of the transportation required to establish navigability. The federal government has asserted that a waterway must be used, or capable of use, for transporting commerce to be considered navigable. Other, "noncommercial" transportation uses are not considered sufficient to establish navigability. In this context, the federal government has claimed that the only relevant "commercial" transportation is the distribution of goods for sale or barter, or the transportation for hire of people or things. The federal government has admitted that professionally guided transportation on Alaska's rivers, lakes and streams constitutes commerce, but nevertheless has argued that the waters are not being used as a navigable "highway" when recreation is involved, but rather more as an amusement park. The federal government has therefore claimed that waters used only for commercial recreation are legally non-navigable even though they may be navigable in fact.

Through the work of the state's navigability program, this definition has been repeatedly rejected by the courts, most recently in the Gulkana River case. *Alaska v. United States*, 662 F. Supp. 455 (D. Alaska 1986), *affirmed sub nom. Alaska v. Ahtna, Inc.*, 891 F.2d 1401 (9th Cir. 1989). Applying the correct definition of navigability, many of the submerged lands that the federal government attempted to convey to ANCSA corporations should have been recognized as belonging to the state. The state appealed many conveyances to protect its title. As occurred in the Kandik-Nation Rivers appeal, *Appeal of Doyon*, 86 I.D. 692 (ANCAB 1979), Alaska Native corporations also found it necessary to challenge erroneous federal determinations of non-navigability to insure they would not be deprived of any portion of their entitlement by being charged for submerged land owned by the state.

The federal government has also argued that aluminum boats, boats propelled by jet units, inflatable boats and canoes are not customary modes of travel for the purpose of determining navigability in Alaska. As a result, many waterbodies navigated by these types of watercraft have been found legally non-navigable by the federal government. The claim is that these boats represent post-statehood technological advances, are too small to be considered "commercial", or that most "commercial" use of the watercraft developed after statehood.

Another navigability dispute involves remote, isolated lakes. The federal government has found many of these lakes legally non-navigable, even though they are physically capable of being navigated. The federal government's contention is that a navigable connection to another area is necessary to make travel on a remote lake worthwhile. Otherwise, the federal government views the lack of development in the area around the isolated lake as an indication that the lake will never be used for commercial transportation.

To resolve these navigability criteria disputes the state has actively pursued a limited number of court cases challenging particular findings of non-navigability by the federal government. With the sole exception of floatplanes, the courts have agreed with the navigability criteria presented by the State of Alaska and have rejected the limitations suggested by the federal government. These cases include:

**Gulkana River.** In this case, both in the U.S. District Court and on appeal to the U.S. Court of Appeals, the federal courts rejected the federal government's restrictive interpretation of the phrase "highway of commerce" in the title navigability test. The federal district court stated that to demonstrate navigability, it is only necessary to show that the waterbody is physically capable of "the most basic form of commercial use: the transportation of people or goods." Because the Gulkana River can be used for the transportation of people or goods, the Gulkana River was found navigable. *Alaska v. United States*, 662 F.Supp. 455 (D. Alaska 1987). On appeal, the court of appeals affirmed the district court's finding of navigability. *Alaska v. Ahtna, Inc.*, 891 F.2d 1401 (9th Cir. 1989). The court of appeals found that the modern use of the Gulkana River for guided hunting, fishing and sightseeing trips is a commercial use and, since the physical characteristics of the river have not significantly changed since 1959, provides conclusive evidence that the river was susceptible of commercial use at statehood. The court also found that modern inflatable rafts can be used to establish navigability. In April 1990, the United States Supreme Court denied a request by Ahtna, Inc. to reconsider and overturn the court of appeal's decision. The Gulkana River precedent is now binding on all future navigability determinations in Alaska.

**Kandik and Nation Rivers.** In this administrative appeal, the State of Alaska and Doyon Limited, an ANCSA regional corporation, successfully established that the use or susceptibility of use of a river or stream by an 18-24-foot wooden riverboat capable of carrying at least 1,000 pounds of gear or supplies is sufficient to establish navigability. Based upon the use of these types of boats for the transportation of goods and supplies by fur trappers, as well as extensive historic and contemporary canoe use, the court found the Kandik and Nation rivers, in Interior Alaska, navigable. *Appeal of Doyon*, 86 I.D. 692 (ANCAB 1979).

**Alagnak River.** In this federal district court case, the Alagnak River, the Nonvianuk River, Kukaklek Lake and Nonvianuk Lake were all found navigable. These interconnected waterbodies are located in the Bristol Bay region of Alaska, south of Lake Iliamna. Their primary transportation use is for commercially guided hunting, fishing, and sightseeing and for government research and management. They also serve as a means of access for local residents to their homes and to the surrounding areas for subsistence hunting and fishing. After several years of litigation, the federal government conceded that these rivers and lakes are navigable. *Alaska v. United States*, No. 82-2 1 (D. Alaska Feb. 2, 1985).

**Matanuska River.** The recommended decision in this administrative appeal agreed with the State of Alaska's position that post-statehood commercial river rafting operations are sufficient to establish navigability. Based upon that type of use, the administrative law judge who heard the case recommended that the Matanuska River, in Southcentral Alaska, be found navigable. The Secretary of Interior, over the state's objections, assumed jurisdiction over the case and stayed implementation of the recommended decision. No action has been taken in the case since that time. *Appeal of Alaska*, No. 82-1133 (IBLA Rec. Decision Aug. 18, 1983)

**Slopbucket Lake.** The state claimed that the extensive use of floatplanes on Slopbucket Lake, a twenty acre lake adjacent to Lake Iliamna, was sufficient to establish navigability. The federal courts rejected this view. The courts reasoned that floatplanes do not use the lake as a navigable highway; they just take off and land there. *Alaska v. United States*, 754 F.2d 851 (9th Cir.), *cert. denied*, 106 S. Ct. 333 (1985).

## Identification of Navigable Waters

Even if the criteria for determining navigability in Alaska were totally agreed upon, it still would be difficult to prepare a complete list of all of the navigable lakes, rivers and streams in the state. Much of Alaska has not yet been surveyed and many maps are inaccurate and out-of-date. It is an immense and complex task simply to identify and locate all of the thousands of named and unnamed lakes, rivers and streams in the state which might be considered navigable. Furthermore, once a potentially navigable lake, river or stream has been identified, detailed information about its size and uses is necessary for an accurate navigability determination. Because of Alaska's undeveloped and remote character, gathering navigability information is both time-consuming and expensive. Finally, administrative navigability determinations made by the state or the federal government are always subject to legal challenge, since only the courts can authoritatively determine title to submerged lands.

Despite these difficulties, both the state and the federal government are frequently called upon to issue navigability determinations. Although the requirement that BLM adhere to the meandering requirements of the BLM Survey Manual has eliminated the need for navigability determinations on the larger rivers, lakes and streams, which must now be meandered regardless of navigability, navigability determinations are still required for the smaller rivers, lakes and streams to determine if they are to be meandered at the time of survey. Because of this, some navigability determinations are still made for nearly every federal land conveyance under ANCSA or the Alaska Statehood Act. The management plan for nearly every federal Conservation System Unit (CSU) also addresses the navigability issue.

Federal navigability determinations are reviewed by the state to insure that available information sources were used and interpreted correctly. Where the federal government determines non-navigable a waterbody which is considered navigable by the state, the state may provide the government with supplemental information about the uses and characteristics of the waterbody to obtain a redetermination of navigability. Under some circumstances, the state needs to make its own navigability determinations, such as for a state oil and gas lease sale, land disposal,

material sale, mining claim, or another use of state land or resources requiring a determination of ownership of submerged lands within the affected area.

For large, undeveloped regions of Alaska there may be little or no accurate waterbody use or physical characteristics information available for making navigability determinations. When information is lacking, and it must make a navigability determination, the state is forced to rely solely upon the physical characteristics shown on maps and aerial photographs. In these cases, the state identifies as navigable all streams depicted on the U.S.G.S. maps with double lines (generally at least 70 feet wide) and having an average gradient over the length of the stream of no more than 50 feet per mile. With rare exceptions, the state's experience has been that streams of this type are deep enough and wide enough to be navigable by boats carrying persons or goods and must therefore be considered legally navigable. Streams depicted with single lines, although narrower in width, may also be listed as potentially navigable if they have gradients of substantially less than 50 feet per mile and are at least 10 miles long.

If there is no public use or physical characteristics information readily available for lakes, those lakes which are shown on maps and aerial photographs as having a navigable water connection with other navigable waters, or which are accessible by short overland portages, are considered navigable regardless of the size of the lake. These lakes are part of a system of interconnected navigable waters. If a lake is totally isolated, it will be included on the state's navigability maps if it is at least 1-1/2 miles long. That length insures that the lake can be used as a "highway". Future judicial decisions interpreting the "highway" requirement for isolated lakes could shorten or lengthen this 1-1/2 mile "rule of thumb."

The state recognizes that, under some circumstances, lakes smaller than 1-1/2 miles long can be and are used as navigable highways. In those cases, when known, these smaller lakes are also depicted on the state's navigability map. Moreover, as a matter of administrative policy and convenience only, the state may sometimes make an exception to the 1-1/2 mile standard in the extremely wet regions of the state, including some areas in the Yukon-Kuskokwim Delta, Yukon Flats and on the North Slope. In these areas, an isolated lake might need to be 2-3 miles long to be included on the state's navigability maps. Although smaller lakes in these areas are capable of being used for transportation and should be found navigable by the courts, the state has decided to concentrate its limited resources in protecting the larger waterbodies first.

## Navigable Waters within Pre-statehood Federal Withdrawals

Although disputes over which waters in Alaska are navigable are the most frequent cause of submerged land ownership disputes, there is another major legal issue which poses a threat to Alaska's sovereign claim to the beds of navigable waters. Even where navigability is conceded, the federal government often contends that title to the submerged lands did not vest in the state if the area was withdrawn or reserved by the federal government on the date of statehood. Within Native conveyance areas, the federal government has used this claim of "reserved submerged lands" to justify its attempts to convey the beds of navigable waters in fulfillment of the Native entitlements. Within state selections, the federal government has used the same claim to charge the acreage of submerged lands against the state's entitlement.

The state strongly disagrees with this federal claim and has actively pursued a number of court challenges to resolve the issue. In addition to numerous appeals from federal decisions to convey or charge for the beds of navigable waters, the state was actively involved as a friend of the court in one case before the United States Supreme Court and continues to be involved in another Supreme Court case which presents this issue. The pending case is *United States v. Alaska*, U.S. Supreme Court 84 Original (filed June, 1979).

On June 8, 1987 the Court issued its decision in *Utah v. United States*, No. 85-1772 (filed Oct. 14, 1986). In this case the federal government, in 1976, issued oil and gas leases for land underlying Utah Lake, a navigable waterbody located in Utah. The suit sought a declaratory judgement that Utah, rather than the United States, holds the lands under navigable waters in the territories in trust for future states, and, absent a prior conveyance by the federal government to third parties, a state acquires title to such land upon entering the Union on an "equal footing" with the original 13 states.

The Supreme Court held that title did pass to the state upon Utah's admission to the Union. They held that there is a strong presumption against finding congressional intent to defeat a state's title, and, that in light of the longstanding policy of the federal government's holding land under navigable waters for the ultimate benefit of future states absent exceptional circumstances, an intent to defeat a state's equal footing entitlement could not be inferred from the mere act of the reservation itself. The United States would not merely be required to establish that Congress clearly intended to include land under navigable waters within the federal reservation, but would additionally have to establish that Congress affirmatively intended to defeat the future state's title to such land.

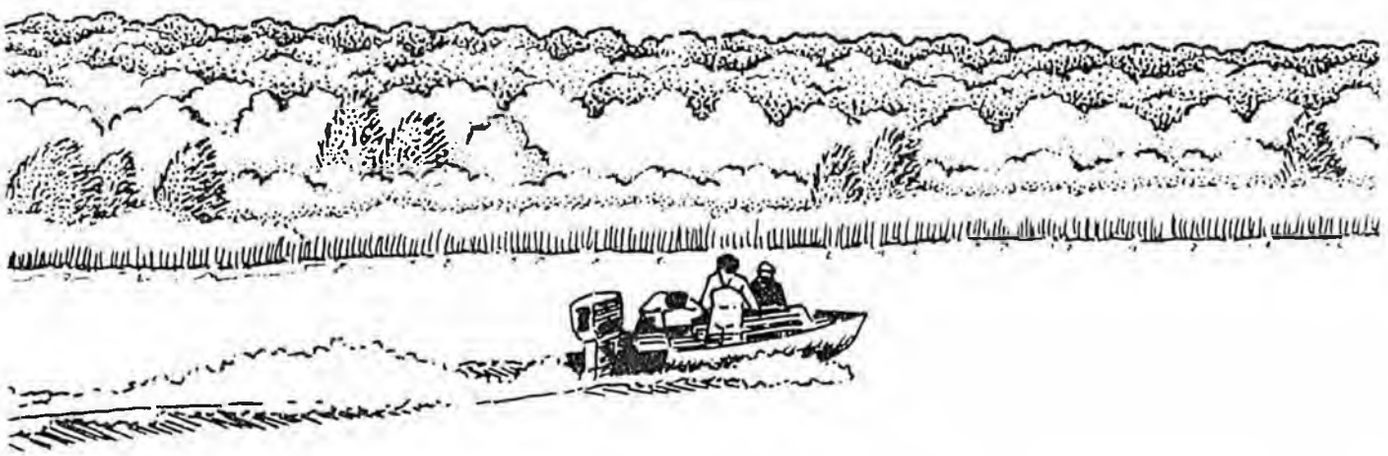
This decision has significant ramifications within Alaska, since over 95 million acres -- more than 25% of the total area of the state -- was enclosed within various federal withdrawals and reservations at the time Alaska became a state.

## Navigable Waters within ANILCA Conservation System Units

On December 2, 1980, the Alaska National Interest Lands Conservation Act became law. This act created or added 104.3 million acres to various federal conservation system units. Because these "withdrawals" occurred after the date of statehood, there is no disagreement between the state and federal governments that navigable waters within the various CSU's are owned by the state. However, there is some disagreement on the amount of authority the federal land managers may have to regulate these state owned submerged lands.

The U.S. Constitution gives Congress certain limited powers to control uses on state owned submerged land. These are known as the Property Clause, Navigational Servitude and the Commerce Clause. The extent of these powers involves complex legal questions. However, even assuming that Congress has the power to regulate state-owned submerged lands in Alaska, the United States Supreme Court has ruled that Congress may choose not to exercise that power, thus leaving regulation totally up to the state. *Escanaba Co. v. Chicago*, 107 U.S. (17 Otto.) 678 (1883). Whether Congress has done that can only be determined by examining the federal laws passed by Congress dealing with Alaska lands. Another possibility is that the state and federal governments have concurrent jurisdiction, sharing the authority to regulate submerged lands.

In ANILCA, Congress did not take away the state's power to regulate state-owned submerged lands within federal CSU's in Alaska. Numerous provisions in ANILCA recognize and respect the state's authority over state-owned land. In some cases, however, Congress may have attempted to give the federal land managers some concurrent authority to regulate navigable waters within CSU's. The state, where possible, cooperates with rather than confronts the federal land managers. This cooperation often takes the form of a memorandum of understanding that discusses management issues and how they will be resolved. Differences do occur, however, over issues such as column management and restrictions on mining.



# Legal and Policy Guidelines Governing Management of Submerged Lands and Public Waters

## Public Trust Doctrine

The state has special duties and management constraints with respect to state owned land underlying navigable waters. These special duties and management constraints arise from the Alaska Constitution. The Alaska Constitution contains numerous provisions embracing the principles commonly known as the public trust doctrine. The public trust doctrine is remarkable both for its age and for its vigor. Rooted in the customs of the seafaring Greeks and Romans, it has evolved to become one of the most effective safeguards of public rights. Basically, the trust reflects an understanding of the ancient concept that navigable waters, their beds and their banks, should be enjoyed by all the people because they are too important to be reserved for private use.

In America, the concept of public rights to public waters was recognized since the early days of the Massachusetts Bay Colony where the Great Pond Ordinance of 1641 guaranteed the right to fish and fowl in ponds greater than 10 acres, along with the freedom to pass through private property to do so.

By 1821 American courts were pronouncing the law of public trust as we know it today. This does not mean that no water-related development can take place. The public trust doctrine permits states to improve waterways by constructing ports, docks and wharves, thus furthering the purposes of the trust. Generally speaking the people's trust rights may be alienated only in ways that further overall trust uses, and in relatively small parcels.

*Illinois Central Railroad Company v. Illinois*, 146 U.S. 387, 452 (1982), involved a grant by the State of Illinois of one thousand acres of the bed of Lake Michigan, constituting the entire harbor of the City of Chicago, to the Illinois Central Railroad. The U.S. Supreme Court held that the grant was revokable, that the state held the land in trust for the public, and that it was powerless to relinquish its rights as trustee.

The court went on to say that land underlying navigable waters is much more than a simple property right.

> [I]t is a title different in character from that which the state holds in lands intended for sale. It is different from the title which the United States holds in the public lands which are open to preemption and sale. It is a title held in trust for the people of the state that they may enjoy the navigation of the waters, carry on commerce over them, and have liberty of fishing therein freed from the obstruction or interference of private parties... The trust devolving upon the state for the public, and which can only be discharged by the management and control of property in which the public has an interest, cannot be relinquished by a transfer of the property.

In the 19th century the purposes of the trust were generally described as "commerce, navigation and fishery." This was logical because the major waterways were essential highways of commerce. But as other values became increasingly important, courts began to recognize recreation and environmental protection among the purposes for which the trust exists. As a California court said in 1971, "with our ever increasing leisure time...and the ever increasing need for recreational areas it is extremely important that the public need not be denied use of recreational water...the rule is that a navigable stream may be used by the public for boating, swimming, fishing, hunting and all recreational purposes." *People ex rel. Baker v. Mack*, 19 Cal. App. 3d 1040, 1044 (1971).

The Alaska constitution provides protections similar to the public trust doctrine protections that cannot be disregarded by the legislature or overruled by the courts. Article VIII, sec. 3 provides; "Wherever occurring in their natural state, fish wildlife and waters are reserved to the people for common use." After reviewing the public trust doctrine in *Owsichek v. State, Guide Licensing*, 753 P.2d 488 (Alaska 1988), the Alaska Supreme Court explained that "the common use clause was intended to engraft in our constitution certain trust principles

guaranteeing access to the fish, wildlife and water resources of the state."

*In CWC Fisheries, Inc. v. Bunker*, 755 P.2d 1115 (Alaska 1988), the Alaska Supreme Court applied the public trust doctrine to tidelands, holding that even after conveyance the title remains subject to continuing public easements for purposes of navigation, commerce and fishery.

The 1985 Alaska legislature recognized the constitution application of public trust doctrine principles in Alaska. In an Act relating to the public or navigable waters of the state, the legislature found that "the people of the state have a constitutional right to free access to the navigable or public waters of the state" and that the state "holds and controls all navigable or public waters in trust for the use of the people of the state". 85 SLA Ch. 82. In the same act, the legislature ruled that submerged lands are "subject to the rights of the people of the state to use and have access to the water for recreational purposes or any other public purpose for which the water is used or capable of being used consistent with the public trust."

Courts in other states over the years have defined in somewhat different ways the public uses that are permitted and protected by the public trust as it applies to submerged lands. In reviewing these other cases, it can clearly be seen that through time an ever expanding definition of the public uses protected by the public trust doctrine is being adopted. The California Supreme Court recently held that:

> Although early cases had expressed the scope of the public's right in (lands subject to the public trust) as encompassing navigation, commerce and fishing, the permissible range of public uses is far broader, including the right to hunt, bathe or swim, and the right to preserve the (public trust) lands in their natural state as ecological units for scientific study. *City of Berkeley v. Superior Court of Alameda*, 606 P. 2d 362, 365 (Cal. 1980).

It is clear under the Alaska Constitution that the State of Alaska has the responsibilities of a trustee with respect to management of land underlying navigable waters. Moreover, the Alaska legislature has adopted a broad view of the public uses protected or permitted by the public trust. Accordingly, the Alaska Attorney General's Office has determined that, until the Alaska Supreme Court rules on the question, the state should assume that a broad definition of public rights protected by the Alaska Constitution and the public trust doctrine applies in Alaska, similar to the one adopted by the California Supreme Court. 1982 Atty. Gen. Op. No. 3 (June 10, 1982).

## Public Waters

It is not only the beds of navigable waters in Alaska that are reserved in public ownership for public use. Under Article VIII, section 3 of the Alaska Constitution, all waters occurring in their natural state are reserved to the people for common use. Article VIII, section 14 of the Alaska Constitution also provides for the broadest possible access to and use of state waters by the general public.

> Section 14. *Access to Navigable Waters.* Free access to the navigable or public waters of the state, as defined by the legislature, shall not be denied any citizen of the United States or resident of the state, except that the legislature may by general law regulate and limit such access for other beneficial uses or public purposes.

Pursuant to this grant of authority, the Alaska State Legislature, in AS 38.05.365(12), defined "navigable waters" as follows:

> "Navigable waters" means any water of the state forming a river, stream, lake, pond, slough, creek, bay, sound, estuary, inlet, strait, passage, canal sea or ocean, or any other body of water or waterway within the territorial limits of the state or subject to its jurisdiction, that is navigable in fact for any useful public purpose, including but not limited to water suitable for commercial navigation, floating of logs, landing and takeoff of aircraft, and public boating, trapping, hunting waterfowl and aquatic animals, fishing, or other public recreational purposes.

This definition of navigable waters does not define state ownership of submerged land in Alaska. The definition of navigability for ownership purposes was discussed earlier in this paper. This definition, however, does define what types of waterbodies in Alaska are available for public use under the Alaska statutes.

The Alaska State Legislature has broadly construed the constitutional protections for public use of the

waters of the state. In an Act (85 SLA chap. 82, codified as AS 38.05.128) relating to the navigable or public waters of the state, the state legislature found:

> (a) The people of the state have a constitutional right to free access to the navigable or public waters of the state.
>
> (b) Subject to the federal navigational servitude, the state has full power and control of all of the navigable or public waters of the state, both meandered and unmeandered, and it holds and controls all navigable or public waters in trust for the use of the people of the state.
>
> (c) Ownership of land bordering navigable or public waters does not grant an exclusive right to the use of the water and any rights of title to the land below the ordinary high water mark are subject to the rights of the people of the state to use and have access to the water for recreational purposes or any other public purposes for which the water is used or capable of being used consistent with the public trust.
>
> (d) This Act may not be construed to affect or abridge valid existing rights or create any right or privilege of the public to cross or enter private land.

Thus, under the Alaska Constitution and this statute, any surface waters capable of use by the public defined in AS 38.05.365(12) are available to the public, irrespective of streambed ownership. Further, such public use is not considered a taking and is not subject to inverse condemnation action. Private ownership is subject to the public rights that are protected by the public trust.

In two Montana Supreme Court cases involving the nature of public rights where the submerged lands are privately owned, the court ruled that public portaging, anchoring, and other uses incidental to the use of the water are allowed. The court also found that if travel on the water or streambed is obstructed, the public is allowed to use the adjacent private land to portage around the barrier in the least intrusive way possible, avoiding damage to the property holder's rights. However, the public does not have the right to enter into or trespass across private property in order to enjoy the recreational use of state owned waters. The State of Alaska agrees with this ruling and believes a similar ruling would be made by our state courts.

## Boundaries of Navigable Waters

The state is often asked where the public portion of a navigable lake or stream ends and private ownership rights begin. The boundary between public and private ownership is the ordinary high water mark. According to the Alaska Supreme Court, the ordinary high water mark is a natural physical characteristic placed upon the lands by the action of the water. It is not a highly technical boundary requiring a surveyor to locate. It has been defined as the mark along the bank or shore where the presence and action of water are so common and usual, and so long continued in all ordinary years, as to leave a natural line impressed on the bank or shore. That line may be indicated by erosion, shelving, changes in soil characteristics, destruction of terrestrial vegetation, or other distinctive physical characteristics. *See State Department of Natural Resources v. Pankratz*, 538 P.2d 984, 988-89 (Alaska 1975).

The same question often arises in the case of wide, braided streams. A braided stream is simply a river with numerous channels that are constantly changing. *See Oklahoma v. Texas*, 260 U.S. 606, 634-36 (1923). Thus, the test for determining the boundary is the same. Is the area so regularly covered with water as to deprive it of terrestrial vegetation? If so, it is considered part of the bed of the stream and is subject to the public rights of use. On the other hand, if upland vegetation has taken hold, the area should be considered part of the adjacent uplands or, if isolated, an island. Islands are not part of the riverbed and, if privately owned, are not subject to the same public rights. However, newly formed islands belong to the owner of the river bed. Thus, islands which have risen since the date of statehood from the beds of state owned navigable rivers belong to the state and may be used by the public. If the river is nonnavigable and the bed is privately owned, a newly formed island belongs to the private owner.

## Conclusion

This paper describes the state's policies and procedures for managing and protecting state submerged lands and public waters. As further legal and practical developments occur in this area, these policies and procedures will be reexamined by the state and, if necessary, appropriate changes will be made.

# Fact Sheet:

# Dam Safety in Alaska

Alaska Department of NATURAL RESOURCES
Division of Water • March 1992

## Who is ultimately responsible for the safety of dams in Alaska?

Old English common law, on which our legal system is based, holds that the capture of water in itself is a hazardous activity. Therefore, whoever captures the water is liable for any damages caused. In almost all cases, the dam owner is responsible. However, under state law, the Department of Natural Resources oversees most dams in Alaska to ensure that safety standards are met.

## What state dam safety statutes and regulations are in effect?

The statutory basis for the dam safety program, AS 46.17, went into effect in May 1987. 11 AAC 93, Article 3, gives the regulatory requirements for activities related to dam safety; and 11 AAC 05.010(a)(8)(I)-(K) states the fees required for dam safety applications.

## What dams are covered by state dam safety statutes and regulations?

- Any dam that impounds at least 50 acre-feet of water and is at least 10 feet high;
- Any dam that is at least 20 feet in height, regardless of the amount of water impounded;
- Any dam that the department determines through an inspection to pose a threat to lives and property.

State statutes do not apply to federally owned or operated dams, or dams that are regulated by the Federal Energy Regulatory Commission (FERC), such as those used for hydro-electric power.

## How is the height of a dam, and the volume of water impounded by a dam, measured?

The height of the dam is measured from its lowest point, which is found at either the upstream or downstream toe of the dam, to the crest of the dam. Water volume is measured by determining the acre-foot volume of water in the reservoir when the water level is at the crest of the dam. An acre-foot of water is the equivalent of one foot of water covering one acre.

## How does the department determine that a dam poses a threat to lives and property?

The department rates dams in a "hazard potential classification" which is based on the threat to lives and property the dam would pose if the dam were to fail. The hazard potential classification is not an indicator of how safe or unsafe the dam is. Under Alaska regulations dams are classified into three hazard potential classifications:

- Class I: Failure would result in loss of life, a serious health hazard, or damage to high value property.
- Class II: Failure would result in the loss of high value property, damage to major transportation facilities or public utilities, or damage to important salmon spawning habitat.
- Class III: Failure would result in damage to rural land, buildings, and local roads.

## What are the requirements to construct, modify, remove, or abandon a dam?

Any person who constructs, modifies, removes or abandons a dam must receive prior approval from the department. The regulation governing such activity, 11 AAC 93.171, requires:

- Submitting engineering reports, plans, and specifications for the dam.
- Submitting the fee required by 11 AAC 05.010(a)(8)(J), which is based on the projected cost of the activity, but is not less than $500.

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A Certificate of Approval must be issued by the department before the activity can proceed. If construction or modification is involved, the department must approve as-built plans and a completion report before the dam owner will be issued a Certificate of Approval to operate the dam. Once the certificate is issued the dam owner may fill the reservoir and operate the dam.

## Is dam inspection required?

Periodic dam safety inspections must be performed on dams at intervals based on the hazard potential classification. Class I and Class II dams must be inspected every three years and Class III dams every five years. Owners are responsible for the inspections. A qualified engineer, approved in advance by the department, must be used. The inspection is conducted according to guidelines issued by the department. The inspection report must be approved by the department and the specified number of copies of the final report submitted.

## What happens if the owner does not perform the required inspection?

The department will perform the inspection under 11 AAC 93.159(e) and will require the owner to reimburse the state for its costs incurred in making the inspection.

## Does the department have the authority to inspect dams that it believes to be unsafe and to take emergency action if necessary?

If the department determines a dam is likely to be unsafe, it has the right to inspect a dam at any time under 11 AAC 93.161. The owner is responsible for reimbursing the state for these inspections. If the dam is determined to be unsafe and the owner does not voluntarily comply with the department's order to correct the condition, the department may take action to protect lives and property, including taking supervisory control of the dam.

## What records is the owner of a dam required to maintain?

The owner of a dam must maintain on file all records pertaining to the safety of the dam. These records include:

- Construction plans and specifications
- Engineering reports
- As-built plans
- Completion reports
- Construction inspection reports
- Material test analyses
- Reports of routine and periodic dam safety inspection

The department may inspect these records at any time during the owner's regular business hours and, if denied access, may seek an administrative subpoena to require the owner to produce the records.

## Is it illegal to make a false report concerning the condition of a dam?

Yes. Under AS 11.56.800(a)(4) it is illegal to knowingly make a false report to the department concerning the condition of a dam or reservoir.

*For more information on the dam safety program and to submit applications for construction, modification, removal or abandonment of dams, contact:*

Dam Safety Program
Division of Water
Department of Natural Resources
P.O. Box 772116
Eagle River, Alaska 99577-2116
(907) 696-0070

# Current Dam Safety Projects

**AJ Mine Sheep Creek Dam (Juneau Area)**

This dam is a state of the art roller compacted concrete, arch-gravity dam that has been designed to store tailings from the AJ Mine. The AJ Mine Project is being developed by Echo Bay Alaska. Stage I will be heavily instrumented and the information collected will be used in any subsequent stages. The review of Stage I is complete and a draft permit is in process.

**Kensington Dams (Juneau Area)**

Kensington Venture is proposing to build a large embankment dam for storage of mine tailings from the Kensington Mine. A smaller water dam is also proposed. Review of the project is underway and it is expected that a permit can be issued before the end of the year.

**Fort Knox Dams (Fairbanks Area)**

Fairbanks Gold is proposing to build a large embankment dam for storage of mine tailings and a large embankment dam for water storage. It is essential that the water dam design be reviewed and approved in a timely manner to allow capture of two years of flow to provide enough water for mine operation. Design review is in progress and it is expected that permits will be issued by February 1, 1993.

**Valdez Creek Mine Dams (Denali Highway Area)**

Camboir Alaska operates the largest placer mine in North America at Valdez Creek, 65 miles from Cantwell. The dam safety program has been actively involved for the past several years reviewing and inspecting settling pond, tailing pond, and water diversion dams. Our most recent project was working with Camboir Alaska to correct problems associated with a failed, unpermitted dam and appurtenant dams.

**Bridge Creek Dam (Homer Area)**

For the past year the dam safety program has been working cooperatively with the City of Homer to monitor and determine the cause of a possible seep on the downstream face of Bridge Creek Dam. The dam is the primary water supply for the city and its failure could also adversely affect the Anchor River. Completion of the monitoring effort and subsequent solution is expected in early 1993.

# Fact sheet:

# WATER RIGHTS IN ALASKA

Alaska Department of NATURAL RESOURCES

Division of Water • September, 1992

### *What Are Water Rights?*

A water right is a legal right to use surface or ground water under the Alaska Water Use Act (Alaska Statute 46.15). A water right allows a specific amount of water from a specific water source to be diverted, impounded or withdrawn for a specific use. When a water right is granted, it becomes attached to the land where the water is being used for as long as the water is used. If the land is sold, the water right transfers with the land to the new owner, unless the Department of Natural Resources approves its separation from the land. In Alaska, land owners do not have automatic rights to ground water or surface water. For example, if a farmer has a creek running through his property, he will need a water right to protect his use. Using water without a permit or certificate does not give the user a legal right to use the water.

### *How Do I Obtain Water Rights?*

To obtain water rights in Alaska, you should submit an application for water rights to the Division of Water regional office in the area of the proposed water use. After your application is processed, you will be issued a permit to drill a well or divert the water. Once you have established the full amount of water that you use beneficially and have complied with all of the permit conditions, a Certificate of Appropriation will be issued. This is the legal document that establishes water rights.

### *What Costs Are Involved?*

An application for water rights must be accompanied by the filing fee: $50 for the use of 5,000 gallons per day (gpd) or less; $100 for the use of more than 5,000 gpd but less than 30,000 gpd; $200 for the use of 30,000 gpd or more but less than 100,000 gpd; $300 for the use of 100,000 gpd or more but less than 500,000 gpd; $500 for the use of 500,000 gpd or more but less than 1,000,000 gpd; $1,000 for the use of 1,000,000 gpd or more except $1,500 for the use of 1,000,000 gpd or more outside of the hydrologic unit from which it was removed (hydrologic units are based on the most current U.S.G.S. Hydrologic Unit Map of Alaska). To insure that the public is notified of proposed water uses, you are required to pay the cost of a legal advertisement in at least one issue of a local newspaper in the area of the proposed water use. Public notice is required if the appropriation is over 5,000 gallons per day, if it comes from an anadromous fish stream, or if the water source has a high level of competition among water users.

### *Why Should I Apply For Water Rights?*

1. If you have water rights, you have legal standing to assert those rights against conflicting water users who do not have water rights.

2. A person with water rights has priority to use water over persons who later file for water rights from the same source.

3. Anyone who diverts, impounds, or withdraws water, or uses a significant amount of water without a permit or certificate is guilty of a misdemeanor (AS 46.15.180). A significant amount of water is defined by 11 AAC 93.970(14) as:

   - the use of more than 5,000 gallons of water in a single day from a single water source; or,
   - the regular daily or recurring seasonal use of more than 500 gallons of water per day for 10 days or more per year from a single water source; or,
   - the non-consumptive use of more than 30,000 gallons of water per day (0.05 cubic feet per second) from a single water source; or,
   - any use of water from a water source listed in the Department of Fish and Game "Catalog of Waters Important for the Spawning, Rearing, or Migration of Anadromous Fishes"; or,
   - any water use that might adversely affect the water rights of other appropriators or the public interest.

4. By filing for water rights, you provide valuable information about water use and water availability in Alaska. This information allows state water managers to estimate present uses of water, determine how much water is available from streams and aquifers in the state, protect established water rights holders, prevent over-appropriation of water sources, and manage the state's water resources.

### *What Other Water Resources Authorizations Are Available From the Department of Natural Resources?*

Dam Safety: If your water use requires you to construct a dam that impounds 50 acre-feet of water and is at least 10 feet high, or is at least 20 feet high, or poses a threat to life and property, a certificate of approval is needed. A separate application form and the fee prescribed by 11 AAC 05 should be filed with the Division of Water.

Instream Reservation: If you do not want to remove water from its source, but want to make sure that enough water is available for a particular use, you should apply for an instream reservation to maintain a specific flow in a stream or water level in a lake. An instream flow reservation application can be made to protect fish and wildlife habitat, migration, and propagation; recreation and park purposes; navigation and transportation purposes; and sanitary and water quality purposes.

### *How Do I Obtain Authorization for Short-Term Water Use? (Temporary Water Use Permit)*

A temporary water use permit may be needed if the amount of water to be used is a significant amount, the use continues for less than five consecutive years, and the water to be used is not already appropriated. This permit does not establish a water right but will avoid conflicts with fisheries and existing water right holders. The application fee for a temporary water use permit is the same as for a water right.

### *Where can I get more information?*

More information about water rights is available in the Department of Natural Resources' "Water User's Handbook", and from fact sheets on Glacier Ice Harvesting, Instream Water Reservations, Dam Safety, Federal Reserved Water Rights and the Water Resources Board. Copies of this information and application forms are available at the offices listed below. Applications should be submitted to the regional office located in the area of the proposed water use.

***Department of Natural Resources***

***Public Information Center***
*3601 C Street, Suite 200*
*P.O. Box 107005*
*Anchorage, AK 99510-7005*
*(907) 762-2261*
*FAX: 762-2236*

***Division of Water***
***Southcentral Region***
*3601 C Street, Suite 822*
*P.O. Box 107005*
*Anchorage, Ak 99510-7005*
*(907) 762-2575*
*FAX: 562-1384*

***Southeast Region***
*400 Willoughby Avenue, 4th Floor*
*Juneau, AK 99801*
*(907) 465-3400*
*FAX: 586-2954*

***Northern Region***
*3700 Airport Way*
*Fairbanks, AK 99706-2703*
*(907) 451-2700*
*FAX: 451-2751*

***Mat-su/Copper Basin Area***
*1800 Glenn Hwy., Suite 12*
*Palmer, AK 99645*
*(907) 745-7200*
*FAX: 745-7112*

# ALASKA WATER RIGHTS ADJUDICATION PROCESS

Alaska water law is founded on the doctrine of prior appropriation. The law is set forth in Article VIII Section 13 of the Constitution of the State of Alaska and the Alaska Water Use Act, Alaska Statute 46.15. Alaska Department of Natural Resources (DNR), Division of Water (DOW) administers water rights and is responsible for the appropriation and distribution of water in the State. The only way to establish a new water right is through the filing of an application to appropriate water as set forth under law. Initially a Permit to Appropriate Water is issued while the beneficial use is being established. A Certificate of Appropriation is granted after the water right is perfected. In Alaska the use of water without a permit or certificate does not give the user defensible legal rights to the water no matter how long the water has been in use or continues to be in use. The following is a brief summary of the process that an applicant must follow to establish a water right from either a surface or ground water source and for any water use in excess of 500 gallons per day.

To initiate a water right, the applicant is required to submit a completed application form along with the required supporting documentation and correct filing fee to the Division of Water. The date on which an application is filed serves as the priority date for the eventual water right. The proposed appropriation is reviewed for completeness, accepted, then initiated into an indexed tracking and retrieval system. The pending applications are adjudicated in the order in which they are received. Prior to public notice, the adjudicator establishes the proper quantity of water to be permitted, the proper legal description to the points of take and use, determines which prior appropriators to notify, and identifies any other additional information or concerns that need to be addressed prior to public notice. Public notice is required if the appropriation is over 5,000 gallons per day; if it comes from an anadromous fish stream; or if the water source has a high level of competition. This notice process includes certified mailings to prior appropriators that might be affected; the Departments of Fish & Game and Environmental Conservation; local governments; and regional native corporations and other interested parties. The legal notice is published in a local newspaper or when appropriate posted in a local post office. A 15-day comment period is required for public and agency notice. All substantive objections are addressed in writing before a permit will be issued.

In addition, if a proposed water use is to take place within the Alaska coastal zone boundary or within an approved coastal resource district, a coastal zone consistency review and determination must be made prior to the issuance of a permit to appropriate water. The CZM determination review will either be conducted by DOW or the Division of Governmental Coordination depending on other state or federal permits that may be required.

In approving or rejecting an application, the Division of Water must find the following: 1) rights of prior appropriators will not be unduly affected; 2) the proposed means of diversion or construction are adequate; 3) the proposed use of water is beneficial; and 4) the proposed appropriation is in the public interest. In determining the public interest, the Division of Water shall consider: 1) the benefit to the applicant resulting from the proposed appropriation; 2) the effect of the economic activity resulting from the proposed appropriation; 3) the effect on fish and game resources and on public recreational opportunities; 4) the effect on public health; 5) the effect of loss of alternate uses of water that might be made within a reasonable time if not precluded or hindered by the proposed appropriation; 6) harm to other persons resulting from the proposed appropriation; 7) the intent and ability of the applicant to complete the appropriation; and 8) the effect upon access to navigable or public water. If the applicant or objector disagrees with the DOW's decision, an appeal in writing must be received by the Director of DOW within 30 days from receipt of notification. The DOW may hold a hearing on the objections. After a decision to issue or deny a permit, an applicant or the objector may appeal the decision to the Commissioner and then finally to the Alaska Superior Court.

When a permit is approved, it will include specific conditions, such as: requirements that fish passage and minimum flows for fish be maintained, water use is metered and reported to DOW, establishment of gaging stations and submittal of flow records, mandatory recycling, submittal of design specifications, as-built plans, plan of operation, and any other condition DOW feels is necessary to protect prior appropriators and the public interest. A permit is granted for a specific period of time

(generally two or five years) in which to develop the project. If additional time is needed, a request for an extension of time must be filed and a like period may be granted for good cause. A site inspection may be conducted by DOW or in cooperation with other state and federal agencies to verify that water is being used and the size and type of operation or equipment used to determine the appropriate quantity of water needed. Once the system is fully developed, the full amount of beneficially used water is established, all the permit conditions have been complied with, and a sworn Statement of Beneficial Use is submitted, a Certificate of Appropriation can be granted. This right becomes attached to the land where the water is being used for as long as the water is used. If the land is sold, the water right transfers with the land to the new owner, unless the DOW approves its severance from the land (severance by regulation requires a public interest determination).

A Permit to Appropriate Water and a Certificate of Appropriation can be amended to decrease the quantity of water used, to change the take points, points of use, type of water use, structures used to divert, impound, withdraw, and beneficially use water. DOW must review the proposed changes in order to determine its impact on other water rights holders and the public interest; if approved, a 1-year permit is issued to make the change. If no objections are raised within that year, the change becomes final.

A water right can be lost in whole or part by abandonment of forfeiture. A certificate holder may voluntarily relinquish his or her water right by submitting a notarized statement. A water right is lost by forfeiture with 5 successive years of nonuse. Water lost through abandonment or forfeiture reverts back to the state and is subject to future appropriation.

If the water use requires construction of a dam that impounds 50 acre-feet of water and is at least 10 feet high, or is at least 20 feet high, or poses a threat to life and property, a certificate of approval issued by the DOW is required.

An instream flow reservation can be granted by the DOW to protect fish and wildlife habitat, migration, and propagation; recreation and park purposes; navigation and transportation; and sanitary and water quality purposes. Private individuals, organizations, and government agencies may apply for a reservation of water for instream use. The adjudication of an Instream Flow Application is similar to that of a water right. The major difference is in the quantification of the flows to be reserved and the expanded public and agency notice.

A public water supplier can exercise a preferred use to water under Alaska Statutes and can be granted rights to water over prior appropriators. This preference right can only be granted if just compensation is made to prior appropriators.

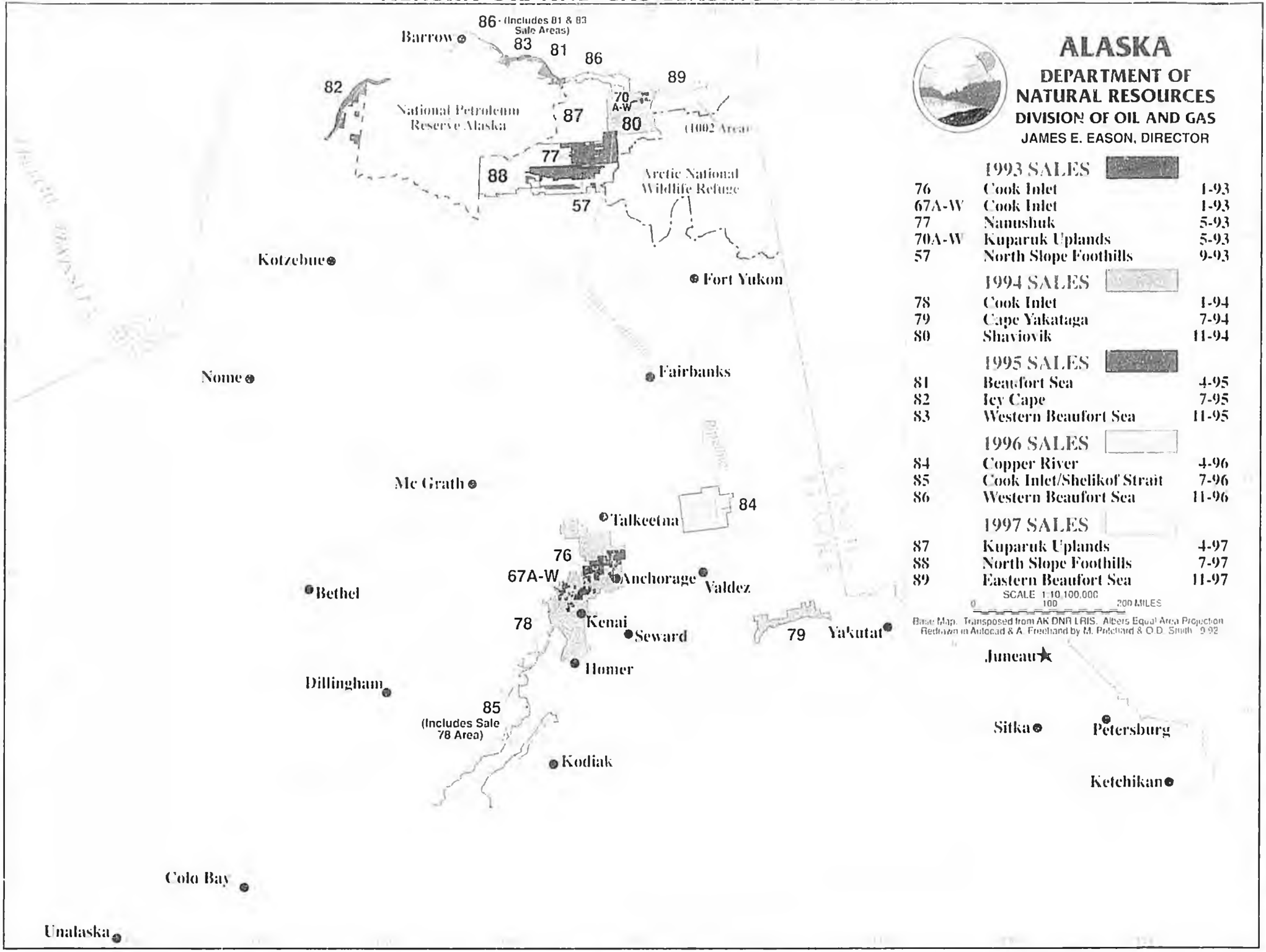
A temporary water use permit (TWP) may be issued to take and use water for a period of time not to exceed 5 years. No water rights are assigned with a TWP, and the use is junior to current and future appropriations of water. Notice to ADF&G and DEC is still required and, where appropriate, the water use must be found consistent with the Alaska Coastal Management Program.

The State of Alaska may be the first and only state, to date, with the express statutory authority to appropriate water to itself for the purpose of sale. The water for sale must be surplus to needs within the hydrologic unit from which it is appropriated. A purchaser of water from the state shall acquire only those contractual rights to the water set out in sale documents prepared by the Division of Water.

The state agency with responsibility for issuing water rights and for the management of Alaska's water resources is the Alaska Department of Natural Resources, Division of Water. For further information, please contact the Director, Division of Water, P.O. Box 107005, Anchorage, AK 99510-7005 or call (907) 762-2575.

November 9, 1992

# ALASKA OIL AND GAS LEASING PROGRAM




## ALASKA

**DEPARTMENT OF NATURAL RESOURCES**

**DIVISION OF OIL AND GAS**

JAMES E. EASON, DIRECTOR

### 1993 SALES

| | | |
|---|---|---|
| 76 | Cook Inlet | 1-93 |
| 67A-W | Cook Inlet | 1-93 |
| 77 | Nanushuk | 5-93 |
| 70A-W | Kuparuk Uplands | 5-93 |
| 57 | North Slope Foothills | 9-93 |

### 1994 SALES

| | | |
|---|---|---|
| 78 | Cook Inlet | 1-94 |
| 79 | Cape Yakataga | 7-94 |
| 80 | Shaviovik | 11-94 |

### 1995 SALES

| | | |
|---|---|---|
| 81 | Beaufort Sea | 4-95 |
| 82 | Icy Cape | 7-95 |
| 83 | Western Beaufort Sea | 11-95 |

### 1996 SALES

| | | |
|---|---|---|
| 84 | Copper River | 4-96 |
| 85 | Cook Inlet/Shelikof Strait | 7-96 |
| 86 | Western Beaufort Sea | 11-96 |

### 1997 SALES

| | | |
|---|---|---|
| 87 | Kuparuk Uplands | 4-97 |
| 88 | North Slope Foothills | 7-97 |
| 89 | Eastern Beaufort Sea | 11-97 |

SCALE 1:10,100,000

0 100 200 MILES

Base Map: Transposed from AK DNR LRIS, Albers Equal Area Projection
Redrawn in Autocad & A. Freehand by M. Pritchard & O.D. Smith 9.92

# A STRATEGIC PLAN

# "INTO THE 21ST CENTURY"




*Alaska is the most centrally located geographical feature in the Northern Hemisphere. As such, Alaska is the largest air cargo hub in the world, and with the opening of the "Northwest Passage" or Arctic Ocean Sea Route across the top of Russia, Alaska is also the most centrally located maritime shipping location to the three most developed continents of the world.*

## VISION

Lead *Alaska* into the *21st century* in *response* to the *economic, social,* and *cultural* needs of our *people*. *Fulfill* the Statehood Compact and pioneer effective leadership of the Owners' State. Raise public *awareness* that Alaska's *natural resources* are the *basic assets* of our economy. *Stimulate* and *encourage* resource-based, value-added *economic activity,* while conserving Alaska's wild and scenic values.

October 1992

Alaska Department of
NATURAL
RESOURCES

# A MESSAGE FROM THE GOVERNOR



*We must say "yes" to Alaska's future!*

We used to say , "North to the Future." Now we ask, "Do we have a future?" We've been so busy counting our money, we've lost our courage.

I've been in Alaska 52 years and one very basic lesson I've learned is: ***There is no wealth without production.*** We can not save ourselves rich, we must produce ourselves rich. Because we forgot that lesson, we have gone from being a rich state with no money to a poor state with money in the bank.

**We're not poor, we're just thinking poor.** Its' time to think rich again and bring back the environment of hope.

For more than a decade virtually all of Alaska's economy has come from one oil field. Is there any other state economy that dependent on one project?

Money is not secure wealth. It is merely a medium of exchange to acquire assets that produce. **We may have a Permanent Fund but we do not have a permanent economy.**

What are we doing to get things started? This strategic plan is a beginning and I invite all Alaskans to join in our effort to lead Alaska into the 21st century.

Walter J. Hickel
Governor

# A MESSAGE FROM THE COMMISSIONER



*Time and Place. Both are critical to Alaska's global future.*

What a time for Alaska! The North is where the resources are in great abundance to renew the world - fresh water, land, timber, minerals, fuel, energy, unencumbered by the population explosion. Here is where some of the most tenacious peoples mingle with contemporary scientific cultures to form a new partnership with nature in forging a new world.

We are leaving behind the tired struggle of development versus environment. Our commitment makes the two compatible. That's the pioneering of this generation and the next. At stake is the quality of life of not only the Alaskan people, from the new born child on Gambell Island to the pioneer senior in Ketchikan but the world.

Alaska's role is to lead and serve, positioned as we are equidistant from Europe and Asia over its shortest route, the pole, and blessed with resources of sea, land and air. This profile of possibilities sketches our opportunities. This is where tomorrow begins.

Glenn A. Olds
Commissioner

# GOVERNOR'S PRIORITIES FOR ALASKA

1. **Implement** responsibilities of an Owners' State.
2. **Stimulate** sustainable economic development.
3. **Implement** efficiencies.
4. **Deliver** essential services.
5. **Stimulate** local initiative and personal responsibility.

# DNR's STRATEGIC MISSIONS

***(Consistent with this strategic plan, each Division will adopt tactical plans)***

## "Leading Alaska into the 21st Century"

As Alaska moves into the 21st century facing a time of serious economic stress and in response to the Governor's priorities, the missions of the Department of Natural Resources are:

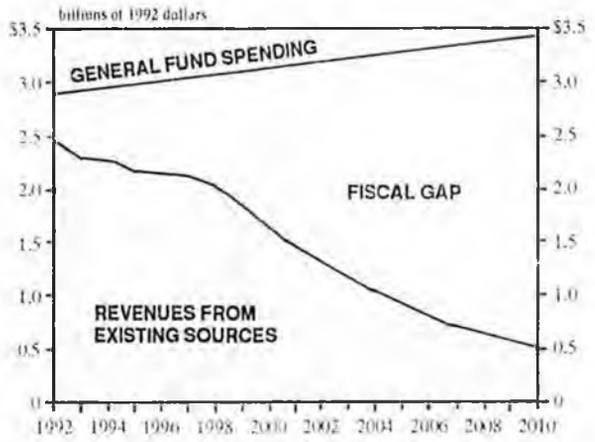
I. To vigorously **fulfill** and **implement** the Statehood Compact and pioneer effective leadership of an Owners' State through the **integration** of state and federal interests, **cooperation**, and protect State interests.

II. To **stimulate** resource-based economic activity while **conserving** Alaska's wild, scenic and cultural values as a major player in an evolving world.

III. To **simplify** and accelerate regulatory processes and organizational structures to **allow** rapid, **sustained** economic growth.

IV. To **raise** public awareness of Alaska's natural resource asset base, its **market** potential within Alaska and the world, how it effects our daily lives, and how to implement its promise for our common future.

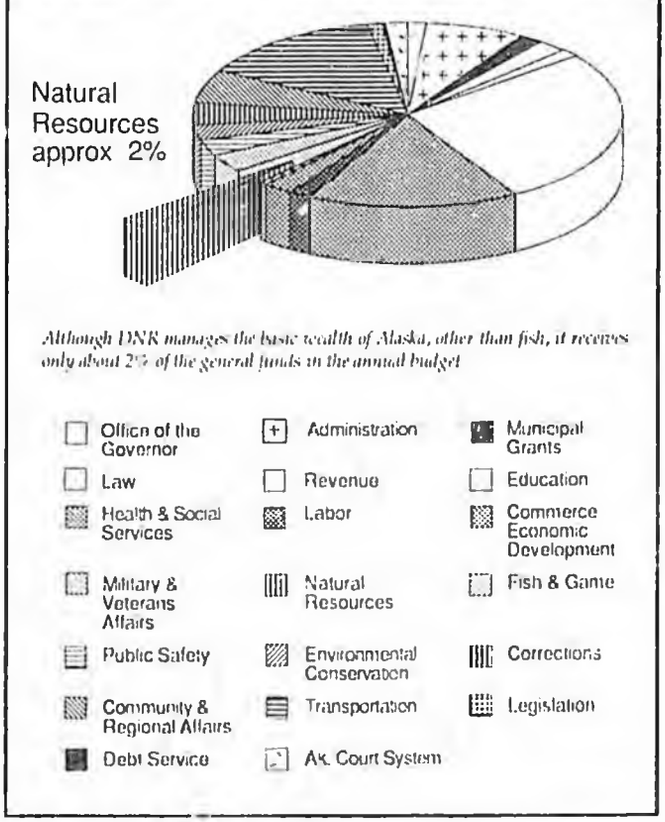
### Estimated State Fiscal Gap




*Estimated gap assuming current spending trend (constant real per capita) with no new revenue sources and oil prices at $19 per barrel*

Source: ISER estimates

### Expenditures by Department




*Although DNR manages the basic wealth of Alaska, other than fish, it receives only about 2% of the general funds in the annual budget*

# THE DEPARTMENT OF NATURAL RESOURCES

The Department of Natural Resources (DNR) is the manager of Alaska's land, water and its surface and subsurface resources - *its wealth*. The state was granted 106 million acres of land at statehood to provide an economic base for its people. The state has chosen land for community expansion, natural resource development, recreation and wildlife habitat. DNR manages approximately 86 million acres of land (more than the combined areas of Colorado, Vermont, New Hampshire, and Maryland) for diverse uses ranging from oil and gas development to state parks. The State of Alaska also owns about 40% of our nation's unfrozen fresh water.

With offices in every major community in the state, the department consists of 8 divisions and 740 full-time and about 230 part-time and seasonal employees. Against Alaska's 86 million acres, this equates to a little over 116 thousand acres per full-time employee. The department's total operating budget of just over $63 million equates to a management cost of less than 75 cents per acre.

# RESOURCE MANAGEMENT POLICY

The management philosophy of the Department of Natural Resources is derived from the State Constitution: to "encourage the **settlement** of its **land** and the **development** of its **resources** by making them available for **maximum use** consistent with the **public interest**."

The department's management challenge is shaped by the projected rapid downturn in the overall state economy resulting from the depletion of the Prudhoe Bay oilfield and the necessity for developing a swiftly diversifying economy. Oil revenue, now providing 85% of the state's general fund and a substantial portion of the economy may decline 50% over the next decade. Without rapid, responsible development of Alaska's varied resources, a serious decline in the quality of life for Alaska's residents is inevitable.

Consistent with this philosophy and within its statutory mandates, the Department of Natural Resources must encourage the development, use, and responsible management of Alaska's natural and cultural resources in cooperation with resource-based industry and improve the standard of living for all Alaskans. This is accomplished by:

- Advancing economic activity by encouraging exploration and development of Alaska's trade and value-added natural resource industries.
- Ensuring competent and responsible management of Alaska's vast natural and cultural resources.
- Enhancing the quality of life and property through the understanding and interpretation of Alaska's dynamic natural and cultural resources.

# LAND

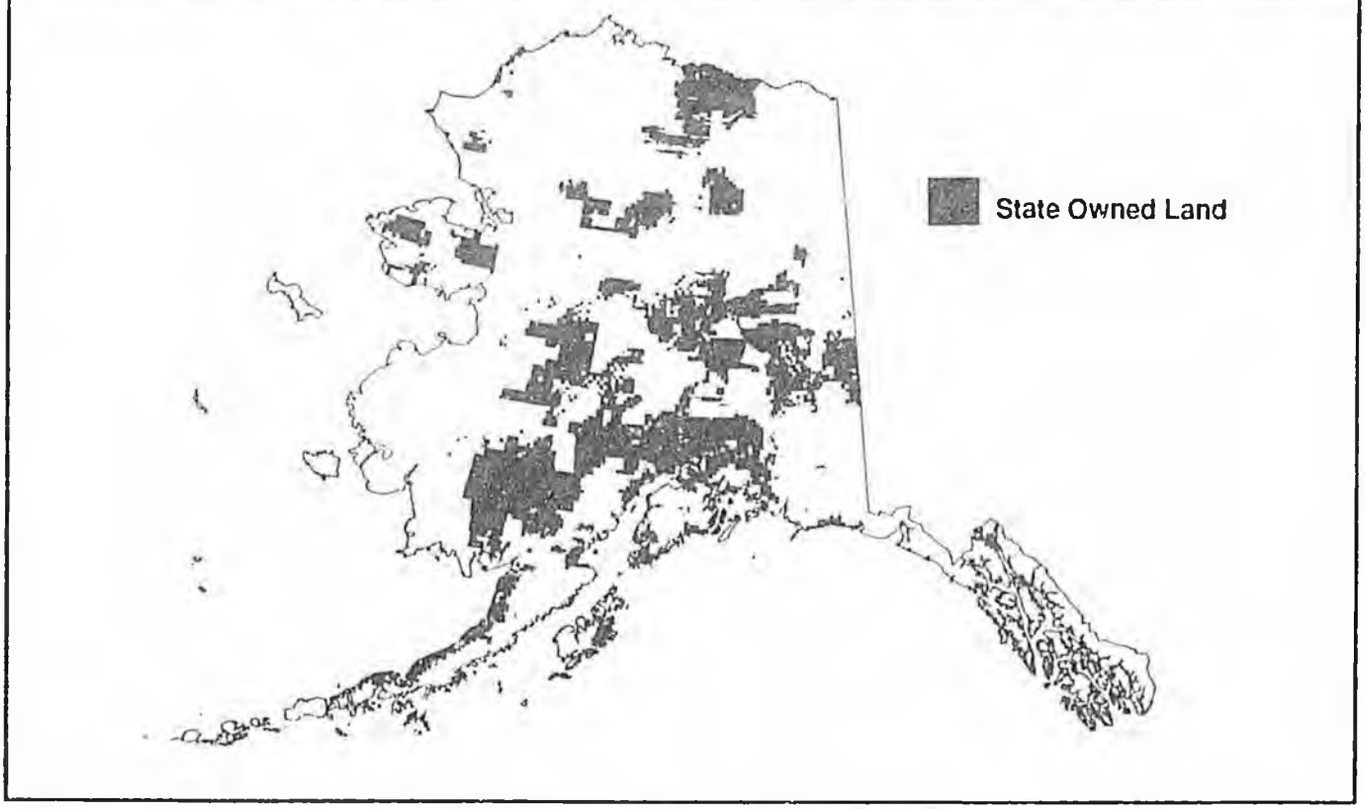
## *Our Wealth:* Alaska's Natural Resources

- 86 million acres of upland.
- 22 million acres under selection.
- 34 thousand miles of coastline .
- 65 million acres of tide and submerged land.
- Annual land sales and fees generate about $10 million in revenue.
- 552,000 acres transferred to private ownership since 1960.
- Over 2.5 million acres in Public Use and Recreational River Systems.
- Alaska is 1/5 the size of the lower 48 states combined- more than twice the size of Texas.

## *Our Markets:* Alaska's Future

Demand for strategically located commercial and industrial land is so strong that the state has a serious backlog of lease applications. Examples are sites for timber transfer facilities in southeast Alaska; upland and tideland seafood processing sites in southeast and western Alaska, as well as the Aleutian Chain; industrial support facilities for oil and gas exploration and development on the North Slope; gravel sales for roads and facilities; leases and permits for guide sites, and other commercial recreation activities. Thousands of new land sale contracts for private recreational and residential use can be issued as soon as surveys and appraisals are completed. DNR is also working to facilitate major mine developments such as Fort Knox, and all-season resorts at Girdwood and Hatcher Pass. Land use classifications are designed to support a vibrant mix of uses - mining, tourism, forestry, oil and gas leasing, guiding, gravel sales, commercial, sport, and subsistence fishing, commercial water use, and recreation - in contrast to the limited activities permitted on most federal land.

## State Land Ownership



# OIL & GAS

## *Our Wealth:* Alaska's Natural Resources

- Prudhoe Bay is the largest known oil field in North America; Kuparuk is second largest.
- Six common-carrier pipelines, including the 800-mile Trans-Alaska Pipeline that transports up to 2 million barrels of oil per day, 25% of the nations domestic production.
- Remaining known reserves in Prudhoe Bay exceed 4.6 billion barrels. Over 300 million barrels were recently discovered at the Point McIntyre field. Other known, but undeveloped, North Slope oil reserves exceed 500 million barrels. Other fields such as Endicott, Kuparuk, and Milne Point further expand known reserves.
- 1,200 oil and gas leases: three-quarters on North Slope, one quarter in Cook Inlet.
- Nation's only liquid natural gas (LNG) export operation at Nikiski.
- 14 lease sales scheduled by 1994.
- Minimum 25% of petroleum royalties deposited in the Alaska Permanent Fund since 1976.
- 85% of the state's General Fund comes from oil and gas activity.
- Some analysts believe we may have just scratched the surface of this major arctic resource.

## *Our Markets:* Alaska's Future

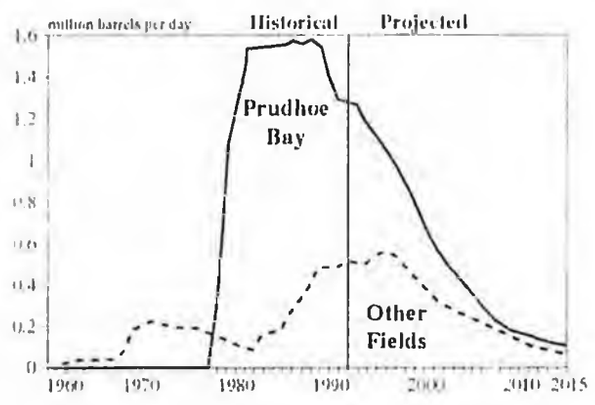
Governor Hickel has filed suit against federal restrictions that forbid Alaska to export its North Slope oil to other nations. When the export ban is lifted, Alaska would realize an additional $185 million per year in new revenue allowing many marginal fields to become economic.

Proven North Slope gas reserves exceed 30 trillion cubic feet and the probability of additional gas reserves is high. Currently this gas is reinjected or used as a fuel source in the fields. When a delivery system is available, North Slope gas can be sold to any market. Markets appear primarily in Asia (Japan, Taiwan, South Korea).

Some of Alaska's royalty oil is sold to in-state refiners, creating jobs and economic activity.

Oil and gas are two of the world's most valuable commodities and the competition for markets is fierce. If federal restrictions are lifted, Alaska's location makes these products readily available to Pacific Rim nations. Alaska, a stable and dependable supplier, can compete with the Middle East, Indonesia, Australia and Russia. Energy has become the new currency for international economic development, and Alaska is a prime energy bank for the nation.

### Alaska Oil Production




*Sources: Alaska Departments of Revenue and Natural Resources*

# PARKS & RECREATION

## *Our Wealth:* Alaska's Natural Resources

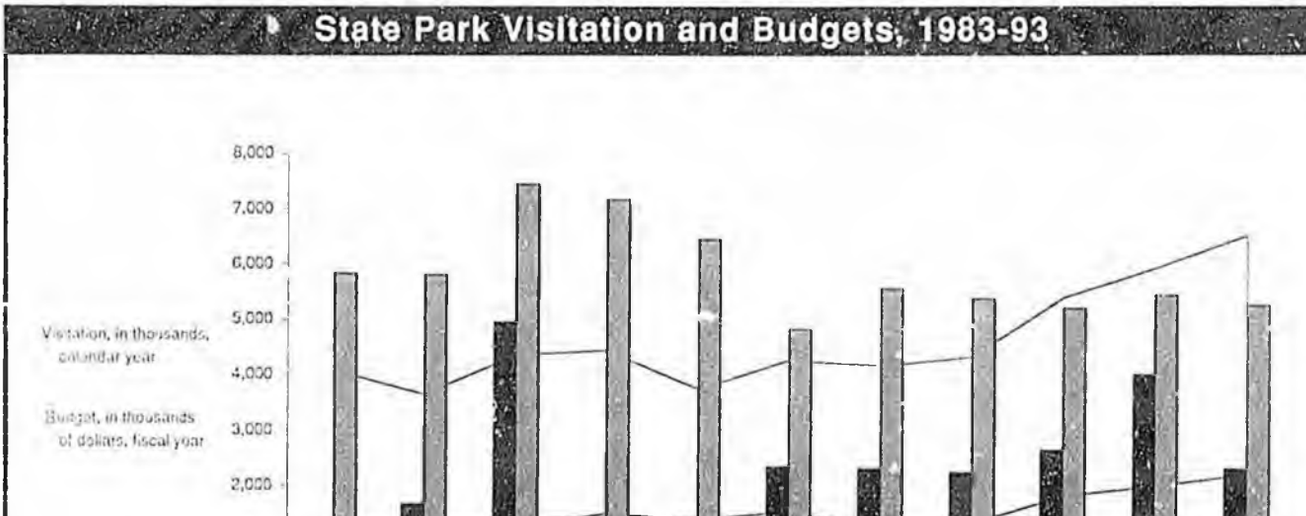
- Newest and largest state park system in the United States containing more than 130 units and more than 3.2 million acres.
- State parks average nearly seven million "visits" each year with one out of four visits from a non-resident.
- More than 2,000 campsites, visitor centers, picnic areas, fishing access sites, trail systems, public use cabins, and historic sites.
- More than $1 million in user and concession fees generated annually.
- The largest volunteer program in Alaska with more than 360 volunteers contributing more than 100,000 hours of labor.
- More than half of America's national park land, with 15 units covering 51 million acres.
- More than 80% of all National Wildlife Refuge land, with 16 units covering 77 million acres.
- Alaska has one third of the total state park acreage in the United States.
- Wood-Tikchik State Park is the nation's largest state park, at 1.6 million acres.
- The Alaska Chilkat Bald Eagle Preserve supports the world's largest concentration of bald eagles each fall, when 3,500 gather to feed on late salmon runs.

## *Our Markets:* Alaska's Future

Alaskans utilize state parks at rates often twice the national average contributing 75% of the more than six million visits annually. National Parks support an additional 1.2 million visits. More than 400 commercial use permits are issued annually to small businesses operating inside state parks.

Alaska's scenic beauty, wildlife, and outdoor recreation are premier exports attracting 800,000 non-residents a year. Tourists spend an estimated $1.1 billion annually. Seasonal employment surpasses 18,000 jobs with an annualized equivalent of 13,500 jobs. Tourism is the second largest private sector employer, behind fisheries. With an annual growth potential of 5% projected into the next century, tourism is a key component of Alaska's economic future. More people are travelling independently rather than in group package tours, benefitting communities as the independent traveler spends more in local businesses. Foreign visitors , most coming from Europe, are a small but growing segment of the market.

### State Park Visitation and Budgets, 1983-93




Notes: 1. 1993 visitation projected to grow 10% over 1992. 2. Budgets expressed in 1992 dollars.

# WATER

## *Our Wealth:* Alaska's Natural Resources

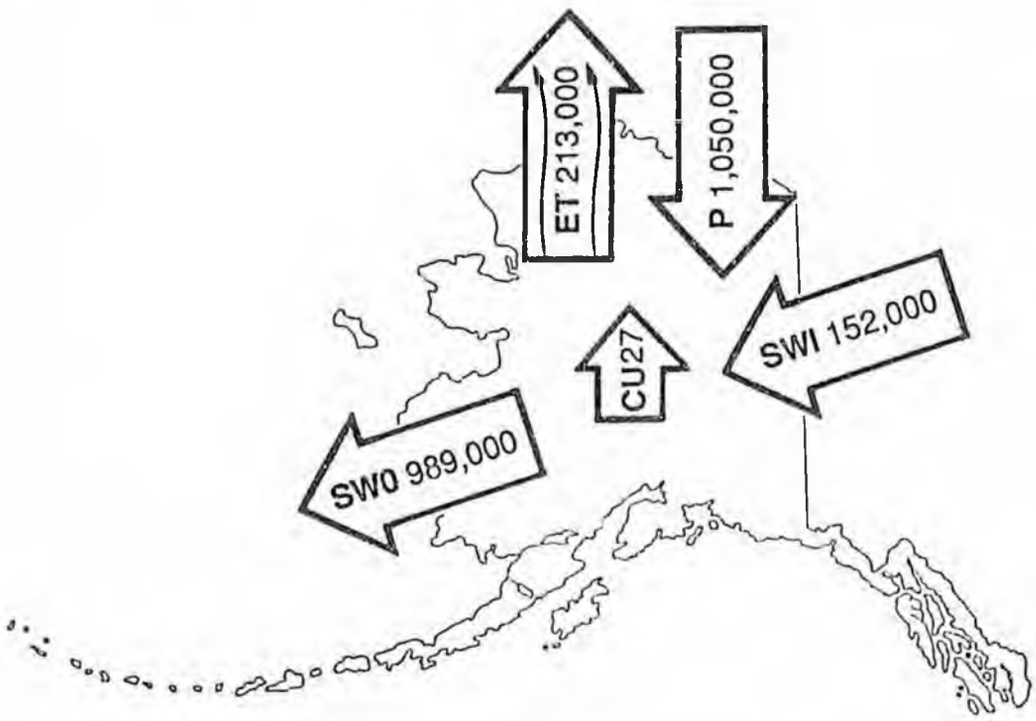
- Alaska has about 40% of our nation's free (not frozen) freshwater resources in 30,000 streams and 3 million lakes (50+ acres). An estimated 100,000 glaciers covering approximately 28,800 square miles hold almost 75% of all fresh water in Alaska.
- Alaska owns and manages 20 million acres of inland waters--and claims title to 12 to 14 million acres of land underneath those waters.
- Alaska discharges nearly 1 billion acre feet (892 billion gallons a day) into the ocean annually.
- With annual precipitation upwards of 400 inches in some southeast drainages, Alaska has vast recharge capabilities in locations accessible for large volume water exports.

## *Our Markets:* Alaska's Future

Many experts agree that by the mid 21st century fresh water in urban areas will be more valuable than oil for human survival and economic development. The world's need is Alaska's opportunity to serve. Currently the most viable market for Alaska's water is the area of southern California and northern Mexico, now in its seventh year of drought and bracing for a population increase of one third by the year 2010. Officials project an annual water deficit of 4 to 6 million acre feet for southern California, even if it rains. Desalinization is Alaska's only significant competition. However, on a dollar per acre-foot basis, Alaska can beat "desal" costs, especially with cost vulnerabilities in desal energy and waste stream management. An export target of 2 million acre-feet a year is possible with existing technologies, generating potentially $200 million a year in new revenue to the State treasury.

## Alaska's Water Budget

(million gallons per day)




**CU** - Consumptive Use
**ET** - Evapotranspiration
**P** - Precipitation
**SWI** - Surface-Water Inflow
**SWO** - Surface-Water Outflow

# MINING

## *Our Wealth:* Alaska's Natural Resources

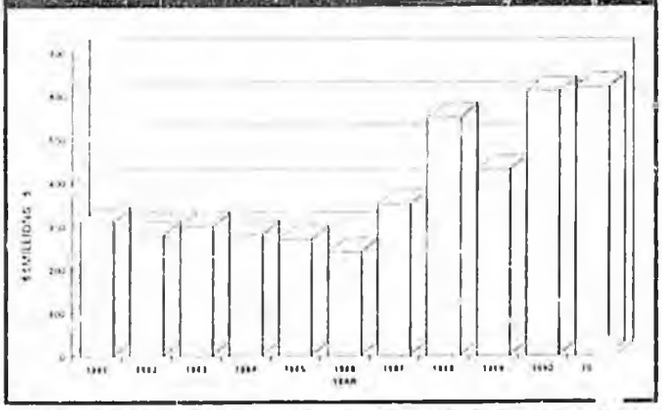
- 159 million acres, of which 96 million are state land, available for mineral exploration and mining.
- 1.4 million acres presently under mineral location or lease, representing only 1.5% of the state land open to mineral entry.
- 1,980 known mineral deposits on land open to mining.
- Abo 31,000 mining claims on state land generate $oo0,000 in revenue to the state treasury.
- Land and gravel revenues exceed $1.1 million.
- Mining leases, excluding Healy, generate nearly $50,000 to the state treasury.
- 2.8 trillion tons of coal resource, representing 44% of nation's coal and 15% of known world's inventory.
- Alaska coal is one of the world's lowest in sulfur.
- More than $1 million in coal royalties generated each year.
- 3 gold deposits contain estimated 13.0 million ounces, worth $5 billion(in place).
- Identified reserves of 7 of 13 strategic minerals including tin, nickel, platinum, cobalt, chromium, graphite, and titanium.
- Copper, lead, zinc, and molybdenum contained in 8 deposits worth $32 billion.
- Alaska mines account for 57% of U.S. production of zinc, 16% of silver, and 13% of lead.

## *Our Markets:* Alaska's Future

Alaska represents a secure and diverse source of international energy and strategic minerals. Large hardrock deposits under development will soon make Alaska one of the nation's largest producers of gold. Mining now generates over 3500 jobs directly and over 12,000 indirectly, many in rural Alaska. As mining becomes more restricted in the Lower 48, the industry will increasingly turn to Alaska's state and private lands as a source of raw minerals.

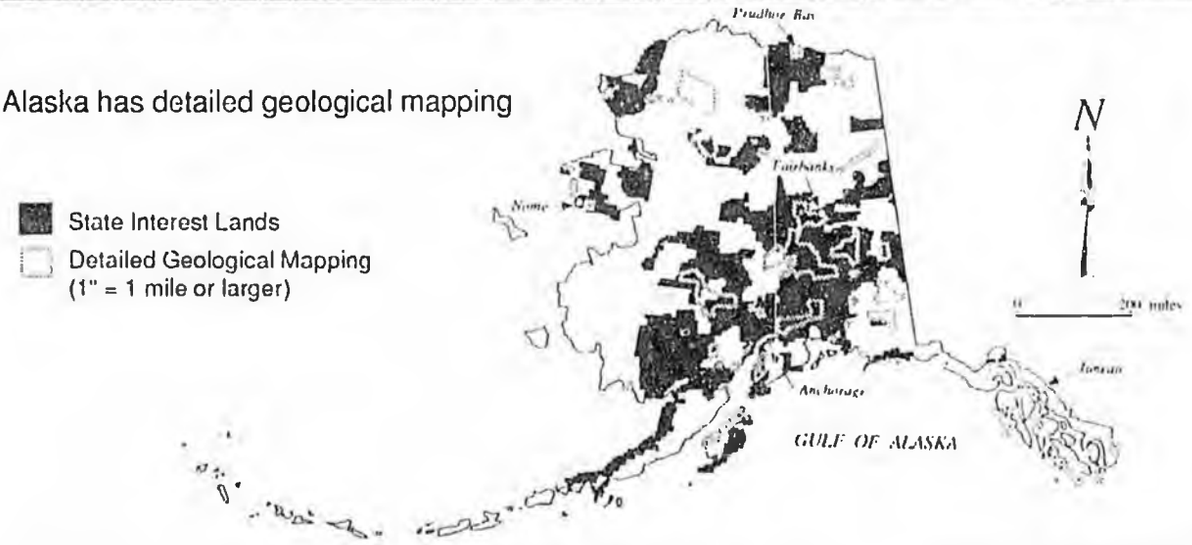
Global demand for clean, low sulfur Alaskan coal is increasing with interest from the lower 48 states, Asia, and Western Europe. Two large coal reserves are close to tidewater. Existing exports (about 1 million tons annually) go to South Korea.

### Value of Alaska Mineral Industry 1981-1991



### Geological Mapping in Alaska

7% of Alaska has detailed geological mapping



# AGRICULTURE

## *Our Wealth:* Alaska's Natural Resources

- Alaska's giant vegetables caused by natural conditions and summer light are world famous.
- 560 farms, averaging more than 1,000 acres each, contribute $30 million to Alaska's economy each year.
- More than 1 million acres of open farmable land with less than 200,000 in production.
- With Alaska's vast acreage and bountiful natural gas, a greenhouse industry can be developed to help feed the hungry of the world.
- More than 20 million pounds of potatoes produced annually.
- The number one U.S. producer of reindeer meat and byproducts (over $1.7 million in sales).
- 9 million acres of potential crop land in state and private ownership.

## *Our Markets:* Alaska's Future

Alaska consumes what it grows. Success with products that demonstrate freight or freshness advantages include potatoes, vegetables, milk, and hay. New markets for greenhouse bedding plants, reindeer, honey, and grass seed. Future and exciting opportunities in game farming of indigenous species, and wild berry production and processing.

There is a growing demand for specialized grass seed suitable for environmental cleanup and reclamation in northern latitudes.

# FORESTRY

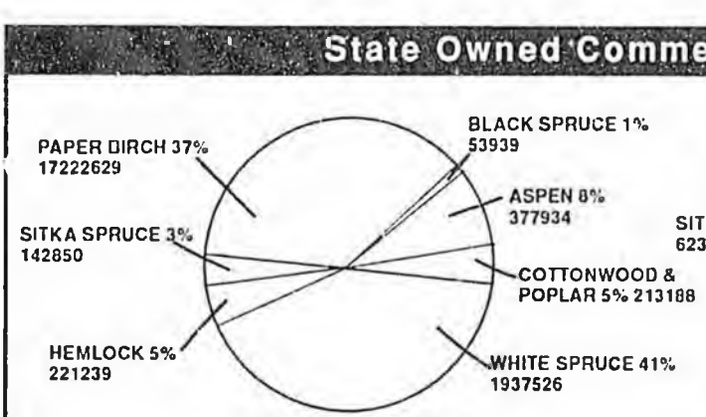
## *Our Wealth:* Alaska's Natural Resources

- Over two million acres of dedicated state forest located in the Tanana Valley and near Haines, greater than all forests in Washington State.
- State sells about 25 million board feet of timber annually, grossing $500,000 in state revenue.
- State nursery produces 800,000 seedlings a year for reforestation. New nursery, in construction, will increase production and seedling quality.
- Highly trained wildfire suppression organization protects 134 million acres, over twice the size of Washington State.

## *Our Markets:* Alaska's Future

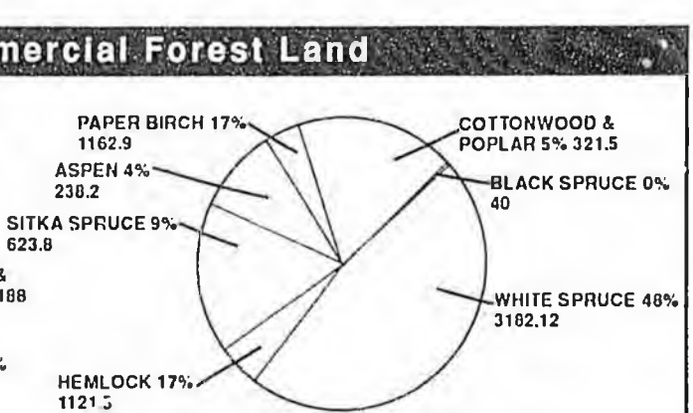
Vast spruce and hardwood interior forests are among North America's great untapped timber resources. Demand in the Pacific Rim for round logs and processed wood fibre is expected to continue. Small scale local mills supply some domestic demand. Coastal private timber holdings now are limited; federal timber harvesting in Alaska has been reduced; and Pacific Northwest timber supplies have decreased. As a result, state, Mental Health, and University of Alaska timber will be more marketable. Future opportunities include expanded local processing of unused hardwood into value-added products, such as fiberboard.

## State Owned Commercial Forest Land




ACRES BY FOREST TYPE

Hemlock includes Western & Mountain Hemlock




VOLUME (million cubic feet) BY TYPE

Hemlock includes Western & Mountain Hemlock

# INTELLECTUAL CAPITAL

*Our Wealth:* Alaska's Natural Resources

- As a result of Alaska's unique history, its vast resources, and its environment, Alaskan people have developed special knowledge, skills, and a heightened sensitivity to the challenge of human social, cultural and economic survival in the arctic. Pioneering oil and gas exploration, environmental clean-up and mitigation, development of specialized plants, business experience in rent and royalty structure and resource sales, resource mapping designed for the management of vast areas, and mining demonstrate Alaskans' proven, tested skills.
- Existing institutions such as the Alaska Foundation for Science and Technology, the WorldTrade Center and the Center for International Trade, the Arctic Research Commission, the Northern Forum, and the many research institutes associated with the University of Alaska and other post secondary institutions are viable instruments to facilitate technological transfers.

*Our Markets:* Alaska's Future

Long exported to other northern nations, Alaska's intellectual talent is resulting in new and important social, cultural, and trade relationships. The first joint mineral assessment of the Russian Far East and Alaska is taking place through the Alaska/Russian Academy of Sciences metallogenis project.

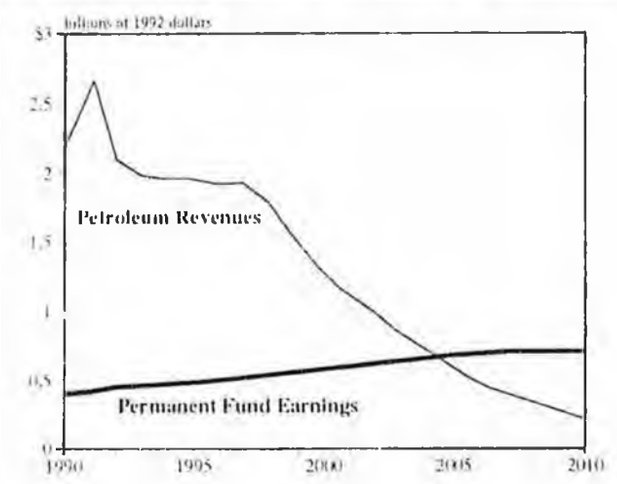
Space Development Authority. Space is the world's new frontier. Alaska offers unique polar launch and technology miniturization opportunities.

# PERMANENT FUND

*Our Wealth:* Alaska's Natural Resources

- State's savings account of over $13 billion is a result of oil and mineral royalty income stimulated by DNR.

**Permanent Fund Earnings Compared to Petroleum Revenues**




*Source: ISER estimates*

# STRATEGIC LOCATION

*Our Markets:* Alaska's Future

Because of Alaska's location, unique investment opportunities are available in sea and air transfer locations. With the development of the Northern Sea Route, new and economically viable access is available to new markets. Alaska's location in the north also allows unique opportunities for space exploration. The state and the University of Alaska's significant investments at Poker Flats have attracted international attention.

# MISSION I

***To vigorously fulfill and implement the Statehood Compact and pioneer effective leadership of an Owners' State through the integration of state and federal interests, cooperation and protect State interests.***

## Goal A

Acquire the highest value natural resources for the people of the state.

**Necessary Action**

- **Identify** and select land containing Alaska's most useful resource access corridors, securing Alaska's land entitlement in the Statehood Compact.
- **Determine** title navigability on all water bodies of interest to the state.
- **Complete** the STORET system providing more cost effective and more useful information storage and retrieval for land and water managers.
- **Quantify** federally reserved water rights in areas of potential development such as the coastal plain of the Arctic National Wildlife Refuge.

## Goal B

Implement state interests

**Necessary Action**

- Administratively **assert** and **file** with the court for all surface access rights.
- Administratively **assert** and **file** with the court all navigability and submerged land rights.
- **Ensure** title is clear of encumbrances and environmental and physical liabilities before state invests.
- **Assert** Statehood rights to oil and gas revenue (90% - 10% split) on federal lands.
- **Assert** Alaska's right to open export markets.

## Goal C

Review and revise final land selection strategy to ensure state priorities.

**Necessary Action**

- **Expand** and **extend** upland selections through innovative exchanges of appropriate submerged lands within CSUs where some permitted state uses may be in conflict with federal purposes.
- **Pool** some remaining selections allowing later choices.

## Goal D

Seek geographic distribution of selected lands to ensure that high quality resources are accessible to Alaska's population centers.

## Goal E

Integrate state and federal interests.

**Necessary Action**

- **Identify** opportunities where state and federal interests coincide for the benefit of the people of Alaska and formalize appropriate management agreements.
- **Assume** control of federal mining programs through agreements on management authority of specific federal lands or activities, such as permitting of coal extraction on federal lands.
- **Obtain** a General Permit under Section 404 of the Clean Water Act (wetlands).
- **Acquire** land to assemble state or privately owned strategic blocks.

## Goal F

Institutionalize cooperative resource management.

**Necessary Action**

- Formally **establish** the Alaska Water Management Council consisting of 20 state and federal agencies and the University of Alaska.
- **Facilitate** an efficient and expedited land conveyance process with federal agencies, to move state lands under state title.
- **Create** cooperative waterbody management agreements in federal areas with state owned submerged lands and state-owned water.

## Goal G

Attract, retain, and develop superior DNR staff through unique opportunities, training, and employee improvement programs.

# MISSION II

*To stimulate resource-based economic activity while conserving Alaska's wild, scenic and cultural values as a major player in an evolving world.*

## Goal A

Foster practical, effective, and efficient methods for developing, marketing, selling, and leasing, the state's natural resources, emphasizing value-added jobs and development that is environmentally responsible.

Necessary Action

- **Develop** regional guidelines and site-specific strategies for putting state land to use by resource developers and land purchasers such as pollution free natural gas, low sulpher coal, and pristine water.
- As a stimulus to private sector development and to facilitate marketing, **publish** and **disseminate** summary reports on Alaska's resources and their market potential.
- **Promote** the uniqueness of Alaska's water resources as a marketing tool (pristine, glacial).

## Goal B

Promote the enhancement, production, and management of Alaska's **renewable** resources to *improve* their economic value.

Necessary Action

*Timber-*

- **Identify, inventory,** and **dedicate** an appropriate land base for forest production.
- **Attract** private investment.
- Cooperatively **research** technical, economic, and silviculture issues.
- **Create** non-profit "Center for Northern Forestry" funded by timber development revenue.

*Water -*

- **Maintain** high profile with Western State's Water Council to ensure that water marketing network captures opportunities as they develop.
- **Encourage** drought states (and Mexico) to consider Alaska water imports as a part of their Drought Contingency Plans.
- **Maintain** highest possible knowledge of competitors, including desalinization technologies.
- Work closely with groups developing new technologies for water transfers.
- **Encourage** the General Accounting Office to investigate limitations to water transfers.

*Agriculture-*

- **Maintain** effective marketing service programs providing quality assurance on production, and facilitate commercial transactions between producers and buyers based on prevailing markets.
- **Develop** an agricultural land base inventory with planned infrastructure to facilitate new farm development
- **Identify** an inventory of grazing land to allow scheduled resource leasing to livestock producers.
- **Maintain** agricultural lending program with development goals focused on new resource opportunities.

*Recreation-*

- **Refurbish** and add new recreation and tourism facilities in key locations.
- **Create** a scenic highway program with DOTPF and develop wayside system.
- **Enhance** the integrity of cultural and environmental resources affected by Exxon Valdez Oil Spill with innovative use of the $900 million trust fund. Develop a restoration plan that will identify options.

*Space-*

- Foster commercial use in maximizing the potential of polar orbits.

## Goal C

Cooperatively develop and advance innovative economic tools that attract and encourage investment and risk-taking by the private sector.

Necessary Action

- **Identify** public/private partnership opportunities in resource development using the Alaska Industrial Development and Export Authority, the Alaska Railroad Corporation, the University of Alaska, the Alaska Permanent Fund, and other funding partners.
- **Explore Leveraging, Tax Incentives,** and **Regulatory Incentives** as economic tools, where appropriate, to **stimulate** economic activity.

Examine:

*Strategic Location* - New infrastructure (ports/highways), that **links** other development opportunities, **opens** new resource areas due to improved economics.

*Creation of Alaska Work Hours* - Leverage work hours for forgiveness in costs.

*Capital Investment* - Leverage amount of investment for cost forgiveness of capital investment.
*Conversion or Upgrading* - **Encourage** the harvest of a very low-value renewable resource so a higher value renewable resource can be developed.

## Goal D

Improve the business investment climate in Alaska.

Necessary Action

- **Streamline** authority to enable the Department of Natural Resources to negotiate and finalize large transactions such as land exchanges, water sales, and royalty oil and gas sales.
- **Inform** the business community of DNR's strategic and tactical plans to encourage resource development.
- **Prepare** sales prospectuses and establish schedules for resource development.

## Goal E

Structure development and settlement activities to increase the overall asset value to the state.

Necessary Action

- **Structure** timber sales in the southcentral and northern basins to support local forest-product manufacturing.
- Actively **market** state lands for onshore fish processing sites.
- **Delineate** and **offer** public land disposals that promote trade and local industry.
- **Offer** state land for sale or lease to Alaskans for settlement and recreation.
- **Complete** the transfer of state land grants to cities and boroughs.
- **Market** appropriate state land for year-round recreation resorts.
- **Acquire** undeveloped former state land disposals that cause conflict with forest-product harvesting.
- **Bring** the University of Alaska into parity with other land grant universities by transferring more state land to the University.
- Actively **solicit** buyers for state water.
- **Explore** increasing the acreage of state land grants to municipalities with requirements that the land selected be converted to a value-added use within a specific time frame.

## Goal F

Capitalize state assets to stimulate and underwrite venture capital investment.

Necessary Action

- **Identify** prevailing market values for both undeveloped and developed resources.
- **Obtain** appraisals of key resources with high probability of investment that should result in value-added industries.

## Goal G

Develop and implement a short-term and long-term transportation infrastructure plan in cooperation with ARR, AIDEA, DOTPF, CRA.

Necessary Action

- **Ensure** that transportation corridor identification and selection is a priority in final state land selections.
- **Assert** and defend RS 2477 rights-of-ways.
- **Develop** partnerships with federal agencies, native corporations, and private land owners to link corridors .
- **Establish** a statewide stream-gaging network in cooperation with USGS (federal/state /private land areas).
- **Secure** public easements with sensitivity to federal government land grants to ANCSA corporations.
- **Establish** easements across uplands and along public waters before the state conveys land.
- **Prioritize** and acquire easements necessary to restore public access to landlocked state parcels.
- **Assure** access to Alaska's coastal lands via land and water routes.

## Goal H

Explore with the Department of Commerce and AIDEA, the cost benefits of establishing a state insurance corporation for bonding Alaskan developments.

## Goal I

Utilize the University of Alaska Northern Research Center and other post secondary institutions ro research northern and arctic issues.

Necessary Action

- **Develop** and implement cooperative agreements with institutions establishing research partnerships in the development of oil and gas, minerals, timber, water, agriculture and recreation.
- **Utilize** the University of Alaska Water Research Center.

- **Work** with University of Alaska to establish a Center for Northern Forestry.
- **Work** with University of Alaska coal research program and industry to advance coal bed methane opportunities.
- **Cooperate** with the University of Alaska petroleum engineer program and industry to advance gas hydrates (estimate 40+ trillion cubic feet in Prudhoe/Kuparuk fields).

## Goal J

Identify, analyze, and mitigate potential hazards to human life, property, and economic recovery

**Necessary Action**

- *Earthquakes* - **Identify** and map active faults, determine their earthquake potential, and prepare maps of earthquake hazards in populated areas.
- *Volcanos* - **Determine** eruptive potential and hazards of volcanoes in Cook Inlet and Alaska Peninsula regions and, through participation in the Alaska Volcano Observatory, provide timely information to state public-safety officials in the event of threatened or actual eruptions.
- *Landslides* - **Prepare maps** of existing landslides and potential slope instability in developing areas.
- *Dam Safety* - **Assure** dams are constructed and maintained to protect lives and property, natural resource values, and the capital investment in the structures.
- *Flood and Erosion Mitigation Program* - **Provide** technical assistance to local communities, groups, and other agencies to mitigate potential flood and erosion to avoid expensive emergencies.
- **Provide** wildfire protection to appropriate state resources and protect life and property.
- **Maintain** inspection staff to regulate and control the entry into the State of plants, pests, seed, and products that are potentially harmful to the public interest.

## Goal K

Rehabilitate and expand existing park and tourism facilities and develop new facilities to meet growing demand.

**Necessary Action**

- **Pursue** capital improvement funding from state and federal sources with priorities in areas of highest demand that can stimulate private or local investment. Public facilities will be managed on a self-sufficient basis through user fees or concession contracts.

## Goal L

Advance tourism destination projects that serve as attractions for resident and visitor use.

**Necessary Action**

- **Pursue** capital funding from an interagency public/private effort to identify, plan, design, and market large scale tourism development opportunities.
- **Advance** tourism infrastructure projects in Denali, Wrangell-St. Elias, Prince William Sound, Hatcher Pass, and Glacier Winter Creek.

## Goal M

Expand DNR user-fee programs appropriate to cost and service.

**Necessary Action**

- **Pursue** legislation authorizing new user-fee categories, including day-use fees, interpretive programs, sale of DNR merchandise, water use, and publications.
- **Pursue** the establishment of a water management fee for all large (50 acre feet a year or more) water users.
- **Establish** and **adjust** use fees consistent with prevailing markets and more reflective of costs.

## Goal N

Protect, p[illegible]ve, and interpret Alaska's cultural heritage for residents and visitors.

**Necessary Action**

- **Pursue** capital funding for an Alaska Historic Preservation Plan.
- **Designate** new state park units that commemorate important themes, periods, and people in Alaska's history.
- **Strengthen** enforcement of the Alaska Historic Preservation Act.
- **Identify** and **pursue** opportunities for celebrations commemorating important historical events.

## Goal O

Assure that Alaska's water resources are managed responsibly and made available for maximum use.

**Necessary Action**

- **Ensure** all Alaskans obtain rights, within a reasonable time, to the water they use for domestic, commercial, and industrial purposes.
- **Assure** water-right applications and Temporary Water Use Permits are adjudicated in a reasonable time. Accelerate reduction of permit backlog (over 1000).

## Goal P

Audit and evaluate accounting integrity to assure full and timely payment for resources sold, leased, or permitted.

## Goal Q

Evaluate and audit the process for determining if waste of resources is occurring.

## Goal R

Enhance the role of local government in economic recovery.

**Necessary Action**

- **Revise** municipal land entitlement statutes to allow an increased locally controlled land base that stimulates local governments to attract diversified resource development value-added opportunities.
- **Provide** technical assistance in resource development to local governments.
- **Revise** appropriate regulations allowing greater local control and less delay in resource development permitting.
- Actively **solicit** local government participation in the development and implementation of regional strategies.

## Goal S

Evaluate the process for determining unauthorized use of state land and review the citation and litigation processes for the purpose of expediting resolutions.

**Necessary Action**

- **Amend** statutes and regulations to allow faster resolution of problems.

# MISSION III

***To simplify and accelerate regulatory processes and organizational structures to allow rapid, sustained economic growth.***

## Goal A

Craft statutes and regulations and a departmental organization to **streamline** natural resource development.

**Necessary Action**

- **Amend** Titles 38 and 46.
- **Amend** mining laws to promote coal and mineral exploration.
- **Implement** the Forest Practices Act.
- **Develop** a State Water Management Strategy including a plan for water exports.
- **Develop** statutes and regulations that enhance water sales.
- **Establish** program management accountability for implementation of the approved Strategic Plan.
- **Establish** the Alaska Water Management Council.
- Cooperatively **consolidate** state, federal, and local government offices in regional areas.
- **Develop** and **implement** regional strategic plans.
- **Improve** the investment climate by minimizing the time required to fully permit major projects.
- **Explore** the establishment of an oil and gas monitoring office with all affected agencies in one location.
- **Consolidate** inspection and regulatory functions related to food and agriculture industry within one state agency.
- **Reclassify** mineral land categories to make exploration permitting less expensive while maintaining appropriate environmental protection.

## Goal B

Identify and remove inappropriate barriers to the exploration and development of natural resources.

**Necessary Action**

- **Evaluate** and **revise**, where appropriate and with proper processes, land use categories that may foreclose or significantly inhibit resource development.
- **Add**, as appropriate, resource development and economic strategies and schedules to all land and resource management plans.
- **Use** land management plans to *simplify* development processes.
- **Develop** an asset- or economic-potential inventory for all state lands and related surface and subsurface resources.
- **Build** and **maintain** automated resource-inventory tracking and evaluation systems.

- **Develop** the ability to issue some permits on site, similar to ADF&G and DEC processes.
- **Acquire** necessary land records and surveys to protect state land against encumbrances and adverse claims.
- **Reacquire** those former state disposals that have limited or stopped the development of state resources with value-added potential.

## Goal C

Make accessible those unique Alaskan locations that hold special value.

Necessary Action

- **Remove** barriers to opening access routes such as the Haul Road for the purpose of resource extraction, recreation, and transportation.
- **Acquire** North Denali and Loop Road Access rights-of-ways.

## Goal D

Expand the department's volunteer and internship programs to augment the professional staff and provide additional public services.

Necessary Action

- **Identify** opportunities for volunteers at all levels of DNR.
- **Solicit** volunteers from Alaska and other states and nations.
- **Increase** park volunteer effort to at least 150,000 hours annually.

## Goal E

Create local economic development opportunities through commercial use permits, concession contracts, and other public/private partnerships.

Necessary Action

- **Expand** opportunities for business operations in state parks or other designated recreational areas.

## Goal F

Improve Alaska's highway waysides, scenic overlooks, trails, and wildlife viewing sites.

Necessary Action

- **Work** with DOTPF to provide recreational and tourism enhancement, using the Intermodal Surface Transportation Efficiency Act (ISTEA).
- **Develop** and implement a cooperative management agreement with DOTPF for improved services at selected highway waysides in exchange for improved road maintenance in state parks.
- **Implement** an interagency memorandum of understanding for the development of a wildlife-viewing program.
- Continue **research** on possible state legislation to implement the federal Symms Trail Act and designate a state trails council.

## Goal G

Establish a state park foundation to raise funds, acquire land, and secure donations of goods and services for the state park system.

Necessary Action

- **Create** a park foundation and develop it as appropriate.
- **Work** with park advisory boards and interest groups to draft articles of incorporation and designate a board of directors.

# MISSION IV

***To raise public awareness of Alaska's natural resource asset base, its market potential within Alaska and the world, how it effects our daily lives, and how to implement its promise for our common future.***

## Goal A

Establish and maintain a current comprehensive portfolio of Alaska's marketable assets.

**Necessary Action**

- **Identify, inventory,** and **quantify** the surface and subsurface natural resources, and rank them based on market potential.
- **Determine** the market potential of Alaska's metals, minerals, construction materials, hydrocarbons, water, geothermal resources, wood products, agriculture, lands.
- With the cooperation of private industry, **archive, maintain** and **make available** a systematic collection of subsurface geological samples, specimens, and drill cores from oil wells, water wells, geothermal fields, and mineral properties throughout Alaska.
- **Publish** and **disseminate** technical and summary reports on Alaska's geological and hydrological resources as a stimulus to private investment.
- **Publish** *practical* guides for resource development. Include maps of inven.ories resource ownerships, use limitations, regulatory process descriptions.
- Work in direct cooperation with the Department of Commerce and Economic Development and International Trade to explore and enhance the world potential for Alaska products.

## Goal B

Create a resource development and marketing education program in cooperation with other agencies, the University of Alaska, and other appropriate institutions.

**Necessary Action**

- **Negotiate** a cooperative agreement with appropriate academic and research programs.
- **Coordinate** with Department of Commerce, AIDEA, and the Alaska Permanent Fund Board.

## Goal C

Raise citizen awareness of the domestic and export value of Alaska's water resources.

**Necessary Action**

- **Establish** a water marketing group.
- **Establish** a water education group of government agency, special interest, and education representatives under the Alaska Water Management Council.
- **Utilize** state Public Information Centers for marketing.

## Goal D

Train staff and volunteers in search and rescue, law enforcement, emergency medicine, interpretive programs, and public information services in collaboration with other appropriate State and Federal agencies.

**Necessary Action**

- **Pursue** legislation giving the DNR commissioner the authority to commission trained park rangers and others for law enforcement.
- **Update** and **expand** the department's policies and procedures for training and professional standards.
- **Appoint** division training officers to coordinate annual training for staff and volunteers.

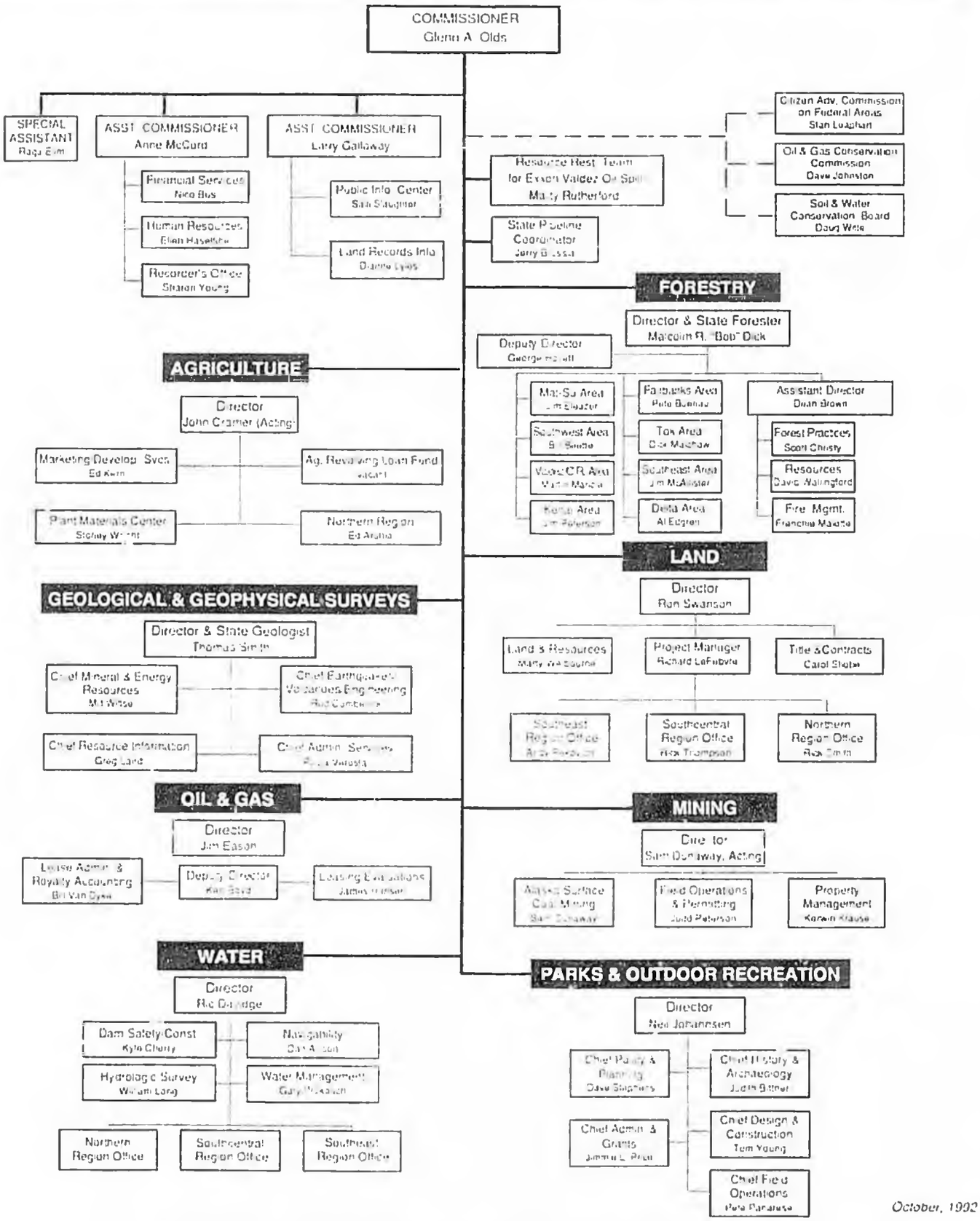
## Goal E

Improve recreation and tourism-related research and marketing, enabling better quality control and more precise targeting of tourism developments and visitor services.

**Necessary Action**

- **Strengthen** relationships with the Division of Tourism, Alaska Tourism Marketing Council, Alaska Visitors Association, and colleges and universities.
- **Develop** a marketing plan for state parks and other state owned recreational resources in cooperation with the Division of Tourism.

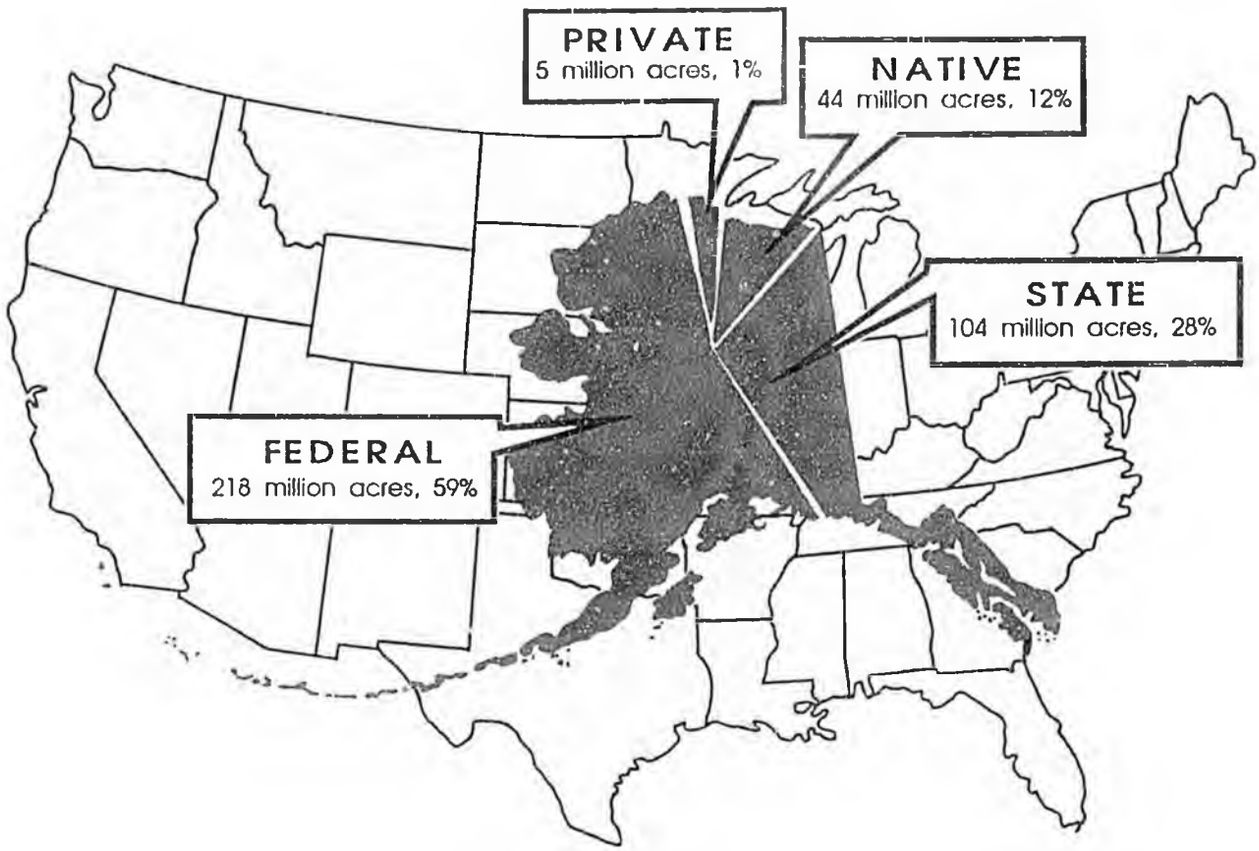
# DEPARTMENT OF NATURAL RESOURCES




*October, 1992*

This publication was developed and released by the Department of Natural Resources, at a cost of $0.74 per copy to inform the public of the efforts of the department to stimulate economic development and diversification. This publication was printed in Anchorage, Alaska.

# WHO OWNS ALASKA?




Prepared by the Management Team of the Department of Natural Resources - 1992

PRINTED ON RECYCLED PAPER

THE ALASKA



DEPARTMENT OF

# NATURAL RESOURCES

# THE DEPARTMENT OF NATURAL RESOURCES

**has the responsibility to manage and develop Alaska's land, water, and surface and subsurface resources.**

- It oversees approximately 86 million acres of uplands and 65 million acres of tidelands, shorelands, and submerged lands.
- The State also owns about 40% of the nation's freshwater resources.
- The department has 8 divisions, offices in 22 Alaskan communities, and nearly 740 full-time employees and 230 part-time and seasonal employees.

STATE OF ALASKA
WALTER J. HICKEL
GOVERNOR

DEPARTMENT OF NATURAL RESOURCES
GLENN A. OLDS
COMMISSIONER

Prepared by:
Public Information Center

# THE COMMISSIONER'S OFFICE

*sets department goals and policies and provides support services to DNR's divisions and 25 boards and commissions. It serves the public and private sectors through fourteen Recorders' Offices throughout the state, and its public information services. The Pipeline Coordinator's Office, the Citizen's Advisory Commission on Federal Areas, the Alaska Oil and Gas Conservation Commission, and the Soil and Water Conservation Board are also within the Commissioner's Office. The Commissioner maintains offices in Juneau and Anchorage.*

## *Intellectual Capital*

### ALASKA HAS

- people who have developed special knowledge, skills and a heightened sensitivity to the challenge of survival in the Far North. Alaskans have pioneered arctic oil & gas exploration, environmental clean-up and mitigation, development of specialized plants, and have experience in resource sales, mapping and mining.
- institutions that facilitate technology transfers: Alaska Foundation for Science and Technology, the World Trade Center and the Center for International Trade, the Arctic Research Commission, the Northern Forum and the many research institutes associated with Alaskan universities.



# THE DIVISION OF AGRICULTURE

*works with local producers to promote and support Alaska's agriculture industry through financing for farmers and processors, conservation education and inspection, and farm product certification. The "Alaska Grown" program promotes Alaska's farm products, and the Plant Materials Center develops and tests plants for Alaska's climate for use in agriculture production, erosion control, land reclamation and habitat improvement.*

### ALASKA

- has more than 1 million acres of open farmable land with nearly 200,000 acres in production.
- has 9 million acres of potential crop land in state and private ownership
- has vast acreage and bountiful natural gas creating potential for a greenhouse industry that can help feed a growing world population.

### ALASKA'S 560 FARMS

- produce world-famous giant vegetables--a result of natural conditions and long summer light.
- average more than 1,000 acres each, and contribute $30 million to Alaska's economy each year.
- produce more than 20 million pounds of potatoes annually.
- are the number one U.S. producers of reindeer meat.




# THE DIVISION OF FORESTRY

*manages State Forests for multiple use and sustained yield, protects forest values, and develops and sells forest products. Staff gives technical assistance to private forest landowners; operates the State Forest Nursery, and administers the Forest Practices Act. Foresters cooperate with other agencies to protect 134 million acres of private and state forest land from fire and disease. Village crews are trained in fire protection, enabling them to work on fires in Alaska and around the nation.*

## ALASKA

- has over two million acres of dedicated state forest located in the Tanana Valley and near Haines.
- sells about 25 million board feet of timber annually
- produces 800,000 seedlings a year for reforestation.
- protects 134 million acres--over twice the size of Washington State--with its highly trained wildfire suppression organization.
- is responsible for implementing the Forest Practices Act on non-federal lands throughout the state.






# THE DIVISION OF GEOLOGICAL & GEOPHYSICAL SURVEYS

*collects, analyzes, and interprets data on natural resources and natural conditions; maps and inventories resources on state land for use by government, private industry, scientists, educators and the public. Their geologic hazards program provides engineering and safety information on slope-stability, volcano and earthquake hazards, permafrost and other natural conditions. The staff annually publishes about 75 technical reports and geologic maps and distributes more than 11,000 copies of publications.*

## ALASKA

- has 1,980 known mineral deposits on land open to mining.
- has 2.8 trillion tons of coal resource, representing 44% of the nation's coal and 15% of the known world's inventory.
- has some of the world's lowest sulfur coals.
- has three gold deposits containing an estimated 13.0 million ounces, worth $5 billion (in place).
- has identified reserves of seven of 13 strategic minerals including tin, nickel, platinum, cobalt, chromium, graphite, and titanium.
- has copper, lead, zinc, and molybdenum contained in eight deposits worth $32 billion.
- has mines accounting for 57% of U.S. production of zinc, 16% of silver, and 13% of lead.

# THE DIVISION OF MINING

*oversees state mineral exploration, development and leasing programs (excluding oil, gas and geothermal energy) on state land; maintains records of locatable mineral claims; administers the state's Surface Coal Mining Control and Reclamation Program; and provides mineral information to the public and technical assistance to the mining industry.*

## ALASKA

- has 96 million acres of state land available for mineral exploration and mining; another 63 million acres are available through other land owners.
- has 1.4 million acres presently under mineral location or lease, representing only 1.5% of the state land open to mineral entry.
- has about 31,000 mining claims on 1.3 million acres of state land generating $650,000 in revenue to the state treasury.
- generates nearly $50,000 from mining leases, excluding Healy.
- generates more than $1 million in coal royalties each year.

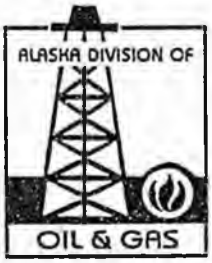


# THE DIVISION OF LAND

*is the primary manager of Alaska's land holdings. Responsibilities include classifying land; selling land and materials; leasing state land for recreation, commercial and industrial uses; managing major projects such as land selections to fulfill the state's land entitlement, reconstituting mental health lands, and Fort Knox gold mine development.*

## ALASKA

- is 1/5 the size of the lower 48 states combined – more than twice the size of Texas.
- owns 86 million acres of upland.
- has 22 million acres of uplands under selection.
- manages 34 thousand miles of coastline and 65 million acres of tide and submerged land.
- generates about $10 million in revenue from land sales and fees.
- generates gravel and other material sale revenues exceeding $1.1 million.
- has transferred 552,000 acres to private ownership since 1960.
- has over 2.5 million acres in Public Use and Recreational River Systems.




# THE DIVISION OF OIL & GAS

*develops and manages the state's oil and gas leasing programs which generate 85% of the State of Alaska's general fund revenues. The staff identifies prospective lease areas; performs geologic, economic, environmental and social analyses, develops a five-year leasing schedule, and conducts public review of proposed sales. The Division conducts competitive oil, gas and geothermal lease sales and monitors collection of all bonuses, rentals and royalties resulting from its leasing program.*

## ALASKA

- has the two largest known oil fields in North America: Prudhoe Bay and Kuparuk River.
- has oil reserves: over 4.6 billion barrels remaining at Prudhoe Bay; 300 million barrels at Pt. McIntyre; over 500 million barrels in other known North Slope fields.
- has six common-carrier pipelines, including the 800-mile Trans-Alaska Pipeline that transports up to 2 million barrels of oil per day, 25% of the nation's domestic production.
- has 1,200 oil and gas leases: three-quarters on the North Slope, one quarter in Cook Inlet.
- has the nation's only liquid natural gas (LNG) export operation at Nikiski
- has 14 lease sales scheduled through 1994.






# THE DIVISION OF PARKS & OUTDOOR RECREATION

*plans, develops and manages the Alaska State Park System, which hosts over six million visits annually, with assistance from its Volunteers in Parks and youth employment program. The park system provides interpretive programs for its visitors; administers grant programs and manages historic sites and a wildlife preserve. The Alaska Office of History & Archaeology is housed within the Division of Parks.*

## ALASKA

- has the newest and largest state park system in the United States containing more than 130 units and more than 3.2 million acres.
- averages nearly seven million "visits" to its state parks each year with one out of four visits from a non-resident tourist.
- manages more than 2,000 campsites, as well as visitor centers, picnic ares, fishing access sites, trail system, public use cabins, and historic sites.
- generates more than $1 million in user and concession fees annually.
- has the largest volunteer program in Alaska with more than 400 volunteers contributing over 60,000 hours of labor.
- has one-third of the total state park acreage in the United States.
- has the nation's largest state park, Wood-Tikchik, with 1.6 million acres.
- has the world's largest concentration of bald eagles each fall, when 3,500 gather to feed on late salmon runs in the Alaska Chilkat Bald Eagle Preserve.

# THE DIVISION OF WATER

*manages, plans, promotes and authorizes responsible use of Alaska's water resources. Its staff also works to resolve state title to submerged lands under all navigable water bodies; collects and provides information on quantity and quality of Alaska's vast surface, ground and coastal waters; issues water use permits and water rights; and protects lives and property through its Dam Safety Program.*

## THE STATE OF ALASKA

- has about 40% of our nation's free (not frozen) freshwater resources in 30,000 streams and 3 million lakes. An estimated 100,000 glaciers covering approximately 28,800 square miles hold almost 75% of all fresh water in Alaska.
- owns and manages 20 million acres of inland waters–and claims title to 12 to 14 million acres of land underneath those waters.
- discharges nearly 1 billion acre feet (892 billion gallons a day) into the ocean annually.
- has vast recharge capabilities in locations accessible for large volume water exports with annual precipitation upwards of 400 inches in some southeast drainages.



# THE DEPARTMENT OF NATURAL RESOURCES & THE ALASKA PERMANENT FUND

- Since 1977, Alaskans have saved 25% of the $38.8 billion in petroleum revenues received by the state.
- The State of Alaska annually deposits a minimum of 25% of each petroleum royalty dollar into the Permanent Fund.
- The Permanent Fund has earned $8.9 billion since its inception in 1977.
- Each eligible Alaskan has received a Permanent Fund Dividend check since 1977. The average payment to individual Alaskans is more than $900.00.
- 65% of the Permanent Fund's principal is from the state's petroleum revenues, the majority of which comes from land managed by the Department of Natural Resources.
- Approximately half the Permanent Fund's earnings have been distributed to Alaskans, and half has been saved for future generations through inflation-proofing and special appropriations.

# DEPARTMENT INDEX

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# Division of Forestry

# 1991

# Annual Report

Alaska Department of Natural Resources
Division of Forestry
State Forester's Office
P.O. Box 107005
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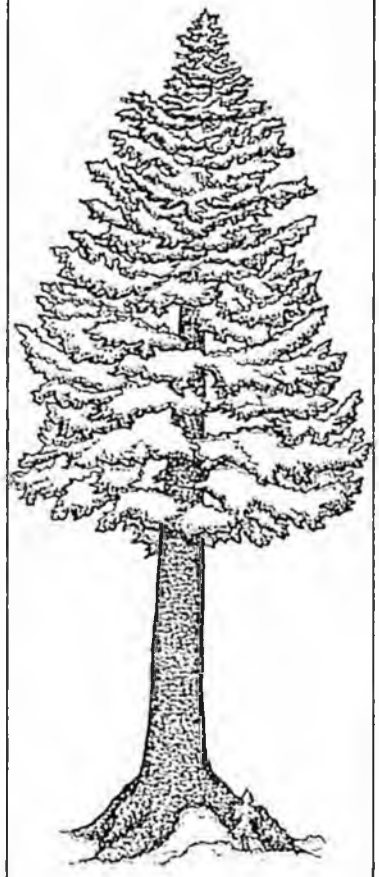
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# State Forester's Comments

*Malcolm R. "Bob" Dick*



This year's annual report will give you an overview of 1991. I would like to look ahead—set the stage, if you will—for 1992 and beyond.

Forest Practices regulations are complete. Next comes training, implementation and monitoring. The division will develop training workshops for agencies and operators; implementation of the new regulations will occur once the final package is signed; monitoring programs will be developed with agencies and operators. The Board of Forestry will be an integral part of the division's Forest Practices Program.

Timber sales will get more attention in 1992. The division will review the program to see where and how we can get timber to market. On a related note, the new forestry nursery will be built in Palmer. We will lose one crop but the expansion will supply more, higher quality seedlings destined for harvested and burned areas.

The Fire and Aviation Program has its hands full as it seeks to find the most efficient and safe program for today's budget realities. The growing urban/wildland interface and increasingly complex interagency relationships provide significant challenges for the 1990s. Restructuring options are being reviewed in such areas as crew contracting, aviation management, logistics, warehousing and fire prevention.

The division's Resources Section houses forest inventory, insect and disease, and silviculture experts, who provide technical and on-site support for our operational programs. Increasingly, this group is lending its expertise to landowners and others outside the division. We expect this trend to continue.

The Forest Health Program, which is just getting underway will focus on forest health problems, particularly the spruce bark beetle. The division will develop a plan for the Kenai Peninsula, emphasizing public input.

The division has also joined the national tree planting program, America the Beautiful. This federally funded effort includes the Forest Stewardship Program, which promotes stewardship on private non-industrial forested land, and Urban and Community Forestry, which supports tree planting and care in urban areas and communities. Two citizen committees guide these programs.

In 1989 the division established a goal of being a full service forestry agency, dedicated to good forest stewardship and the efficient use of our forests. We are getting ever closer to that goal, even with reduced budgets. It hasn't been easy but we are moving forward and are proud of our progress.

*"... the division established a goal of being a full service forestry agency, dedicated to good forest stewardship and efficient use of our forests. We are getting ever closer to that goal..."*

# Introduction

The Alaska Division of Forestry was established in November, 1981. Prior to that time it was a section within the Division of Forest, Land and Water Management. Today it is one of eight divisions under the Direction of the Commissioner of the Department of Natural Resources. Its mission is to manage and protect the state's forest resources.

The division manages state forested lands for multiple use and sustained yield. It encourages development of the timber industry and forest products markets; conducts personal-use and commercial fuelwood and timber sales; gives technical assistance to forest landowners; operates the Forest Regeneration Center; and administers the Forest Practices Act and the Community Forestry and Stewardship programs. The division also manages the Haines and Tanana Valley state forests, consisting of more than two million acres.

To perform these functions, the division has a central office for policy and program direction, regional offices that provide program direction and support, and ten area offices responsible for field work on a statewide basis.

In 1991 the division employed 94 people full-time, 138 seasonally, and about 950 emergency firefighters.

The Division of Forestry is designed to:

- protect water quality, fish and wildlife habitat and other forest values through the use of appropriate forest practices;
- provide efficient management of the benefits and products associated with a dynamic forest system;
- manage a wildland fire program on public, private and municipal lands;
- provide administrative and technical services to support program activities and meet state administrative directives.

# 1991 Highlights

Day-to-day activities may seem routine, but collectively they add up to major accomplishments for the Division of Forestry.

In 1991 the division:

- Cooperated with federal agencies in providing fire protection for 134 million acres of private, state and municipal land.
- Responded to 493 fires that burned 174,276 acres of state-protected land.
- Employed emergency firefighters who collected $9.09 million in state and federal wages.
- Administered aviation contracts and rentals that, along with fuel purchases, put nearly $6 million into Alaska's economy in 1991.
- Processed 193 forest practices notifications for 57,237 acres of forest land and conducted 222 inspections.
- Produced 827,388 seedlings for reforestation of federal, state, municipal and private land.
- Planted 618,936 seedlings on 605 acres of state harvested or burned land.
- Issued 40 commercial timber sale contracts and 11 salvage beach log licenses.
- Issued 928 fuelwood permits, 20 house log sales and 12 saw log sales for personal use by Alaskans.
- Issued 4,359 permits for burning, as part of the fire prevention program—1,500 more than in 1990.
- Constructed 31 miles of road and maintained an additional 180 miles.
- Granted federal community forestry funds, totaling $37,000, to nine communities for tree planting projects. The grants were matched with $53,000 in local donations and in-kind services.
- Administered a $32,000 grant from the Small Business Administration for a tree planting and highway beautification project in Delta Junction.
- Completed a draft plan for managing the 360-acre Homer Demonstration Forest.
- Began a major effort to address forest health in Alaska, beginning on the Kenai Peninsula.
- Participated in six open houses and provided information to the Division of Land for the Kenai Area Plan.



# Fire Management

## Wildland fire protection

Wildland fire suppression in Alaska is administered by the Division of Forestry, the Bureau of Land Management's Alaska Fire Service, and the U.S. Forest Service. Each organization protects its respective land under cooperative suppression agreements that were developed through an interagency planning process. Alaska is the only state covered by an interagency fire plan.

The Alaska Interagency Fire Management Plan recognizes that fire is a part of the natural cycle, as well as a potential destroyer of life, property and resources. The plan divides the state into fire-suppression areas based on major natural fire breaks and the objectives of land managers.

Fire suppression efforts are focused on communities and valuable natural resources. In remote and unsettled areas, fires are monitored to assure they do not burn unchecked toward areas where human life or development can be threatened.

All lands in Alaska have been placed in one of four Fire Protection Levels:

**Critical Protection:** Areas where life and property are present receive immediate and aggressive suppression efforts.

**Full Protection:** Areas with high value resources, where fire adversely impacts the resource management objectives, also receive immediate and aggressive suppression efforts.

**Modified Action:** Areas of high value resources, but where land managers may consider the trade-off of acres burned versus suppression costs. Initial attack is immediate but resource managers guide the suppression effort.

**Limited Action:** Areas where fire is beneficial or the cost of fighting the fire is greater than the fire damage. Fires are monitored and no suppression action is taken except to prevent the fire from burning onto higher value land.

## 1991 fire season

The 1991 fire season began with concerns that the drying trend of the past few summers could cause problems. The record snow pack in the Interior did not soak the organic layer because most of the snow melted before the ground thawed enough to absorb it.

The first fire began on April 1, on state protected land in the Delta area. There were 20 fires in April, all on state protected land. The first lightning fire of the summer was on May 6 near Delta. There were nine additional lightning fires in May; none caused major problems. Fire occurrences for the month were not unusual, however, 27 new fires were reported May 1 through May 12 in state protected areas.

June began normally with the first day of multiple lightning-caused fires on June 6. The season's one-day high for new starts was June 30, with 46 new fires.

The project fire period began on June 22 with 42 new fires. From that day until July 3 there were 269 new fires. The Upper Yukon and Tanana Zones and the Southwest Area were the hardest hit. The Yukon Territory also recorded 100 starts the last eight days of June.

After July 3 starts dropped to an average of 2.7 per day for the rest of the month. There were no new starts the first week of August, however, there were 28 during the rest of the month.

There were 20 new fires during September, with four occurring on September 2, the day of the last recorded lightning start. The last AFS fire began on September 29 and the last fire of the season was reported on November 15 near Illiamna.

# Fire Highlights

## Pothole Lake Fire

The Pothole Lake Fire was discovered on May 19 in the Kenai National Wildlife Refuge, in an area that required monitoring only. After aerial reconnaissance and a review of weather forecasts, the Division of Forestry and the refuge manager decided to continue daily monitoring.

By May 21 the fire was threatening to move east, possibly into a modified suppression area in the Chugach National Forest. An updated evaluation obligated the division to take some indirect suppression action and a small management corps and firefighters were dispatched.

On May 24, after winds switched during a large burnout effort, a type II team was brought in. During a five-mile run on May 26, requiring the evacuation of Hidden Lake Campground, a type I team was employed. At the height of the suppression activity the fire organization grew to more than 625 people. The fire was controlled on June 3 at 8,900 acres.

The fire appeared in local, state and national news stories due to its proximity to Cooper Landing and the evacuation of the campground. Although the fire drew attention to the beetle-killed forests, it seemed to spread through the dead grass of early spring more than through the dead spruce trees.

A local multi-agency coordinating group, made up of the Forest Service, Fish and Wildlife Service, Kenai Peninsula Borough and the Division of Forestry coordinated concerns of land managers and presented them to the fire management team.

## American Wellesly Lake Fire

On August 17, a 40-mph wind caused a fire, which was being monitored on Fish and Wildlife Service land, to escape. The fire ran nine miles in six hours and came within a half-mile of the U.S. Customs and Immigration complex at the Yukon/Alaska border. It also threatened another dozen residences and structures along the Alaska Highway, both in Canada and in Alaska. Heavy smoke and high winds led to the evacuation of 25 people.

The fire became dangerous when it spread toward homes, other high-value improvements and the visual corridor along the Alaska Highway. It required the cooperation of both the U.S. and Canadian Customs and Immigrations Services, the Fish and Wildlife Service, the BLM, the Division of Forestry, the Canadian Department of Northern Affairs and Canadian Fire Management. Interagency and international fire suppression cooperative agreements were successfully implemented during the fire. The fire was contained at 19,150 acres.

## 1991 fires by cause on state protected land

| | Number | Acres |
|---|---|---|
| Lightning | 130 | 164,920.2 |
| Campfires | 60 | 7,941.5 |
| Field/debris | 72 | 996.5 |
| Fireworks | 17 | 304 |
| Dump/trash | 21 | 21.7 |
| Children | 37 | 6.8 |
| Smoking | 27 | 6.1 |
| Incendiary | 7 | 2 |
| Other | 122 | 78 |
| **Total** | **493** | **174,276.8** |

# 1991 Statewide Fire Statistics

## Fire activity by landowner

| Landowner | No. | Acres |
|---|---|---|
| State Division of Land | 112 | 255,637.3 |
| State Dept. of Transportation | 14 | 3.3 |
| State Refuge | 0 | 0 |
| State Parks | 14 | 7.8 |
| State Railroad | 8 | 21 |
| State Forest | 6 | 3.7 |
| State Mental Health | 3 | 5,761 |
| State University | 5 | 1,812.7 |
| Borough/City | 15 | 3 |
| Private | 270 | 1,342 |
| Bureau of Land Mgmt. | 89 | 522,577.6 |
| National Park Service | 13 | 86,651.1 |
| Fish & Wildlife Service | 72 | 703,090.7 |
| Bureau of Indian Affairs | 5 | 673.2 |
| Native Lands | 81 | 169,478.6 |
| Military | 35 | 2,688.1 |
| Canada | 2 | 345 |
| Forest Service | 16 | 557.1 |
| **Total** | **760** | **1,750,653.2** |

## Fire activity statewide

| | |
|---|---|
| Number of fires: | 760 |
| Acres burned: | 1,750,653.2 |

## Area key

| | |
|---|---|
| AMS | Anchorage/Mat-Su |
| KK | Kenai/Kodiak |
| VCR | Valdez/Copper River |
| SW | Southwest |
| F | Fairbanks |
| D | Delta |
| T | Tok |
| SE | Southeast |
| CGF | Chugach National Forest |
| CMF | Tongass Nat'l Forest, Chatham Area |
| KNF | Tongass Nat'l Forest, Ketchikan Area |
| STF | Tongass Nat'l Forest, Stikine Area |
| GAL | Galena |
| TAL | Tanana |
| UYK | Upper Yukon |
| FCC | Fire Coordination Center, Fairbanks |

# 1991 Fires by Area and Management Option

## State protected

| Area[1] | CRITICAL No. | CRITICAL Acres | FULL No. | FULL Acres | MODIFIED No. | MODIFIED Acres | LIMITED No. | LIMITED Acres | TOTAL No. | TOTAL Acres |
|---|---|---|---|---|---|---|---|---|---|---|
| AMS | 102 | 1,132.1 | 10 | 5.5 | 2 | 1.8 | 2 | 128 | 116 | 1,267.4 |
| KK | 43 | 19.6 | 3 | 106.5 | 0 | 1,386 | 1 | 6,418 | 47 | 7,930.1 |
| VCR | 7 | 1.6 | 14 | 3.9 | 1 | 0.2 | 4 | 5,697 | 26 | 5,702.7 |
| SW | 6 | 5.4 | 33 | 45,181.8 | 17 | 36,941.8 | 26 | 53,661.8 | 82 | 135,790.8 |
| F | 112 | 165.8 | 37 | 1,737.1 | 10 | 505.7 | 1 | 10 | 160 | 2,418.6 |
| D | 8 | 12 | 12 | 179.7 | 0 | 0 | 0 | 0 | 20 | 191.7 |
| T | 18 | 2.7 | 14 | 16.7 | 3 | 155.0 | 6 | 20,801 | 41 | 20,975.4 |
| SE | 0 | 0 | 1 | 0.1 | 0 | 0 | 0 | 0 | 1 | 0.1 |
| **Total** | **296** | **1,339.2** | **124** | **47,231.3** | **33** | **38,990.5** | **40** | **86,715.8** | **493** | **174,276.8** |

## U.S. Forest Service protected

| Area[1] | CRITICAL No. | CRITICAL Acres | FULL No. | FULL Acres | MODIFIED No. | MODIFIED Acres | LIMITED No. | LIMITED Acres | TOTAL No. | TOTAL Acres |
|---|---|---|---|---|---|---|---|---|---|---|
| CGF | 7 | 14 | 6 | 1.3 | 0 | 0 | 1 | 0.1 | 14 | 15.4 |
| CMF | 0 | 0 | 3 | 0.3 | 0 | 0 | 0 | 0 | 3 | 0.3 |
| KNF | 2 | 0.2 | 1 | 0.2 | 0 | 0 | 0 | 0 | 3 | 0.4 |
| STF | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Total** | **9** | **14.2** | **10** | **1.8** | **0** | **0** | **1** | **0.1** | **20** | **16** |

## Alaska Fire Service protected

| Area[1] | CRITICAL No. | CRITICAL Acres | FULL No. | FULL Acres | MODIFIED No. | MODIFIED Acres | LIMITED No. | LIMITED Acres | UNPLANNED* No. | UNPLANNED* Acres | TOTAL No. | TOTAL Acres |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| GAL | 0 | 0 | 7 | 7,803 | 27 | 17,739.2 | 26 | 71,429.2 | 1 | 3 | 61 | 96,974.4 |
| TAL | 3 | 271.6 | 14 | 72,047.4 | 33 | 543,662.9 | 40 | 326,260.6 | 26 | 2,556.5 | 116 | 944,799 |
| UYK | 6 | 4.1 | 15 | 74.1 | 24 | 197,191.8 | 16 | 333,639.8 | 9 | 3,677.1 | 70 | 534,586.9 |
| FCC | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Total** | **9** | **275.7** | **36** | **79,924.5** | **84** | **758,593.9** | **82** | **731,329.6** | **36** | **6,236.6** | **247** | **1,576,360.3** |

## Statewide

| Area[1] | CRITICAL No. | CRITICAL Acres | FULL No. | FULL Acres | MODIFIED No. | MODIFIED Acres | LIMITED No. | LIMITED Acres | UNPLANNED* No. | UNPLANNED* Acres | TOTAL No. | TOTAL Acres |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Total | 314 | 1,629.1 | 170 | 127,157.6 | 117 | 797,584.4 | 123 | 818,045.5 | 36 | 6,236.6 | 760 | 1,750,653.2 |

[1]Area key on page 6 [2]Military land

# Fire management goals

## Management

- Stabilize the organizational structure that supports the fire program.
- Finalize master agreements with the BLM and Forest Service.
- Become a working member of the Western State Fire Managers organization.
- Improve property management, inventory control and fire equipment cost-tracking by computerizing the fire warehouse system.
- Complete and implement the *Forest Fire and Aviation Program: A Program Review and Workforce Analysis 1991.*

## Operations

- Complete development of an Air Attack Supervisor position under supervision of the Fire Operations Forester and implement the Air Attack Supervisor Module.
- Strengthen relationship with the Chugach National Forest.
- Verify the accuracy of the Canadian Forest Fire Danger rating System on Alaska fuels.
- Expand the prescribed fire program with the Alaska Department of Fish & Game.
- Initiate an evaluation of the merits of the Limited Action Protection category and quantify the impacts on the ecosystem and natural resources.
- Complete consolidation of the 13 Interagency Fire Management Plans.

## Aviation

- Develop relationship with the Alaska Fire Service to provide for joint decisions on air tanker and smokejumper aircraft requirements.
- Complete a Five-year Aviation Plan.

## Training

- Formalize our approach to providing training for structure fire departments.
- Train division managers and initial attack personnel in the Canadian Forest Fire Danger Rating System.
- Develop and offer contract administration training with emphasis on aviation contracts.
- Provide fire management training for division line officers.

## Prevention

- Initiate action to create a non-profit fire prevention and education organization. (Learn to Live with Wildland Fire)
- Complete Hazard Mitigation Plan on the 1990 Tok River fire. (FEMA requirement)
- Conduct a prevention analysis to determine program needs and deficiencies. (USFS participation)

## Communications

- Complete and bring to full operation the computerized Fire Suppression Tracking System.
- Complete Five-year Communications Plan.
- Determine if the Initial Attack Management System is a viable communication network for interagency initial attack operations.
- Complete communications upgrades for the Southwest and Tok areas. (dependent on CIP/supplemental funding)

# Fire management program

## Fire and aviation working group formed

In December, 1990 a fire and aviation working group formed to help guide the division's fire program. The group has been accepted within the division as an effective clearinghouse for fire related issues and has become an important part of the management structure. The group meets monthly to help chart the future of the fire program.

## Interagency cooperation

The state participated in interagency type II fire overhead teams for the first time in 1991. The state and federal government had previously had separate teams. The teams were used successfully on state and federal responsibility fires nine times and the state will continue to participate in the future.

In another cooperative, cost-saving effort, the Southern Region and the Chugach National Forest started an interagency dispatch function in Anchorage.

## Land manager meetings

The Southwest Area Forester and Fire Management Officer met with land managers for the National Park Service and the Fish and Wildlife Service in Dillingham, Bethel and King Salmon to discuss fire plans and management goals. This was the first opportunity for some land managers to hold such discussions with the fire management agency. The meetings proved to be informative and good training exercises for all who participated. Wildland Fire Suppressio topics covered were:

- fire management plans and updates
- suppression capabilities
- communications, radio frequencies
- cabins/improvements, locations
- sensitive areas such as archaeological sites, burial sites, and nesting areas
- level of involvement and land manager's ability to assist DOF
- land manager's concerns about DOF operations
- utilization of resources

## Canadian Forest Fire Danger Rating System

In 1990, the division examined the possibility of using the Canadian Forest Fire Danger Rating System in Alaska, as it appeared to be more applicable to Alaska's fire environment than the American System. Several division employees went to Alberta for training in the spring of 1991 and then trained other personnel. The system was very useful in managing wildfire in the state in 1991.




The Division of Forestry and the Big Lake Volunteer Fire Department cooperate on an early season grass fire.

## T-28 program

The state has successfully used surplus T-28 airplanes since 1984. However, due to the poor availability of replacement parts, they will be gradually phased out by 1993.

## McGrath retardant ramp damaged by flood

The retardant ramp in McGrath was closed for a week during fire season because of flood damage. It was reopened with a new management plan detailing safety procedures and traffic patterns to increase safety and prolong the useful life of the surface. The plan included moving the service island and installing steel hardstands.

Damage to the ramp was estimated at $63,900. Total flood damage to the fire station and ramp was estimated at $114,822.

## Tok fire mushrooms

The 100,000-acre fire near Tok in 1990 created conditions for a bumper crop of morel mushrooms in 1991. An estimated 350,000 pounds were collected and nine buyers paid pickers up to $3 per pound, green weight. The morel mushroom is a delicacy in Europe, where it is sold for up to $75 per pound dry weight. A few local families who persisted earned up to $20,000 for their summer's work. Many professional pickers arrived from outside Alaska, including a crew of 30 Cambodians that camped out for 30 days.

This was the first time commercial mushroom buyers had been to Interior Alaska and the experience has created nationwide interest in commercial mushroom harvesting in Alaska. The many large fires that burn in Alaska each year may provide other opportunities for mushroom harvesting—an interesting way to use forest products to diversify Alaska's economy.

## Rural community fire protection grants

The division administers Rural Community Fire Protection grant monies from the U.S. Forest Service. Through this program, volunteer fire departments serving communities of under 10,000 people may apply for grants of up to $5,000 on a 50/50 cost share basis to organize, train and equip fire protection units. In 1991 the division approved 20 grants, totaling $69,990, to conduct training and to purchase portable pumps, radios, protective clothing, smoke detectors, self contained breathing apparatus, fire hose and supplies.

| Department | Grant Amount |
|---|---|
| Haines VFD | $1,500 |
| Thorne Bay VFD | 5,000 |
| Wrangell VFD | 2,930 |
| Chugiak VFD | 2,358 |
| Houston VFD | 1,968 |
| Palmer VFD | 5,000 |
| Victory VFD | 3,200 |
| Chitina VFD | 600 |
| Copper Center VFD | 5,000 |
| Glennallen VFD | 5,000 |
| Kenny Lake VFD | 5,000 |
| Valdez VFD | 4,664 |
| Ester VFD | 2,500 |
| Chena-Goldstream VFD | 3,750 |
| McKinley VFD | 900 |
| Moose Creek VFD | 2,140 |
| Nenana VFD | 4,430 |
| North Star VFD | 5,000 |
| Delta VFD | 4,050 |
| Huslia VFD | 5,000 |
| **Total** | **$69,990** |

## Emergency firefighter wages paid by agency

| Calendar Year | State | Federal | Total |
|---|---|---|---|
| 1980 | 614,887 | 600,561 | 1,215,448 |
| 1981 | 1,705,360 | 2,898,293 | 4,603,653 |
| 1982 | 19,950 | 1,230,351 | 1,250,301 |
| 1983 | 1,553,258 | 1,969,374 | 3,522,632 |
| 1984 | 234,388 | 507,004 | 741,392 |
| 1985 | 561,238 | 2,656,350 | 3,217,588 |
| 1986 | 2,515,750 | 2,832,208 | 5,347,958 |
| OT[1] | 561,770 | | 561,770 |
| 1987 | 646,674 | 5,352,799 | 5,999,473 |
| OT[2] | 643,932 | | 643,932 |
| 1988 | 4,474,107 | 5,146,861 | 9,620,968 |
| OT[3] | 907,865 | | 907,865 |
| 1989 | 1,805,955 | 2,276,175 | 4,082,130 |
| 1990 | 7,398,211 | 5,765,547 | 13,163,758 |
| 1991 | 5,344,384 | 3,741,521 | 9,085,905 |
| **Total** | **$28,987,729** | **$34,977,044** | **$63,964,773** |

[1] Special appropriation due to Fair Labor Standards Act.

[2] U.S. Dept. of Labor ruling required payment at time-and-one-half when week exceeded 40 hours. Amount shown was paid in 1990.

[3] U.S. Dept. of Labor ruling required payment at time-and-one-half when week exceeded 40 hours. Amount shown was paid in 1991.

## Emergency out-of-state crew use (20-person crews)

| Year | Number of crews |
|---|---|
| 1970 | 40 |
| 1973 | 6 |
| 1981 | 18 |
| 1982 | 4 |
| 1985 | 39 |
| 1986 | 22 |
| 1987 | 59 |
| 1988 | 54 |
| 1989 | 61 |
| 1990 | 7 |
| 1991 | 0 |



# Resource Management



## Alaska Forest Regeneration Center

In 1991 the Alaska Forest Regeneration Center (nursery) shipped 640,433 seedlings and sowed 827,388 to fill increased orders. Seedlings were used to reforest state, federal and non-industrial private land; for research; Arbor Day activities and other civic purposes such as Koncor Forest Products' First-Tree Program.

As in past years, inmate laborers from the Department of Corrections worked at the nursery throughout the year. Two full-time forestry technicians, a maintenance worker and a University of Alaska Anchorage student intern also provided labor. Handicapped students received vocational training through an agreement with the Anchorage School District.

### Regeneration center plans move

In 1990 the state legislature appropriated funds to expand the Forest Regeneration Center, which is located in Eagle River at the site of the division's mechanical shop and fire warehouse. The expansion was planned for that site, but when an engineer found the water supply inadequate for a larger facility the search began for another location. The division is now considering 12 acres at the University of Alaska Agriculture and Forestry Experiment Station on Trunk Road near Palmer. This location is readily accessible to the public, has sufficient water and no flood danger.

Expansion plans call for moving the division's two greenhouses from Eagle River and constructing two new greenhouses, depending on costs. Annual production for the four greenhouses would be about 800,000 seedlings (200,000 in each greenhouse). The Alaska Reforestation Council has recommended an eventual annual production of 1.6 million seedlings.

The two greenhouses at Eagle River have each been producing two crops of 200,000 seedlings each per year, however, in the future the division intends to grow only a single crop each year to produce higher quality seedlings and to allow greater flexibility in production schedules.

An important addition to the nursery will be a 100-foot by 100-foot head house containing equipment for tray filling and sowing, seed extraction and cleaning, and fertilizer and pesticide storage and mixing. It will also include a walk-in freezer, 600-square-foot cooler, lunch room, shower and wash rooms.

## Regeneration

### Fabric Mat Study

In areas impacted by spruce bark beetles, or that have not produced adequate natural regeneration following timber harvest, Calamagrostis grass dominates the ground vegetation. The grass is a stiff competitor for spruce seedlings, as its thick rhizome layer cools soils and the foliage blocks sunlight.

The division, in cooperation with the Institute of Northern Forestry, established several plots on the Kenai Peninsula and on a timber sale unit near Willow to assess the use of fabric reforestation mats with white spruce seedlings. The mats inhibit the growth of vegetation around the seedlings.

While initial costs of planting with fabric mats is higher than some other techniques, it may be cost-effective when compared to seedling survival rates and the replanting costs on sites dominated by grass. These studies compare survival, growth and form of seedlings using mats, against control plots with no mats. They will also distinguish the best type of mat fabric for use in Alaska's forests.

### Trencher for regeneration

The Anchorage, Mat-Su and Kenai-Kodiak area offices, in cooperation with the Department of Fish and Game, purchased a TTS-35 disc trencher for regeneration work on timber sale and habitat enhancement projects. The trencher was first used in the spring of 1991 and results of work in the Susitna Valley and on the Kenai have been promising.

## 1991 nursery production

| Species | Seedlings Sown |
|---|---|
| white spruce | 702,318 |
| lodgepole pine | 29,046 |
| Siberian larch | 28,046 |
| Scotch pine | 13,800 |
| Sitka spruce | 11,800 |
| paper birch | 9,400 |
| willow (cuttings) | 6,076 |
| American green alder | 4,018 |
| European mountain ash | 3,600 |
| blue spruce | 3,600 |
| Sitka alder | 3,000 |
| Norway spruce | 2,800 |
| Siberian pea shrub | 2,176 |
| poplar (cuttings) | 1,173 |
| mountain hemlock | 2,000 |
| subalpine fir | 1,000 |
| Sakhalin fir | 800 |
| Siberian pine | 600 |
| Swiss stone pine | 400 |
| bush cinquefoil | 356 |
| misc. species | 1,379 |
| **Total** | **827,388** |

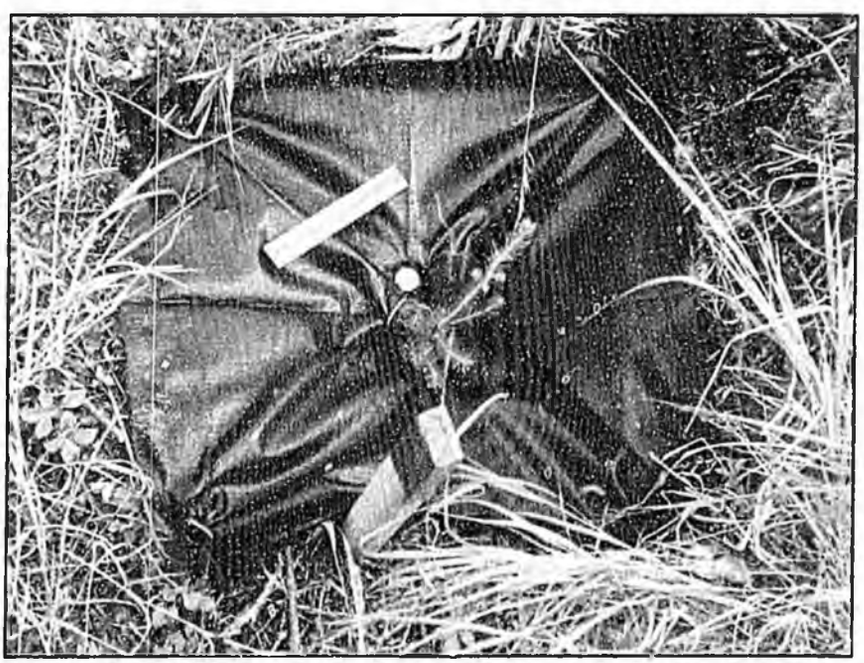
| | Seedlings | |
|---|---|---|
| **Client** | **Sown** | **Shipped** |
| State | 618,936 | 444,394 |
| Federal | 53,824 | 17,553 |
| Borough | 132,000 | 130,038 |
| Private | 22,628 | 48,448 |
| **Total** | **827,388** | **640,433** |

| Species | Seed processed (lbs) |
|---|---|
| white spruce | 701 |
| Lutz spruce | 140 |
| Sitka spruce | 13 |
| paper birch | 8 |
| black spruce | 3 |
| **Total** | **865** |

## Reforestation

| Reforestation | 1990 | 1991 |
|---|---|---|
| Seedlings grown | 586,086 | 827,388 |
| Acres planted | 707 | 605 |
| Pounds of seed processed | 28 | 865 |
| Acres surveyed for regeneration | 370 | 2,395 |
| Acres of site preparation | 421 | 462 |
| Acres direct-seeded | 0 | 240 |





Fabric mats inhibit the growth of vegetation around seedlings and give them a better chance of survival.

# Forest insects & disease

Forest insect populations and disease increased throughout the state in 1991. This was the third consecutive year with warm, dry springs and early summers, which allowed insect populations to increase dramatically. The largest increase in acres infested by destructive insects was in southcentral and interior Alaska.

## Hardwood defoliators

Hardwood defoliator activity increased for the second consecutive year throughout most of southcentral and interior Alaska. Willow defoliation accounted for most of the increase. Assorted leaf miners, Noctuid and Rusty-tussock moth larvae defoliated more than 130,000 acres of willow in 1991, compared to 30,000 acres in 1990.

Exploding populations of spruce budworm near Fairbanks and Delta Junction defoliated more than 20,000 acres of white spruce. Black-headed budworm defoliation on western hemlock and Sitka spruce in Prince William Sound decreased to 7,000 acres compared to 40,000 acres of defoliation detected in 1990. White and Sitka spruce throughout southwest and southcentral Alaska were affected by needle rust. Aspen leaf blight was conspicuous for the second consecutive year in portions of the Kenai Peninsula.

A list of forest insect and disease infestations in Alaska by acreage, land ownership and pest is on page 17.

A summary of statewide annual survey results titled the "Alaska Conditions Report" is available from the State Division of Forestry (762-2107) and the U.S. Forest Service, State and Private Forestry Office (271-2575). The report includes extensive summaries of forest insect and disease trends by pest species statewide. The annual forest insect and disease aerial survey is a cooperative effort between the Division of Forestry and the Forest Service.



## Spruce bark beetles

Spruce bark beetle activity increased for the third consecutive year, with on-going and new infestations affecting more than 375,000 acres, primarily in the southcentral and interior regions. This represents an increase of 142,000 acres, or 38 percent, over all areas surveyed in 1990. On just state and private lands, including Native corporation land, spruce beetle-caused mortality increased from 152,000 acres in 1990 to 215,000 in 1991, a 62 percent increase.

Spruce beetle activity in the Copper River area near Chitina increased from 11,000 acres in 1990 to 25,000 acres in 1991. In the Clam Gulch/Tustumena Lake area on the Kenai Peninsula the infestation on state and private lands grew from 35,000 acres to about 55,300 acres. On the west side of Cook Inlet near the Theodore River/Beluga area and the Skwentna River, the infestation increased from 12,700 to 45,000 acres.

An area in Southcentral Alaska where spruce beetle activity decreased is along the south side of Kachemak Bay where 10,000 acres of infested Sitka spruce were detected in 1990 and only 7,000 acres were detected in 1991. No expansion was detected outside the area originally infested.

Another area of reduced activity was the Yukon River where the number of infested acres decreased for the second consecutive year, to about 80,000 acres. In 1987, aerial surveys detected 100,000 infested acres between Anvik and Koyukuk.

Southeast Alaska experienced less dramatic increases in spruce beetle damage due to generally cool, wet weather, which tends to keep insect populations in check. The most notable increase was in the Haines area where several discrete populations of spruce beetles infested 6,500 acres on University of Alaska and Mental Health Trust lands.

### Spruce beetle pheromone testing

The Division of Forestry continues to cooperate with the U.S. Forest Service pest management researchers in testing spruce bark beetle pheromones as a way to manipulate spruce beetle populations. Spruce beetles produce chemicals (called pheromones) to communicate with other beetles, for mating, to locate susceptible spruce hosts, and to attract or repel other spruce beetles.

Pheromone research has been limited because of the time and expense involved in obtaining EPA registrations, formulating adequate quantities of the pure pheromone and rigorous testing. However, recent advances with new pheromone components have enhanced the lure strength and efficiency of spruce beetle traps.

Pheromones are being used primarily as a beetle monitoring tool, but there is the potential for manipulating low-level populations and reducing damage in large areas.

The anti-attractant pheromone, methylcyclohexenone (MCH), though experimental, may prove effective in reducing the build-up of spruce beetle populations during logging operations, right-of-way clearing, or similar activities. Applying the synthetic chemical to susceptible spruce sends signals to attacking beetles that the trees are full and that they should go elsewhere. This disrupts the natural dispersal of beetles.

The Forest Service and Division of Forestry were asked by Marathon Oil Co. to evaluate right-of-way debris clearing along a gas pipeline to determine what treatment could be used to minimize spruce beetle populations. The pipeline, located on the west side of Cook Inlet, had Lutz spruce decked on both sides of the clearing.

Following Forest Service recommendations, an aerial and ground application of MCH was made along the right-of-way in May to test its efficiency. The Forest Service and DOF completed sampling the treatment in August. Overall, very low numbers of spruce beetle attacks and progeny were found in the 30 evaluation plots, but, based on the low levels of beetles in the right-of-way, the effects of the MCH treatment were not conclusive. The number indicated a low endemic spruce beetle population in the surrounding forests. A publication with details of the test is available upon request. Its title is "Evaluation of Potential for Spruce Bark Beetle Population Build-up in Right-of-Way Clearing Debris Tyonek/Beluga—August 1991."



Sampling spruce beetle infestation in trap trees.

### Kenai Peninsula infestation and surveys

In an annual detection flight over the Kenai Peninsula, state and U.S. Forest Service entomologists mapped a new, large infestation of spruce bark beetles in the vicinity of Kasilof/Clam Gulch. The 1991 infestation is estimated at 101,543 acres; this is in addition to the 39,033 acres infested in 1990. Tree mortality was found on Native, university, borough, state and federal land. DOF completed systematic survey plots in the impacted area during 1990 and 1991. Data from the surveys will be analyzed and a summary report prepared in late 1992.

A ground survey at Upper Trail Lake, near Moose Pass, after the July aerial survey, found new pockets of infestations. Forestry technicians and Seward Skill Center forestry students took samples on the north and east sides of the lake in October to determine numbers of infested spruce per acre for this and the last two years. Although the visual impact of the red, beetle-damaged trees is very evident, preliminary information from the survey indicates a low level of beetle-caused mortality in the spruce stands along the lake and Johnson Pass Trail. An additional ground survey is planned for summer, 1992, to assess impacts on the residual spruce stands in the area.

Information on growth increment, height, age, basal area and tree diameter will be compiled and provided to the Kenai Peninsula Borough in 1992. Most of this area is state community grant land selected for conveyance to the borough under its municipal land entitlement.



Klukwan Forest Products baits log decks with attractant pheromones to prevent spruce beetles from leaving the decks and infesting adjacent unlogged spruce.

Three student interns working in the Kenai-Kodiak Area collected field data on bark beetle infestations from more than 600 one-half-acre strip plots. The crew recorded the number of trees within each plot and the number of beetle infested spruce by the year that the attack occurred. Three plots within each strip recorded species, dbh, heights, stand composition and vegetative ground cover data. Most of the plots were located in the Clam Gulch/Kasilof vicinity, but some were on other parts of the peninsula, including the Homer Demonstration Forest.

### Public meetings on Kenai infestation

Forest health and fire problems caused by spruce beetles near Cooper Landing have lead to a great deal of interest on the part of the public and media. Kenai-Kodiak Area Office staff attended public meetings at the Funny River Road and Homer chambers of commerce to raise public awareness of spruce bark beetle problems on the peninsula. They presented information about the infestation, how to recognize the beetles and beetle attacked trees, how to protect trees from beetles and actions being taken by the state and other agencies.

## Pest Management Assistance

The Division of Forestry provides technical pest management assistance to private non-industrial landowners, using matching grants from the U.S. Forest Service. The division completed two such projects in 1991. It helped Klukwan Forest Products to bait log decks with attractant pheromones on land owned by the Ninilchik Native Association to prevent spruce beetles from leaving the decks and infesting adjacent unlogged spruce.

# 1991 Forest Insect and Disease Infestation in Alaska by Land Ownership [1]

| Pest | Nat'l Forest | Other Federal | Native | State/Private | Total |
|---|---|---|---|---|---|
| Spruce beetle<br>*Dendroctonus rufipennis (Coleoptera)* | 19,526 | 142,228 | 23,315 | 191,748 [2] | **376,817** |
| E. larch beetle<br>*Dendroctonus simplex (Coleoptera)* | | 156 | | 3,425 | **3,581** |
| Engravers<br>*Ips spp. (Coleoptera)* | | 2,572 | 1,414 | 1,902 | **5,888** |
| Spruce budworm<br>Choristoneura spp. *(Lepidoptera)* | | | 1,791 | 25,143 | **26,934** |
| Black-headed budworm<br>*Acleris gloverana (Lepidoptera)*<br>affects w. hemlock, Sitka spruce | 11,064 | | 2,107 | 234 | **13,405** |
| Hemlock sawfly<br>*Neodiprion tsugae (Hymenoptera)* | 934 | | | | **934** |
| Large aspen tortrix<br>*Choristoneura conflictana (Lepidoptera)* | | 3,176 | 267 | 677 | **4,120** |
| Spear-marked black moth<br>*Rheumaptera hastata* | | 4,223 | | | **4,223** |
| Birch defoliation<br>*various spp. (Lepidoptera)* | | 215 | 251 | 716 | **1,182** |
| Cottonwood defoliation .<br>*various spp (Coleoptera, Lepidoptera)* | 2,955 | 4,617 | | 9,119 | **16,691** |
| Willow defoliation<br>*(Coleoptera, Lepidoptera)* | | 53,538 | 75,081 | 3,098 | **131,717** |
| Alaska yellow cedar decline[3]<br>(cumulative) | 500,406 | | 17,511 | 8,718 | **526,635** |
| **Total Acres** | **534,885** | **210,725** | **121,737** | **244,780** | |
| **Grand Total** 1,112,127 **acres** | | | | | |

[1] Table does not include many of the most destructive diseases, e.g., wood decays and dwarf mistletoe, because those losses are not detectable in aerial surveys.

[2] Represents an increase of 63,000 acres over 1990 on state and private (including Native corp.) land. This is almost 70% of the total increase in spruce beetle infestation statewide on all ownerships since 1990.

[3] Acreage of Alaska yellow-cedar decline is the cumulative total up to 1991 and not an annual figure.

## Forest Health Initiative

The Alaska State Legislature appropriated $450,000 to the Division of Forestry in 1991 to develop a "forest pest infestation management plan." Pete Buist was hired as project manager in August. Recognizing that pest problems are often a symptom of poor forest health, the division decided to look at ways to improve the condition of forests in general, as a means of preventing and suppressing infestations. The division is beginning on the Kenai Peninsula, but intends to expand the effort to other forests in the state.

The first step in this project is to complete a forest health management plan for the western Kenai Peninsula and Kalgin Island. Three groups were formed to provide information and help draft the plan—a Planning Team made up of Division of Forestry and U.S. Forest Service staff; a Policy Group with the major landowners and managers within the planning area; and a Working Group, an advisory committee of representatives from state and federal agencies, land managers, private landowners and others interested in forest health on the Kenai. The working group will meet regularly through the spring of 1992 and a draft plan will be completed by July 1.

## Public Opinion Survey

The Division of Forestry commissioned the University of Alaska Anchorage, Institute of Social and Economic Research (ISER) to research public opinion on managing spruce bark beetles. ISER's study, entitled, *Developing a Public Consensus on the Management of Spruce Bark Beetles on the Kenai Peninsula* includes a survey of 400 peninsula households and 100 Anchorage households.

Nearly 90 percent of those surveyed said that dead or dying spruce trees are the most serious problem with forests on the Kenai Peninsula. Respondants said the chief problems caused by beetle-killed trees were (1) less attractive views, (2) fire threat, and (3) loss of privacy. Other problems cited were the large areas affected, loss of timber and declining property values.

The survey asked how the state should manage infested spruce in four locations—near homes, along highways, in campgrounds and in the backcountry.

Following is a summary of the responses:

- About three out of four respondents want the state to cut and remove dead trees near homes.
- More than half want the state to plant new trees near homes and either scrape the ground or use fabric mats to discourage grass from choking seedlings.
- Fewer than one-quarter support the use of chemicals near homes to kill grasses that could choke newly planted trees.
- Two-thirds of peninsula residents and more than half of Anchorage residents want the state to cut and burn beetle-killed trees along the highways and plant new trees.
- A substantial minority—40 percent in Anchorage and nearly 30 percent on the peninsula—think the state should do nothing about beetle-killed trees along highways.
- More than half want the state to thin infested trees in campgrounds.
- Nearly 40 percent favor protecting selected trees in campgrounds by spraying them with insecticides.
- Southcentral residents are almost evenly split in their opinions about what the state should do about beetle-killed trees in the backcountry; roughly half say the state should do nothing, and almost half want the state to cut and burn dead trees and plant new ones.

A summary of survey results is available from the Division of Forestry. A copy of the complete report is available from ISER (786-7710) for a cost of $5.

## America the Beautiful

America the Beautiful is a national tree planting initiative introduced by President Bush in 1990. It calls on the public, volunteers, businesses, industry and local government to work together to plant and care for one billion additional trees each year.

Healthy community trees and forests provide important environmental, social and economic benefits to the nation and to local communities. Trees and forests:

- enhance wildlife, fish and human habitats;
- conserve energy in buildings by providing summer shade and winter wind protection;
- improve air, soil and water quality, and reduce soil erosion;
- act as natural air cleaners by removing carbon dioxide and other impurities from the atmosphere and by releasing oxygen into the atmosphere;
- provide valuable products (timber, paper, firewood, etc.) and associated jobs which strengthen local economies;
- improve aesthetics in neighborhoods, communities and business areas, which increases neighborhood pride and property values;

The Forest Service provides national guidance and funding for America the Beautiful and the Division of Forestry coordinates the program in Alaska. Dan Ketchum was hired in August as coordinator for America the Beautiful's two main programs, Community Forestry and Forest Stewardship.

Two citizen advisory groups were appointed by the state forester to provide direction to the programs. The Alaska Community Forestry Council and the Alaska Forest Stewardship Coordinating Committee were formed and each held an organizational meeting in late August.

## Forest Stewardship

The Forest Stewardship Program's goals are to:

- help private forest land owners to more actively manage their forests and related resources;
- increase the number of trees planted and cared for nationwide;
- enhance economic, environmental and aesthetic qualities of rural areas; and
- reduce global carbon dioxide levels.

To meet these goals, the Forest Stewardship Program provides technical assistance to owners of non-industrial private forest land—forested land owned by a private individual, group, association, corporation, Indian tribe or other private legal entity, such as an Alaska Native Corporation, not involved in wood product manufacturing.

Landowners, with the help of a natural resource professional, prepare a Forest Stewardship Plan that meets their land management objectives. The plans address such aspects of forest management as:

- soil and water quality;
- wetlands and their role in the ecosystem;
- timber production, harvesting and regeneration;
- protection from fire, pests and disease;
- recreation and aesthetics;
- fish and wildlife habitat.

The Stewardship Incentive Program (SIP) is a cost-share assistance program for non-industrial, private forest landowners who own a maximum of 1,000 forested acres. SIP allows up to 75 percent cost-sharing for certain activities that protect, manage or enhance forest resources. Landowners must develop, and agree to maintain, a Forest Stewardship Plan to be eligible for the SIP.




***Instead of focusing simply upon trees as a crop, Forest Stewardship helps educate people about the forest as a complete ecosystem containing many plants, animals, birds and fish—all of which depend on a healthy forest condition.***

National Association of Conservation Districts

## Community Forestry

The objectives of Alaska's Community Forestry Program go beyond just planting trees. They are to:

- maintain an active Alaska Community Forestry Council.
- encourage the establishment of local community tree boards or advisory committees wherever there is a need and desire for them.
- provide information, training, and educational opportunities on the benefits of, and proper techniques for, retaining, planting and caring for community trees.
- enhance the understanding of, and technical skills for, sound vegetation maintenance and arboricultural practices, including the cultivation of trees, shrubs and complementary ground covers, by individuals who plan, develop and maintain urban landscapes and community trees and forests.
- support, and increase the number of, citizens informed and involved in local volunteer efforts to plant and maintain trees, shrubs and perennials.
- encourage more local governments to develop effective, long-term, community forest and tree, shrub and perennial management programs.
- encourage state agencies, local government, industry, private business, civic groups and individuals to support and fund community forestry.
- encourage and support the establishment of school, community and university forests.
- increase the number of trees and shrubs retained, established and cared for in Alaskan communities.
- increase the number of trees and shrubs retained, planted and cared for during urban development and community expansion.
- encourage owners of private residences and commercial properties to retain, maintain and increase the number of trees and shrubs on their properties.
- encourage and support programs involved in research, introduction or trials of new tree, shrub and perennial varieties in Alaska.



### Community forestry grants

The division awards federal grants to communities to encourage local tree planting projects and provides technical assistance to ensure their success. Any non-profit organization or local government may prepare proposals for projects on non-federal public property.

To be considered for funding, a project must have the support and involvement of community volunteers. It must also accomplish a specific goal or remedy a specific problem and include a detailed five-year maintenance plan for any trees planted.

In 1991, the division funded demonstration and pilot projects in nine communities. Federal funds totaling $37,249 were matched by $53,530 in donations and in-kind services from comunities that received the grants. Projects included plantings to beautify the grounds of public buildings and schools in Delta, Anchorage, Talkeetna and Wrangell; plantings along streets in Fairbanks, Wasilla and Palmer; landscaping a ballpark in Sitka; and creating a living wind break in Nome. More than 300 ornamental trees, 500 ornamental shrubs and 3,500 seedlings were planted.

# Resource management and planning

## Anchorage/Mat-Su Area

The Anchorage/Mat-Su Area Office completed the State Forest Land Management plans for the Kashwitna Corridor and Recreation River, and the Susitna Forestry Guidelines in 1991. Mental Health Land Trust legislation identified all land classified for forestry in the Susitna Forest Guidelines Area (502,890 acres) as part of ...nd pool for possible selection by the ...ntal Health Land Trust.

## Kenai Area

The Division of Forestry assisted the Division of Land in preparing a Kenai Area Plan. Forestry staff participated in six public open houses, provided input on areas to retain in state ownership, areas to be managed for timber production, activities that would conflict with forest management, maps depicting areas needing forest management actions, and silvicultural prescriptions for various forest conditions.

## Ruffed Grouse Management Area in Delta

The first annual Ruffed Grouse Society event in Delta was held in the fall to demonstrate the division's interest in seeing habitat improvements for these feathered creatures. Ruffed Grouse Society President Sam Pursglove was given a tour of a 40,000-acre aspen stand considered a potential ruffed grouse management area. A grant was proposed to make small patch cuts in this over-mature stand to encourage young aspen shoots. Al Edgren of DOF, Sam Pursglove, and Paul Karczmarczyk of ADF&G were featured in the Ruffed Grouse Society magazine in February.

## The Goodpaster River settlement

When former DNR Commissioner Rod Swope signed the Tanana Basin Area Plan the communities of Delta and Tok responded with a protest of the restrictions. The Delta City Council, Tok Chamber of Commerce and other private citizens and organizations submitted petitions and resolutions to the incoming Hickel administration opposing the plan.

The next DNR Commissioner, Harold Heinze, directed the Division of Land to work with the communities to resolve the issue. A working group of 15 representatives from local government, state agencies and private interest groups was formed, but was not able to reach consensus. Majority and minority viewpoints were presented to the planning team, which ultimately drew compromising corridor boundaries and set guidelines. The commissioner has signed amendments to the Tanana Basin Area Plan and the Tanana Valley State Forest Plan that allow access to state forest and other state lands that surround a river corridor one to two miles wide. The general public seems satisfied with this settlement.

# Forest inventory

In support of the Yakataga Area Plan, the inventory and associated Geographical Information System coverages were edited. Maps showing timber values, 20-year timber availability and vegetation stratification were produced.

Aerial surveys of spruce beetles in the Kasilof and Ninilchik vicinity were digitized and laid over a map of land ownership. The map illustrates the ownership complexity of the Forest Health Initiative project.

A partial fire database was constructed that portrays the 1991 fire season. Also, area/zone boundaries were converted to the Geographical Information System and used in a map showing fire occurrences from 1985 through 1989.

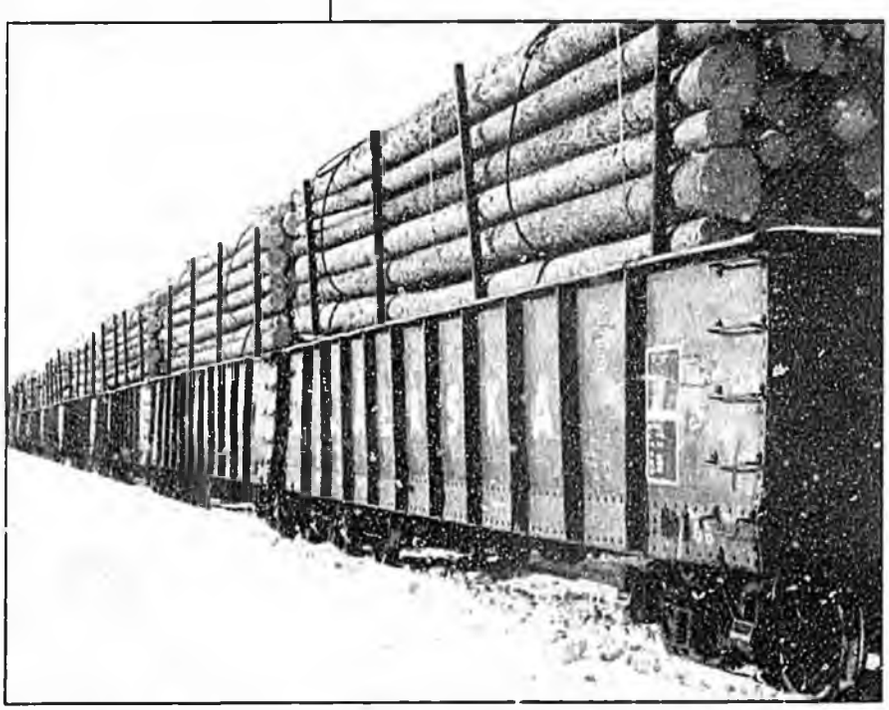
***The division's goal for forest resource management is to efficiently manage the benefits as well as the products of a dynamic forest system.***

# Timber sales

## Falls Creek salvage sale

A cooperative salvage sale of bark beetle-killed trees in the Falls Creek area was sold between the Division of Forestry, University of Alaska and Cook Inlet Region, Inc. in November. DOF Kenai-Kodiak Area staff proposed a joint salvage sale to combat the spruce bark beetles in the Kasilof-Clam Gulch vicinity. Although the University and CIRI agreed to the sale, they did not have field staff to set up it up. In order to move the sale forward, DOF staff completed the field and paper work. The Kenai-Kodiak Area is also, by agreement, administering the sale. Harvest operations will be complete by the end of March, 1992.

An increase in bark beetle activity in the area was detected in late 1989. During the spring of 1990, DOF staff put in more than 45 trap tree plots and 50 beetle pheromone traps. The trap tree plots were successful in drawing beetles into the down green trees. Harvest operations must be completed and trap trees removed by the spring of 1992, when the beetles emerge and fly to new host trees.



Logs in the Fairbanks railroad yards on their way to Japan.

## Mat-Su timber sales

The Five-Year Schedule of Timber Sales for the Anchorage/Mat-Su Area was withdrawn because 99 percent of the proposed sales were located on lands hypothecated to the Mental Health Land Trust.

## Southwest Area timber management

Southwest Area foresters and technicians had a busy year of data collection and resource planning. The Five-Year Timber Sale Schedule was updated, and reviewed by agencies and the public. Sale administration efforts were stepped up, with several visits to each of the active sales and a preliminary regeneration survey conducted on one of the sales. Observations of severe insect infestations along the Kuskokwim River resulted in plans to harvest additional infested trees from one sale area.

Additional sales were added to the timber sale schedule for fiscal years 1993 through 1997 following meetings with loggers from Bethel and McGrath. In particular the loggers requested that the division begin planning a sale near Big River on the Kuskokwim River northeast of McGrath.

## Southeast beach log salvage licenses

The number of beach log salvage licenses dropped from a record high of 22 in 1990 to 11 in 1991. These licenses are a direct reflection of current log prices, since the cost of the one-year license is fixed. Although the process for issuing the licenses has been streamlined, it still requires between three and nine months.

## Log brands

The 1990 Log Brand Book showed the following activities regarding the five-year log brands that were issued in 1986 and expiring in 1991:

| Activity | 1986 | 1991 |
|---|---|---|
| Renewed | 27 | 27 |
| Expired | 29 | |
| New | | 18 |
| Total | 56 | 45 |

Of 54 log brans registered in 1987, 13 have been renewed.

# Forest Resources & Practices Act

Key elements of the Forest Practices Program are:

- to educate forest landowners, operators and the public about the requirements of the Forest Resources and Practices Act and proper forest practices
- to administer the Forest Resources and Practices Act by reviewing notifications, conducting forest inspections and taking appropriate enforcement actions.

In 1991 draft regulations to implement revisions made to the Forest Resources and Practices Act in 1990 were completed and presented for public review. The intent of the proposed regulations is to establish a new working relationship among state agencies, timber owners and the timber industry. There is a new enforcement procedure with significant penalties for non-compliance.

Public hearings were held in Anchorage, Fairbanks, Juneau and Ketchikan for the public to present verbal and written comments.

Following the hearings, a revised draft of the regulations was presented to the Board of Forestry for review in December.

Forest practices activity has increased statewide, but the Southeast Region continues to be the most active. There were 142 forest practices notifications for 21,016 acres in the Southeast Region in 1991. The total acreage was down almost 30 percent from 1990, and down 37 percent from the 1989 high. However, the number of inspections climbed to an all-time high of 149, up 66 percent from 1990 and 73 percent from 1989. This jump in inspections is a result of the increased requirements in the new Forest Resources and Practices Act.

The trend of growth in inspections and in variation requests is likely to continue for the next few years. Such activities are also increasing in areas outside of the Southeast, especially on Native corporation land in Interior and Southcentral Alaska. Harvesting operations continue on the lower Kenai Peninsula, on Afognak Island, near Cordova and near Tetlin.

## Kitoi Lake timber harvest

Two large-scale timber operators provided plans in early 1991 for harvesting timber in the Kitoi Lake watershed on Afognak Island. The lake supplies water for a Department of Fish and Game fish hatchery. The planned harvest caught the attention of the hatchery manager and Kodiak fishermen who feared that the harvest could potentially impact fish production at the hatchery.

As interest mounted in the plans for the timber harvest, a special interest group, the Kodiak Environmental Network, sponsored well-attended public forums. The Division of Forestry, ADF&G's Habitat and Commercial Fish divisions, the landowner, timber industry representatives and an environmentalist participated in a panel discussion at one of these meetings. The division focused on requirements of the 1990 Forest Practices Act amendments and the safeguards these legislative standards would provide for this important fishery. At a second meeting, the state forester provided information on the maintenance of water quality during and after timber harvest.

Plans for the harvest proceeded and operations were completed during 1991. The forest products industry set up water sampling stations to test for any differences in water quality. Samples from streams running through the harvest area were compared with nearby unaffected streams. Kitoi Lake was sampled near the water intake for the fish hatchery. The tests showed little discernable variation in the water quality as a result of the timber harvest activity.

***The Forest Practices Program is designed to protect water quality, fish and wildlife habitat and other public forest values through the use of appropriate forest practices.***

### Statewide Forest Practices Activities

| Activity | 1990 | 1991 |
|---|---|---|
| Number of notifications | 201 | 193 |
| Acreage under notification | 55,091 | 57,237 |
| Number of inspections | 146 | 222 |
| Number of training sessions | 5 | 10 |
| Alaska coastal mgmt. project reviews | 78 | 70 |

# Cut and Sold on State Lands
## 1959 ~ 1991

| Year | Annual Sales Volume (MBF) | Annual Cut Volume (MBF) | Cut Value ($) |
|---|---|---|---|
| 1959-66 | 231,109 | 93,227 | $238,415 |
| 1967 | 134,371 | 45,816 | 164,782 |
| 1968 | 97,948 | 47,974 | 162,210 |
| 1969 | 246,415 | 49,018 | 221,371 |
| 1970 | 14,926 | 53,568 | 229,101 |
| 1971 | 41,077 | 43,191 | 246,091 |
| 1972 | 23,110 | 50,591 | 401,133 |
| 1973 | 449,452 | 38,356 | 218,357 |
| 1974 | 21,146 | 51,241 | 376,450 |
| 1975 | 4,655 | 33,540 | 430,486 |
| 1976 | 2,358 | 41,714 | 73,043 |
| 1977 | 2,412 | 60,251 | 544,884 |
| 1978 | 6,932 | 30,301 | 638,806 |
| 1979 | 156,235 | 32,382 | 1,016,585 |
| 1980 | 4,949 | 47,547 | 1,254,500 |
| 1981 | 18,402 | 53,678 | 1,491,554 |
| 1982 | 24,154 | 35,198 | 488,512 |
| 1983 | 72,145 | 35,511 | 402,774 |
| 1984 | 21,087 | 29,044 | 833,793 |
| 1985 | 20,178 | 12,864 | 192,109 |
| 1986 | 10,469 | 18,995 | 233,862 |
| 1987 | 27,588 | 25,884 | 379,540 |
| 1988 | 27,475 | 25,177 | 515,980 |
| 1989 | 21,600 | 22,711 | 514,632 |
| 1990 | 35,783 | 18,603 | 477,580 |
| 1991 | 10,156 | 16,241 | 236,205 |

# Sawtimber Calendar Year Average Stumpage Per MBF

| Year | Aspen | Birch | Cottonwood | Hemlock | Sitka Spruce | White Spruce |
|---|---|---|---|---|---|---|
| 1981 | 0.00 | 32.22 | 7.46 | 14.53 | 24.82 | 35.96 |
| 1982 | 0.00 | 27.27 | 10.00 | 10.92 | 28.24 | 25.65 |
| 1983 | 14.47 | 29.95 | 0.00 | 3.50 | 166.93 | 39.95 |
| 1984 | 10.60 | 26.70 | 0.00 | 0.00 | 32.72 | 20.20 |
| 1985 | 0.00 | 0.00 | 15.10 | 21.85 | 17.65 | 26.52 |
| 1986 | 20.13 | 30.00 | 15.10 | 9.22 | 19.44 | 25.00 |
| 1987 | 10.00 | 8.76 | 0.00 | 14.13 | 18.78 | 7.32 |
| 1988 | 2.03 | 0.00 | 9.42 | 3.00 | 97.80 | 21.11 |
| 1989 | 2.13 | 7.01 | 9.96 | 5.88 | 71.29 | 34.25 |
| 1990 | 0.00 | 6.86 | 10.00 | 3.67 | 46.95 | 17.14 |
| 1991 | 0.00 | 24.76 | 0.00 | 0.00 | 82.57 | 14.32 |

# Cut and Sold Report by Region, CY 1991
# Volume - MBF Scribner

## Volume Cut

| Region | Sawtimber | Other Products[1] | Volume |
|---|---|---|---|
| Northern | 7,000.0 | 4,000.0 | 11,000.0 |
| Southcentral | 1,412.0 | 1,101.0 | 2,513.0 |
| Southeast | 2,728.4 | 0.0 | 2,728.4 |
| **Total** | **11,140.4** | **5,101.0** | **16,241.4** |

## Volume Sold

| Region | Sawtimber | Other Products[1] | Volume |
|---|---|---|---|
| Northern | 4,100.0 | 5,419.0 | 9,519.0 |
| Southcentral | 349.0 | 216.0 | 565.0 |
| Southeast | 72.2 | 0.0 | 72.2 |
| **Total** | **4,521.2** | **5,635.0** | **10,156.2** |

*[1]Other products include pulp logs, fuelwood, house logs, etc.*

# Contracts Issued by Type and Area
# CY 1991

| | COMMERCIAL USE | | | PERSONAL USE | | |
|---|---|---|---|---|---|---|
| | Fuelwood Sales | Saw log Sales | Beach log Salvage | Fuelwood Permits | House log Sales | Saw log Sales |
| **Northern Region** | | | | | | |
| Fairbanks | 14 | 15 | 0 | 645 | 10 | 0 |
| Delta | 2 | 2 | 0 | 118 | 2 | 2 |
| Tok | 1 | 1 | 0 | 108 | 0 | 0 |
| **Total** | **17** | **18** | **0** | **871** | **12** | **2** |
| **Southcentral Region** | | | | | | |
| Anchorage/Mat-Su | 0 | 1 | 0 | 18 | 6 | 9 |
| Kenai/Kodiak | 0 | 1 | 0 | 25 | 2 | 0 |
| Valdez/Copper River | 0 | 0 | 0 | 14 | 0 | 0 |
| Southwest (McGrath) | 0 | 0 | 0 | 0 | 0 | 0 |
| **Total** | **0** | **2** | **0** | **57** | **8** | **9** |
| **Southeast Region** | | | | | | |
| Juneau | 1 | 1 | 7 | 0 | 0 | 0 |
| Haines | 0 | 1 | 0 | 0 | 0 | 1 |
| Ketchikan | 0 | 0 | 4 | 0 | 0 | 0 |
| **Total** | **1** | **2** | **11** | **0** | **0** | **1** |
| **GRAND TOTAL** | **18** | **22** | **11** | **928** | **20** | **12** |

# Special Services and Activities

## Arbor Day

Each spring communities around the country set aside a time to celebrate the beauty and usefulness of trees by holding special tree planting ceremonies and activities. In Alaska, Arbor Day is the first Monday in May. Planting trees is but a starting point; Arbor Day gives us the opportunity to educate people about he value and importance of trees and their ecological and economic roles. The division supported and participated in the following Arbor Day activities in 1991:

- provided tree seedlings to the Society of American Foresters to distribute at shopping malls,
- sent 8,000 seedlings home with school children in Fairbanks, along with information about proper planting and care,
- DNR Commissioner Harold Heinze, State Forester Bob Dick and U.S. Forest Service Regional Forester Mike Barton led a tree planting ceremony on the University of Alaska campus in Fairbanks.



Smokey shows off his fire truck during a fire prevention program in the Mat-Su area.

## Delta outdoor classroom

Five hundred fourth and seventh grade students attended an outdoor classroom in Delta, sponsored by the Division of Forestry, Department of Fish and Game and the Soil and Water Conservation Service. Forestry staff focused on measuring heights and diameters, and determining the volume of the measured trees. An increment borer was used to determine age. Both students and staff enjoyed their learning experience.

## Earth Day 1991

Division of Forestry staff in Fairbanks sponsored a forestry booth for Earth Day, with the theme, "Forestry—the Initiator of Sustainable Living." They gave away tree seedlings and tips on planting and care, had a forest products display, and offered a number of hands-on tree activities.

## Smokey Bear

As he does every spring, Smokey Bear emerged from hibernation and toured schools in Fairbanks. In addition to his "learn not to burn" message, he talked about the importance of trees and wood products in our daily lives. Smokey encouraged students to be good citizens of the earth by helping renew our forest resources and gave each student a Siberian larch seedling to plant at home.

Southwest Area staff made presentations in nine schools along the Kuskokwim River, teaching fire prevention and wise burning procedures to 378 students. Pamphlets and Smokey Bear educational materials were given to the students and teachers. These 30-minute programs covered:

- fire history in the local area
- how human-caused fires are started
- what to do when you spot a fire
- tips for making a safe campfire and burning trash
- nature-caused fires.

## Mat-Su student interns

A crew of high school interns spent the summer working for the division in the Mat-Su area. The crew planted 9,863 seedlings in the Willer-Kash area near Willow. Planting was interrupted during fire season but completed by August 1.

The interns were assigned to two small fires for training and to one project fire at Galickson Creek in Takotna, where they spent 14 days. Their final projects for the summer were removing hazard trees in state parks and helping the Mat-Su Borough lay out a timber sale.

## Homer Demonstration Forest

The Homer Demonstration Forest covers 360 acres of state-owned land just northwest of Homer. It was established in 1986 and is managed by the Division of Forestry.

In 1991 a draft framework plan was prepared by the USDA Soil Conservation Service based on guidance by the Division of Forestry, an interagency steering committee and members of the Homer Community. The plan provides a framework for the use and management of the forest.

The plan states that the Homer Demonstration Forest will be managed to provide areas where schools, interested organizations and the general public can:

- observe demonstrations and field trials of various ways to use and manage forests;
- learn first-hand about forest ecology;
- observe and learn about wildlife;
- recreate in ways that are compatible with other forest management objectives.

The forest will be managed so that:

- the quality of its soils, waters, plants, animals and air is maintained for future generations;
- the potential productivity of its reosurces is not diminished by their use.

The draft framework plan underwent public review late in the year and will be adopted by the steering committee in 1992. Detailed implementation plans will then be developed to specify exactly how the land used laid out in the framework plan are carried out.



Student intern cleans up slash near Big Lake.

## Project Learning Tree

Project Learning Tree (PLT) is an environmental education program for kindergarten through 12th grade teachers. The goal of PLT is to help students develop the skills, knowledge and attitudes needed to make wise decisions regarding the use and management of natural resources and the protection of environmental quality.

PLT provides lessons, materials and activities for teachers, and training in how to use them in the classroom. PLT is cosponsored by the American Forest Foundation and the Western Regional Environmental Education Council. Alaska sponsors include the Alaska Forestry Association, Cooperative Extension Service, Department of Education, Forest Service, and the Division of Forestry. The PLT curriculum guides are being revised and made more appropriate for use in Alaska.

Dan Ketchum, the division's representative on the statewide Coordinating Committee, three other division employees and one Cooperative Extension employee attended a PLT workshop in October, which qualified them to conduct workshops for school teachers.

## Alaska Board of Forestry

The nine-member Board of Forestry advises the state on forestry-related issues and regulations. Board members are appointed by the governor from groups and organizations that represent a wide range of forestry intersts.

Board members are Malcolm R. "Bob" Dick, state forester; Ralph Malone, non-governmental forestry representative; Andy Miscovich, mining organization representative; Loisann Reeder, recreational organization representative; John Sturgeon, Forest Industry Trade Association; William Thomas, native corporation representative; and Carl Yanagawa, non-governmental fish and wildlife biologist. There were two vacancies on the board in 1991.

## WASF meets in Alaska

The Western Association of State Foresters and the Alaska Society of American Foresters held a joint annual meeting in Fairbanks in May. Presentations focused on Alaskan, as well as national, issues such as forest stewardship, public lands management and land ethics. A field trip highlighted the geologic history of the Fairbanks area, with visits to the permafrost tunnel, a large mining operation and several forest sites. Alaska State Forester Bob Dick was elected chair of the Western Association of State Foresters.

## Tok tree-improvement workshop

The Alaska Reforestation Council sponsored a tree improvement workshop in Tok September 24-25, in cooperation with the University of Alaska Fairbanks. Cooperative Extension Service, Institute of Northern Forestry, U.S. Forest Service State and Private Forestry, and Division of Forestry. The workshop provided field foresters and technicians with elementary techniques for tree improvement applicable to Alaska.

Dr. Ed Packee, the workshop leader, gave presentations on silviculture and tree improvement, and led discussions on how silvicultural systems affect the future genetic value of stands, wood quality and seed zone maps. Dr. John Alden discussed basic tree genetics and gave a slide program on advanced tree improvement techniques used in Scandinavia.

The workshop included a tour of the Tok seed production area, where ideas for establishing seed production areas and superior tree selection were presented. Participants also visited a plantation of exotic tree species near Tok.

### Training in 1991

| Type | # of courses | Participants |
|---|---|---|
| Emergency | 5 | 154 |
| Wildfire for fire departments | 5 | 112 |
| Initial attack | 15 | 99 |
| Extended attack | 15 | 38 |
| Fire management | 27 | 117 |
| Administration | 1 | 13 |
| Supervision and management | 9 | 11 |
| First aid and safety | 1 | 1 |
| Computer management | 8 | 21 |
| Technical resource training | 3 | 12 |
| Forest management | 8 | 26 |
| **Totals** | **97** | **604** |

# Appendices

# Fiscal Year 1991 Actuals

(in thousands)

| Funding Sources | Forest Management | Fire Suppression |
|---|---|---|
| General Funds | $9,175.4 | $27,531.2 |
| Federal Funds | 444.3 | 23,446.8 |
| Other Funds | 630.0 | 27.1 |
| **Totals** | **$10,249.7** | **$51,005.1** |

| Positions | | |
|---|---|---|
| Permanent Full-time | 93 | 1 |
| Permanent Part-time | 138 | 0 |
| Non-Permanent | 17 | 950 |
| Staff Months | 1,970 | 2,012 |

| Resource Management | Northern Region | Southcentral Region | Southeast Region | Central Office | Totals |
|---|---|---|---|---|---|
| Resource Management | 699.7 | 363.4 | 448.7 | 259.0 | 1,770.8 |
| State Forest Nursery | | | | 73.4 | 73.4 |
| Board of Forestry | | | | 3.8 | 3.8 |
| Firewood Access | 24.0 | 14.0 | | | 38.0 |
| HB331 Forest Practices | | 155.5 | 122.6 | 156.8 | 434.9 |
| HB15, Sec 128 Cooper Landing Fuel Reduction Project | | 65.7 | | | 65.7 |
| **Subtotal** | **$723.7** | **$598.6** | **$571.3** | **$493.0** | **$2,386.6** |
| **Fire Management** | | | | | |
| Pre-suppression | 1,927.0 | 2,896.9 | 22.0 | 506.3 | 5,352.2 |
| Rural Community Fire Prot/Fed | | | | 71.2 | 71.2 |
| Anchorage School District Interns | | 56.0 | | | 56.0 |
| **Subtotal** | **$1,927.0** | **$2,952.9** | **$22.0** | **$577.5** | **$5,479.4** |
| **Forest Administration** | | | | | |
| Federal Coop Forestry Assistance | | | | 358.1 | 358.1 |
| Forest Administration | 404.4 | 395.9 | 111.9 | 512.3 | 1,424.5 |
| Unbudgeted RSAs | | | | 601.1 | 601.1 |
| **Subtotal** | **$404.4** | **$395.9** | **$111.9** | **$1,471.5** | **$2,383.7** |
| **Totals:** | | | | | |
| **Forest Management** | **$3,055.1** | **$3,947.4** | **$705.2** | **$2,542.0** | **$10,249.7** |
| **Fire Suppression** | | | | | **$51,005.1** |
| **Grand Total** | | | | | **$61,254.8** |

# Fiscal Year 1992 Budget

(in thousands)

| Funding Sources | Forest Management | Fire Suppression |
|---|---|---|
| General Funds | $9,560.5 | $3,069.4 |
| Federal Funds | 705.3 | 5,350.0 |
| Other Funds | 33.8 | 0 |
| **Totals** | **$10,299.6** | **$8,419.4** |

| Positions | | |
|---|---|---|
| Permanent Full-time | 88 | 2 |
| Permanent Part-time | 127 | 3 |
| Non-Permanent | 17 | 750 |
| Staff Months | 1,829 | 1,545 |

| Resource Management | Northern Region | Southcentral Region | Southeast Region | Central Office | Totals |
|---|---|---|---|---|---|
| Resource Management | 937.7 | 531.3 | 701.3 | 345.3 | 2,551.6 |
| Forest Regeneration Center (nursery) | | | | 493.8 | 493.8 |
| Board of Forestry | | | | 10.7 | 10.7 |
| **Subtotal** | **$973.7** | **$531.3** | **$701.3** | **$849.8** | **$3,056.1** |
| **Fire Management** | | | | | |
| Pre-suppression | 1,700.3 | 2,827.2 | 28.2 | 419.0 | 4,974.7 |
| Rural Community Fire Prot/Fed | | | | 77 | 77 |
| Anchorage School District Interns | | 58.4 | | | 58.4 |
| **Subtotal** | **$1,700.3** | **$2,885.6** | **$28.2** | **$496.0** | **$5,110.1** |
| **Forest Administration** | | | | | |
| Federal Coop Forestry Assistance | | | | 628.3 | 628.3 |
| Forest Administration | 513.74 | 420.2 | 119.3 | 451.9 | 1,505.1 |
| **Subtotal** | **$513.7** | **$420.2** | **$119.3** | **$1,080.2** | **$2,133.4** |
| **Totals** | | | | | |
| Forest Management | $3,187.7 | $3,837.1 | $848.8 | $2,426.0 | $10,299.6 |
| Fire Suppression | | | | | $8,419.4 |
| **Grand Total** | | | | | **$18,719.0** |

# Aircraft Utilization Report

| Category | FLIGHT HOURS | | | | | FLIGHT COSTS | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Contract | | Rental | | | Contract | | Rental | |
| | DOF FEP[1] | Fixed Wing | Rotor Wing | Fixed Wing | Rotor Wing | DOF FEP[1] | Fixed Wing | Rotor Wing | Fixed Wing | Rotor Wing |
| 1. Detection | 0 | 0 | 29.1 | 83.2 | 1.9 | 0 | 0 | 14,550 | 17,031 | 2,073 |
| 2. Air coordination | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 3. Reconnaissance | 524.4 | 0 | 0.2 | 50.7 | 41.6 | 0 | 0 | 100 | 10,555 | 40,440 |
| 4. Helitack | 0 | 0 | 717 | 0 | 8.3 | 0 | 0 | 329,720 | 0 | 13,120 |
| 5. Retardant/bucket | 0 | 170.3 | 29.6 | 0 | 28.2 | 0 | 358,501 | 14,800 | 0 | 45,368 |
| 6. Prepositioning | 0 | 4.0 | 8.7 | 2.7 | 32.4 | 0 | 8,262 | 4,350 | 560 | 39,783 |
| 7. Cargo/paracargo | 0 | 0 | 21.6 | 0.6 | 15.4 | 0 | 0 | 10,800 | 161 | 26,180 |
| 8. Fire Transport | 0 | 296 | 118.2 | 1,472.1 | 970.8 | 0 | 29,598 | 58,950 | 997,568 | 1,637,102 |
| 9. Non-fire transport | 0 | 0 | 10.4 | 10.2 | 2.4 | 0 | 0 | 5,200 | 11,159 | 1,140 |
| 10. Smokejumper delivery | 0 | 0 | 5.3 | 0 | 0 | 0 | 0 | 2,650 | 0 | 0 |
| 11. Training/maintenance | 35.2 | 0 | 7.4 | 15.7 | 0 | 0 | 0 | 3,700 | 830 | 0 |
| 12. Misc./medi vac | 0 | 0 | 14.6 | 1.5 | 10 | 0 | 0 | 7,400 | 305 | 5,132 |
| **13. Totals** | **559.6** | **470.3** | **692.1** | **1,636.7** | **1111** | **$367,910** | **$396,361** | **$452,220** | **$1,038,169** | **$1,810,336** |
| 14. Passengers | 0 | 403 | 8,016 | 1,799 | 9,556 | | | | | |
| 15. Retardant-gallons | 0 | 377,840 | 0 | 0 | 0 | | | | | |
| 16. Water/foam-gallons | 0 | 0 | 474,763 | 0 | 161,584 | | | | | |
| 17. Cargo (lbs) | 0 | 17,?99 | 703,57? | 290,834 | 862,505 | | | | | |
| 18. $ availability in excess of flight $ | | | | | | 0 | $494,984 | $1,271,788 | $20 | $73,796 |
| 19. Fuel-gallons | | 45,388 | 24,807 | 0 | 14,691 | | | | | |
| 20. Fuel cost | | | | | | | 0 | $39,592 | 0 | $16,099 |

| | |
|---|---|
| **Total Line 13** | **$4,064,996** |
| **Plus Line 18** | **$1,840,588** |
| **Plus Line 20** | **$55,691** |
| **Total Cost** | **$5,961,275** |

[1] Division of Forestry Federal Express Property

# Division of Forestry Directory

## Director's Office

3601 C Street, Suite 1058
P.O. Box 107005
Anchorage, Alaska 99510-7005
762-2501 fax: 561-2507

**Director & State Forester**
Malcolm R. "Bob" Dick

**Deputy Director of Administration**
George Hollett

**Deputy Director of Operations**
Dean Brown

**Fire Management**
Frenchie Malotte, Section Chief, 762-2505

**Aviation Supervisor**
Bud Graham, 762-2509

**Fire Operations**
Joe Stam, Fairbanks, 356-5529

**Forest Practices**
Michael S. Christy, Section Chief, 762-2131

**Alaska State Forest Nursery**
P.O. Box 650 (Hiland Road)
Eagle River, Alaska 99577
694-5880
Joe Stehlik, Nursery Manager

## Southcentral Region Office

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P.O. Box 107005
Anchorage, Alaska 99510-7005
762-2511 fax: 568-3587
David Wallingford, Regional Forester

**Hotline Recording**
762-2412
Fire information in summer
Christmas tree permits in December

**Kenai-Kodiak Area Office**
HC 1, Box 107 (Mi. 92.5 Sterling Hwy.)
Soldotna, Alaska 99669
262-4124 fax: 262-6390
Jim Peterson, Area Forester

**Mat-Su Area Office**
P.O. Box 520455 (Mi. 8.2 Big Lake Rd.)
Big Lake, Alaska 99652
892-6027 fax: 892-7958
Jim Eleazer, Area Forester

**Southwest Area Office**
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McGrath, Alaska 99627
524-3010 fax: 524-3932
Bill Beebe, Area Forester

**Valdez/Copper River Area Office**
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822-5534 fax: 822-5539
Martin Maricle, Area Forester

## Northern Region Office

3700 Airport Way
Fairbanks, Alaska 99709
451-2700 fax: 451-2690
Les Fortune, Regional Forester

**Delta Area Office**
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Delta Junction, Alaska 99737
895-4225 fax: 895-4934
Al Edgren, Area Forester

**Fairbanks Area Office**
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Fairbanks, Alaska 99709
451-2700 fax: 451-2633
Pete Buenau, Area Forester

**Tok Area Office**
Box 10 (Mile 123 Glenn Hwy.)
Tok, Alaska 99780
883-5134 fax: 883-5135
Dick Malchow, Area Forester

## Southeast Region Office

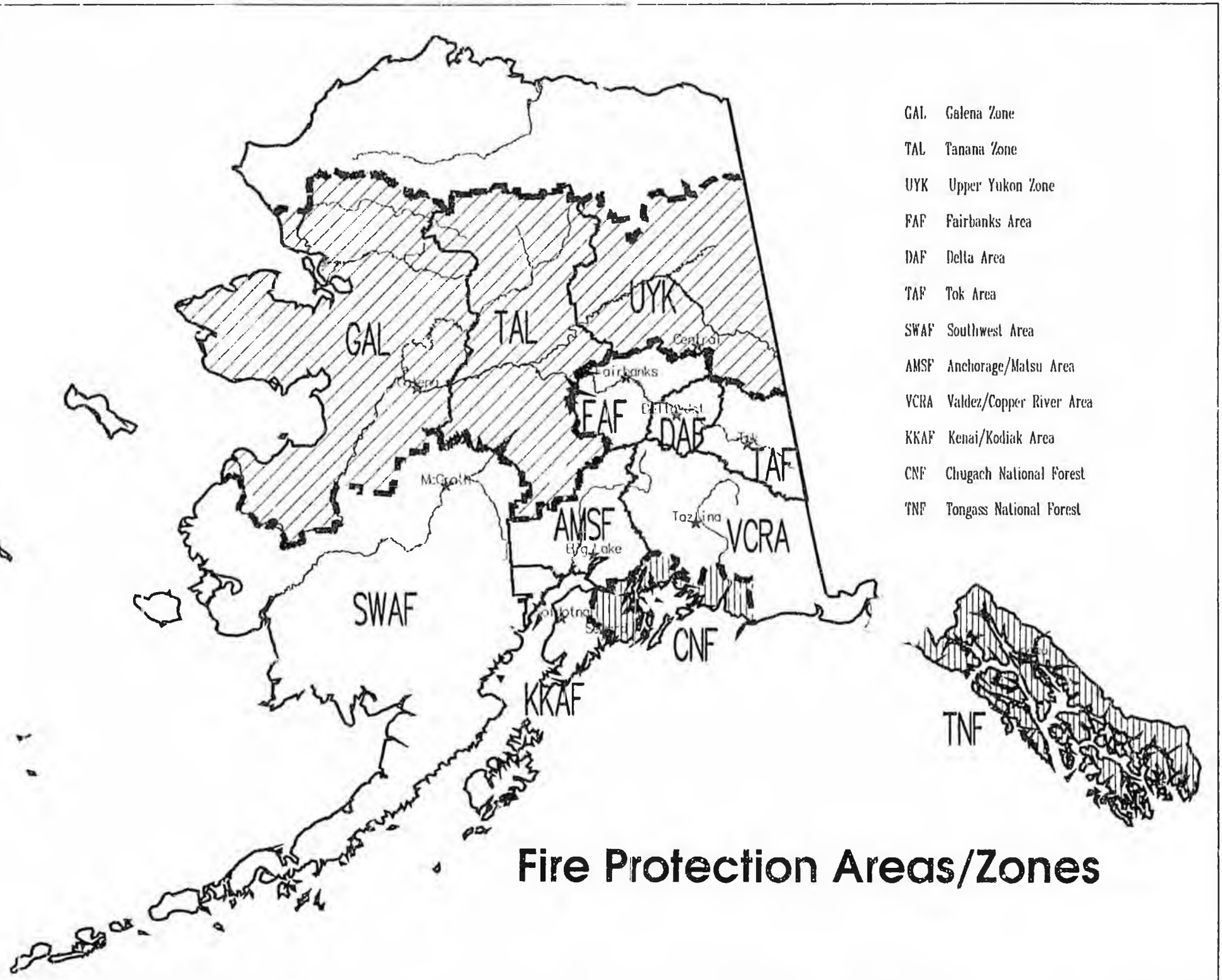
400 Willoughby Ave., 5th Floor
Juneau, Alaska 99801
465-2491 fax: 586-2754
Jim McAllister, Regional Forester

**Haines Area Office**
P.O. Box 263 (Gateway Building)
Haines Alaska 99827
766-2120
Roy Josephson, Area Forester

**Icy Bay Field Office**
P.O. Box 460
Cordova, Alaska 99574
424-3933 Fax: 766-3225
Chris Foley, Forester

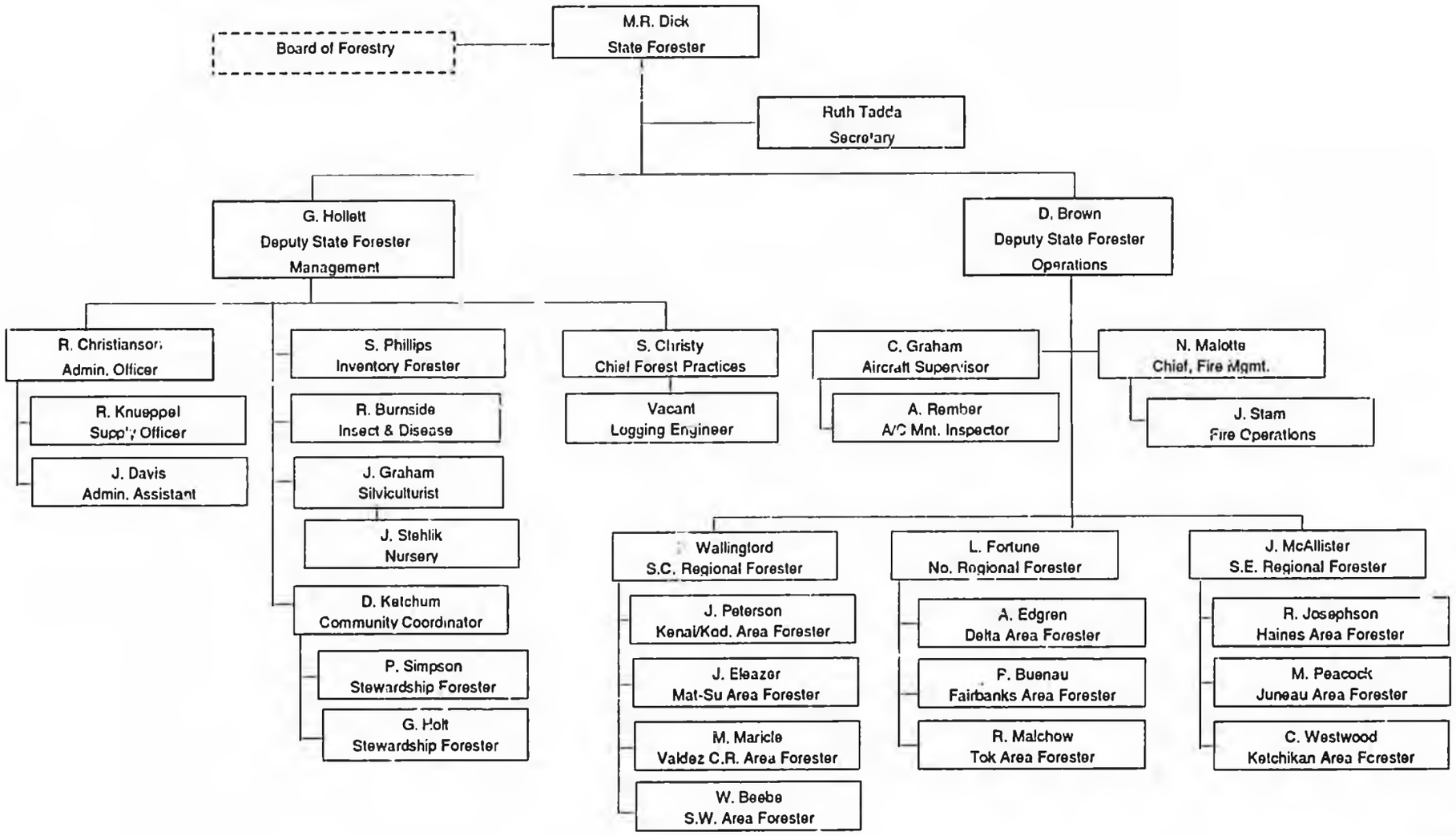
**Icy Bay/Juneau Area Office**
400 Willoughby Ave., 5th Floor
Juneau, Alaska 99801
465-2491
Mike Peacock, Area Forester

**Ketchikan Area Office**
2030 Sea Level Dr., Suite 217
Ketchikan, Alaska 99901
225-3070
Chris Westwood, Area Forester




**Fire Protection Areas/Zones**

# Department of Natural Resources
# Division of Forestry
# Organization Chart




12/31/91

This publication was released by the Department of Natural Resources to provide information about the operations of the Division of Forestry during 1991. Four hundred copies were printed in Anchorage, Alaska at a cost of $3.96 per copy.

# ALASKA AGRICULTURAL STATISTICS 1992





June 1992




CHECKED AREAS ON THE MAP SHOW THE LOCATION OF THE MAJOR AGRICULTURAL ACTIVITIES IN THE STATE. THE NUMBERS DESIGNATE THE AGRICULTURAL STATISTICS DISTRICTS.

1 TANANA VALLEY
2 MATANUSKA VALLEY
3 KENAI PENINSULA
4 SOUTHEAST
5 SOUTHWEST

# ALASKA AGRICULTURAL STATISTICS

## 1992

**COMPILED BY**

**ALASKA AGRICULTURAL STATISTICS SERVICE**


DeLon A. Brown
State Statistician

P. O. Box 799
Palmer, Alaska 99645

Janey Wineinger
Statistical Assistant

Marge Burgess
Administrative Technician


**ISSUED COOPERATIVELY BY**


U.S. DEPARTMENT OF AGRICULTURE
NATIONAL AGRICULTURAL STATISTICS SERVICE
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DIVISION OF AGRICULTURE
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# STATE OF ALASKA

**DEPARTMENT OF NATURAL RESOURCES**

*DIVISION OF AGRICULTURE*

*WALTER J. HICKEL, GOVERNOR*

P.O. BOX 949
PALMER, ALASKA 99645-0949
PHONE (907) 745-7200


May, 1992

Dear Friends of Alaskan Agriculture:

It is my pleasure to welcome you to the annual publication of Alaska Agricultural Statistics, a look at 1991 Alaskan agriculture through statistics. For the past 31 years, the Division of Agriculture has cooperated with the USDA National Agriculture Statistics Service, the Cooperative Extension Service, and the University of Alaska Agricultural & Forestry Experimental Station. With the input from these different agencies, we hope that this information is useful to the agriculture community.

Some farm cash receipts have had significant growth, while others have decreased. One thing is certain; Alaska agriculture is healthy, and there is tremendous opportunity for expansion into different areas. Delon Brown and his assistant continue to do much needed reporting, and deserve our special thanks.

We would like to compliment you, the producers and consumers, for your commitment to supplying and purchasing the very best products that there are.

We would be very interested in hearing from you if you have any suggestions which might improve this publication.

All of us involved in this report wish each of you a successful 1992.

Sincerely,

John W. Cramer

John Cramer
Deputy Director

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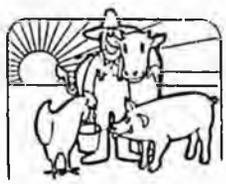



PHOTO CREDITS:

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| Front Cover: | Farm Hay Scene - Palmer by Alaska Agricultural Statistics Staff |
| | Insets - Delta Junction by Don Quarberg, CES, Delta Junction |
| All Other Photos: | Alaska Agricultural Statistics Staff |
| Back Cover: | Logo from State Division of Ag |

ALASKA
AGRICULTURAL
STATISTICS
SERVICE

UNITED STATES
DEPARTMENT OF AGRICULTURE
National Agricultural Statistics Service

P.O. BOX 799
PALMER, ALASKA 99645
(907) 745-4272
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We, the Staff of Alaska Agricultural Statistics Service, are pleased to issue the 1992 "Alaska Agricultural Statistics" bulletin. This is the 31st in a series and shows the latest summary of crop and livestock data compiled by this office, the State and other Federal Agencies. State, as well as area estimates are presented for crops, dairy, livestock and poultry. Preliminary and any revisions made to prior years' data were based on new information available since the original estimates were prepared.

We are extremely appreciative of the support provided to the Alaska Agricultural Statistics program by our cooperators, the Alaska Division of Agriculture; the Agriculture and Forestry Experiment Station and Cooperative Extension Service of the University of Alaska and the National Agricultural Statistics Service of United States Department of Agriculture. These agencies provide the funding for these detailed collection of agriculture information.

A special "thank you" to all farmers, ranchers, and agri-business people who voluntarily report the essential data for making these estimates. Our office pledges confidentiality to all who provide us with individual farm, ranch, or firm data. We also pledge service to all who need assistance with numbers that measure agriculture in some way.

This year, we are featuring the Hay industry on our front cover. Hay is made in all reporting districts with the Tanana Valley leading in production during 1991. This is only the fourth time since our records began in 1960, that the Tanana Valley produced more hay than the Matanuska Valley. Value of the 1991 hay crop was 3.4 million dollars.

Your suggestions for improvement of future publications will be appreciated.

DELON A. BROWN, State Statistician



## OTHER REPORTS AVAILABLE

ALASKA "FARM REPORTER" - Monthly
"Crop Weather - Weekly (May to October)
Call us at (907) 745-4272 or write for an order form to:
Alaska Agricultural Statistics Service
P. O. Box 799
Palmer, AK 99645

# ALASKA CASH RECEIPTS FROM FARM MARKETINGS 1/ SELECTED YEARS

| Item | 1961 | 1971 | 1981 | 1989 | 1990 | 1991 |
|---|---|---|---|---|---|---|
| | (000 Dollars) | | | | | |
| TOTAL ALL COMMODITIES | 4,369 | 3,694 | 14,210 | 28,651 | 26,794 | 26,620 |
| Total Livestock Poducts | 3,179 | 2,683 | 5,088 | 8,836 | 7,555 | 6,474 |
| All Meat Animals | 190 | 371 | 571 | 1,389 | 1,120 | 732 |
| Cattle & Calves | 116 | 273 | 287 | 1,320 | 992 | 578 |
| Sheep and Lambs | 7 | 10 | 9 | 32 | 25 | 30 |
| Hogs and Pigs | 67 | 88 | 275 | 37 | 103 | 124 |
| All Dairy Products | 2,504 | 1,838 | 2,465 | 4,550 | 3,254 | 2,582 |
| Milk Wholesale | 2,182 | 1,671 | 2,400 | 4,485 | 3,187 | 2,517 |
| Milk Retail | 322 | 167 | 65 | 65 | 67 | 65 |
| All Poultry & Eggs | 434 | 417 | 695 | 84 | 86 | 77 |
| Poultry | 24 | 13 | 25 | 30 | 33 | 25 |
| Eggs | 410 | 404 | 670 | 54 | 53 | 52 |
| All Misc 'laneous Livestock | 51 | 57 | 1,357 | 2,813 | 3,095 | 3,083 |
| Wool | 51 | 43 | 8 | 19 | 19 | 16 |
| Other Livestock 2/ | – | 14 | 1,349 | 2,794 | 3,076 | 3,067 |
| Total All Crops | 1,190 | 1,011 | 9,122 | 19,815 | 19,239 | 20,146 |
| All Feed Crops | 326 | 197 | 2,684 | 2,018 | 1,708 | 2,472 |
| Barley | 105 | 67 | 869 | 636 | 264 | 643 |
| Hay | 205 | 120 | 1,776 | 1,275 | 1,394 | 1,715 |
| Oats | 16 | 10 | 39 | 107 | 50 | 114 |
| All Vegetables | 847 | 810 | 2,148 | 3,020 | 2,790 | 2,430 |
| Potatoes | 651 | 507 | 1,502 | 2,226 | 1,910 | 1,547 |
| Miscellaneous Vegetables | 196 | 303 | 646 | 794 | 880 | 883 |
| All Other Crops | 17 | 4 | 4,290 | 14,777 | 14,741 | 15,244 |
| Greenhouse & Nursery | – | – | 4,020 | 14,458 | 14,570 | 15,080 |
| Other Crops 3/ | 17 | 4 | 270 | 319 | 171 | 164 |

1/ Includes cash receipts from all crop and livestock commodities in Alaska. 2/ Includes equine, fox, goats, honey, musk ox, reindeer, and other livestock and poultry. 3/ Includes forest products, berries, grass seed and other field crops not mentioned above. Dash indicates not available.

# ALASKA VALUE OF ON FARM PRODUCTION BY BY AREA 1/ -- SELECTED YEARS

| Year | Tanana Valley | Matanuska Valley | Kenai Peninsula | South-East | South-West | State Total |
|---|---|---|---|---|---|---|
| | | | Dollars | | | |
| | | | CROPS | | | |
| 1961 | 465,800 | 1,665,100 | 154,200 | 31,800 | 27,100 | 2,344,000 |
| 1971 | 399,400 | 1,575,600 | 135,000 | 2/ | 8,000 | 2,118,000 |
| 1981 | 2,608,600 | 4,435,400 | 438,000 | 2/ | 16,000 | 7,498,000 |
| 1989 | 3,438,300 | 4,328,700 | 385,000 | 2/ | 20,000 | 8,172,000 |
| 1990 | 1,585,700 | 5,046,300 | 495,000 | 2/ | 24,000 | 7,151,000 |
| **1991** | **2,955,900** | **4,490,600** | **490,500** | **2/** | **40,000** | **7,977,000** |
| | | | LIVESTOCK AND POULTRY | | | |
| 1961 | 388,800 | 2,431,000 | 190,200 | 233,300 | 120,700 | 3,364,000 |
| 1971 | 248,200 | 2,355,900 | 51,300 | 16,200 | 174,400 | 2,846,000 |
| 1981 | 634,100 | 3,258.800 | 399,300 | 19,300 | 351,500 | 4,663,000 |
| 1989 | 1,040,400 | 5,632,800 | 218,400 | 17,000 | 204,400 | 7,113,000 |
| 1990 | 1,138,800 | 3,712,200 | 204,000 | 20,000 | 182,000 | 5,257,000 |
| **1991** | **902,500** | **2,956,700** | **143,900** | **13,000** | **133,900** | **4,150,000** |
| | | | TOTAL | | | |
| 1961 | 854,600 | 4,096,100 | 344,400 | 265,100 | 147,800 | 5,708,000 |
| 1971 | 647,600 | 3,931,500 | 186,300 | 16,200 | 182,400 | 4,964,000 |
| 1981 | 3,242,700 | 7,694,200 | 837,300 | 19,300 | 367,500 | 12,161,000 |
| 1989 | 4,478,700 | 9,961,500 | 603,400 | 17,000 | 224,400 | 15,285,000 |
| 1990 | 2,724,500 | 8,758,500 | 699,000 | 20,000 | 206,000 | 12,408,000 |
| **1991** | **3,858,400** | **7,447,300** | **634,400** | **13,000** | **173,900** | **12,127,000** |

1/ Includes total value of crop and livestock production from farm commodities in this bulletin except reindeer. Excludes other livestock and all other crops as shown on Page 3. 2/ Included with Southwest.







# ALASKA AND U.S. PRICES RECEIVED FOR CROPS AND LIVESTOCK PRODUCTS – SELECTED YEARS

| Year | Barley (Bu.) | Oats (Bu.) | All Hay (Ton) | Silage (Ton) | Potatoes (Cwt.) | Eggs (Doz) | All Milk (Cwt.) |
|---|---|---|---|---|---|---|---|
| | | | Dollars | | | | |
| | | | ALASKA | | | | |
| 1961 | 2.35 | 1.55 | 66.00 | 21.00 | 6.30 | 0.78 | 11.79 |
| 1971 | 1.85 | 1.40 | 80.00 | 18.00 | 7.00 | 0.83 | 11.21 |
| 1981 | 4.10 | 3.00 | 160.00 | 39.00 | 21.00 | 1.20 | 19.41 |
| 1989 | 3.40 | 2.40 | 150.00 | 43.00 | 18.10 | 1.55 | 20.31 |
| 1990 | 3.30 | 2.35 | 170.00 | 42.00 | 19.90 | 1.51 | 20.47 |
| **1991** | **3.35** | **2.40** | **175.00** | **48.00** | **17.00** | **1.49** | **20.49** |
| | | | UNITED STATES | | | | |
| 1961 | 0.99 | 0.64 | 20.70 | NA | 1.36 | 0.36 | 4.22 |
| 1971 | 0.96 | 0.60 | 28.20 | NA | 2.00 | 0.31 | 5.87 |
| 1981 | 2.45 | 1.86 | 66.90 | NA | 5.40 | 0.63 | 13.80 |
| 1989 | 2.42 | 1.49 | 85.40 | NA | 7.36 | 0.69 | 13.56 |
| 1990 | 2.14 | 1.14 | 80.60 | NA | 6.08 | 0.71 | 13.81 |
| **1991** | **2.10** | **1.15** | **70.70** | **NA** | **5.05** | **0.67** | **12.34** |

NA–Not Available.

# ALASKA AND U.S. PRICES RECEIVED FOR LIVESTOCK AND POULTRY – SELECTED YEARS

| Year | All Hogs (Cwt.) | Beef Cattle (Cwt.) | All Cows (Cwt.) | Steers & Heifers (Cwt.) | Milk Cows (Head) | Calves (Cwt.) | All Sheep (Cwt.) | All Chickens (Head) |
|---|---|---|---|---|---|---|---|---|
| | | | | Dollars | | | | |
| | | | | ALASKA | | | | |
| 1961 | 26.00 | 22.00 | NA | NA | NA | NA | 26.00 | 2.31 |
| 1971 | 47.60 | 27.00 | 24.00 | 30.50 | 425.00 | 33.40 | 24.00 | 2.64 |
| 1981 | 75.00 | 66.00 | 47.00 | 74.00 | 840.00 | 65.00 | 35.00 | 5.05 |
| 1989 | 62.00 | 60.00 | 47.00 | 70.00 | 960.00 | 74.00 | 30.00 | 4.50 |
| 1990 | 78.00 | 62.00 | 52.00 | 70.00 | 980.00 | 76.00 | 30.00 | 4.60 |
| **1991** | **60.00** | **68.00** | **55.00** | **73.00** | **945.00** | **81.00** | **35.00** | **4.30** |
| | | | | UNITED STATES | | | | |
| 1961 | 16.60 | 21.41 | 21.00 | 28.50 | 208.00 | 23.12 | 5.20 | 0.76 |
| 1971 | 17.50 | 29.00 | 20.70 | 31.10 | 358.00 | 36.30 | 6.58 | 1.23 |
| 1981 | 43.90 | 58.60 | 41.30 | 62.40 | 1200.00 | 64.00 | 21.20 | 1.89 |
| 1989 | 42.50 | 69.50 | 48.00 | 74.30 | 1030.00 | 90.80 | 24.40 | 2.16 |
| 1990 | 53.70 | 74.60 | 51.50 | 78.80 | 1160.00 | 95.60 | 23.20 | 2.29 |
| **1991** | **49.10** | **72.70** | **49.80** | **76.60** | **1100.00** | **98.00** | **19.70** | **2.30** |

NA–Not Available.

# ALASKA FARM BALANCE SHEET 1985–1990 1/

| Item | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 |
|---|---|---|---|---|---|---|
| | Million Dollars | | | | | |
| TOTAL FARM ASSETS | 727.6 | 607.2 | 581.0 | 547.7 | 551.9 | 592.9 |
| Real Estate | 534.0 | 374.1 | 328.6 | 260.9 | 237.4 | 235.1 |
| Livestock/Poultry | 6.5 | 6.5 | 6.7 | 6.0 | 5.5 | 5.1 |
| Machinery/Motor vehicles | 22.6 | 22.9 | 23.3 | 23.3 | 23.7 | 23.6 |
| Crops | 0.0 | 0.2 | 0.2 | 0.0 | 0.0 | 0.0 |
| Financial Assets | 164.5 | 203.5 | 222.2 | 257.5 | 285.3 | 329.1 |
| TOTAL FARM DEBT 2/ | 41.6 | 36.4 | 30.6 | 33.2 | 33.1 | 27.1 |
| Real estate debt | 32.4 | 25.5 | 20.7 | 22.2 | 23.6 | 20.7 |
| Nonreal estate debt | 9.2 | 10.9 | 9.9 | 11.0 | 9.6 | 6.4 |
| EQUITY | 686.1 | 570.6 | 550.4 | 514.5 | 518.8 | 565.7 |
| DEBT/ASSETS RATIO | 5.7 | 6.0 | 5.3 | 6.1 | 6.0 | 4.6 |

1/ Data are for farms with annual sales of $1,000 or more. 2/ Excludes Alaska Agriculture Revolving Loan.
SOURCE: ERS ECIF 10-2

# ALASKA FARM GROSS AND NET INCOME –1985–1990

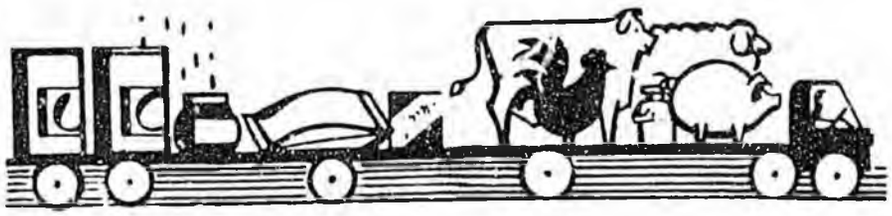
| ITEM | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 |
|---|---|---|---|---|---|---|
| | Million Dollars | | | | | |
| REALIZED GROSS FARM INCOME | | | | | | |
| Cash Receipts/farm marketings | 25.0 | 28.0 | 29.3 | 30.4 | 28.6 | 26.5 |
| Government payments | 0.3 | 0.8 | 2.4 | 1.8 | 1.1 | 1.1 |
| Nonmoney income | 3.3 | 5.0 | 3.9 | 3.2 | 2.8 | 2.6 |
| Other farm income | 1.3 | 1.5 | 1.7 | 1.6 | 1.9 | 2.0 |
| Net inventory Change | –2.9 | –1.7 | –0.5 | –0.6 | –0.6 | 0.0 |
| TOTAL GROSS FARM INCOME | 27.0 | 33.6 | 36.8 | 36.4 | 33.8 | 32.2 |
| FARM PRODUCTION EXPENSES | 22.1 | 25.9 | 25.8 | 25.1 | 25.0 | 24.7 |
| REALIZED NET FARM INCOME | 4.9 | 7.7 | 10.9 | 11.3 | 8.9 | 7.5 |

SOURCE: ERS ECIF 10-2

# ALASKA AGRICULTURAL COMMODITIES PRODUCED – SELECTED YEARS

| Commodity | 1961 | 1971 | 1981 | 1989 | 1990 | 1991 |
|---|---|---|---|---|---|---|
| | (000) Units | | | | | |
| **CROP PRODUCTION** | | | | | | |
| Oats for Grain (Bu.) | 45.9 | 11.8 | 21.7 | 55.7 | 23.7 | 59.4 |
| Barley for Grain (Bu.) | 73.0 | 45.0 | 251.0 | 249.0 | 138.0 | 250.0 |
| Grain Silage (Tons) | 15.5 | 13.3 | 6.1 | 3.4 | 1.2 | 3.0 |
| Grass Silage (Tons) | 6.6 | 6.2 | 6.7 | 5.3 | 5.0 | 3.7 |
| All Silage (Tons) | 22.1 | 19.5 | 12.8 | 8.7 | 6.2 | 6.7 |
| Grain Hay (Tons) | 2.5 | 2.6 | 5.5 | 0.8 | 0.3 | 0.9 |
| Grass Hay (Tons) | 7.4 | 4.6 | 14.7 | 15.7 | 15.9 | 18.6 |
| All Hay (Tons) | 9.9 | 7.2 | 20.2 | 16.5 | 16.2 | 19.5 |
| Potatoes (Cwt.) | 146.3 | 110.3 | 95.0 | 196.0 | 138.0 | 140.0 |
| Cabbage (Cwt.) 1/ | 3.4 | 2.7 | 4.6 | 4.2 | 5.6 | 5.4 |
| Lettuce (Cwt.) 1/ 2/ | 6.8 | 9.5 | 10.5 | 11.2 | 10.3 | 14.1 |
| Carrots (Cwt.) | 5.2 | 1.5 | 3.7 | 5.9 | 7.4 | 4.9 |
| Other Vegetables (Cwt.) | 2.1 | 2.4 | 4.7 | 8.6 | 9.0 | 8.7 |
| **LIVESTOCK AND POULTRY PRODUCTION** | | | | | | |
| Eggs (Doz.) | 541.7 | 483.0 | 558.0 | 58.0 | 58.0 | 59.4 |
| Poultry (Lbs.) | 61.0 | 58.0 | 231.0 | 63.0 | 63.0 | 70.0 |
| Beef (Lbs.) | 353.0 | 624.0 | 749.0 | 1734.0 | 1183.0 | 738.0 |
| Pork (Lbs.) | 175.0 | 150.0 | 293.0 | 180.0 | 180.0 | 304.0 |
| Mutton (Lbs.) | 18.0 | 34.0 | 18.0 | 29.0 | 29.0 | 37.0 |
| Wool (Lbs.) | 128.0 | 225.0 | 16.0 | 16.0 | 15.0 | 16.0 |
| Reindeer (Lbs.) | 485.0 | 456.0 | – | 452.0 | 411.0 | 440.0 |
| | Million Units | | | | | |
| Milk (Lbs.) | 22.8 | 17.1 | 13.4 | 23.3 | 16.8 | 13.3 |

1/ Production unit changed to cartons in 1981. 2/ Head lettuce only beginning 1981; prior years included all lettuce. Dash indicates data not available.



# ALASKA LIVESTOCK AND POULTRY ON FARMS (By Class) – SELECTED YEARS

| Class | Jan. 1 1962 | Jan. 1 1972 | Jan. 1 1982 | Jan. 1 1990 | Jan. 1 1991 | Jan. 1 1992 |
|---|---|---|---|---|---|---|
| | (000 Head) | | | | | |
| ALL CATTLE AND CALVES | 7.9 | 8.8 | 9.2 | 8.2 | 8.0 | 8.5 |
| Beef Cows | 1.4 | 2.6 | 3.0 | 2.6 | 2.5 | 2.7 |
| Milk Cows | 3.2 | 1.6 | 1.1 | 1.4 | 1.1 | 0.8 |
| Heifers 500 Pounds+ | 1.1 | 1.3 | 1.5 | 1.0 | 1.1 | 1.2 |
| Beef Cow Replacement | 0.5 | 0.6 | 1.0 | 0.7 | 0.8 | 0.9 |
| Milk Cows Replacement | 0.6 | 0.7 | 0.5 | 0.3 | 0.3 | 0.3 |
| Steers 500 Pounds+ | 0.7 | 0.8 | 0.7 | 0.5 | 0.5 | 0.5 |
| Bulls 500 Pounds+ | 0.2 | 0.5 | 0.8 | 1.2 | 1.6 | 1.6 |
| Calves · nder 500 pounds | 1.3 | 2.0 | 2.1 | 1.5 | 1.5 | 1.7 |
| ALL SHEEP AND LAMBS | 15.0 | 19.0 | 3.9 | 2.5 | 2.5 | 2.4 |
| Lambs | 4.0 | 2.0 | 0.6 | 0.3 | 0.5 | 0.5 |
| Ewes 1 Year+ | 7.0 | 9.0 | 1.9 | 1.5 | 1.4 | 1.3 |
| Wethers and Rams 1 Year+ | 4.0 | 8.0 | 1.4 | 0.7 | 0.6 | 0.6 |

| Class | Dec. 1 1961 | Dec. 1 1971 | Dec. 1 1981 | Dec. 1 1989 | Dec. 1 1990 | Dec. 1 1991 |
|---|---|---|---|---|---|---|
| | (000 Head) | | | | | |
| ALL HOGS AND PIGS | 1.0 | 1.5 | 2.8 | 0.7 | 1.2 | 1.4 |
| Slaughter Hogs and Pigs | NA | 1.1 | 0.7 | 0.4 | 0.9 | 1.0 |
| Breeding Hogs | NA | 0.4 | 2.1 | 0.3 | 0.3 | 0.4 |
| ALL CHICKENS | 42.0 | 36.0 | 37.0 | 5.0 | 5.0 | 4.0 |
| HPLA | 41.0 | 34.0 | 35.0 | 4.0 | 4.0 | 3.0 |
| Other Chickens | 1.0 | 2.0 | 2.0 | 1.0 | 1.0 | 1.0 |

NA–Not available.

# ALASKA FARM NUMBER AND LAND IN FARMS – SELECTED YEARS

| Year | Land in Farms (000 Acres) | Total All Farms | All Cattle | Beef Cow | Milk Cow | Chickens | Hogs | Sheep |
|---|---|---|---|---|---|---|---|---|
| 1961 | 1,665 | 410 | 210 | NA | 140 | NA | NA | NA |
| 1971 | 1,710 | 320 | 160 | NA | 90 | 70 | 40 | 20 |
| 1981 1/ | 1,520 | 500 | 190 | NA | 60 | 100 | 70 | 20 |
| 1989 | 1,010 | 600 | 160 | 90 | 40 | 80 | 40 | 40 |
| 1990 | 1,000 | 580 | 150 | 80 | 40 | 80 | 40 | 30 |
| **1991** | **1,000** | **560** | **140** | **70** | **30** | **70** | **40** | **30** |

1./ Farm redefined to include farms and ranches with annual sales of $1,000 or more. NA–Not Available.

# ALASKA FERTILIZER CONSUMPTION 1/ – 1990 – 1991

| Material | 1990 | 1991 |
|---|---|---|
| | – – Tons – – | |
| NITROGEN: | | |
| Ammonium Nitrate | 470 | 40 |
| Urea | 6,000 | 6,040 |
| Other Nitrogen | 110 | 50 |
| PHOSPHATE: | | |
| Ammoniated Phosphate | 660 | 510 |
| Other Phosphate | – | 60 |
| POTASH: | | |
| Muriate of Potash | 40 | 10 |
| TOTAL MATERIAL | 7,280 | 6,710 |
| COMPLETED FORMULAS: | | |
| 5.5–26–26 | 30 | 20 |
| 8–32–16 | 510 | 850 |
| 10–20–10 | – | 60 |
| 10–20–20 | 1[illegible] | 250 |
| 15–31–10–5 | 50 | – |

| Material | 1990 | 1991 |
|---|---|---|
| | – – Tons – – | |
| COMPLETED FORMULAS: | | |
| 16–16–16 | 420 | 390 |
| 17–17–17 | – | 50 |
| 18–18–18 | 150 | 50 |
| 20–2–5 | 60 | – |
| 20–10–10 | 90 | – |
| 20–20–10 | 210 | 130 |
| 20–20–10–3 | – | 260 |
| 20–20–10–10 | – | 170 |
| 22–4–4 | 160 | 160 |
| 22–11–11 | 550 | 540 |
| 24–12–10–5 | 20 | – |
| 25–3–5 | 40 | 20 |
| Miscellaneous | 540 | 1,340 |
| TOTAL FORMULAS | 3,020 | 4,340 |
| TOTAL FERTILIZER | 10,300 | 11,050 |
| LIME | 680 | 660 |

1/ Survey conducted by State Division of Agriculture.



# ALASKA CONSUMPTION OF FERTILIZER PLANT NUTRIENTS – SELECTED YEARS 1/

| Year ended June 30 | 1965 | 1971 | 1981 | 1989 | 1990 | 1991 |
|---|---|---|---|---|---|---|
| Mixed Fertilizer (Tons) | 3,033 | 2,812 | 5,005 | 4,280 | 3,020 | 4,340 |
| Primary Nutrient Material (Tons) | 1,339 | 1,738 | 4,055 | 6,150 | 7,280 | 6,710 |
| Secondary and MicroNutrient | 0 | 3 | 0 | 0 | 0 | 0 |
| Total Fertilizer (Tons) | 4,372 | 4,553 | 9,060 | 10,430 | 10,300 | 11,050 |

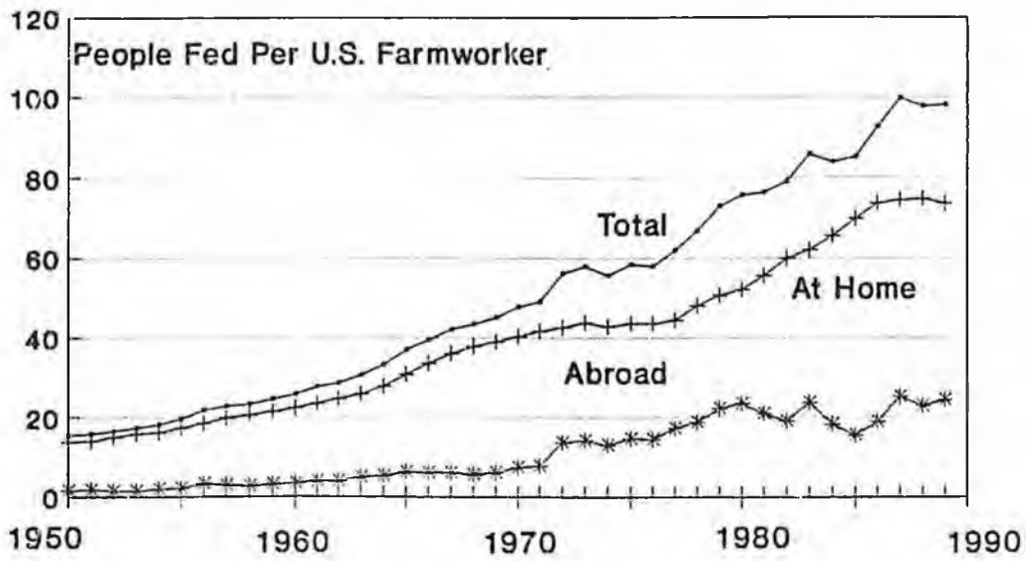
1/ Beginning 1987, Survey conducted by Alaska Division of Agriculture.

# ALASKA FARM LABOR – SELECTED YEARS 1/

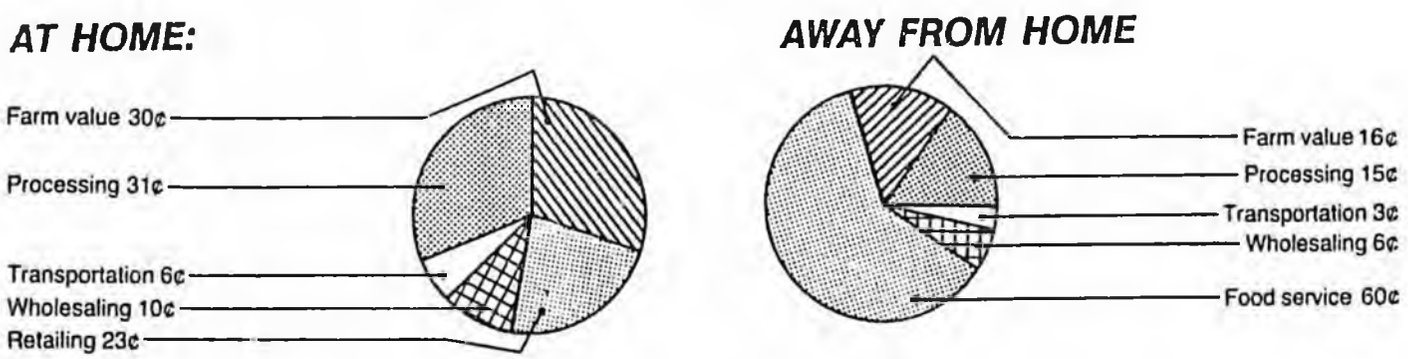
| Item | 1962 | 1965 | 1971 | 1975 | 1980 | 1991 |
|---|---|---|---|---|---|---|
| Farm Wage Hourly Rate | 2.00 | 2.15 | 2.65 | 3.50 | 5.20 | 6.65 |
| Hired Workers | 425 | 350 | 225 | 300 | 520 | 400 |
| Family Workers | 775 | 550 | 575 | 600 | 440 | 400 |
| Total Workers | 1,200 | 900 | 800 | 900 | 960 | 800 |

1/ Quarterly survey 1962–1975; Annual Survey 1980–1991.

# HOW MANY PEOPLE DOES ONE FARMER FEED?




# WHERE THE FOOD DOLLAR GOES AT HOME AND AWAY – 1990



# U.S. PER CAPITA CONSUMPTION – SELECTED YEARS

| Item | 1970 | 1975 | 1980 | 1985 | 1988 | 1989 |
|---|---|---|---|---|---|---|
| | Pounds | | | | | |
| Red Meats (Boneless) | 132.0 | 125.3 | 126.4 | 124.9 | 119.5 | 115.9 |
| Beef | 79.6 | 83.0 | 72.1 | 74.6 | 68.6 | 65.4 |
| Veal | 2.0 | 2.8 | 1.3 | 1.5 | 1.1 | 1.0 |
| Pork | 48.2 | 38.2 | 52.1 | 47.7 | 48.8 | 48.4 |
| Lamb & Mutton | 2.1 | 1.3 | 1.0 | 1.1 | 1.0 | 1.1 |
| Poultry (Boneless) | 34.1 | 34.2 | 42.6 | 49.4 | 57.4 | 60.8 |
| Chicken | 27.7 | 27.5 | 34.3 | 39.9 | 44.7 | 47.3 |
| Turkey | 6.4 | 6.7 | 8.3 | 9.6 | 12.6 | 13.5 |
| Fish & Shellfish (Boneless) | 11.7 | 12.1 | 12.8 | 14.4 | 15.2 | 15.8 |
| Eggs | 39.2 | 35.0 | 34.4 | 32.4 | 31.2 | 29.9 |
| Dairy Products | 563.9 | 539.4 | 543.5 | 594.1 | 583.5 | 567.6 |
| Fluid Milk & Cream | 275.1 | 261.4 | 245.6 | 241.0 | 234.6 | 231.8 |
| Lowfat Milk (1–2% Fat) | 29.8 | 53.2 | 70.1 | 83.3 | 89.9 | 94.2 |
| Whole Milk | 219.1 | 181.3 | 146.4 | 123.4 | 105.7 | 95.8 |
| Cheese | 11.4 | 14.3 | 17.5 | 22.5 | 23.7 | 23.8 |
| Amer. (excl. cottage, full-skim) | 7.0 | 8.2 | 9.6 | 12.2 | 11.5 | 11.0 |
| Other | 4.4 | 6.1 | 7.9 | 10.4 | 12.2 | 12.8 |
| Ice Cream | 17.8 | 18.6 | 17.5 | 18.1 | 17.3 | 16.1 |
| Fats & Oils, Product Wt. | 55.8 | 55.6 | 60.3 | 67.4 | 66.0 | 63.9 |
| Butter | 5.4 | 4.7 | 4.5 | 4.9 | 4.5 | 4.3 |
| Margarine | 10.8 | 11.0 | 11.3 | 10.8 | 10.3 | 10.2 |
| Shortening | 17.3 | 17.0 | 18.2 | 22.9 | 21.5 | 21.5 |
| Salad & Cooking Oils | 15.4 | 17.9 | 21.2 | 23.5 | 25.8 | 23.9 |
| Fresh Fruit | 76.7 | 82.0 | 86.9 | 86.1 | 95.1 | 93.9 |
| Citrus | 27.8 | 28.4 | 27.9 | 21.9 | 25.6 | 23.8 |
| Noncitrus | 48.9 | 53.6 | 59.0 | 64.2 | 69.5 | 70.1 |
| Apples | 16.3 | 18.7 | 18.5 | 16.8 | 19.2 | 20.9 |
| Citrus Juice | 31.8 | 45.7 | 44.6 | 45.9 | 46.9 | 44.2 |
| Selected Fresh Vegetables | 65.1 | 68.0 | 74.3 | 81.2 | 88.7 | 91.8 |
| Processed Vegetables (Farm Wt.) | 105.0 | 102.7 | 105.0 | 105.0 | 101.5 | NA |
| Tomatoes for Processing | 62.1 | 61.9 | 63.6 | 63.3 | 61.4 | NA |
| Other Vegetables for Canning | 23.6 | 20.8 | 21.4 | 18.7 | 16.9 | 16.0 |
| Vegetables for Freezing | 13.5 | 13.8 | 14.4 | 17.1 | 18.1 | 16.9 |
| Fresh Potatoes | 59.3 | 50.5 | 49.0 | 44.9 | 49.6 | 48.0 |
| Frozen Potatoes | 12.7 | 18.6 | 17.6 | 22.6 | 21.4 | 23.2 |
| Flour & Cereal Products | 135.1 | 138.8 | 145.5 | 158.0 | 172.9 | 169.3 |
| Wheat Flour | 110.9 | 114.3 | 116.9 | 124.7 | 130.0 | 123.4 |
| Rice (Milled Basis) | 6.7 | 7.6 | 9.5 | 9.1 | 14.4 | 15.6 |
| Corn Products | 11.1 | 10.8 | 12.9 | 17.8 | 20.7 | 21.8 |
| Coffee (Gal.) | 33.4 | 31.4 | 26.7 | 27.3 | 25.6 | 26.7 |
| Refined Sugar | 101.8 | 89.2 | 83.6 | 62.7 | 62.1 | 62.5 |
| Corned Sweetners | 19.3 | 27.4 | 39.1 | 65.9 | 69.7 | 70.3 |

SOURCE: ERS-USDA Statistical Bulletin No. 825. NA–Not available.

# ALASKA'S 1991 CROP AND WEATHER REVIEW

The 1991 crop season started off with warmer than normal high temperatures and unusually low night time temperatures. After a heavy winter snow accumulation, many areas remained too wet, laden with unmelted snow to begin fieldwork until mid-May. Small grain seeding of barley and oats began the second week of May and was nearly complete by June 3rd. Early seeded fields had excellent emergence. Fresh market potato planting began the week of May 20th and was being wrapped up the first week in June, equal to 1990 progress. Planting for seed continued into mid-June. Vegetable growers in the Matanuska Valley began setting transplants about May 10th. Atypical, warm daytime temperatures and significantly drier than normal weather in May promoted mostly moderate to rapid emergence of small grains in the Delta-Clearwater area. However, by early June, barley and oats development lagged behind 1990's advancement due to cooler than normal nighttime temperatures.

Cool soil temperatures slowed potato vine development in most areas through much of June. Critically dry soil moisture and above normal hot weather prevailed during mid June to early July in most areas. Welcome rainfall, in varying amounts throughout the Railbelt, fell during first week of July alleviating drought conditions.

First crop hay making began around the 15th of June in the Tanana and Matanuska Valleys. Lack of growth early in the season and frequent showers during the normal harvest period delayed conclusion of first crop till late August except in the Fairbanks area. Hay harvest on the Kenai Peninsula began around July 20th, a month later than the previous year due to continual showers. Second cutting was active in the Fairbanks region of the Tanana Valley the first week of August while farmers in the Matanuska Valley delayed harvest till late August, waiting for more growth. By October 1, Railbelt-wide, most of the second cutting had been made.

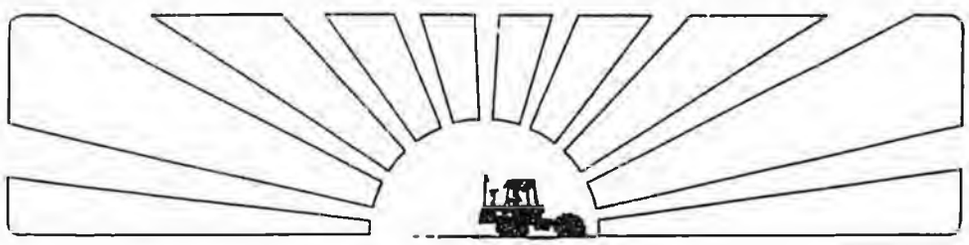
Barley for grain harvest began the third week of August in the Tanana Valley. Harvest was generally completed by October 1.

Potato digging for seed began about August 20th with fresh market harvest starting a week later and behind progress in 1990, due to small tubers. Tanana Valley commercial potato harvest began approximately September 1st. Harvest was generally complete by October 1 throughout the Railbelt. Excellent quality supplies of head lettuce, carrots, cabbage and squash were harvested during the season.

A hard killing frost ended the growing season in much of the Tanana Valley on August 26th. Clearwater had a low of 21 degrees the morning of August 28th.

In the Matanuska Valley, on September 22, a low temperature of 31 degrees was reported at the Palmer AES station. Kenny Lake recorded a low of 26 on August 19th. However, most areas didn't have a killing frost until October, after most perishables had been harvested.

Detailed summaries are shown on the next four pages for temperatures, precipitation and growing degree days. Data for these summaries are taken from the monthly Climatological Data Publications, NOAA, Environmental Data Service and may vary somewhat from the Annual Climatological data publication when it becomes available.



# ALASKA PRECIPITATION DATA (Inches)

| Station | 1991 Precipitation | | | | | | | 1991 Snow | Average Precipitation 1/ | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Apr | May | Jun | Jul | Aug | Sep | Year | | Apr | May | Jun | Jul | Aug | Sep | Year |
| TANANA VALLEY | | | | | | | | | | | | | | | |
| Fairbanks Ap | .00 | .10 | .36 | .81 | 1.18 | 1.16 | 9.40 | 95 | .26 | .63 | 1.40 | 1.80 | 1.63 | 1.02 | 10.62 |
| University Exp. Sta. | .00 | .13 | 1.25 | 1.40 | 2.12 | 1.40 | 12.48 | 88 | .18 | .56 | 1.71 | 2.10 | 1.89 | 1.15 | 12.22 |
| Eielson Field | .00 | .17 | 1.05 | 2.67 | 2.12 | 1.40 | 10.64 | 99 | .23 | .65 | 1.66 | 2.34 | 2.06 | 1.26 | 11.72 |
| Big Delta Ap | .04 | .20 | 2.80 | 2.40 | 1.43 | .77 | 12.31 | 73 | .21 | .83 | 2.65 | 2.86 | 1.96 | 1.07 | 12.18 |
| Clearwater | .12 | .20 | 2.89 | 1.46 | 1.43 | 1.05 | 13.95 | 65 | .49 | 1.00 | 2.62 | 2.71 | 1.95 | 1.43 | 15.98 |
| MATANUSKA VALLEY | | | | | | | | | | | | | | | |
| Anchorage Ap | .23 | .12 | .18 | 2.82 | 3.54 | 3.41 | 17.31 | 83 | .63 | .63 | 1.03 | 1.77 | 2.72 | 2.91 | 16.30 |
| PMC-Butte | 1.02 | 1.05 | .49 | 3.89 | 3.19 | 3.47 | 18.05 | 59 | .51 | .50 | .97 | 1.73 | 1.41 | 1.77 | 12.89 |
| Palmer AES | .07 | .06 | .55 | 3.79 | 1.64 | 1.97 | 14.11 | 76 | .54 | .59 | 1.35 | 2.19 | 2.18 | 2.64 | 15.60 |
| Matanuska Exp. Sta. | .05 | .19 | .34 | 3.47 | .82 | 1.97 | 11.81 | 72 | .52 | .66 | 1.37 | 2.34 | 2.22 | 2.55 | 15.19 |
| Wasilla 3S | .12 | .20 | .19 | 3.64 | 1.27 | 2.71 | 13.42 | 69 | .53 | .75 | 1.64 | 2.37 | 2.45 | 2.98 | 16.98 |
| Point McKenzie | * | .01 | .82 | 1.64 | 2.68 | 4.63 | * | * | * | .01 | .82 | 1.64 | 2.69 | 3.64 | * |
| Talkeetna Ap | 1.02 | 1.05 | .49 | 3.89 | 3.19 | 3.47 | 25.85 | 190 | 1.30 | 1.59 | 2.65 | 3.54 | 4.39 | 4.54 | 29.13 |
| KENAI PENINSULA | | | | | | | | | | | | | | | |
| Homer Ap | .81 | 1.54 | 1.30 | 1.50 | 2.20 | 3.40 | 24.02 | 77 | 1.39 | 1.15 | .97 | 1.47 | 2.24 | 3.34 | 26.32 |
| Kenai Ap | .27 | .07 | .55 | 2.02 | 2.77 | 3.75 | 20.94 | 100 | .73 | .99 | 1.09 | 1.57 | 2.48 | 3.26 | 18.63 |
| Kasilof 3 NW | .20 | .07 | .66 | 1.17 | 2.14 | 2.92 | 12.17 | 83 | .69 | .74 | 1.04 | 1.60 | 2.60 | 3.19 | 18.09 |
| OTHER AREAS | | | | | | | | | | | | | | | |
| Kodiak Ap | 8.02 | 9.74 | 8.65 | 2.29 | 4.77 | 10.19 | 90.27 | 98 | 4.53 | 6.28 | 5.41 | 4.01 | 4.80 | 7.05 | 72.11 |
| Nome Ap | .64 | .35 | 2.28 | 2.44 | .75 | 2.69 | 14.17 | 43 | .64 | .64 | 1.30 | 2.23 | 2.71 | 2.52 | 15.55 |
| McGrath Ap | .59 | .26 | .57 | 2.73 | 2.96 | 1.25 | 15.53 | 90 | .72 | 1.01 | 1.45 | 2.20 | 2.53 | 2.25 | 17.45 |
| Juneau Ap | 4.73 | 4.72 | 3.41 | 4.85 | 9.60 | 15.14 | 85.15 | 120 | 2.84 | 3.40 | 3.18 | 3.81 | 5.51 | 7.05 | 54.96 |
| Haines Ap | 1.76 | 1.44 | .51 | .42 | 4.36 | 7.12 | 45.51 | 260 | 2.42 | 1.95 | 1.38 | 1.44 | 2.70 | 4.83 | 47.56 |
| Kenny Lake | .25 | .13 | .84 | 2.74 | 1.65 | .89 | 11.99 | 74 | .19 | .54 | 1.46 | 1.99 | 1.49 | 1.23 | 11.13 |

1/ Averages based on Historical records from 1970-1991 when data available.

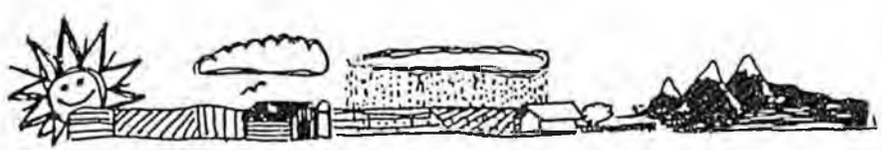
* Data not available.



# ALASKA 1991 TEMPERATURE DATA

| Station | High/Low For | | | | | Average for | | | | | Date of Last Spring Minimum of | | Date of First Fall Minimum of | | Days Between |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Year | Jan | Apr | Jul | Sep | Year | Jan | Apr | Jul | Sep | <32° | <40° | <40° | <32° | <32° |
| TANANA VALLEY | | | | | | | | | | | | | | | |
| Fairbanks Ap | 94/-45 | 45/-45 | 58/3 | 83/39 | 72/26 | 29 | -5 | 35 | 61 | 48 | 5/12 | 5/23 | 7/10 | 8/29 | 109 |
| Univ Exp Sta | 93/-42 | 44/-42 | 58/3 | 87/37 | 71/28 | 28 | -4 | 35 | 60 | 48 | 5/14 | 6/10 | 7/10 | 8/28 | 106 |
| Eielson Field | 92/-45 | 43/-44 | 59/0 | 82/43 | 72/28 | 29 | -5 | 35 | 60 | 50 | 5/13 | 5/23 | 8/3 | 8/28 | 108 |
| Big Delta Ap | 90/-53 | 44/-53 | 58/-1 | 83/38 | 70/20 | 29 | -1 | 35 | 58 | 48 | 5/15 | 6/13 | 7/9 | 8/26 | 103 |
| Clearwater | 90/-57 | 42/-57 | 59/-10 | 82/34 | 71/17 | 27 | -4 | 32 | 58 | 46 | 5/24 | 6/17 | 7/9 | 8/21 | 89 |
| MATANUSKA VALLEY | | | | | | | | | | | | | | | |
| Anchorage Ap | 75/-14 | 46/-14 | 50/15 | 72/44 | 66/35 | 37 | 16 | 38 | 58 | 51 | 5/8 | 5/21 | 8/29 | 10/8 | 153 |
| PMC-Butte | 81/-31 | 46/-27 | 53/23 | 76/38 | 67/28 | 36 | 12 | 40 | 56 | 50 | 5/21 | 5/26 | 7/25 | 8/28 | 99 |
| Palmer AES | 80/-19 | 43/-13 | 57/22 | 74/42 | 65/31 | 37 | 13 | 40 | 56 | 50 | 4/23 | 6/8 | 8/3 | 9/22 | 152 |
| Matanuska Exp. Sta. | 80/-21 | 46/-15 | 57/21 | 75/42 | 68/31 | 36 | 13 | 40 | 57 | 50 | 5/17 | 6/10 | 8/28 | 9/22 | 128 |
| Wasilla 3S | 79/-22 | 46/-20 | 60/19 | 74/40 | 69/30 | 37 | 13 | 41 | 58 | 52 | 5/14 | 6/10 | 8/3 | 9/22 | 131 |
| Pt. McKenzie | * | * | 54/15 | 76/43 | 70/36 | * | * | 38 | 57 | 51 | 5/8 | 5/26 | 8/31 | 10/8 | 153 |
| Talkeetna Ap | 83/-36 | 40/-21 | 53/05 | 78/40 | 69/29 | 35 | 12 | 36 | 58 | 49 | 5/20 | 6/16 | 8/3 | 9/22 | 124 |
| KENAI PENINSULA | | | | | | | | | | | | | | | |
| Homer Ap | 71/0 | 44/1 | 49/24 | 67/42 | 63/37 | 39 | 24 | 39 | 54 | 50 | 5/12 | 6/23 | 8/3 | 10/6 | 147 |
| Kenai Ap | 74/-26 | 42/-18 | 51/11 | 72/37 | 65/35 | 35 | 15 | 37 | 54 | 50 | 5/12 | 6/23 | 7/25 | 10/5 | 146 |
| Kasilof 3 NW | 72/-21 | 40/-18 | 54/10 | 69/38 | 66/31 | 35 | 16 | 36 | 54 | 49 | 5/22 | 6/23 | 7/21 | 8/29 | 99 |
| OTHER AREAS | | | | | | | | | | | | | | | |
| Kodiak Ap | 73/-2 | 45/4 | 48/26 | 68/43 | 63/34 | 41 | 30 | 39 | 54 | 50 | 4/20 | 5/31 | 9/18 | 10/7 | 170 |
| Nome Ap | 80/-37 | 34/-37 | 47/-13 | 80/39 | 69/30 | 28 | 7 | 25 | 55 | 48 | 5/19 | 6/23 | 8/3 | 8/28 | 101 |
| McGrath Ap | 88/-60 | 38/-60 | 55/-6 | 82/35 | 72/31 | 28 | -3 | 32 | 58 | 49 | 5/11 | 6/5 | 8/20 | 9/22 | 134 |
| Juneau Ap | 84/-4 | 46/-4 | 60/26 | 73/46 | 61/40 | 42 | 25 | 42 | 55 | 50 | 4/16 | 6/4 | 8/6 | 10/15 | 182 |
| Haines Ap | 90/-15 | 39/-15 | 58/21 | 70/53 | 59/44 | 39 | 13 | 38 | 56 | 48 | 6/4 | 6/14 | 10/9 | 10/17 | 135 |
| Kenny Lake | 90/-45 | 44/-45 | 57/02 | 76/30 | 66/21 | 29 | -2 | 35 | 55 | 46 | 5/25 | 6/15 | 7/2 | 7/25 | 61 |

*Data not available.



# ALASKA HISTORICAL TEMPERATURE DATA 1/

| Station | High/Low For | | | | | Average for | | | | | Growing Season Average No. Frost Free Days 32° | Elevation in Feet |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Year | Jan | Apr | Jul | Sep | Year | Jan | Apr | Jul | Sep | | |
| TANANA VALLEY | | | | | | | | | | | | |
| Fairbanks Ap | 96/-66 | 50/-66 | 74/-49 | 93/34 | 84/10 | 28 | -8 | 31 | 63 | 45 | 118 | 436 |
| University Exp. Sta. | 99/-65 | 47/-65 | 76/-32 | 99/29 | 85/6 | 28 | -6 | 31 | 61 | 45 | 95 | 475 |
| Eielson Field | 93/-64 | 49/-64 | 74/-23 | 89/36 | 75/5 | 26 | -10 | 29 | 61 | 44 | 113 | 547 |
| Big Delta Ap | 92/-63 | 48/-63 | 76/-37 | 91/35 | 79/2 | 28 | -3 | 30 | 60 | 44 | 101 | 1268 |
| Clearwater | 93/-72 | 48/-72 | 74/-33 | 90/28 | 74/13 | 25 | -9 | 29 | 59 | 42 | 55 | 1100 |
| MATANUSKA VALLEY | | | | | | | | | | | | |
| Anchorage Ap | 86/-38 | 56/-35 | 65/-21 | 83/35 | 73/19 | 36 | 16 | 36 | 58 | 48 | 136 | 114 |
| PMC-Butte | 85/-45 | 51/-45 | 72/-15 | 85/36 | 71/17 | 35 | 11 | 27 | 43 | 35 | 101 | 67 |
| Palmer AES | 90/-36 | 51/-36 | 69/-17 | 85/37 | 72/17 | 36 | 14 | 35 | 58 | 48 | 124 | 225 |
| Matanuska Exp. Sta. | 91/-41 | 51/-40 | 68/-16 | 85/31 | 75/16 | 36 | 14 | 36 | 58 | 47 | 107 | 150 |
| Wasilla 3S | 90/-40 | 52/-40 | 68/-8 | 87/37 | 76/17 | 37 | 15 | 37 | 59 | 49 | 103 | 50 |
| Pt. McKenzie | 84/-45 | 45/-45 | 57/12 | 82/41 | 68/34 | 34 | 8 | 28 | 47 | 40 | 132 | 145 |
| Talkeetna Ap | 91/-48 | 45/-48 | 69/-37 | 90/26 | 78/11 | 34 | 10 | 33 | 58 | 46 | 104 | 345 |
| KENAI PENINSULA | | | | | | | | | | | | |
| Homer Ap | 81/-24 | 49/-24 | 60/-7 | 78/37 | 66/24 | 38 | 23 | 35 | 54 | 48 | 123 | 89 |
| Kenai Ap | 86/-44 | 48/-44 | 62/-15 | 84/29 | 71/22 | 34 | 14 | 34 | 55 | 47 | 120 | 86 |
| Kasilof 3 NW | 87/-45 | 48/-45 | 63/-17 | 83/27 | 72/15 | 34 | 14 | 33 | 53 | 46 | 91 | 70 |
| OTHER AREAS | | | | | | | | | | | | |
| Kodiak Ap | 86/-16 | 54/-16 | 62/-7 | 81/38 | 73/26 | 41 | 31 | 37 | 55 | 50 | 144 | 111 |
| Nome Ap | 86/-54 | 46/-54 | 60/-30 | 86/31 | 67/15 | 27 | 6 | 17 | 52 | 42 | 81 | 13 |
| McGrath Ap | 90/-75 | 54/-75 | 67/-40 | 89/33 | 76/6 | 26 | -8 | 26 | 59 | 44 | 100 | 344 |
| Juneau Ap | 90/-22 | 57/-20 | 71/6 | 90/36 | 72/26 | 41 | 25 | 40 | 56 | 50 | 143 | 12 |
| Haines Ap | 98/-17 | 53/-15 | 74/16 | 98/35 | 76/24 | 41 | 24 | 41 | 58 | 50 | 157 | 31 |
| Kenny Lake | 88/-57 | 44/-57 | 68/-26 | 88/30 | 77/-1 | 28 | -3 | 32 | 57 | 44 | 56 | 1320 |

1/ Averages based on Historical records from 1970-1991 when data available, Pt. MacKenzie, based on four years.

* Data not available.



# ALASKA SEASON GROWING DEGREE DAYS (Base 40° F.) 1/

| Station | May | | Jun | | Jul | | Aug | | Sep | | Total | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1991 | Avg | 1991 | Avg | 1991 | Avg | 1991 | Avg | 1991 | Avg | 1991 | Avg |
| TANANA VALLEY | | | | | | | | | | | | |
| Fairbanks Ap | 347 | 306 | 714 | 604 | 639 | 710 | 446 | 532 | 240 | 161 | 2386 | 2313 |
| University Exp. Sta. | 295 | 270 | 624 | 555 | 617 | 666 | 403 | 501 | 240 | 146 | 2178 | 2138 |
| Eielson Field | 332 | 266 | 681 | 559 | 617 | 657 | 459 | 505 | 306 | 142 | 2394 | 2129 |
| Big Delta Ap | 155 | 239 | 690 | 514 | 567 | 630 | 403 | 483 | 249 | 135 | 2064 | 2001 |
| Clearwater | 248 | 191 | 504 | 463 | 527 | 577 | 344 | 415 | 177 | 62 | 1800 | 1708 |
| MATANUSKA VALLEY | | | | | | | | | | | | |
| Anchorage Ap | 205 | 213 | 471 | 431 | 543 | 569 | 481 | 507 | 330 | 242 | 2029 | 1962 |
| PMC-Butte | 260 | 243 | 495 | 449 | 496 | 557 | 440 | 484 | 288 | 230 | 1980 | 1964 |
| Palmer AES | 264 | 224 | 498 | 433 | 508 | 546 | 453 | 496 | 300 | 237 | 2023 | 1938 |
| Matanuska Exp. Sta. | 245 | 220 | 504 | 423 | 530 | 547 | 462 | 487 | 312 | 225 | 2053 | 1902 |
| Wasilla 3S | 260 | 241 | 516 | 452 | 555 | 589 | 481 | 522 | 348 | 264 | 2160 | 2068 |
| Pt.McKenzie | 236 | * | 493 | * | 534 | * | 495 | * | 333 | * | 2091 | * |
| Talkeetna Ap | 171 | 170 | 540 | 437 | 555 | 572 | 462 | 479 | 264 | 184 | 1991 | 1843 |
| KENAI PENINSULA | | | | | | | | | | | | |
| Homer Ap | 121 | 98 | 309 | 283 | 437 | 422 | 394 | 419 | 309 | 233 | 1570 | 1456 |
| Kenai Ap | 155 | 127 | 327 | 311 | 419 | 451 | 384 | 425 | 288 | 204 | 1573 | 1520 |
| Kasilof 3 NW | 102 | 63 | 309 | 262 | 425 | 404 | 353 | 382 | 258 | 173 | 1447 | 1283 |
| OTHER AREAS | | | | | | | | | | | | |
| Kodiak Ap | 152 | 116 | 291 | 291 | 428 | 446 | 443 | 468 | 309 | 305 | 1623 | 1626 |
| Nome Ap | 0 | 0 | 333 | 199 | 468 | 383 | 360 | 333 | 240 | 79 | 1364 | 993 |
| McGrath Ap | 217 | 168 | 582 | 469 | 555 | 593 | 422 | 460 | 267 | 126 | 2043 | 1815 |
| Juneau Ap | 254 | 231 | 450 | 398 | 471 | 503 | 465 | 476 | 309 | 291 | 1949 | 1899 |
| Haines Ap | 177 | 267 | 441 | 454 | 508 | 560 | 434 | 523 | 246 | 307 | 1806 | 2110 |
| Kenny Lake | 189 | 140 | 474 | 396 | 456 | 525 | 357 | 415 | 177 | 116 | 1652 | 1592 |

1/ Averages based on Historical records from 1970-1991 when data available.
* Not enough data for average.



# ALASKA CROP SUMMARY - 1991

**BARLEY** was planted on 5,200 acres in 1991, 500 acres less than in 1990 but 100 acres above 1989. Growers harvested 5,000 acres for grain, down 400 acres from 1990. Production of **BARLEY FOR GRAIN** was 250,000 bushels, 112,000 bushels above 1990. A yield of 50.0 bushels per acre was up 24.5 bushels from 25.5 per acre in 1990. The 1991 crop value, at $838,000 was $383,000 above the 1990 level.

**OAT** growers planted 2,200 acres of oats, 900 acres above a year ago. Growers harvested 2,100 an increase of 1,100 from last year. Most of the oat acreage was harvested for grain in 1991.

**OATS FOR GRAIN** was harvested from 1,100 acres, up 500 acres from 1990. Production was 59,400 bushels, 35,700 bushels above the 1990 production. The State's yield averaged 54.0 bushels per acre compared with 39.5 in 1990. Value of the 1991 crop at $143,000 compares with $56,000 in 1990.

**ALL HAY** production of 19,500 tons was 3,300 above the 1990 production. The State's average yield at 1.17 tons per acre compares with 1.07 tons per acre in 1990. The 1991 crop was harvested from a record 16,700 acres, up 1,600 acres from a year earlier and up 4,000 acres from 1989. At $3,413,000, value of production of all hay increased $659,000 from the previous year.

**GRASS HAY** was harvested from a record 16,000 acres, 1,200 acres more than in 1990. Production of 18,600 tons of grass hay was 2,700 tons above the 1990 level. Seeded grass hay, brome, and timothy, are harvested mostly in the Tanana and Matanuska Valleys. Native grasses still make up part of the Kenai Peninsula hay production.

**GRAIN HAY**, mostly oat hay was harvested from 700 acres, 400 acres more than 1990. Production totaled 900 tons compared with 300 acres in 1990.

**ALL SILAGE** production totaled 6,700 tons, up from 6,200 tons the previous year. A total of 1,700 acres of silage was harvested, up 300 acres from 1990. **GRASS SILAGE** was harvested from 1,300 acres and produced 3,700 tons. **GRAIN SILAGE** produced 3,000 tons from 400 acres. Silage is produced mainly by Grade A Dairies included in the Palmer and Pt. MacKenzie areas. Production value of all silage at $320,000 was $60,000 more than a year ago.

**POTATO** production of 140,000 cwt. was harvested from 650 acres, compared with 138,000 cwt. from 590 in 1990. At $2,380,000, value of production was $366,000 below the 1990 crop.

**VEGETABLES** were harvested from 248 acres, down 16 acres from 1990. Value of all vegetables produced, excluding greenhouse vegetables was $883,000 compared with $880,000 in 1990. **HEAD LETTUCE** production of 23,700 cartons was harvested from 65 acres in 1991. Other types of lettuce are included in other vegetables. An annual average carton weight for head lettuce in Alaska was 45 pounds in 1991 same as in 1990. **CABBAGE** production of 10,700 cartons was harvested from 38 acres in 1991. An annual average carton weight for cabbage in Alaska was 50 pounds in 1991 and 55 pounds in 1990.

**CARROT** production totaled 4,900 cwt., 2,500 cwt. below 1990. Acres harvested at 37 was slightly above year ago. **OTHER VEGETABLES** were harvested from 108 acres, 12 acres below the previous year.

# ALASKA CROPLAND UTILIZATION – 1991

| Crops | Tanana Valley | Matanuska Valley | Kenai Peninsula | South-West 1/ | State Total |
|---|---|---|---|---|---|
| | Acres | | | | |
| | PLANTED AREA | | | | |
| COMMERCIAL VEGETABLES | | | | | |
| Potatoes | 110 | 540 | 10 | – | 660 |
| Lettuce | 23 | 54 | – | – | 77 |
| Cabbage | 10 | 30 | – | – | 40 |
| Carrots | 11 | 32 | – | – | 43 |
| Other Vegetables | 24 | 109 | – | – | 133 |
| FEED CROPS | | | | | |
| All Oats | 1,700 | 500 | – | – | 2,200 |
| All Barley | 4,850 | 350 | – | – | 5,200 |
| GRASSLAND HARVESTED | | | | | |
| Grass | 7,100 | 7,700 | 2,300 | 200 | 17,300 |
| TOTAL LAND IN CROPS | 13,828 | 9,315 | 2,310 | 200 | 25,653 |
| Percent of State Total | 54% | 36% | 9% | 1% | 100% |
| | HARVESTED AREA | | | | |
| COMMERCIAL VEGETABLES | | | | | |
| Potatoes | 110 | 530 | 10 | – | 650 |
| Lettuce | 22 | 43 | – | – | 65 |
| Cabbage | 10 | 28 | – | – | 38 |
| Carrots | 8 | 29 | – | – | 37 |
| Other Vegetables | 23 | 85 | – | – | 108 |
| FEED CROPS | | | | | |
| Oats – All Purposes | 1,600 | 500 | – | – | 2,100 |
| Barley – All Purposes | 4,750 | 350 | – | – | 5,100 |
| Grass | 7,100 | 7,700 | 2,300 | 200 | 17,300 |
| GRAIN | | | | | |
| Oats | 1,000 | 100 | – | – | 1,100 |
| Barley | 4,700 | 300 | – | – | 5,000 |
| HAY | | | | | |
| Grain | 450 | 250 | – | – | 700 |
| Grass | 6,700 | 6,800 | 2,300 | 200 | 16,000 |
| SILAGE | | | | | |
| Grain | 200 | 200 | – | – | 400 |
| Grass | 400 | 900 | – | – | 1,300 |

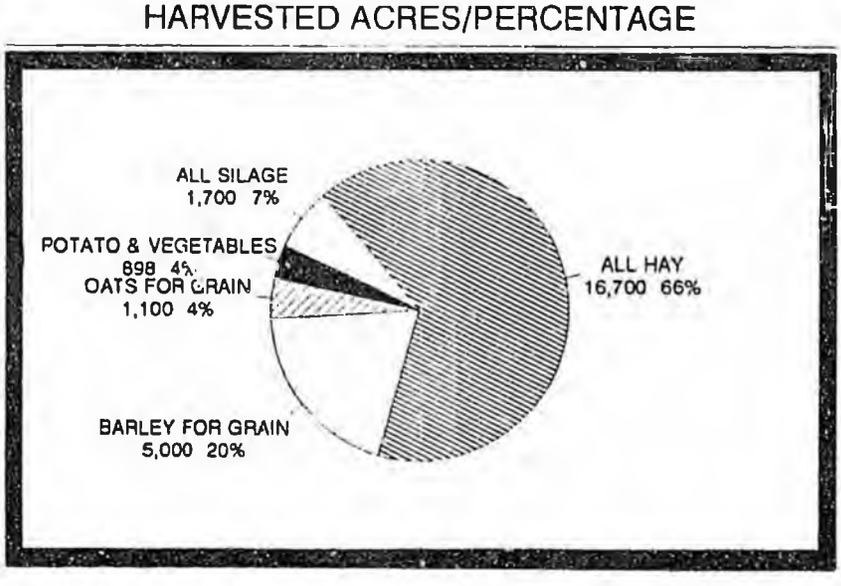
1/ Includes Southeast. Dash indicates no crop produced or combined with other areas.

# ALASKA BARLEY -- SELECTED YEARS

| District | Year | Area Planted Acres | AREA HARVESTED FOR GRAIN | | | |
|---|---|---|---|---|---|---|
| | | | Acres | Yield Bu. | Production Bu. (000) | Production $ Value (000) |
| Tanana Valley | 1961 | 700 | 410 | 23.9 | 9.8 | 23.7 |
| | 1971 | 3,000 | 2,600 | 11.7 | 30.4 | 56.8 |
| | 1981 | 15,600 | 7,800 | 28.7 | 224.0 | 899.0 |
| | 1989 | 4,800 | 4,500 | 54.0 | 243.0 | 826.0 |
| | 1990 | 5,400 | 5,100 | 24.3 | 124.0 | 403.0 |
| | **1991** | **4,850** | **4,700** | **50.0** | **236.0** | **785.0** |
| Matanuska Valley 1/ | 1961 | 1,900 | 1,590 | 39.7 | 63.2 | 148.3 |
| | 1971 | 1,100 | 500 | 29.2 | 14.6 | 26.2 |
| | 1981 | 900 | 700 | 38.6 | 27.0 | 130.0 |
| | 1989 | 300 | 200 | 30.0 | 6.0 | 21.0 |
| | 1990 | 300 | 300 | 46.7 | 14.0 | 52.0 |
| | **1991** | **350** | **300** | **46.5** | **14.0** | **53.0** |
| State Total | 1961 | 2,600 | 2,000 | 36.5 | 73.0 | 172.0 |
| | 1971 | 4,100 | 3,100 | 14.5 | 45.0 | 83.0 |
| | 1981 | 16,500 | 8,500 | 29.5 | 251.0 | 1029.0 |
| | 1989 | 5,100 | 4,700 | 53.0 | 249.0 | 847.0 |
| | 1990 | 5,700 | 5,400 | 25.5 | 138.0 | 455.0 |
| | **1991** | **5,200** | **5,000** | **50.0** | **250.0** | **838.0** |

1/ Includes Kenai Peninsula.





# ALASKA OATS – SELECTED YEARS

| District | Year | Area Planted Acres | AREA HARVESTED FOR GRAIN | | | |
|---|---|---|---|---|---|---|
| | | | Acres | Yield Bu. | Production Bu. (000) | Production $ Value (000) |
| Tanana Valley | 1961 | 570 | 130 | 56.2 | 7.3 | 11.7 |
| | 1971 | 450 | 100 | 59.0 | 5.9 | 8.6 |
| | 1981 | 5,100 | 300 | 47.7 | 14.3 | 39.0 |
| | 1989 | 1,000 | 600 | 88.5 | 53.1 | 127.0 |
| | 1990 | 1,000 | 500 | 38.8 | 19.4 | 44.0 |
| | **1991** | **1,700** | **1,000** | **54.5** | **54.5** | **130.0** |
| Matanuska Valley 1/ | 1961 | 2,430 | 770 | 50.1 | 38.6 | 59.3 |
| | 1971 | 1,650 | 100 | 59.0 | 5.9 | 8.4 |
| | 1981 | 900 | 200 | 37.0 | 7.4 | 26.0 |
| | 1989 | 400 | 100 | 26.0 | 2.6 | 7.0 |
| | 1990 | 300 | 100 | 43.0 | 4.3 | 12.0 |
| | **1991** | **500** | **100** | **49.0** | **4.9** | **13.0** |
| State Total | 1961 | 3,000 | 900 | 51.0 | 45.9 | 71.0 |
| | 1971 | 2,100 | 200 | 59.0 | 11.8 | 17.0 |
| | 1981 | 6,000 | 500 | 43.5 | 21.7 | 65.0 |
| | 1989 | 1,400 | 700 | 79.5 | 55.7 | 134.0 |
| | 1990 | 1,300 | 600 | 39.5 | 23.7 | 56.0 |
| | **1991** | **2,200** | **1,100** | **54.0** | **59.4** | **143.0** |

1/ Includes Kenai Peninsula and Southwest.

# ALASKA GRAIN STOCKS – SELECTED YEARS

| Year | On Farm | | | | Off Farm | | | | Total | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Jan. 1 | Apr. 1 | Jul. 1 | Sep. 1 | Jan. 1 | Apr. 1 | Jul. 1 | Sep. 1 | Jan. 1 | Apr. 1 | Jul. 1 | Sep. 1 |
| | Tons | | | | | | | | | | | |
| | OATS | | | | | | | | | | | |
| 1989 | 420 | 360 | 190 | 110 | 350 | 250 | 230 | 170 | 770 | 610 | 420 | 28 |
| 1990 | 620 | 530 | 380 | 280 | 240 | 230 | 150 | 110 | 860 | 760 | 530 | 39 |
| 1991 | 490 | 410 | 270 | 200 | 60 | 20 | 40 | 30 | 550 | 430 | 310 | 230 |
| **1992** | **880** | **680** | **NA** | **NA** | **140** | **110** | **NA** | **NA** | **1020** | **790** | **NA** | **NA** |
| | BARLEY | | | | | | | | | | | |
| 1989 | 3070 | 2250 | 1090 | 330 | 1510 | 1200 | 810 | 670 | 4580 | 3450 | 1900 | 1000 |
| 1990 | 3510 | 2270 | 1640 | 1150 | 2000 | 1590 | 1430 | 1110 | 5510 | 3860 | 2870 | 2260 |
| 1991 | 2290 | 1820 | 820 | 590 | 1590 | 930 | 500 | 480 | 3880 | 2750 | 1320 | 1070 |
| **1992** | **3610** | **2680** | **NA** | **NA** | **2040** | **1600** | **NA** | **NA** | **5650** | **4280** | **NA** | **NA** |

NA – not available

# ALASKA GRAIN AND GRASS HAY – SELECTED YEARS

| District | Year | Area Harv. Acres | Production | | Area Harv. Acres | Production | |
|---|---|---|---|---|---|---|---|
| | | | Tons | $ Value (000) | | Tons | $ Value (000) |
| | | | GRAIN HAY 1/ | | | GRASS HAY | |
| Tanana Valley | 1961 | 450 | 600 | 33.0 | 750 | 850 | 62.0 |
| | 1971 | 400 | 500 | 35.0 | 1,000 | 800 | 65.0 |
| | 1981 | 2,600 | 4,900 | 733.0 | 3,600 | 3,700 | 584.0 |
| | 1989 | 300 | 500 | 59.0 | 5,100 | 6,200 | 932.0 |
| | 1990 | 200 | 200 | 31.0 | 5,900 | 4,200 | 673.0 |
| | **1991** | **450** | **600** | **95.0** | **6,700** | **8,200** | **1,391.0** |
| Matanuska Valley | 1961 | 1,220 | 1,550 | 86.0 | 3,730 | 5,650 | 387.0 |
| | 1971 | 1,050 | 1,650 | 130.0 | 2,650 | 2,600 | 208.0 |
| | 1981 | 300 | 300 | 46.0 | 5,900 | 9,300 | 1,549.0 |
| | 1989 | 100 | 300 | 45.0 | 5,200 | 7,200 | 1,045.0 |
| | 1990 | 100 | 100 | 14.0 | 6,500 | 8,700 | 1,538.0 |
| | **1991** | **250** | **300** | **51.0** | **6,800** | **7,600** | **1,372.0** |
| Kenai Peninsula | 1961 | 170 | 280 | 18.2 | 730 | 650 | 45.5 |
| | 1971 | 450 | 450 | 36.0 | 1,300 | 1,100 | 94.0 |
| | 1981 | 300 | 300 | 47.0 | 1,600 | 1,600 | 257.0 |
| | 1989 | – | – | – | 1,900 | 2,200 | 374.0 |
| | 1990 | – | – | – | 2,300 | 2,900 | 478.0 |
| | **1991** | – | – | – | **2,300** | **2,600** | **464.0** |
| Southwest 2/ | 1961 | 60 | 70 | 4.8 | 290 | 250 | 16.5 |
| | 1971 | – | – | – | 150 | 100 | 8.0 |
| | 1981 | – | – | – | 100 | 100 | 16.0 |
| | 1989 | – | – | – | 100 | 100 | 20.0 |
| | 1990 | – | – | – | 100 | 100 | 20.0 |
| | **1991** | – | – | – | **200** | **200** | **40.0** |
| State Total | 1961 | 1,900 | 2,500 | 142.0 | 5,500 | 7,400 | 511.0 |
| | 1971 | 1,900 | 2,600 | 201.0 | 5,100 | 4,600 | 375.0 |
| | 1981 | 3,200 | 5,500 | 826.0 | 11,200 | 14,700 | 2,406.0 |
| | 1989 | 400 | 800 | 104.0 | 12,300 | 15,700 | 2,371.0 |
| | 1990 | 300 | 300 | 45.0 | 14,800 | 15,900 | 2,709.0 |
| | **1991** | **700** | **900** | **146.0** | **16,000** | **18,600** | **3,257.0** |

1/ Includes oats and barley. 2/ Includes Southeast. Dash indicates no crop produced or combined with other areas.

# ALASKA ALL HAY – SELECTED YEARS

| District | Year | Area Harv. Acres | Production | | |
|---|---|---|---|---|---|
| | | | Yield Tons | Tons | $ Value (000) |
| | 1961 | 1,200 | 1.21 | 1,450 | 95.0 |
| | 1971 | 1,400 | 0.93 | 1,300 | 100.0 |
| | 1981 | 6,200 | 1.39 | 8,600 | 1,317.0 |
| Tanana Valley | 1989 | 5,400 | 1.24 | 6,700 | 993.0 |
| | 1990 | 6,100 | 0.72 | 4,400 | 704.0 |
| | **1991** | **7,150** | **1.23** | **8,800** | **1,486.0** |
| | 1961 | 4,950 | 1.45 | 7,200 | 473.0 |
| | 1971 | 3,700 | 1.15 | 4,250 | 338.0 |
| | 1981 | 6,200 | 1.55 | 9,600 | 1,595.0 |
| Matanuska Valley | 1989 | 5,300 | 1.42 | 7,500 | 1,088.0 |
| | 1990 | 6,600 | 1.33 | 8,800 | 1,552.0 |
| | **1991** | **7,050** | **1.12** | **7,900** | **1,423.0** |
| | 1961 | 900 | 1.03 | 930 | 63.7 |
| | 1971 | 1,750 | 0.89 | 1,550 | 130.0 |
| | 1981 | 1,900 | 1.00 | 1,900 | 304.0 |
| Kenai Peninsula | 1989 | 1,900 | 1.16 | 2,200 | 374.0 |
| | 1990 | 2,300 | 1.26 | 2,900 | 478.0 |
| | **1991** | **2,300** | **1.13** | **2,600** | **464.0** |
| | 1961 | 350 | 0.91 | 320 | 21.3 |
| | 1971 | 150 | 0.67 | 100 | 8.0 |
| | 1981 | 100 | 1.00 | 100 | 16.0 |
| Southwest 1/ | 1989 | 100 | 1.00 | 100 | 20.0 |
| | 1990 | 100 | 1.00 | 100 | 20.0 |
| | **1991** | **200** | **1.00** | **200** | **40.0** |
| | 1961 | 7,400 | 1.34 | 9,900 | 653.0 |
| | 1971 | 7,000 | 1.03 | 7,200 | 576.0 |
| | 1981 | 14,400 | 1.40 | 20,200 | 3,232.0 |
| State Total | 1989 | 12,700 | 1.30 | 16,500 | 2,475.0 |
| | 1990 | 15,100 | 1.07 | 16,200 | 2,754.0 |
| | **1991** | **16,700** | **1.17** | **19,500** | **3,413.0** |

1/ Includes Southeast.



# ALASKA GRAIN AND GRASS SILAGE – SELECTED YEARS

| District | Year | Area Harv. Acres | Production | | Area Harv. Acres | Production | |
|---|---|---|---|---|---|---|---|
| | | | Tons | $ Value (000) | | Tons | $ Value (000) |
| | | | GRAIN SILAGE 1/ | | | GRASS SILAGE | |
| Tanana Valley | 1961 | 320 | 1,250 | 27.5 | 290 | 1,000 | 22.0 |
| | 1971 | 100 | 300 | 5.5 | 150 | 700 | 12.0 |
| | 1981 | 600 | 1,400 | 48.0 | 300 | 500 | 20.0 |
| | 1989 | 200 | 1,000 | 43.0 | 300 | 600 | 26.0 |
| | 1990 | 50 | 200 | 9.0 | 600 | 1,200 | 50.0 |
| | **1991** | **200** | **1,300** | **55.0** | **400** | **700** | **36.0** |
| Matanuska Valley | 1961 | 2,470 | 12,900 | 271.8 | 930 | 4,400 | 94.7 |
| | 1971 | 2,100 | 13,000 | 234.5 | 1,850 | 5,500 | 99.0 |
| | 1981 | 750 | 4,500 | 171.0 | 1,250 | 6,000 | 246.0 |
| | 1989 | 300 | 2,400 | 103.0 | 1,600 | 4,700 | 202.0 |
| | 1990 | 100 | 900 | 37.0 | 600 | 3,800 | 160.0 |
| | **1991** | **200** | **1,700** | **80.0** | **900** | **3,000** | **149.0** |
| Kenai Peninsula 2/ | 1961 | 310 | 1,350 | 25.7 | 380 | 1,200 | 22.3 |
| | 1971 | – | – | – | – | – | – |
| | 1981 | 50 | 200 | 7.0 | 50 | 200 | 7.0 |
| | 1989 | – | – | – | – | – | – |
| | 1990 | 50 | 100 | 4.0 | – | – | – |
| | **1991** | – | – | – | – | – | – |
| State Total | 1961 | 3,100 | 15,500 | 325.0 | 1,600 | 6,600 | 139.0 |
| | 1971 | 2,200 | 13,300 | 240.0 | 2,000 | 6,200 | 111.0 |
| | 1981 | 1,400 | 6,100 | 226.0 | 1,600 | 6,700 | 273.0 |
| | 1989 | 500 | 3,400 | 146.0 | 1,900 | 5,300 | 228.0 |
| | 1990 | 200 | 1,200 | 50.0 | 1,200 | 5,000 | 210.0 |
| | **1991** | **400** | **3,000** | **135.0** | **1,300** | **3,700** | **185.0** |

1/ Includes oats and barley. 2/ Includes Southwest. Dash indicates no crop produced or combined with other areas.

# ALASKA ALL SILAGE – SELECTED YEARS

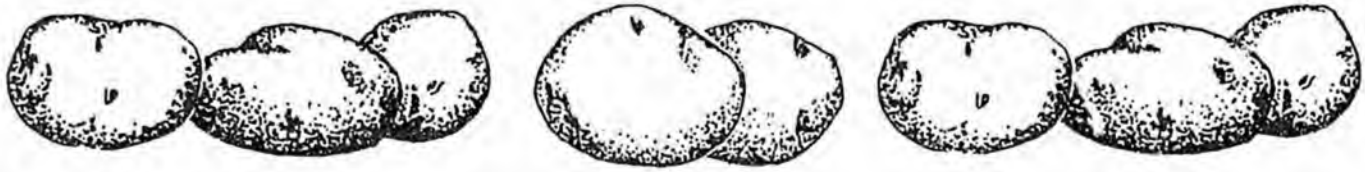
| District | Year | Area Harv. Acres | Production | | |
|---|---|---|---|---|---|
| | | | Yield Tons | Tons | $ Value (000) |
| Tanana Valley | 1961 | 610 | 3.69 | 2,250 | 49.5 |
| | 1971 | 250 | 4.00 | 1,000 | 17.5 |
| | 1981 | 900 | 2.11 | 1,900 | 68.0 |
| | 1989 | 500 | 3.20 | 1,600 | 69.0 |
| | 1990 | 650 | 2.15 | 1,400 | 59.0 |
| | **1991** | **600** | **3.33** | **2,000** | **91.0** |
| Matanuska Valley | 1961 | 3,400 | 5.09 | 17,300 | 366.5 |
| | 1971 | 3,950 | 4.68 | 18,500 | 333.5 |
| | 1981 | 2,000 | 5.25 | 10,500 | 417.0 |
| | 1989 | 1,900 | 3.74 | 7,100 | 305.0 |
| | 1990 | 700 | 6.71 | 4,700 | 197.0 |
| | **1991** | **1,100** | **4.27** | **4,700** | **229.0** |
| Kenai Peninsula 1/ | 1961 | 690 | 3.70 | 2,550 | 48.0 |
| | 1971 | – | – | – | – |
| | 1981 | 100 | 4.00 | 400 | 14.0 |
| | 1989 | – | – | – | – |
| | 1990 | 50 | 2.00 | 100 | 4.0 |
| | **1991** | – | – | – | – |
| State Total | 1961 | 4,700 | 4.70 | 22,100 | 464.0 |
| | 1971 | 4,200 | 4.64 | 19,500 | 351.0 |
| | 1981 | 3,000 | 4.27 | 12,800 | 499.0 |
| | 1989 | 2,400 | 3.63 | 8,700 | 374.0 |
| | 1990 | 1,400 | 4.43 | 6,200 | 260.0 |
| | **1991** | **1,700** | **3.94** | **6,700** | **320.0** |

1/ Includes Southwest. Dash indicates no crop produced or combined with other areas.

# ALASKA POTATOES – SELECTED YEARS

| District | Year | Area Harv. Acres | Production | | |
|---|---|---|---|---|---|
| | | | Yield Cwt. | Cwt. | $ Value (000) |
| Tanana Valley | 1961 | 335 | 146 | 49,000 | 263.0 |
| | 1971 | 185 | 139 | 25,700 | 179.0 |
| | 1981 | 80 | 110 | 8,800 | 194.0 |
| | 1989 | 360 | 192 | 69,100 | 1,282.0 |
| | 1990 | 90 | 134 | 12,100 | 237.0 |
| | **1991** | **110** | **129** | **14,200** | **242.0** |
| Matanuska Valley | 1961 | 380 | 225 | 85,400 | 454.0 |
| | 1971 | 430 | 195 | 84,000 | 588.0 |
| | 1981 | 395 | 204 | 80,500 | 1,681.0 |
| | 1989 | 470 | 269 | 126,300 | 2,255.0 |
| | 1990 | 490 | 255 | 125,000 | 2,492.0 |
| | **1991** | **530** | **236** | **125,100** | **2,123.0** |
| Kenai Peninsula 1/ | 1961 | 55 | 216 | 11,900 | 66.0 |
| | 1971 | 15 | 40 | 600 | 5.0 |
| | 1981 | 25 | 228 | 5,700 | 120.0 |
| | 1989 | 10 | 60 | 600 | 11.0 |
| | 1990 | 10 | 90 | 900 | 17.0 |
| | **1991** | **10** | **70** | **700** | **15.0** |
| State Total | 1961 | 770 | 190 | 146,300 | 783.0 |
| | 1971 | 630 | 175 | 110,300 | 772.0 |
| | 1981 | 500 | 190 | 95,000 | 1,995.0 |
| | 1989 | 840 | 233 | 196,000 | 3,548.0 |
| | 1990 | 590 | 234 | 138,000 | 2,746.0 |
| | **1991** | **650** | **215** | **140,000** | **2,380.0** |

1/ Includes Southeast and Southwest.



# ALASKA POTATO STOCKS – SELECTED YEARS

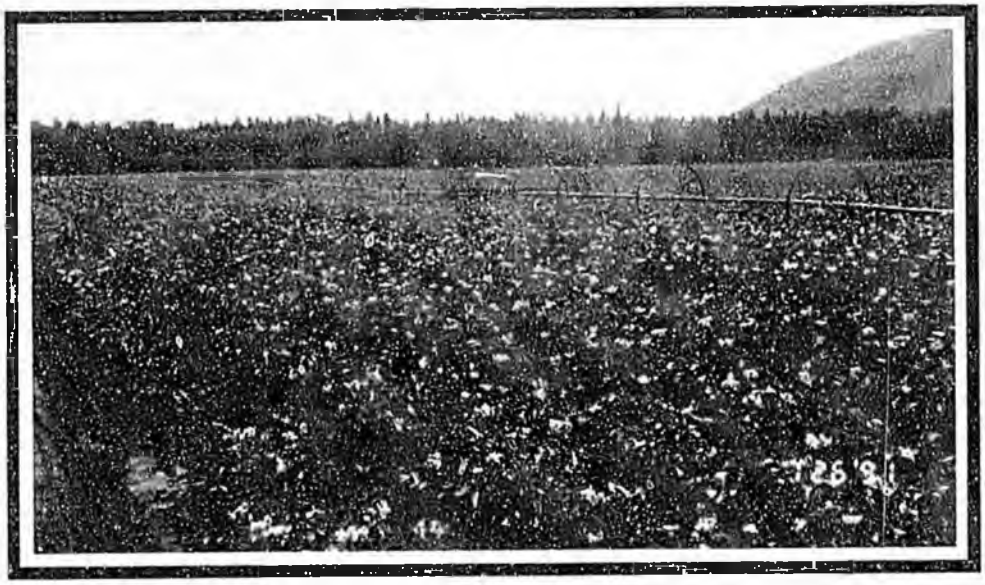
| Year | Total Production | STOCKS ON HAND AS OF | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Oct. 1 | Dec. 1 | Jan. 1 | Feb. 1 | Mar.1 | Apr. 1 | May 1 | Jun. 1 |
| | | (000) Hundredweight | | | | | | | |
| 1961 | 146.3 | NA | 90.0 | 77.0 | 64.0 | 58.0 | 47.7 | 32.2 | 18.7 |
| 1971 | 110.3 | 100.6 | 83.2 | 72.0 | 63.1 | 54.8 | 43.3 | 31.5 | 17.7 |
| 1981 | 95.0 | 88.5 | 67.5 | 57.0 | 50.5 | 40.0 | 33.5 | 24.0 | 11.5 |
| 1989 | 196.0 | 184.0 | 151.0 | 134.0 | 119.0 | 103.0 | 84.0 | 58.0 | 24.0 |
| 1990 | 138.0 | 124.5 | 101.0 | 87.5 | 72.0 | 54.5 | 45.0 | 34.0 | 13.4 |
| **1991** | **140.0** | **125.5** | **105.5** | **90.5** | **77.0** | **66.5** | **48.5** | **34.5** | NA |

NA–Data Not Available.

# ALASKA POTATO PRODUCTION, DISPOSITION AND AVERAGE PRICE – SELECTED YEARS

| Year | Production | Total Seed | Farm Food Seed 1/ | Lost and Shrinkage | Sold | $ Price Per Cwt. |
|---|---|---|---|---|---|---|
| | Hundredweight | | | | | |
| 1960 | 131,400 | 8,000 | 9,000 | 26,400 | 96,000 | 6.40 |
| 1970 | 106,800 | 7,400 | 8,400 | 25,600 | 72,800 | 6.60 |
| 1980 | 77,000 | 8,400 | 10,500 | 10,500 | 56,000 | 20.30 |
| 1988 | 202,000 | 13,600 | 23,000 | 51,000 | 128,000 | 16.70 |
| 1989 | 196,000 | 13,800 | 24,000 | 49,000 | 123,000 | 18.10 |
| **1990** | **138,000** | **12,000** | **28,000** | **14,000** | **96,000** | **19.90** |

1/ Household use, livestock feed, and seed used on farm where grown.



# ALASKA HEAD LETTUCE AND CABBAGE – SELECTED YEARS

| District | Year | Area Harv. Acres | Production | | |
|---|---|---|---|---|---|
| | | | Ctn. | Cwt. | $ Value (000) |
| | | | HEAD LETTUCE 1/ | | |
| | 1961 | 6 | | 760 | 9.9 |
| | 1971 | 8 | | 400 | 10.0 |
| | 1981 | 14 | 2,500 | | 39.0 |
| Tanana Valley | 1989 | 27 | 3,700 | | 52.0 |
| | 1990 | 18 | 2,000 | | 28.0 |
| | **1991** | **22** | **6,700** | | **118.0** |
| | 1961 | 44 | | 6,040 | 76.1 |
| | 1971 | 67 | | 9,100 | 218.0 |
| | 1981 | 86 | 20,900 | | 235.0 |
| Matanuska Valley 2/ | 1989 | 62 | 21,100 | | 228.0 |
| | 1990 | 53 | 20,800 | | 239.0 |
| | **1991** | **43** | **17,000** | | **196.0** |
| | 1961 | 50 | | 6,800 | 86.0 |
| | 1971 | 75 | | 9,500 | 228.0 |
| | 1981 | 100 | 23,400 | | 274.0 |
| State Total | 1989 | 89 | 24,800 | | 280.0 |
| | 1990 | 71 | 22,800 | | 267.0 |
| | **1991** | **65** | **23,700** | | **214.0** |
| | | | CABBAGE | | |
| | 1961 | 4 | | 360 | 2.8 |
| | 1971 | 10 | | 850 | 12.8 |
| | 1981 | 7 | 1,400 | | 17.6 |
| Tanana Valley | 1989 | 9 | 800 | | 11.3 |
| | 1990 | 9 | 1,000 | | 14.7 |
| | **1991** | **10** | **1,500** | | **21.2** |
| | 1961 | 21 | | 3,040 | 29.2 |
| | 1971 | 15 | | 1,850 | 22.2 |
| | 1981 | 34 | 7,700 | | 84.4 |
| Matanuska Valley 2/ | 1989 | 23 | 7,600 | | 69.7 |
| | 1990 | 29 | 9,200 | | 96.3 |
| | **1991** | **28** | **9,200** | | **97.8** |
| | 1961 | 25 | | 3,400 | 32.0 |
| | 1971 | 25 | | 2,700 | 35.0 |
| | 1981 | 41 | 9,100 | | 102.0 |
| State Total | 1989 | 32 | 8,400 | | 81.0 |
| | 1990 | 38 | 10,200 | | 111.0 |
| | **1991** | **38** | **10,700** | | **119.0** |

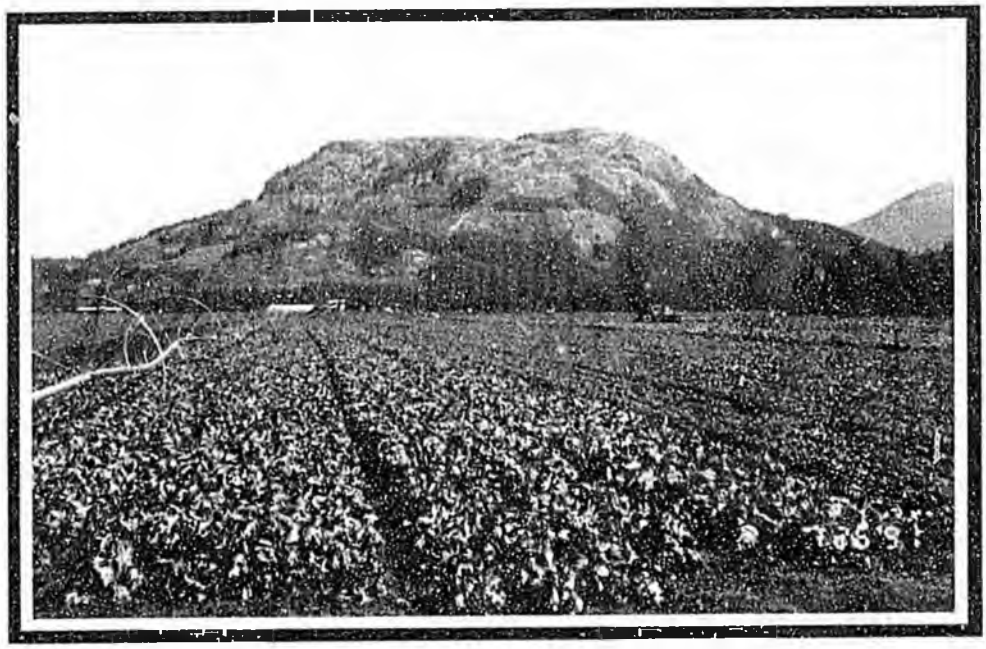


1/ Prior to 1986, included all lettuce. 2/ Includes Kenai Peninsula.

# ALASKA CARROTS AND OTHER VEGETABLES – SELECTED YEARS

| District | Year | Area Harv. Acres | Production | | Area Harv. Acres | Production | |
|---|---|---|---|---|---|---|---|
| | | | Tons | $ Value (000) | | Tons | $ Value (000) |
| | | | CARROTS | | | OTHER VEGETABLES 1/ | |
| Tanana Valley | 1961 | 6 | 960 | 8.0 | 5 | 160 | 2.2 |
| | 1971 | 5 | 300 | 5.1 | 20 | 600 | 9.6 |
| | 1981 | 6 | 700 | 25.0 | 13 | 200 | 10.0 |
| | 1989 | 10 | 900 | 28.0 | 17 | 1,200 | 50.0 |
| | 1990 | 10 | 1,000 | 33.0 | 21 | 1,500 | 63.0 |
| | **1991** | **8** | **700** | **24.0** | **23** | **1,500** | **59.0** |
| Matanuska Valley 2/ | 1961 | 34 | 4,240 | 49.0 | 30 | 1,940 | 26.8 |
| | 1971 | 10 | 1,200 | 15.9 | 70 | 1,800 | 25.4 |
| | 1981 | 21 | 3,000 | 96.0 | 92 | 4,500 | 171.0 |
| | 1989 | 21 | 5,000 | 130.0 | 85 | 7,400 | 225.0 |
| | 1990 | 25 | 6,400 | 148.0 | 99 | 7,500 | 258.0 |
| | **1991** | **29** | **4200** | **95.0** | **85** | **7200** | **272.0** |
| State Total | 1961 | 40 | 5,200 | 57.0 | 35 | 2,100 | 29.0 |
| | 1971 | 15 | 1,500 | 21.0 | 90 | 2,400 | 35.0 |
| | 1981 | 27 | 3,700 | 121.0 | 105 | 4,700 | 181.0 |
| | 1989 | 31 | 5,900 | 158.0 | 102 | 8,600 | 275.0 |
| | 1990 | 35 | 7,400 | 181.0 | 120 | 9,000 | 321.0 |
| | **1991** | **37** | **4,900** | **119.0** | **108** | **8,700** | **331.0** |

1/ Excludes greenhouse grown vegetables. 2/ Includes Kenai Peninsula.



# ALASKA LIVESTOCK AND POULTRY - 1991

**CATTLE AND CALVES:** There were 8,500 head of cattle and calves on Alaska farms and ranches January 1, 1992, up 500 head from last year. Inventory value of all cattle on January 1, 1992 totaled $5,185,000.

**DAIRY:** Milk cows that have calved numbered 800 on January 1, 1992, down 300 head from the a year ago and the lowest on record. There were 300 head of dairy replacement heifers.

The number of Grade A dairies in the State on January 1, 1992 totaled 9. Six from the Palmer and Pt. MacKenzie areas are included with the Matanuska Valley; 3 in the Tanana Valley near Delta Junction.

**MILK PRODUCTION** in 1991 totaled 13.3 million pounds, 3,500,000 pounds less than in 1990. The value of milk produced at $2,726,000 was $712,000 less than a year ago. The 1991 value per hundredweight of $20.49 compares with 1990.

**BEEF:** Beef cattle (all cattle and calves less milk cows and dairy replacement heifers) numbered 7,400 head, 800 head more than the January 1, 1991 number. Beef cow numbers at 2,700 head, up 200 head from the previous year. Beef heifers are estimated at 800 head.

Marketing and transportation problems continue to be main obstacles of the rancher. Beef are generally sold off the range at the end of the grazing season. During the past year, several head of beef cattle have been force fed in feed lots before being slaughtered.

**HOGS:** There were 1,400 hogs and pigs on farms on December 1, 1991, up 200 head from the previous year. Total value of hogs on December 1, 1991 was $224,000 compared with $198,000 on December 1, 1990.

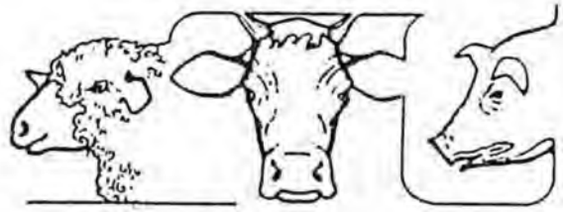
**SHEEP:** Stock sheep and lambs on January 1, 1992 totaled 2,400 head, down 100 head from year earlier. Inventory value of sheep was estimated at $170,000 unchanged from a year earlier.

**WOOL PRODUCTION** of 16,000 pounds was up 1,000 pounds from 1991. The 1,800 head shorn compares with 1,700 head shorn in 1990. At 8.9 pounds, fleece weight was up from 8.8 pounds the previous year. The 1991 wool crop was valued at $16,000.

**POULTRY:** All chickens on farms totaled 4,000 on December 1, 1991. Value of all chickens totaled $17,000, down $6,000 from a year earlier.

**EGG PRODUCTION** totaled 58,000 dozen in 1991, unchanged from 1990. Value of eggs produced in 1991 was $87,000, down $1,000 from the previous year.

**REINDEER:** There were an estimated 41,000 head of reindeer during 1991, up 4,000 head from 1990. Value of sales from meat and by-products totaled $2,168,000, up $226,000 from 1990.



# ALASKA CATTLE ON FARMS (January 1) – SELECTED YEARS

| District | 1962 | 1972 | 1982 | 1990 | 1991 | 1992 |
|---|---|---|---|---|---|---|
| | | | BEEF COWS THAT HAVE CALVED 1/ | | | |
| Tanana Valley | 30 | 20 | 480 | 450 | 290 | 330 |
| Matanuska Valley | 40 | 50 | 170 | 210 | 180 | 190 |
| Kenai Peninsula | 60 | 300 | 330 | 300 | 180 | 250 |
| Southwest 2/ | 1,270 | 2,230 | 2,020 | 1,640 | 1,850 | 1,930 |
| STATE TOTAL | 1,400 | 2,600 | 3,000 | 2,600 | 2,500 | 2,700 |
| Value (000) Dollars | 329.0 | 701.0 | 1650.0 | 1669.0 | 1650.0 | 1766.0 |
| | | | MILK COWS THAT HAVE CALVED 1/ | | | |
| Tanana Valley | 410 | 85 | 180 | 200 | 190 | 170 |
| Matanuska Valley | 2,430 | 1,485 | 880 | 1,170 | 880 | 610 |
| Kenai Peninsula | 100 | 20 | 30 | 20 | 20 | 10 |
| Southwest 2/ | 260 | 10 | 10 | 10 | 10 | 10 |
| STATE TOTAL | 3,200 | 1,600 | 1,100 | 1,400 | 1,100 | 800 |
| Value (000) Dollars | 1376.0 | 759.0 | 924.0 | 1347.0 | 1078.0 | 755.0 |
| | | | BEEF REPLACEMENT AND OTHER HEIFERS 3/ | | | |
| Tanana Valley | 20 | 10 | 120 | 180 | 140 | 220 |
| Matanuska Valley | 70 | 40 | 70 | 100 | 120 | 150 |
| Kenai Peninsula | 30 | 80 | 120 | 110 | 130 | 100 |
| Southwest 2/ | 380 | 470 | 690 | 310 | 410 | 430 |
| STATE TOTAL | 500 | 600 | 1,000 | 700 | 800 | 900 |
| Value (000) Dollars | 92.0 | 164.0 | 562.0 | 402.0 | 437.0 | 514.0 |
| | | | DAIRY REPLACEMENT HEIFERS 3/ | | | |
| Tanana Valley | 70 | 30 | 50 | 50 | 80 | 70 |
| Matanuska Valley | 460 | 660 | 440 | 250 | 220 | 230 |
| Kenai Peninsula | 30 | 10 | 10 | – | – | – |
| Southwest 2/ | 40 | – | – | – | – | – |
| STATE TOTAL | 600 | 700 | 500 | 300 | 300 | 300 |
| Value (000) Dollars | 150.0 | 191.0 | 290.0 | 246.0 | 240.0 | 245.0 |

1/ Prior to January 1, 1970, definition was cows 2 years and and older. 2/ Includes Southeast.
3/ Over 500 pounds. Dash indicates combined with other areas.

# ALASKA CATTLE ON FARMS (January 1) – SELECTED YEARS

| District | 1962 | 1972 | 1982 | 1990 | 1991 | 1992 |
|---|---|---|---|---|---|---|
| | | | STEERS 1/ | | | |
| Tanana Valley | 20 | – | 60 | 160 | 150 | 130 |
| Matanuska Valley | 40 | 40 | 110 | 110 | 90 | 70 |
| Kenai Peninsula | 20 | 50 | 30 | 80 | 30 | 40 |
| Southwest 2/ | 620 | 710 | 500 | 150 | 230 | 260 |
| STATE TOTAL | 700 | 800 | 700 | 500 | 500 | 500 |
| Value (000) Dollars | 119.0 | 199.0 | 406.0 | 300.0 | 293.0 | 296.0 |
| | | | BULLS 1/ | | | |
| Tanana Valley | 20 | 10 | 50 | 60 | 40 | 40 |
| Matanuska Valley | 50 | 40 | 40 | 50 | 30 | 30 |
| Kenai Peninsula | 20 | 30 | 40 | 30 | 20 | 10 |
| Southwest 2/ | 110 | 420 | 670 | 1,060 | 1,110 | 1,520 |
| STATE TOTAL | 200 | 500 | 800 | 1,200 | 1,200 | 1,600 |
| Value (000) Dollars | 67.0 | 187.0 | 544.0 | 818.0 | 814.0 | 1014.0 |
| | | | CALVES 3/ | | | |
| Tanana Valley | 120 | 50 | 370 | 320 | 260 | 230 |
| Matanuska Valley | 470 | 570 | 570 | 380 | 470 | 350 |
| Kenai Peninsula | 70 | 150 | 170 | 130 | 120 | 150 |
| Southwest 2/ | 640 | 1,230 | 990 | 670 | 750 | 970 |
| STATE TOTAL | 1,300 | 2,000 | 2,100 | 1,500 | 1,600 | 1,700 |
| Value (000) Dollars | 103.0 | 219.0 | 546.0 | 425.0 | 488.0 | 595.0 |
| | | | ALL CATTLE | | | |
| Tanana Valley | 690 | 205 | 1,310 | 1,420 | 1,150 | 1,190 |
| Matanuska Valley | 3,560 | 2,885 | 2,280 | 2,270 | 1,990 | 1,630 |
| Kenai Peninsula | 330 | 640 | 730 | 670 | 500 | 560 |
| Southwest 2/ | 3,320 | 5,070 | 4,880 | 3,840 | 4,360 | 5,120 |
| STATE TOTAL | 7,900 | 8,800 | 9,200 | 8,200 | 8,000 | 8,500 |
| Value (000) Dollars | 2236.0 | 2420.0 | 4922.0 | 5207.0 | 5000.0 | 5185.0 |

1/ Over 500 pounds. 2/ Includes Southeast. 3/ Under 500 pounds

# ALASKA CALF CROP – SELECTED YEARS

| Item | 1961 | 1971 | 1981 | 1989 | 1990 | 1991 |
|---|---|---|---|---|---|---|
| Cows & Heifers that have Calved January 1 | 4,200 | 4,200 | 4,100 | 4,000 | 3,600 | 3,500 |
| Calf Crop | 3,500 | 3,600 | 3,200 | 3,400 | 2,800 | 2,800 |
| Calving Percentage | 83% | 86% | 78% | 85% | 78% | 80% |

# ALASKA FARROWINGS AND PIG CROP – SELECTED YEARS

| Item | 1961 | 1971 | 1981 | 1989 | 1990 | 1991 |
|---|---|---|---|---|---|---|
| | | | SPRING FARROWINGS | | | |
| Sows Farrowed | 130 | 110 | 280 | 100 | 110 | 150 |
| Pigs Saved | 900 | 730 | 1,600 | 800 | 900 | 1,200 |
| Pigs Per Litter | 6.9 | 6.6 | 5.7 | 8.0 | 8.2 | 8.0 |
| | | | FALL FARROWINGS | | | |
| Sows Farrowed | 120 | 140 | 350 | 110 | 130 | 180 |
| Pigs Saved | 820 | 1,370 | 2,000 | 1,000 | 1,000 | 1,400 |
| Pigs Per Litter | 6.8 | 9.8 | 5.7 | 9.1 | 7.7 | 7.8 |



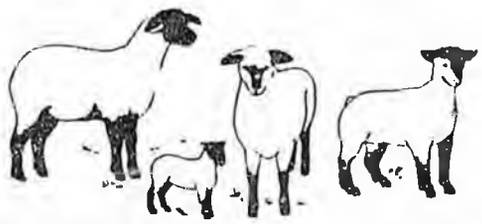
# ALASKA ALL HOGS (December 1) – SELECTED YEARS

| District | 1961 | 1971 | 1981 | 1989 | 1990 | 1991 |
|---|---|---|---|---|---|---|
| Tanana Valley | 110 | 1,070 | 1,550 | 300 | 670 | 800 |
| Matanuska Valley | 770 | 320 | 1,140 | 310 | 390 | 440 |
| Kenai Peninsula | 60 | 50 | 60 | 50 | 40 | 50 |
| Southeast 1/ | 60 | 60 | 50 | 40 | 100 | 110 |
| State Total | 1,000 | 1,500 | 2,800 | 700 | 1,200 | 1,400 |
| Value (000) Dollars | 61.0 | 103.0 | 392.0 | 130.0 | 198.0 | 224.0 |

1/ Includes Southwest

# ALASKA SHEEP AND LAMBS (January 1) – SELECTED YEARS

| As of January 1 | 1962 | 1972 | 1982 | 1990 | 1991 | 1992 |
|---|---|---|---|---|---|---|
| Ewes 1 Year + | 7,000 | 9,000 | 1,900 | 1,500 | 1,400 | 1,300 |
| Value (000) Dollars | 210.0 | 315.0 | 190.0 | 114.0 | 97.0 | 96.0 |
| Wethers & Rams 1 Year + | 4,000 | 8,000 | 1,400 | 700 | 600 | 600 |
| Value (000) Dollars | 100.0 | 215.0 | 126.0 | 42.0 | 33.0 | 36.0 |
| All Lambs | 4,000 | 2,000 | 600 | 300 | 500 | 500 |
| Value (000) Dollars | 76.0 | 59.0 | 53.0 | 22.0 | 40.0 | 38.0 |
| All Sheep & Lambs | 15,000 | 19,000 | 3,900 | 2,500 | 2,500 | 2,400 |
| Value (000) Dollars | 386.0 | 589.0 | 369.0 | 178.0 | 170.0 | 170.0 |



# ALASKA LAMB CROP – SELECTED YEARS

| As of January 1 | 1961 | 1971 | 1981 | 1989 | 1990 | 1991 |
|---|---|---|---|---|---|---|
| Ewes 1 Year+ | 6,000 | 10,000 | 2,000 | 1,400 | 1,500 | 1,400 |
| Lambs Saved | 5,000 | 3,000 | 800 | 700 | 800 | 700 |
| Lambing Percentage | 83% | 30% | 40% | 50% | 53% | 50% |

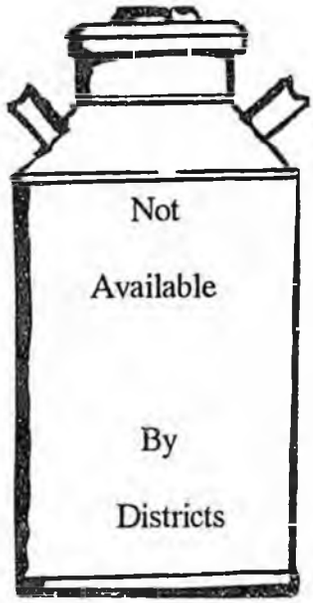
# ALASKA, WOOL, LAMB AND MUTTON PRODUCTION – SELECTED YEARS

| Item | 1961 | 1971 | 1981 | 1989 | 1990 | 1991 |
|---|---|---|---|---|---|---|
| | | | WOOL PRODUCTION | | | |
| Pounds | 128,000 | 225,000 | 16,000 | 16,000 | 15,000 | 16,000 |
| Dollar Value | 51,000 | 43,000 | 8,000 | 19,000 | 19,000 | 16,000 |
| | | | LAMB AND MUTTON PRODUCTION | | | |
| Pounds (Dr. Wt.) | 18,000 | 34,000 | 18,000 | 29,000 | 29,000 | 37,000 |
| Dollar Value | 10,000 | 16,000 | 18,000 | 39,000 | 32,000 | 35,000 |



# ALASKA MILK PRODUCTION AND VALUE – SELECTED YEARS

| District | Year | Production | | $ Value Per Cwt. | Percent Milkfat |
|---|---|---|---|---|---|
| | | Pounds | $ Value | | |
| | | – – – – (000) – – – – | | | |
| Tanana Valley 1/ | 1961 | 4,708 | 547 | | |
| | 1971 | 1,000 | 110 | | |
| | 1981 | 1,500 | 320 | | |
| | 1989 | 2,400 | 460 | | |
| | 1990 | 2,500 | 484 | | |
| | **1991** | **2,400** | **462** | | |
| Matanuska Valley | 1961 | 18,092 | 2,073 | | |
| | 1971 | 16,100 | 1,807 | | |
| | 1981 | 11,900 | 2,281 | | |
| | 1989 | 20,900 | 4,272 | | |
| | 1990 | 14,300 | 2,954 | | |
| | **1991** | **10,900** | **2,264** | | |
| State Total | 1961 | 22,800 | 2,620 | 11.49 | 3.75 |
| | 1971 | 17,100 | 1,917 | 11.21 | 3.69 |
| | 1981 | 13,400 | 2,601 | 19.41 | 3.58 |
| | 1989 | 23,300 | 4,732 | 20.31 | 3.36 |
| | 1990 | 16,800 | 3,438 | 20.47 | 3.43 |
| | **1991** | **13,300** | **2,726** | **20.49** | 3.37 |




1/ Includes Kenai Peninsula.

# ALASKA DAIRY PRODUCTS PRODUCTION 1987–1991

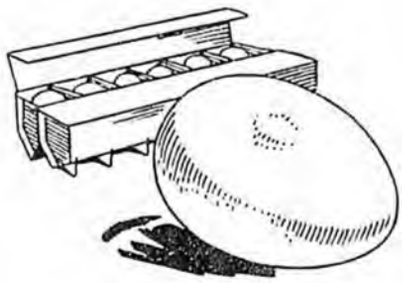
| Item | 1987 | 1988 | 1989 | 1990 | 1991 |
|---|---|---|---|---|---|
| | – – – – – – – – – Thousand Gallons – – – – – – – – – – | | | | |
| Ice Cream Mix | 30 | 40 | 49 | 44 | 24 |
| Ice Cream Product | 48 | 61 | 90 | 86 | 46 |
| Ice Milk Mix | 412 | 391 | 419 | 439 | 289 |
| Ice Milk Product | 535 | 508 | 545 | 577 | 376 |

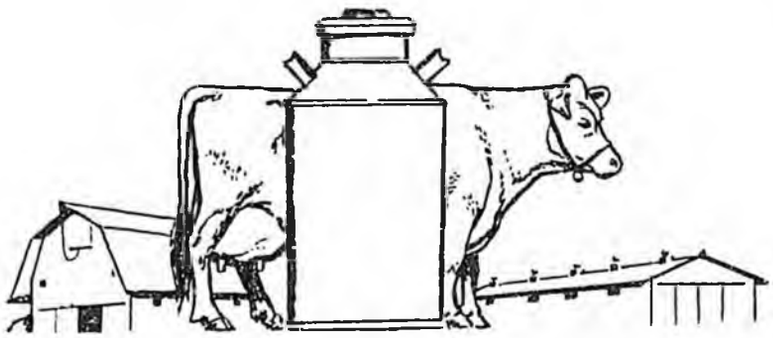


# ALASKA MILK PRODUCTION BY MONTHS – 1981 AND 1991

| Month | Milk Cows in Herd 1/ | | Milk Per Cow | | Milk Production | |
|---|---|---|---|---|---|---|
| | 1981 | 1991 | 1981 | 1991 | 1981 | 1991 |
| | | | – – – Pounds – – – | | – – (000) Pounds – – | |
| January | 1,100 | 1,100 | 1,025 | 1,090 | 1,130 | 1,200 |
| February | 1,100 | 1,100 | 925 | 1,030 | 1,030 | 1,130 |
| March | 1,100 | 1,100 | 1,000 | 1,200 | 1,100 | 1,320 |
| April | 1,100 | 1,000 | 1,025 | 1,290 | 1,130 | 1,290 |
| May | 1,100 | 1,000 | 1,045 | 1,280 | 1,150 | 1,280 |
| June | 1,100 | 900 | 1,010 | 1,270 | 1,110 | 1,140 |
| July | 1,100 | 900 | 990 | 1,210 | 1,090 | 1,090 |
| August | 1,100 | 900 | 1,025 | 1,140 | 1,130 | 1,030 |
| September | 1,100 | 800 | 1,035 | 1,240 | 1,140 | 990 |
| October | 1,100 | 800 | 1,055 | 1,240 | 1,160 | 990 |
| November | 1,100 | 800 | 1,020 | 1,180 | 1,120 | 940 |
| December | 1,100 | 800 | 1,010 | 1,130 | 1,110 | 900 |
| Annual | 1,100 | 1,000 | 12,182 | 13,300 | 13,400 | 13,300 |

1/ Includes all fresh and dry cows.





# ALASKA EGG PRODUCTION (Quarterly) – SELECTED YEARS

| Period | Average No. of Layers | | | Total Egg Production | | |
|---|---|---|---|---|---|---|
| | 1981 | 1990 | 1991 | 1981 | 1990 | 1991 |
| Dec. 1/–Feb. | 26,000 | 4,000 | 4,000 | 1,400,000 | 200,000 | 200,000 |
| Mar.–May | 27,000 | 3,000 | 3,000 | 1,500,000 | 100,000 | 100,000 |
| June–Aug. | 27,000 | 4,000 | 4,000 | 1,600,000 | 200,000 | 200,000 |
| Sep.–Nov. | 34,000 | 4,000 | 4,000 | 2,200,000 | 200,000 | 200,000 |

1/ December preceding year.

# ALASKA EGGS – SELECTED YEARS

| District | Year | Average Number of layers | Production | | Sales (Dozen) |
|---|---|---|---|---|---|
| | | | Dozen | $ Value | |
| Tanana Valley | 1961 | | 60,100 | 51,500 | 56,600 |
| | 1971 | | 90,000 | 78,000 | 88,000 |
| | 1981 | | 65,000 | 97,500 | 58,000 |
| | 1989 | Not | 25,000 | 40,000 | 14,000 |
| | 1990 | | 28,000 | 43,000 | 13,000 |
| | **1991** | | **18,000** | **27,000** | **11,000** |
| Matanuska Valley | 1961 | | 249,400 | 193,500 | 244,000 |
| | 1971 | | 384,000 | 325,000 | 381,500 |
| | 1981 | | 420,000 | 470,000 | 412,000 |
| | 1989 | Available | 25,000 | 38,000 | 16,000 |
| | 1990 | | 22,000 | 33,000 | 17,000 |
| | **1991** | | **32,000** | **47,000** | **19,000** |
| Kenai Peninsula | 1961 | | 155,800 | 120,000 | 151,500 |
| | 1971 | | 3,000 | 3,000 | 1,000 |
| | 1981 | | 67,000 | 93,500 | 60,000 |
| | 1989 | By | 4,000 | 6,000 | 3,000 |
| | 1990 | | 4,000 | 6,000 | 3,000 |
| | **1991** | | **4,000** | **6,000** | **3,000** |
| Southeast 1/ | 1961 | | 76,400 | 57,000 | 73,900 |
| | 1971 | | 6,000 | 5,000 | 4,500 |
| | 1981 | | 6,000 | 9,000 | 3,000 |
| | 1989 | Districts | 4,000 | 6,000 | 2,000 |
| | 1990 | | 4,000 | 6,000 | 2,000 |
| | **1991** | | **4,000** | **6,000** | **2,000** |
| State Total | 1961 | 41,000 | 541,700 | 422,000 | 526,000 |
| | 1971 | 34,000 | 483,000 | 411,000 | 475,000 |
| | 1981 | 26,000 | 558,000 | 670,000 | 533,000 |
| | 1989 | 4,000 | 58,000 | 90,000 | 35,000 |
| | 1990 | 4,000 | 58,000 | 88,000 | 35,000 |
| | **1991** | **3,000** | **58,000** | **86,000** | **35,000** |

1/ Includes Southwest.

# ALASKA POULTRY ON FARMS (December 1) – SELECTED YEARS

| District | 1961 | 1971 | 1981 | 1989 | 1990 | 1991 |
|---|---|---|---|---|---|---|
| | | | HENS AND PULLETS OF LAYING AGE | | | |
| Tanana Valley | 5,000 | 7,600 | 2,900 | 2,100 | 2,800 | 1,200 |
| Matanuska Valley | 16,900 | 25,500 | 27,700 | 1,500 | 800 | 1,300 |
| Kenai Peninsula | 12,700 | 400 | 4,100 | 200 | 200 | 300 |
| Southeast 1/ | 6,400 | 500 | 300 | 200 | 200 | 200 |
| STATE TOTAL | 41,000 | 34,000 | 5,000 | 4,000 | 4,000 | 3,000 |
| Value (000) Dollars | 96.0 | 90.0 | 179.0 | 19.0 | 19.0 | 14.0 |
| | | | ALL CHICKENS | | | |
| Tanana Valley | 5,000 | 8,300 | 3,400 | 2,400 | 3,100 | 1,500 |
| Matanuska Valley | 17,500 | 26,400 | 28,500 | 2,000 | 1,300 | 1,800 |
| Kenai Peninsula | 13,000 | 600 | 4,600 | 300 | 300 | 400 |
| Southeast 1/ | 6,500 | 700 | 500 | 300 | 300 | 300 |
| STATE TOTAL | 42,000 | 36,000 | 37,000 | 5,000 | 5,000 | 4,000 |
| Value (000) Dollars | 97.0 | 95.0 | 187.0 | 23.0 | 23.0 | 17.0 |





1/ Includes Southwest

# ALASKA POULTRY PRODUCTION – SELECTED YEARS

| District | 1961 | 1971 | 1981 | 1989 | 1990 | 1991 |
|---|---|---|---|---|---|---|
| | | | PRODUCTION–POUNDS | | | |
| Tanana Valley | 4,800 | 7,500 | 66,400 | 18,000 | 21,000 | 25,000 |
| Matanuska Valley | 33,300 | 47,500 | 104,600 | 24,000 | 21,000 | 24,000 |
| Kenai Peninsula | 17,800 | 1,000 | 55,700 | 15,000 | 15,000 | 14,000 |
| Southeast 1/ | 5,100 | 2,000 | 4,300 | 6,000 | 6,000 | 7,000 |
| STATE TOTAL | 61,000 | 58,000 | 231,000 | 63,000 | 63,000 | 70,000 |
| | | | PRODUCTION VALUE–DOLLARS | | | |
| Tanana Valley | 2,100 | 2,200 | 36,500 | 20,000 | 24,000 | 25,000 |
| Matanuska Valley | 17,000 | 12,900 | 54,500 | 26,000 | 24,000 | 24,000 |
| Kenai Peninsula | 7,600 | 300 | 30,600 | 17,000 | 17,000 | 14,000 |
| Southeast 1/ | 2,300 | 600 | 2,400 | 7,000 | 7,000 | 7,000 |
| STATE TOTAL | 29,000 | 16,000 | 124,000 | 70,000 | 72,000 | 70,000 |



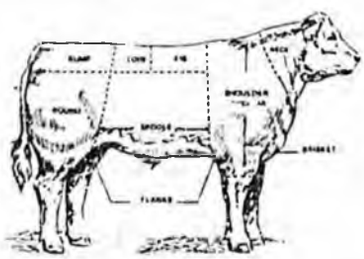


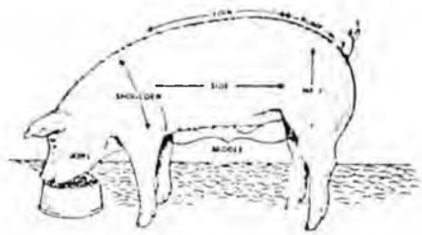
1/ Includes Southwest

# ALASKA MEAT PRODUCTION – SELECTED YEARS

| District | Year | Production | | Production | |
|---|---|---|---|---|---|
| | | Pounds | $ Value | Pounds | $ Value |
| | | BEEF AND VEAL | | PORK | |
| Tanana Valley | 1961 | 31,000 | 14,900 | 23,000 | 10,300 |
| | 1971 | 29,000 | 16,000 | 62,000 | 40,000 |
| | 1981 | 130,000 | 162,000 | 137,000 | 137,000 |
| | 1989 | 376,000 | 452,000 | 69,000 | 57,000 |
| | 1990 | 413,000 | 475,000 | 101,000 | 104,000 |
| | **1991** | **199,000** | **265,000** | **145,000** | **116,000** |
| Matanuska Valley | 1961 | 206,000 | 92,500 | 138,000 | 55,000 |
| | 1971 | 302,000 | 173,000 | 62,000 | 41,000 |
| | 1981 | 274,000 | 320,000 | 134,000 | 131,000 |
| | 1989 | 1,087,000 | 1,217,000 | 74,000 | 61,000 |
| | 1990 | 527,000 | 627,000 | 59,000 | 58,000 |
| | **1991** | **386,000** | **504,000** | **131,000** | **101,000** |
| Kenai Peninsula | 1961 | 14,000 | 6,300 | 11,000 | 4,400 |
| | 1971 | 81,000 | 44,000 | 7,000 | 4,000 |
| | 1981 | 104,000 | 142,000 | 11,000 | 12,000 |
| | 1989 | 137,000 | 171,000 | 21,000 | 17,000 |
| | 1990 | 128,000 | 165,000 | 7,000 | 8,000 |
| | **1991** | **80,000** | **106,000** | **10,000** | **9,000** |
| Southeast 1/ | 1961 | 102,000 | 47,300 | 3,000 | 1,300 |
| | 1971 | 212,000 | 114,000 | 19,000 | 11,000 |
| | 1981 | 241,000 | 325,000 | 11,000 | 13,000 |
| | 1989 | 134,000 | 174,000 | 16,000 | 14,000 |
| | 1990 | 115,000 | 154,000 | 14,000 | 17,000 |
| | **1991** | **73,000** | **99,000** | **18,000** | **17,000** |
| State Total | 1961 | 353,000 | 161,000 | 175,000 | 71,000 |
| | 1971 | 624,000 | 347,000 | 150,000 | 96,000 |
| | 1981 | 749,000 | 949,000 | 293,000 | 293,000 |
| | 1989 | 1,734,000 | 2,014,000 | 180,000 | 149,000 |
| | 1990 | 1,183,000 | 1,421,000 | 181,000 | 187,000 |
| | **1991** | **738,000** | **974,000** | **304,000** | **243,000** |

1/ Includes Southwest.



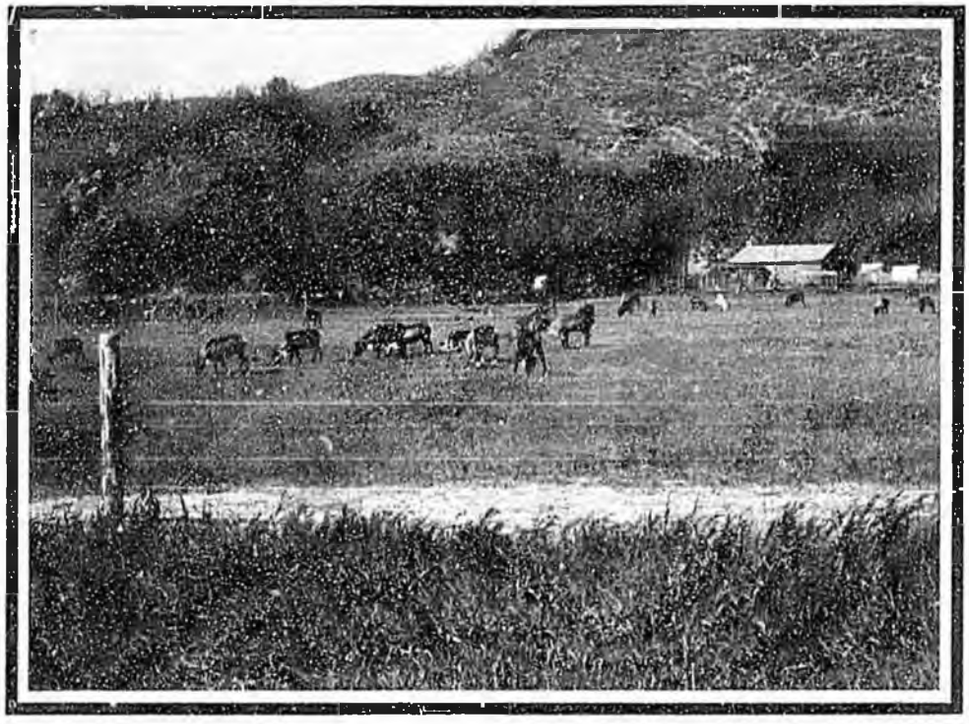


# ALASKA REINDEER – SELECTED YEARS

Reindeer: Most reindeer are located on the Seward Peninsula and Nunivak and Umnak Islands. There are also village herds located on the Bering Sea Islands and also small herds in Palmer, Homer, and Kenai. Revenue is mainly from sale of meat and by-products.

ALASKA REINDEER NUMBERS 1/

| Type | 1987 | 1988 | 1989 | 1990 | 1991 |
|---|---|---|---|---|---|
| Males | 11,000 | 14,000 | 13,000 | 14,000 | **14,000** |
| Females | 16,000 | 19,000 | 21,000 | 23,000 | **27,000** |
| Total 2/ | 27,000 | 33,000 | 34,000 | 37,000 | **41,000** |



# ALASKA REINDEER MEAT AND BY-PRODUCTS 1/

| Year | Meat Production | | Meat Sales | | Other Sales 3/ |
|---|---|---|---|---|---|
| | Pounds Dr. Wt. | $ Value | Pounds Dr. Wt. | $ Value | $ Value |
| 1961 | 485,000 | 181,000 | 330,000 | 132,000 | 4/ |
| 1971 | 456,000 | 235,000 | 365,000 | 188,000 | 4/ |
| 1982 | 273,000 | 423,000 | 240,000 | 408,000 | 454,000 |
| 1989 | 452,000 | 848,000 | 372,000 | 763,000 | 943,000 |
| 1990 | 411,000 | 857,000 | 363,000 | 825,000 | 1,117,000 |
| 1991 | 440,000 | 988,000 | 415,000 | 978,000 | 1,190,000 |

1/ Based on information supplied by BIA, CES, and Native Corps. 2/ Includes bulls, steers, cows, and fawns. 3/ Antlers, hides and other by-products. 4/ Data not available.


Alaska
GROWN

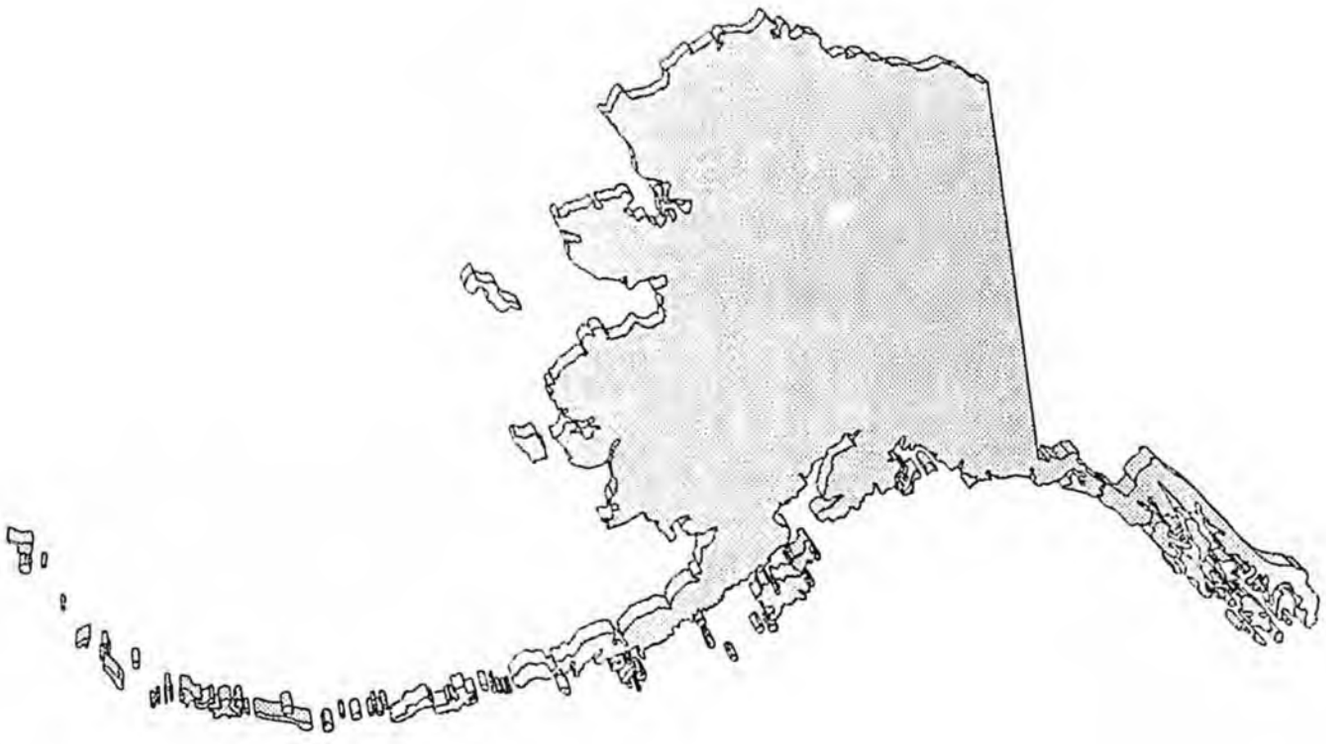
State of Alaska
Department of Natural Resources

# Divison of Geological and Geophysical Surveys

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# Briefing Paper

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1992 - 1993

# TRANSITION BRIEFING PAPER

Division of Geological and Geophysical Surveys
794 University Avenue, Suite 200
Fairbanks, Alaska 99709-3645

## HISTORY

The organizational evolution of DGGS is outlined below:

Territorial Department of Mines, 1959
Division of Mines and Minerals, 1959-66
Division of Mines and Geology, 1966-70
Division of Geological Survey 1970-72
Division of Geological and Geophysical Surveys, 1972-Present

Six professionally qualified geoscientists have served as Director and State Geologist, including the following:

Jim Williams, 1959-71
William Fackler, 1971-73
Donald Hartman, 1973-75
Ross G. Schaff, 1975-86
Robert B. Forbes, 1987-1990
Thomas E. Smith, 1991-Present

The qualifications and responsibilities of the State Geologist and the mission of DGGS are defined by statute.

> **Sec. 41.08.010. Division of geological and geophysical surveys.** There is established in the Department of Natural Resources a division of geological and geophysical surveys under the direction of the state geologist. (1 ch 93 SLA 1972)
>
> **Sec. 41.08.015. State geologist.** The commissioner of natural resources shall appoint the state geologist, who must be qualified by education and experience to direct the activities of the division. (1 ch 93 SLA 1972)
>
> **Sec. 41.08.020. Powers and duties.** (a) The state geologist shall conduct geological and geophysical surveys to determine the potential of Alaskan land for production of metals, minerals, fuels, and geothermal resources; the locations and supplies of groundwater and construction materials; the potential geologic hazards to buildings, roads, bridges and other installations and structures; and shall conduct such other surveys and investigations as will advance knowledge of the geology of Alaska. With the approval of the commissioner, the state geologists may acquire, by gift or purchase, geological and geophysical reports, surveys and similar information.

The administrative headquarters is located in Fairbanks. The current DGGS staff strength totals 39 professional and support personnel, plus 11 part-time student interns in the following locations:

| | |
|---|---|
| Fairbanks | 32 + 10 interns |
| Eagle River | 1 + 2 interns |
| Juneau | 1 |

The Eagle River compound includes the DGGS Geological Materials Center.

A DGGS organizational chart is included in this report.

## DIVISION OF GEOLOGICAL AND GEOPHYSICAL SURVEYS

The **Division of Geological and Geophysical Surveys (DGGS)** collects, analyzes, interprets, and publishes data on Alaska's geologic resources as a stimulus to private-sector exploration and to facilitate effective management of Alaska's lands. The State Geologist serves as Director of the Division.

The *Mineral and Energy Resources Section* collects, analyzes, and makes available information on the geologic framework of Alaska and on the mineral and energy resources of the state. Geological maps and reports illustrate the location, quality, and quantity of the state's mineral, coal, and geothermal resources. Probabilistic estimates of the mineral resource potential of Alaskan lands are produced in cooperation with federal agencies and the University of Alaska.

The *Engineering Geology Section* collects, analyzes, and makes available geologic data useful for engineering purposes. Surficial-geologic maps portray the distribution of sediment types and provide information on their engineering properties and usefulness as construction materials. Studies of major hazards like earthquakes, volcanoes, and landslides result in publications discussing the areas affected, frequency of occurrence, and potential effects.

The *Resource Information Section* prepares and publishes technical reports and maps on Alaska's geological resources. The published reports, including color and black-and-white geologic maps, are distributed to the public and private sectors, and are available for distribution to interested persons and organizations through DGGS and selected USGS offices in Alaska. The section also responds each year to an estimated 30,000 public inquiries about geologic resources in the state of Alaska, and provides cartographic and technical report editing services for other state agencies.

The *Administrative Services Section*, which includes the Director's Office, manages the Division's fiscal affairs and provides personnel and clerical services. The section acts as a liaison between the Division and local, state, federal, and private agencies, assists in contract negotiation, and provides contract administration. The section also ensures adherence to pertinent statutes and regulations in all areas of operation, coordinates purchasing for the Division, and submits the annual budget.

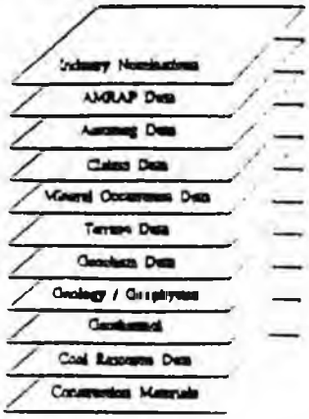
# ALASKA DIVISION OF GEOLOGICAL AND GEOPHYSICAL SURVEYS
# LAND SELECTION PROJECT

In January 1991, the Alaska Division of Geological and Geophysical Surveys (ADGGS) began an assessment of the mineral, coal, and construction material resources contained within 68 million acres of land still available for state selection. The mineral resource evaluation is scheduled for completion in March, 1993. The candidate lands available for selection include thirty-six evaluation tracts distributed throughout the state from Haines northward. To date, compilation of existing data is progressing well in thirty-four of the tracts. During the summer of 1991, sixteen of the tracts were visited by geologic field teams to gather critical data needed to establish mineral deposit types for the final endowment estimates. The remaining tracts not visited in 1991 are scheduled for examination in the summer of 1992. All area-specific mineral resource endowment estimates are scheduled for completion by March 1993. The project is on track at this time.

ADGGS is also working closely with the Division of Oil and Gas on hydrocarbon potential of basins included within the candidate lands, and with the State Pipeline Coordinator's Office on construction materials near potential corridor routes.

# ECONOMIC RESOURCE VALUATION SEQUENCE

**PHASE 1 - Compilation of Existing Resource Data**

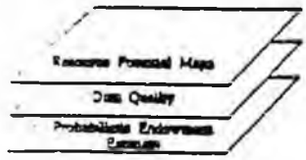



**PHASE 2 - Resource Data Modeling**

- Delineation of mineral belts, deposits types, and terranes
- Construction materials
- Outline of geothermal fields
- Delineation of coal resources

**PHASE 3 - Field Verification**

**PHASE 4 - Quantitative Resource Evaluation**




**PHASE 5 - Selection Policy Panel**




**SELECTION - STRATEGY DECISIONS**

# PROGRESS MAP
# GEOLOGIC FIELD EVALUATION
# LAND SELECTION PROJECT



## FY93 BUDGET REQUEST

### Division of Geological and Geophysical Surveys

| General Fund | $ | Total |
|---|---|---|
| Statewide Mineral Resource Appraisal | $742.5 | |
| Energy Resource Appraisal | 461.3 | |
| Geologic Materials Center | 85.7 | |
| Earthquakes, Volcanoes, and Engineering | 295.2 | |
| Construction Materials Resources | 140.6 | |
| Resource Information | 320.5 | |
| Administrative Services | 511.1 | |
| | | $2,556.9* |
| **Anticipated Receipts** | | |
| Federal Receipts | $258.9 | |
| Interagency Receipts | 101.8 | |
| Program Receipts | 61.6 | |
| | | 422.3 |
| **Division Total** | | **$2,979.2*** |

**Positions** (including vacancies)

35 Permanent Full-time
4 Permanent Part-time/seasonal
22 Non-permanent (mainly student interns)

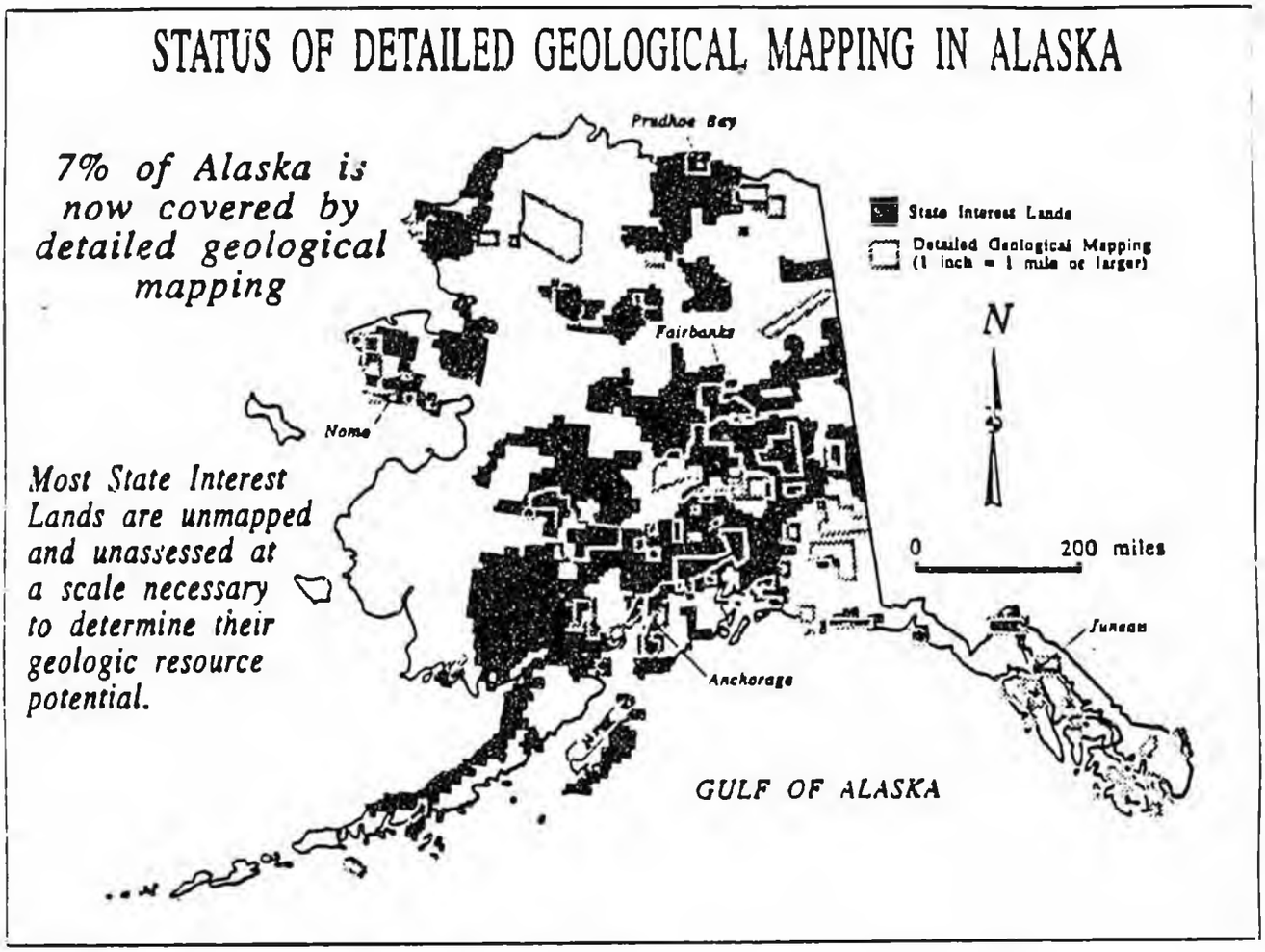
*Note: The 1992 legislature reduced the GF request by $136,400.

## DIVISION OF GEOLOGICAL AND GEOPHYSICAL SURVEYS
### Summary of Budget History
### FY85 - FY93
### General Fund

| REMAINING DGGS ALLOCATIONS | FY85 | FY86 | FY87 Auth | FY87 Revised | FY88 | FY89 | FY90 | FY91 | FY92 | FY93 Request |
|---|---|---|---|---|---|---|---|---|---|---|
| Mineral Resource Appraisal | 2039.9 | 1687.6 | 1202.4 | 1022.0 | 808.2 | 808.2 | 715.3 | 853.0 | 768.7 | 742.5 |
| Energy Resource Appraisal | ---- | ---- | ---- | ---- | 421.0 | 421.0 | 599.6 | 535.8 | 507.8 | 547.0 |
| Resource Information/Earthquakes, Volcanoes & Engineering | 1940.3 | 1158.0 | 1006.3 | 878.6 | 775.5 | 775.5 | 678.3 | 665.7 | 698.3 | 756.3 |
| Water Resources | 1254.6 | 1120.5 | 959.1 | 815.2 | 599.7 | 599.7 | 611.1 | 763.2 | | |
| Administrative Services | 1532.2 | 1201.6 | 902.2 | 766.9 | 466.2 | 575.7 | 543.1 | 535.7 | 514.2 | 511.1 |
| TOTAL | 6767.2 | 5167.7 | 4070.0 | 3482.7 | 3070.6 | 3180.1 | 3147.4 | 3353.4 | 2489.0 | 2556.9* |
| **TRANSFERRED PROJECTS AND APPROPRIATIONS** | | | | | | | | | | |
| Water Resources (to Division of Water) | | | | | | | | | 739.4 | 0.0 |
| Cadastral Survey (to Land and Water) | 644.3 | 574.1 | 431.7 | 337.7 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Archaeological Survey (to Parks) | 188.2 | 205.8 | 250.0 | 212.5 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Energy Resources (to Oil and Gas) | 1708.1 | 1790.8 | 1699.4 | 1444.5 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Seismic Engineering (to Oil and Gas) | 408.2 | 258.5 | 182.1 | 131.5 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| TOTAL | 9716.2 | 7996.9 | 6633.2 | 5608.9 | 3070.6 | 3180.1 | 3147.4 | 3353.4 | 3190.5 | 2556.9* |
| **DGGS CHART** | 9.7 | 8.0 | 6.6 | 5.6 | 3.1 | 3.2 | 3.1 | 3.35 | 3.2 | 2.56 |
| **ADJUSTED TOTAL** | **6.8** | **5.2** | **4.1** | **3.5** | **3.1** | **3.2** | **3.1** | **3.35** | **3.2** | **2.56*** |

*1992 Legislature reduced by $136,400

# STATUS OF DETAILED GEOLOGICAL MAPPING IN ALASKA



# Major Accomplishments FY91-92

- Initiated a statewide project to inventory and evaluate mineral and coal resources on lands available for Alaska's final statehood land selections. Half the selection areas were visited in 1991.

- In cooperation with the Division of Oil and Gas, initiated a program to inventory and evaluate the oil and gas potential on lands available for Alaska's final statehood land selections.

- Prepared and published the 1990 edition of *Alaska's Mineral Industry*, an annual report on statewide mining activity, in cooperation with the Division of Mining and the Department of Commerce and Economic Development. This year's report was completely redesigned for easier comprehension.

- Completed the first year of a two-year project to evaluate the construction materials and geologic hazards of proposed access corridors throughout Alaska for use in final State land selections.

- Initiated a two-year project to map construction materials in mineral-potential areas that may be proposed for State land selections.

- Expanded operation of the Geologic Data Modeling System to provide computerized mapping and analysis capabilities for the land selection project.

- Completed a joint Federal/DGGS mineral assessment of the Iditarod Quadrangle.

- Completed the final phase of a joint Federal/Russian Academy of Sciences/DGGS project to unify the description and classification of 540 lode mineral deposits and 68 placer mining districts distributed from the Russian Far East, through Alaska, and into western Canada.

- Completed an evaluation of the mineral deposits in the Russian Mission/Aniak areas of Alaska.

- Completed field studies in the Horn Mountains Federal COGEOMAP grant program.

- Completed borehole drilling and sample analyses for the second phase of a cooperative Federal program to determine the frequency of major earthquakes in southcentral Alaska during the past 5,000 years.

- Completed geologic studies of Redoubt Volcano, including eruptive history during the past several thousand years and composition of the 1989-1990 eruptions. These studies will increase our knowledge of past volcanism and will allow us to better anticipate future activity.

- Initiated geologic studies of Mt. Douglas, the least known Cook Inlet volcano.

- Delineated the advance-retreat cycle of the Taku Glacier during the past 3,000 years, documenting evidence for the periodic glacier damming of the Taku River. Published an information circular explaining our current understanding of the Taku Glacier advance.

- Assisted Division of Water in studying potential impact of reopening the Alaska-Juneau Gold Mine on Juneau's domestic water

supply derived from Last Chance Basin.

- Assisted Division of Water and City and Borough of Juneau in searching for additional ground-water sources in the Juneau area.

- Brought on-line a computer database for 102,000 processed micro samples of oil and gas well materials in the DGGS Alaska Geologic Materials Center at Eagle River.

- Acquired 9,000 feet of exploration drill core representing 11 Alaska mineral prospects for use as reference material by private sector companies and State and Federal agencies.

- Acquired 500 new micro samples of oil and gas well materials to expand the coverage of reference materials available to Alaska's petroleum industry.

- Examined regional distribution of potential oil reservoir rocks in the Pre-Mississippian strata of the northeastern North Slope Basin to acquire data for use in future State on-shore and off-shore lease sales.

- Initiated sequence stratigraphic study of Pre-Mississippian Katakturuk Dolomite in ANWR in order to establish correlations between surface and subsurface data that will be needed for future State lease sales west of ANWR.

- Completed a Federal Minerals Management Service grant to establish chronological variations along the pre-Echooka unconformity which provides better information on the regional extent of the Prudhoe Bay Lisburne group oil reservoir rocks.

- Expanded compilation of coal resources information of interior Alaska and entered the data into the National Coal Resource Database System of the Federal government. Non-proprietary data is available to all Alaskans on a national computer network.

- Completed a summary report and map of part of the Chugach Mountains.

- Converted to desktop publishing for all reports to speed dissemination of State geologic resource information.

- By spring of 1992, DGGS will have published 26 new reports and 4 new full-color geologic maps.

# Anticipated Activities FY92-93

The principal focus of the Division of Geological and Geophysical Surveys team will be on identifying candidate land tracts offering high potential revenue return--in preparation for Alaska's last major land selection effort.

The geological hazards team will continue studies to determine earthquake potential in the Cook Inlet Basin--with an aim to predictive models and early mitigation procedure, necessary to minimize human casualties and expensive remediation after the events. They will also continue to participate with the Alaska Volcano Observatory (AVO) program in monitoring and assessing the hazards associated with volcanic eruptions in the Cook Inlet Basin.

## FY 93 Project Descriptions

| Project | Benefit | Funding |
|---|---|---|
| **Statewide Mineral Resource Appraisal**<br>Evaluates mineral resource potential of land available for state selection as well as providing an inventory of geologic resources on state lands. Prepares annual Alaska's Mineral Industry report. | Enhances revenue-generating capability of state lands by providing geologic resource inventory and predicting mineral asset values. Provides current information on mineral industry. | **742.5** (GF)<br>(Reduced to 6[illegible]) |
| **Energy Resource Appraisal**<br>Conducts statewide geologic studies to support inventories of petroleum, coal and other energy resources in Alaska, with emphasis on Alaska's North Slope. | Provides the state and private sector with the geologic information for estimates of Alaska's energy resources. | **461.3** (GF) |
| **Geologic Materials Center**<br>Curate, store and make available to the public a priceless collection of cores, samples and geologic information from oil and gas wells and hardrock mineral deposits in Alaska. | Benefits the public and private sector, exploration and development projects and assessment of the state's energy and mineral assets. | **85.7** (GF) |

| Project | Benefit | Funding |
|---|---|---|
| **Earthquakes, Volcanoes and Engineering**<br>Generates and distributes information about geologic conditions that affect public safety, and development of harbors, urban facilities, and transportation corridors. | Significantly reduces financial risks and human casualties. | 295.2 (GF) |
| **Construction Materials Resources**<br>Provides reliable information on construction materials resources for use in state land selection, to support statewide construction, and to facilitate effective land management. | Provides direct economic benefit to the state from lease revenues and indirectly supports local economies. | 140.6 (GF) |
| **Resource Information**<br>Publishes technical maps and reports on Alaska's geologic resources. Supports division and inter-agency reports for mineral assessments in state land selection areas. | Provides a public database for Alaska's geologic resources that directly supports state resource management and geologic resource development. | 320.5 (GF) |
| **Administrative Services**<br>This project provides administrative services to the Geological Management BRU including project management, financial services, personnel services and clerical services. | Provides support necessary to produce mineral, energy and construction materials resource inventories, produce geologic hazard information and publish technical data. | 511.1 (GF) |
| **Federal Receipts**<br>This project provides authorization to receive and expend funds from federal agencies. | Provides cost-effective public services and promotes cooperative agreements. | 258.9 (Fed) |
| **Inter-Agency Receipts**<br>This project provides authorization to receive and expend funds from other state agencies. | Provides cost-effective public services and promotes cooperative agreements. | 101.8 (I-A) |
| **Program Receipts**<br>This project provides authorization to receive and expend funds from other state agencies. | Provides cost-effective public services and promotes cooperative agreements. | 61.6 (GF/PR) |

# DEPARTMENT OF NATURAL RESOURCES
## Division of Geological and Geophysical Surveys

### STAFFING CHART

DIRECTOR & STATE GEOLOGIST
Smith
2001 Fairbanks 26

Associate Director
GEOLOGIST VI
Wiltse
2046 Fairbanks 24

SECRETARY I
Chavez
2100 Fairbanks 10

**Chief, Mineral and Energy Resources Section**
GEOLOGIST VI
Wiltse
2046 Fairbanks 24

- GEOLOGIST VI — Gilbert — 2010 Fairbanks 24
- GEOLOGIST V — Bundtzen — 2083 Fairbanks 22
- GEOLOGIST IV — Solie — 2082 Fairbanks 20
- GEOLOGIST IV — Burns — 2122 Fairbanks 20
- GEOLOGIST III — Clautice — 2064 Fairbanks 18
- GEOLOGIST I — Harris — 2035 Fairbanks 14
- GEOLOGY ASSISTANT I — Bowman — 2041 Fairbanks 11
- CHEMIST V — Vacant — 2011 Fairbanks 22
- STUDENT INTERN III — Werdon — C092 Fairbanks
- STUDENT INTERN II — DePa'ma — B090 Fairbanks
- STUDENT INTERN II — Jackson — B082 Fairbanks

- GEOLOGIST VI — Mull — 4193 Fairbanks 24
- GEOLOGIST IV — Robinson — 2005 Fairbanks 20
- GEOLOGIST IV — Reeder — 2058 Eagle River 20
- GEOLOGIST III — Clough — 2060 Fairbanks 18
- GEOLOGIST III — Reifenstuhl — 2133 Fairbanks 18
- GEOLOGIST II — Liss — 2085 Fairbanks 16
- GEOLOGIST VI — Vacant — 2008 Fairbanks 24
- GEOLOGIST III — Vacant — 2146 Fairbanks 18
- STUDENT INTERN II — Baldwin — B066 Eagle River
- STUDENT INTERN II — Rathbun — A072 Eagle River

**Chief, Earthquakes, Volcanoes, and Engineering Section**
GEOLOGIST V
Combellick
2040 Fairbanks 22

- GEOLOGIST V — Reger — 2016 Fairbanks 22
- GEOLOGIST IV — March — 2124 Fairbanks 20
- GEOLOGIST IV — Nye — 2117 Fairbanks 20
- GEOLOGIST IV — Motyka — 2055 Juneau 20
- GEOLOGIST III — Kline — 2125 Fairbanks 18
- GEOLOGIST I (Non-Perm) — Pinney — N128 Fairbanks 14
- GEOLOGIST I (Non-Perm) — Roe — N141 Fairbanks 14
- GEOLOGY ASSISTANT II (Non-Perm) — Clement — N155 Fairbanks 11
- GEOLOGY ASSISTANT II (Non-Perm) — Cruse — N Fairbanks 11
- STUDENT INTERN III — Campbell — C090 Fairbanks
- STUDENT INTERN II — Fisher — B057 Fairbanks

**Chief, Resource Information Section**
PUBLICATIONS SPECIALIST III
Laird
2061 Fairbanks 19

- CARTOGRAPHER III — Schell — 2049 Fairbanks 16
- CARTOGRAPHER II — Sturmann — 2062 Fairbanks 15
- PUBLICATIONS SPECIALIST II — Tannian — 2222 Fairbanks 13
- PUBLICATIONS TECHNICIAN II — Maret — 2206 Fairbanks 13
- PUBLICATIONS TECHNICIAN II — Robinson — 2175 Fairbanks 13
- CLERK IV — Vacant — 2009 Fairbanks 9
- CLERK TYPIST III — Vacant — 2048 Fairbanks 8

**Chief, Administrative Services Section**
ADMINISTRATIVE ASSISTANT III
Verosta
2102 Fairbanks 16

- ACCOUNTING TECHNICIAN II — Gronet — 2135 Fairbanks 14
- ADMINISTRATIVE ASSISTANT I — Brown — 2217 Fairbanks 12
- ACCOUNTING CLERK I — Czajka — 2030 Fairbanks 8
- CLERK TYPIST III — Murphree — 1607 Fairbanks 8
- CLERK TYPIST III — Vacant — 2109 Fairbanks 8

Shaded boxes denote permanent staff

Unshaded boxes denote non-permanent staff and student interns

Dashed lines denote a function being carried out by a staff member whose normal duties are shown elsewhere

Revised 5/14/92

# Evolution of Petroleum Development Technology on Alaska's North Slope...

## Reduced Impacts and Enhanced Environmental Protection



Alaska Department of
NATURAL RESOURCES
Division of Oil and Gas
September 1991

# FOLLOWING 20 YEARS OF DEVELOPMENT EXPERIENCE ON THE NORTH SLOPE:

- SPACING BETWEEN WELLHEADS—REDUCED 91%
- SURFACE AREA OF GRAVEL DEVELOPMENT PADS— REDUCED 76%
- SURFACE AREA FOR CONTRACTOR SERVICE AREA— REDUCED 95%
- GRAVEL ROADS FOR PIPELINE CONSTRUCTION— ELIMINATED
- ICE PADS USED IN LIEU OF GRAVEL PADS FOR EXPLORATORY WELLS
- UNDERGROUND INJECTION FOR DISPOSAL OF DRILLING FLUIDS
- DESIGN AND PERMITTING OF CENTRALIZED WASTE MANAGEMENT FACILITIES — 95% RECYCLING OF ALL ASSOCIATED WASTES
- FEWER DRILL SITES NEEDED DUE TO ADVANCES IN DIRECTIONAL DRILLING
- RESERVE PITS ELIMINATED OR NEEDED ONLY ON A TEMPORARY BASIS

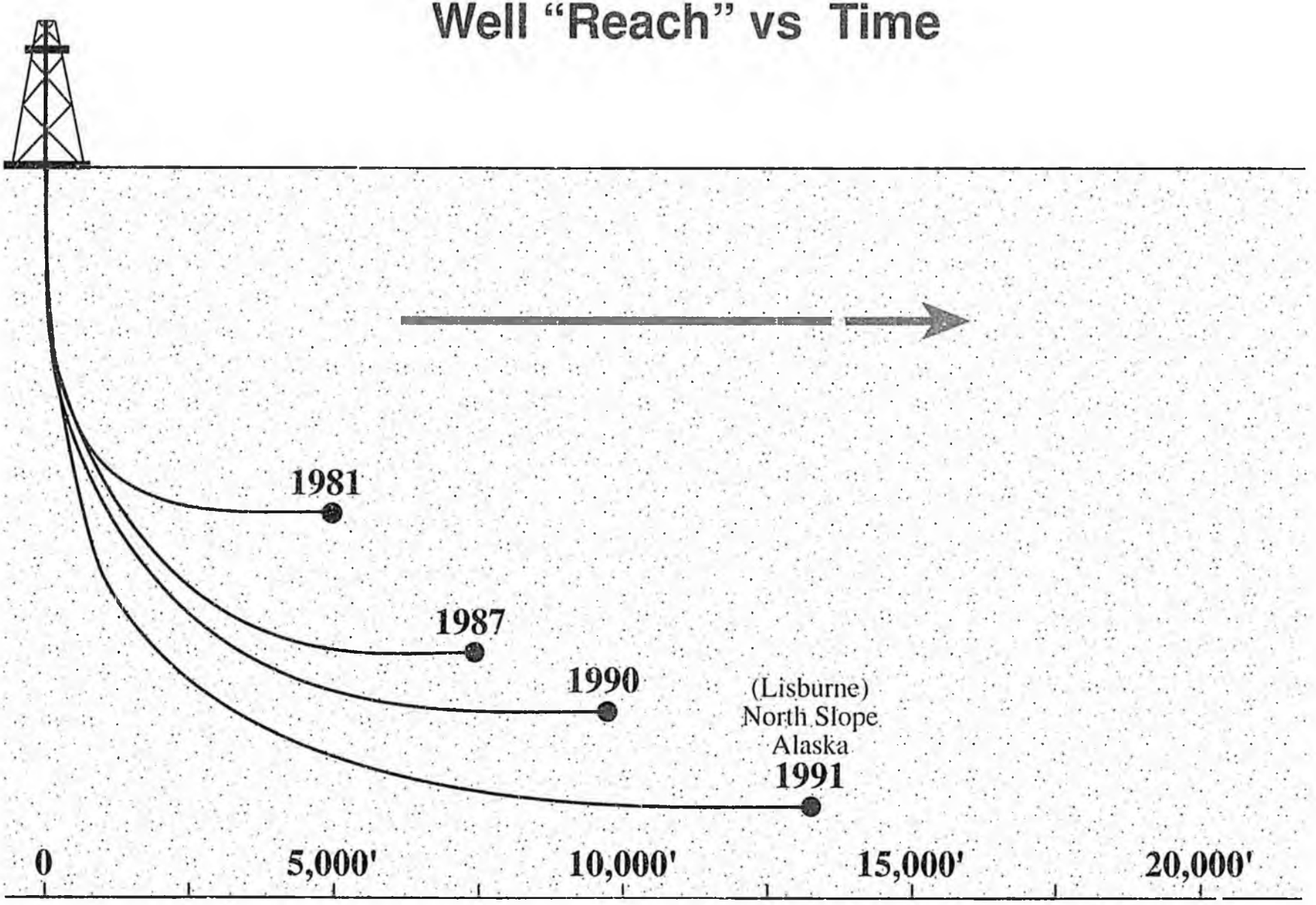
Alaska
Dept. of Natural Resources
Division of Oil and Gas
8-29-91

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Dept. of Natural Resources
Division of Oil and Gas
8-29-91

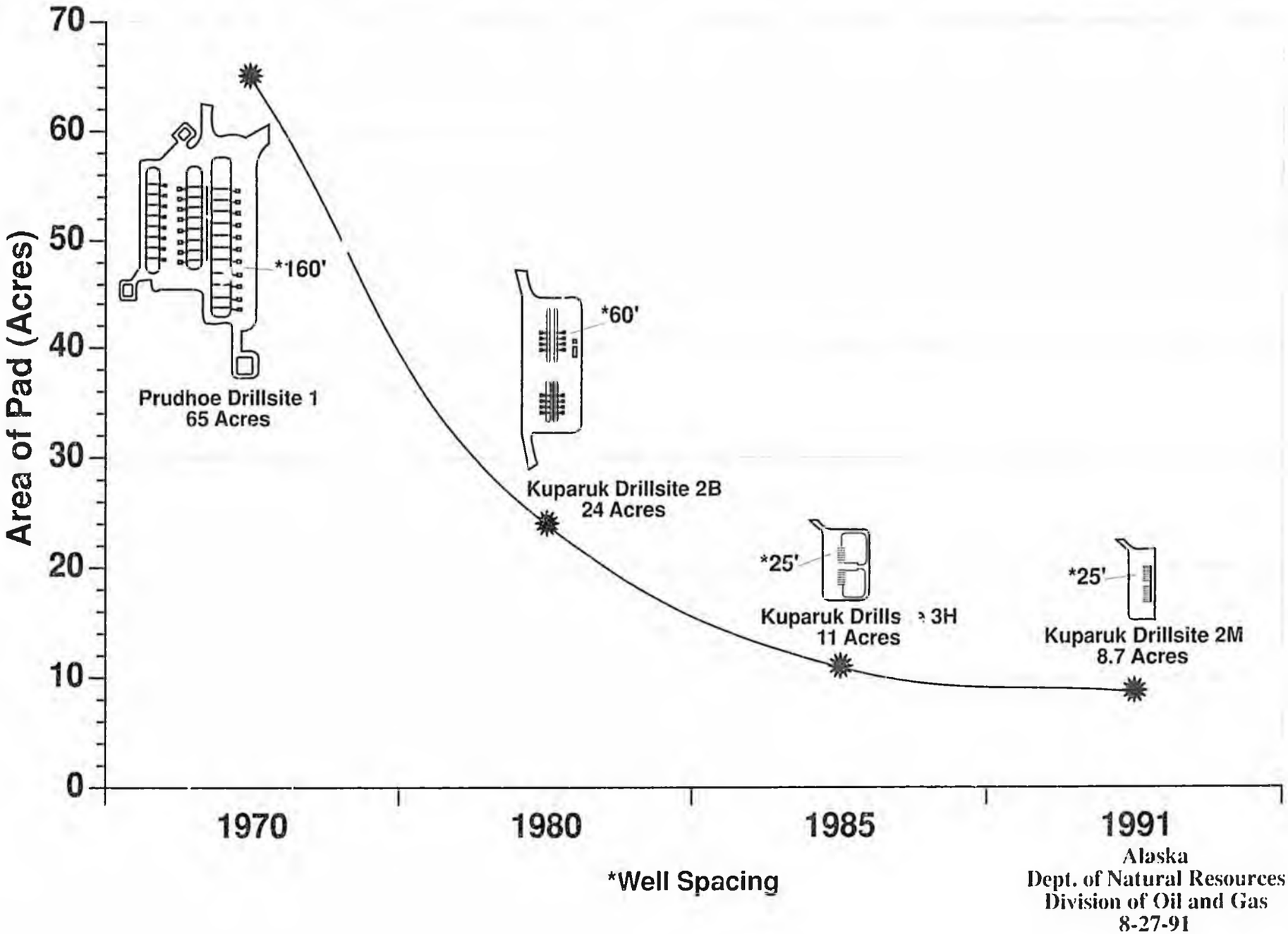
# Well "Reach" vs Time



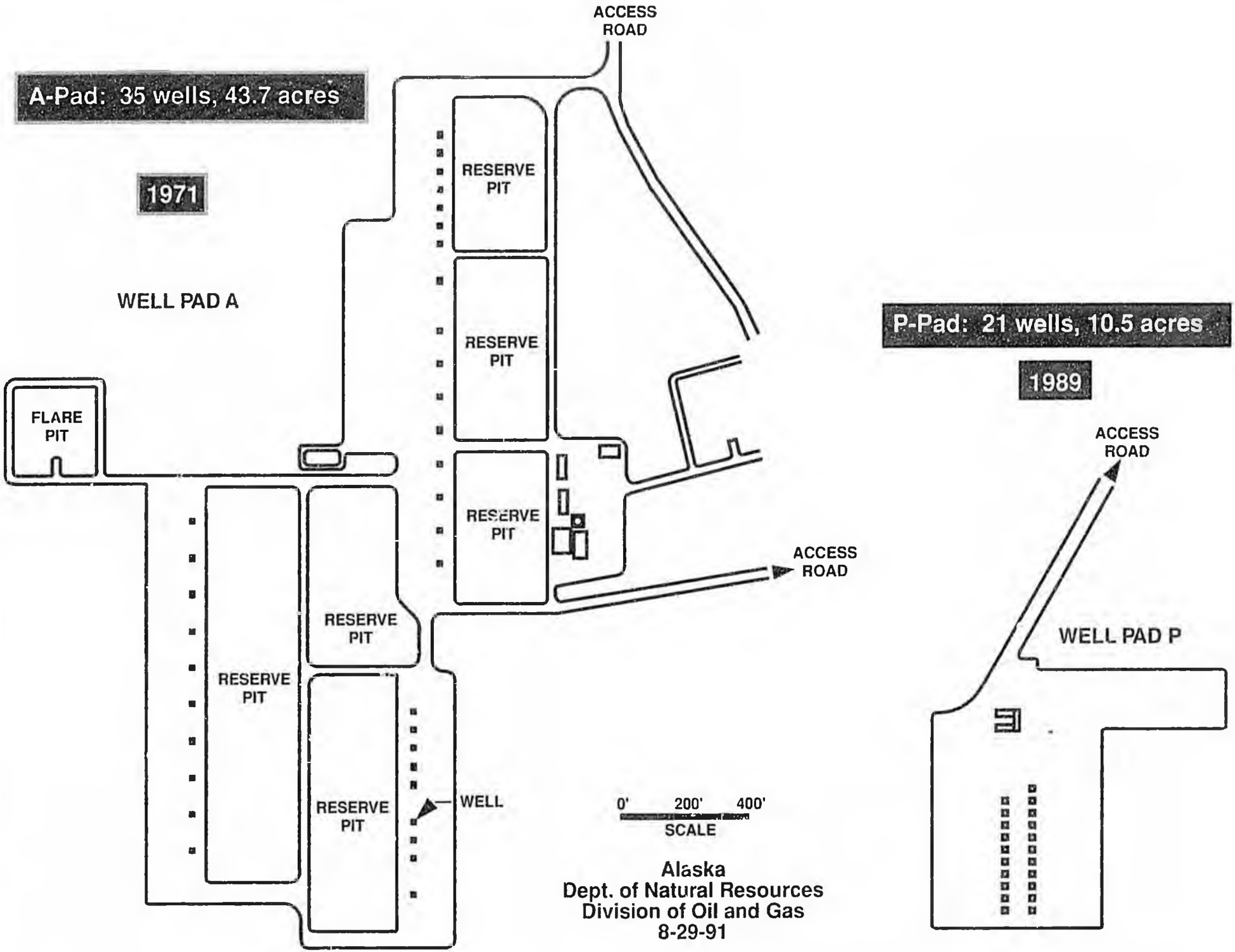

**Total Horizontal Departure**

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Division of Oil and Gas
8-29-91

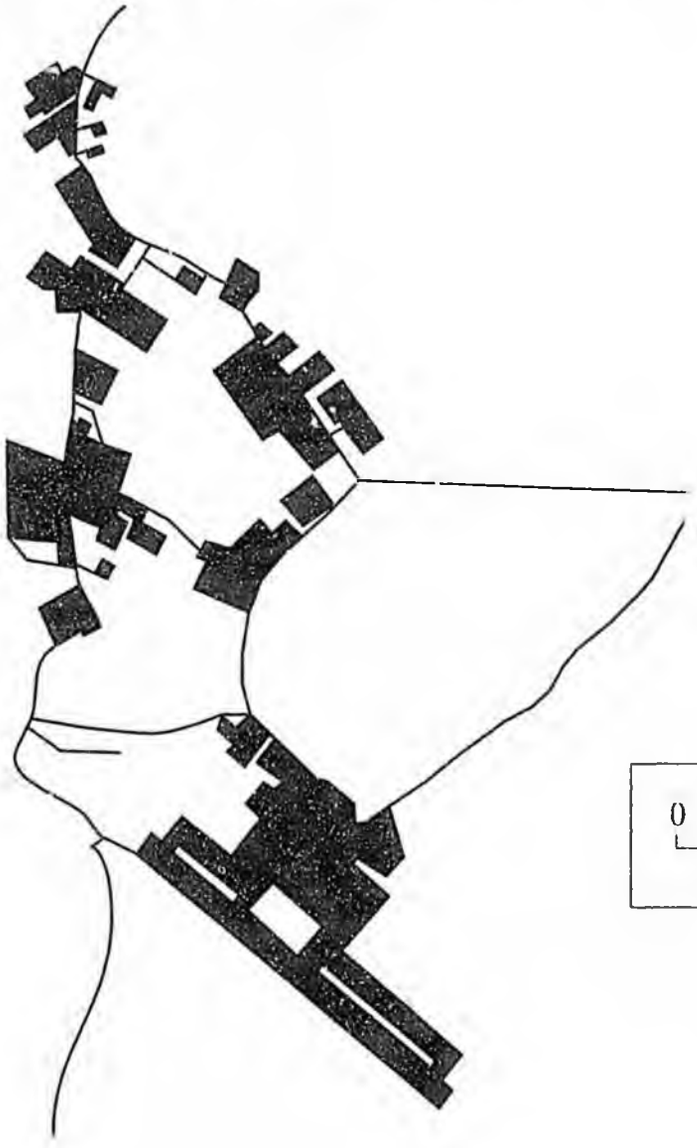
# Evolving Consolidation of North Slope Production Pad Size



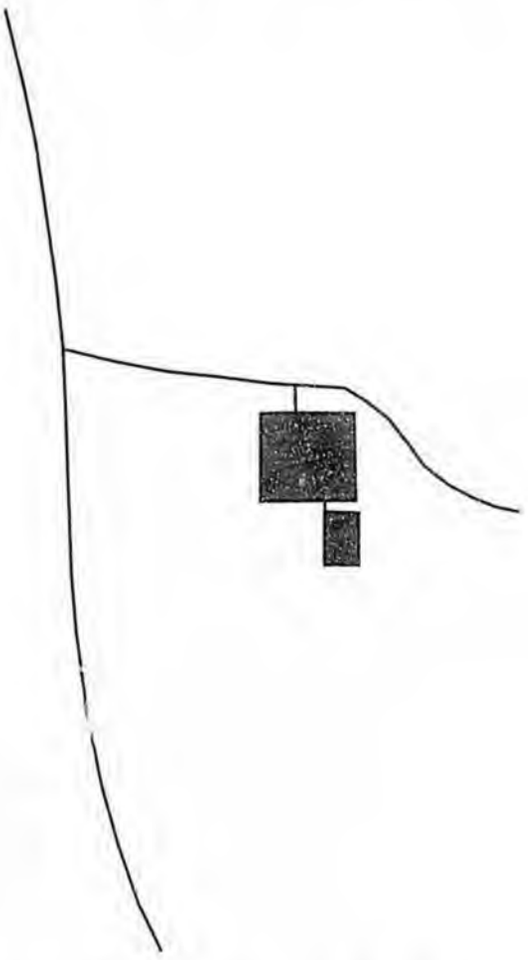

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Division of Oil and Gas
8-27-91


A-Pad: 35 wells, 43.7 acres
1971
WELL PAD A
ACCESS ROAD
RESERVE PIT
RESERVE PIT
RESERVE PIT
FLARE PIT
ACCESS ROAD
RESERVE PIT
RESERVE PIT
RESERVE PIT
WELL
0' 200' 400'
SCALE
Alaska
Dept. of Natural Resources
Division of Oil and Gas
8-29-91
P-Pad: 21 wells, 10.5 acres
1989
ACCESS ROAD
WELL PAD P

# Deadhorse Service Area



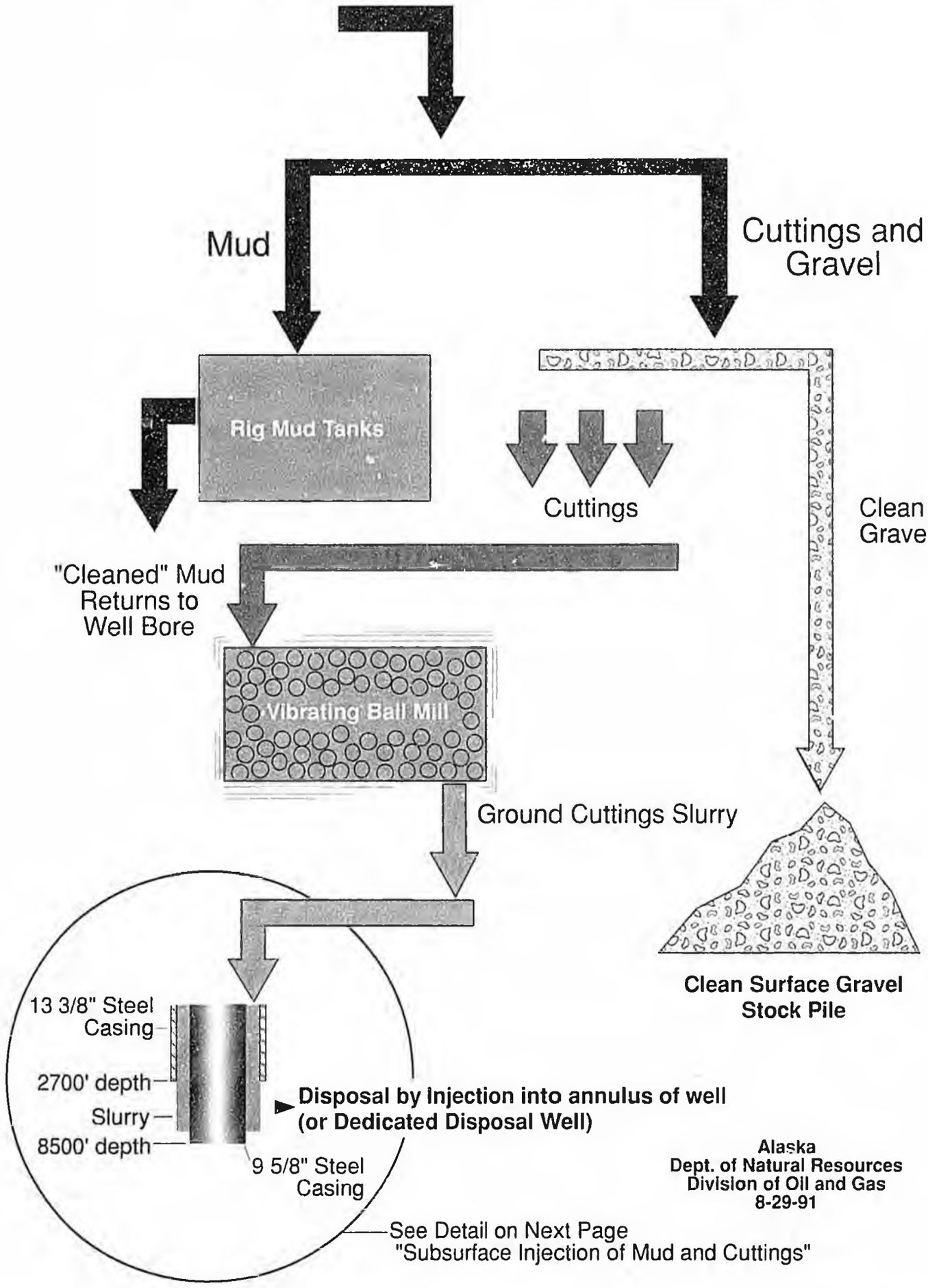
# Conceptual ANWR Service Center




*Service facilities for the Prudhoe Bay oil fields are located at Deadhorse. These buildings are situated on 1,050 acres. Satellite service facilities at ANWR could be located on only 55 acres, as was done for the Kuparuk oil field.*

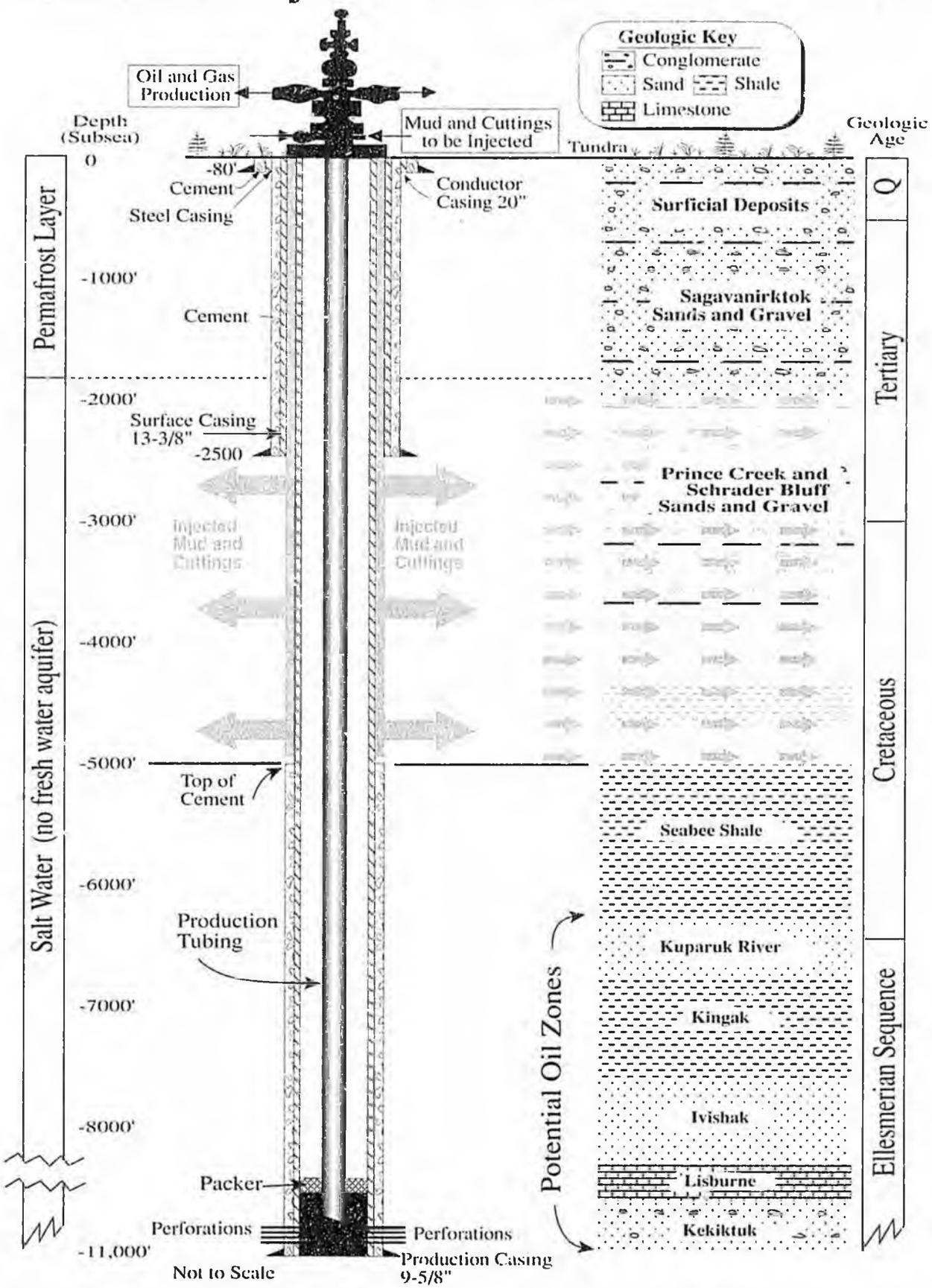
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Division of Oil and Gas
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# Mud, Cuttings and Gravel from Well




Alaska
Dept. of Natural Resources
Division of Oil and Gas
8-29-91

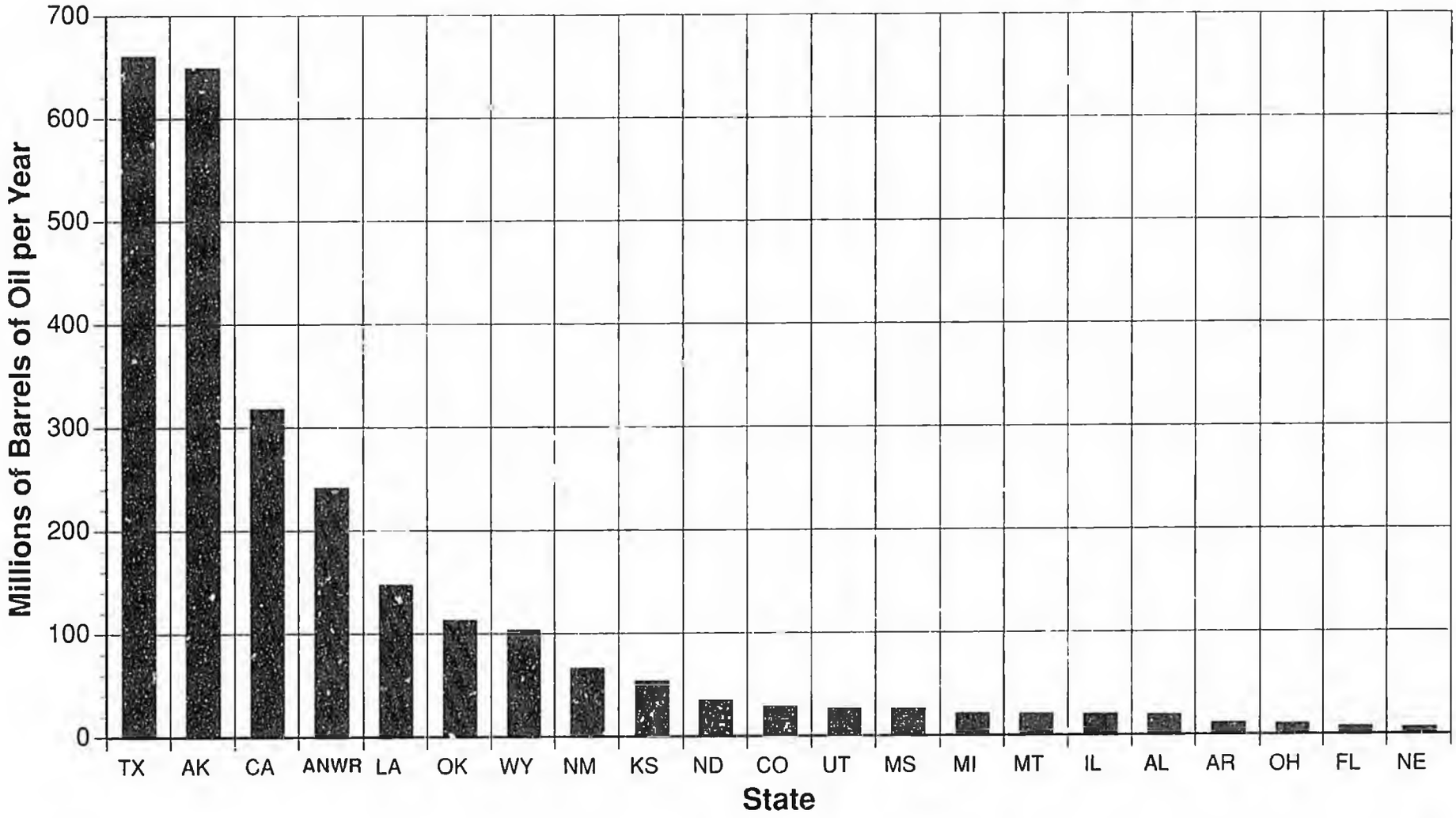
# Subsurface Injection of Mud and Cuttings




Please Note:
1. When injection phase is completed, the 9-5/8" X 13-3/8" annular space is pumped full of cement and permanently sealed.
2. In the Kuparuk River Unit the surface casing is set through the West Sak interval (to approximately -4000 ss).


Alaska
Dept. of Natural Resources
Division of Oil and Gas
8-29-91

# Top Twenty Oil Producing States and ANWR

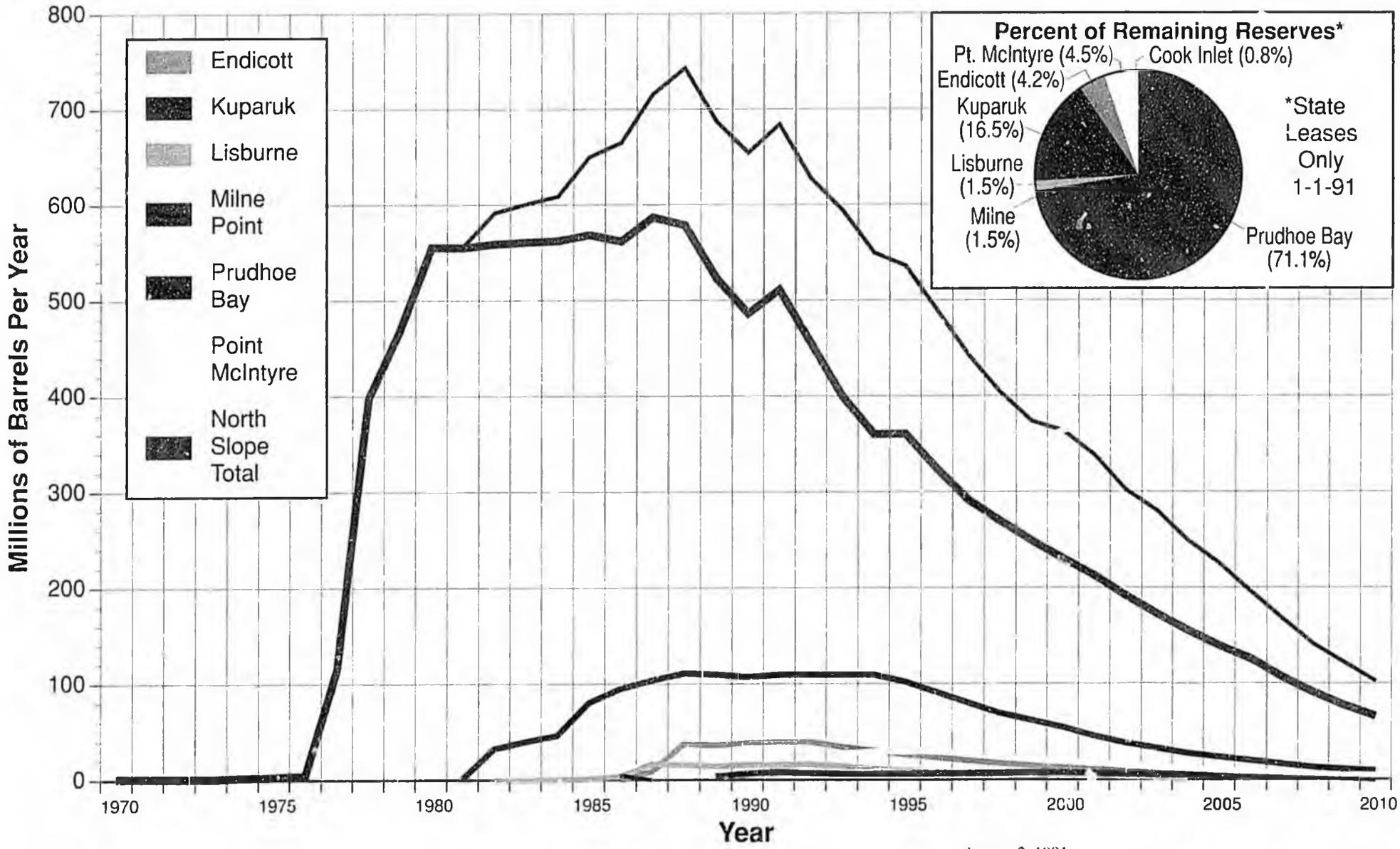



State figures reflect 1990 production.
ANWR figure assumes peak production from mean value economic field.

Source: Department of Interior

Alaska Department of Natural Resources
Division of Oil & Gas August 2, 1991

# North Slope Historical & Projected Oil Production




August 2, 1991

Source: Alaska Dept. of Natural Resources, Div. of Oil & Gas.

# Five-Year Oil and Gas Leasing Program

## Alaska Department of Natural Resources
## Division of Oil and Gas

| Proposed Sale Area & Date | | | 1992 | | | 1993 | | | | | | | | | | | 1994 | | | | | | | | | | | | 1995 | | | | | | | | | | | | 1996 | | | | | | | | | | | | 1997 | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | O | N | D | J | F | M | A | M | J | J | A | S | O | N | D | J | F | M | A | M | J | J | A | S | O | N | D | J | F | M | A | M | J | J | A | S | O | N | D | J | F | M | A | M | J | J | A | S | O | N | D | J | F | M | A | M | J | J | A | S | O | N | D |
| 76 & | Cook Inlet | 1-93 | F | | | S | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 67A-W | Cook Inlet | 1-93 | F | | | S | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 77 & | Nanushuk | 5-93 | | P | | M | F | | | S | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 70A-W | Kuparuk Uplands | 5-93 | | | | | F | | | S | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 57 | North Slope Foothills | 9-93 | | | | | | P | | M | F | | | S | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 78 | Cook Inlet | 1-94 | | | | | | | | | P | | | M | F | | | S | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 79 | Cape Yakataga | 7-94 | | | | L | | C 3 | | | | | | | | | | P | | M | F | | | S | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 80 | Shaviovik | 11-94 | | | | | | | | L | | C 3 | | | | | | | | | | P | | M | F | | | S | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 81 | Beaufort Sea | 4-95 | | | | | | | | | | | | L | | C 3 | | | | | | | | | | | | P | | M | F | | | S | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 82 | Icy Cape | 7-95 | | | | | | | | | | | | | | | | L | | C 3 | | | | | | | | | | | P | | M | F | | | S | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 83 | Western Beaufort Sea | 11-95 | | | C 2 | | | | | | | | | | | | | | | | | L | | C 3 | | | | | | | | | P | | M | F | | | S | | | | | | | | | | | | | | | | | | | | | | |
| 84 | Copper River | 4-96 | | | | A | | | C 2 | | | | | | | | | | | | | | | | | L | | C 3 | | | | | | | | | P | | M | F | | | S | | | | | | | | | | | | | | | | | | |
| 85 | Cook Inlet / Shelikof Strait | 7-96 | | | | A | | | | | | C 2 | | | | | | | | | | | | | | | | | | L | | C 3 | | | | | | | | | P | | M | F | | | S | | | | | | | | | | | | | | |
| 86 | Western Beaufort Sea | 11-96 | | | | A | | | | | | | | | | C 2 | | | | | | | | | | | | | | | | | | L | | C 3 | | | | | | | | | P | | M | F | | | S | | | | | | | | | | |
| 87 | Kuparuk Uplands | 4-97 | | | | A | | | | | | | | | | | | | | C 2 | | | | | | | | | | | | | | | | | | | | | L | | C 3 | | | | | | | | | P | | M | F | | | S | | | | |
| 88 | North Slope Foothills | 7-97 | | | | A | | | | | | | | | | | | | | | | | | C 2 | | | | | | | | | | | | | | | | | | | L | | C 3 | | | | | | | | | P | | M | F | | | S | | |
| 89 | Eastern Beaufort Sea | 11-97 | | | | A | | | | | | | | | | | | | | | | | | | | | | C 2 | | | | | | | | | | | | | | | | L | | C 3 | | | | | | | | | P | | M | F | | | S | |

A = Proposed Sale Area Added to 5-Year Program.
C = Call for Comments:
1 = New Sales and 5-Year Program Revisions
2 = Request for General Information
3 = Request for Socioeconomic and Environmental Information

L = Preliminary Land Status Check
P = Preliminary Finding / Notice of Intent to Issue Final Finding [AS 38.05.945(a)(3)] / ACMP Consistency Analysis. (If required.)

M = Public Meeting or Teleconference
F = Final Finding and/or Notice of Sale and Terms [AS 38.05.945(a)(4)]
S = Sale

9/17/92

**Partial List of**
**Current Issues Where Division of Oil and Gas Has Lead**

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Units

- **Jones Island**—work commitment being negotiated with ARCO
- **Thetis Island**—complex negotiation with Exxon regarding conversion of NPSL to royalty, removal of EIC and work commitment.
- **Kuukpik**—completed negotiations with ARCO on work commitment. Unit formed. ARCO drilling two wells in unit (and one adjacent) this season.
- **Kuparuk River**—negotiated with ARCO on "final" contraction. Have solid drilling commitment requirements.
- **Niakuk** —resolving commingling and other issues prior to 1995? startup.
- **Pt. McIntyre**—resolving some commingling issues, startup in 1993.
- **Pt. Thomson**—evaluate effects of gas cycling and Kuvlum discovery.
- **West McArthur River Unit** (Stewart)—waiting on second Plan of Development. Rig on site. Spud second well this month?

Pro-Development Initiatives

- **Marketing** ANWR/"new explorers"/contractors/investors—numerous meetings at Society of Exploration Geophysicists meeting to promote pro-development opportunities in Alaska.
- **"Open ANWR"** strategies with new administration.
- **Large Block Licensing/Leasing and Exploration Incentive Credits**—have met with and will continue to meet with industry, native organizations, legislators, contractors to promote these bills.
- **Coal Bed Methane**—Have met with industry, native organizations, contractors, University, AEA and others to promote the concept of coal-bed methane development in Alaska.
- **Gas Hydrates**—30 TCF known reserves in Prudhoe/Kuparuk. Preliminary discussions have begun. (Probably not a near-term project).
- **Gas Sales**—Working with industry and Harold Heinze to resolve reservoir issues that may lead to an expedited sale of North Slope gas.
- **Streamline lease sale procedures**—re-thought and re-wrote stipulations and other aspects of Best Interest Finding to help streamline lease-sale process.
- Evaluated all **recent discoveries** (Kuvlum, Badami, Sunfish, Stinson, all Chukchi wells, all Colville wells and others) to update our subsurface studies.

Royalty and Settlement

- **"Severed" issues** (gas) discussions with producers—royalties due from gas "transfers" and related issues.
- **RIK settlements with refiners**—negotiations with Tesoro, Mapco, Chevron and GVEA--royalties owed as a result of "Amerada Hess" settlement with producers.
- **Royalty Reduction/Discovery Royalty**—Conoco litigation.
- **Metering and commingling**—assuring that proper techniques are used and that each hydrocarbon type is properly allocated and accounted for..
- **Reopeners**—planning strategy for ANS settlement reopeners.
- **OGRA re-write and Electronic Data Interchange**—enhance accuracy, speed and efficiency of collecting royalty payments. Developing capability to process run-tickets (and other data) by electronic exchange.
- Support litigation for **lifting North Slope oil export ban**—Petroleum economist working with Governor's staff.

THE FOLLOWING DOCUMENT
HAS NOT BEEN FILMED
BUT IS AVAILABLE IN THE
ORIGINAL FILE

# ALASKAN FORESTS FOREVER



ALASKA DIVISION OF FORESTRY

Alaska Department of NATURAL RESOURCES

# ALASKAN FORESTS FOREVER



ALASKA DIVISION OF FORESTRY

Alaska Department of NATURAL RESOURCES

## MISSION STATEMENT

The Division of Forestry's mission is to manage forest land for multiple use and sustained yield, protect the forest's natural values, and support Alaska's economy through development of timber and wood products.

To accomplish this important mission, the division will:

- ensure that public resources--such as water, fish, wildlife, and forests--are protected on state, municipal, and private lands
- manage renewable resources on state-owned forest land in a balanced manner to serve the needs of Alaskans now and in the future
- protect people, private property, and natural resources from fire, insects, and disease
- provide technical assistance to forest landowners
- cooperate with other forest landowners and managers to improve management efficiency by using new scientific and technological methods

## DIVISION OF FORESTRY RESPONSIBILITIES

*"Fish, forests, wildlife, grasslands, and all other replenishable resources belonging to the state shall be utilized, developed, and maintained on a sustained yield principle, subject to preferences among beneficial uses."*

ALASKA STATE CONSTITUTION

By state law, the Commissioner of the Department of Natural Resources charges the Division of Forestry with the following responsibilities:

- to protect forest land from fire and destructive agents
- to manage state forests for multiple use and sustained yield
- to guarantee a perpetual supply of renewable resources
- to reforest state land
- to establish and maintain forest vegetation nurseries and greenhouses for planting stock
- to advise state land managers on sound forest practices
- to provide public information and assistance regarding

# THE ALASKA DIVISION OF FORESTRY'S MANAGEMENT PROGRAMS

The Division of Forestry manages state-owned forest land and resources through four management programs:



*State Forestry and Fish and Game staff participate in a field inspection.*

### The Forest Practices Program

The Forest Practices Program is designed to protect water quality, fish and wildlife habitat, and other public forest values through the use of appropriate forest practices.

The key elements of the program are to:

- educate forest landowners, operators, and the public about the requirements of the Forest Resources and Practices Act and proper forest practices



*Gathering firewood for personal use.*

### The Forest Resource Management Program

The Forest Resource Management Program is designed to efficiently manage the benefits as well as the products of a dynamic forest system.

The key elements of the program are to:

- develop and maintain statewide forest inventory statistics for state-owned forest resources
- provide forest management expertise for statewide resource planning efforts
- promote establishment of state forests
- manage state-owned forest land for non-timber related multiple use benefits
- evaluate all forest resource values before harvesting



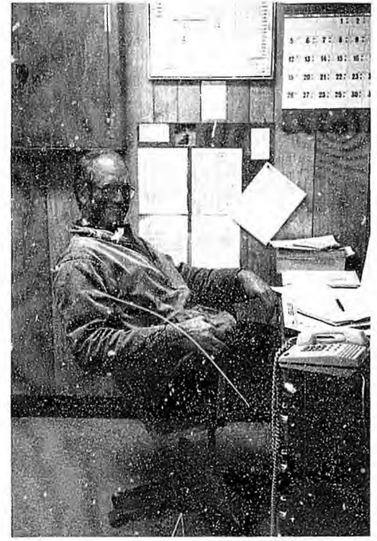
*Wildland fire in interior Alaska.*

### The Fire and Aviation Management Program

The Fire and Aviation Management Program carries out an effective wildland fire program on public and private lands.

The key elements of the program are to:

- support and continue the interagency fire management agreements for cooperative protection and planning efforts
- maintain current cooperative wildland fire protection levels
- improve the resource evaluation system for lands to be protected from wildland fire
- maintain fire prevention and enforcement programs to reduce risk and minimize the number of human caused wildland fires
- provide wildland fire protection by having staff and equipment ready and prepared to suppress any wildland fires statewide
- develop and maintain wildland fire detection capabilities, including the Automated Lightening Detection System



*Office support for state forestry programs.*

### The Support Services Program

The Support Services Program is designed to provide administrative and technical services necessary to support program activities and fully meet state administrative directives.

The key elements of the program are to:

- provide efficient management of the division's budget, personnel, and property
- improve computerized transfer of information throughout the division

Department of Natural Resources
Division of Forestry
P. O. Box 107005
Anchorage, AK 99510-7005

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forest practices and timber management
- to regulate operations of private forest land
- to establish the Board of Forestry

# THE BOARD OF FORESTRY

The nine-member Board of Forestry advises the Director of the Division of Forestry. Its members are appointed by the governor, from groups and organizations representing a wide range of forestry interests:

- a commercial fishermen's organization
- a Native corporation established under the Alaska Native Claims Settlement Act (43 U.S.C. 1601-1628)
- an environmental organization
- a forest industry trade association
- a professional fish or wildlife biologist who is not employed by state, municipal, or federal government agencies, except for university employment
- a mining organization
- a recreational organization
- the Director of the Division of Forestry, who serves ex-officio and without a vote

The powers and duties of the Board of Forestry are to:

- advise the Commissioner of the Department of Natural Resources on forestry related regulations
- provide a forum for interest groups to discuss and resolve state forest issues
- work with the Departments of Natural Resources, Environmental Conservation, and Fish and Game to conduct annual survey or research needs related to forest practices and report to the legislature on these needs
- coordinate and monitor implementation and effectiveness of the Forest Resources and Practices Act and management of forest lands, and to report annually to the legislature and the governor

The presiding officer of the board is the Director of the Division of Forestry, who also has the title of State Forester. The Board of Forestry can be contacted through the state forester's office in Anchorage, 36th and C Street, Suite 1058, P. O. Box 107005, Anchorage, Alaska 99510-7005. Phone Number: (907) 762-2501

- improve administration of the Forest Resources and Practices Act, including review of notifications, conducting forest inspections, and taking appropriate enforcement actions
- meet the Department of Natural Resources' forest management responsibilities, as in the Alaska Coastal Management Program and the Forest Resources and Practices Act regulations



*Timber harvest on private land, southcentral Alaska.*

The 1990 legislature adopted a revised Forest Resources and Practices Act (HB 331) which changed the way forests on public lands will be managed. The Act sets new standards for protecting stream banks, strengthens the Department of Natural Resources' ability to enforce compliance, and provides increased funding for the state to inspect logging sites. The Act also restructures the Board of Forestry to include a wider range of interests, and establishes a comprehensive five-year planning schedule for logging on state land. The state is drafting regulations for setting these changes in motion.

timber resources
- improve long-term forest management, including silviculture, and management techniques
- assess and monitor state, private, and municipal field operations
- incorporate forest pest management into the resource management program
- improve timber sale management on state-owned forest land
- oversee the log brand program
- reforest the non-productive timber lands
- improve management of the state forest nursery
- provide additional funding for the Alaska Reforestation Council
- regenerate harvested and high-value burned forests
- apply new technology to field operations
- provide forestry assistance to other forest landowners, including industrial and non-industrial private forest land owners, and private citizens



*Recreation in Matanuska Valley Moose Range.*

and the Alaska Initial Attack Management System
- establish and maintain a weather and fire danger rating system
- provide a safe and effective aviation program to support the division's fire and resource operations



*Training wildland fire crews.*



*Aviation support for wildland fire.*

- strengthen an effective, professional workforce
- provide incentives for improved staff performance
- improve staff qualifications through training in administration of the Forest Resources and Practices Act, forest resource management, fire and aviation management, and administrative responsibilities
- develop comprehensive division-wide management policies
- improve communications with the public and other agencies
- incorporate technical information and research into forest management decisions and operations



*Interagency field inspection of spruce bark beetle infestation.*

# STATEWIDE DIVISION OF FORESTRY OFFICES

The Division of Forestry has 15 offices to serve the public. The central office provides statewide policy direction and program assistance in forest management. There are three regional offices: northern, south-central, and southeast. Ten area offices and one state forest nursery are located around the state.

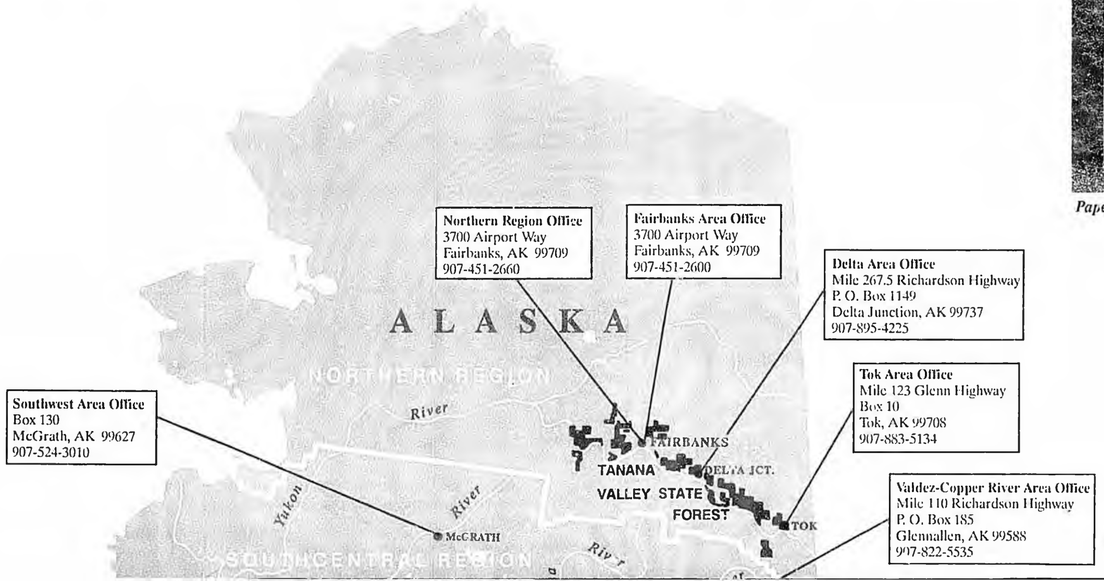
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*Winter logging by dog sled.*



*Paper Birch tree.*




**Northern Region Office**
3700 Airport Way
Fairbanks, AK 99709
907-451-2660

**Fairbanks Area Office**
3700 Airport Way
Fairbanks, AK 99709
907-451-2600

**Delta Area Office**
Mile 267.5 Richardson Highway
P. O. Box 1149
Delta Junction, AK 99737
907-895-4225

**Tok Area Office**
Mile 123 Glenn Highway
Box 10
Tok, AK 99708
907-883-5134

**Southwest Area Office**
Box 130
McGrath, AK 99627
907-524-3010

**Valdez-Copper River Area Office**
Mile 110 Richardson Highway
P. O. Box 185
Glennallen, AK 99588
907-822-5535

# FORESTRY ASSISTANCE FROM THE FEDERAL GOVERNMENT

## Forest Stewardship

The Division of Forestry has presented a proposal to the U.S.D.A. Forest Service for funding to develop a forest stewardship program. If the Alaska proposal is accepted, the division will provide direct forest management assistance to private and municipal non-industrial forest landowners. The division will assist the forest landowners in developing and achieving their management goals for the benefit of the resources, the landowners, and the citizens of Alaska.

A stewardship program will provide:

- substantial volumes of raw wood materials for both local consumption and value added processing
- an economic basis for local employment of youths in rural areas
- maintained or improved water and air quality
- habitat for threatened or endangered species
- sustainable forests which contribute to environmental health
- continued public and private benefits with long-term commitment to forest management

## Urban and Community Forestry

In 1990, the Division of Forestry received an urban and community forestry grant from the U.S.D.A. Forest Service, State and Private Forestry, to assist communities in forest related activities. The community of St. George received state assistance in planting a research site of 2,500 trees on the island. This forest improvement will be studied for the next several years to determine whether trees can survive in this harsh environment.





*A state forester discusses forest management with a forest land owner.*

# NEW DIRECTIONS IN FOREST RESOURCE MANAGEMENT

Alaska has a wealth of renewable and nonrenewable resources, and our forests play a vital role in this legacy. How we manage our resources today will set the stage for tomorrow. The Alaska Division of Forestry is committed to long term, sustained productivity of the forest ecosystem, which includes soil, water, air, fish and wildlife habitat, and healthy trees. The division's directions are based on the belief that development of forest resources in Alaska can coexist with environmental preservation and multiple use by applying proper management guidelines.

The Division of Forestry is committed to:

- managing state-owned forest lands for long-term benefit for future generations of Alaskans
- protecting forest resources by properly administering the Forest Resources and Practices Act
- providing a leadership role in multiple use management of state-owned forest lands

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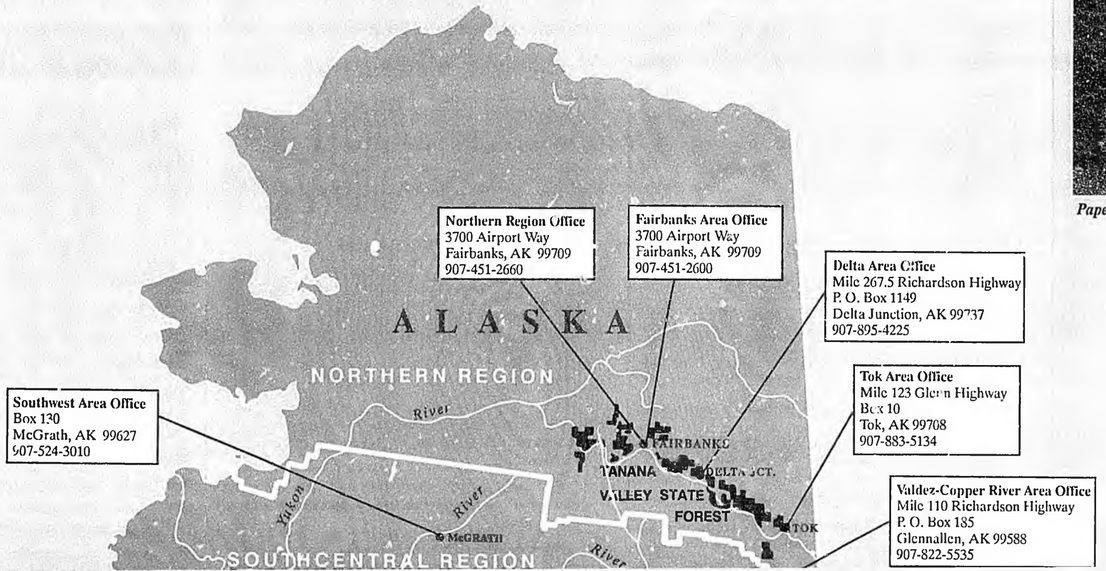
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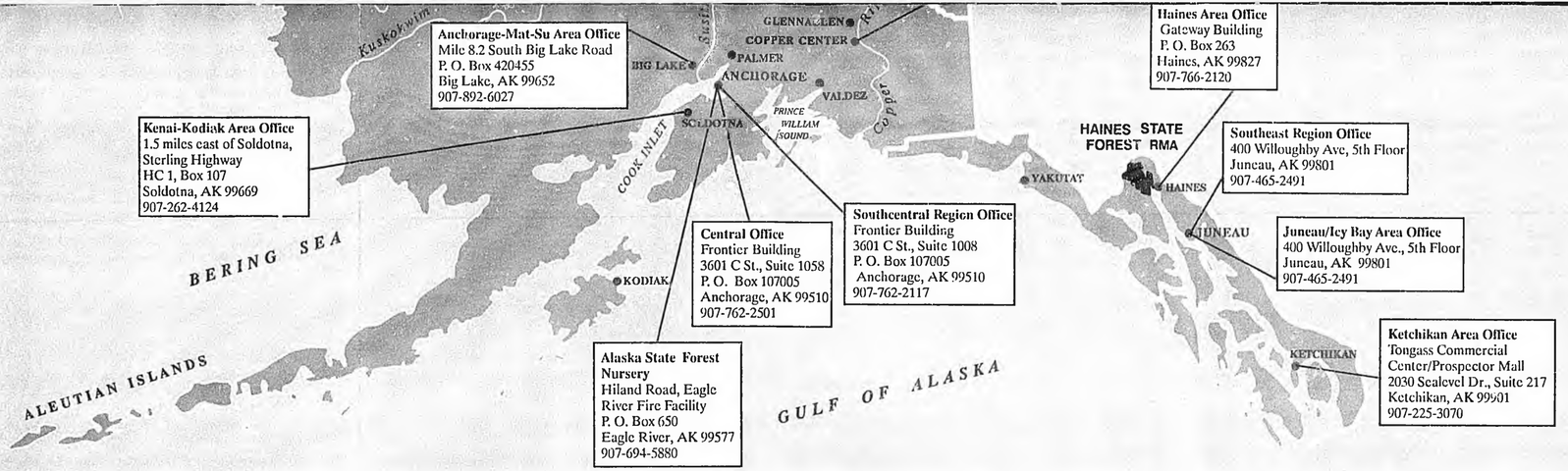
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**Anchorage-Mat-Su Area Office**
Mile 8.2 South Big Lake Road
P. O. Box 420455
Big Lake, AK 99652
907-892-6027

**Kenai-Kodiak Area Office**
1.5 miles east of Soldotna,
Sterling Highway
HC 1, Box 107
Soldotna, AK 99669
907-262-4124

**Central Office**
Frontier Building
3601 C St., Suite 1058
P. O. Box 107005
Anchorage, AK 99510
907-762-2501

**Southcentral Region Office**
Frontier Building
3601 C St., Suite 1008
P. O. Box 107005
Anchorage, AK 99510
907-762-2117

**Alaska State Forest Nursery**
Hiland Road, Eagle
River Fire Facility
P. O. Box 650
Eagle River, AK 99577
907-694-5880

**Haines Area Office**
Gateway Building
P. O. Box 263
Haines, AK 99827
907-766-2120

**Southeast Region Office**
400 Willoughby Ave, 5th Floor
Juneau, AK 99801
907-465-2491

**Juneau/Icy Bay Area Office**
400 Willoughby Ave., 5th Floor
Juneau, AK 99801
907-465-2491

**Ketchikan Area Office**
Tongass Commercial
Center/Prospector Mall
2030 Sealevel Dr., Suite 217
Ketchikan, AK 99901
907-225-3070



*Private sawmill operation on state-owned forest land.*

# LEGISLATIVELY DESIGNATED STATE FORESTS

There are two state forests in Alaska, both created by the Alaska state legislature for multiple use management of the forest lands and resources. State forests are managed for sustained yield to guarantee a continuing supply of state-owned forest resources.

**The Tanana Valley State Forest** is located in interior Alaska and is in the area generally bordered by Fairbanks, Delta, and Tok. This state forest is administered through the Northern Region Office and the Fairbanks, Delta, and Tok Area Offices. The Tanana Valley State Forest contains 1,786,330 acres of state land.

**The Haines State Forest and Resource Management Area** is located in southeast Alaska near Haines and is administered through the Southeastern Region Office and the Haines Area Office. The Haines State Forest and Resource Management Area contains 250,600 acres of state land.

Photos contributed by-

Division of Forestry Staff:
Lisa Holzapfel
Cindy Forrest
Dave Wallingford
McGrath Area Office
Valdez-Copper River Area Office
Southcentral Region Office

United States Forest Service:
State and Private Forestry



*Forest user asks for advice from a state forester.*

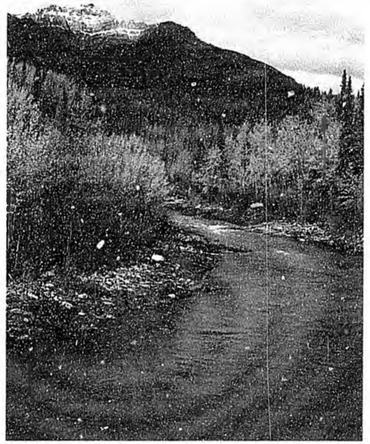
# ALASKA STATE FOREST NURSERY

The 1990 legislature provided the Division of Forestry with funding for reforestation. The division will use this money to build two more greenhouses at the State Forest Nursery in Eagle River, doubling its capacity to produce seedlings. State foresters are actively collecting seed from cones statewide to use in the nursery. This funding will also improve the water system at the nursery, increase staffing capability, and provide a bare-root growing yard. With the additional staff and facilities, the state will improve the quality of the seedlings and will grow 1.6 million seedlings for use on state and private lands.

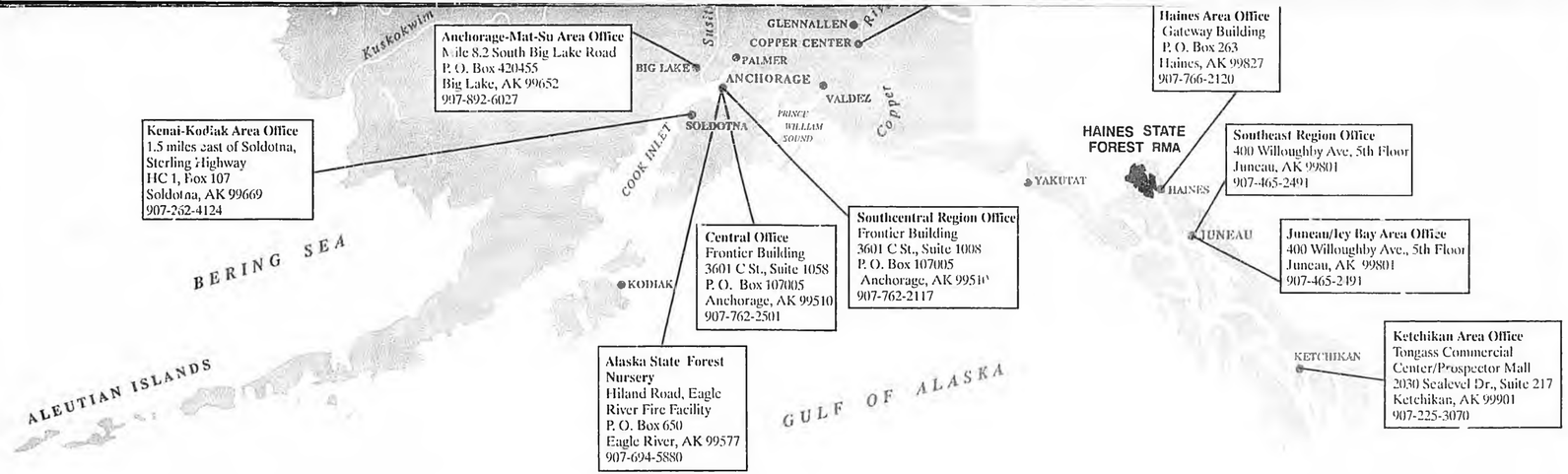


*New seedlings for reforestation.*

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- caring equally for multiple use forest resources and timber-cutting
- improving our fire prevention program
- using fire as a management tool to improve wildlife habitat and forest growth
- protecting forest resources, human life, and property from wildland fire
- expanding the aviation program to also support the division's forest practices and resource management work
- providing clear policy direction for sustained productivity and multiple use
- improving interagency communications and public relations
- motivating and training division staff
- learning from previous forest management mistakes and not repeating them



*Early snow in a southcentral Alaska forest.*






*Private sawmill operation on state-owned forest land.*

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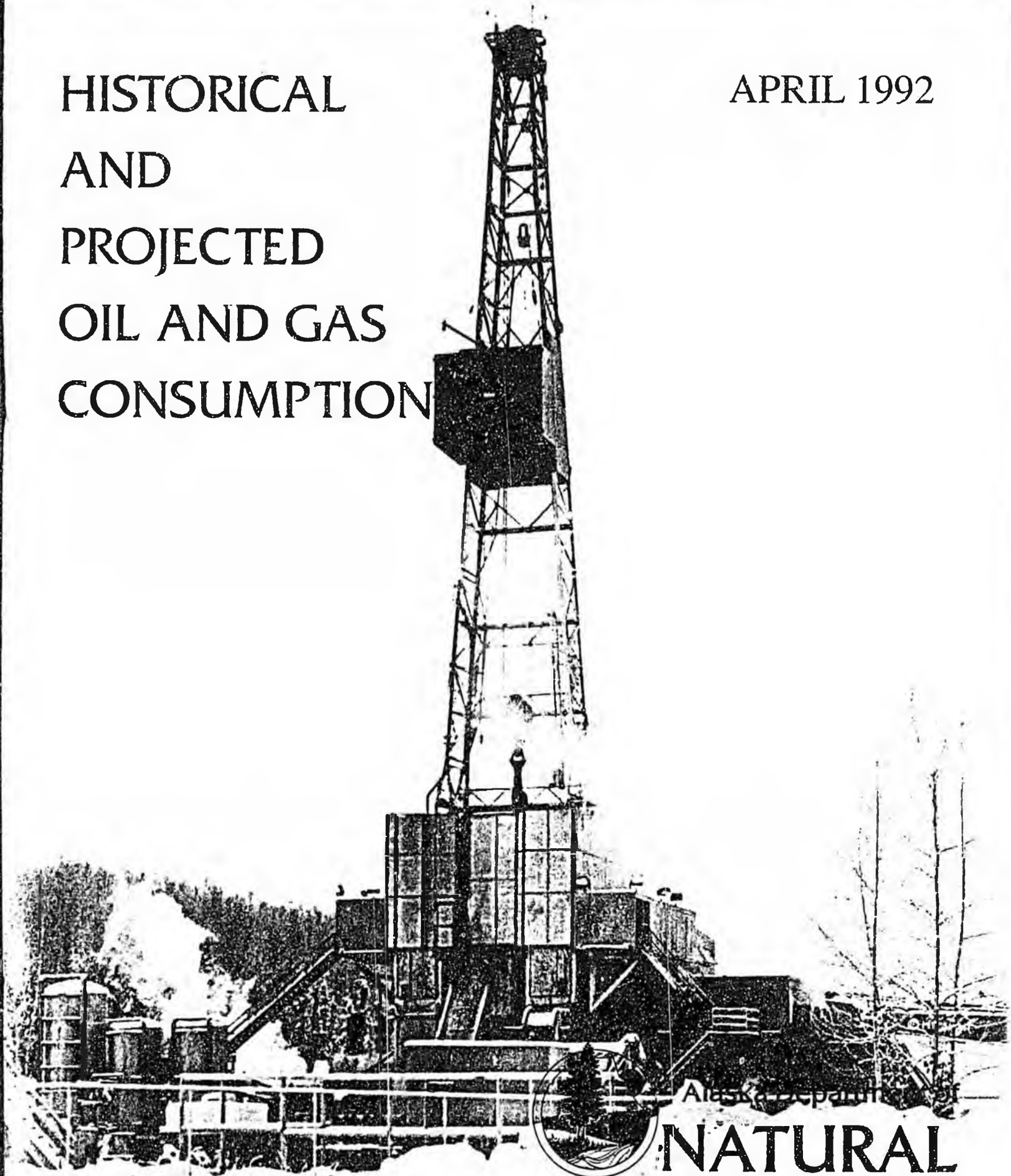


*Early snow in a southcentral Alaska forest.*

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# HISTORICAL AND PROJECTED OIL AND GAS CONSUMPTION

APRIL 1992



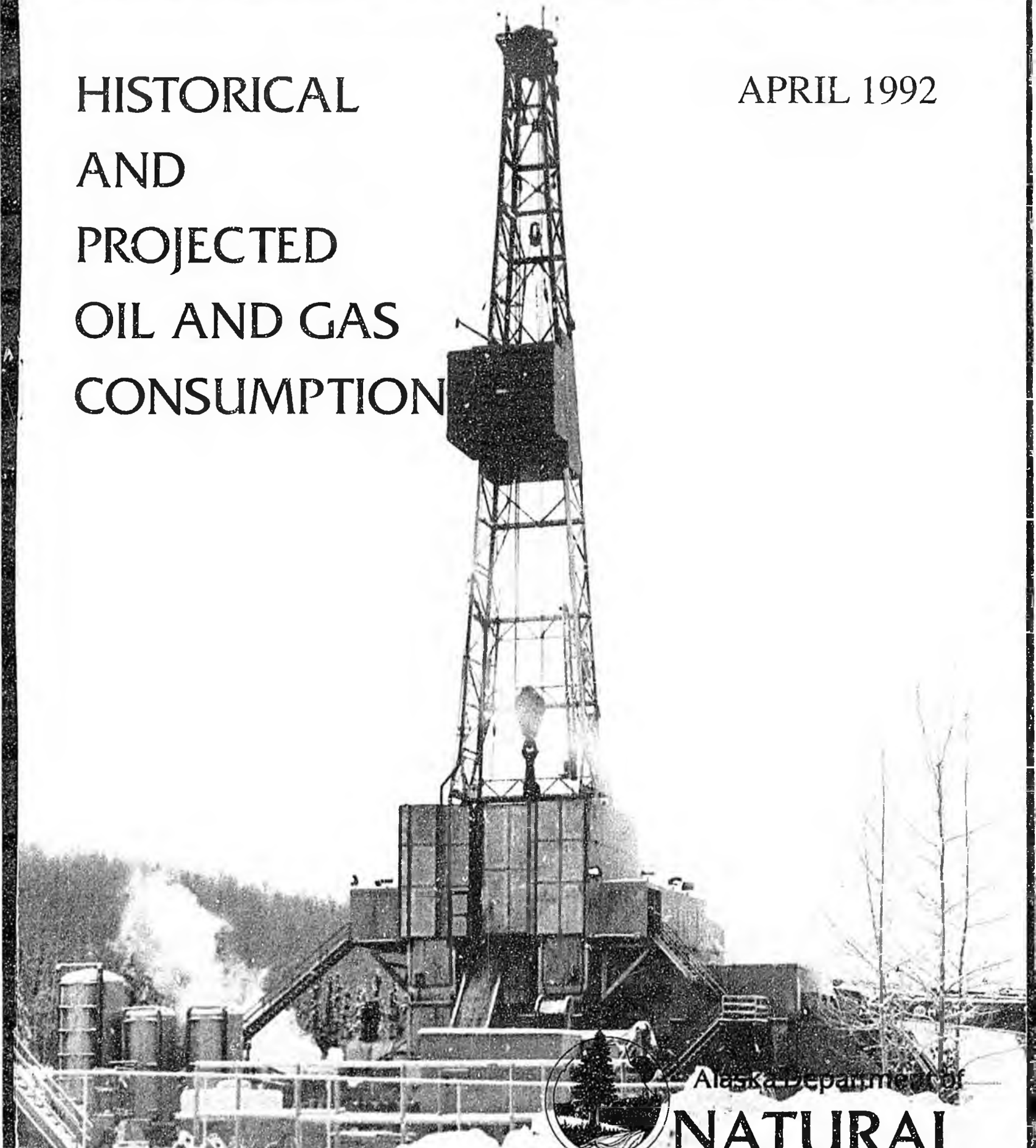
Alaska Department of

NATURAL RESOURCES

DIVISION OF OIL & GAS

# HISTORICAL AND PROJECTED OIL AND GAS CONSUMPTION

APRIL 1992



Alaska Department of

NATURAL RESOURCES

DIVISION OF OIL & GAS

Cover Photo: Arco BLT #1
Exploratory Well at Big Lake.
Alaska. Photo by Div. of
Oil & Gas Staff.

This publication was released by the Department of Natural Resources, Division of Oil and Gas. 1000 copies were produced at a cost of $1.88 per copy. The purpose of the publication is to inform the legislature and the public of the state's Historical and Projected Oil and Gas Consumption. This publication was printed in Anchorage.

STATE OF ALASKA

# HISTORICAL AND PROJECTED OIL AND GAS CONSUMPTION

Walter J. Hickel
Governor

Harold C. Heinze
Commissioner
Department of Natural Resources

April 1992

Prepared for the Second Session
Seventeenth Alaska Legislature

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# SECTION 1
# RESERVES OF OIL AND NATURAL GAS

## PROVEN RESERVES

Reserves is the volume of oil or gas that can be recovered from a reservoir under existing economic and operating conditions. A reserve estimate is a single volume which summarizes a range of scenarios: a low-range estimate assumes combinations of low prices and sub-standard reservoir performance, a mid-range estimate assumes stable prices and average reservoir performance, a high-range estimate assumes rising prices and better-than-predicted reservoir performance.

The Division of Oil and Gas (DO&G) estimates that Alaska's reserves are:

Oil: 7.0 billion barrels

Gas: 30.8 trillion cubic feet

North Slope fields hold 99% of the oil and 89% of the gas reserves. Reserves of Alaskan fields as of January 1, 1992 are listed on Table 1. DO&G Gas staff recalculated the reserves of the major fields this year. Estimates of the other fields were calculated in 1988 by the Alaska Oil and Gas Conservation Commission (AOGCC) and DO&G staff have subtracted subsequent production from these estimates to arrive at 1992 reserves.

## ROYALTY RESERVES

The state's royalty share of reserves are:

Oil: 891 million barrels

Gas: 3.7 trillion cubic feet.

Table 1 lists the royalty share of reserves by region and field. The division calculated the royalty reserves for each field by multiplying the fields reserves by the respective royalty rate.

# ESTIMATED REMAINING RESERVES AND ROYALTY SHARE, AS OF 1/1/92

TABLE 1

| | OIL (MILLIONS OF BARRELS) | | | | | | GAS (BILLIONS OF CUBIC FEET) | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | RESERVES | | | ROYALTY SHARE | | | RESERVES | | | ROYALTY SHARE | | |
| | LOW | MID | HIGH | LOW | MID | HIGH | LOW | MID | HIGH | LOW | MID | HIGH |
| **NORTH SLOPE** | | | | | | | | | | | | |
| **DEVELOPED** | | | | | | | | | | | | |
| East Barrow | -- | -- | -- | -- | -- | -- | 6 | 6 | 6 [1] | -- | -- | -- |
| Endicott | 194 | 252 | 282 [2] | 27 | 35 | 39 | 563 | 763 | 1,163 [2] | 79 | 107 | 163 |
| Kuparuk River | 823 | 1,058 | 1,173 [2] | 103 | 132 | 147 | 343 | 468 | 618 [2] | 43 | 59 | 77 |
| Lisburne | 70 | 90 | 100 [2] | 9 | 11 | 13 | 770 | 870 | 970 [2] | 96 | 109 | 121 |
| Milne Point | 67 | 97 | 117 [2] | 12 | 17 | 21 | -- | -- | -- | -- | -- | -- |
| Prudhoe Bay | 3,532 | 4,537 | 5,037 [2] | 442 | 567 | 630 | 25,479 | 25,479 | 25,479 [2][3] | 3,185 | 3,185 | 3,185 |
| South Barrow | -- | -- | -- | -- | -- | -- | 5 | 5 | 5 [1] | -- | -- | -- |
| **UNDEVELOPED** | | | | | | | | | | | | |
| Beaufort Sea | 0 | 180 | 300 [2] | 0 | 36 | 60 | -- | -- | -- | -- | -- | -- |
| Pt. Thomson/Flaxman Id | 0 | 0 | 200 [2] | 0 | 0 | 25 | 0 | 0 | 3,500 [2] | 0 | 0 | 438 |
| West Sak | 0 | 310 | 1,000 [2] | 0 | 39 | 125 | -- | -- | -- | -- | -- | -- |
| Niakuk/Alapah | 0 | 60 | 80 [2] | 0 | 8 | 10 | -- | -- | -- | -- | -- | -- |
| Point McIntyre | 220 | 300 | 400 [2] | 28 | 38 | 50 | -- | -- | -- | -- | -- | -- |
| TOTAL | 4,906 | 6,884 | 8,689 | 620 | 883 | 1,119 | 27,166 | 27,591 | 31,741 | 3,403 | 3,459 | 3,984 |
| **COOK INLET** | | | | | | | | | | | | |
| **PROVEN AND DEVELOPED** | | | | | | | | | | | | |
| Beaver Creek | | <1 [1] | | | 0 | | | 128 [1] | | | 0 | |
| Beluga River | | -- | | | -- | | | 615 [2] | | | 46 | |
| Cannery Loop | | -- | | | -- | | | 124 [2] | | | 5 | |
| Granite Point | | 12 [2] | | | 2 | | | 9 [1] | | | 1 | |
| Ivan River, Lewis River, | | -- | | | | | | | | | | |
| Pretty Creek, Stump Lake | | -- | | | -- | | | 490 [2] | | | 61 | |
| Kenai | | -- | | | -- | | | 508 [2] | | | 11 | |
| McArthur River | | 40 [2] | | | 5 | | | 477 [2] | | | 60 | |
| Middle Ground Shoal | | 15 [2] | | | 2 | | | <1 [1] | | | <1 | |
| North Cook Inlet | | -- | | | -- | | | 597 [2] | | | 75 | |
| Swanson River | | 4 [1] | | | 0 | | | 152 [1] | | | 0 | |
| Trading Bay | | 7 [2] | | | <1 | | | 27 [1] | | | 3 | |
| **PROVEN BUT UNDEVELOPED OR SHUT-IN** | | | | | | | | | | | | |
| Birch Hill | | -- | | | -- | | | 11 [1] | | | 0 | |
| Falls Creek | | -- | | | -- | | | 13 [1] | | | 2 | |
| Nicolai Creek | | -- | | | -- | | | 3 [1] | | | <1 | |
| North Fork | | -- | | | -- | | | 12 [1] | | | <1 | |
| Sterling | | -- | | | -- | | | 23 [1] | | | <1 | |
| West Foreland | | -- | | | -- | | | 20 [1] | | | 0 | |
| West Fork | | -- | | | -- | | | 6 [1] | | | <1 | |
| TOTAL | | 78 | | | 8 | | | 3,215 | | | 263 | |
| **STATE** | | | | | | | | | | | | |
| TOTAL | 4,984 | 6,962 | 8,767 | 628 | 891 | 1,128 | 30,381 | 30,806 | 34,956 | 3,666 | 3,722 | 4,247 |

[1] Alaska Oil and Gas Conservation Commission, "Estimate of Oil Reserves in Alaska" and "Estimate of Gas Reserves in Alaska". Estimates calculated as of 1/1/88, adjusted for subsequent production.
[2] William Van Dyke, Division of Oil and Gas.
[3] Not adjusted for future fuel use.
02/07/92

# SECTION 2
# PROJECTED PRODUCTION OF OIL

## NORTH SLOPE

North Slope production of oil and other liquid hydrocarbons peaked at an average of 2.0 million barrels per day in 1988. Since then, production has declined to an average of 1.8 million barrels per day in 1991, despite a slight increase during the Gulf War. DO&G estimates that the combined production of the five operating fields and five planned fields will decline to 1.6 million barrels per day in 1995, to 1.1 million barrels per day in 2000, and to 109 thousand barrels per day in 2016. Cumulative production during this period will be about 7.2 billion barrels. Projected production between 1992 and 2016 is shown in Table 2.1 and Fig. 2A.

## COOK INLET

Cook Inlet fields will continue to produce at least through the 1990s. DO&G projects the region's production for five years to 2000, a shorter span than for North Slope, because Cook Inlet production depends on economic factors which can not be reasonably estimated beyond five years. The projection does not include Swanson River and Beaver Creek fields, though they will continue producing oil and gas, because the state holds no leases in the fields.

Production will decline from 32 thousand barrels per day in 1992 to 14 thousand barrels per day in 2000. During this period the region will produce 72 million barrels.

## AVAILABLE ROYALTY OIL

The state's estimated total royalty share of production will decline from 220 thousand barrels per day in 1992, to 203 thousand barrels per day in 1995, to 137 thousand barrels per day in 2000, and to 14 thousand barrels per day in 2016. Between 1992 and 2016, North Slope royalty production will be 916 million barrels and Cook Inlets royalty production will be 9 million barrels, for a state total of 926 million barrels.

Table 2.1, Table 2.2, and Fig. 2B show how much royalty oil the state has contracted to sell in-kind and how much will be available to sell in-value for the next 25 years. The state sells all Cook Inlet oil in-value, whereas it sells North Slope royalty oil both in-value and in-kind. The two North Slope in-kind contracts commit a maximum of 191 million barrels, which leaves a minimum of 735 billion barrels available for in-value sales. The Tesoro contract expires in 1995 and the Mapco contract expires in 2003. The state is negotiating with Petrostar for an in-kind sale of 30,000 barrels per day of Kuparuk royalty oil. If the legislature approves the contracts, oil deliveries may begin in late 1992.

## PRODUCERS SHARE OF NORTH SLOPE PRODUCTION

Production projections from Table 2.1 for presently operating North Slope fields is repeated in Table 2.2 and the field production is then allocated to each of the field's producers.

# PRODUCTION FORECAST AND AVAILABLE ROYALTY OIL

THOUSANDS OF BARRELS PER DAY

| | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **PRODUCTION FORECAST [1]** | | | | | | | | | | | | | |
| NORTH SLOPE | | | | | | | | | | | | | |
| Prudhoe Bay | 1,260 | 1,190 | 1,110 | 1,110 | 1,020 | 912 | 830 | 755 | 687 | 625 | 526 | 474 | 426 |
| Kuparuk | 310 | 310 | 300 | 280 | 250 | 220 | 190 | 170 | 150 | 125 | 105 | 90 | 75 |
| Lisburne | 40 | 40 | 34 | 27 | 22 | 17 | 14 | 11 | 10 | 9 | 7 | 5 | - |
| Endicott [2] | 110 | 94 | 83 | 72 | 63 | 55 | 47 | 40 | 34 | 29 | 24 | 21 | 18 |
| Milne Point [3] | 19 | 17 | 16 | 16 | 17 | 18 | 19 | 20 | 20 | 18 | 16 | 14 | 13 |
| Prudhoe Bay Other | - | - | - | - | - | 10 | 10 | 10 | 10 | 8 | 6 | 5 | - |
| West Sak | - | - | - | 6 | 12 | 12 | 12 | 25 | 25 | 50 | 50 | 75 | 75 |
| Point McIntyre | - | 20 | 80 | 80 | 80 | 80 | 72 | 65 | 58 | 52 | 47 | 41 | 36 |
| Beaufort Sea | - | - | - | - | - | - | - | - | 60 | 54 | 49 | 44 | 39 |
| Niakuk/Alapah | - | - | - | 20 | 20 | 20 | 20 | 17 | 14 | 12 | 10 | 9 | 7 |
| TOTAL | 1,739 | 1,671 | 1,623 | 1,611 | 1,484 | 1,344 | 1,214 | 1,113 | 1,068 | 982 | 840 | 778 | 689 |
| COOK INLET [4] | | | | | | | | | | | | | |
| Granite Point | 5.1 | 4.6 | 4.1 | 3.7 | 3.3 | 3.0 | 2.7 | 2.4 | 2.2 | | | | |
| McArthur River | 17.5 | 15.8 | 14.2 | 12.8 | 11.5 | 10.3 | 9.3 | 8.4 | 7.5 | | | | |
| Trading Bay | 3.0 | 2.7 | 2.4 | 2.2 | 2.0 | 1.8 | 1.6 | 1.4 | 1.3 | | | | |
| Middle Ground Shoal | 6.6 | 5.9 | 5.3 | 4.8 | 4.3 | 3.9 | 3.5 | 3.2 | 2.8 | | | | |
| TOTAL | 32.2 | 29.0 | 26.1 | 23.5 | 21.1 | 19.0 | 17.1 | 15.4 | 13.9 | | | | |
| STATE | | | | | | | | | | | | | |
| TOTAL | 1,771 | 1,700 | 1,649 | 1,634 | 1,505 | 1,363 | 1,231 | 1,128 | 1,082 | 982 | 840 | 778 | 689 |
| **AVAILABLE ROYALTY OIL** | | | | | | | | | | | | | |
| NORTH SLOPE | | | | | | | | | | | | | |
| Prudhoe Bay [5] | 158 | 149 | 139 | 139 | 128 | 114 | 104 | 94 | 86 | 78 | 66 | 59 | 53 |
| Kuparuk [5] | 39 | 39 | 38 | 35 | 31 | 28 | 24 | 21 | 19 | 16 | 13 | 11 | 9 |
| Lisburne [5] | 5 | 5 | 4 | 3 | 3 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | - |
| Endicott [2] [6] | 15 | 13 | 12 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 3 | 3 |
| Milne Point [3] [7] | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 2 | 2 |
| Prudhoe Bay Other [5] | - | - | - | - | - | 1 | 1 | 1 | 1 | 1 | 1 | 1 | - |
| West Sak [5] | - | - | - | 1 | 2 | 2 | 2 | 3 | 3 | 6 | 6 | 9 | 9 |
| Point McIntyre [5] | - | - | 10 | 10 | 10 | 10 | 9 | 8 | 7 | 7 | 6 | 5 | 5 |
| Beaufort Sea [8] | - | - | - | - | - | - | - | - | 10 | 9 | 8 | 7 | 6 |
| Niakuk/Alapah [5] | - | - | - | 3 | 3 | 3 | 3 | 2 | 2 | 2 | 1 | 1 | 1 |
| TOTAL | 220 | 209 | 205 | 203 | 187 | 170 | 153 | 141 | 137 | 126 | 108 | 100 | 88 |
| COOK INLET [4][5] | | | | | | | | | | | | | |
| Granite Point | 0.6 | 0.6 | 0.5 | 0.5 | 0.4 | 0.4 | 0.3 | 0.3 | 0.3 | | | | |
| McArthur River | 2.2 | 2.0 | 1.8 | 1.6 | 1.4 | 1.3 | 1.2 | 1.0 | 0.9 | | | | |
| Trading Bay | 0.4 | 0.3 | 0.3 | 0.3 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | | | | |
| Middle Ground Shoal | 0.8 | 0.7 | 0.7 | 0.6 | 0.5 | 0.5 | 0.4 | 0.4 | 0.4 | | | | |
| TOTAL | 4.0 | 3.6 | 3.3 | 2.9 | 2.6 | 2.4 | 2.1 | 1.9 | 1.7 | | | | |
| STATE | | | | | | | | | | | | | |
| TOTAL | 224 | 212 | 208 | 206 | 190 | 172 | 155 | 143 | 139 | 126 | 108 | 100 | 88 |
| **IN-KIND ROYALTY OIL SALES** | | | | | | | | | | | | | |
| Mapco [9] | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | |
| Tesoro [10] | 38 | 34 | 30 | | | | | | | | | | |
| TOTAL | 73 | 69 | 65 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | |
| **IN-VALUE ROYALTY OIL** | | | | | | | | | | | | | |
| TOTAL | 151 | 144 | 143 | 171 | 155 | 137 | 120 | 108 | 104 | 91 | 73 | 65 | 88 |

Note: numbers may not sum to totals due to rounding errors.
[1] Includes oil, condensate, and NGL.
[2] Includes Sag Delta North.
[3] Includes Schrader Bluff.
[4] Projection is not extended beyond 2000 because production is very sensitive to short term economics.
[5] 12.5% of production.
[6] 14.0% of production (weighted average).
[7] 18.0% of production (weighted average).
[8] Calculated as 16% of production. Royalty rate is 20% but state controlls only 80% of production.
[9] 35,000 BPD of Prudhoe royalty production.
[10] Maximum 24.533% of Prudhoe Bay royalty production. Contract expires January 1995.
02/03/92

# TABLE 2.1

| | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | TOTAL (MBbl) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **PRODUCTION FORECAST [1]** | | | | | | | | | | | | | |
| NORTH SLOPE | | | | | | | | | | | | | |
| Prudhoe Bay | 383 | 345 | 293 | 249 | 212 | 180 | 153 | 130 | 110 | 94 | 80 | 68 | 4,826,030 |
| Kuparuk | 65 | 55 | 45 | 35 | 30 | 25 | 20 | 20 | 15 | 15 | 10 | 10 | 1,065,800 |
| Lisburne | - | - | - | - | - | - | - | - | - | - | - | - | 86,140 |
| Endicott [2] | 16 | - | - | - | - | - | - | - | - | - | - | - | 257,690 |
| Milne Point [3] | 12 | 10 | 8 | 6 | 5 | - | - | - | - | - | - | - | 96,360 |
| Prudhoe Bay Other | - | - | - | - | - | - | - | - | - | - | - | - | 21,535 |
| West Sak | 75 | 67 | 61 | 55 | 50 | 42 | 35 | 30 | 26 | 22 | 18 | 16 | 306,235 |
| Point McIntyre | 30 | 26 | 22 | 19 | 16 | 14 | 12 | 10 | 8 | 7 | 6 | 5 | 323,390 |
| Beaufort Sea | 35 | 32 | 29 | 26 | 23 | 21 | 19 | 17 | 15 | 14 | 12 | 10 | 182,135 |
| Niakuk/Alapah | 6 | 5 | 5 | - | - | - | - | - | - | - | - | - | 60,225 |
| TOTAL | 622 | 540 | 463 | 390 | 336 | 282 | 239 | 207 | 174 | 152 | 126 | 109 | 7,225,540 |
| COOK INLET [4] | | | | | | | | | | | | | |
| Granite Point | | | | | | | | | | | | | 11,403 |
| McArthur River | | | | | | | | | | | | | 39,129 |
| Trading Bay | | | | | | | | | | | | | 6,708 |
| Middle Ground Shoal | | | | | | | | | | | | | 14,757 |
| TOTAL | | | | | | | | | | | | | 71,996 |
| STATE | | | | | | | | | | | | | |
| TOTAL | 622 | 540 | 463 | 390 | 336 | 282 | 239 | 207 | 174 | 152 | 126 | 109 | 7,297,536 |
| **AVAILABLE ROYALTY OIL** | | | | | | | | | | | | | |
| NORTH SLOPE | | | | | | | | | | | | | |
| Prudhoe Bay [5] | 48 | 43 | 37 | 31 | 27 | 23 | 19 | 16 | 14 | 12 | 10 | 9 | 603,254 |
| Kuparuk [5] | 8 | 7 | 6 | 4 | 4 | 3 | 3 | 3 | 2 | 2 | 1 | 1 | 133,225 |
| Lisburne [5] | - | - | - | - | - | - | - | - | - | - | - | - | 10,768 |
| Endicott [2] [6] | 2 | - | - | - | - | - | - | - | - | - | - | - | 36,0.7 |
| Milne Point [3] [7] | 2 | 2 | 1 | 1 | 1 | - | - | - | - | - | - | - | 16,381 |
| Prudhoe Bay Other [5] | - | - | - | - | - | - | - | - | - | - | - | - | 2,692 |
| West Sak [5] | 9 | 8 | 8 | 7 | 6 | 5 | 4 | 4 | 3 | 3 | 2 | 2 | 38,279 |
| Point McIntyre [5] | 4 | 3 | 3 | 2 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 39,511 |
| Beaufort Sea [8] | 6 | 5 | 5 | 4 | 4 | 3 | 3 | 3 | 2 | 2 | 2 | 2 | 29,142 |
| Niakuk/Alapah [5] | 1 | 1 | 1 | - | - | - | - | - | - | - | - | - | 7,528 |
| TOTAL | 80 | 69 | 59 | 50 | 43 | 36 | 31 | 26 | 22 | 19 | 16 | 14 | 916,856 |
| COOK INLET [4][5] | | | | | | | | | | | | | |
| Granite Point | | | | | | | | | | | | | 1,425 |
| McArthur River | | | | | | | | | | | | | 4,891 |
| Trading Bay | | | | | | | | | | | | | 838 |
| Middle Ground Shoal | | | | | | | | | | | | | 1,845 |
| TOTAL | | | | | | | | | | | | | 9,000 |
| STATE | | | | | | | | | | | | | |
| TOTAL | 80 | 69 | 59 | 50 | 43 | 36 | 31 | 26 | 22 | 19 | 16 | 14 | 925,856 |
| **IN-KIND ROYALTY OIL SALES** | | | | | | | | | | | | | |
| Mapco [9] | | | | | | | | | | | | | 153,300 |
| Tesoro [10] | | | | | | | | | | | | | 37,284 |
| TOTAL | | | | | | | | | | | | | 190,584 |
| **IN-VALUE ROYALTY OIL** | | | | | | | | | | | | | |
| TOTAL | 80 | 69 | 59 | 50 | 43 | 36 | 31 | 26 | 22 | 19 | 16 | 14 | 735,271 |

# PRODUCTION FORECAST AND AVAILABLE ROYALTY OIL FOR PRODUCING NORTH SLOPE FIELDS

THOUSANDS OF BARRELS PER DAY

| | Working Interest | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **PRODUCTION FORECAST FOR NORTH SLOPE [1]** | | | | | | | | | | | | | | |
| Prudhoe Bay [2] | | 1,260 | 1,190 | 1,110 | 1,110 | 1,020 | 912 | 830 | 755 | 687 | 625 | 526 | 474 | 426 |
| Amerada | 0.54% | 7 | 6 | 6 | 6 | 5 | 5 | 4 | 4 | 4 | 3 | 3 | 3 | 2 |
| Arco | 21.78% | 274 | 259 | 242 | 242 | 222 | 199 | 181 | 164 | 150 | 136 | 115 | 103 | 93 |
| BP | 50.68% | 639 | 603 | 563 | 563 | 517 | 462 | 421 | 383 | 348 | 317 | 267 | 240 | 216 |
| Chevron | 0.67% | 8 | 8 | 7 | 7 | 7 | 6 | 6 | 5 | 5 | 4 | 4 | 3 | 3 |
| Exxon | 21.78% | 274 | 259 | 242 | 242 | 222 | 199 | 181 | 164 | 150 | 136 | 115 | 103 | 93 |
| LL&E | 0.04% | 1 | - | - | - | - | - | - | - | - | - | - | - | - |
| Marathon | 0.05% | 1 | 1 | 1 | 1 | - | - | - | - | - | - | - | - | - |
| Mobil | 1.89% | 24 | 23 | 21 | 21 | 19 | 17 | 16 | 14 | 13 | 12 | 10 | 9 | 8 |
| Phillips | 1.88% | 24 | 22 | 21 | 21 | 19 | 17 | 16 | 14 | 13 | 12 | 10 | 9 | 8 |
| Shell | 0.14% | 2 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Texaco | 0.55% | 7 | 7 | 6 | 6 | 6 | 5 | 5 | 4 | 4 | 3 | 3 | 3 | 2 |
| Kuparuk | | 310 | 310 | 300 | 280 | 250 | 220 | 190 | 170 | 150 | 125 | 105 | 90 | 75 |
| Arco | 56.30% | 175 | 175 | 169 | 158 | 141 | 124 | 107 | 96 | 84 | 70 | 59 | 51 | 42 |
| BP | 38.76% | 120 | 120 | 116 | 109 | 97 | 85 | 74 | 66 | 58 | 48 | 41 | 35 | 29 |
| Chevron | 0.11% | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Exxon | 0.22% | 1 | 1 | 1 | 1 | 1 | - | - | - | - | - | - | - | - |
| Mobil | 0.37% | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | - | - | - | - |
| Union | 4.25% | 13 | 13 | 13 | 12 | 11 | 9 | 8 | 7 | 6 | 5 | 4 | 4 | 3 |
| Lisburne | | 40 | 40 | 34 | 27 | 22 | 17 | 14 | 11 | 10 | 9 | 7 | 5 | - |
| Arco | 40.00% | 16 | 16 | 14 | 11 | 9 | 7 | 6 | 4 | 4 | 4 | 3 | 2 | - |
| BP | 20.00% | 8 | 8 | 7 | 5 | 4 | 3 | 3 | 2 | 2 | 2 | 1 | 1 | - |
| Exxon | 40.00% | 16 | 16 | 14 | 11 | 9 | 7 | 6 | 4 | 4 | 4 | 3 | 2 | - |
| Endicott [3] | | 110 | 94 | 83 | 72 | 63 | 55 | 47 | 40 | 34 | 29 | 24 | 21 | 18 |
| Amoco | 10.49% | 12 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 4 | 3 | 3 | 2 | 2 |
| Arco | 0.02% | - | - | - | - | - | - | - | - | - | - | - | - | - |
| BP | 56.78% | 62 | 53 | 47 | 41 | 36 | 31 | 27 | 23 | 19 | 16 | 14 | 12 | 10 |
| CIRI | 0.65% | 1 | 1 | 1 | - | - | - | - | - | - | - | - | - | - |
| Doyon | 0.13% | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Exxon | 21.02% | 23 | 20 | 17 | 15 | 13 | 12 | 10 | 8 | 7 | 6 | 5 | 4 | 4 |
| NANA | 0.39% | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Unocal | 10.52% | 12 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 4 | 3 | 3 | 2 | 2 |
| Milne Point [4] | | 19 | 17 | 16 | 16 | 17 | 18 | 19 | 20 | 20 | 18 | 16 | 14 | 13 |
| Chevron | 17.37% | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 2 | 2 |
| Conoco | 72.15% | 14 | 12 | 12 | 12 | 12 | 13 | 14 | 14 | 14 | 13 | 12 | 10 | 9 |
| Oxy | 10.48% | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 1 | 1 |
| TOTAL | | 1,739 | 1,651 | 1,543 | 1,505 | 1,372 | 1,222 | 1,100 | 996 | 901 | 806 | 678 | 604 | 532 |
| **AVAILABLE ROYALTY OIL** | | | | | | | | | | | | | | |
| Prudhoe Bay [5] | | 158 | 149 | 139 | 139 | 128 | 114 | 104 | 94 | 86 | 78 | 66 | 59 | 53 |
| Kuparuk [5] | | 39 | 39 | 38 | 35 | 31 | 28 | 24 | 21 | 19 | 16 | 13 | 11 | 9 |
| Lisburne [5] | | 5 | 5 | 4 | 3 | 3 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | - |
| Endicott [3][6] | | 15 | 13 | 12 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 3 | 3 |
| Milne Point [4][7] | | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 4 | 4 | 3 | 3 | 3 | 2 |
| TOTAL | | 220 | 209 | 195 | 190 | 173 | 155 | 139 | 126 | 114 | 102 | 86 | 77 | 67 |
| **IN-KIND ROYALTY OIL SALES** | | | | | | | | | | | | | | |
| Mapco [8] | | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 |
| Tesoro [9] | | 39 | 36 | 34 | 34 | | | | | | | | | |
| TOTAL | | 74 | 71 | 69 | 69 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 |
| **IN-VALUE ROYALTY OIL** | | | | | | | | | | | | | | |
| TOTAL | | 146 | 137 | 126 | 121 | 138 | 120 | 104 | 91 | 79 | 67 | 51 | 42 | 32 |

Note: numbers may not sum to totals due to rounding errors.
[1] Oil, condensate, and NGL.
[2] Oil Rim %.
[3] Does not include Sag Delta North.
[4] Does not include Schrader Bluff.
[5] 12.5% of production.
[6] 14.0% of production (weighted average).
[7] 18.0% of production (weighted average).
[8] 35,000 BPD of Prudhoe royalty production.
[9] Maximum 24.533% of Prudhoe Bay royalty production. Contract expires January 1995.
02/03/92

# TABLE 2.2

| | | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | TOTAL (MBbl) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **PRODUCTION FORECAST FOR NORTH SLOPE [1]** | | | | | | | | | | | | | | |
| Prudhoe Bay [2] | | 383 | 345 | 293 | 249 | 212 | 180 | 153 | 130 | 110 | 94 | 80 | 68 | 4,826,030 |
| Amerada | 0.54% | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | - | - | 25,672 |
| Arco | 21.78% | 83 | 75 | 64 | 54 | 46 | 39 | 33 | 28 | 24 | 20 | 17 | 15 | 1,051,187 |
| BP | 50.68% | 194 | 175 | 149 | 126 | 107 | 91 | 78 | 66 | 56 | 48 | 41 | 34 | 2,446,250 |
| Chevron | 0.67% | 3 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | - | 32,256 |
| Exxon | 21.78% | 83 | 75 | 64 | 54 | 46 | 39 | 33 | 28 | 24 | 20 | 17 | 15 | 1,051,075 |
| LL&E | 0.04% | - | - | - | - | - | - | - | - | - | - | - | - | 183 |
| Marathon | 0.05% | - | - | - | - | - | - | - | - | - | - | - | - | 851 |
| Mobil | 1.89% | 7 | 7 | 6 | 5 | 4 | 3 | 3 | 2 | 2 | 2 | 2 | 1 | 91,295 |
| Phillips | 1.88% | 7 | 6 | 6 | 5 | 4 | 3 | 3 | 2 | 2 | 2 | 2 | 1 | 90,760 |
| Shell | 0.14% | 1 | - | - | - | - | - | - | - | - | - | - | - | 5,683 |
| Texaco | 0.55% | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | - | - | 26,173 |
| Kuparuk | | 65 | 55 | 45 | 35 | 30 | 25 | 20 | 20 | 15 | 15 | 10 | 10 | 1,065,800 |
| Arco | 56.30% | 37 | 31 | 25 | 20 | 17 | 14 | 11 | 11 | 8 | 8 | 6 | 6 | 600,261 |
| BP | 38.76% | 25 | 21 | 17 | 14 | 12 | 10 | 8 | 8 | 6 | 6 | 4 | 4 | 413,207 |
| Chevron | 0.11% | - | - | - | - | - | - | - | - | - | - | - | - | 0 |
| Exxon | 0.22% | - | - | - | - | - | - | - | - | - | - | - | - | 1,155 |
| Mobil | 0.37% | - | - | - | - | - | - | - | - | - | - | - | - | 2,914 |
| Union | 4.25% | 3 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | - | - | 44,998 |
| Lisburne | | - | - | - | - | - | - | - | - | - | - | - | - | 86,140 |
| Arco | 40.00% | - | - | - | - | - | - | - | - | - | - | - | - | 34,602 |
| BP | 20.00% | - | - | - | - | - | - | - | - | - | - | - | - | 17,301 |
| Exxon | 40.00% | - | - | - | - | - | - | - | - | - | - | - | - | 34,602 |
| Endicott [3] | | 16 | - | - | - | - | - | - | - | - | - | - | - | 257,690 |
| Amoco | 10.49% | 2 | - | - | - | - | - | - | - | - | - | - | - | 27,080 |
| Arco | 0.02% | - | - | - | - | - | - | - | - | - | - | - | - | 0 |
| BP | 56.78% | 9 | - | - | - | - | - | - | - | - | - | - | - | 146,530 |
| CIRI | 0.65% | - | - | - | - | - | - | - | - | - | - | - | - | 679 |
| Doyon | 0.13% | - | - | - | - | - | - | - | - | - | - | - | - | 0 |
| Exxon | 21.02% | 3 | - | - | - | - | - | - | - | - | - | - | - | 54,245 |
| NANA | 0.39% | - | - | - | - | - | - | - | - | - | - | - | - | 1 |
| Unocal | 10.52% | 2 | - | - | - | - | - | - | - | - | - | - | - | 27,141 |
| Milne Point [4] | | 12 | 10 | 8 | 6 | 5 | - | - | - | - | - | - | - | 96,360 |
| Chevron | 17.37% | 2 | 2 | 1 | 1 | 1 | - | - | - | - | - | - | - | 16,805 |
| Conoco | 72.15% | 9 | 7 | 6 | 4 | 4 | - | - | - | - | - | - | - | 69,786 |
| Oxy | 10.48% | 1 | 1 | 1 | 1 | 1 | - | - | - | - | - | - | - | 10,134 |
| TOTAL | | 476 | 410 | 346 | 290 | 247 | 205 | 173 | 150 | 125 | 109 | 90 | 78 | 6,332,020 |
| **AVAILABLE ROYALTY OIL** | | | | | | | | | | | | | | |
| Prudhoe Bay [5] | | 48 | 43 | 37 | 31 | 27 | 23 | 19 | 16 | 14 | 12 | 10 | 9 | 603,254 |
| Kuparuk [5] | | 8 | 7 | 6 | 4 | 4 | 3 | 3 | 3 | 2 | 2 | 1 | 1 | 133,225 |
| Lisburne [5] | | - | - | - | - | - | - | - | - | - | - | - | - | 10,768 |
| Endicott [3][6] | | 2 | - | - | - | - | - | - | - | - | - | - | - | 36,077 |
| Milne Point [4][7] | | 2 | 2 | 1 | 1 | 1 | - | - | - | - | - | - | - | 17,345 |
| TOTAL | | 60 | 52 | 44 | 37 | 31 | 26 | 22 | 19 | 16 | 14 | 11 | 10 | 800,668 |
| **IN-KIND ROYALTY OIL SALES** | | | | | | | | | | | | | | |
| Mapco [8] | | | | | | | | | | | | | | 166,075 |
| Tesoro [9] | | | | | | | | | | | | | | 52,272 |
| TOTAL | | | | | | | | | | | | | | 218,347 |
| **IN-VALUE ROYALTY OIL** | | | | | | | | | | | | | | |
| TOTAL | | 60 | 52 | 44 | 37 | 31 | 26 | 22 | 19 | 16 | 14 | 11 | 10 | 582,320 |

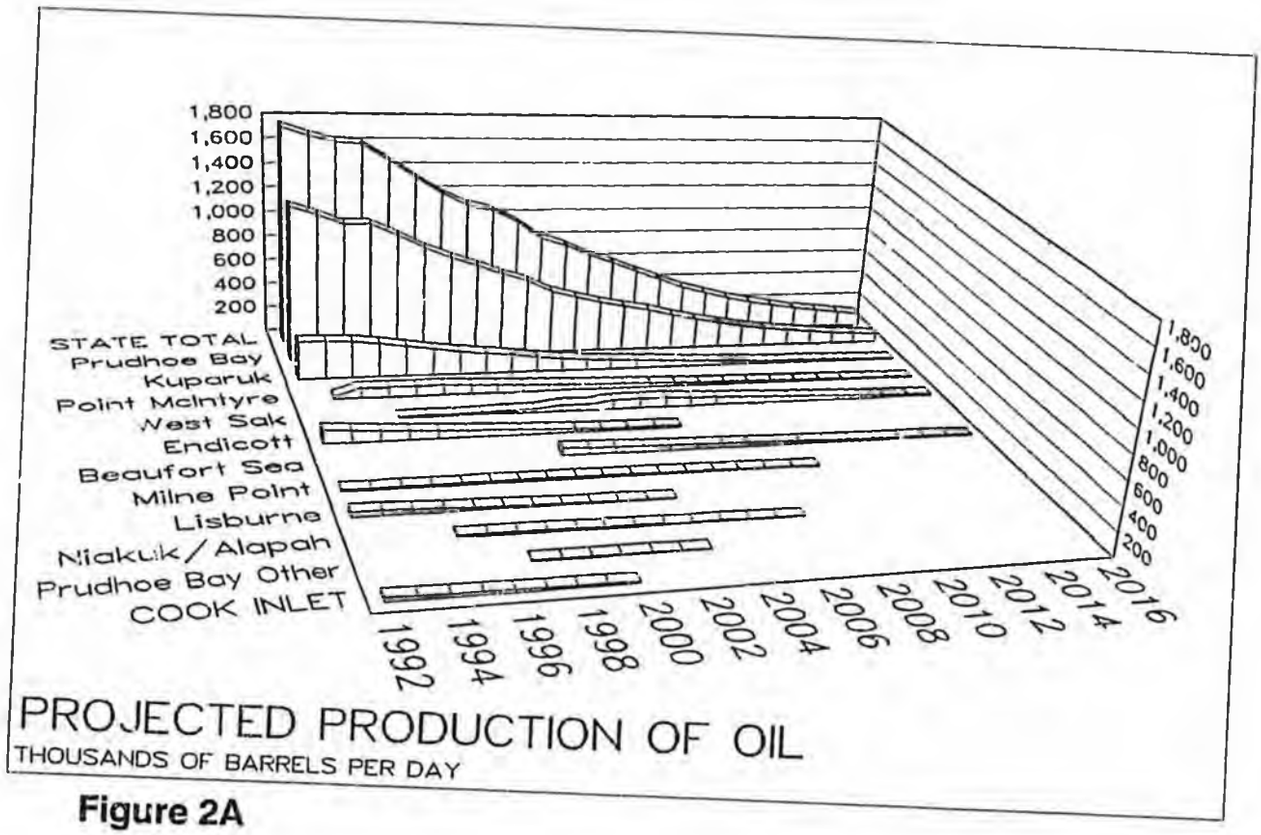



**Figure 2A**

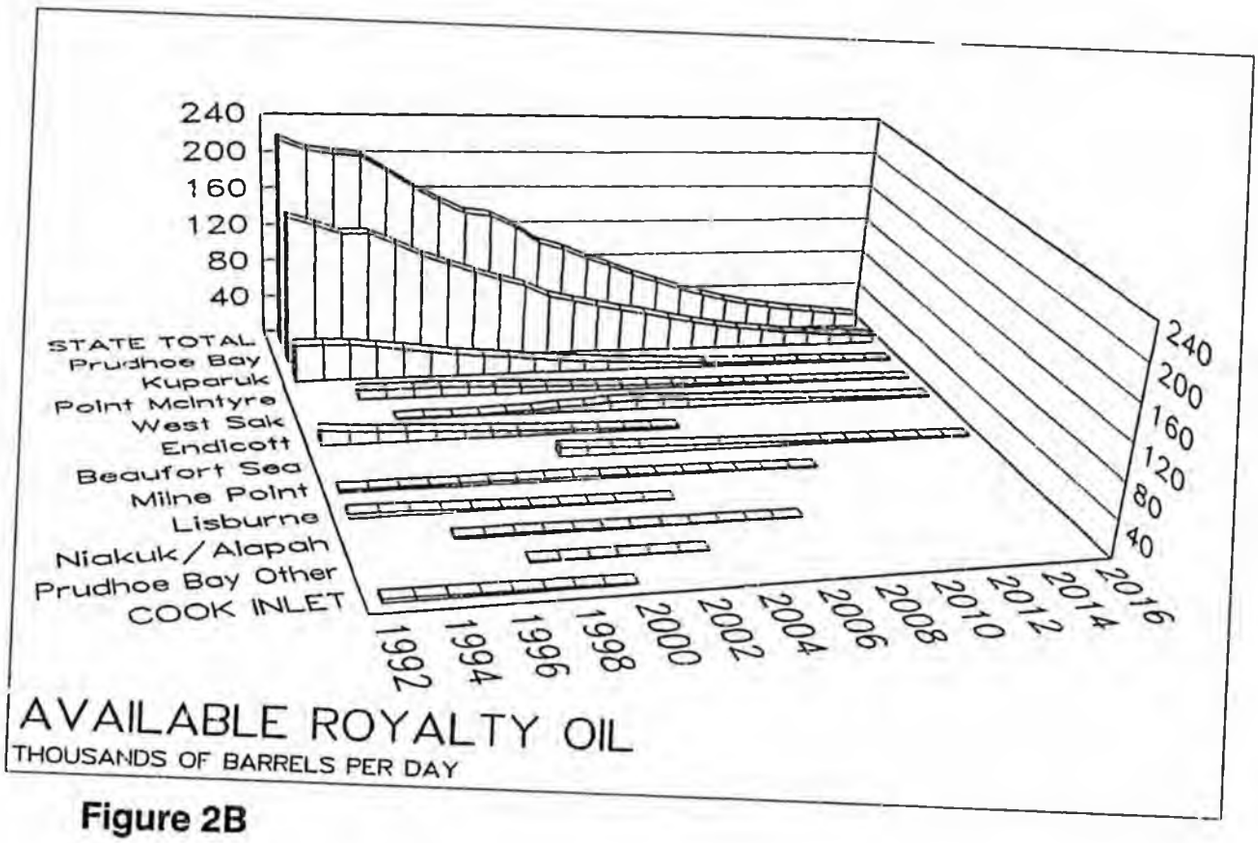



**Figure 2B**

# SECTION 3
# HISTORICAL PRODUCTION OF OIL

Alaska produces oil from two regions, Cook Inlet and North Slope. Katalla field on the Gulf of Alaska southeast of Cordova did produce a total of 154,000 barrels of oil, but the on-site refinery burned in 1933 and was not replaced. Fig. 3B list the annual production from the fields in each region.

## NORTH SLOPE

North Slope oil production began from Prudhoe Bay field. during development of the field, between 1969 and 1977, small amounts of oil and gas were produced. Some of this was used for on-site fuel and the rest was injected. Commercial production began in 1977 when the TAPS line was completed. North Slope production peaked at an average of 744 million barrels per year in 1988 and declined to 654 million barrels in 1990. The Gulf War in January 1991 boosted that year's production to 665 millon barrels but daily production has since fallen below pre-war levels.

## COOK INLET

Cook Inlet production began at Swanson River field in 1959, peaked in 1970 at 83 million barrels per year and subsequently declined to 15.4 million barrels in 1991. By the end of 1991 Cook Inlet fields had produced 1.1 billion barrels of oil.

The Table 3 data in this year's report are significantly revised from last year's. First, the historical data now extends back to the start-up of Swanson River field in 1958, and the beginning of Alaska's oil industry. Second, production figures now incorporate all the data revisions which producers have submitted to AOGCC through February 1992.

# HISTORICAL OIL PRODUCTION

MILLIONS OF BARRELS PER YEAR

| | Type* | 1958 | 1959 | 1960 | 1961 | 1962 | 1963 | 1964 | 1965 | 1966 |
|---|---|---|---|---|---|---|---|---|---|---|
| NORTH SLOPE | | | | | | | | | | |
| Endicott | oil | - | - | - | - | - | - | - | - | - |
| | NGL | - | - | - | - | - | - | - | - | - |
| | inj | - | - | - | - | - | - | - | - | - |
| Kuparuk River | oil | - | - | - | - | - | - | - | - | - |
| | NGL | - | - | - | - | - | - | - | - | - |
| Lisburne | oil | - | - | - | - | - | - | - | - | - |
| | NGL | - | - | - | - | - | - | - | - | - |
| Milne Point | oil | - | - | - | - | - | - | - | - | - |
| Prudhoe Bay | oil[1] | - | - | - | - | - | - | - | - | - |
| | NGL | - | - | - | - | - | - | - | - | - |
| | inj | - | - | - | - | - | - | - | - | - |
| Sag Delta | oil | - | - | - | - | - | - | - | - | - |
| | NGL | - | - | - | - | - | - | - | - | - |
| Schrader Bluff | oil | - | - | - | - | - | - | - | - | - |
| West Sak | oil | - | - | - | - | - | - | - | - | - |
| TOTAL | oil[1] | - | - | - | - | - | - | - | - | - |
| | NGL | - | - | - | - | - | - | - | - | - |
| | liq | - | - | - | - | - | - | - | - | - |
| COOK INLET | | | | | | | | | | |
| Beaver Creek | oil | - | - | - | - | - | - | - | - | - |
| Granite Point | oil | - | - | - | - | - | - | - | 0.002 | - |
| Kenai | NGL | - | - | - | - | - | - | - | - | - |
| McArthur River | oil | - | - | - | - | - | - | - | 0.001 | 0.003 |
| | NGL | - | - | - | - | - | - | - | - | - |
| Middle Ground Shoal | oil | - | - | - | - | - | - | - | 0.027 | 2.649 |
| Redoubt Shoal | oil | - | - | - | - | - | - | - | - | - |
| Swanson River | oil | 0.036 | 0.187 | 0.558 | 6.327 | 10.259 | 10.740 | 11.054 | 11.099 | 11.712 |
| | NGL | - | - | - | - | - | - | - | - | - |
| Trading Bay | oil | - | - | - | - | - | - | - | - | - |
| | NGL | - | - | - | - | - | - | - | - | - |
| TOTAL | oil[1] | 0.036 | 0.187 | 0.558 | 6.327 | 10.259 | 10.740 | 11.054 | 11.131 | 14.364 |
| | NGL | - | - | - | - | - | - | - | - | - |
| | liq | 0.036 | 0.187 | 0.558 | 6.327 | 10.259 | 10.740 | 11.054 | 11.131 | 14.364 |
| STATE | | | | | | | | | | |
| TOTAL | oil[1] | 0.036 | 0.187 | 0.558 | 6.327 | 10.259 | 10.740 | 11.054 | 11.131 | 14.364 |
| | NGL | - | - | - | - | - | - | - | - | - |
| | liq | 0.036 | 0.187 | 0.558 | 6.327 | 10.259 | 10.740 | 11.054 | 11.131 | 14.364 |
| TAPS FLOW [2] | | | | | | | | | | |
| Throughput at PS #1 | | - | - | - | - | - | - | - | - | - |
| Liftings at Valdez | | - | - | - | - | - | - | - | - | - |

* oil = crude oil, NGL = natural gas liquids, inj = injected, Liq = liquids (oil + NGL)
Source: Alaska Oil and Gas Conservation Commission (OGCC), "Alaska Production Summary by Field and Pool", monthly repor..
[1] Includes condensates.
[2] 1977–81: Alaska Oil and Gas Conservation Commission, "Statistical Report."
1982–91: Alyeska Pipeline Service Co.
02/08/92

# TABLE 3

| | | 1967 | 1968 | 1969 | 1970 | 1971 | 1972 | 1973 | 1974 | 1975 |
|---|---|---|---|---|---|---|---|---|---|---|
| NORTH SLOPE | | | | | | | | | | |
| Endicott | oil | - | - | - | - | - | - | - | - | - |
| | NGL | - | - | - | - | - | - | - | - | - |
| | inj | - | - | - | - | - | - | - | - | - |
| Kuparuk River | oil | - | - | - | - | - | - | - | - | - |
| | NGL | - | - | - | - | - | - | - | - | - |
| Lisburne | oil | - | - | - | - | - | - | - | - | - |
| | NGL | - | - | - | - | - | - | - | - | - |
| Milne Point | oil | - | - | - | - | - | - | - | - | - |
| Prudhoe Bay | oil[1] | - | - | 0.277 | 1.193 | 1.157 | 0.922 | 0.944 | 2.170 | 2.870 |
| | NGL | - | - | - | - | - | - | - | - | - |
| | inj | - | - | 0.217 | 0.879 | 0.833 | 0.792 | 0.817 | 1.640 | 2.147 |
| Sag Delta | oil | - | - | - | - | - | - | - | - | - |
| | NGL | - | - | - | - | - | - | - | - | - |
| Schrader Bluff | oil | - | - | - | - | - | - | - | - | - |
| West Sak | oil | - | - | - | - | - | - | - | - | - |
| TOTAL | oil[1] | - | - | 0.060 | 0.320 | 0.323 | 0.130 | 0.127 | 0.529 | 0.722 |
| | NGL | - | - | - | - | - | - | - | - | - |
| | liq | - | - | 0.060 | 0.320 | 0.323 | 0.130 | 0.127 | 0.529 | 0.722 |
| COOK INLET | | | | | | | | | | |
| Beaver Creek | oil | - | - | - | - | - | 0.002 | 0.416 | 0.375 | 0.322 |
| Granite Point | oil | 7.052 | 13.131 | 9.183 | 7.522 | 5.577 | 4.663 | 4.767 | 4.237 | 4.361 |
| Kenai | NGL | - | - | 0.002 | 0.002 | 0.001 | 0.002 | 0.001 | <.001 | 0.001 |
| McArthur River | oil | 0.749 | 21.782 | 31.301 | 40.165 | 40.537 | 40.774 | 38.884 | 39.145 | 40.876 |
| | NGL | - | - | - | 0.426 | 0.593 | 0.570 | 0.661 | 0.654 | 0.644 |
| Middle Ground Shoal | oil | 7.404 | 14.134 | 10.467 | 12.719 | 11.304 | 9.720 | 10.239 | 9.001 | 8.670 |
| Redoubt Shoal | oil | - | 0.002 | - | - | - | - | - | - | - |
| Swanson River | oil | 12.980 | 13.619 | 13.151 | 12.408 | 11.466 | 8.896 | 10.064 | 9.765 | 8.754 |
| | NGL | - | 0.004 | 0.070 | 0.063 | 0.077 | 0.012 | 0.098 | 0.096 | 0.089 |
| Trading Bay | oil | 0.729 | 3.477 | 9.936 | 9.600 | 8.744 | 8.585 | 7.825 | 7.552 | 6.128 |
| | NGL | - | - | - | 0.039 | 0.039 | 0.025 | 0.051 | 0.043 | 0.031 |
| TOTAL | oil[1] | 28.913 | 66.146 | 74.038 | 82.415 | 77.628 | 72.640 | 72.196 | 70.074 | 69.111 |
| | NGL | - | 0.004 | 0.073 | 0.530 | 0.710 | 0.608 | 0.812 | 0.793 | 0.765 |
| | liq | 28.913 | 66.150 | 74.111 | 82.945 | 78.338 | 73.248 | 73.007 | 70.867 | 69.876 |
| STATE | | | | | | | | | | |
| TOTAL | oil[1] | 28.913 | 66.146 | 74.098 | 82.735 | 77.952 | 72.770 | 72.322 | 70.603 | 69.833 |
| | NGL | - | 0.004 | 0.073 | 0.530 | 0.710 | 0.608 | 0.812 | 0.793 | 0.765 |
| | liq | 28.913 | 66.150 | 74.171 | 83.265 | 78.661 | 73.378 | 73.134 | 71.396 | 70.598 |
| TAPS FLOW [2] | | | | | | | | | | |
| Throughput at PS #1 | | - | - | - | - | - | - | - | - | - |
| Liftings at Valdez | | - | - | - | - | - | - | - | - | - |

# HISTORICAL OIL PRODUCTION

MILLIONS OF BARRELS PER YEAR

| | | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 | 1983 | 1984 |
|---|---|---|---|---|---|---|---|---|---|---|
| NORTH SLOPE | | | | | | | | | | |
| Endicott | oil | - | - | - | - | - | - | - | - | - |
| | NGL | - | - | - | - | - | - | - | - | - |
| | inj | - | - | - | - | - | - | - | - | - |
| Kuparuk River | oil | - | - | - | - | - | 1.092 | 32.406 | 39.876 | 46.169 |
| | NGL | - | - | - | - | - | - | - | - | - |
| Lisburne | oil | - | - | - | - | - | 0.002 | 0.208 | 0.087 | 0.294 |
| | NGL | - | - | - | - | - | - | - | - | - |
| Milne Point | oil | - | - | - | - | - | - | - | - | - |
| Prudhoe Bay | oil[1] | 4.604 | 115.258 | 397.679 | 468.412 | 555.394 | 555.170 | 558.889 | 560.837 | 561.952 |
| | NGL | - | - | - | - | 0.254 | 0.450 | 0.500 | 0.311 | 0.317 |
| | inj | 3.611 | 2.075 | - | - | - | - | - | - | - |
| Sag Delta | oil | - | - | - | - | - | - | - | - | - |
| | NGL | - | - | - | - | - | - | - | - | - |
| Schrader Bluff | oil | - | - | - | - | - | - | - | - | - |
| West Sak | oil | - | - | - | - | - | - | - | 0.006 | 0.124 |
| TOTAL | oil[1] | 0.993 | 113.183 | 397.679 | 468.412 | 555.394 | 556.264 | 591.503 | 600.806 | 608.539 |
| | NGL | - | - | - | - | 0.254 | 0.450 | 0.500 | 0.311 | 0.317 |
| | liq | 0.993 | 113.183 | 397.679 | 468.412 | 555.648 | 556.714 | 592.003 | 601.117 | 608.856 |
| COOK INLET | | | | | | | | | | |
| Beaver Creek | oil | 0.302 | 0.276 | 0.223 | 0.211 | 0.214 | 0.180 | 0.182 | 0.170 | 0.159 |
| Granite Point | oil | 4.471 | 4.711 | 4.867 | 4.613 | 4.394 | 3.975 | 3.467 | 3.550 | 3.287 |
| Kenai | NGL | 0.001 | <.001 | <.001 | <.001 | - | - | - | - | - |
| McArthur River | oil | 35.810 | 33.235 | 30.223 | 25.440 | 20.894 | 18.022 | 15.806 | 13.564 | 11.707 |
| | NGL | 0.653 | 0.733 | 0.730 | 0.541 | 0.412 | 0.484 | 0.449 | 0.332 | 0.317 |
| Middle Ground Shoal | oil | 8.864 | 7.617 | 6.382 | 5.423 | 4.854 | 4.291 | 3.573 | 3.381 | 3.238 |
| Redoubt Shoal | oil | - | - | - | - | - | - | - | - | - |
| Swanson River | oil | 7.591 | 5.981 | 4.870 | 4.344 | 3.724 | 2.938 | 2.999 | 3.017 | 2.517 |
| | NGL | 0.090 | 0.086 | 0.065 | 0.080 | 0.064 | 0.048 | 0.048 | 0.045 | 0.039 |
| Trading Bay | oil | 5.366 | 4.276 | 3.567 | 2.892 | 2.167 | 1.669 | 1.384 | 1.081 | 1.076 |
| | NGL | 0.026 | 0.044 | 0.019 | 0.014 | 0.006 | 0.005 | 0.002 | 0.004 | 0.005 |
| TOTAL | oil[1] | 62.404 | 56.095 | 50.132 | 42.923 | 36.247 | 31.075 | 27.411 | 24.763 | 21.985 |
| | NGL | 0.770 | 0.863 | 0.815 | 0.635 | 0.481 | 0.538 | 0.499 | 0.381 | 0.361 |
| | liq | 63.175 | 56.958 | 50.946 | 43.558 | 36.728 | 31.613 | 27.910 | 25.144 | 22.346 |
| STATE | | | | | | | | | | |
| TOTAL | oil[1] | 63.398 | 169.278 | 447.810 | 511.335 | 591.641 | 587.339 | 618.914 | 625.569 | 630.524 |
| | NGL | 0.770 | 0.863 | 0.815 | 0.635 | 0.735 | 0.988 | 0.999 | 0.692 | 0.678 |
| | liq | 64.168 | 170.141 | 448.625 | 511.970 | 592.376 | 588.327 | 619.912 | 626.261 | 631.201 |
| TAPS FLOW [2] | | | | | | | | | | |
| Throughput at PS #1 | | - | 112.315 | 397.149 | 467.939 | 554.934 | 556.067 | 591.142 | 600.859 | 608.836 |
| Liftings at Valdez | | - | 96.669 | 394.080 | 464.394 | 548.895 | 547.026 | 583.370 | 592.319 | 596.588 |

# TABLE 3 – CONTINUED

| | | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | Cum. Prod. (MMBbl) | Field Deplstn. |
|---|---|---|---|---|---|---|---|---|---|---|
| NORTH SLOPE | | | | | | | | | | |
| Endicott | oil | – | 0.011 | 8.796 | 37.441 | 35.746 | 36.181 | 38.996 | 157.171 | 39% |
| | NGL | – | – | 0.003 | 0.492 | 0.839 | 0.845 | 1.170 | 3.348 | |
| | inj | – | 0.007 | 0.014 | – | – | – | – | 0.021 | |
| Kuparuk River | oil | 78.926 | 93.900 | 102.448 | 110.891 | 109.770 | 107.206 | 113.532 | 836.222 | 44% |
| | NGL | 0.761 | 1.072 | 1.257 | 0.256 | – | – | – | 3.346 | |
| Lisburne | oil | 1.123 | 3.594 | 10.158 | 14.773 | 13.091 | 14.466 | 13.315 | 77.111 | 48% |
| | NGL | – | – | 0.458 | 1.008 | 1.093 | 1.204 | 1.337 | 5.099 | |
| Milne Point | oil | 0.704 | 4.709 | 0.040 | – | 3.715 | 6.624 | 6.701 | 22.494 | 19% |
| Prudhoe Bay | oil[1] | 568.534 | 561.538 | 572.045 | 559.412 | 505.940 | 470.140 | 465.399 | 7,490.736 | 63% |
| | NGL | 0.056 | 0.230 | 14.610 | 19.274 | 16.928 | 16.094 | 21.307 | 90.331 | |
| | inj | – | – | – | – | – | – | – | 13.013 | |
| Sag Delta | oil | – | – | – | – | 0.349 | 1.542 | 2.309 | 4.200 | ND |
| | NGL | – | – | – | – | 0.005 | 0.028 | 0.048 | 0.080 | |
| Schrader Bluff | oil | – | – | – | – | – | 0.004 | 0.756 | 0.760 | ND |
| West Sak | oil | 0.326 | 0.300 | – | – | – | – | – | 0.755 | 0% |
| TOTAL | oil[1] | 649.613 | 664.045 | 699.472 | 722.517 | 668.611 | 636.164 | 641.009 | 8,576.415 | |
| | NGL | 0.817 | 1.302 | 16.328 | 21.029 | 18.864 | 18.171 | 23.861 | 102.204 | |
| | liq | 650.430 | 665.347 | 715.799 | 743.546 | 687.476 | 654.335 | 664.870 | 8,678.619 | |
| COOK INLET | | | | | | | | | | |
| Beaver Creek | oil | 0.146 | 0.158 | 0.185 | 0.141 | 0.227 | 0.212 | 0.179 | 4.279 | 81% |
| Granite Point | oil | 3.052 | 3.169 | 2.803 | 2.677 | 2.275 | 1.462 | 2.064 | 115.332 | 91% |
| Kenai | NGL | – | – | – | – | – | – | – | 0.012 | NA |
| McArthur River | oil | 7.454 | 7.942 | 7.375 | 7.143 | 6.955 | 4.265 | 7.250 | 547.303 | 93% |
| | NGL | 0.194 | 0.228 | 0.196 | 0.162 | – | – | – | 8.979 | |
| Middle Ground Shoal | oil | 3.098 | 3.211 | 2.834 | 2.742 | 2.769 | 2.688 | 2.670 | 163.968 | 92% |
| Redoubt Shoal | oil | – | – | – | – | – | – | – | 0.002 | ND |
| Swanson River | oil | 2.165 | 2.055 | 2.059 | 2.127 | 1.875 | 1.878 | 1.962 | 215.177 | 98% |
| | NGL | 0.026 | 0.054 | 0.030 | 0.033 | 0.024 | 0.019 | 0.023 | 1.283 | |
| Trading Bay | oil | 1.029 | 1.046 | 0.935 | 0.886 | 1.264 | 0.643 | 1.216 | 93.074 | 93% |
| | NGL | 0.004 | 0.002 | 0.001 | 0.000 | 0.000 | 0.000 | 0.000 | 0.360 | |
| TOTAL | oil[1] | 16.944 | 17.580 | 16.191 | 15.716 | 15.366 | 11.147 | 15.340 | 1,139.135 | |
| | NGL | 0.223 | 0.284 | 0.227 | 0.195 | 0.024 | 0.019 | 0.023 | 10.633 | |
| | liq | 17.167 | 17.865 | 16.418 | 15.911 | 15.390 | 11.167 | 15.363 | 1,149.768 | |
| STATE | | | | | | | | | | |
| TOTAL | oil[1] | 666.557 | 681.625 | 715.662 | 738.233 | 683.978 | 647.311 | 656.349 | 9,715.550 | |
| | NGL | 1.040 | 1.586 | 16.555 | 21.224 | 18.888 | 18.191 | 23.884 | 112.837 | |
| | liq | 667.597 | 683.211 | 732.217 | 759.457 | 702.866 | 665.502 | 680.233 | 9,828.388 | |
| TAPS FLOW [2] | | | | | | | | | | |
| Throughput at PS #1 | | 649.887 | 665.435 | 716.662 | 743.302 | 688.062 | 654.551 | 665.199 | | |
| Liftings at Valdez | | 643.512 | 603.028 | 700.878 | 736.047 | 672.461 | 636.199 | 647.345 | | |

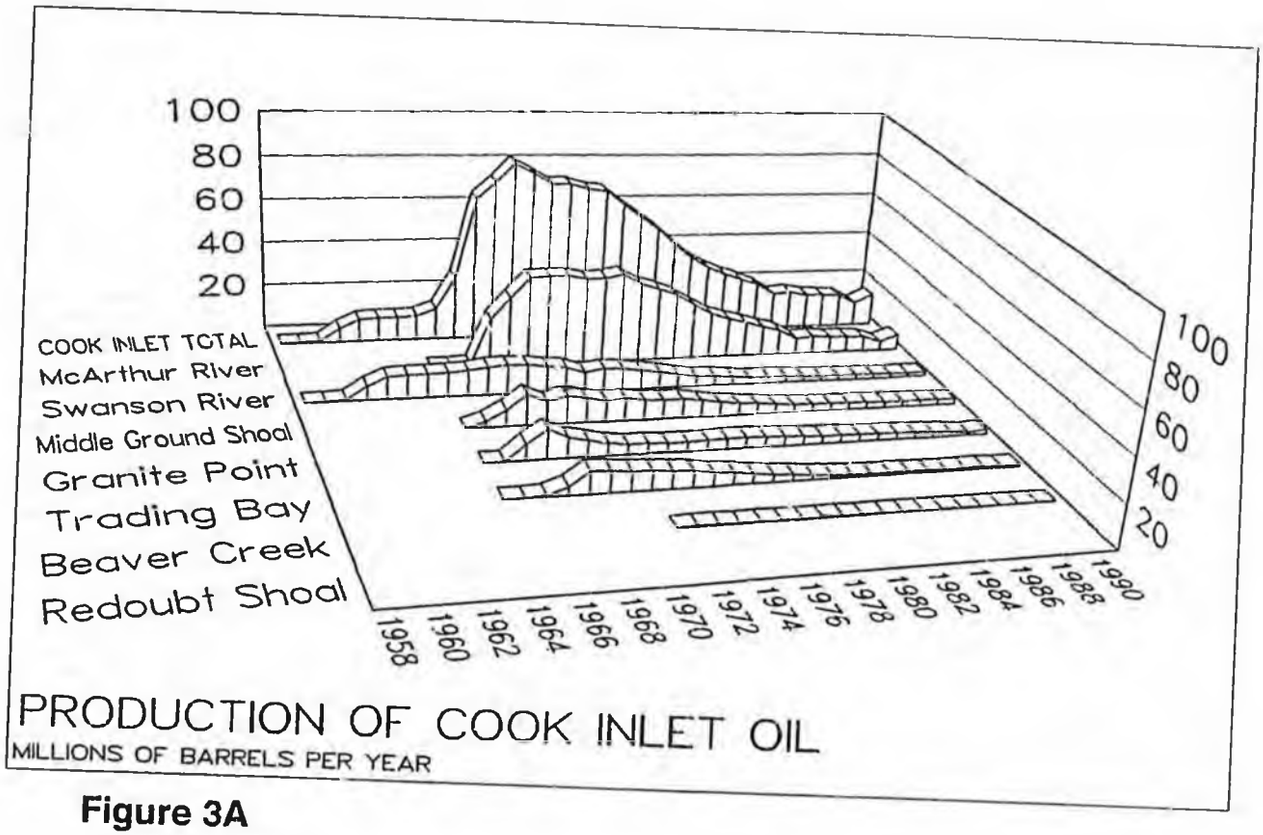



**Figure 3A**

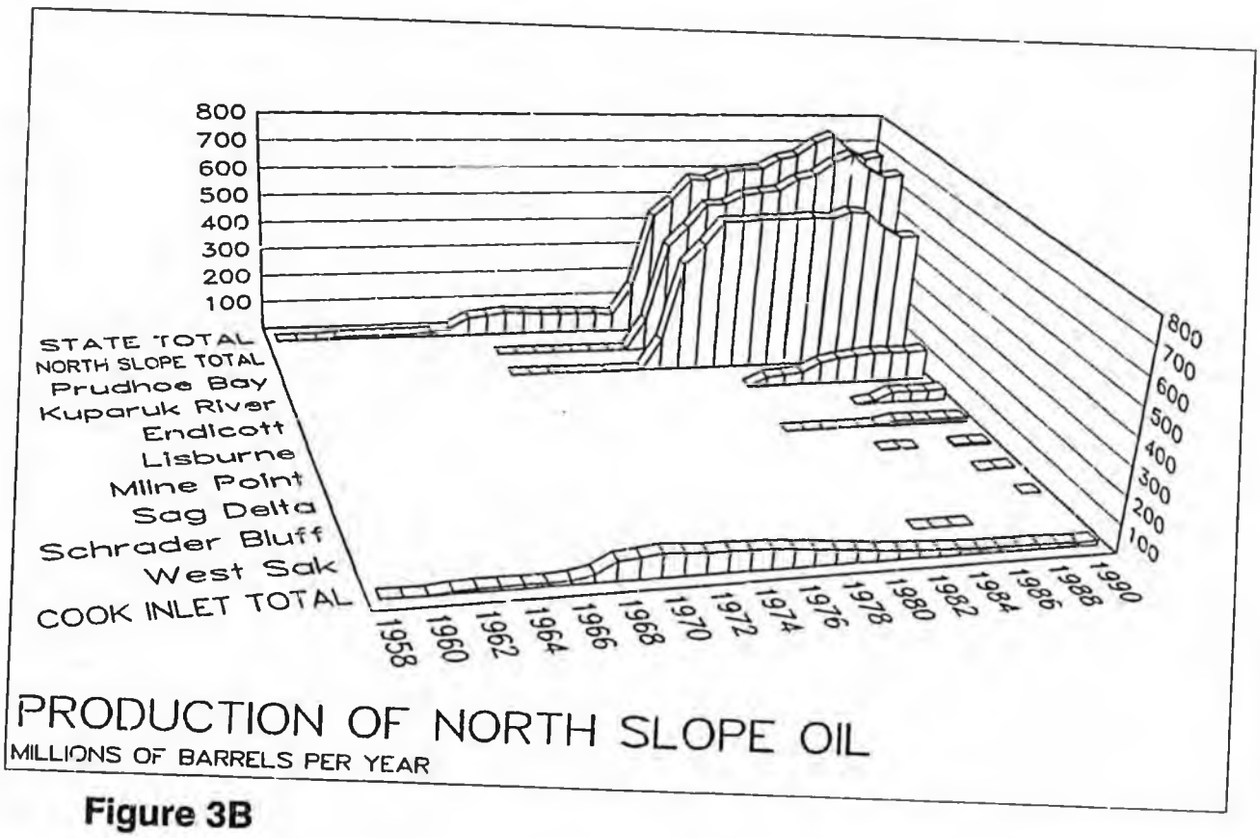



**Figure 3B**

# SECTION 4
# HISTORICAL PRODUCTION OF NATURAL GAS

A discussion of natural gas production uses several terms that are unique to the industry. The terms dry gas and casinghead gas refer to the reservoir source of the gas. Alaska produces gas from three types of reservoirs, those which 1) contain only gas, 2) contain oil with dissolved gas, and 3) contain oil with dissolved gas and which also have gas caps which contain only gas. Gas which has not been dissolved in oil is termed dry gas whereas gas which has been separated from oil is termed casinghead gas.

Three production terms, extraction, injection, and production, refer to the disposition of gas after it emerges from a well. Oil and dissolved gas and oil are extracted from the reservoir and separated. Gas which is sold or consumed as fuel or raw material is termed produced but gas which is injected back into the reservoir is not considered produced because it is still available for consumption. Table 4, Fig. 4A, and Fig. 4B show how much dry and casinghead gas has been extracted, injected, and produced from each field.

Cook Inlet and North Slope are the only regions currently producing natural gas. The production regimes of the two regions are very different because their markets are very different. The only market for North Slope, at present, is as fuel for oil production facilities and related activities and, consequently, most of the extracted gas is injected. Cook Inlet fields, however, lie near Anchorage and Kenai markets, so nearly all extracted gas is consumed and relatively little is injected.

## NORTH SLOPE

Alaskan gas production began on North slope in 1946 from South Barrow field, which still produces gas for local consumption in Barrow. Prudhoe Bay oil field was discovered in 1969 and during the development of the field some gas was produced for fuel. Large scale gas production began in 1977 when TAPS was completed and commercial oil production began. Gas production has grown each year, to 248 billion cubic feet in 1991, and is expected to increase for the next several years, whether or not a gas pipeline is built. Cumulatively, North Slope fields have produced a net 1.7 trillion cubic feet by the end of 1991.

## COOK INLET

Cook Inlet gas production began from Swanson River field in 1954. Production rose to an average of 309 billion cubic feet per year in 1982 and has varied to an average of 308 billion cubic feet per year in 1991. The region's fields have produced a cumulative net 4.1 trillion cubic feet by the end of 1991.

# HISTORICAL GAS PRODUCTION

BILLIONS OF CUBIC FEET PER YEAR

| | Type* | 1958 | 1959 | 1960 | 1961 | 1962 | 1963 | 1964 | 1965 | 1966 | 1967 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **NORTH SLOPE** | | | | | | | | | | | |
| East Barrow | dry | - | - | - | - | - | - | - | - | - | - |
| Endicott | csg | - | - | - | - | - | - | - | - | - | - |
| | inj | - | - | - | - | - | - | - | - | - | - |
| Kuparuk River | csg | - | - | - | - | - | - | - | - | - | - |
| | inj | - | - | - | - | - | - | - | - | - | - |
| Lisburne | csg | - | - | - | - | - | - | - | - | - | - |
| | inj | - | - | - | - | - | - | - | - | - | - |
| Milne Point | csg | - | - | - | - | - | - | - | - | - | - |
| | inj | - | - | - | - | - | - | - | - | - | - |
| Prudhoe Bay | csg | - | - | - | - | - | - | - | - | - | - |
| | inj | - | - | - | - | - | - | - | - | - | - |
| Sag Delta | csg | - | - | - | - | - | - | - | - | - | - |
| Schrader Bluff | csg | - | - | - | - | - | - | - | - | - | - |
| South Barrow | dry | 0.119 | 0.132 | 0.172 | 0.172 | 0.197 | 0.211 | 0.249 | 0.389 | 0.438 | 0.475 |
| West Sak | csg | - | - | - | - | - | - | - | - | - | - |
| TOTAL GROSS | | 0.119 | 0.132 | 0.172 | 0.172 | 0.197 | 0.211 | 0.249 | 0.389 | 0.438 | 0.475 |
| TOTAL INJECTED | | - | - | - | - | - | - | - | - | - | - |
| TOTAL NET | | 0.119 | 0.132 | 0.172 | 0.172 | 0.197 | 0.211 | 0.249 | 0.389 | 0.438 | 0.475 |
| **COOK INLET** | | | | | | | | | | | |
| Albert Kaloa | dry | - | - | - | - | - | - | - | - | - | - |
| Beaver Creek | csg | - | - | - | - | - | - | - | - | - | - |
| | dry | - | - | - | - | - | - | - | - | - | - |
| | inj | - | - | - | - | - | - | - | - | - | - |
| Beluga River | dry | - | - | - | - | - | 0.014 | 0.137 | - | - | 0.168 |
| Birch Hill | dry | - | - | - | - | - | - | - | 0.065 | - | - |
| Cannery Loop | dry | - | - | - | - | - | - | - | - | - | - |
| Falls Creek | dry | - | - | - | - | - | - | - | - | 0.019 | - |
| Granite Point | csg | - | - | - | - | - | - | - | - | - | 4.890 |
| Ivan River | dry | - | - | - | - | - | - | - | - | - | - |
| Kenai | dry | - | - | 0.017 | 0.215 | 1.460 | 3.106 | 4.493 | 5.985 | 33.375 | 39.624 |
| Lewis River | dry | - | - | - | - | - | - | - | - | - | - |
| McArthur River | csg | - | - | - | - | - | - | - | - | - | 0.220 |
| | dry | - | - | - | - | - | - | - | - | - | - |
| Middle Ground | csg | - | - | - | - | - | - | - | 0.010 | 1.200 | 3.215 |
| Shoal | dry | - | - | - | - | - | - | - | - | - | - |
| Moquawkie | dry | - | - | - | - | - | - | - | - | - | 0.034 |
| Nicolai Creek | dry | - | - | - | - | - | - | - | - | - | - |
| North Cook Inlet | dry | - | - | - | - | - | - | - | - | - | - |
| North Fork | dry | - | - | - | - | - | - | - | - | 0.105 | - |
| Pretty Creek | dry | - | - | - | - | - | - | - | - | - | - |
| Redoubt Shoal | csg | - | - | - | - | - | - | - | - | - | - |
| Sterling | dry | - | - | - | - | 0.025 | 0.046 | 0.058 | 0.120 | 0.157 | 0.180 |
| Stump Lake | dry | - | - | - | - | - | - | - | - | - | - |
| Swanson River | csg | 0.006 | 0.027 | 0.099 | 1.293 | 1.914 | 2.808 | 3.233 | 3.831 | 5.622 | 13.541 |
| | dry | - | - | 0.020 | - | 0.157 | 4.836 | 3.943 | 2.141 | 0.740 | - |
| | inj | - | - | 46.482 | - | 0.259 | 6.478 | 5.620 | 4.843 | 28.770 | 37.944 |
| Trading Bay | csg | - | - | - | - | - | - | - | 0.001 | 0.315 | 0.722 |
| | dry | - | - | - | - | - | - | - | - | - | - |
| West Fork | dry | - | - | - | - | - | - | - | - | - | - |
| TOTAL GROSS | | 0.006 | 0.027 | 0.137 | 1.508 | 3.557 | 10.810 | 11.865 | 12.155 | 41.534 | 62.593 |
| TOTAL INJECTED | | - | - | 46.482 | - | 0.259 | 6.478 | 5.620 | 4.843 | 28.770 | 37.944 |
| TOTAL NET | | 0.006 | 0.027 | (46.345) | 1.508 | 3.298 | 4.333 | 6.245 | 7.311 | 12.764 | 24.649 |
| **STATE** | | | | | | | | | | | |
| TOTAL GROSS | | 0.124 | 0.159 | 0.309 | 1.680 | 3.753 | 11.021 | 12.114 | 12.543 | 41.971 | 63.069 |
| TOTAL INJECTED | | 0.000 | 0.000 | 46.482 | 0.000 | 0.259 | 6.478 | 5.620 | 4.843 | 28.770 | 37.944 |
| TOTAL NET | | 0.124 | 0.159 | (46.173) | 1.680 | 3.495 | 4.543 | 6.494 | 7.700 | 13.201 | 25.124 |

* dry = dry gas, csg = casinghead gas, inj = injected.
NA = Not Applicable, ND = No Data
Source: Alaska Oil and Gas Conservation Commission, "Alaska Production Summary by Field and Pool", monthly report.
[1] Milne Point is assigned no gas reserves because most of its gas will be used for production fuel.
[2] Ivan River, Lewis River, Pretty Creek and Stump Lake are computed as a single reservoir.
[3] More gas is injected into the field than is produced, to maintain oil production.
03/27/92

# TABLE 4

| | | 1968 | 1969 | 1970 | 1971 | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **NORTH SLOPE** | | | | | | | | | | | |
| East Barrow | dry | - | - | - | - | - | - | - | - | - | - |
| Endicott | csg | - | - | - | - | - | - | - | - | - | - |
| | inj | - | - | - | - | - | - | - | - | - | - |
| Kuparuk River | csg | - | - | - | - | - | - | - | - | - | - |
| | inj | - | - | - | - | - | - | - | - | - | - |
| Lisburne | csg | - | - | - | - | - | - | - | - | - | - |
| | inj | - | - | - | - | - | - | - | - | - | - |
| Milne Point | csg | - | - | - | - | - | - | - | - | - | - |
| | inj | - | - | - | - | - | - | - | - | - | - |
| Prudhoe Bay | csg | - | 0.243 | 1.037 | 0.889 | 0.658 | 0.699 | 2.022 | 3.046 | 5.077 | 94.936 |
| | inj | - | - | - | - | - | - | - | - | - | 68.118 |
| Sag Delta | csg | - | - | - | - | - | - | - | - | - | - |
| Schrader Bluff | csg | - | - | - | - | - | - | - | - | - | - |
| South Barrow | dry | 0.504 | 0.582 | 0.619 | 0.627 | 0.675 | 0.707 | 0.765 | 0.799 | 0.832 | 0.879 |
| West Sak | csg | - | - | - | - | - | - | - | - | - | - |
| TOTAL GROSS | | 0.504 | 0.825 | 1.657 | 1.516 | 1.333 | 1.406 | 2.787 | 3.845 | 5.909 | 95.814 |
| TOTAL INJECTED | | - | - | - | - | - | - | - | - | - | 68.118 |
| TOTAL NET | | 0.504 | 0.825 | 1.657 | 1.516 | 1.333 | 1.406 | 2.787 | 3.845 | 5.909 | 27.696 |
| **COOK INLET** | | | | | | | | | | | |
| Albert Kaloa | dry | - | - | 0.095 | 0.024 | - | - | - | - | - | - |
| Beaver Creek | csg | - | - | - | - | - | 0.153 | 0.130 | 0.104 | 0.095 | 0.090 |
| | dry | - | - | - | - | - | 0.054 | 0.020 | 0.218 | 0.166 | 0.113 |
| | inj | - | - | - | - | - | - | 0.019 | - | 0.091 | 0.100 |
| Beluga River | dry | 2.018 | 3.038 | 3.571 | 4.055 | 4.142 | 4.929 | 5.596 | 6.980 | 11.211 | 13.353 |
| Birch Hill | dry | - | - | - | - | - | - | - | - | - | - |
| Cannery Loop | dry | - | - | - | - | - | - | - | - | - | - |
| Falls Creek | dry | - | - | - | - | - | - | - | - | - | - |
| Granite Point | csg | 10.036 | 8.043 | 9.211 | 7.753 | 5.773 | 4.518 | 3.265 | 3.390 | 3.205 | 3.634 |
| Ivan River | dry | - | - | - | - | - | - | - | - | - | - |
| Kenai | dry | 46.014 | 59.340 | 80.612 | 72.184 | 76.007 | 71.345 | 68.485 | 77.175 | 79.467 | 81.886 |
| Lewis River | dry | - | - | - | - | - | - | - | - | - | - |
| McArthur River | csg | 6.124 | 9.565 | 14.989 | 15.732 | 15.477 | 14.178 | 12.739 | 13.474 | 12.402 | 11.969 |
| | dry | 0.032 | 4.629 | 4.699 | 3.572 | 4.245 | 4.085 | 6.861 | 7.997 | 6.825 | 7.737 |
| Middle Ground | csg | 6.654 | 6.006 | 6.137 | 5.147 | 4.075 | 4.826 | 4.259 | 4.199 | 4.347 | 4.108 |
| Shoal | dry | - | - | - | - | - | - | - | - | - | - |
| Moquawkie | dry | 0.353 | 0.514 | 0.083 | - | - | - | - | - | - | - |
| Nicolai Creek | dry | 0.026 | 0.387 | 0.202 | 0.141 | 0.066 | 0.006 | 0.011 | 0.083 | 0.108 | 0.032 |
| North Cook Inlet | dry | - | 7.881 | 40.947 | 45.024 | 41.580 | 42.709 | 44.238 | 45.622 | 45.091 | 47.201 |
| North Fork | dry | - | - | - | - | - | - | - | - | - | - |
| Pretty Creek | dry | - | - | - | - | - | - | - | - | - | - |
| Redoubt Shoal | csg | <.001 | - | - | - | - | - | - | - | - | - |
| Sterling | dry | 0.198 | 0.265 | 0.265 | 0.267 | 0.172 | 0.027 | 0.032 | 0.035 | 0.035 | 0.029 |
| Stump Lake | dry | - | - | - | - | - | - | - | - | - | - |
| Swanson River | csg | 25.434 | 40.756 | 50.396 | 66.569 | 67.441 | 74.067 | 80.869 | 90.665 | 101.427 | 106.911 |
| | dry | - | - | - | - | - | - | - | - | - | - |
| | inj | 58.316 | 67.215 | 73.139 | 73.892 | 76.133 | 87.482 | 86.793 | 97.976 | 113.279 | 118.279 |
| Trading Bay | csg | 2.961 | 7.119 | 7.156 | 9.097 | 5.668 | 3.539 | 3.312 | 2.613 | 2.473 | 2.890 |
| | dry | - | - | - | - | - | - | - | - | - | - |
| West Fork | dry | - | - | - | - | - | - | - | - | - | - |
| TOTAL GROSS | | 99.852 | 147.543 | 218.363 | 229.566 | 224.647 | 225.230 | 229.816 | 252.554 | 266.651 | 279.955 |
| TOTAL INJECTED | | 58.316 | 67.215 | 73.139 | 73.892 | 76.133 | 87.482 | 86.812 | 97.976 | 113.370 | 118.380 |
| TOTAL NET | | 41.535 | 80.328 | 145.224 | 155.674 | 148.514 | 137.754 | 143.004 | 154.578 | 153.281 | 161.575 |
| **STATE** | | | | | | | | | | | |
| TOTAL GROSS | | 100.355 | 148.368 | 220.021 | 231.081 | 225.980 | 226.642 | 232.603 | 256.399 | 272.560 | 375.769 |
| TOTAL INJECTED | | 58.316 | 67.215 | 73.139 | 73.892 | 76.133 | 87.482 | 86.812 | 97.976 | 113.370 | 186.498 |
| TOTAL NET | | 42.039 | 81.153 | 146.882 | 157.189 | 149.847 | 139.160 | 145.791 | 158.423 | 159.190 | 189.271 |

# HISTORICAL GAS PRODUCTION

BILLIONS OF CUBIC FEET PER YEAR

| | | 1978 | 1979 | 1980 | 1981 | 1982 | 1983 | 1984 | 1985 |
|---|---|---|---|---|---|---|---|---|---|
| NORTH SLOPE | | | | | | | | | |
| East Barrow | dry | - | - | - | 0.037 | 0.717 | 0.689 | 0.693 | 0.632 |
| Endicott | csg | - | - | - | - | - | - | - | - |
| | inj | - | - | - | - | - | - | - | - |
| Kuparuk River | csg | - | - | - | 0.615 | 22.989 | 44.391 | 57.508 | 104.279 |
| | inj | - | - | - | - | 17.822 | 38.277 | 47.930 | 85.909 |
| Lisburne | csg | - | - | - | 0.003 | 0.374 | 0.154 | 0.343 | 1.902 |
| | inj | - | - | - | - | - | - | - | - |
| Milne Point | csg | - | - | - | - | - | - | - | 0.253 |
| | inj | - | - | - | - | - | - | - | - |
| Prudhoe Bay | csg | 307.966 | 432.475 | 597.148 | 647.768 | 756.884 | 818.993 | 846.674 | 936.613 |
| | inj | 271.854 | 390.136 | 546.509 | 595.106 | 697.813 | 754.044 | 768.899 | 346.786 |
| Sag Delta | csg | - | - | - | - | - | - | - | - |
| Schrader Bluff | csg | - | - | - | - | - | - | - | - |
| South Barrow | dry | 0.893 | 0.913 | 1.027 | 1.009 | 0.532 | 0.541 | 0.650 | 0.678 |
| West Sak | csg | - | - | - | - | - | 0.005 | 0.079 | 0.134 |
| TOTAL GROSS | | 308.859 | 433.388 | 598.175 | 649.431 | 781.496 | 864.775 | 905.947 | 1,044.491 |
| TOTAL INJECTED | | 271.854 | 390.136 | 546.509 | 595.106 | 715.635 | 792.321 | 816.829 | 932.695 |
| TOTAL NET | | 37.004 | 43.252 | 51.665 | 54.325 | 65.861 | 72.454 | 89.119 | 111.796 |
| COOK INLET | | | | | | | | | |
| Albert Kaloa | dry | - | - | - | - | - | - | - | - |
| Beaver Creek | csg | 0.092 | 0.094 | 0.091 | 0.080 | 0.082 | 0.092 | 0.101 | 0.094 |
| | dry | 0.237 | 0.088 | 0.090 | 0.137 | 0.308 | 8.252 | 9.234 | 10.833 |
| | inj | 0.144 | 0.079 | 0.029 | 0.020 | 0.037 | 0.031 | - | - |
| Beluga River | dry | 14.253 | 16.994 | 17.002 | 17.248 | 18.653 | 18.084 | 19.833 | 22.571 |
| Birch Hill | dry | - | - | - | - | - | - | - | - |
| Cannery Loop | dry | - | - | - | - | - | - | - | - |
| Falls Creek | dry | - | - | - | - | - | - | - | - |
| Granite Point | csg | 3.851 | 3.287 | 3.233 | 3.509 | 2.780 | 2.578 | 2.340 | 2.147 |
| Ivan River | dry | - | - | - | - | - | - | - | - |
| Kenai | dry | 97.290 | 97.029 | 98.846 | 105.800 | 115.913 | 112.978 | 110.109 | 115.843 |
| Lewis River | dry | - | - | - | - | - | - | 0.696 | 1.644 |
| McArthur River | csg | 10.923 | 8.849 | 8.043 | 7.830 | 7.521 | 6.444 | 5.834 | 4.073 |
| | dry | 7.662 | 7.756 | 7.547 | 7.555 | 8.719 | 7.931 | 9.242 | 6.603 |
| Middle Ground | csg | 3.290 | 2.744 | 2.628 | 2.502 | 2.277 | 2.294 | 2.212 | 2.129 |
| Shoal | dry | - | - | - | - | 0.097 | 0.371 | 0.514 | 0.493 |
| Moquawkie | dry | - | - | - | - | - | - | - | - |
| Nicolai Creek | dry | - | - | - | - | - | - | - | - |
| North Cook Inlet | dry | 46.757 | 49.448 | 41.540 | 49.486 | 45.368 | 47.877 | 46.981 | 45.819 |
| North Fork | dry | - | - | - | - | - | - | - | - |
| Pretty Creek | dry | - | - | - | - | - | - | - | - |
| Redoubt Shoal | csg | - | - | - | - | - | - | - | - |
| Sterling | dry | 0.024 | 0.025 | 0.026 | 0.023 | 0.024 | 0.022 | 0.018 | 0.012 |
| Stump Lake | dry | - | - | - | - | - | - | - | - |
| Swanson River | csg | 106.934 | 116.068 | 113.787 | 103.592 | 105.654 | 97.508 | 96.710 | 92.104 |
| | dry | - | 0.198 | 0.068 | - | - | - | - | - |
| | inj | 114.557 | 120.268 | 120.636 | 106.137 | 113.023 | 95.353 | 93.687 | 89.025 |
| Trading Bay | csg | 2.427 | 1.708 | 1.448 | 1.232 | 1.221 | 0.915 | 0.940 | 1.115 |
| | dry | - | - | 0.104 | 0.192 | 0.411 | 0.631 | 0.626 | 0.417 |
| West Fork | dry | 0.052 | 0.770 | 0.476 | 0.030 | 0.086 | 0.067 | 0.037 | 0.022 |
| TOTAL GROSS | | 293.792 | 305.058 | 299.929 | 299.218 | 309.114 | 306.044 | 305.427 | 305.919 |
| TOTAL INJECTED | | 114.701 | 120.347 | 120.666 | 106.157 | 113.060 | 95.384 | 93.687 | 89.025 |
| TOTAL NET | | 179.091 | 184.712 | 179.264 | 193.061 | 196.054 | 210.660 | 211.739 | 216.894 |
| STATE | | | | | | | | | |
| TOTAL GROSS | | 602.651 | 738.446 | 898.104 | 948.648 | 1,090.610 | 1,170.819 | 1,211.374 | 1,350.410 |
| TOTAL INJECTED | | 386.556 | 510.482 | 667.175 | 701.263 | 828.695 | 887.705 | 910.516 | 1,021.720 |
| TOTAL NET | | 216.095 | 227.964 | 230.929 | 247.386 | 261.915 | 283.114 | 300.858 | 328.690 |

# TABLE 4 – CONTINUED

| | | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | Cum. Prod. (Bcf) | Field Depletion |
|---|---|---|---|---|---|---|---|---|---|
| NORTH SLOPE | | | | | | | | | |
| East Barrow | dry | 0.589 | 0.590 | 0.661 | 0.475 | 0.488 | 0.583 | 6.154 | 51% |
| Endicott | csg | 0.196 | 8.237 | 34.834 | 41.197 | 42.490 | 60.246 | 187.200 | 4% |
| | inj | - | 5.615 | 28.023 | 33.033 | 35.523 | 51.136 | 153.330 | |
| Kuparuk River | csg | 114.889 | 125.089 | 119.883 | 107.519 | 116.579 | 123.207 | 936.949 | 31% |
| | inj | 90.449 | 89.191 | 87.906 | 83.323 | 91.273 | 95.982 | 728.062 | |
| Lisburne | csg | 8.677 | 64.849 | 94.507 | 104.527 | 107.132 | 124.263 | 506.731 | 5% |
| | inj | - | 56.741 | 87.815 | 102.248 | 101.542 | 112.457 | 460 803 | |
| Milne Point | csg | 1.644 | 0.011 | - | 0.978 | 2.718 | 3.515 | 9.120 | NA [1] |
| | inj | 0.197 | 0.000 | - | 0.320 | 1.401 | 1.704 | 3.622 | |
| Prudhoe Bay | csg | 970.290 | 1,228.527 | 1,404.992 | 1,412.853 | 1,481.462 | 1,768.837 | 13,720.088 | 5% |
| | inj | 925.630 | 1,104.827 | 1,245.254 | 1,244.000 | 1,312.874 | 1,574.366 | 12,346.215 | |
| Sag Delta | csg | - | - | - | 0.236 | 1.416 | 2.347 | 3.999 | ND |
| Schrader Bluff | csg | - | - | - | - | - | 0.244 | 0.244 | ND |
| South Barrow | dry | 0.589 | 0.622 | 0.598 | 0.758 | 0.733 | 0.662 | 20.574 | 80% |
| West Sak | csg | 0.108 | - | - | - | - | - | 0.326 | NA |
| TOTAL GROSS | | 1,096.982 | 1,427.925 | 1,655.476 | 1,668.543 | 1,753.018 | 2,083.904 | 15,391.386 | |
| TOTAL INJECTED | | 1,016.276 | 1,256.374 | 1,448.997 | 1,462.924 | 1,542.612 | 1,835.645 | 13,692.032 | |
| TOTAL NET | | 80.706 | 171.551 | 206.479 | 205.619 | 210.405 | 248.258 | 1,699.354 | |
| COOK INLET | | | | | | | | | |
| Albert Kaloa | dry | - | - | - | - | - | - | 0.119 | ND |
| Beaver Creek | csg | 0.078 | 0.053 | 0.039 | 0.064 | 0.058 | 0.049 | 1.640 | 47% |
| | dry | 17.694 | 15.475 | 14.307 | 12.257 | 12.416 | 10.354 | 112.253 | |
| | inj | - | - | - | - | - | - | 0.551 | |
| Beluga River | dry | 25.357 | 23.971 | 25.586 | 30.126 | 39.512 | 38.494 | 386.896 | 39% |
| Birch Hill | dry | - | - | - | - | - | - | 0.065 | 1% |
| Cannery Loop | dry | - | - | 9.400 | 11.255 | 12.502 | 12.318 | 45.474 | 27% |
| Falls Creek | dry | - | - | - | - | - | - | 0.019 | 0% |
| Granite Point | csg | 2.415 | 2.431 | 2.543 | 2.251 | 1.431 | 1.586 | 100.100 | 92% |
| Ivan River | dry | - | - | - | - | 0.676 | 2.132 | 2.809 | 3% [2] |
| Kenai | dry | 82.471 | 90.014 | 76.299 | 65.706 | 38.393 | 25.581 | 2,033.059 | 80% |
| Lewis River | dry | 1.338 | 0.345 | 0.045 | 0.095 | 1.485 | 1.420 | 7.068 | NA [2] |
| McArthur River | csg | 4.397 | 3.393 | 4.120 | 4.317 | 2.559 | 5.121 | 210.093 | 51% |
| | dry | 9.163 | 9.884 | 12.603 | 26.683 | 48.897 | 56.075 | 277.802 | |
| Middle Ground | csg | 1.199 | 1.274 | 1.223 | 1.250 | 1.334 | 1.074 | 81.614 | 99% |
| Shoal | dry | 0.394 | 0.312 | 0.411 | 0.715 | 1.246 | 0.513 | 5.067 | |
| Moquawkie | dry | - | - | - | - | - | - | 0.985 | ND |
| Nicolai Creek | dry | - | - | - | - | - | - | 1.062 | 26% |
| North Cook Inlet | dry | 43.838 | 42.889 | 44.989 | 45.287 | 45.014 | 44.695 | 1,000.282 | 63% |
| North Fork | dry | - | - | - | - | - | - | 0.105 | 1% |
| Pretty Creek | dry | 0.067 | 0.776 | 0.871 | 0.641 | 0.607 | 0.742 | 3.704 | NA [2] |
| Redoubt Shoal | csg | - | - | - | - | - | - | <.001 | ND |
| Sterling | dry | 0.002 | - | - | - | - | - | 2.088 | 8% |
| Stump Lake | dry | - | - | - | - | 0.528 | 1.608 | 2.135 | NA [2] |
| Swanson River | csg | 95.083 | 83.508 | 101.685 | 102.910 | 101.685 | 101.885 | 2,161.024 | 0% [3] |
| | dry | - | 0.555 | 0.915 | 1.184 | 2.710 | 2.944 | 20.412 | |
| | inj | 93.602 | 87.013 | 99.734 | 107.802 | 106.031 | 105.174 | 2,434.940 | |
| Trading Bay | csg | 0.994 | 0.991 | 1.120 | 1.291 | 0.465 | 0.944 | 64.678 | 72% |
| | dry | 0.385 | 0.443 | 0.191 | 0.141 | 0.003 | - | 3.543 | |
| West Fork | dry | - | - | - | - | - | 0.460 | 2.001 | |
| TOTAL GROSS | | 284.874 | 276.314 | 296.347 | 306.173 | 311.519 | 307.997 | 6,526.097 | |
| TOTAL INJECTED | | 93.602 | 87.013 | 99.734 | 107.802 | 106.031 | 105.174 | 2,435.491 | |
| TOTAL NET | | 191.272 | 189.302 | 196.614 | 198.370 | 205.488 | 202.823 | 4,090.606 | |
| STATE | | | | | | | | | |
| TOTAL GROSS | | 1,381.856 | 1,704.239 | 1,951.823 | 1,974.715 | 2,064.536 | 2,391.900 | 21,917.483 | |
| TOTAL INJECTED | | 1,109.877 | 1,343.387 | 1,548.731 | 1,570.726 | 1,648.643 | 1,940.819 | 16,127.522 | |
| TOTAL NET | | 271.978 | 360.852 | 403.092 | 403.989 | 415.893 | 451.081 | 5,789.961 | |

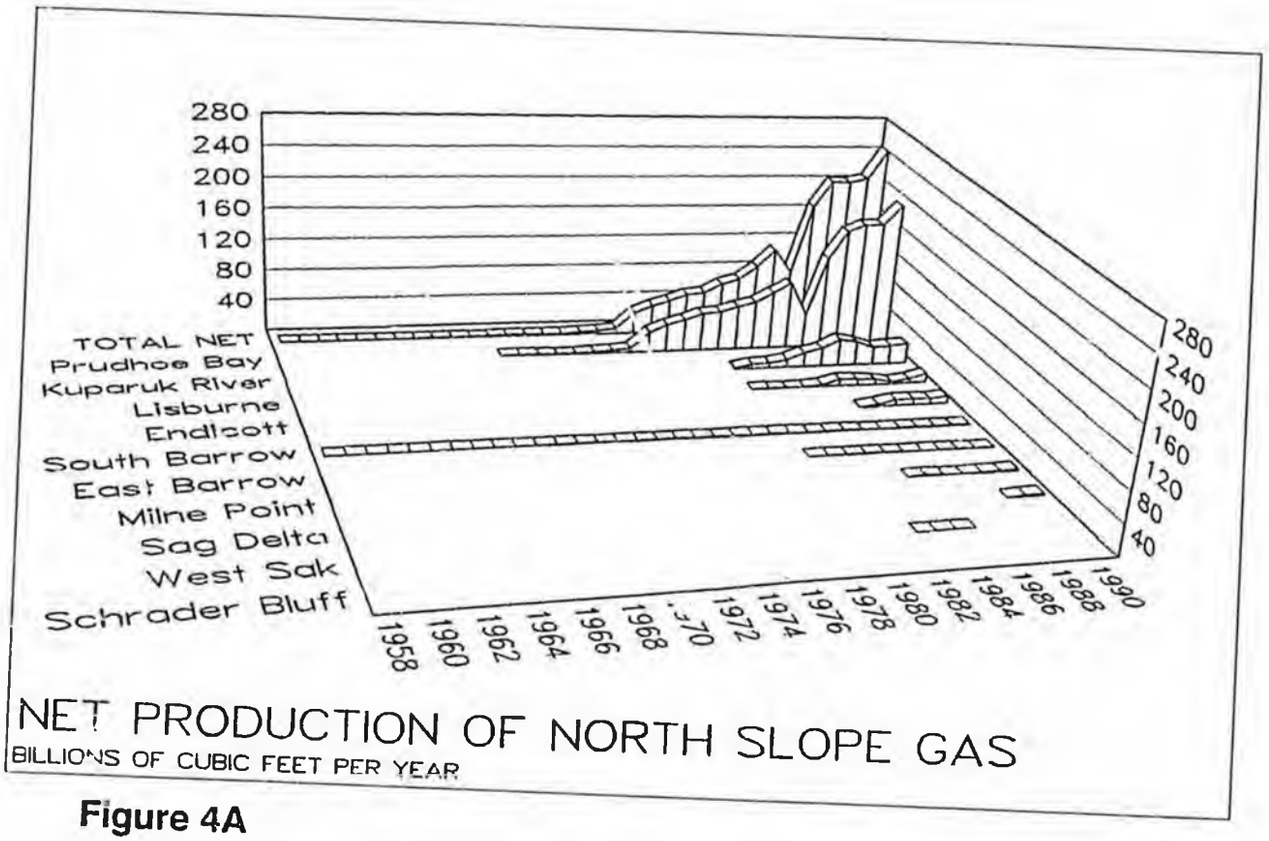



**Figure 4A**

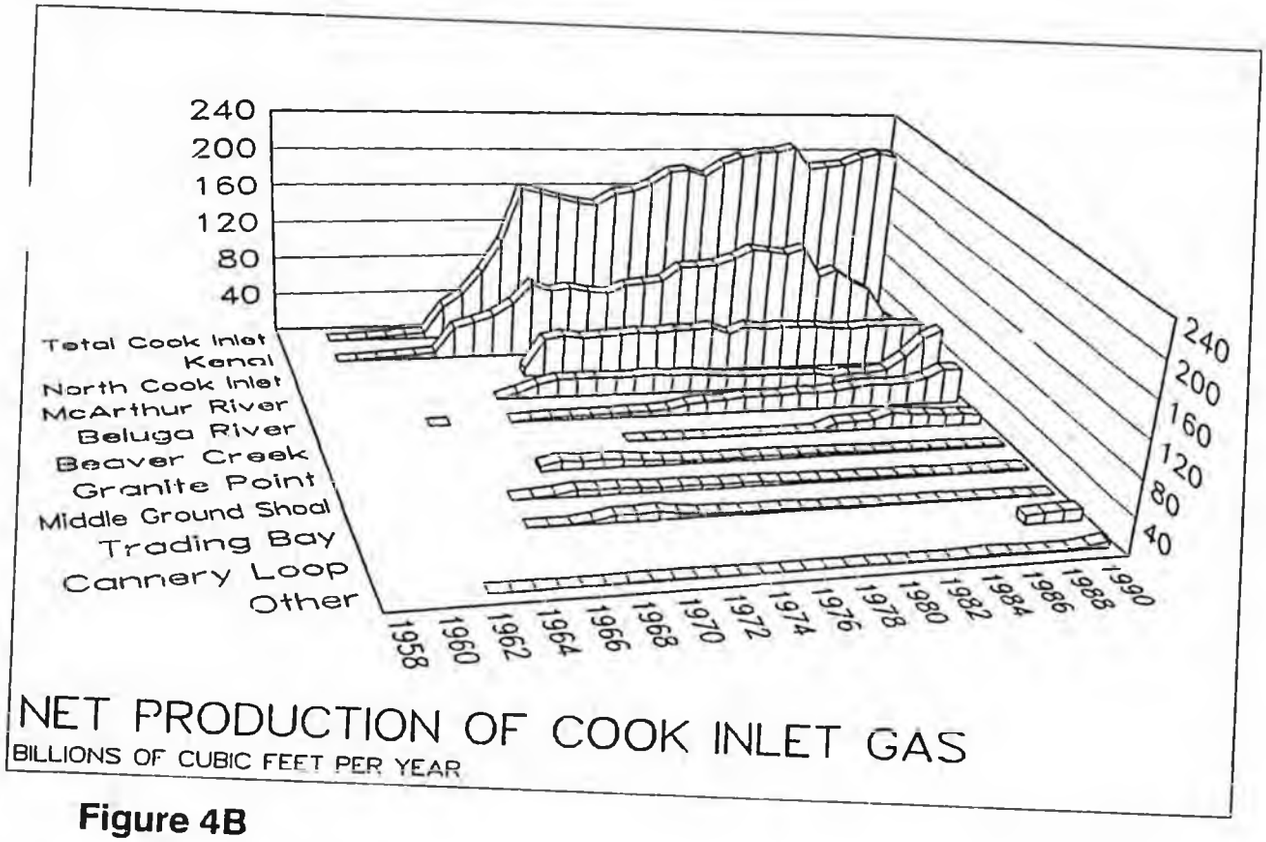



**Figure 4B**

# SECTION 5
# HISTORICAL CONSUMPTION OF OIL

Virtually all oil consumed in Alaska is in the form of refined fuels. Much of this fuel is supplied by the state's three refineries, though the exact amount is not publicly available. Suppliers barge the rest from West Coast refineries to fuel docks and storage facilities along the Alaska coast.

The Alaska Department of Revenue (DOR) compiles data on how much fuel is reported sold within the state. DOR compiled their sales categories for tax purposes, not to record fuel use patterns, so some categories are more definitive than others. Table 5.1 lists historical fuel sales of DOR's six major fuel categories, and Table 5.2 lists 1991 sales of the major categories and their subcategories. A major caveat is that the category, "Other Diesel/Exported as Cargo" is primarily residual oil from Tesoro refinery sold to West Coast or Pacific Rim refineries and so, under most definitions, is not consumed in Alaska. Table 5.2 shows that in 1991, when Exported as Cargo is subtracted from total fuel sales, Alaska consumed 2.0 billion gallons of fuel, consisting of 724 million gallons of Aviation Jet fuel, 968 million gallons of diesel, and 249 million gallons of gasoline.

# HISTORICAL OIL CONSUMPTION

TABLE 5.1

MILLIONS OF GALLONS PER YEAR

| | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 | 1983 | 1984 |
|---|---|---|---|---|---|---|---|---|
| FUEL SALES | | | | | | | | |
| Aviation Gas | 16.770 | 15.830 | 16.925 | 16.912 | 18.754 | 16.596 | 15.244 | 17.399 |
| Exempt | 1.521 | 0.685 | 0.552 | 0.558 | 0.574 | 0.589 | 0.498 | 0.574 |
| Taxable | 15.249 | 15.145 | 16.373 | 16.354 | 18.180 | 16.007 | 14.746 | 16.825 |
| Aviation Jet | 330.744 | 363.607 | 415.164 | 416.184 | 400.177 | 432.366 | 517.575 | 611.314 |
| Exempt | 227.581 | 250.601 | 288.974 | 286.110 | 247.619 | 99.957 | 242.815 | 311.820 |
| Taxable | 103.163 | 113.006 | 126.190 | 130.074 | 152.558 | 332.409 | 274.760 | 299.494 |
| Marine Gas | 11.766 | 7.714 | 8.296 | 7.598 | 7.602 | 7.878 | 8.568 | 8.955 |
| Exempt | 5.707 | 0.554 | 0.292 | 0.025 | 0.085 | 0.032 | 0.052 | 0.120 |
| Taxable | 6.059 | 7.160 | 8.004 | 7.573 | 7.517 | 7.846 | 8.516 | 8.835 |
| Marine Diesel | 38.613 | 51.985 | 59.492 | 67.711 | 72.282 | 99.443 | 147.569 | 124.416 |
| Exempt | 6.396 | 10.116 | 6.325 | 5.370 | 5.153 | 30.443 | 75.395 | 50.874 |
| Taxable | 32.217 | 41.869 | 53.167 | 62.341 | 67.129 | 69.000 | 72.174 | 73.542 |
| Other Gas | 186.213 | 187.359 | 181.329 | 177.353 | 186.446 | 210.644 | 197.968 | 223.178 |
| Exempt | 5.094 | 8.290 | 7.527 | 8.162 | 9.084 | 12.809 | 10.887 | 11.028 |
| Taxable | 181.119 | 179.069 | 173.802 | 169.191 | 177.362 | 197.835 | 187.081 | 212.150 |
| Other Diesel | 165.752 | 184.876 | 269.377 | 302.647 | 326.440 | 411.125 | 420.279 | 436.308 |
| Exempt | 46.160 | 54.050 | 120.960 | 120.939 | 117.074 | 187.856 | 178.494 | 190.891 |
| Taxable | 119.592 | 130.826 | 148.417 | 181.708 | 209.366 | 223.269 | 241.785 | 245.113 |
| TOTAL | 749.858 | 811.371 | 950.583 | 988.405 | 1,011.701 | 1,178.052 | 1,307.203 | 1,421.570 |

| | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 Est. |
|---|---|---|---|---|---|---|---|
| FUEL SALES | | | | | | | |
| Aviation Gas | 17.997 | 17.815 | 18.492 | 19.314 | 19.309 | 20.807 | 20.943 |
| Exempt | 0.515 | 0.858 | 0.384 | 0.743 | 0.816 | 1.019 | 0.732 |
| Taxable | 17.482 | 16.957 | 18.108 | 18.571 | 18.493 | 19.788 | 20.211 |
| Aviation Jet | 518.092 | 592.620 | 644.477 | 684.910 | 682.239 | 873.336 | 720.589 |
| Exempt | 223.635 | 280.654 | 318.349 | 333.703 | 311.805 | 423.583 | 347.448 |
| Taxable | 294.457 | 311.966 | 326.128 | 351.207 | 370.434 | 449.753 | 373.141 |
| Marine Gas | 14.664 | 10.464 | 11.510 | 10.554 | 10.202 | 10.477 | 12.084 |
| Exempt | 0.251 | 0.291 | 0.183 | 0.075 | 0.194 | 0.239 | 0.722 |
| Taxable | 14.413 | 10.173 | 11.327 | 10.479 | 10.008 | 10.238 | 11.362 |
| Marine Diesel | 98.675 | 105.218 | 171.769 | 159.027 | 176.361 | 198.301 | 212.738 |
| Exempt | 9.724 | 10.097 | 83.120 | 43.828 | 28.636 | 15.701 | 16.636 |
| Taxable | 88.951 | 95.121 | 88.649 | 115.199 | 147.725 | 182.600 | 196.102 |
| Other Gas | 235.081 | 234.482 | 221.259 | 222.162 | 215.462 | 244.488 | 218.883 |
| Exempt | 15.353 | 21.558 | 17.541 | 15.040 | 15.445 | 9.331 | 7.810 |
| Taxable | 219.728 | 212.924 | 203.718 | 207.122 | 200.017 | 235.157 | 211.073 |
| Other Diesel | 643.430 | 897.970 | 843.045 | 858.228 | 956.127 | 843.652 | 777.813 |
| Exempt | 369.279 | 559.413 | 583.305 | 576.131 | 674.692 | 570.569 | 485 739 |
| Taxable | 274.151 | 338.557 | 259.740 | 282.097 | 281.435 | 273.083 | 29 .074 |
| TOTAL | 1,527.939 | 1,858.569 | 1,910.552 | 1,954.195 | 2,059.700 | 2,191.061 | 1,9( 3.050 |

Source: Alaska Department of Revenue, "Report of Motor Fuel Sold or Distributed in Alaska."
2/12/92

# FUEL SOLD OR DISTRIBUTED IN ALASKA, 1991 TABLE 5.2

GALLONS

| | Aviation Gas | Aviation Jet | Marine Gas | Marine Diesel | Other Gas | Other Diesel |
|---|---|---|---|---|---|---|
| **EXEMPT** | | | | | | |
| Sold for heating use | --- | --- | --- | --- | 234,867 | 110,652,512 |
| Federal government | 488,286 | 83,406,502 | 507,606 | 2,456,430 | 2,259,387 | 15,645,641 |
| State/local government | 159,919 | 297,530 | 91,452 | 5,747,697 | 2,732,033 | 15,028,250 |
| Charitable institution | 1,007 | 0 | 2,510 | 0 | 60,469 | 1,086,484 |
| Pub. util./non-profit power assoc. | --- | --- | --- | --- | --- | 28,909,079 |
| Exempt power plant | --- | --- | --- | --- | 73,497 | 9,640,846 |
| Jet fuel-foreign flights | --- | 257,622,632 | --- | --- | --- | --- |
| Bonded jet fuel | --- | 0 | --- | --- | --- | --- |
| Consigned to foreign countries | 0 | 0 | 0 | 0 | 0 | 0 |
| Exported as cargo | 21,078 | 63,000 | 4,943 | 6,535,637 | 2,400,451 | 289,382,079 |
| Gasohol | 0 | 0 | 0 | 0 | 0 | 0 |
| Actual losses | 0 | 3,083 | 0 | 0 | 0 | 0 |
| Other | 0 | 834,981 | 81 | 0 | 22,776 | 706,735 |
| **TOTAL EXEMPT** | 673,290 | 342,261,884 | 606,592 | 14,852,376 | 7,811,036 | 471,045,626 |
| **TOTAL TAXABLE** | 18,887,207 | 374,474,826 | 9,661,589 | 178,341,530 | 209,227,656 | 285,625,196 |
| **TOTAL EXEMPT + TAXABLE** | 19,560,497 | 716,736,710 | 10,268,181 | 193,193,906 | 217,038,692 | 756,670,822 |

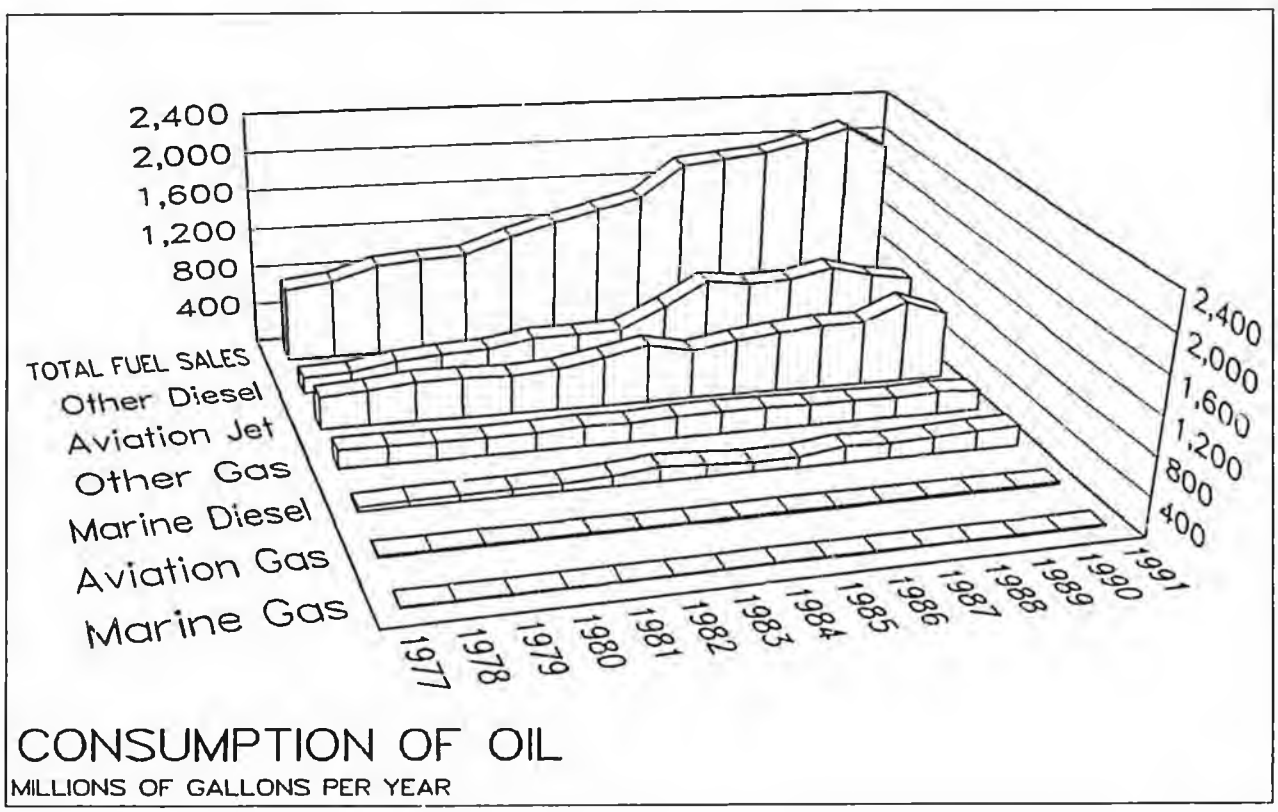



**Figure 5**

# SECTION 6
# HISTORICAL CONSUMPTION OF NATURAL GAS

In 1991 Alaska consumed 551 billion cubic feet of natural gas. Table 6, Fig. 6A, and Fig. 6B list the major end users of natural gas from 1971 to 1991.

## NORTH SLOPE

At present, the only market for North Slope gas is as fuel for oil production plants and equipment. Consequently, 88% of the extracted gas is injected back into the fields to maintain reservoir pressure. Of 210 billion cubic feet consumed in 1990, 82% went to field operations, 7% to TAPS, and 7% was reported to the AOGCC as NGL. The volume of gas consumed on the North Slope to produce oil is as large as the combined Anchorage and Kenai domestic, commercial and industrial markets.

## COOK INLET

Anchorage and Kenai markets consume nearly all the gas extracted from Cook Inlet fields. Of 206 billion cubic feet consumed in 1990, 30% went to LNG production, 26% to ammonia/urea production, 21% to power generation, 12% to utility gas, and 7% to field operations.

# HISTORICAL GAS CONSUMPTION

BILLIONS OF CUBIC FEET PER YEAR

| | 1971 | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| NORTH SLOPE | | | | | | | | | | | |
| Field Operations [1] | ND | ND | ND | 2.650 | 2.808 | 3.856 | 24.444 | 29.231 | 33.763 | 39.697 | 41.607 |
| Vented and Flared | ND | ND | ND | 1.076 | 1.061 | 1.254 | 10.882 | 2.313 | 1.840 | 1.801 | 2.485 |
| Used on Lease | ND | ND | ND | 1.556 | 1.747 | 2.602 | 13.562 | 18.826 | 23.559 | 28.967 | 29.642 |
| Shrinkage | ND | ND | ND | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Other | ND | ND | ND | 0.018 | 0.000 | 0.000 | 0.000 | 8.092 | 8.364 | 8.929 | 9.480 |
| Sold [1] | ND | ND | ND | 0.136 | 1.037 | 2.054 | 3.347 | 7.802 | 9.512 | 12.007 | 12.791 |
| Power generation [3 | ND | ND | ND | ND | ND | ND | ND | 0.219 | 0.235 | 0.235 | 0.315 |
| Gas Utilities [3] | ND | ND | ND | ND | ND | ND | ND | 0.291 | 0.317 | 0.400 | 0.435 |
| TAPS [7] | 0.00 | 0.00 | 0.00 | 0.000 | 0.000 | 0.000 | 1.754 | 6.949 | 8.648 | 10.686 | 11.106 |
| NGL [8] | 0.00 | 0.00 | 0.00 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.215 | 0.381 |
| Other [9] | ND | ND | ND | ND | ND | ND | ND | 0.343 | 0.312 | 0.471 | 0.554 |
| TOTAL | ND | ND | ND | 2.786 | 3.845 | 5.910 | 27.791 | 37.033 | 43.275 | 51.704 | 54.398 |
| COOK INLET | | | | | | | | | | | |
| Field Operations [1] | 45.25 | 36.56 | 20.90 | 49.834 | 28.830 | 24.467 | 24.416 | 25.949 | 24.101 | 22.304 | 20.559 |
| Vented and Flared | 33.18 | 20.98 | 6.93 | 7.978 | 9.496 | 5.421 | 4.848 | 3.870 | 2.710 | 3.045 | 3.175 |
| Used on Leases | 10.96 | 14.86 | 12.42 | 39.845 | 16.215 | 15.822 | 16.404 | 16.228 | 14.564 | 14.608 | 14.950 |
| Shrinkage | 1.11 | 0.72 | 1.55 | 2.011 | 3.119 | 3.224 | 3.145 | 3.426 | 2.847 | 2.438 | 2.434 |
| Other | 0.00 | 0.00 | 0.00 | 0.000 | 0.000 | 0.000 | 0.019 | 2.425 | 3.980 | 2.213 | 0.000 |
| Sold [1] | 121.72 | 123.72 | 130.94 | 130.509 | 140.717 | 143.710 | 152.437 | 164.300 | 168.106 | 162.201 | 178.082 |
| Power generation | 14.69 | 15.38 | 16.70 | 17.448 | 25.461 | 27.613 | 28.590 | 29.718 | 33.141 | 33.520 | 33.632 |
| Public [2] | 8.14 | 8.91 | 10.63 | 11.764 | 19.619 | 22.189 | 23.590 | 24.592 | 28.155 | 28.757 | 29.071 |
| Military [2] | 6.55 | 6.47 | 6.07 | 5.684 | 5.842 | 5.424 | 5.000 | 5.126 | 4.986 | 4.763 | 4.561 |
| Gas Utilities | 10.24 | 13.10 | 14.76 | 15.128 | 12.092 | 12.551 | 12.683 | 13.454 | 14.045 | 15.521 | 15.778 |
| Residential [2] | 5.44 | 6.03 | 6.52 | 6.717 | 5.548 | 5.916 | 6.010 | 6.536 | 6.911 | 7.773 | 7.950 |
| Commercial [2] | 4.80 | 7.07 | 8.24 | 8.411 | 6.544 | 6.635 | 6.673 | 6.918 | 7.134 | 7.748 | 7.828 |
| LNG [4] | 63.24 | 59.87 | 60.99 | 61.870 | 64.777 | 63.509 | 66.912 | 60.874 | 64.111 | 54.844 | 68.823 |
| Amonia-Urea [5] | 19.49 | 20.58 | 20.64 | 22.100 | 23.888 | 24.257 | 28.620 | 48.879 | 51.657 | 54.699 | 53.836 |
| Rental Gas [6] | ND | 13.400 | 12.590 | 10.410 | 12.477 | 11.588 | 6.703 | 10.523 | 6.958 | 5.190 | 5.601 |
| Other [9] | 14.058 | 1.389 | 5.260 | 3.553 | 2.022 | 4.192 | 8.929 | 0.852 | -1.806 | -1.573 | 0.412 |
| TOTAL | 166.97 | 160.28 | 151.84 | 180.343 | 169.547 | 168.177 | 176.853 | 190.249 | 192.207 | 184.505 | 198.641 |
| STATE | | | | | | | | | | | |
| Field Operations [1] | 45.25 | 36.56 | 20.90 | 52.484 | 31.639 | 28.322 | 48.859 | 55.180 | 57.865 | 62.001 | 62.166 |
| Vented and Flared | 33.18 | 20.98 | 6.93 | 9.054 | 10.557 | 6.674 | 15.729 | 6.183 | 4.551 | 4.846 | 5.660 |
| Used on Leases | 10.96 | 14.86 | 12.42 | 41.401 | 17.963 | 18.424 | 29.966 | 35.055 | 38.123 | 43.575 | 44.592 |
| Shrinkage | 1.11 | 0.72 | 1.55 | 2.011 | 3.119 | 3.224 | 3.145 | 3.426 | 2.847 | 2.438 | 2.434 |
| Other | 0.00 | 0.00 | 0.00 | 0.018 | 0.000 | 0.000 | 0.019 | 10.516 | 12.344 | 11.142 | 9.480 |
| Sold [1] | 121.72 | 123.72 | 130.94 | 130.645 | 141.754 | 145.763 | 155.785 | 172.101 | 177.616 | 174.208 | 190.873 |
| Power generation | 14.69 | 15.38 | 16.70 | 17.448 | 25.461 | 27.613 | 28.590 | 29.937 | 33.376 | 33.755 | 33.947 |
| Public [2][3] | 8.14 | 8.91 | 10.63 | 11.764 | 19.619 | 22.189 | 23.590 | 24.811 | 28.390 | 28.992 | 29.386 |
| Military [2] | 6.55 | 6.47 | 6.07 | 5.684 | 5.842 | 5.424 | 5.000 | 5.126 | 4.986 | 4.763 | 4.561 |
| Gas Utilities | 10.24 | 13.10 | 14.76 | 15.128 | 12.092 | 12.551 | 12.683 | 13.745 | 14.362 | 15.921 | 16.213 |
| Residential [2][3] | 5.44 | 6.03 | 6.52 | 6.717 | 5.548 | 5.916 | 6.010 | 6.827 | 7.228 | 8.173 | 8.385 |
| Commercial [2] | 4.80 | 7.07 | 8.24 | 8.411 | 6.544 | 6.635 | 6.673 | 6.918 | 7.134 | 7.748 | 7.828 |
| LNG [4] | 63.24 | 59.87 | 60.99 | 61.870 | 64.777 | 63.509 | 66.912 | 60.874 | 64.111 | 54.844 | 68.823 |
| Amonia-Urea [5] | 19.49 | 20.58 | 20.64 | 22.100 | 23.888 | 24.257 | 28.620 | 48.879 | 51.657 | 54.699 | 53.836 |
| Rental Gas [6] | ND | 13.40 | 12.59 | 10.414 | 12.477 | 11.588 | 6.703 | 10.523 | 6.958 | 5.190 | 5.601 |
| TAPS [7] | 0.00 | 0.00 | 0.00 | 0.000 | 0.000 | 0.000 | 1.754 | 6.949 | 8.648 | 10.686 | 11.106 |
| NGL [8] | 0.00 | 0.00 | 0.00 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.215 | 0.381 |
| Other [9] | ND | 1.39 | 5.26 | 3.69 | 3.06 | 6.25 | 10.52 | 1.19 | -1.50 | -1.10 | 0.97 |
| TOTAL | 166.97 | 160.28 | 151.84 | 183.129 | 173.393 | 174.085 | 204.644 | 227.281 | 235.481 | 236.209 | 253.039 |

[1] Alaska Oil and Gas Conservation Commission, "Report of Gas Disposition," monthly reports.
[2] Sum of sales from Beluga gas field in: Alaska Oil and Gas Conservation Commission, "Report of Gas Disposition" and
1971-82: Annual reports from Alaska Pipeline Co., ENSTAR and Kenai Utility Service Co. to Alaska Public Utilities Commission
1983-91: Enstar Natural Gas Co., personal communication.
[3] Barrow Utilities and Electric Cooperative Inc..
[4] 1971-74: Stanford Research Institute, "Natural Gas Demand and Supply to the Year 2000 in the Cook Inlet Basin of South Central Alaska," Nov. 1977.
1975-79: Sum of 1) production from Kenai and Beaver Creek gas fields in: Alaska Oil and Gas Conservation Commission, "Report of Gas Disposition," and 2) sales from North Cook Inlet gas field in Alaska Oil and Gas Conservaton Commission, "Kenai Gas Sales."
1980-88: Royalty reports from producers to Division of Oil and Gas.
1989-91: Phillips Petroleum Co., personal communication.
[5] 1971-74: Stanford Research Institute, "Natural Gas Demand and Supply to the Year 2000 in the Cook Inlet Basin of South Central Alaska," Nov. 1977.
1975-79: Sum of 1) sales from Kenai and Beaver Creek gas fields to Collier Chomical in: Alaska Oil and Gas Conservation Commission, "Kenai Gas Sales," and 2) sales from McArthur River gas field in: Alaska Oil and Gas Conservation Commission, "Monthly Report of Gas Disposition."
1980-88: Royalty reports from producers to Division of Oil and Gas.
1989-91: Unocal Corp., personal communication.
[6] Royalty reports from Unocal to Division of Oil and Gas, Item: Swanson River Rental Gas.
[7] Royalty reports from Arco to Division of Oil and Gas, sales to TAPS from Prudhoe Bay and Kuparuk fields.
[8] Alaska Oil and Gas Conservation Commission, "Alaska Production Summary by Field and Pool", monthly reports.
[9] Calculated difference between "Sold" and sum of listed "Sold" items.
03/27/92

# TABLE 6

| | 1982 | 1983 | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 |
|---|---|---|---|---|---|---|---|---|---|---|
| NORTH SLOPE | | | | | | | | | | |
| Field Operations [1] | 51.921 | 58.210 | 74.732 | 91.388 | 101.722 | 138.581 | 192.846 | 172.625 | 169.343 | 298.597 |
| Vented and Flared | 3.490 | 2.524 | 5.814 | 3.437 | 5.802 | 12.952 | 5.747 | 6.792 | 8.753 | 6.795 |
| Used on Lease | 37.864 | 44.837 | 53.884 | 70.683 | 71.338 | 109.127 | 132.245 | 136.576 | 137.981 | 154.038 |
| Shrinkage | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 40.759 | 9.678 | 1.099 | 118.153 |
| Other | 10.567 | 10.849 | 15.034 | 17.268 | 24.582 | 16.502 | 14.095 | 19.579 | 21.510 | 19.611 |
| Sold [1] | 14.000 | 14.589 | 15.088 | 20.089 | 20.001 | 42.719 | 48.267 | 39.546 | 37.067 | 45.475 |
| Power generation [3 | 0.404 | 0.482 | 0.480 | 0.486 | 0.559 | 0.544 | 0.620 | 0.620 | 0.644 | 0.667 |
| Gas Utilities [3] | 0.539 | 0.407 | 0.508 | 0.453 | 0.486 | 0.493 | 0.519 | 0.484 | 0.495 | 0.486 |
| TAPS [7] | 11.952 | 13.277 | 12.856 | 14.381 | 15.166 | 16.624 | 17.855 | 16.147 | 14.543 | 15.349 |
| NGL [8] | 0.424 | 0.264 | 0.269 | 0.693 | 1.103 | 13.837 | 17.821 | 15.987 | 15.399 | 20.221 |
| Other [9] | 0.681 | 0.159 | 0.975 | 4.076 | 2.687 | 11.221 | 11.472 | 6.308 | 5.986 | 8.752 |
| TOTAL | 65.921 | 72.799 | 89.820 | 111.477 | 121.723 | 181.300 | 241.133 | 212.171 | 206.410 | 344.072 |
| COOK INLET | | | | | | | | | | |
| Field Operations [1] | 20.957 | 19.380 | 22.468 | 18.637 | 18.408 | 18.529 | 19.143 | 19.353 | 15.570 | 20.256 |
| Vented and Flared | 3.494 | 2.560 | 3.260 | 2.893 | 3.095 | 2.746 | 3.244 | 2.940 | 2.214 | 3.900 |
| Used on Leases | 14.861 | 14.056 | 14.597 | 13.971 | 13.845 | 14.651 | 14.636 | 14.317 | 12.260 | 14.476 |
| Shrinkage | 2.602 | 2.726 | 2.657 | 1.773 | 1.468 | 1.130 | 1.263 | 2.096 | 1.064 | 1.843 |
| Other | 0.000 | 0.038 | 1.954 | 0.000 | 0.000 | 0.002 | 0.000 | 0.000 | 0.032 | 0.037 |
| Sold [1] | 185.913 | 192.578 | 192.752 | 199.311 | 174.563 | 177.660 | 177.471 | 185.767 | 194.877 | 186.366 |
| Power generation | 35.818 | 36.169 | 36.520 | 40.851 | 44.208 | 40.698 | 42.100 | 44.936 | 38.860 | 35.340 |
| Public [2] | 30.988 | 31.573 | 32.182 | 36.321 | 39.677 | 36.041 | 37.284 | 39.920 | 33.920 | 30.640 |
| Military [2] | 4.830 | 4.596 | 4.338 | 4.530 | 4.531 | 4.657 | 4.816 | 5.016 | 4.940 | 4.700 |
| Gas Utilities | 19.025 | 19.111 | 20.903 | 24.419 | 23.235 | 23.063 | 23.249 | 25.238 | 25.892 | 24.700 |
| Residential [2] | 9.981 | 10.202 | 10.999 | 12.445 | 11.935 | 12.027 | 12.292 | 13.564 | 13.968 | 13.440 |
| Commercial [2] | 9.044 | 8.909 | 9.904 | 11.974 | 11.300 | 11.036 | 10.957 | 11.674 | 11.924 | 11.260 |
| LNG [4] | 64.438 | 67.729 | 65.882 | 65.177 | 61.906 | 60.879 | 63.325 | 64.354 | 63.916 | 65.494 |
| Amonia-Urea [5] | 55.220 | 50.338 | 50.083 | 50.688 | 35.733 | 45.230 | 41.882 | 54.495 | 54.495 | 54.750 |
| Rental Gas [6] | 11.383 | 12.698 | 18.362 | 21.532 | 14.785 | 16.733 | 8.722 | 6.705 | 3.182 | 3.683 |
| Other [9] | 0.029 | 6.533 | 1.002 | -3.356 | -5.304 | -8.943 | -1.807 | -9.961 | -6.010 | 2.399 |
| TOTAL | 206.870 | 211.958 | 215.220 | 217.948 | 192.971 | 196.189 | 196.614 | 205.120 | 210.447 | 206.622 |
| STATE | | | | | | | | | | |
| Field Operations [1] | 72.876 | 77.590 | 95.249 | 110.025 | 120.130 | 157.110 | 211.989 | 191.978 | 184.913 | 318.853 |
| Vented and Flared | 6.983 | 5.084 | 9.075 | 6.330 | 8.897 | 15.698 | 8.991 | 9.732 | 10.787 | 10.695 |
| Used on Leases | 52.724 | 58.893 | 68.481 | 84.654 | 85.183 | 123.778 | 146.881 | 150.893 | 150.241 | 168.514 |
| Shrinkage | 2.602 | 2.726 | 2.657 | 1.773 | 1.468 | 1.130 | 42.022 | 11.774 | 2.163 | 119.996 |
| Other | 10.567 | 10.887 | 15.036 | 17.268 | 24.582 | 16.504 | 14.095 | 19.579 | 21.542 | 19.648 |
| Sold [1] | 199.914 | 207.167 | 207.840 | 219.400 | 194.653 | 220.379 | 225.758 | 225.313 | 231.944 | 231.841 |
| Power generation | 36.222 | 36.651 | 37.000 | 41.337 | 44.767 | 41.242 | 42.720 | 45.556 | 54.046 | 36.007 |
| Public [2][3] | 31.392 | 32.055 | 32.662 | 36.807 | 40.236 | 36.585 | 37.904 | 40.540 | 49.109 | 31.307 |
| Military [2] | 4.830 | 4.596 | 4.338 | 4.530 | 4.531 | 4.657 | 4.816 | 5.016 | 4.937 | 4.700 |
| Gas Utilities | 19.564 | 19.518 | 20.911 | 24.872 | 23.721 | 23.556 | 23.768 | 25.722 | 26.387 | 25.186 |
| Residential [2][3] | 10.520 | 10.609 | 11.507 | 12.898 | 12.421 | 12.520 | 12.811 | 14.048 | 14.463 | 13.926 |
| Commercial [2] | 9.044 | 8.909 | 9.404 | 11.974 | 11.300 | 11.036 | 10.957 | 11.674 | 11.924 | 11.260 |
| LNG [4] | 64.438 | 67.729 | 65.892 | 65.177 | 61.906 | 60.879 | 63.325 | 64.354 | 63.916 | 65.494 |
| Amonia-Urea [5] | 55.220 | 50.338 | 50.083 | 50.688 | 35.733 | 45.230 | 41.882 | 54.495 | 54.495 | 54.750 |
| Rental Gas [6] | 11.383 | 12.698 | 18.362 | 21.532 | 14.785 | 16.733 | 8.722 | 6.705 | 3.182 | 3.683 |
| TAPS [7] | 11.952 | 13.277 | 12.856 | 14.381 | 15.166 | 16.624 | 17.855 | 16.147 | 14.543 | 15.349 |
| NGL [8] | 0.424 | 0.264 | 0.269 | 0.646 | 1.103 | 13.825 | 17.447 | 15.272 | 15.414 | 20.221 |
| Other [9] | 0.711 | 6.692 | 2.467 | 0.767 | -2.528 | 2.290 | 10.039 | -2.938 | -0.039 | 11.151 |
| TOTAL | 272.790 | 284.757 | 303.089 | 329.425 | 314.783 | 377.489 | 437.747 | 417.291 | 416.857 | 550.694 |

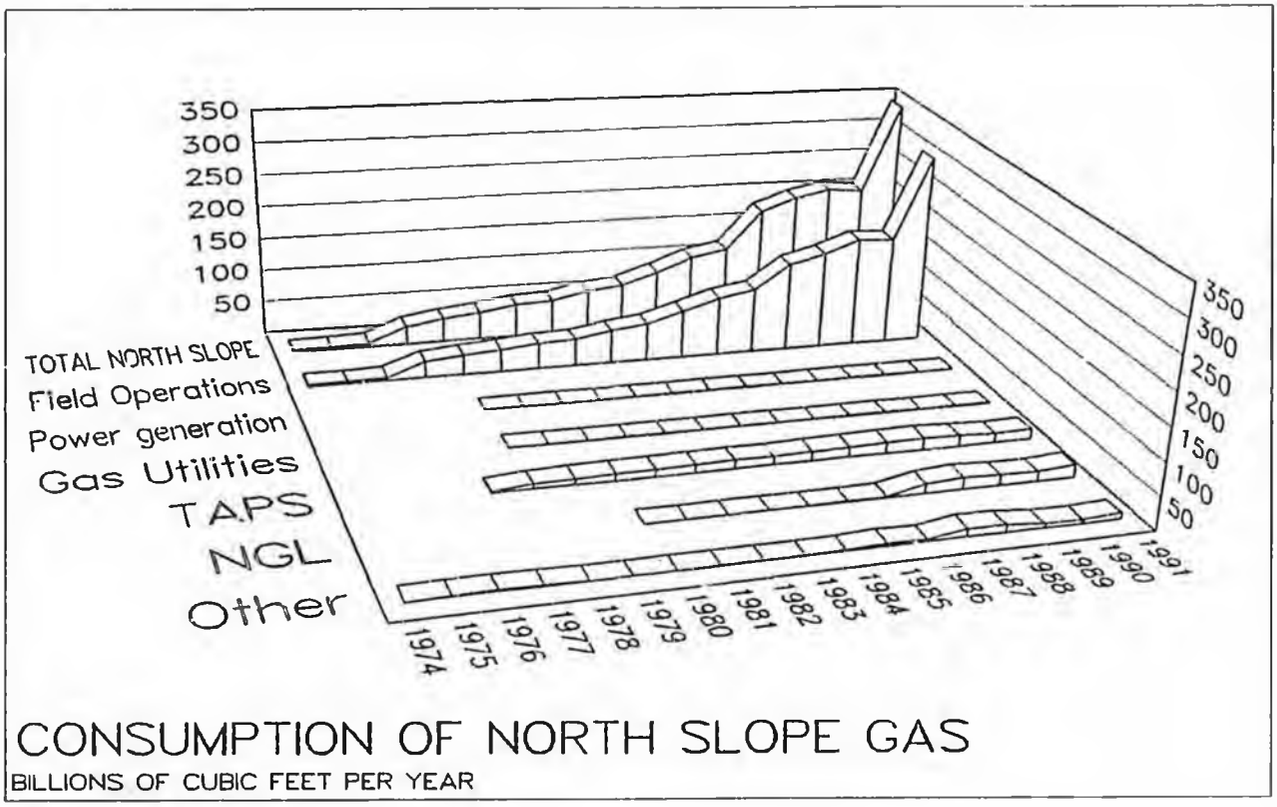



**Figure 6A**

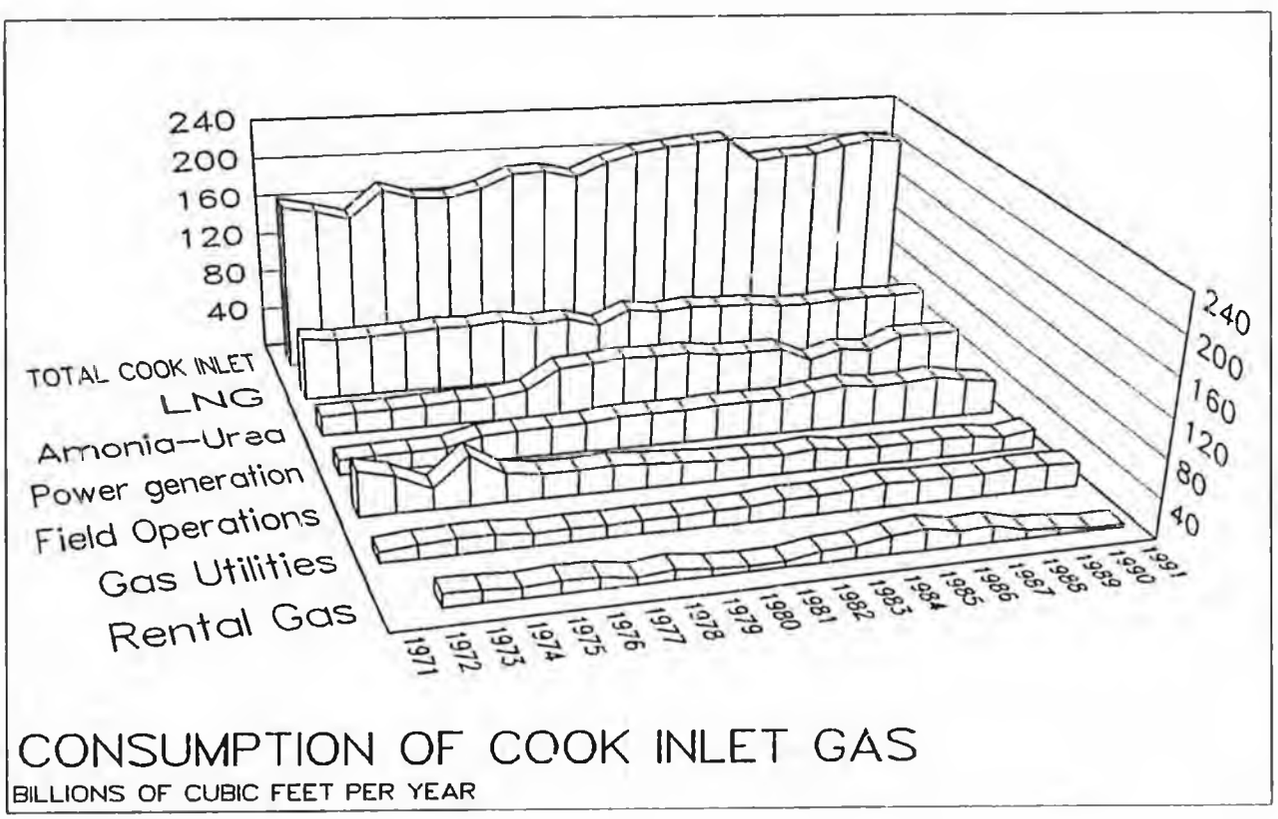



**Figure 6B**

# SECTION 7
# PROJECTED CONSUMPTION OF OIL AND NATURAL GAS

The Institute of Social and Economic Research (ISER) prepared a forecast of statewide energy demand for the January 1987 edition of the "Historical and Projected Oil and Gas Consumption" report. This forecast was developed using the Energy Demand Model (ENDMOD), a computer spreadsheet that portrayed future oil and gas demand in Alaska for various end-uses. Future oil and gas demand was determined as a function of population and the availability of alternative energy sources. In subsequent editions, this forecast was updated by DO&G staff by adjusting first-year predicted consumption rates to actual observed data. These later forecasts presupposed that trends that were anticipated in 1986 were still valid. This year staff have more thoroughly recalibrated the model using a new ISER forecast of state and local population, new data on electrical generation and vehicle fuel use, and new assumptions about petroleum industry trends. The forecast period has also been extended to 2010. While the basic structure of this year's model remains the same as its predecessor, our forecast of oil and gas demand is significantly different.

Future consumption of oil and gas will not increase as fast as population because increased consumption for utility generation will be offset by reduced consumption by the oil and gas industry.

## LIQUID PETROLEUM

Total consumption of liquid petroleum products will see a average annual growth of only 2 percent rising from 2.3 billion gallons in 1991 to 3.1 billion gallons in 2010. Requirements for electrical generation, barring any significant changes in hydroelectric or coal-based generation capacity, will grow 4 percent a year. The oil industry itself consumed 2.3 million barrels in 1991, largely for fuel requirements for TAPS. As TAPS throughput declines, consumption will fall to nearly 310 thousand barrels of product by 2010.

Transportation fuel consumption (excluding pipelines) will grow moderately in future years, increasing from 2 million gallons in 1992 to 2.8 million in 2010. Marine and highway diesel is the largest component of transportation fuel consumption, about 48 percent of the total, but jet fuel consumption will grow most rapidly (3 percent annually) as predicted in earlier forecasts.

Total consumption for petroleum liquids projected over the 18 year period from 1992 to 2010 is 49 billion gallons or approximately 1.2 billion barrels.

## NATURAL GAS

Consumption of natural gas is expected to remain flat throughout the forecast period. Although growth may be expected in utilities to meet the modest growth in population, use of gas by the petroleum industry will decline offsetting gains in other sectors. Utility generation will increase from 38.1 billion cubic feet in 1992 to 56.3 billion cubic feet by 2010, an increase of just 2 percent per year on average. Petroleum industry demand for natural gas will fall by an average of 2 percent per year. The most dramatic decline in energy consumption by the oil and gas industry is predicted for pipeline fuel (dominated by TAPS) that parallels the decline in North Slope oil production and transportation. Pipeline fuel demand will drop by 8 percent per year, roughly the same decline predicted for TAPS throughput. Consumption of gas for field operations will increase through 1993 as the gas-handling expansion project for the Prudhoe Bay field comes on-line but then will decline at 2 percent per year thereafter.

We assume that ammonia-urea production will continue at current levels, 54.5 billion cubic feet per year. Exports of LNG from the Kenai Peninsula and potential future sales of North Slope gas are not included as a component of statewide demand. At the current level of 64 billion cubic feet per year approximately 832 billion cubic feet will be required to sustain LNG exports from the Kenai facility over the next 18 years.

Total in-state requirements for natural gas over the next 18 years will total 6.7 trillion cubic feet.

# PROJECTED DEMAND FOR OIL

MILLIONS OF GALLONS PER YEAR

| | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **RAILBELT** | | | | | | | | | | | |
| Vehicle Transportation | 1,264 | 1,295 | 1,318 | 1,339 | 1,372 | 1,411 | 1,447 | 1,467 | 1,487 | 1,507 | 1,527 |
| Jet Fuel | 612 | 631 | 647 | 663 | 683 | 706 | 729 | 745 | 762 | 779 | 797 |
| Civilian Domestic | 322 | 338 | 352 | 365 | 382 | 402 | 421 | 436 | 450 | 465 | 479 |
| Military and International | 290 | 293 | 296 | 298 | 301 | 304 | 307 | 310 | 312 | 315 | 318 |
| Gasoline | 189 | 192 | 193 | 193 | 196 | 199 | 202 | 202 | 201 | 201 | 200 |
| Aviation | 17 | 18 | 18 | 18 | 18 | 19 | 19 | 19 | 19 | 19 | 19 |
| Highway | 164 | 167 | 167 | 168 | 170 | 172 | 175 | 175 | 174 | 174 | 173 |
| Marine | 7 | 7 | 7 | 7 | 8 | 8 | 8 | 8 | 8 | 8 | 8 |
| Diesel | 462 | 472 | 478 | 483 | 493 | 505 | 516 | 520 | 523 | 526 | 529 |
| Highway | 309 | 314 | 317 | 320 | 325 | 332 | 338 | 339 | 340 | 341 | 342 |
| Marine | 153 | 158 | 161 | 164 | 168 | 173 | 178 | 181 | 183 | 185 | 187 |
| Space Heat | 63 | 64 | 64 | 65 | 66 | 68 | 69 | 69 | 70 | 70 | 70 |
| Utility Generation | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 |
| Industry | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| TOTAL | 1,335 | 1,367 | 1,392 | 1,413 | 1,447 | 1,487 | 1,525 | 1,545 | 1,565 | 1,585 | 1,606 |
| **NON-RAILBELT** | | | | | | | | | | | |
| Vehicle Transportation | 413 | 424 | 431 | 440 | 451 | 463 | 474 | 484 | 492 | 499 | 505 |
| Jet Fuel | 135 | 139 | 144 | 149 | 154 | 158 | 163 | 169 | 175 | 180 | 185 |
| Civilian Domestic | 74 | 78 | 81 | 85 | 89 | 94 | 98 | 103 | 107 | 111 | 115 |
| Military and International | 61 | 62 | 62 | 63 | 64 | 65 | 65 | 67 | 68 | 69 | 70 |
| Gasoline | 69 | 70 | 71 | 71 | 72 | 73 | 74 | 75 | 75 | 75 | 75 |
| Aviation | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 5 | 5 | 5 | 5 |
| Highway | 60 | 61 | 61 | 62 | 63 | 63 | 64 | 65 | 65 | 65 | 65 |
| Marine | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 6 | 6 | 6 | 6 |
| Diesel | 334 | 341 | 345 | 350 | 357 | 365 | 371 | 376 | 380 | 382 | 384 |
| Highway | 265 | 270 | 273 | 276 | 281 | 286 | 291 | 294 | 296 | 298 | 299 |
| Marine | 69 | 70 | 72 | 74 | 76 | 78 | 80 | 82 | 83 | 85 | 86 |
| Space Heat | 117 | 119 | 120 | 122 | 124 | 127 | 129 | 131 | 132 | 133 | 134 |
| Utility Generation | 41 | 43 | 44 | 46 | 49 | 52 | 55 | 58 | 60 | 62 | 64 |
| Southeast | 8 | 9 | 9 | 10 | 11 | 13 | 14 | 15 | 15 | 15 | 16 |
| Rest of State | 33 | 34 | 35 | 37 | 38 | 40 | 41 | 43 | 45 | 46 | 48 |
| Industry | 90 | 83 | 77 | 71 | 66 | 62 | 57 | 53 | 50 | 47 | 43 |
| TOTAL | 544 | 549 | 553 | 558 | 567 | 577 | 587 | 595 | 602 | 607 | 612 |
| **STATE** | | | | | | | | | | | |
| Vehicle Transportation | 1,802 | 1,845 | 1,877 | 1,909 | 1,954 | 2,006 | 2,055 | 2,087 | 2,117 | 2,144 | 2,172 |
| Jet Fuel | 748 | 770 | 791 | 811 | 837 | 864 | 892 | 915 | 937 | 960 | 982 |
| Civilian Domestic | 397 | 416 | 433 | 450 | 471 | 495 | 519 | 539 | 557 | 576 | 595 |
| Military and International | 351 | 354 | 358 | 362 | 365 | 369 | 373 | 376 | 380 | 384 | 388 |
| Gasoline | 258 | 262 | 263 | 265 | 268 | 272 | 276 | 277 | 277 | 276 | 276 |
| Aviation | 22 | 22 | 22 | 22 | 23 | 23 | 24 | 24 | 24 | 24 | 24 |
| Highway | 225 | 227 | 229 | 230 | 232 | 236 | 239 | 239 | 239 | 239 | 238 |
| Marine | 12 | 12 | 13 | 13 | 13 | 13 | 13 | 13 | 14 | 14 | 14 |
| Diesel | 796 | 813 | 823 | 833 | 850 | 870 | 887 | 896 | 903 | 908 | 913 |
| Highway | 574 | 584 | 590 | 596 | 606 | 618 | 629 | 634 | 637 | 639 | 640 |
| Marine | 222 | 228 | 233 | 237 | 244 | 251 | 258 | 263 | 266 | 270 | 273 |
| Space Heat | 179 | 183 | 185 | 187 | 191 | 194 | 198 | 200 | 202 | 203 | 204 |
| Utility Generation | 50 | 52 | 53 | 55 | 58 | 61 | 64 | 67 | 69 | 71 | 72 |
| Industry | 90 | 83 | 77 | 71 | 66 | 62 | 57 | 53 | 50 | 47 | 43 |
| Pipeline Fuel | 70 | 63 | 58 | 52 | 48 | 43 | 40 | 36 | 33 | 30 | 27 |
| Electricity Generation | 20 | 20 | 19 | 19 | 19 | 18 | 18 | 17 | 17 | 17 | 16 |
| TOTAL | 2,120 | 2,162 | 2,192 | 2,222 | 2,269 | 2,323 | 2,374 | 2,408 | 2,437 | 2,464 | 2,491 |

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# TABLE 7.1

| | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | TOTAL | ANNUAL GROWTH |
|---|---|---|---|---|---|---|---|---|---|---|
| RAILBELT | | | | | | | | | | |
| Vehicle Transportation | 1,549 | 1,577 | 1,609 | 1,643 | 1,680 | 1,719 | 1,763 | 1,812 | 30,009 | 2% |
| Jet Fuel | 816 | 838 | 862 | 887 | 914 | 943 | 974 | 1,008 | 15,589 | 3% |
| Civilian Domestic | 496 | 514 | 534 | 556 | 579 | 604 | 631 | 661 | 9,291 | 4% |
| Military and International | 321 | 324 | 328 | 331 | 335 | 339 | 343 | 347 | 6,298 | 1% |
| Gasoline | 200 | 201 | 202 | 203 | 204 | 206 | 208 | 211 | 3,988 | 1% |
| Aviation | 19 | 20 | 20 | 20 | 20 | 20 | 21 | 21 | 383 | 1% |
| Highway | 173 | 173 | 174 | 175 | 176 | 177 | 179 | 181 | 3,447 | 1% |
| Marine | 8 | 8 | 8 | 8 | 8 | 8 | 9 | 9 | 158 | 1% |
| Diesel | 533 | 538 | 545 | 553 | 561 | 570 | 581 | 593 | 10,432 | 1% |
| Highway | 343 | 345 | 348 | 352 | 356 | 360 | 366 | 372 | 6,759 | 1% |
| Marine | 190 | 193 | 197 | 201 | 205 | 210 | 215 | 221 | 3,672 | 2% |
| Space Heat | 70 | 71 | 72 | 72 | 73 | 74 | 75 | 77 | 1,383 | 1% |
| Utility Generation | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 176 | 0% |
| Industry | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0% |
| TOTAL | 1,629 | 1,656 | 1,689 | 1,724 | 1,762 | 1,802 | 1,847 | 1,897 | 31,568 | 2% |
| NON-RAILBELT | | | | | | | | | | |
| Vehicle Transportation | 512 | 519 | 527 | 535 | 545 | 555 | 566 | 578 | 9,813 | 2% |
| Jet Fuel | 190 | 195 | 199 | 204 | 209 | 215 | 220 | 226 | 3,540 | 3% |
| Civilian Domestic | 119 | 123 | 128 | 132 | 137 | 142 | 147 | 153 | 2,187 | 4% |
| Military and International | 71 | 71 | 72 | 72 | 72 | 73 | 73 | 73 | 1,352 | 1% |
| Gasoline | 75 | 75 | 76 | 76 | 76 | 76 | 77 | 77 | 1,477 | 1% |
| Aviation | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 90 | 1% |
| Highway | 65 | 65 | 65 | 65 | 65 | 66 | 66 | 66 | 1,277 | 1% |
| Marine | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 110 | 1% |
| Diesel | 387 | 390 | 393 | 397 | 402 | 407 | 413 | 419 | 7,515 | 1% |
| Highway | 300 | 302 | 304 | 306 | 309 | 312 | 316 | 320 | 5,855 | 1% |
| Marine | 87 | 88 | 90 | 91 | 93 | 95 | 97 | 99 | 1,660 | 2% |
| Space Heat | 135 | 135 | 136 | 137 | 139 | 140 | 141 | 143 | 2,607 | 1% |
| Utility Generation | 65 | 67 | 69 | 71 | 73 | 76 | 78 | 81 | 1,193 | 4% |
| Southeast | 16 | 17 | 18 | 19 | 19 | 20 | 22 | 23 | 294 | 8% |
| Rest of State | 49 | 50 | 51 | 53 | 54 | 55 | 57 | 58 | 899 | 3% |
| Industry | 41 | 38 | 36 | 34 | 32 | 30 | 28 | 27 | 1,061 | -6% |
| TOTAL | 618 | 624 | 632 | 640 | 650 | 661 | 673 | 686 | 12,067 | 1% |
| STATE | | | | | | | | | | |
| Vehicle Transportation | 2,202 | 2,237 | 2,277 | 2,320 | 2,368 | 2,418 | 2,473 | 2,534 | 42,541 | 2% |
| Jet Fuel | 1,006 | 1,032 | 1,061 | 1,091 | 1,124 | 1,158 | 1,194 | 1,234 | 19,129 | 3% |
| Civilian Domestic | 615 | 637 | 662 | 688 | 716 | 746 | 779 | 814 | 11,479 | 4% |
| Military and International | 392 | 395 | 399 | 403 | 407 | 411 | 416 | 420 | 7,650 | 1% |
| Gasoline | 276 | 276 | 277 | 279 | 280 | 282 | 285 | 288 | 5,465 | 1% |
| Aviation | 24 | 24 | 24 | 25 | 25 | 25 | 26 | 26 | 473 | 1% |
| Highway | 238 | 238 | 239 | 240 | 241 | 243 | 245 | 247 | 4,723 | 1% |
| Marine | 14 | 14 | 14 | 14 | 14 | 14 | 15 | 15 | 268 | 1% |
| Diesel | 920 | 928 | 939 | 950 | 964 | 978 | 994 | 1,012 | 17,947 | 1% |
| Highway | 643 | 646 | 652 | 658 | 665 | 673 | 682 | 692 | 12,615 | 1% |
| Marine | 277 | 282 | 287 | 292 | 298 | 305 | 312 | 320 | 5,332 | 2% |
| Space Heat | 205 | 206 | 208 | 210 | 212 | 214 | 217 | 220 | 3,990 | 1% |
| Utility Generation | 74 | 76 | 78 | 80 | 82 | 85 | 87 | 90 | 1,369 | 4% |
| Industry | 41 | 38 | 36 | 34 | 32 | 30 | 28 | 27 | 1,061 | -6% |
| Pipeline Fuel | 25 | 22 | 20 | 19 | 17 | 15 | 14 | 13 | 721 | -8% |
| Electricity Generation | 16 | 16 | 15 | 15 | 15 | 15 | 14 | 14 | 340 | -2% |
| TOTAL | 2,522 | 2,557 | 2,598 | 2,643 | 2,694 | 2,747 | 2,805 | 2,870 | 48,961 | 2% |

# PROJECTED DEMAND FOR GAS

TABLE 7.2

BILLION CUBIC FEET PER YEAR

| | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| RAILBELT | | | | | | | | | | | |
| Vehicle Transportation | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Space Heat | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 |
| Utility Generation | 37 | 38 | 39 | 40 | 41 | 43 | 44 | 45 | 46 | 46 | 47 |
| Industry | 76 | 75 | 74 | 74 | 73 | 72 | 72 | 71 | 71 | 70 | 69 |
| Ammonia-Urea Production | 55 | 55 | 55 | 55 | 55 | 55 | 55 | 55 | 55 | 55 | 55 |
| Military Power Generation | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 |
| Petroleum Production | 17 | 16 | 15 | 14 | 14 | 13 | 12 | 12 | 11 | 10 | 10 |
| Pipeline Fuel | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Miscellaneous | 17 | 16 | 15 | 14 | 14 | 13 | 12 | 12 | 11 | 10 | 10 |
| TOTAL | 140 | 141 | 140 | 141 | 141 | 142 | 143 | 143 | 143 | 143 | 143 |
| NON-RAILBELT | | | | | | | | | | | |
| Vehicle Transportation | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Space Heat | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Utility Generation | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Industry | 189 | 197 | 192 | 188 | 183 | 179 | 175 | 171 | 167 | 164 | 160 |
| Pipeline Fuel | 12 | 11 | 10 | 9 | 8 | 7 | 7 | 6 | 6 | 5 | 5 |
| Other Petroleum | 177 | 186 | 182 | 179 | 175 | 172 | 168 | 165 | 162 | 158 | 155 |
| TOTAL | 191 | 199 | 194 | 189 | 185 | 181 | 177 | 173 | 169 | 165 | 162 |
| STATE | | | | | | | | | | | |
| Vehicle Transportation | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Space Heat | 28 | 27 | 27 | 27 | 28 | 28 | 28 | 28 | 28 | 28 | 28 |
| Utility Generation | 38 | 39 | 40 | 41 | 42 | 44 | 45 | 46 | 47 | 47 | 48 |
| Industry | 329 | 336 | 331 | 326 | 320 | 316 | 311 | 306 | 302 | 297 | 293 |
| Ammonia-Urea Production | 55 | 55 | 55 | 55 | 55 | 55 | 55 | 55 | 55 | 55 | 55 |
| Military Power Generation | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 |
| Petroleum Production | 206 | 213 | 207 | 202 | 197 | 192 | 187 | 183 | 178 | 174 | 170 |
| Pipeline Fuel | 12 | 11 | 10 | 9 | 8 | 7 | 7 | 6 | 6 | 5 | 5 |
| Miscellaneous | 194 | 202 | 197 | 193 | 189 | 185 | 180 | 177 | 173 | 169 | 165 |
| TOTAL | 395 | 403 | 398 | 394 | 390 | 387 | 384 | 380 | 376 | 372 | 369 |

| | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | TOTAL | ANNUAL GROWTH |
|---|---|---|---|---|---|---|---|---|---|---|
| RAILBELT | | | | | | | | | | |
| Vehicle Transportation | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0% |
| Space Heat | 27 | 27 | 27 | 27 | 27 | 27 | 28 | 28 | 542 | 0% |
| Utility Generation | 47 | 48 | 49 | 50 | 51 | 52 | 53 | 55 | 911 | 2% |
| Industry | 69 | 68 | 68 | 68 | 67 | 67 | 66 | 66 | 1,414 | -1% |
| Ammonia-Urea Production | 55 | 55 | 55 | 55 | 55 | 55 | 55 | 55 | 1,090 | 0% |
| Military Power Generation | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 100 | 0% |
| Petroleum Production | 9 | 9 | 9 | 8 | 8 | 7 | 7 | 7 | 224 | -5% |
| Pipeline Fuel | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0% |
| Miscellaneous | 9 | 9 | 9 | 8 | 8 | 7 | 7 | 7 | 224 | -5% |
| TOTAL | 143 | 143 | 144 | 145 | 146 | 146 | 147 | 149 | 2,867 | 0% |
| NON-RAILBELT | | | | | | | | | | |
| Vehicle Transportation | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0% |
| Space Heat | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 12 | 2% |
| Utility Generation | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 23 | 3% |
| Industry | 156 | 153 | 150 | 146 | 143 | 140 | 137 | 134 | 3,309 | -1% |
| Pipeline Fuel | 4 | 4 | 4 | 3 | 3 | 3 | 2 | 2 | 124 | -8% |
| Other Petroleum | 152 | 149 | 146 | 143 | 140 | 138 | 135 | 132 | 3,184 | -1% |
| TOTAL | 158 | 155 | 152 | 148 | 145 | 142 | 139 | 136 | 3,343 | -1% |
| STATE | | | | | | | | | | |
| Vehicle Transportation | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0% |
| Space Heat | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 554 | 0% |
| Utility Generation | 48 | 49 | 50 | 51 | 52 | 53 | 55 | 56 | 933 | 2% |
| Industry | 289 | 285 | 282 | 278 | 274 | 271 | 268 | 264 | 6,003 | -1% |
| Ammonia-Urea Production | 55 | 55 | 55 | 55 | 55 | 55 | 55 | 55 | 1,090 | 0% |
| Military Power Generation | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 100 | 0% |
| Petroleum Production | 166 | 162 | 158 | 154 | 151 | 147 | 144 | 141 | 3,533 | -2% |
| Pipeline Fuel | 4 | 4 | 4 | 3 | 3 | 3 | 2 | 2 | 124 | -8% |
| Miscellaneous | 162 | 158 | 155 | 151 | 148 | 145 | 142 | 139 | 3,408 | -1% |
| TOTAL | 365 | 362 | 360 | 357 | 355 | 353 | 351 | 349 | 7,490 | -1% |

[1] Includes industrial,military, and government use. Excludes pipeline fuel.
03/27/92

# APPENDIX A
# OIL AND GAS FIELD DATA

**ALBERT KALOA (Gas)**
Location Cook Inlet, west side; onshore
Operator CIRI
Production suspended
State of Alaska has no leases in this field

**BEAVER CREEK (Oil and Gas)**
Location Cook Inlet, east side; onshore
Operator Marathon
Production began 1973
State of Alaska has no leases in this field

**BELUGA RIVER (Gas)**
Location Cook Inlet, west side; onshore
Operator Arco
Production began 1968

**BIRCH HILL (Gas)**
Location Cook Inlet, east side; onshore
Operator Arco
Production shut-in 1965
State of Alaska has no leases in this field

**CANNERY LOOP (Gas)**
Location Cook Inlet, east side; onshore
Operator Unocal
Production began 1988

**EAST BARROW (Gas)**
Location North Slope; onshore
Operator North Slope Borough
Production began 1981
State of Alaska has no leases in this field.

**EAST UMIAT (Gas)**
Location North Slope, onshore
Operator UMC Petroleum
Production shut-in, no production

**ENDICOTT (Oil and Gas)**
Location North Slope; offshore
Operator BP
Production began 1987

**FALLS CREEK (Gas)**
Location Cook Inlet, east side; onshore
Operator Arco
Production shut-in 1981

**GRANITE POINT (Oil and Gas)**
Location Cook Inlet, west side; offshore
Operator Unocal
Production began 1967

**GWYDYR BAY (Oil)**
Location North Slope; onshore and offshore
Operator Arco
Production field delineation underway

**HEMI SPRINGS (Oil)**
Location North Slope; onshore
Operator Arco
Production field delineation underway

**KATALLA (Oil)**
Location Gulf of Alaska
Production abandoned 1933

**KAVIK (Gas)**
Location North Slope; onshore
Operator Arco
Production shut-in

**KEMIK (Gas)**
Location North Slope; onshore
Operator BP
Production shut-in 1972

**KENAI (Gas)**
Location Cook Inlet, east side; onshore
Operator Unocal
Production began 1961

**KUPARUK (Oil and Gas)**
Location North Slope; onshore
Operator Arco
Production began 1981

**LEWIS RIVER (Gas)**
Location Cook Inlet, west side; onshore
Operator Unocal
Production began 1984

**LISBURNE (Oil and Gas)**
Location North Slope; onshore
Operator Arco
Production began 1986

**MCARTHUR RIVER (Oil and Gas)**
Location Cook Inlet, west side; offshore
Operator Unocal
Production began 1967
Platforms Grayling, King Salmon, Dolly Vardon, Steelhead

**MIDDLE GROUND SHOAL (Oil and Gas)**
Location Cook Inlet, east side; offshore
Operator A and C platforms: Shell
Baker and Dillon platforms: Unocal
Production began 1967
Platforms A, Baker, C, Dillon,

**MILNE POINT (Oil)**
Location North Slope; onshore
Operator Conoco
Production began 1985, suspended 1/88 – 2/89

**MOQUAWKIE (Gas)**
Location Cook Inlet, west side; onshore
Operator CIRI
Production shut-in 1979

**NIAKUK (Oil)**
Location North Slope; offshore; Prudhoe Bay Unit
Operator BP
Production startup in 1995

**NICOLAI CREEK (Gas)**
Location Cook Inlet, west side; onshore and offshore
Operator Unocal
Production began 1968, now shut-in

**NORTH COOK INLET (Gas)**
Location Cook Inlet, mid channel; offshore
Operator Phillips
Production began 1970
Platform Phillips A

**NORTH FORK (Gas)**
Location Cook Inlet, east side; onshore
Operator Unocal
Production shut-in 1965

**NORTH MIDDLE GROUND SHOAL (Gas)**
Location Cook Inlet; offshore
Operator Shell and Unocal, one well each
Production abandoned

**POINT McINTYRE (Oil)**
Location North Slope; offshore; Prudhoe Bay Unit
Operator Arco
Production startup in 1994

**POINT THOMSON AND FLAXMAN ISLAND (Oil and Gas)**
Location North Slope; onshore and offshore
Operator Exxon
Production shut-in

**PRETTY CREEK (Gas)**
Location Cook Inlet, west side; onshore
Operator Unocal
Production began 1986

**PRUDHOE BAY (Oil and Gas)**
Location North Slope; onshore
Operator Western Operating Area: BP
Eastern Operating Area: Arco
Production began 1977

**REDOUBT SHOAL (Oil)**
Location Cook Inlet, west side; offshore
Operator unleased
Production abandoned

**SAG DELTA (Oil)**
Location North Slope; offshore; Duck Island Unit
Operator BP
Production began 1639

**SCHRADER BLUFF (Oil)**
Location North Slope; onshore; Milne Point Unit
Operator Conoco
Production began 1991

**SIMPSON LAGOON (Oil)**
Operator US Navy
Production shut-in

**SOUTH BARROW (Gas)**
Operator North Slope Borough
Production began 1950
State of Alaska has no leases in this field.

**STERLING (Gas)**
Location Cook Inlet, east side; onshore
Operator Unocal
Production began 1962, shut-in 1986
State of Alaska has no leases in this field.

**STUMP LAKE (Gas)**
Location Cook Inlet, west side; onshore
Operator Unocal
Production began 1990

**SWANSON RIVER (Oil and Gas)**
Location Cook Inlet, east side; onshore
Operator Arco
Production began 1958
State of Alaska has no leases in this field

**TRADING BAY (Oil and Gas)**
Location Cook Inlet, west side; offshore
Operator Marathon: Spur and Spark, Unocal: Monopod
Production began 1967
Platforms Spur, Spark, Monopod

**UGNU (Oil)**
Location North Slope, onshore
Operator Standard
Production abandoned

**UMIAT (Oil)**
Location North Slope, onshore
Operator US Dpt. of Interior
Production shut-in

**WEST FORELANDS (Gas)**
Location Cook Inlet, west side; onshore and offshore
Operator Phillips
Production shut-in 1962

**WEST SAK (Oil)**
Location North Slope; onshore
Operator Arco
Production Pilot study, 1984 – 1986

01/30/92

# APPENDIX B
# LEASE DATA

This table lists only state oil and gas leases that produced hydrocarbons as of January 31, 1992.

| LEASE TRACT | PARTICIPATING AREA OIL % | PARTICIPATING AREA GAS % | ROYALTY % | OWNER | % | OWNER | % | OWNER | % |
|---|---|---|---|---|---|---|---|---|---|
| **BELUGA** | | | | | | | | | |
| 17592 | 100.0000000 | 8.0024000 | 0.00000 | ARCO | 33.3333333 | CHEVRON | 33.3333333 | SHELL | 33.3333334 |
| 17599 | 0.0000000 | 5.0210000 | 0.00000 | ARCO | 33.3333333 | CHEVRON | 33.3333333 | SHELL | 33.3333334 |
| 17658 | 0.0000000 | 12.7251000 | 0.00000 | L PART. | 33.3333333 | CHEVRON | 33.3333333 | SHELL | 33.3333334 |
| 21126 | 0.0000000 | 0.7855000 | 0.00000 | MARATHON | 33.3333333 | CHEVRON | 33.3333333 | SHELL | 33.3333334 |
| 21127 | 0.0000000 | 9.4019000 | 0.00000 | CHEVRON | 33.3333333 | CHEVRON | 33.3333333 | SHELL | 33.3333334 |
| 21128 | 0.0000000 | 14.5560000 | 0.00000 | PHILLIPS | 33.3333333 | CHEVRON | 33.3333333 | SHELL | 33.3333334 |
| 21129 | 0.0000000 | 0.5803000 | 0.00000 | ARCO | 33.3333333 | CHEVRON | 33.3333333 | SHELL | 33.3333334 |
| 58815 8 | 0.0000000 | 0.0162000 | 0.00000 | ARCO | 33.3333333 | CHEVRON | 33.3333333 | SHELL | 33.3333334 |
| 58820 9 | 0.0000000 | 1.5889000 | 0.00000 | ARCO | 33.3333333 | CHEVRON | 33.3333333 | SHELL | 33.3333334 |
| 58831 0 | 0.0000000 | 7.7629000 | 0.00000 | ARCO | 33.3333333 | CHEVRON | 33.3333333 | SHELL | 33.3333334 |
| **CANNERY LOOP** | | | | | | | | | |
| **BELUGA** | | | | | | | | | |
| 002397 A | 0.0000000 | 5.4332000 | 0.00000 | CIRI | 6.2500000 | MARATHON | 50.0000000 | UNION | 43.7500000 |
| 324602 A | 0.0000000 | 17.0829500 | 0.00000 | CIRI | 9.3750000 | MARATHON | 25.0000000 | UNION | 65.6250000 |
| 324604 B | 0.0000000 | 0.1541300 | 0.00000 | CALL | 100.0000000 | | | | |
| 359153 | 0.0000000 | 6.6835800 | 0.00000 | CIRI | 33.3330000 | MARATHON | 33.3330000 | UNION | 33.3340000 |
| 364095 C | 0.0000000 | 1.9844900 | 0.00000 | CIRI | 33.3330000 | MARATHON | 33.3330000 | UNION | 33.3340000 |
| 365454 | 0.0000000 | 0.4591900 | 0.00000 | CIRI | 33.3330000 | MARATHON | 33.3330000 | UNION | 33.3340000 |
| **TYONEK DEEP** | | | | | | | | | |
| 002397 A | 0.0000000 | 5.4125000 | 0.00000 | CIRI | 6.2500000 | MARATHON | 50.0000000 | UNION | 43.7500000 |
| 324602 A | 0.0000000 | 29.2068900 | 0.00000 | CIRI | 9.3750000 | MARATHON | 25.0000000 | UNION | 65.6250000 |
| 359153 7 | 0.0000000 | 13.5137500 | 0.00000 | CIRI | 33.3330000 | MARATHON | 33.3330000 | UNION | 33.3340000 |
| **UPPER TYONEK** | | | | | | | | | |
| 002397 A | 0.0000000 | 7.3449200 | 0.00000 | CIRI | 6.2500000 | MARATHON | 50.0000000 | UNION | 43.7500000 |
| 324602 A | 0.0000000 | 29.8726200 | 0.00000 | CIRI | 9.3750000 | MARATHON | 25.0000000 | UNION | 65.6250000 |
| 359153 7 | 0.0000000 | 13.5705700 | 0.00000 | CIRI | 33.3330000 | MARATHON | 33.3330000 | UNION | 33.3340000 |
| 365454 2 | 0.0000000 | 1.3091500 | 0.00000 | CIRI | 33.3330000 | MARATHON | 33.3330000 | UNION | 33.3340000 |
| **DUCK ISLAND UNIT** | | | | | | | | | |
| **ENDICOTT** | | | | | | | | | |
| 34633 3 | 26.7609000 | 26.7609000 | 12.50000 | BP | 100.0000000 | | | | |
| 34634 2 | 0.0675000 | 0.0675000 | 12.50000 | BP | 100.0000000 | | | | |
| 34636 4 | 5.2911000 | 5.2911000 | 12.50000 | BP | 100.0000000 | | | | |
| 47502 1 | 22.3357000 | 22.3357000 | 12.50000 | AMOCO | 25.0000000 | EXXON | 50.0000000 | UNION | 25.0000000 |
| 47503 2 | 19.6233000 | 19.6233000 | 12.50000 | AMOCO | 25.0000000 | EXXON | 50.0000000 | UNION | 25.0000000 |
| 47504 3 | 0.0036000 | 0.0036000 | 12.50000 | EXXON | 100.0000000 | | | | |
| 47505 4 | 0.0140000 | 0.0140000 | 12.50000 | EXXON | 100.0000000 | | | | |
| 47506 5 | 0.0084000 | 0.0084000 | 12.50000 | AMOCO | 50.0000000 | UNION | 50.0000000 | | |
| 312828 5 [1] | 25.8252000 | 25.8252000 | 20.00000 | BP | 95.5000000 | CIRI | 2.5000000 | DOYON | 0.5000000 |
| | | | | NANA | 1.5000000 | | | | |
| 312834 6 [2] | 0.0703000 | 0.0703000 | 20.00000 | ARCO | 33.3400000 | EXXON | 33.3300000 | UNION | 33.3300000 |
| **SAG DELTA** | | | | | | | | | |
| 34633 3 | 25.0000000 | 6.6356000 | 12.50000 | BP | 100.0000000 | | | | |
| 312828 5 | 75.0000000 | 93.3644000 | 20.00000 | BP | 95.5000000 | CIRI | 2.5000000 | DOYON | 0.5000000 |
| **GRANITE POINT** | | | | | | | | | |
| **GRANITE POINT 1** | | | | | | | | | |
| 18761 | 100.0000000 | 100.0000000 | 12.50000 | MOBIL | 75.0000000 | UNION | 25.0000000 | | |
| **GRANITE POINT 2** | | | | | | | | | |
| 17586 | 100.0000000 | 100.0000000 | 12.50000 | AMOCO | 62.5000000 | CHEVRON | 12.5000000 | TEXACO | 25.0000000 |
| 17587 | 100.0000000 | 100.0000000 | 12.50000 | CHEVRON | 12.5000000 | TEXACO | 25.0000000 | UNION | 62.5000000 |
| 18742 | 100.0000000 | 100.0000000 | 12.50000 | CHEVRON | 12.5000000 | TEXACO | 25.0000000 | UNION | 62.5000000 |
| **GRANITE POINT II GAS FIELD** | | | | | | | | | |
| 17586 | 0.0000000 | 2.1040000 | 0.00000 | AMOCO | 25.0000000 | ARCO | 12.5000000 | CHEVRON | 12.5000000 |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | GETTY | 25.0000000 | PHILLIPS | 25.0000000 | | |
| 17587 | | 0.0000000 | 1.2430000 | 0.00000 | AMOCO | 25.0000000 | ARCO | 12.5000000 | CHEVRON | 12.5000000 |
| | | | | | GETTY | 25.0000000 | PHILLIPS | 25.0000000 | | |
| 18742 | | 0.0000000 | 98.6530000 | 0.00000 | AMOCO | 25.0000000 | ARCO | 12.5000000 | CHEVRON | 12.5000000 |
| | | | | | GETTY | 25.0000000 | PHILLIPS | 25.0000000 | | |
| IVAN RIVER | | | | | | | | | | |
| 17600 | 1 | 0.0000000 | 6.5064900 | 0.00000 | ARCO | 44.9690000 | SHELL | 4.0250000 | UNION | 51.0060000 |
| 302282 | 6 | 0.0000000 | 3.4922500 | 0.00000 | ARCO | 100.0000000 | | | | |
| 302284 | 5 | 0.0000000 | 18.7468100 | 0.00000 | UNION | 100.0000000 | | | | |
| 326058 | 7 | 0.0000000 | 10.4767400 | 0.00000 | ARCO | 26.8200500 | UNION | 73.1799500 | | |
| 32930 | 2 | 0.0000000 | 25.8428100 | 0.00000 | ARCO | 29.3300000 | UNION | 70.6700000 | | |
| 32930 | A | 0.0000000 | 7.9348200 | 0.00000 | ARCO | 29.3300000 | UNION | 70.6700000 | | |
| 32930 | B | 0.0000000 | 13.1103200 | 0.00000 | ARCO | 29.3300000 | UNION | 70.6700000 | | |
| 33637 | 3 | 0.0000000 | 8.4686900 | 0.00000 | ARCO | 12.5000000 | UNION | 87.5000000 | | |
| 33727 | 4 | 0.0000000 | 5.4212700 | 0.00000 | ARCO | 50.0000000 | UNION | 50.0000000 | | |
| KENAI | | | | | | | | | | |
| STERLING | | | | | | | | | | |
| 588 | 5 | 0.0000000 | 6.7607000 | 0.00000 | MARATHON | 50.0000000 | UNION | 50.0000000 | | |
| 593 | 6 | 0.0000000 | 7.4430000 | 0.00000 | MARATHON | 50.0000000 | UNION | 50.0000000 | | |
| 594 | 7 | 0.0000000 | 0.6717000 | 0.00000 | MARATHON | 50.0000000 | UNION | 50.0000000 | | |
| 2411 | 8 | 0.0000000 | 0.7608000 | 0.00000 | MARATHON | 50.0000000 | UNION | 50.0000000 | | |
| 308223 | 6 | 0.0000000 | 0.0083000 | 0.00000 | MARATHON | 50.0000000 | UNION | 50.0000000 | | |
| 324598 | 4 | 0.0000000 | 0.9065000 | 0.00000 | MARATHON | 50.0000000 | UNION | 50.0000000 | | |
| KUPARUK RIVER | | | | | | | | | | |
| 25512 | 2 | 1.6551400 | 1.6551400 | 12.50000 | ARCO | 50.0000000 | BP | 50.0000000 | | |
| 25513 | 3 | 1.7152640 | 1.7152640 | 12.50000 | ARCO | 50.0000000 | BP | 50.0000000 | | |
| 25519 | 4 | 1.3457100 | 1.3457100 | 12.50000 | ARCO | 50.0000000 | BP | 50.0000000 | | |
| 25520 | 5 | 1.6672300 | 1.6672300 | 12.50000 | ARCO | 50.0000000 | BP | 50.0000000 | | |
| 25521 | 6 | 1.5143720 | 1.5143720 | 12.50000 | ARCO | 50.0000000 | BP | 50.0000000 | | |
| 25522 | 1 | 0.5234520 | 0.5234520 | 12.50000 | ARCO | 50.0000000 | BP | 50.0000000 | | |
| 25523 | 7 | 1.4024420 | 1.4024420 | 12.50000 | ARCO | 50.0000000 | BP | 50.0000000 | | |
| 25524 | 8 | 0.4135480 | 0.4135480 | 12.50000 | ARCO | 50.0000000 | BP | 50.0000000 | | |
| 25531 | 1 | 1.2773760 | 1.2773760 | 12.50000 | ARCO | 33.3300000 | BP | 33.3400000 | UNION | 33.3300000 |
| 25547 | 4 | 1.3601070 | 1.3601070 | 12.50000 | ARCO | 33.3300000 | BP | 33.3400000 | UNION | 33.3300000 |
| 25548 | 9 | 0.8598570 | 0.8598570 | 12.50000 | ARCO | 33.3300000 | BP | 33.3400000 | UNION | 33.3300000 |
| 25568 | 5 | 0.4582890 | 0.4582890 | 12.50000 | ARCO | 33.3300000 | BP | 33.3400000 | UNION | 33.3300000 |
| 25569 | 4 | 1.4250720 | 1.4250720 | 12.50000 | ARCO | 33.3300000 | BP | 33.3400000 | UNION | 33.3300000 |
| 25570 | 0 | 2.1593850 | 2.1593850 | 12.50000 | ARCO | 33.3300000 | BP | 33.3400000 | UNION | 33.3300000 |
| 25571 | 9 | 0.9853950 | 0.9853950 | 12.50000 | ARCO | 33.3300000 | BP | 33.3400000 | UNION | 33.3300000 |
| 25585 | 9 | 0.1109790 | 0.1109790 | 12.50000 | ARCO | 33.3300000 | BP | 33.3400000 | UNION | 33.3300000 |
| 25586 | 8 | 1.0958670 | 1.0958670 | 12.50000 | ARCO | 33.3300000 | BP | 33.3400000 | UNION | 33.3300000 |
| 25587 | 7 | 1.4997570 | 1.4997570 | 12.50000 | ARCO | 33.3300000 | BP | 33.3400000 | UNION | 33.3300000 |
| 25588 | 6 | 1.3118010 | 1.3118010 | 12.50000 | ARCO | 33.3300000 | BP | 33.3400000 | UNION | 33.3300000 |
| 25589 | 5 | 0.9666180 | 0.9666180 | 12.50000 | ARCO | 33.3300000 | BP | 33.3400000 | UNION | 33.3300000 |
| 25590 | 4 | 0.3544680 | 0.3544680 | 12.50000 | ARCO | 33.3300000 | BP | 33.3400000 | UNION | 33.3300000 |
| 25603 | 0 | 0.0724380 | 0.0724380 | 12.50000 | ARCO | 33.3300000 | BP | 33.3400000 | UNION | 33.3300000 |
| 25604 | 9 | 0.3536130 | 0.3536130 | 12.50000 | ARCO | 33.3300000 | BP | 33.3400000 | UNION | 33.3300000 |
| 25605 | 8 | 0.3154080 | 0.3154080 | 12.50000 | ARCO | 33.3300000 | BP | 33.3400000 | UNION | 33.3300000 |
| 25627 | 6 | 0.1302260 | 0.1302260 | 12.50000 | ARCO | 50.0000000 | BP | 50.0000000 | | |
| 25628 | 5 | 0.8958480 | 0.8958480 | 12.50000 | ARCO | 50.0000000 | BP | 50.0000000 | | |
| 25629 | 4 | 1.7086340 | 1.7086340 | 12.50000 | ARCO | 50.0000000 | BP | 50.0000000 | | |
| 25630 | 3 | 1.8849320 | 1.8849320 | 12.50000 | ARCO | 50.0000000 | BP | 50.0000000 | | |
| 25631 | 2 | 1.4012720 | 1.4012720 | 12.50000 | ARCO | 50.0000000 | BP | 50.0000000 | | |
| 25632 | 3 | 2.8707800 | 2.8707800 | 12.50000 | ARCO | 50.0000000 | BP | 50.0000000 | | |
| 25633 | 2 | 2.3583440 | 2.3583440 | 12.50000 | ARCO | 50.0000000 | BP | 50.0000000 | | |
| 25634 | 1 | 1.9633840 | 1.9633840 | 12.50000 | ARCO | 50.0000000 | BP | 50.0000000 | | |
| 25635 | 0 | 1.7273580 | 1.7273580 | 12.50000 | ARCO | 50.0000000 | BP | 50.0000000 | | |
| 25636 | 9 | 0.3740640 | 0.3740640 | 12.50000 | ARCO | 50.0000000 | BP | 50.0000000 | | |
| 25637 | 8 | 0.0438520 | 0.0438520 | 12.50000 | ARCO | 50.0000000 | BP | 50.0000000 | | |
| 25638 | 5 | 0.3165730 | 0.3165730 | 12.50000 | ARCO | 100.0000000 | | | | |
| 25639 | 4 | 1.4173980 | 1.4173980 | 12.50000 | ARCO | 100.0000000 | | | | |
| 25640 | 3 | 2.9779340 | 2.9779340 | 12.50000 | ARCO | 50.0000000 | BP | 50.0000000 | | |
| 25641 | 2 | 3.5857240 | 3.5857240 | 12.50000 | ARCO | 50.0000000 | BP | 50.0000000 | | |
| 25642 | 1 | 3.6870000 | 3.6870000 | 12.50000 | ARCO | 50.0000000 | BP | 50.0000000 | | |
| 25643 | 0 | 2.4034580 | 2.4034580 | 12.50000 | ARCO | 50.0000000 | BP | 50.0000000 | | |
| 25644 | 3 | 2.4954600 | 2.4954600 | 12.50000 | ARCO | 50.0000000 | BP | 50.0000000 | | |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 25645 | 2 | | 3.9018940 | 3.9018940 | 12.50000 | ARCO | 50.0000000 | BP | 50.0000000 | | |
| 25646 | 1 | | 4.2658220 | 4.2658220 | 12.50000 | ARCO | 50.0000000 | BP | 50.0000000 | | |
| 25647 | 0 | | 3.5252980 | 3.5252980 | 12.50000 | ARCO | 100.0000000 | | | | |
| 25648 | 9 | | 1.8731170 | 1.8731170 | 12.50000 | ARCO | 100.0000000 | | | | |
| 25649 | 8 | | 1.2069380 | 1.2069380 | 12.50000 | ARCO | 100.0000000 | | | | |
| 25650 | 6 | | 1.4300340 | 1.4300340 | 12.50000 | ARCO | 100.0000000 | | | | |
| 25651 | 5 | | 3.0223280 | 3.0223280 | 12.50000 | ARCO | 100.0000000 | | | | |
| 25652 | 4 | | 2.6442780 | 2.6442780 | 12.50000 | ARCO | 50.0000000 | BP | 50.0000000 | | |
| 25653 | 3 | | 2.8414500 | 2.8414500 | 12.50000 | ARCO | 50.0000000 | BP | 50.0000000 | | |
| 25654 | 2 | | 2.2721880 | 2.2721880 | 12.50000 | ARCO | 50.0000000 | BP | 50.0000000 | | |
| 25655 | 1 | | 2.7833600 | 2.7833600 | 12.50000 | ARCO | 50.0000000 | BP | 50.0000000 | | |
| 25656 | 6 | | 1.8244560 | 1.8244560 | 12.50000 | ARCO | 50.0000000 | BP | 50.0000000 | | |
| 25657 | 5 | | 2.1913520 | 2.1913520 | 12.50000 | ARCO | 50.0000000 | BP | 50.0000000 | | |
| 25658 | 4 | | 1.8263800 | 1.8263800 | 12.50000 | ARCO | 50.0000000 | BP | 50.0000000 | | |
| 25659 | 3 | | 1.2902640 | 1.2902640 | 12.50000 | ARCO | 50.0000000 | BP | 50.0000000 | | |
| 25660 | 2 | | 1.0760830 | 1.0760830 | 12.50000 | ARCO | 100.0000000 | | | | |
| 25661 | 1 | | 0.6854630 | 0.6854630 | 12.50000 | ARCO | 100.0000000 | | | | |
| 25664 | 0 | | 0.0481210 | 0.0481210 | 12.50000 | ARCO | 100.0000000 | | | | |
| 25665 | 9 | | 0.1792340 | 0.1792340 | 12.50000 | ARCO | 50.0000000 | BP | 50.0000000 | | |
| 25666 | 8 | | 0.3953800 | 0.3953800 | 12.50000 | ARCO | 50.0000000 | BP | 50.0000000 | | |
| 25667 | 7 | | 1.1418280 | 1.1418280 | 12.50000 | ARCO | 50.0000000 | BP | 50.0000000 | | |
| 25668 | 7 | | 0.0049340 | 0.0049340 | 12.50000 | ARCO | 50.0000000 | BP | 50.0000000 | | |
| 28242 | 7 | | 0.4346000 | 0.4346000 | 12.50000 | ARCO | 50.0000000 | EXXON | 50.0000000 | | |
| 28243 | 7 | | 0.5124000 | 0.5124000 | 12.50000 | ARCO | 32.9672400 | BP | 17.0327600 | MOBIL | 50.0000000 |
| 355023 | 2 | [3] | 0.8266180 | 0.8266180 | 12.50000 | ARCO | 100.0000000 | | | | |
| 355024 | 3 | [3] | 0.1087260 | 0.1087260 | 12.50000 | ARCO | 100.0000000 | | | | |
| 355030 | 4 | [3] | 0.0021490 | 0.0021490 | 12.50000 | ARCO | 100.0000000 | | | | |
| 355032 | 5 | [3] | 0.1329500 | 0.1329500 | 12.50000 | ARCO | 100.0000000 | | | | |
| 355501 | 6 | | 0.0039560 | 0.0039560 | 12.50000 | ARCO | 100.0000000 | | | | |
| 47449 | 6 | | 0.2172000 | 0.2172000 | 12.50000 | CHEVRON | 50.0000000 | MOBIL | 50.0000000 | | |

LEWIS RIVER

PARTICIPATING AREA 1

| | | | | | | |
|---|---|---|---|---|---|---|
| 58798 | 0.0000000 | 16.6670000 | 0.00000 | L PARTNER | 100.0000000 | |
| 58801 | 0.0000000 | 61.1110000 | 0.00000 | L PARTNER | 100.0000000 | |
| 58802 | 0.0000000 | 22.2220000 | 0.00000 | L PARTNER | 100.0000000 | |

PARTICIPATING AREA 2

| | | | | | | |
|---|---|---|---|---|---|---|
| 58798 | 0.0000000 | 76.1905000 | 0.00000 | L PARTNER | 100.0000000 | |
| 58801 | 0.0000000 | 14.2857000 | 0.00000 | L PARTNER | 100.0000000 | |
| 58802 | 0.0000000 | 9.5238000 | 0.00000 | L PARTNER | 100.0000000 | |

LISBURNE

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 28277 | 5 | | 0.0170000 | 0.0000000 | 12.50000 | BP | 100.0000000 | | | | |
| 28280 | 4 | | 0.0380000 | 0.0000000 | 12.50000 | BP | 100.0000000 | | | | |
| 28285 | 9 | | 0.0300000 | 0.0000000 | 12.50000 | BP | 100.0000000 | | | | |
| 28299 | 6 | | 0.1870000 | 0.0000000 | 12.50000 | ARCO | 50.0000000 | EXXON | 50.0000000 | | |
| 28300 | 7 | | 1.7170000 | 0.0000000 | 12.50000 | ARCO | 50.0000000 | EXXON | 50.0000000 | | |
| 28301 | 8 | | 2.4440000 | 0.0000000 | 12.50000 | ARCO | 50.0000000 | EXXON | 50.0000000 | | |
| 28302 | 1 | | 5.4180000 | 0.0000000 | 12.50000 | ARCO | 50.0000000 | EXXON | 50.0000000 | | |
| 28303 | 2 | | 2.2490000 | 0.0000000 | 12.50000 | ARCO | 50.0000000 | EXXON | 50.0000000 | | |
| 28304 | 3 | | 0.5380000 | 0.0000000 | 12.50000 | ARCO | 50.0000000 | EXXON | 50.0000000 | | |
| 28305 | 0 | | 0.1450000 | 0.0000000 | 12.50000 | BP | 100.0000000 | | | | |
| 28306 | 1 | | 0.9190000 | 0.0000000 | 12.50000 | ARCO | 50.0000000 | EXXON | 50.0000000 | | |
| 28307 | 2 | | 3.5270000 | 0.0000000 | 12.50000 | ARCO | 50.0000000 | EXXON | 50.0000000 | | |
| 28308 | 3 | | 0.2460000 | 0.0000000 | 12.50000 | ARCO | 50.0000000 | EXXON | 50.0000000 | | |
| 28309 | 4 | | 0.0890000 | 0.0000000 | 12.50000 | BP | 100.0000000 | | | | |
| 28320 | 8 | | 6.7190000 | 0.0000000 | 12.50000 | BP | 100.0000000 | | | | |
| 28321 | 3 | | 8.5540000 | 0.0000000 | 12.50000 | ARCO | 50.0000000 | EXXON | 50.0000000 | | |
| 28322 | 4 | | 10.0680000 | 0.0000000 | 12.50000 | ARCO | 50.0000000 | EXXON | 50.0000000 | | |
| 28323 | 5 | | 11.0800000 | 0.0000000 | 12.50000 | ARCO | 50.0000000 | EXXON | 50.0000000 | | |
| 28324 | 0 | | 4.3250000 | 0.0000000 | 12.50000 | ARCO | 50.0000000 | EXXON | 50.0000000 | | |
| 28325 | 1 | | 3.7180000 | 0.0000000 | 12.50000 | ARCO | 50.0000000 | EXXON | 50.0000000 | | |
| 28326 | ** | | 1.9750000 | 0.0000000 | 12.50000 | ARCO | 50.0000000 | EXXON | 50.0000000 | | |
| 28327 | 3 | | 0.0400000 | 0.0000000 | 12.50000 | ARCO | 50.0000000 | EXXON | 50.0000000 | | |
| 28328 | 2 | | 0.0260000 | 0.0000000 | 12.50000 | ARCO | 50.0000000 | EXXON | 50.0000000 | | |
| 28329 | 1 | | 0.0190000 | 0.0000000 | 12.50000 | ARCO | 50.0000000 | EXXON | 50.0000000 | | |
| 28337 | 6 | | 0.6590000 | 0.0000000 | 12.50000 | BP | 100.0000000 | | | | |
| 28338 | 7 | | 0.8960000 | 0.0000000 | 12.50000 | BP | 100.0000000 | | | | |
| 28339 | 6 | | 3.1550000 | 0.0000000 | 12.50000 | BP | 100.0000000 | | | | |
| 28339 | A | | 1.0830000 | 0.0000000 | 12.50000 | BP | 100.0000000 | | | | |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 28340 | 7 | 0.0300000 | 0.0000000 | 12.50000 | BP | 100.0000000 | | | | |
| 28340 | A | 0.2000000 | 0.0000000 | 12.50000 | BP | 100.0000000 | | | | |
| 28342 | 4 | 0.5690000 | 0.0000000 | 12.50000 | BP | 100.0000000 | | | | |
| 28343 | 9 | 2.4130000 | 0.0000000 | 12.50000 | BP | 100.0000000 | | | | |
| 28343 | A | 1.1160000 | 0.0000000 | 12.50000 | BP | 100.0000000 | | | | |
| 28344 | 5 | 0.0250000 | 0.0000000 | 12.50000 | ARCO | 50.0000000 | EXXON | 50.0000000 | | |
| 28345 | 4 | 0.1170000 | 0.0000000 | 12.50000 | ARCO | 50.0000000 | EXXON | 50.0000000 | | |
| 34628 | 9 | 3.3300000 | 0.0000000 | 12.50000 | ARCO | 50.0000000 | EXXON | 50.0000000 | | |
| 34629 | 0 | 3.5260000 | 0.0000000 | 12.50000 | ARCO | 50.0000000 | EXXON | 50.0000000 | | |
| 34630 | 1 | 1.3770000 | 0.0000000 | 12.50000 | BP | 100.0000000 | | | | |
| 34631 | 9 | 8.6100000 | 0.0000000 | 12.50000 | ARCO | 50.0000000 | EXXON | 50.0000000 | | |
| 34632 | 0 | 7.3420000 | 0.0000000 | 12.50000 | ARCO | 50.0000000 | EXXON | 50.0000000 | | |
| 34634 | 3 | 0.6490000 | 0.0000000 | 12.50000 | BP | 100.0000000 | | | | |
| 34635 | ** | 0.8150000 | 0.0000000 | 12.50000 | BP | 100.0000000 | | | | |
| MCARTHUR RIVER | | | | | | | | | | |
| HEMLOCK | | | | | | | | | | |
| 17579 | | 12.9480000 | 12.9480000 | 12.50000 | ARCO | 100.0000000 | | | | |
| 17594 | | 28.6480000 | 28.6480000 | 12.50000 | MARATHON | 50.0000000 | UNION | 50.0000000 | | |
| 17602 | | 3.7000000 | 3.7000000 | 12.50000 | ARCO | 100.0000000 | | | | |
| 18716 | | 2.6730000 | 2.6730000 | 12.50000 | ARCO | 100.0000000 | | | | |
| 18729 | | 17.8330000 | 17.8330000 | 12.50000 | MARATHON | 50.0000000 | UNION | 50.0000000 | | |
| 18730 | | 16.6480000 | 16.6480000 | 12.50000 | MARATHON | 50.0000000 | UNION | 50.0000000 | | |
| 18758 | | 2.7750000 | 2.7750000 | 12.50000 | ARCO | 100.0000000 | | | | |
| 18772 | | 9.2490000 | 9.2490000 | 12.50000 | ARCO | 100.0000000 | | | | |
| 18777 | | 4.6010000 | 4.6010000 | 12.50000 | ARCO | 100.0000000 | | | | |
| 21068 | | 0.9250000 | 0.9250000 | 12.50000 | ARCO | 100.0000000 | | | | |
| MIDDLE KENAI | | | | | | | | | | |
| 17594 | | 26.6700000 | 26.6700000 | 12.50000 | MARATHON | 51.0000000 | UNION | 49.0000000 | | |
| 18729 | | 34.8100000 | 34.8100000 | 12.50000 | MARATHON | 51.0000000 | UNION | 49.0000000 | | |
| 18730 | | 32.5900000 | 32.5900000 | 12.50000 | MARATHON | 51.0000000 | UNION | 49.0000000 | | |
| 18772 | | 5.9300000 | 5.9300000 | 12.50000 | MARATHON | 51.0000000 | UNION | 49.0000000 | | |
| STEELHEAD | | | | | | | | | | |
| 17594 | 3 | 0.0000000 | 38.5542200 | 0.00000 | MARATHON | 50.0000000 | UNION | 50.0000000 | | |
| 18729 | 0 | 0.0000000 | 27.7108400 | 0.00000 | MARATHON | 50.0000000 | UNION | 50.0000000 | | |
| 18730 | 1 | 0.0000000 | 33.7349400 | 0.00000 | MARATHON | 50.0000000 | UNION | 50.0000000 | | |
| WEST FORELAND | | | | | | | | | | |
| 17594 | | 30.2500000 | 30.2500000 | 12.50000 | MARATHON | 51.0000000 | UNION | 49.0000000 | | |
| 18729 | | 29.4100000 | 29.4100000 | 12.50000 | MARATHON | 51.0000000 | UNION | 49.0000000 | | |
| 18730 | | 33.6200000 | 33.6200000 | 12.50000 | MARATHON | 51.0000000 | UNION | 49.0000000 | | |
| 18772 | | 6.7200000 | 6.7200000 | 12.50000 | MARATHON | 51.0000000 | UNION | 49.0000000 | | |
| MIDDLE GROUND SHOAL | | | | | | | | | | |
| 17595 | | 100.0000000 | 100.0000000 | 12.50000 | AMOCO | 62.5000000 | CHEVRON | 12.5000000 | TEXACO | 25.0000000 |
| 18754 | | 100.0000000 | 100.0000000 | 12.50000 | SHELL | 100.0000000 | | | | |
| 18756 | | 100.0000000 | 100.0000000 | 12.50000 | SHELL | 100.0000000 | | | | |
| MILNE POINT | | | | | | | | | | |
| KUPARUK PARTICIPATING AREA | | | | | | | | | | |
| 25509 | 0 | 8.8209200 | 0.0000000 | 12.50000 | CHEVRON | 100.0000000 | | | | |
| 25516 | 4 | 2.7859000 | 0.0000000 | 12.50000 | CHEVRON | 100.0000000 | | | | |
| 25518 | 9 | 4.2759500 | 0.0000000 | 12.50000 | CHEVRON | 100.0000000 | | | | |
| 28231 | 8 | 4.2328300 | 0.0000000 | 12.50000 | CONOCO | 100.0000000 | | | | |
| 315848 | A | 1.4907500 | 0.0000000 | 12.50000 | CHEVRON | 100.0000000 | | | | |
| 47433 | 2 | 8.3527700 | 0.0000000 | 20.00000 | CONOCO | 86.0000000 | | | | |
| 47434 | 3 | 28.4553300 | 0.0000000 | 20.00000 | CONOCO | 87.7500000 | OXY | 12.2500000 | | |
| 47437 | 5 | 32.7923500 | 0.0000000 | 20.00000 | CONOCO | 86.0000000 | OXY | 14.0000000 | | |
| 47438 | 6 | 8.7932000 | 0.0000000 | 20.00000 | CONOCO | 86.0000000 | OXY | 14.0000000 | | |
| SCHRADER BLUFF | | | | | | | | | | |
| 25509 | ** | 1.0053900 | 0.0000000 | 12.50000 | CHEVRON | 100.0000000 | | | | |
| 25514 | ** | 4.9181500 | 0.0000000 | 12.50000 | CHEVRON | 100.0000000 | | | | |
| 25512 | ** | 10.3360400 | 0.0000000 | 12.50000 | CONOCO | 100.0000000 | | | | |
| 25516 | 4 | 6.3159600 | 0.0000000 | 12.50000 | CHEVRON | 100.0000000 | | | | |
| 25518 | 9 | 19.0431900 | 0.0000000 | 12.50000 | CHEVRON | 100.0000000 | | | | |
| 25906 | ** | 25.6086200 | 0.0000000 | 12.50000 | CONOCO | 100.0000000 | | | | |
| 28231 | 8 | 5.0879600 | 0.0000000 | 12.50000 | CONOCO | 100.0000000 | | | | |
| 315848 | A | 6.3159600 | 0.0000000 | 12.50000 | CHEVRON | 100.0000000 | | | | |
| 47432 | 1 | 0.0099100 | 0.0000000 | 20.00000 | CONOCO | 86.0000000 | OXY | 14.0000000 | | |
| 47433 | 2 | 1.3448800 | 0.0000000 | 20.00000 | CONOCO | 86.0000000 | OXY | 14.0000000 | | |

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|---|---|---|---|---|---|---|---|---|---|---|
| 47434 | 3 | 3.2386800 | 0.0000000 | 20.00000 | CONOCO | 87.7500000 | OXY | 12.2500000 | | |
| 47437 | 5 | 13.3041900 | 0.0000000 | 20.00000 | CONOCO | 86.0000000 | OXY | 14.0000000 | | |
| 47438 | 6 | 3.4210700 | 0.0000000 | 20.00000 | CONOCO | 86.0000000 | OXY | 14.0000000 | | |
| NORTH TRADING BAY | | | | | | | | | | |
| 17597 | | 50.0000000 | 50.0000000 | 12.50000 | MARATHON | 50.0000000 | UNION | 50.0000000 | | |
| 18776 | | 28.5700000 | 28.5700000 | 12.50000 | MARATHON | 100.0000000 | | | | |
| 35431 | | 21.4300000 | 21.4300000 | 12.50000 | MARATHON | 100.0000000 | | | | |
| NORTH COOK INLET | | | | | | | | | | |
| 17589 | 2 | 0.0000000 | 44.7324000 | 0.00000 | PHILLIPS | 100.0000000 | | | | |
| 17590 | 3 | 0.0000000 | 6.5430000 | 0.00000 | PHILLIPS | 100.0000000 | | | | |
| 18740 | 7 | 0.0000000 | 8.1787000 | 0.00000 | PHILLIPS | 100.0000000 | | | | |
| 18741 | 8 | 0.0000000 | 6.5429000 | 0.00000 | PHILLIPS | 100.0000000 | | | | |
| 37831 | 1 | 0.0000000 | 34.0030000 | 0.00000 | PHILLIPS | 100.0000000 | | | | |
| PT. McINTYRE | | | | | | | | | | |
| 28297 | | 100.0000000 | 0.0000000 | 12.50000 | ARCO | 100.0000000 | | | | |
| PRETTY CREEK | | | | | | | | | | |
| 58810 | 2 | 0.0000000 | 23.8984800 | 0.00000 | TEXACO | 11.0000000 | UNION | 89.0000000 | | |
| 58813 | 4 | 0.0000000 | 20.8695700 | 0.00000 | TEXACO | 11.0000000 | UNION | 89.0000000 | | |
| 58814 | 5 | 0.0000000 | 10.4347800 | 0.00000 | TEXACO | 11.0000000 | UNION | 89.0000000 | | |
| 63047 | 0 | 0.0000000 | 6.0869600 | 0.00000 | TEXACO | 11.0000000 | UNION | 89.0000000 | | |
| 63048 | 1 | 0.0000000 | 27.8260800 | 0.00000 | TEXACO | 11.0000000 | UNION | 89.0000000 | | |
| 63049 | 2 | 0.0000000 | 10.4347800 | 0.00000 | TEXACO | 11.0000000 | UNION | 89.0000000 | | |
| PRUDHOE BAY | | | | | | | | | | |
| OIL RIM | | | | | | | | | | |
| 25637 | 6 | 0.0046309 | 0.0046309 | 12.50000 | ARCO | 50.0000000 | BP | 50.0000000 | | |
| 28238 | 9 | 0.0163822 | 0.0163822 | 12.50000 | ARCO | 50.0000000 | EXXON | 50.0000000 | | |
| 28239 | 8 | 0.0614364 | 0.0614364 | 12.50000 | ARCO | 50.0000000 | EXXON | 50.0000000 | | |
| 28240 | 0 | 0.0913318 | 0.0913318 | 12.50000 | ARCO | 50.0000000 | EXXON | 50.0000000 | | |
| 28241 | 1 | 0.0486990 | 0.0486990 | 12.50000 | MOBIL | 50.0000000 | PHILLIPS | 50.0000000 | | |
| 28244 | 2 | 0.0000124 | 0.0000124 | 12.50000 | ARCO | 50.0000000 | EXXON | 50.0000000 | | |
| 28245 | 3 | 0.1486696 | 0.1486696 | 12.50000 | ARCO | 50.0000000 | EXXON | 50.0000000 | | |
| 28246 | 2 | 0.0007026 | 0.0007026 | 12.50000 | ARCO | 50.0000000 | EXXON | 50.0000000 | | |
| 28257 | 2 | 1.7767068 | 1.7767068 | 12.50000 | MOBIL | 50.0000000 | PHILLIPS | 50.0000000 | | |
| 28258 | 1 | 0.4599204 | 0.4599204 | 12.50000 | ARCO | 50.0000000 | EXXON | 50.0000000 | | |
| 28259 | 0 | 0.0076616 | 0.0076616 | 12.50000 | ARCO | 50.0000000 | EXXON | 50.0000000 | | |
| 28260 | 7 | 1.4815529 | 1.4815529 | 12.50000 | BP | 100.0000000 | | | | |
| 28261 | 8 | 0.0888936 | 0.0888936 | 12.50000 | MOBIL | 50.0000000 | PHILLIPS | 50.0000000 | | |
| 28262 | 4 | 0.2968897 | 0.2968897 | 12.50000 | CHEVRON | 100.0000000 | | | | |
| 28262 | A | 0.0772452 | 0.0772452 | 12.50000 | CHEVRON | 33.3333333 | MOBIL | 33.3333334 | PHILLIPS | 33.3333333 |
| 28263 | 5 | 0.1338160 | 0.1338160 | 12.50000 | MOBIL | 50.0000000 | PHILLIPS | 50.0000000 | | |
| 28263 | A | 0.2071833 | 0.2071833 | 12.50000 | CHEVRON | 33.3333333 | MOBIL | 33.3333334 | PHILLIPS | 33.3333333 |
| 28264 | 9 | 0.1174944 | 0.1174944 | 12.50000 | ARCO | 50.0000000 | EXXON | 50.0000000 | | |
| 28265 | 4 | 0.0364292 | 0.0364292 | 12.50000 | ARCO | 50.0000000 | EXXON | 50.0000000 | | |
| 28275 | 2 | 0.0133022 | 0.0133022 | 12.50000 | ARCO | 50.0000000 | EXXON | 50.0000000 | | |
| 28276 | 3 | 0.0000864 | 0.0000864 | 12.50000 | ARCO | 50.0000000 | EXXON | 50.0000000 | | |
| 28277 | 5 | 0.8421396 | 0.8421396 | 12.50000 | BP | 100.0000000 | | | | |
| 28278 | 4 | 1.0400165 | 1.0400165 | 12.50000 | BP | 100.0000000 | | | | |
| 28279 | 3 | 1.2989359 | 1.2989359 | 12.50000 | BP | 100.0000000 | | | | |
| 28280 | 4 | 3.8981682 | 3.8981682 | 12.50000 | BP | 100.0000000 | | | | |
| 28281 | 5 | 3.3705436 | 3.3705436 | 12.50000 | BP | 100.0000000 | | | | |
| 28282 | 6 | 3.0429668 | 3.0429668 | 12.50000 | BP | 100.0000000 | | | | |
| 28283 | 7 | 1.5634829 | 1.5634829 | 12.50000 | BP | 100.0000000 | | | | |
| 28284 | 8 | 3.3026290 | 3.3026290 | 12.50000 | BP | 100.0000000 | | | | |
| 28285 | 9 | 3.9964449 | 3.9964449 | 12.50000 | BP | 100.0000000 | | | | |
| 28286 | 6 | 2.6691922 | 2.6691922 | 12.50000 | BP | 100.0000000 | | | | |
| 28287 | 7 | 1.2578240 | 1.2578240 | 12.50000 | BP | 100.0000000 | | | | |
| 28288 | 8 | 0.3601455 | 0.3601455 | 12.50000 | MOBIL | 50.0000000 | PHILLIPS | 50.0000000 | | |
| 28289 | 5 | 0.1312435 | 0.1312435 | 12.50000 | MOBIL | 50.0000000 | PHILLIPS | 50.0000000 | | |
| 28290 | 5 | 0.0024590 | 0.0024590 | 12.50000 | MOBIL | 50.0000000 | PHILLIPS | 50.0000000 | | |
| 28299 | 6 | 0.9307902 | 0.9307902 | 12.50000 | ARCO | 50.0000000 | EXXON | 50.0000000 | | |
| 28300 | 7 | 1.0365258 | 1.0365258 | 12.50000 | ARCO | 50.0000000 | EXXON | 50.0000000 | | |
| 28302 | 1 | 0.3106250 | 0.3106250 | 12.50000 | ARCO | 50.0000000 | EXXON | 50.0000000 | | |
| 28303 | 2 | 1.9447402 | 1.9447402 | 12.50000 | ARCO | 50.0000000 | EXXON | 50.0000000 | | |
| 28304 | 3 | 3.2449752 | 3.2449752 | 12.50000 | ARCO | 50.0000000 | EXXON | 50.0000000 | | |

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|---|---|---|---|---|---|---|---|---|---|---|
| 28305 | 0 | 3.6765194 | 3.6765194 | 12.50000 | BP | 100.0000000 | | | | |
| 28306 | 1 | 2.9343182 | 2.9343182 | 12.50000 | ARCO | 50.0000000 | EXXON | 50.0000000 | | |
| 28307 | 2 | 1.8596860 | 1.8596860 | 12.50000 | ARCO | 50.0000000 | EXXON | 50.0000000 | | |
| 28308 | 3 | 3.9394274 | 3.9394274 | 12.50000 | ARCO | 50.0000000 | EXXON | 50.0000000 | | |
| 28309 | 4 | 3.8650657 | 3.8650657 | 12.50000 | BP | 100.0000000 | | | | |
| 28310 | 5 | 3.9334322 | 3.9334322 | 12.50000 | BP | 100.0000000 | | | | |
| 28311 | 0 | 3.6619111 | 3.6619111 | 12.50000 | BP | 100.0000000 | | | | |
| 28312 | 9 | 2.8963363 | 2.8963363 | 12.50000 | BP | 100.0000000 | | | | |
| 28313 | B | 1.5538656 | 1.5538656 | 12.50000 | ARCO | 50.0000000 | EXXON | 50.0000000 | | |
| 28314 | 2 | 0.4588814 | 0.4588814 | 12.50000 | MOBIL | 50.0000000 | PHILLIPS | 50.0000000 | | |
| 28315 | 1 | 1.2192336 | 1.2192336 | 12.50000 | BP | 100.0000000 | | | | |
| 28316 | A | 0.0565330 | 0.0565330 | 12.50000 | CHEVRON | 33.3333333 | MOBIL | 33.3333334 | PHILLIPS | 33.3333333 |
| 28316 | 7 | 0.0088125 | 0.0088125 | 12.50000 | CHEVRON | 100.0000000 | | | | |
| 28320 | 8 | 0.3566016 | 0.3566616 | 12.50000 | BP | 100.0000000 | | | | |
| 28321 | 3 | 1.1125780 | 1.1125780 | 12.50000 | ARCO | 50.0000000 | EXXON | 50.0000000 | | |
| 28322 | 4 | 1.0995790 | 1.0995790 | 12.50000 | ARCO | 50.0000000 | EXXON | 50.0000000 | | |
| 28323 | 5 | 0.7714806 | 0.7714806 | 12.50000 | ARCO | 50.0000000 | EXXON | 50.0000000 | | |
| 28324 | 0 | 2.0837850 | 2.0837850 | 12.50000 | ARCO | 50.0000000 | EXXON | 50.0000000 | | |
| 28325 | 1 | 2.7773702 | 2.7773702 | 12.50000 | ARCO | 50.0000000 | EXXON | 50.0000000 | | |
| 28326 | 2 | 3.1133992 | 3.1133992 | 12.50000 | ARCO | 50.0000000 | EXXON | 50.0000000 | | |
| 28327 | 3 | 2.7730980 | 2.7730980 | 12.50000 | ARCO | 50.0000000 | EXXON | 50.0000000 | | |
| 28328 | 2 | 4.0900128 | 4.0900128 | 12.50000 | ARCO | 50.0000000 | EXXON | 50.0000000 | | |
| 28329 | 1 | 4.1555298 | 4.1555298 | 12.50000 | ARCO | 50.0000000 | EXXON | 50.0000000 | | |
| 28330 | 0 | 1.4812197 | 1.4812197 | 12.50000 | BP | 100.0000000 | | | | |
| 28331 | 9 | 1.5486835 | 1.5486835 | 12.50000 | BP | 100.0000000 | | | | |
| 28332 | 8 | 1.6240684 | 1.6240684 | 12.50000 | ARCO | 50.0000000 | EXXON | 50.0000000 | | |
| 28333 | 0 | 0.0691187 | 0.0691187 | 12.50000 | BP | 100.0000000 | | | | |
| 28334 | A | 0.1303563 | 0.1303563 | 12.50000 | CHEVRON | 33.3333333 | MOBIL | 33.3333334 | PHILLIPS | 33.3333333 |
| 28334 | 9 | 0.0179622 | 0.0179622 | 12.50000 | MOBIL | 50.0000000 | PHILLIPS | 50.0000000 | | |
| 28335 | 8 | 0.0667905 | 0.0667905 | 12.50000 | BP | 100.0000000 | | | | |
| 28339 | 6 | 0.0001956 | 0.0001956 | 12.50000 | BP | 100.0000000 | | | | |
| 28343 | 9 | 0.1342393 | 0.1342393 | 12.50000 | BP | 100.0000000 | | | | |
| 28345 | 4 | 0.5812244 | 0.5812244 | 12.50000 | ARCO | 50.0000000 | EXXON | 50.0000000 | | |
| 28346 | 7 | 0.2982834 | 0.2982834 | 12.50000 | ARCO | 50.0000000 | EXXON | 50.0000000 | | |
| 28349 | 1 | 0.0092138 | 0.0092138 | 12.50000 | BP | 100.0000000 | | | | |
| 34631 | 9 | 0.2490770 | 0.2490770 | 12.50000 | ARCO | 50.0000000 | EXXON | 50.0000000 | | |
| 34632 | 0 | 0.1146214 | 0.1146214 | 12.50000 | ARCO | 50.0000000 | EXXON | 50.0000000 | | |
| 47446 | 5 | 0.0099777 | 0.0099777 | 12.50000 | CHEVRON | 50.0000000 | MOBIL | 50.0000000 | | |
| 47447 | 4 | 0.0049708 | 0.0049708 | 12.50000 | CHEVRON | 50.0000000 | MOBIL | 50.0000000 | | |
| 47448 | 0 | 0.0010848 | 0.0010848 | 12.50000 | MOBIL | 66.6666667 | PHILLIPS | 33.3333333 | | |
| 47449 | 7 | 0.0064355 | 0.0064355 | 12.50000 | CHEVRON | 50.0000000 | MOBIL | 50.0000000 | | |
| 47450 | 9 | 0.0468606 | 0.0468606 | 12.50000 | CHEVRON | 33.3333333 | MOBIL | 33.3333334 | PHILLIPS | 33.3333333 |
| 47451 | 6 | 0.1902328 | 0.1902328 | 12.50000 | CHEVRON | 33.3333333 | MOBIL | 33.3333334 | PHILLIPS | 33.3333333 |
| 47452 | 0 | 0.2232645 | 0.2232645 | 12.50000 | CHEVRON | 33.3333333 | MOBIL | 33.3333334 | PHILLIPS | 33.3333333 |
| 47453 | 1 | 0.1144260 | 0.1144260 | 12.50000 | CHEVRON | 33.3333333 | MOBIL | 33.3333334 | PHILLIPS | 33.3333333 |
| 47454 | 3 | 0.0200389 | 0.0200389 | 12.50000 | CHEVRON | 33.3333333 | MOBIL | 33.3333334 | PHILLIPS | 33.3333333 |
| 47469 | 9 | 0.0307565 | 0.0307565 | 12.50000 | MOBIL | 50.0000000 | PHILLIPS | 50.0000000 | | |
| 47471 | 6 | 0.3000685 | 0.3000685 | 12.50000 | AMERADA | 27.0000000 | L L & E | 13.2500000 | SHELL | 29.2500000 |
| | | | | | TEXACO | 30.5000000 | | | | |
| 47472 | 7 | 0.8139925 | 0.8139925 | 12.50000 | AMERADA | 50.0000000 | TEXACO | 50.0000000 | | |
| 47475 | 3 | 0.1996175 | 0.1996175 | 12.50000 | AMERADA | 25.0000000 | MARATHON | 25.0000000 | SHELL | 25.0000000 |
| | | | | | TEXACO | 25.0000000 | | | | |
| 47476 | 4 | 0.0028061 | 0.0028061 | 12.50000 | ARCO | 50.0000000 | EXXON | 50.0000000 | | |
| 80595 | 6 | 0.0000019 | 0.0000019 | 12.50000 | ARCO | 50.0000000 | EXXON | 50.0000000 | | |
| GAS CAP | | | | | | | | | | |
| 25637 | 6 | 0.0003024 | 0.0003024 | 12.50000 | ARCO | 50.0000000 | BP | 50.0000000 | | |
| 28238 | 9 | 0.0061712 | 0.0061712 | 12.50000 | ARCO | 50.0000000 | EXXON | 50.0000000 | | |
| 28239 | 8 | 0.0913424 | 0.0913424 | 12.50000 | ARCO | 50.0000000 | EXXON | 50.0000000 | | |
| 28240 | 0 | 0.0496376 | 0.0496376 | 12.50000 | ARCO | 50.0000000 | EXXON | 50.0000000 | | |
| 28241 | 1 | 0.0399457 | 0.0399457 | 12.50000 | MOBIL | 50.0000000 | PHILLIPS | 50.0000000 | | |
| 28244 | 2 | 0.0000110 | 0.0000110 | 12.50000 | ARCO | 50.0000000 | EXXON | 50.0000000 | | |
| 28245 | 3 | 0.1805920 | 0.1805920 | 12.50000 | ARCO | 50.0000000 | EXXON | 50.0000000 | | |
| 28246 | 2 | 0.0003490 | 0.0003490 | 12.50000 | ARCO | 50.0000000 | EXXON | 50.0000000 | | |
| 28257 | 2 | 0.1101259 | 0.1101259 | 12.50000 | MOBIL | 50.0000000 | PHILLIPS | 50.0000000 | | |
| 28258 | 1 | 0.0000012 | 0.0000012 | 12.50000 | ARCO | 50.0000000 | EXXON | 50.0000000 | | |
| 28259 | 0 | 0.0000000 | 0.0000000 | 12.50000 | ARCO | 50.0000000 | EXXON | 50.0000000 | | |
| 28260 | 7 | 0.0777251 | 0.0777251 | 12.50000 | BP | 100.0000000 | | | | |
| 28261 | 8 | 0.0005248 | 0.0005248 | 12.50000 | MOBIL | 50.0000000 | PHILLIPS | 50.0000000 | | |
| 28262 | 4 | 0.2995913 | 0.2995913 | 12.50000 | CHEVRON | 100.0000000 | | | | |
| 28262 | A | 0.1111367 | 0.1111367 | 12.50000 | CHEVRON | 33.3333334 | MOBIL | 33.3333333 | PHILLIPS | 33.3333333 |

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|---|---|---|---|---|---|---|---|---|---|---|
| 28263 | 5 | 0.0511793 | 0.0511793 | 12.50000 | MOBIL | 50.0000000 | PHILLIPS | 50.0000000 | | |
| 28263 | A | 0.1539450 | 0.1539450 | 12.50000 | CHEVRON | 33.3333333 | MOBIL | 33.3333334 | PHILLIPS | 33.3333333 |
| 28264 | 9 | 0.0120620 | 0.0120620 | 12.50000 | ARCO | 50.0000000 | EXXON | 50.0000000 | | |
| 28265 | 4 | 0.0003882 | 0.0003882 | 12.50000 | ARCO | 50.0000000 | EXXON | 50.0000000 | | |
| 28275 | 2 | 0.0000000 | 0.0000000 | 12.50000 | ARCO | 50.0000000 | EXXON | 50.0000000 | | |
| 28276 | 3 | 0.0000000 | 0.0000000 | 12.50000 | ARCO | 50.0000000 | EXXON | 50.0000000 | | |
| 28277 | 5 | 0.1111558 | 0.1111558 | 12.50000 | BP | 100.0000000 | | | | |
| 28278 | 4 | 0.0331538 | 0.0331538 | 12.50000 | BP | 100.0000000 | | | | |
| 28279 | 3 | 0.0190207 | 0.0190207 | 12.50000 | BP | 100.0000000 | | | | |
| 28280 | 4 | 1.7631780 | 1.7631780 | 12.50000 | BP | 100.0000000 | | | | |
| 28281 | 5 | 1.1061331 | 1.1061331 | 12.50000 | BP | 100.0000000 | | | | |
| 28282 | 6 | 0.4341463 | 0.4341463 | 12.50000 | BP | 100.0000000 | | | | |
| 28283 | 7 | 0.1013091 | 0.1013091 | 12.50000 | BP | 100.0000000 | | | | |
| 28234 | 8 | 0.6687738 | 0.6687738 | 12.50000 | BP | 100.0000000 | | | | |
| 28285 | 9 | 1.8633126 | 1.8633126 | 12.50000 | BP | 100.0000000 | | | | |
| 28286 | 6 | 0.2432039 | 0.2432039 | 12.50000 | BP | 100.0000000 | | | | |
| 28287 | 7 | 0.0132529 | 0.0132529 | 12.50000 | BP | 100.0000000 | | | | |
| 28288 | 8 | 0.0000000 | 0.0000000 | 12.50000 | MOBIL | 50.0000000 | PHILLIPS | 50.0000000 | | |
| 28289 | 5 | 0.0000000 | 0.0000000 | 12.50000 | MOBIL | 50.0000000 | PHILLIPS | 50.0000000 | | |
| 28290 | 5 | 0.0000000 | 0.0000000 | 12.50000 | MOBIL | 50.0000000 | PHILLIPS | 50.0000000 | | |
| 28299 | 6 | 0.0668830 | 0.0668830 | 12.50000 | ARCO | 50.0000000 | EXXON | 50.0000000 | | |
| 28300 | 7 | 2.7462020 | 2.7462020 | 12.50000 | ARCO | 50.0000000 | EXXON | 50.0000000 | | |
| 28301 | 8 | 5.4070880 | 5.4070880 | 12.50000 | ARCO | 50.0000000 | EXXON | 50.0000000 | | |
| 28302 | 1 | 8.5730840 | 8.5730840 | 12.50000 | ARCO | 50.0000000 | EXXON | 50.0000000 | | |
| 28303 | 2 | 6.1308134 | 6.1308134 | 12.50000 | ARCO | 50.0000000 | EXXON | 50.0000000 | | |
| 28304 | 3 | 2.9898184 | 2.9898184 | 12.50000 | ARCO | 50.0000000 | EXXON | 50.0000000 | | |
| 28305 | 0 | 3.1854789 | 3.1854789 | 12.50000 | BP | 100.0000000 | | | | |
| 28306 | 1 | 5.4649446 | 5.4649446 | 12.50000 | ARCO | 50.0000000 | EXXON | 50.0000000 | | |
| 28307 | 2 | 7.4776622 | 7.4776622 | 12.50000 | ARCO | 50.0000000 | EXXON | 50.0000000 | | |
| 28308 | 3 | 4.1071874 | 4.1071874 | 12.50000 | ARCO | 50.0000000 | EXXON | 50.0000000 | | |
| 28309 | 4 | 2.2068838 | 2.2068838 | 12.50000 | BP | 100.0000000 | | | | |
| 28310 | 5 | 1.1675071 | 1.1675071 | 12.50000 | BP | 100.0000000 | | | | |
| 28311 | 0 | 0.3709048 | 0.3709048 | 12.50000 | BP | 100.0000000 | | | | |
| 28312 | 9 | 0.1007911 | 0.1007911 | 12.50000 | BP | 100.0000000 | | | | |
| 28313 | 8 | 0.0066790 | 0.0066790 | 12.50000 | ARCO | 50.0000000 | EXXON | 50.0000000 | | |
| 28314 | 2 | 0.0000000 | 0.0000000 | 12.50000 | MOBIL | 50.0000000 | PHILLIPS | 50.0000000 | | |
| 28315 | 1 | 0.0000000 | 0.0000000 | 12.50000 | BP | 100.0000000 | | | | |
| 28316 | A | 0.0000000 | 0.0000000 | 12.50000 | CHEVRON | 33.3333334 | MOBIL | 33.3333333 | PHILLIPS | 33.3333333 |
| 28316 | 7 | 0.0000000 | 0.0000000 | 12.50000 | CHEVRON | 100.0000000 | | | | |
| 28320 | 8 | 0.3216998 | 0.3216998 | 12.50000 | BP | 100.0000000 | | | | |
| 28321 | 3 | 7.2610510 | 7.2610510 | 12.50000 | ARCO | 50.0000000 | EXXON | 50.0000000 | | |
| 28322 | 4 | 4.2486128 | 4.2486128 | 12.50000 | ARCO | 50.0000000 | EXXON | 50.0000000 | | |
| 28323 | 5 | 0.4529448 | 0.4529448 | 12.50000 | ARCO | 50.0000000 | EXXON | 50.0000000 | | |
| 28324 | 0 | 0.3609044 | 0.3609044 | 12.50000 | ARCO | 50.0000000 | EXXON | 50.0000000 | | |
| 28325 | 1 | 3.3036918 | 3.3036918 | 12.50000 | ARCO | 50.0000000 | EXXON | 50.0000000 | | |
| 28326 | 2 | 5.0566434 | 5.0566434 | 12.50000 | ARCO | 50.0000000 | EXXON | 50.0000000 | | |
| 28327 | 3 | 0.0132526 | 0.0132526 | 12.50000 | ARCO | 50.0000000 | EXXON | 50.0000000 | | |
| 28328 | 2 | 0.7489948 | 0.7489948 | 12.50000 | ARCO | 50.0000000 | EXXON | 50.0000000 | | |
| 28329 | 1 | 0.7143628 | 0.7143628 | 12.50000 | ARCO | 50.0000000 | EXXON | 50.0000000 | | |
| 28330 | 0 | 0.0000000 | 0.0000000 | 12.50000 | BP | 100.0000000 | | | | |
| 28331 | 9 | 0.0000000 | 0.0000000 | 12.50000 | BP | 100.0000000 | | | | |
| 28332 | 8 | 0.0000000 | 0.0000000 | 12.50000 | ARCO | 50.0000000 | EXXON | 50.0000000 | | |
| 28333 | 0 | 0.0000000 | 0.0000000 | 12.50000 | BP | 100.0000000 | | | | |
| 28334 | A | 0.0000000 | 0.0000000 | 12.50000 | CHEVRON | 33.3333333 | MOBIL | 33.3333334 | PHILLIPS | 33.3333333 |
| 28334 | 9 | 0.0000000 | 0.0000000 | 12.50000 | MOBIL | 50.0000000 | PHILLIPS | 50.0000000 | | |
| 28335 | 8 | 0.0000000 | 0.0000000 | 12.50000 | BP | 100.0000000 | | | | |
| 28339 | 6 | 0.0000000 | 0.0000000 | 12.50000 | BP | 100.0000000 | | | | |
| 28343 | 9 | 0.0000000 | 0.0000000 | 12.50000 | BP | 100.0000000 | | | | |
| 28345 | 4 | 0.0000000 | 0.0000000 | 12.50000 | ARCO | 50.0000000 | EXXON | 50.0000000 | | |
| 28346 | 7 | 0.0000000 | 0.0000000 | 12.50000 | ARCO | 50.0000000 | EXXON | 50.0000000 | | |
| 28349 | 1 | 0.0000000 | 0.0000000 | 12.50000 | BP | 100.0000000 | | | | |
| 34628 | 9 | 4.9026960 | 4.9026960 | 12.50000 | ARCO | 50.0000000 | EXXON | 50.0000000 | | |
| 34629 | 0 | 2.3763262 | 2.3763262 | 12.50000 | ARCO | 50.0000000 | EXXON | 50.0000000 | | |
| 34630 | 1 | 0.0521132 | 0.0521132 | 12.50000 | BP | 100.0000000 | | | | |
| 34631 | 9 | 4.4211250 | 4.4211250 | 12.50000 | ARCO | 50.0000000 | EXXON | 50.0000000 | | |
| 34632 | 0 | 7.9580580 | 7.9580580 | 12.50000 | ARCO | 50.0000000 | EXXON | 50.0000000 | | |
| 47446 | 5 | 0.0211926 | 0.0211926 | 12.50000 | CHEVRON | 50.0000000 | MOBIL | 50.0000000 | | |
| 47447 | 4 | 0.0011970 | 0.0011970 | 12.50000 | CHEVRON | 50.0000000 | MOBIL | 50.0000000 | | |
| 47448 | 0 | 0.0000000 | 0.0000000 | 12.50000 | MOBIL | 66.6666667 | PHILLIPS | 33.3333333 | | |
| 47449 | 7 | 0.0204696 | 0.0204696 | 12.50000 | CHEVRON | 50.0000000 | MOBIL | 50.0000000 | | |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 47450 | 9 | 0.0193851 | 0.0193851 | 12.50000 | CHEVRON | 33.3333333 | MOBIL | 33.3333334 | PHILLIPS | 33.3333333 |
| 47451 | 6 | 0.0042712 | 0.0042712 | 12.50000 | CHEVRON | 33.3333333 | MOBIL | 33.3333334 | PHILLIPS | 33.3333333 |
| 47452 | 0 | 0.1575467 | 0.1575467 | 12.50000 | CHEVRON | 33.3333333 | MOBIL | 33.3333334 | PHILLIPS | 33.3333333 |
| 47453 | 1 | 0.0384943 | 0.0384943 | 12.50000 | CHEVRON | 33.3333333 | MOBIL | 33.3333334 | PHILLIPS | 33.3333333 |
| 47454 | 3 | 0.0013684 | 0.0013684 | 12.50000 | CHEVRON | 33.3333333 | MOBIL | 33.3333334 | PHILLIPS | 33.3333333 |
| 47469 | 9 | 0.0000000 | 0.0000000 | 12.50000 | MOBIL | 50.0000000 | PHILLIPS | 50.0000000 | | |
| 47471 | 6 | 0.0000000 | 0.0000000 | 12.50000 | AMERADA | 27.0000000 | L L & E | 13.2500000 | SHELL | 29.2500000 |
| | | | | | TEXACO | 30.5000000 | | | | |
| 47472 | 7 | 0.0000000 | 0.0000000 | 12.50000 | AMERADA | 50.0000000 | TEXACO | 50.0000000 | | |
| 47475 | 3 | 0.0000000 | 0.0000000 | 12.50000 | AMERADA | 25.0000000 | MARATHON | 25.0000000 | SHELL | 25.0000000 |
| | | | | | TEXACO | 25.0000000 | | | | |
| 47476 | 4 | 0.0000000 | 0.0000000 | 12.50000 | ARCO | 50.0000000 | EXXON | 50.0000000 | | |
| 80595 | 6 | 0.0000000 | 0.0000000 | 12.50000 | ARCO | 50.0000000 | EXXON | 50.0000000 | | |
| SOUTH MIDDLE GROUND SHOALS | | | | | | | | | | |
| SMG 1 | | | | | | | | | | |
| 18744 | | 6.8965520 | 6.8965520 | 12.50000 | AMOCO | 62.5000000 | CHEVRON | 12.5000000 | TEXACO | 25.0000000 |
| 18746 | | 93.1034480 | 93.1034480 | 12.50000 | AMOCO | 62.5000000 | CHEVRON | 12.5000000 | TEXACO | 25.0000000 |
| SMG 2 | | | | | | | | | | |
| 18746 | | 100.0000000 | 100.0000000 | 12.50000 | AMOCO | 62.5000000 | CHEVRON | 12.5000000 | TEXACO | 25.0000000 |
| STUMP LAKE | | | | | | | | | | |
| 17600 | 1 | 0.0000000 | 2.4424100 | 0.00000 | SHELL | 40.0000000 | UNION | 60.0000000 | | |
| 326059 | A | 0.0000000 | 8.1967200 | 0.00000 | TGX | 4.5226100 | UNION | 95.4773900 | | |
| 326060 | B | 0.0000000 | 15.5737800 | 0.00000 | TGX | 4.5226100 | UNION | 95.4773900 | | |
| 58789 | 1 | 0.0000000 | 11.4754100 | 0.00000 | OXY | 60.0000000 | TGX | 3.6000000 | UNION | 36.4000000 |
| 58789 | A | 0.0000000 | 9.8360700 | 0.00000 | OXY | 100.0000000 | | | | |
| 58790 | 2 | 0.0000000 | 22.6442700 | 0.00000 | TGX | 3.6000000 | UNION | 96.4000000 | | |
| 58791 | 3 | 0.0000000 | 18.8524600 | 0.00000 | OXY | 10.0000000 | TGX | 1.8000000 | UNION | 88.2000000 |
| 58792 | 4 | 0.0000000 | 3.2786800 | 0.00000 | UNION | 100.0000000 | | | | |
| 58794 | 5 | 0.0000000 | 4.0983600 | 0.00000 | UNION | 100.0000000 | | | | |
| 58795 | 6 | 0.0000000 | 3.6018400 | 0.00000 | OXY | 10.0000000 | TGX | 1.8000000 | UNION | 88.2000000 |
| TRADING BAY | | | | | | | | | | |
| MONOPOD A-5 | | | | | | | | | | |
| 18731 | | 100.0000000 | 100.0000000 | 12.50000 | MARATHON | 50.0000000 | UNION | 50.0000000 | | |
| MONOPOD A-6 | | | | | | | | | | |
| 18731 | | 100.0000000 | 100.0000000 | 12.50000 | MARATHON | 50.0000000 | UNION | 50.0000000 | | |
| MONOPOD NON-POOL | | | | | | | | | | |
| 18731 | | 100.0000000 | 100.0000000 | 12.50000 | MARATHON | 50.0000000 | UNION | 50.0000000 | | |

[1] Net Profit Share Lease percentage: 79.5935000.
[2] Net Profit Share Lease percentage: 48.8703100.
[3] Net Profit Share Lease percentage: 30.0000000

02/25/92

# APPENDIX C
# CRUDE OIL ANALYSES

COOK INLET

| | DRIFT RIVER | NIKISKI |
|---|---|---|
| CRUDE | | |
| Gravity, °API @ 6 | 35.3 | 34.6 |
| Spec.Grav. @ 60 | 0.8483 | 0.8519 |
| Kin.Vis. @ 65 °F | 6.94 | 7.34 |
| @ 90 °F | 6.77 | 7.17 |
| @122 °F | 3.39 | 3.55 |
| Sulfur, wt% | 0.09 | 0.10 |
| Nitrogen wt% | 0.13 | 0.14 |
| Carbon wt% | 86.83 | 87.09 |
| Hydrogen wt% | 12.81 | 12.80 |
| Oxygen wt% | 0.09 | 0.15 |
| Sed. and water, v | 0.05 | 0.1 |
| Water, by dist., vo | Nil | 0.05 |
| RVP, psi | 7.5 | 7.85 |
| Pour Pt, °F | 0 | -5 |
| Flash Pt., PMCC, | <0 | <0 |
| BADGER DISTILATION | | |
| C5 AND LIGHTER | | |
| Yield, vol% | 0.4 | 0.7 |
| Composition | | |
| Methane | 0.02 | Traces |
| Ethane | 11.07 | 7.75 |
| Propane | 61.74 | 59.81 |
| Iso-Butane | 11.72 | 12.46 |
| Normal Butane | 13.00 | 16.83 |
| Iso-Pentane | 1.52 | 2.03 |
| Normal Pentane | 0.93 | 1.12 |
| IBP - 120 °F | | |
| Yield vol% | 1.3 | 2.0 |
| Gravity, API @ 60 | X | X |
| 120 - 374 °F | | |
| Yield vol% | 31.4 | 29.5 |
| Gravity, API @ 60 | 59.3 | 57.2 |
| 374 - 440 °F | | |
| Yield vol% | 6.0 | 6.5 |
| Gravity, API @ 60 | 40.9 | 40.6 |
| 440 - 610 °F | | |
| Yield vol% | 17.6 | 15.7 |
| Gravity, API @ 60 | 35.3 | 35.5 |
| 610 + Resid | | |
| Yield vol% | 41.3 | 43.9 |
| Gravity, API @ 60 | 18.1 | 18.2 |
| DISTILATION CURVE, VOL, % | | |
| IBP | 86 | 84 |
| 2% | 131 | 120 |
| 4% | 134 | 130 |
| 6% | 140 | 145 |
| 8% | 150 | 165 |
| 10% | 163 | 195 |
| 12% | 192 | 213 |
| 14% | 211 | 219 |
| 16% | 220 | 239 |
| 18% | 240 | 254 |
| 20% | 257 | 272 |
| 22% | 273 | 292 |
| 24% | 292 | 307 |
| 26% | 309 | 324 |
| 28% | 325 | 341 |
| 30% | 340 | 361 |
| 32% | 361 | 390 |
| 34% | 395 | 420 |
| 36% | 420 | 430 |
| 38% | 430 | 440 |
| 40% | 440 | 460 |
| 42% | 455 | 475 |
| 44% | 475 | 490 |
| 46% | 495 | 510 |
| 48% | 510 | 525 |
| 50% | 525 | 540 |
| 52% | 545 | 555 |
| 54% | 601 | X |
| 56% | 607 | X |

NORTH SLOPE (at VALDES)

| | Nominal | Recalc. |
|---|---|---|
| API Gravity | 27.40 | 27.48 |
| Sp. Gravity | 0.8905 | 0.8905 |
| Wt.% S | 1.1600 | 1.1600 |
| LIGHT ENDS AND BTX ANALYSIS | | |
| | L.V.% | Wt.% |
| C1 | 0.0000 | 0.0000 |
| C2 | 0.0200 | 0.0080 |
| C3 | 0.2000 | 0.1140 |
| IC4 | 0.2500 | 0.1531 |
| NC4 | 0.1500 | 0.7547 |
| TOTAL | 1.6200 | 1.0348 |
| IC5 | 0.1165 | 0.2923 |
| NC5 | 0.9299 | 0.6592 |
| C5 & Ltr. | 2.9665 | 1.9842 |
| IC6 | 0.5000 | |
| NC6 | 1.3400 | |
| C6 Olefins | 0.0000 | |
| MCP | 0.5004 | |
| Cyclo-Hexane | 0.5400 | |
| Benzene | 0.0360 | |

| | Paraffins | Olefins | Naphthenes | Aromatics |
|---|---|---|---|---|
| C7 | 1.5800 | 0.0000 | 1.5900 | 0.6300 |
| C8 | 1.5600 | 0.0000 | 0.9970 | 0.6000 |
| C9+ | 1.2875 | 0.0000 | 1.3544 | 0.1285 |

MOTOR FUEL BLENDING DATA

| | Yield L.V.% | RON Clear | MON Clear | RVP PSI |
|---|---|---|---|---|
| NAPTHA, C5-200 | 6.5 | 69.3 | 68.3 | 7.5 |
| NAPTHA, C5-400 | 21.9 | 62.2 | 58.7 | 2.9 |

Continued on next page

NORTH SLOPE (at VALDES), Continued

RESIDUUM

| Range, IVT-FVT, °F | 0-82 | 82-200 | 200-300 | 300-350 | 350-400 | 400-500 | 500-550 |
|---|---|---|---|---|---|---|---|
| L.V.% of Crude | 1.62 | 6.50 | 7.49 | 3.88 | 4.04 | 8.71 | 4.76 |
| Wt.% of Crude | 1.03 | 5.04 | 6.44 | 3.45 | 3.69 | 8.25 | 4.63 |
| Spec.Gravity | 0.5688 | 0.6903 | 0.7656 | 0.7924 | 0.8116 | 0.8430 | 0.8648 |
| API Gravity | 117.26 | 73.49 | 53.32 | 47.07 | 42.85 | 36.36 | 32.13 |
| Sulpher, Wt.% | 0.0000 | 0.0011 | 0.0025 | 0.0110 | 0.0178 | 0.1704 | 0.4256 |
| Paraffins, L.V.% | | 69.62 | 41.26 | 35.99 | 38.26 | 60.09 | 62.40 |
| Olefins, L.V.% | | 0 | 0 | 0 | 0 | 0 | 0 |
| Naphthenes, L.V.% | | 27.35 | 42.76 | 44.02 | 41.84 | 27.00 | 20.92 |
| Aromatics, L.V.% | | 3.03 | 15.98 | 19.99 | 19.89 | 12.91 | 16.68 |
| N+2A, L.V.% | | 33.41 | 74.72 | 84.00 | 81.63 | 52.81 | |
| Pour Point, °F | | -219.3 | 162.7 | -117.1 | -101.9 | -50.5 | -16.7 |
| Cloud Point, °F | | 207.8 | -162.6 | -115.5 | -105.7 | -44.6 | 12.0 |
| Kin. Visc., 100 °F | | 0.30 | 0.45 | 0.80 | 1.21 | 1.81 | 3.07 |
| Kin. Visc., 122 °F | | 0.24 | 0.35 | 0.67 | 1.09 | 1.48 | 2.38 |
| Smoke Point, MM | | | | 16.44 | 15.60 | 14.23 | 13.00 |
| Cetane Index | | | 10.64 | 28.40 | 35.10 | 40.02 | 44.04 |
| Carbon Resedue | | | | | | | |
| Rams, Wt.% | | | | | | | |
| Con, Wt.% | | | | | | | |
| Nitrogen | | | | | | | |
| Total Nitrogen, PPM | | | | | | 4.99 | 33.17 |
| Basic Nitrogen, PPM | | | | | | | |
| Calc. Refractive Index | | 1.3868 | 1.4290 | 1.4437 | 1.4544 | 1.4721 | 1.4842 |
| Aniline Point, °F | | | | 115.57 | 122.25 | 133.35 | 142.09 |
| UOPK Factor | | 12.22 | 11.65 | 11.64 | 11.60 | 11.49 | 11.50 |
| Neut. Number | | | | | | 0.03 | 0.04 |
| Mercaptan Sulpher, PPM | | | 6.8 | 4.9 | 4.1 | 3.6 | 2.8 |
| Freeze Point, °F | | | | -212.9 | -168.5 | -139.7 | -88.9 |
| Flash Point, °F | | | | | | 70.00 | 106.00 |
| RON Clear | | | | 69.3 | 62.6 | 57.6 | 54.4 |
| MON Clear | | | | 68.3 | 59.1 | 52.5 | 48.4 |
| RVP, PSI | | | | 7.5 | 0.8 | 0.1 | 0.0 |
| Iron | | | | | | | |
| Nickel | | | | | | | |
| Vanadium | | | | | | | |

| Range, IVT-FVT, °F | 550-650 | 650-700 | 700-800 | 800-900 | 900-1050 | 650+ | 1050+ |
|---|---|---|---|---|---|---|---|
| L.V.% of Crude | 10.03 | 4.63 | 8.72 | 8.20 | 11.30 | 52.96 | 24.12 |
| Wt.% of Crude | 9.94 | 4.68 | 8.97 | 8.57 | 12.11 | 57.56 | 23.21 |
| Spec.Gravity | 0.8825 | 0.9005 | 0.9158 | 0.9307 | 0.9549 | 0.9674 | 1.0271 |
| API Gravity | 28.84 | 25.63 | 23.00 | 20.53 | 16.68 | 14.77 | 6.26 |
| Sulpher, Wt.% | 0.7481 | 1.0024 | 1.1974 | 1.3409 | 1.5883 | 1.8295 | 2.5467 |
| Paraffins, L.V.% | 45.31 | | | | | | |
| Olefins, L.V.% | 0 | 0 | | | | | |
| Naphthenes, L.V.% | 22.45 | | | | | | |
| Aromatics, L.V.% | 32.24 | | | | | | |
| N+2A, L.V.% | | | | | | | |
| Pour Point, °F | 19.7 | 38.4 | 63.9 | 87.8 | 108.6 | | |
| Cloud Point, °F | 12.1 | 50.1 | 69.6 | | | | |
| Kin. Visc., 100 °F | 5.84 | 13.89 | 33.26 | 92.81 | 618.74 | 1503.14 | 11647220 |
| Kin. Visc., 122 °F | 4.27 | 9.18 | 19.74 | 48.28 | 253.29 | 556.10 | 1820244 |
| Smoke Point, MM | 11.82 | | | | | | |
| Cetane Index | 44.95 | 42.07 | 35.77 | 22.15 | | | |
| Carbon Resedue | | | | | | | |
| Rams, Wt.% | | 0.09 | 0.13 | 0.33 | 0.69 | 7.92 | 19.08 |
| Con, Wt.% | | 0.05 | 0.03 | 0.33 | 0.86 | 7.93 | 19.16 |
| Nitrogen | | | | | | | |
| Total Nitrogen, PPM | 104.32 | 606.21 | 953.56 | 1121.11 | 1813.78 | 2977.06 | 5529.00 |
| Basic Nitrogen, PPM | 51.37 | 175.73 | 291.05 | 453.23 | 666.56 | | |
| Calc. Refractive Index | 1.4940 | 1.5040 | 1.5124 | 1.5204 | 1.5339 | 1.5411 | 1.5764 |
| Aniline Point, °F | 150.45 | 160.28 | 167.48 | 174.98 | 181.21 | | |
| UOPK Factor | 11.55 | 11.58 | 11.63 | 11.76 | 11.81 | 11.81 | 11.60 |
| Neut. Number | 0.06 | 0.07 | 0.07 | 0.12 | 0.32 | | |
| Mercaptan Sulpher, PP | 3.8 | 7.5 | | | | | |
| Freeze Point, °F | -49.7 | -19.5 | 17.9 | 45.5 | 64.7 | | |
| Flash Point, °F | 160.00 | 202.00 | 268.00 | 348.00 | 376.00 | 443.00 | 524.00 |
| RON Clear | | | | | | | |
| MON Clear | | | | | | | |
| RVP, PSI | | | | | | | |
| Iron | | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.01 |
| Nickel | | 0.00 | 0.00 | 0.00 | 0.00 | 0.04 | 0.08 |
| Vanadium | | 0.00 | 0.00 | 0.00 | 0.00 | 0.18 | 0.38 |

# APPENDIX D
# ALASKA REFINERIES AND PROCESSING PLANTS

| Unit | Capacity | | Products | Market Area |
|---|---|---|---|---|
| **OIL REFINERIES** | | | | |
| ARCO, Kuparuk | | | | |
| Distillaton | 12,000 | Bbl/d | Arctic Heating Fuel/Diesel #2 | Kuparuk |
| ARCO, Prudhoe Bay | | | | |
| Distillaton | 13,700 | Bbl/d | Arctic Heating Fuel/Diesel #2 | Prudhoe Bay |
| MAPCO, North Pole 1977 | | | | |
| Two crude units | 116,000 | Bbl/d | Gasoline, leaded | Alaska |
| | | | Gasoline, unleaded | Alaska |
| | | | JP 4 | Alaska |
| | | | Jet A | Alaska |
| | | | Diesel #1 | Alaska |
| | | | Diesel #2 | Alaska |
| | | | Diesel #4 | Alaska |
| | | | Asphalt | Alaska |
| TESORO, Nikiski 1969 | | | | |
| Crude | 80,000 | Bbl/d | Propane | Alaska |
| Hydrocracker | 9,000 | Bbl/d | Gasoline, leaded | Alaska |
| PowerFormer | 12,000 | Bbl/d | Gasoline, unleaded | Alaska |
| PRIP | 4,000 | Bbl/d | Gasoline, unleaded premium | Alaska |
| LPG | 2,800 | Bbl/d | JP 4 | Alaska |
| Hydrogen | 12,800 | MMcf/d | Jet A | Alaska |
| Sulfur | 15 | T/d | Diesel #2 | Alaska |
| | | | Fuel Oil #6 | export |
| | | | Sulfur | lower 48 |
| PETRO STAR, North Pole 1985 | | | | |
| Crude | 7,000 | Bbl/d | Kerosine Heating/Diesel #2 | Alaska |
| **GAS PROCESSING PLANTS** | | | | |
| PHILLIPS-MARATHON LNG PLANT, Nikiski 1969 | | | | |
| LNG | 230,000 | Mcf/d | LNG | Japan 440,000/Bbl/10 days |
| UNOCAL CHEMICAL PLANT, Nikiski 1969 | | | | |
| Two Ammoni units | 1,300,000 | T/yr | Anhydrous Ammonia | half of ammonia prod is used to produce ur other half is exported. |
| Urea | 1,200,000 | T/yr | Urea prills and granules | West Coast and exported |

02/11/92

# SURVEY OF OPERATING REFINERIES IN THE U.S.

| | No. Plants | Crude | Charge Capacity | | | | |
|---|---|---|---|---|---|---|---|
| | | | Vacuum Distil. | Thermal Ops. | Cat Cracking | Cat Re-forming | Cat Hydro-cracking |
| | | (bbl/cd) | (bbl/sd) | (bbl/sd) | (bbl/sd) | (bbl/sd) | (bbl/sd) |
| Alabama | 4 | 154,250 | 49,000 | 12,000 | --- | 32,500 | --- |
| Alaska | 5 | 224,500 | 6,000 | 29,500 | --- | 12,000 | 9,000 |
| ARCO, Kuparuk | | 12,000 | --- | 12,000 | --- | --- | --- |
| ARCO, Prudhoe Bay | | 17,500 | --- | 17,500 | --- | --- | --- |
| Mapco, North Pole | | 115,000 | 6,000 | --- | --- | --- | --- |
| Petro Star,North Pole | | 8,000 | --- | --- | --- | --- | --- |
| Tesoro, Kenai | | 72,000 | --- | --- | --- | 12,000 | 9,000 |
| Arizona | 2 | 14,210 | 8,000 | --- | --- | --- | --- |
| Arkansas | 3 | 60,470 | 30,700 | --- | 18,500 | 9,000 | --- |
| California | 30 | 2,150,555 | 1,267,630 | 538,300 | 660,000 | 547,600 | 435,000 |
| Colorado | 3 | 91,200 | 41,100 | 4,200 | 27,500 | 22,900 | 5,000 |
| Delaware | 1 | 140,000 | 95,000 | 45,000 | 67,000 | 52,000 | 18,000 |
| Georga | 2 | 35,500 | --- | --- | --- | --- | --- |
| Hawaii | 2 | 143,050 | 71,250 | 13,000 | 20,000 | 13,000 | 18,000 |
| Illinois | 7 | 948,500 | 391,000 | 125,400 | 377,000 | 302,300 | 66,500 |
| Indiana | 4 | 428,900 | 233,200 | 28,000 | 172,000 | 104,500 | --- |
| Kansas | 8 | 353,225 | 129,650 | 52,000 | 129,500 | 100,800 | 3,190 |
| Kentucky | 2 | 218,900 | 92,000 | 57,600 | 100,000 | 46,000 | --- |
| Louisiana | 19 | 2,299,241 | 918,900 | 441,700 | 782,500 | 499,300 | 172,000 |
| Michigan | 4 | 125,200 | 38,000 | --- | 46,500 | 33,500 | --- |
| Minnesota | 2 | 285,600 | 192,000 | 58,000 | 78,000 | 55,500 | --- |
| Mississippi | 5 | 358,600 | 275,000 | 83,000 | 82,000 | 95,800 | 68,000 |
| Montana | 4 | 138,900 | 54,800 | 7,700 | 54,400 | 37,700 | 4,900 |
| Nevada | 1 | 4,500 | 2,500 | --- | --- | --- | --- |
| New Jersey | 6 | 499,250 | 256,200 | 31,000 | 256,000 | 78,500 | --- |
| New Mexico | 4 | 76,650 | 13,900 | --- | 34,000 | 19,300 | --- |
| New York | 1 | 39,900 | 25,000 | --- | --- | --- | --- |
| North Dakota | 1 | 58,000 | --- | --- | 26,000 | 12,100 | --- |
| Ohio | 4 | 454,150 | 153,000 | 33,000 | 174,000 | 162,600 | 87,200 |
| Oklahoma | 7 | 409,500 | 146,500 | 20,500 | 146,000 | 101,500 | 5,000 |
| Oregon | 1 | --- | 16,000 | --- | --- | --- | --- |
| Pennsylvania | 7 | 741,300 | 317,500 | --- | 261,000 | 181,620 | 51,000 |
| Tennessee | 1 | 75,000 | 12,000 | --- | 38,000 | 14,000 | --- |
| Texas | 31 | 3,882,200 | 1,760,500 | 333,200 | 1,686,500 | 1,186,000 | 316,000 |
| Utah | 6 | 154,500 | 48,100 | 8,500 | 55,400 | 31,100 | --- |
| Virginia | 1 | 53,000 | 29,000 | 14,000 | 27,500 | 10,200 | --- |
| Washington | 7 | 523,225 | 263,100 | 74 500 | 121,500 | 134,500 | 52,000 |
| West Virginia | 2 | 29,680 | 10,850 | --- | --- | 4,900 | 4,500 |
| Wisconsin | 1 | 32,000 | 20,500 | --- | 11,000 | 8,000 | --- |
| Wyoming | 4 | 122,900 | 58,600 | 8,000 | 52,500 | 29,850 | --- |
| TOTAL | 192 | 15,326,556 | 7,026,480 | 2,018,100 | 5,504,300 | 3,938.570 | 1,315,290 |

Source: Thrash, Lou Ann, "Worldwide Refining," Oil & Gas Journal, December 23, 1991, p. 42.
02/25/92

| | Charge Capacity | | Production Capacity | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Cat Hydro-refining (bbl/sd) | Cat Hydro-treating (bbl/sd) | Alky. Poly. (bbl/sd) | Aromatic Isomer-ization (bbl/sd) | Lubes (bbl/sd) | Asphalt (bbl/sd) | Hydrogen (MMcf/d) | Coke (t/d) |
| Alabama | 14,800 | 18,500 | --- | 7,000 | --- | 19,500 | 6.0 | --- |
| Alaska | --- | 12,000 | --- | 7,000 | --- | 2,000 | 12.8 | --- |
| ARCO, Kuparuk | --- | --- | --- | --- | --- | --- | --- | --- |
| ARCO, Prudhoe Bay | --- | --- | --- | --- | --- | --- | --- | --- |
| Mapco, North Pole | --- | --- | --- | 3,000 | --- | 2,000 | --- | --- |
| Petro Star,North Pole | --- | --- | --- | --- | --- | --- | --- | --- |
| Tesoro, Kenai | --- | 12,000 | --- | 4,000 | --- | --- | 12.8 | --- |
| Arizona | --- | --- | --- | --- | --- | 4,660 | --- | --- |
| Arkansas | --- | 20,600 | 4,800 | 3,000 | 3,600 | 9,700 | 0.4 | --- |
| California | 587,500 | 917,000 | 132,400 | 17,900 | 29,400 | 90,800 | 1,070.4 | 21,022 |
| Colorado | --- | 35,700 | 3,800 | --- | --- | 5,000 | 6.0 | 200 |
| Delaware | --- | 123,000 | 17,100 | 1,870 | --- | --- | 40.0 | 2,000 |
| Georga | --- | --- | --- | --- | --- | 26,500 | --- | --- |
| Hawaii | --- | 14,500 | 5,625 | 1,500 | --- | 2,300 | 22.5 | --- |
| Illinois | 29,000 | 584,300 | 96,500 | 33,400 | 4,600 | 44,100 | 66.8 | 6,240 |
| Indiana | 94,000 | 184,100 | 36,500 | 39,000 | 6,400 | 51,000 | --- | 1,550 |
| Kansas | 44,000 | 177,800 | 39,100 | 41,000 | --- | 7,000 | --- | 2,100 |
| Kentucky | 40,400 | 137,800 | 13,000 | 22,200 | 8,500 | 30,000 | --- | --- |
| Louisiana | 277,000 | 1,043,100 | 212,900 | 130,900 | 37,600 | 54,000 | 167.1 | 16,025 |
| Michigan | 17,000 | 46,800 | 9,000 | 8,000 | --- | 18,000 | --- | --- |
| Minnesota | 86,500 | 127,000 | 19,200 | 23,300 | --- | 49,000 | 20.0 | 2,800 |
| Mississippi | 192,800 | 59,800 | 19,700 | 5,500 | 3,600 | 40,600 | 217.5 | 4,250 |
| Montana | 14,000 | 101,500 | 13,100 | 6,450 | --- | 26,700 | 21.0 | 435 |
| Nevada | --- | --- | --- | --- | --- | --- | --- | --- |
| New Jersey | 65,000 | 244,200 | 36,000 | 36,300 | 8,500 | 73,000 | 11.0 | 1,100 |
| New Mexico | --- | 30,300 | 6,400 | 4,000 | --- | 3,200 | --- | --- |
| New York | --- | --- | --- | --- | --- | --- | --- | --- |
| North Dakota | --- | 19,100 | 4,400 | 5,100 | --- | --- | --- | --- |
| Ohio | 23,000 | 170,500 | 29,900 | 63,900 | --- | 19,000 | 72.0 | 1,475 |
| Oklahoma | 26,000 | 155,000 | 36,100 | 39,900 | 8,000 | 18,100 | 10.0 | 1,260 |
| Oregon | --- | --- | --- | --- | --- | 11,500 | --- | --- |
| Pennsylvania | 42,000 | 417,800 | 53,500 | 18,950 | 8,750 | 47,000 | 49.5 | --- |
| Tennessee | --- | 35,000 | 6,000 | 4,000 | --- | 3,500 | --- | --- |
| Texas | 823,700 | 2,341,650 | 340,600 | 310,485 | 91,200 | 67,400 | 623.0 | 11,734 |
| Utah | 7,600 | 34,100 | 14,500 | 8,400 | --- | 1,700 | --- | 350 |
| Virginia | --- | 26,500 | --- | --- | --- | --- | --- | 750 |
| Washington | 25,500 | 201,000 | 33,000 | 4,250 | --- | 13,000 | 80.0 | 3,900 |
| West Virginia | --- | 3,900 | --- | --- | 6,440 | --- | 2.7 | --- |
| Wisconsin | 5,800 | 9,000 | 1,300 | 2,000 | --- | 13,500 | --- | --- |
| Wyoming | 21,000 | 56,450 | 8,440 | 2,500 | --- | 16,000 | --- | --- |
| TOTAL | 2,436,600 | 7,348,000 | 1,192,865 | 847,805 | 216,590 | 769,760 | 2,499 | 77,191 |

# APPENDIX E
# CONVERSION FACTORS

## ABBREVIATIONS

| | | | |
|---|---|---|---|
| acre | ac | kilolitre | kl |
| barrel | bbl | kilometer | km |
| British thermal unit | btu | litre | l |
| billion cubic feet | bcf | meter | m |
| calendar day | cd | mile | mi |
| callory | cal | million cubic feet | MMcf |
| cube (e.g. cu m) | cu | nautical mile | naut mi |
| exception: cubic foot | cf | pound | lb |
| day | d | stream day | sd |
| foot | ft | square (e.g. sq ft) | sq |
| gallon, U.S. | gal US | thousand cubic feet | Mcf |
| gallon, Imperial | gal Imp | ton, U.S. | t U.S. |
| nectar | ha | ton, Imperial | t Imp |
| inch | in | tonne | tn |
| kilogram | kg | trillion cubic feet | Tcf |

## ACRONYMS

| | |
|---|---|
| AOGCC | Alaska Oil and Gas Conservation Commission |
| API | American Petroleum Institute |
| DNR | Alaska Department of Natural Resources |
| DO&G | Division of Oil and Gas |
| DOR | Alaska Department of Revenue |
| ISER | Institute of Social and Economic Research |
| LNG | liquid natural gas |
| LPG | liquid propane gas |
| NGL | natural gas liquids |
| TAPS | Trans Alaska Pipeline System |

## LENGTH

| | | ft | mi | naut mi | m | km |
|---|---|---|---|---|---|---|
| 1 ft | = | 1 | 0.0001894 | 0.000164 | 0.3048 | 0.003048 |
| 1 mi | = | 5280 | 1 | 0.8684 | 1609.34 | 1.60934 |
| 1 naut m | = | 6076.12 | 1.1516 | 1 | 1852 | 1.852 |
| 1 m | = | 3.2808 | 0.000621 | 0.000539 | 1 | 1000 |
| 1 km | = | 3280.8 | 0.621371 | 0.5396 | 0.001 | 1 |

## AREA

| | | sq ft | ac | sq mi | sq m | ha | sq km |
|---|---|---|---|---|---|---|---|
| 1 sq ft | = | 1 | 0.000023 | | 0.092903 | | |
| 1 ac | = | 43560 | 1 | 0.0016 | 4046.86 | 0.404686 | 0.004047 |
| 1 sq mi | = | 27878400 | 640 | 1 | 2589990 | 258.999 | 2.58999 |
| 1 sq m | = | 10.7639 | 0.000247 | | 1 | 0.0001 | 0.000001 |
| 1 ha | = | 107636 | 2.47105 | 0.003861 | 10000 | 1 | 0.01 |
| 1 sq km | = | 10763649 | 247.105 | 0.386102 | 1000000 | 100 | 1 |

## VOLUME

| | | cu ft | gal US | gal Imp | bbl | cu m |
|---|---|---|---|---|---|---|
| 1 cu ft | = | 1 | 7.48052 | 6.22883 | 0.17811 | 0.028317 |
| 1 gal US | = | 0.133681 | 1 | 0.832674 | 0.02381 | 0.0037854 |
| 1 gal Im | = | 0.160544 | 1.20095 | 1 | 0.028594 | 0.0045460 |
| 1 bbl | = | 5.6146 | 42 | 34.9726 | 1 | 0.158987 |
| 1 cu m | = | 35.3147 | 264.172 | 219.969 | 6.28981 | 1 |

## WEIGHT

| | | lb | short t | long t | kg | tn |
|---|---|---|---|---|---|---|
| 1 lb | = | 1 | 0.0005 | 0.000367 | 0.453592 | 0.000453 |
| 1 short t | = | 2000 | 1 | 0.892857 | 907.1848 | 0.907185 |
| 1 long t | = | 2240 | 1.12 | 1 | 1016.05 | 1.01605 |
| 1 kg | = | 2.20462 | 0.001102 | 0.000984 | 1 | 0.001 |
| 1 tn | = | 2204.62 | 1.10231 | 0.984207 | 1000 | 1 |

short ton: used in U.S.
long ton: used in U.K.
tonne: metric ton

## CRUDE OIL WEIGHT

Based on average Arabian Light, 33.5 API.

| | gal US | gal Imp | short t | long t | tn | bbl |
|---|---|---|---|---|---|---|
| 1 gal US = | 1 | 0.833 | | 0.00319 | 0.00325 | 0.0238 |
| 1 gal Im = | 1.201 | 1 | | 0.00383 | 0.00391 | 0.0286 |
| 1 short t = | | | 1 | | | |
| 1 long t = | | | | 1 | | |
| 1 tn = | 0.000308 | 0.000256 | | | 1 | 7.31 |
| 1 bbl = | 42 | 35 | | 0.134 | 0.136 | 1 |

## WEIGHT EQIVALENTS OF PETROLEUM AND PETROLEUM PRODUCTS

| | Average Gravity @60 °F | gal/lb | lb/gal | lb/bbl | bbl/ short t | bbl/ long t | bbl/ tn |
|---|---|---|---|---|---|---|---|
| crude oil, foreign | 25.6 | 0.13333 | 7.500 | 315 | 6.349 | 7.111 | 6.998 |
| crude oil, domestic | 36.0 | 0.14217 | 7.034 | 295 | 6.770 | 7.582 | 7.463 |
| gasolin and naptha | 59.5 | 0.16215 | 6.167 | 259 | 7.721 | 8.648 | 8.511 |
| kerosine | 43.0 | 0.14812 | 6.751 | 284 | 7.053 | 7.900 | 7.775 |
| fuel oil, distillate | 31.3 | 0.13817 | 7.237 | 304 | 6.580 | 7.369 | 7.253 |
| fuel oil, residual | 18.0 | 0.12687 | 7.882 | 331 | 6.041 | 6.766 | 6.660 |
| asphalt | 5.6 | 0.11634 | 8.596 | 361 | 5.540 | 6.205 | 6.106 |
| liquid petroleum gas | - | 0.22104 | 4.524 | 190 | 10.526 | 11.789 | 11.603 |

## APPROXIMATE HEAT CONTENTS OF FUELS AND PETROLEUM PRODUCTS

Approximate Million Btu per Barrel

| | |
|---|---|
| asphalt | 6.6 |
| aviation gasoline | 5.0 |
| crude oil | 5.8 |
| fuel oil, distillate | 5.8 |
| fuel oil, residual | 6.3 |
| jet fuel, kerosene type | 5.7 |
| jet fuel, naptha type | 5.4 |
| kerosene | 5.7 |
| ethane | 3.1 |
| butane | 4.3 |
| propane | 3.8 |
| pentanes plus | 4.6 |

## VOLUME CONVERSIONS FOR LIQUID NATURAL GAS AND NATURAL GAS

| LNG @ -260 °F | Natural Gas cu ft |
|---|---|
| 1 lb | 21.082 |
| 1 gal | 79.814 |
| 1 cu ft | 597.0 |
| 1 bbl | 3,352 |
| 1 cu m | 21,085 |
| 1 tn | 46,477 |

# APPENDIX F
# DEMAND PROJECTION METHODOLOGY AND ASSUMPTIONS

## PRODUCTION METHODOLOGY

Demand for oil and gas is best calculated by dividing total demand into use categories. Because the factors affecting the level and growth rate of demand for each use are similar and because oil and gas often compete with one another in different markets, total demand may otherwise be distorted. The use categories in this study are transportation, electricity, space heat (including cooking, water heating and clothes drying), and industrial. A simple model, ENergy Demand MODel (ENDMOD) has been constructed for calculating future energy demands in Alaska.

The factors most important in projecting future demand will vary by use category. In general, the most important are population (or households) and relative fuel prices. The household is the basic consuming unit for the residential sector and population is a good proxy for demand in the commercial sector. In the industrial sector fuel prices are the primary determinate of the total quantity of energy consumed. In the residential and commercial sectors, fuel prices are more important in determining the type of fuel used.

### TRANSPORTATION

Forecasting the demand for oil for transportation fuels in ENDMOD requires the use of per capita consumption coefficients. In each case current levels are assumed to represent a reasonable initial value in our forecast.

#### Gasoline

HIGHWAY. This is the largest category of gasoline consumption in Alaska. Demand is related to population, personal income, and the fuel efficiency of the automobile fleet. Growth in the first two factors will tend to offset the effect of increased efficiency in future years resulting in relatively constant use of this fuel. In Alaska, per capita consumption of highway gasoline peaked in 1975 at 502 gallons per capita and has declined to 388 gallons per capita in 1991. We assume that this coefficient will continue to decline by 1/2 percent per year.

AVIATION GASOLINE. In the past, use has remained at levels that are approximately 10 percent of highway gasoline use. Per capita consumption fell in the early 1980s but has grown slightly since then to its present level of 37 gallons per capita in 1991. We assume that this level will remain constant through the forecast period.

MARINE GASOLINE. For the past several years, use has been roughly half of the aviation consumption level. We assume that the 1991 level of 21 gallons per capita will remain constant over the forecast period.

#### Jet Fuel

Consumption consists of domestic commercial operations, international commercial operations, and military operations. Domestic commercial operations are a function of the size of the Alaskan population and health of the economy. Jet fuel consumption over the last decade has mirrored the changes in the Alaska economy. For purposes of this forecast, we assume that the per capita consumption of jet fuel of 643 gallons will rise by 3 percent per year. International commercial operations have undergone a significant change since 1986 as international passenger flights have all but disappeared. In spite of this circumstance, fuel consumed by cargo flights contributed to a 24 percent increase in exempt jet fuel sales between 1986 and 1991. In this same period the average annual consumption of fuel for international commercial operations has been 344 million gallons. Since the changes experienced in the last few years have essentially played out, we assume that the annual consumption will grow at about one percent per year.

#### Diesel

The consumption of diesel for highway transportation was 1,377 gallons per capita in 1992. This rate is held constant over the forecast period. The total consumption of diesel was at a six-year low in 1992.

Marine diesel use has steadily risen over the last six years. We assume that the current level of 374 gallons per capita grow a one percent per year.

### ELECTRIC UTILITIES

Electric utility use of oil and gas is a derived demand based upon the demand for electricity and the methods used to generate it. We project this use of liquid fuels and natural gas by first

estimating electricity demand for space heating and non-space heating uses, then determining the proportion generated by fuel oil and natural gas, and then finally determining demand based upon the efficiency of generation (heat rate). Since the electricity generation alternatives vary by region in Alaska, we project fuel use by three major regions on the state: Railbelt, Southeast, and the rest of the state.

**Railbelt**

CONSUMPTION OF ELECTRICITY PER CUSTOMER. The total electricity demand is split into the demand for residential space heat and for all other uses. The space heating consumption rates are based on estimates developed for the 1983 Railbelt Electricity Demand (RED) model (Battelle Northwest Laboratories, June 1983). In ISER's original version of ENDMOD, these consumption rates were forecasted to rise slowly both due to increased electricity consumption for space heat in the new additions to the housing stock and due to the aging of the existing stock. These parameters were incorporated in this year's version of ENDMOD.

The number of households using electric space heat depends upon the total number of households and the proportion of housing units which use electric space heat. We assume that currently over 16 percent of the households in the railbelt use electric space heat. This number will fall to 15 percent.

The demand for electricity net of residential space heating uses is calculated on a per household basis projected in the RED model. This includes both residential and commercial consumption. Growth is modest due to expected real price increases.

GENERATION MODE SPLIT. Except as noted below, future additions to capacity within the projection period are all gas-fired turbines. Incremental generation in Anchorage is entirely natural gas. Incremental generation in Fairbanks will depend upon the cheaper cost of purchased electricity from Anchorage generated by natural gas and the marginal cost of locally produced electricity generated by fuel oil. We assume that electricity moves in both directions in the line at different times. Fairbanks excess capacity provides reserves to Anchorage, and cheap Anchorage generation provides off-peak electricity to Fairbanks. Incremental generation in Fairbanks comes from Anchorage-produced electricity. The following assumptions specifically determine mode split:

-Coal-fired generation in Fairbanks remains constant at 316 thousand megawatt hours annually.

-Eklutna and Cooper lake hydroelectric facilities continue to provide railbelt power.

-Bradley Lake came on-line in September 1991 and produces 330 thousand MPH annually.

Heat rates are projected to remain at current levels as assumed in the original ENDMOD.

**Sourheast**

CONSUMPTION OF ELECTRICITY PER CAPITA. The growth rate in consumption per capita in Southeast is assumed to be the same rate as in the Railbelt. These growth rates are applied to the 1990 consumption of 9,705 kwh per capita.

GENERATION MODE SPLIT. The oil-generated power is assumed to supply about 6 percent of the total electric requirements for the Southeast region. Juneau, Ketchikan, and Wrangell/Petersburg consume 44, 21, and 9 percent respectively of the total electricity generated in the region.

**Rest of State**

Growth in per capita electricity demand in the rest of the state is assumed to occur at twice the rate projected for the Railbelt. This growth rate is applied to the 1990 per capita rate of 5,691 kwh per capita. Except for power generated from natural gas in Barrow and the Terror Lake and Solomon Gulch hydro plants, this region depends on fuel oil.

**SPACE HEATING**

In the Anchorage area, natural gas is the most economical fuel for space heating. Elsewhere, fuel oil is the least expensive alternative except where electricity generated by natural gas is available. In projecting future demand, we use different procedures for gas and fuel oil because of differences in data availability. Natural gas use is based upon a projection of the current level of consumption. Fuel oil demand is estimated upon the proportion of the population assumed to heat with fuel oil and estimates of mean household fuel oil consumption. This approach is necessary because there is no reliable direct estimate of the current fuel oil consumption for space heating.

**Railbelt**

Natural gas for space heating (and a small amount of related uses for gas purchased from utilities) is projected to grow as a function of population. Growth has historically occurred at a rate in excess of population due to gas retrofitting and expansion of the commercial sector. This trend is projected to exceed population by 2 percent annually.

The gas market in the Matanuska/Susitna Valleys will reach a 50 percent saturation by 1995 as more households are hooked-up. Residential natural gas consumption is approximately 200 thousand cubic feet per household. Per capita commercial consumption is 55 thousand cubic feet.

Fuel oil use for space heating is generally preferred only where gas or gas-fired electricity is not available. We assume that the proportion of households using fuel oil for space heat remains at about 19 percent. Per-household residential and per-capita commercial fuel oil consumption are based on gas consumption figures converted to fuel oil on the basis of thermal equivalency.

**Non-Railbelt**
Outside the Railbelt, space heating is almost entirely provided by fuel oil, with the exception of Barrow. Fuel oil consumption is calculated using the share of households with fuel oil space heat and the same per capita coefficient of fuel oil use for space heating as applied to the railbelt population. For natural gas consumption in Barrow, a growth rate which exceeds population growth by 2 percent is applied to a base of current consumption.

**INDUSTRY**
Industrial consumption is not a function of population, but rather of the availability of supplies and market opportunities, Since the major industrial users of petroleum fuels are small in number, there are best projected on a case-by-case basis.

**Ammonia-Urea Production**
Ammonia-urea production using natural gas is assumed to continue at a constant level.

**Petroleum Production**
OIL USED FOR PRODUCTION. A small quantity of fuel oil used in oil production is included in the miscellaneous industrial category.

OIL USED FOR TRANSPORTATION. Fuel oil fuels the pumps for most of TAPS. Annual consumption will fall with throughput.

GAS USED FOR PRODUCTION. Petroleum production uses Cook Inlet and North Slope natural gas for space heating, electricity generation, pump fuel, etc. Consumption is difficult to predict because of its many uses, but is primarily dependent upon petroleum production and employment levels. We assume the level declines in the Cook Inlet. On the North Slope, it grows through 1993 and then declines.

GAS USED FOR TRANSPORTATION. Assumed to fall at nearly the same rate as TAPS throughput.

**Miscellaneous**
Some fuel oil is used in electricity generation for industrial self-supplied power. Data on the consumption comes form the Alaska Energy Authority , and it is projected to decline at 2 percent per year.

**Military**
The military uses natural gas for electricity generation and space heating in the Anchorage area and fuel oil elsewhere. Military transportation use of fuel oil is counted in the transportation sector. Military natural gas use is projected to remain constant.

**Injection**
Gas is injected into petroleum reservoirs to enhance recovery. Because this is only a temporary use of gas, it is not counted a part of final consumption.

**LNG**
LNG is defined as export of gas for the purposes of this report.

## PROJECTION ASSUMPTIONS

Economic projections for estimating future petroleum demands were developed for this year's "Historical and Projected Oil and Gas Consumption" report by ISER. Population and household projections were provided for use in ENDMOD from a Man-in-the-Arctic Program (MAP) model run completed in September 1991 for the 1991 Southern Railbelt Utility Study. The MAP model is a large-scale simulation of the Alaskan economy that characterizes the interaction of exogenous, basic-sector industries (oil and gas, mining, fishing, tourism, the federal government, forestry, etc.), the local support sectors, and the state government. The model produces forecasts of employment, population, demographics, and state government revenues and expenditures.

The September 1991 version of the MAP model predicts a growth in statewide population of about 5 percent per year. Railbelt population will grow only slightly faster. The assumptions underlying this forecast are presented below.

**PETROLEUM PRICE ASSUMPTIONS**

AVERAGE EXPECTED OPEC PRICE. Alaska Department of Revenue, Spring 1991 Mid-Scenario.

**INDUSTRY ASSUMPTIONS**

TRANS-ALASKA PIPELINE. Operating employment remains constant through 2010. Source: personal communication with Alyeska Pipeline Company.

PIPELINE CORROSION. Corrosion-related repairs and maintenance results in construction employment peaking at 800 in 1991 and falling to zero in 1994.

OIL SPILL. The Exxon Valdez oil spill generated direct employment of 2,650 in 1989 and $700 million in additional personal income to Alaskans.

NORTH SLOPE PETROLEUM DEVELOPMENT AND PRODUCTION. Employment increases 50 percent during the 1990s from a base of 3,000 and subsequently remains constant.

ANWR. Exploration but no development in ANWR.

OCS. None.

UPPER COOK INLET - PETROLEUM PRODUCTION. Employment in exploration and development of oil and gas in Upper Cook Inlet area declines gradually (1 percent annually) as the major oil fields are depleted.

OIL INDUSTRY HEADQUARTERS. Headquarters employment associated with additional development of North Slope fields increases 2 percent annually.

TAGS PIPELINE. None.

BELUGA COAL PRODUCTION. None.

U.S. BORAX. None.

GREENS CREEK MINE. Production from the Greens Creek Mine on Admiralty Island begins at the end of 1988. Employment is constant at 250 through 2010. Source: personal communication, Greens Creek Mining Company.

RED DOG MINE. The Red Dog Mine in the Western Brooks Range begins operation in 1990 with production employment of 350.

WISHBONE HILL. This coal mine in the Matanuska-Susitna Valley begins operation in mid-1994, employing 250 in the extraction and export of coal to Japan.

AJ MINE. Echo Bay Mining Company begins production from this gold mine in Juneau in mid-1993. Operations employment is 450.

KENSINGTON MINE. Echo Bay Mining Company begins production from this mine north of Juneau in mid-1993. Operations employment is 340.

OTHER SE MINING. None.

FORT KNOX. Production from this mine near Fairbanks begins in 1995, employing 100.

OTHER MINING ACTIVITY. Mining employment net of specifically identified projects increases from 650 in 1989 by 3 percent annually.

AGRICULTURE. Employment in agriculture is constant at 1989 level of 525.

LOGGING AND SAWMILLS. Logging and milling employment in the Southeast declines in the 1990s by 800 as the Native corp. harvest falls to a sustainable level. Employment growth in Southcentral (Seward, Valdez, Mat-Su, and Kenai) reflects new activities.

PULP MILLS. After 1991 employment declines at a rate of 1 percent per year because of productivity gains.

COMMERCIAL FISH HARVESTING, NONBOTTOMFISH. Employment levels in traditional fisheries harvest remain constant at 8,200.

COMMERCIAL FISH PROCESSING, NONBOTTOMFISH. Employment in processing of traditional fisheries harvest increases from 7,200 in 1988 to 7,500 in 1991 and thereafter remains constant.

FINFISH FARMING. None.

COMMERCIAL FISHING, BOTTOMFISH. The total U.S. bottomfish catch expands to allowable catch. Onshore processing is centered in the Aleutians and Kodiak with additional activity in Anchorage, Kenai Peninsula, and Bristol Bay.

FEDERAL MILITARY EMPLOYMENT. Strength level constant after complete deployment of Light Infantry Division in 1991 in Anchorage and Fairbanks and Air Force buildup in Anchorage.

NAVY CRUISER HOMEPORTING. None.

FEDERAL CIVILIAN EMPLOYMENT. Employment rises at 0.5 percent annual rate consistent with the Long-term trend since 1960.

TOURISM. Index of tourist visitor days to Alaska increases by 3 percent per year from 1990.

STATE ELECTRIC PROJECTS (SEE ALSO SPECIAL STATE APPROPRIATIONS). Construction employment from Alaska Power Authority projects includes Bradley Lake.

**Fiscal Assumptions**

SEVERANCE TAXES. No changes from current tax structure.

ROYALTIES. Current royalty structure continues. These revenues are distributed between the General Fund and Permanent Fund.

BONUSES. Based on projections published by Alaska Department of Revenue. No change in regulations.

PROPERTY TAXES. Based on projections published by Alaska Department of Revenue. Augmented by taxes on onshore facilities related to OCS development. (See OCS case.)

PETROLEUM CORPORATE INCOME TAX. Based on projections published by Alaska Department of Revenue. No change in tax regulations.

RENTS. Constant at $9 million annually.

MISCELLANEOUS PETROLEUM SETTLEMENT REVENUES. Alaska receives $2 billion (1990$) over the period FY 1991 to 2000 in settlement of disputed offshore leases in the Beaufort Sea and in settlement of lawsuits and tax disputes regarding the valuation of North Slope oil. These revenues are evenly distributed between the General Fund and the Permanent Fund.

FEDERAL-STATE PETROLEUM-RELATED SHARED REVENUES. Increasing $1 million annually from 1990 level of $13 million.

PERSONAL INCOME TAX. Reimposed at previous level when state appropriations fall below the FY 1988 level in real terms. Income tax is reimposed prior to elimination of the dividend and at the same time that Permanent Fund earnings have been appropriated to the General Fund.

LARGE PROJECT CORPORATE INCOME TAXES. Zero.

MISCELLANEOUS LOCAL REVENUE SOURCES. Miscellaneous state-local transfers, large project property taxes, new petroleum-related federal transfers all set to zero.

NEW FEDERAL-STATE SHARED REVENUES. Zero.

AGGREGATE APPROPREATIONS. Annual appropriation equals current revenues plus 50 percent of General Fund balance available for appropriations.

CAPITAL/OPERATIONS SPLIT. 90 percent operations; 10 percent capital.

GENERAL OBLIGATIONS BONDS. Bond sales for capital expenditures occur at a rate which maintains annual debt service payments at a level no more than 5 percent of current state revenues.

FEDERAL GRANTS-IN-AID FOR CAPITAL EXPENDITURES. Increasing at 6 percent annually.

STATE LOAN PROGRAMS. Appropriations from the General Fund for program capitalization terminated after FY 1987. Programs continue functioning on existing capitalization including AHFC and APA revenue bond expenditures.

MUNICIPAL CAPITAL GRANTS. Funding terminated after FY 1987.

STATE-LOCAL REVENUE SHARING. Continuation proportional to total state expenditures.

STATE-LOCAL MUNICIPAL ASSISTANCE. Continuation proportional to total state expenditures.

PERMINENT FUND/OTHERSPECIAL APPROPRIATIONS INEXCESS OF SPENDING LIMIT. $100 million in unspecified capital expenditures from the Intertie Reserve Account.

PERMINENT FUND PRINCIPAL. Deposits from petroleum revenues continue at current rates; inflation-proofing eliminated when complete withdrawal of nominal earnings commences.

PERMINENT FUND DIVIDEND. Continued at the rate of 50 percent of earnings averaged over the previous 5 years until revenues from all other sources are insufficient to maintain state appropriations at real 1988 level. When that milestone is reached, the dividend is phased out.

PERMINENT FUND EARNINGS. After payment of the dividend, the remaining fund earnings are added to the corpus of the Permanent Fund --

inflation proofing and undistributed income. When state appropriations begin to fall below the real 1988 level, earnings are diverted at an increasing rate to the General Fund to maintain the 1988 level.

REAL RATE OF RETURN. 3.3 percent.

STATE-LOCAL WAGE RATES. Wage rate growth falls below inflation rate for 2 years in mid-1990s, resulting in approximate 10 percent real reduction in average wage.

LOCAL PROPERTY TAX RATE. Trends upward over time from 1.1 to 1.3 mills based on full value.

**NATIONAL VARIABLE ASSUMPTIONS**

U.S. INFLATION RATE. Consumer prices rise at an annual rate of approximately 5 percent.

REAL AVERAGE WEEKLY EARNINGS. Growth in real average weekly earnings averages 0.5 percent annually.

REAL PER CAPITA INCOME. Growth in real per capita income averages 1 percent annually in excess of average weekly earnings.

UNEMPLOYMENT RATE. Long-run rate averages 6.5 percent.

**REGIONAL ASSUMPTIONS**

POPULATION. Regional population growth allocated on the basis of existing population and employment growth.

EMPLOYMENT. No significant shifts in the location of support industries.

**DEMOGRAPHIC ASSUMPTIONS**

LABOR FORCE PARTICIPATION RATE. Constant at 71 percent.

# ACKNOWLEDGEMENTS

This document was prepared by staff of the State of Alaska, Department of Natural Resources, Division of Oil and Gas:

**Bill VanDyke, Petroleum Manager**

**Dick Beasley, Geologist and Principal Document Editor**

**Kevin Sanks, Petroleum Economist**

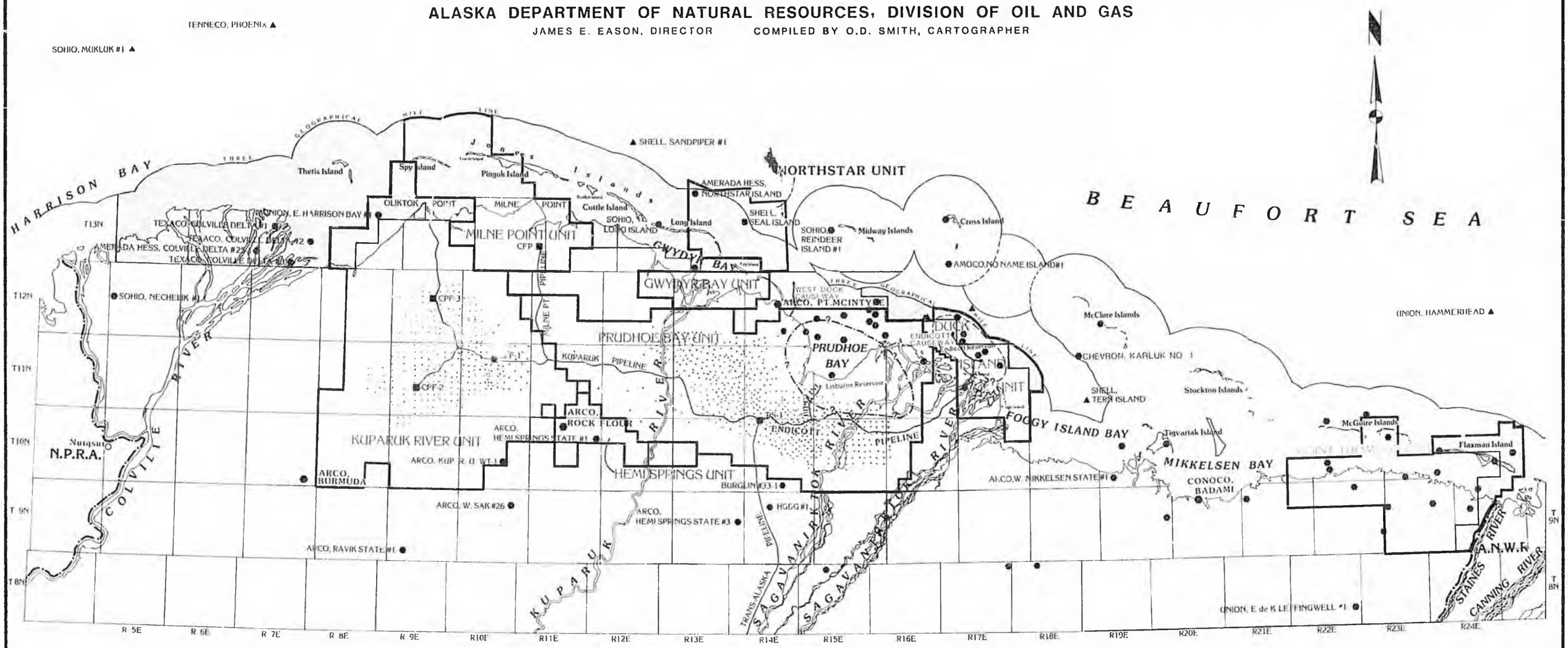
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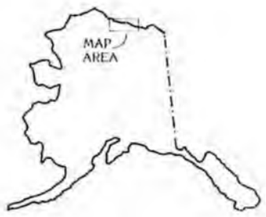
# NORTH SLOPE UNIT MAP

## ALASKA DEPARTMENT OF NATURAL RESOURCES, DIVISION OF OIL AND GAS

JAMES E. EASON, DIRECTOR  COMPILED BY O.D. SMITH, CARTOGRAPHER




## EXPLANATION




| | | | |
|---|---|---|---|
| Pump Station #1 | PS-1 | Net Profit Share Leases | |
| Central Production Facility | CPF | Central Facilities Pad | CFP |
| Selected State Exploratory Wells | ● | Selected Federal Exploratory Wells | ▲ |
| Approximate limits of the Endicott Reservoir | --?----?-- | Approximate limits of the Lisburne Reservoir | --?-.-.-?-.-.- |
| Development Oil Wells | | Oil and Gas Unit Boundaries | |

SCALE 1:500,000  One inch equals eight miles approx.

5 0 5 10 15 20 25 MILES

BASE MAP : Transposed From U.T.M. Projection By U.S.G.S., Original Scale 1:250,000, All Townships - Umiat Meridian.

FEBRUARY 1992

# COOK INLET DEVELOPMENT MAP

State of Alaska
Department of Natural Resources
Division of Oil and Gas
James E. Eason, Director

## Explanation

- Lease Unit boundaries
- Oil field (Approximate limits)
- Gas field (Approximate limits)
- Production platforms
- Pipeline routes

Base map from U.S. Geological Survey Anchorage (1962), Kenai (1959), Seldovia (1963), and Tyonek (1958) Quadrangles, Alaska.

Scale 1:500,000 One inch equals eight miles approx.

5 0 5 10 15 20 Miles

5 0 5 10 15 20 25 30 Kilometers

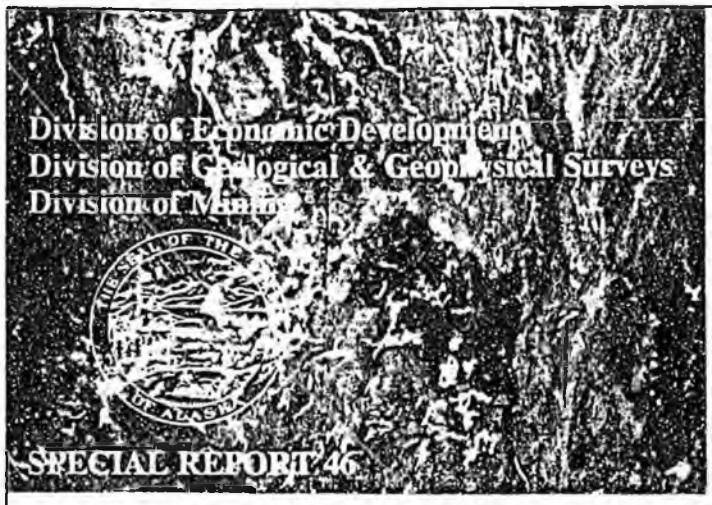
Map Location

Inset Map
Port Nikiski

Compilation by M.E. Pritchard, Cartographer, February 1988.
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Rev. April 1991 Revised February 1992

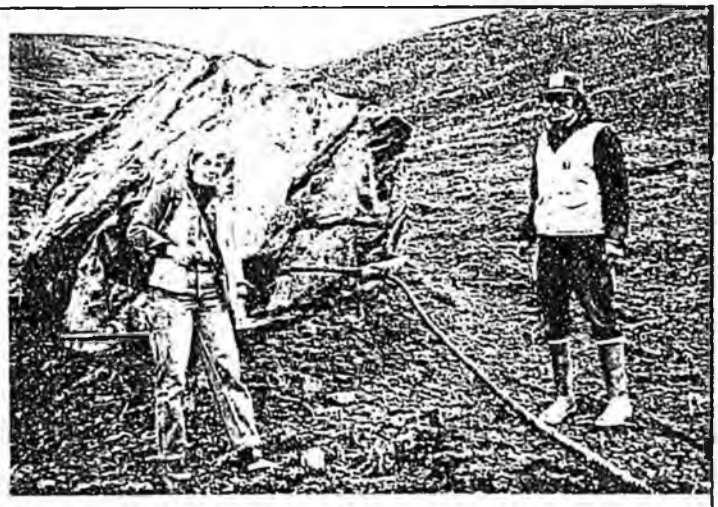
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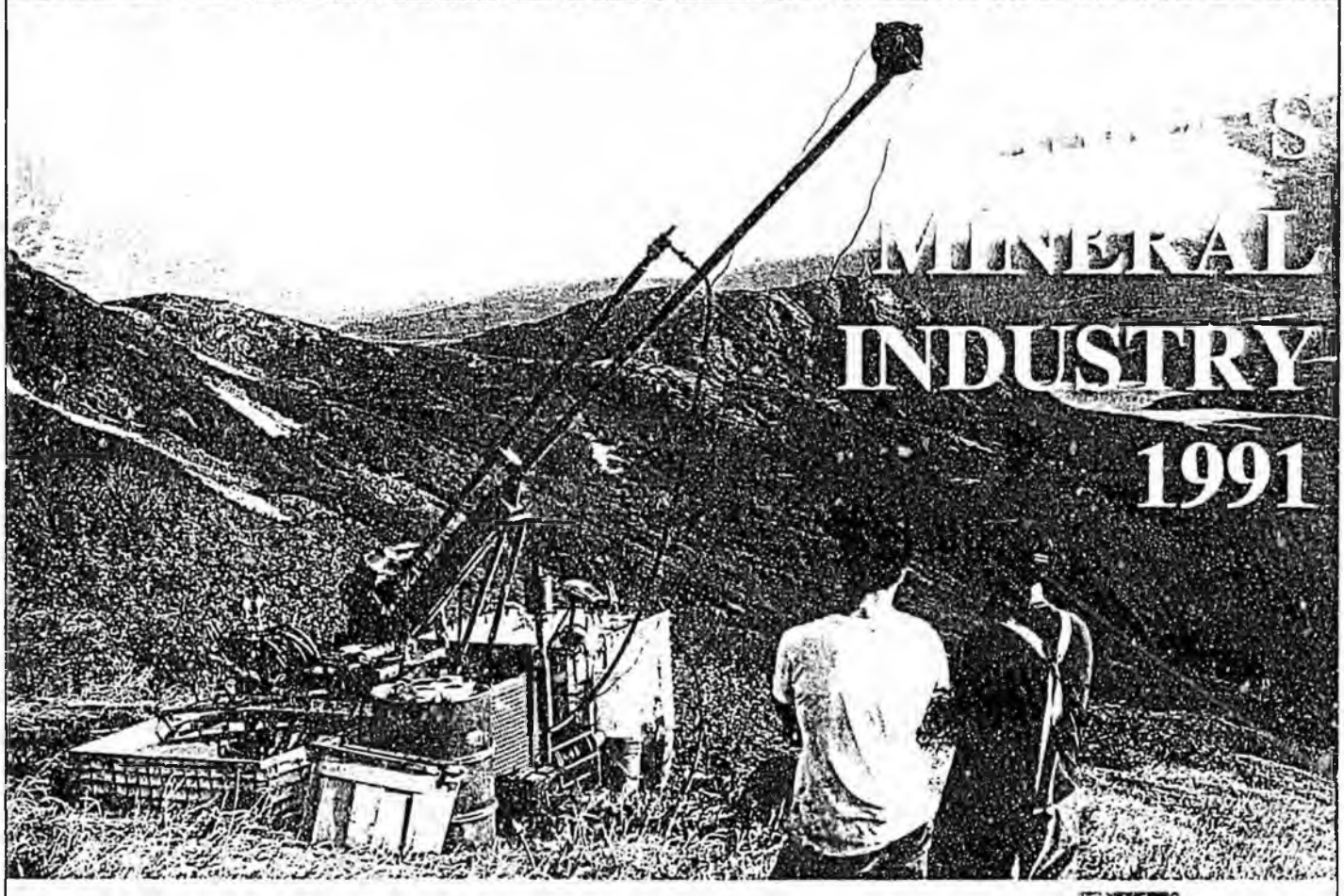
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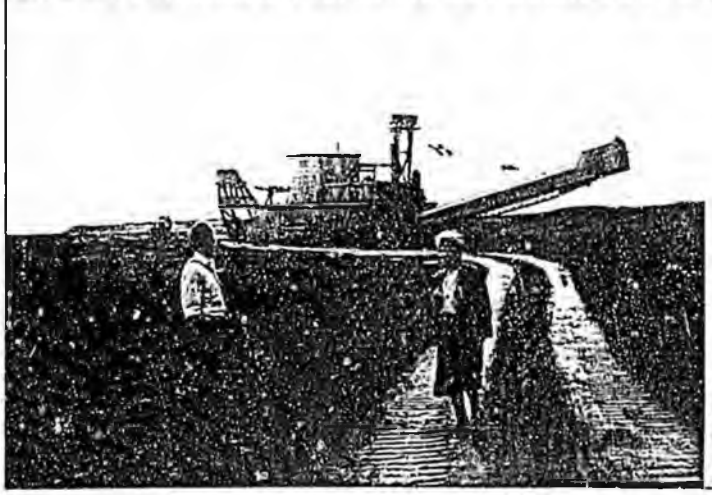
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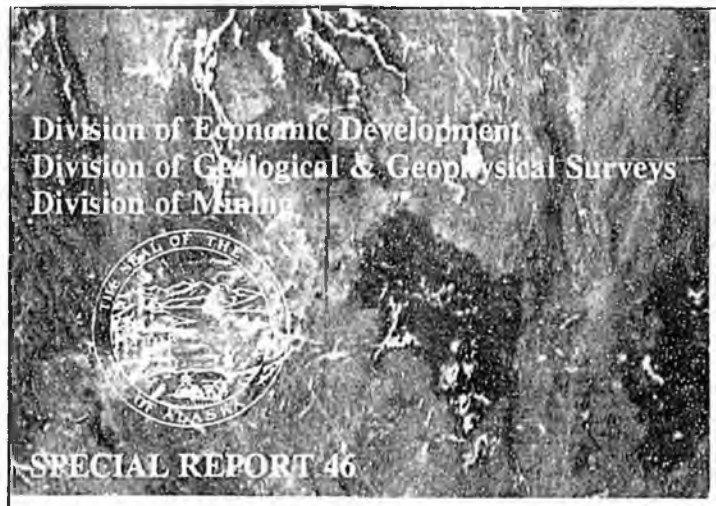




# MINERAL INDUSTRY 1991



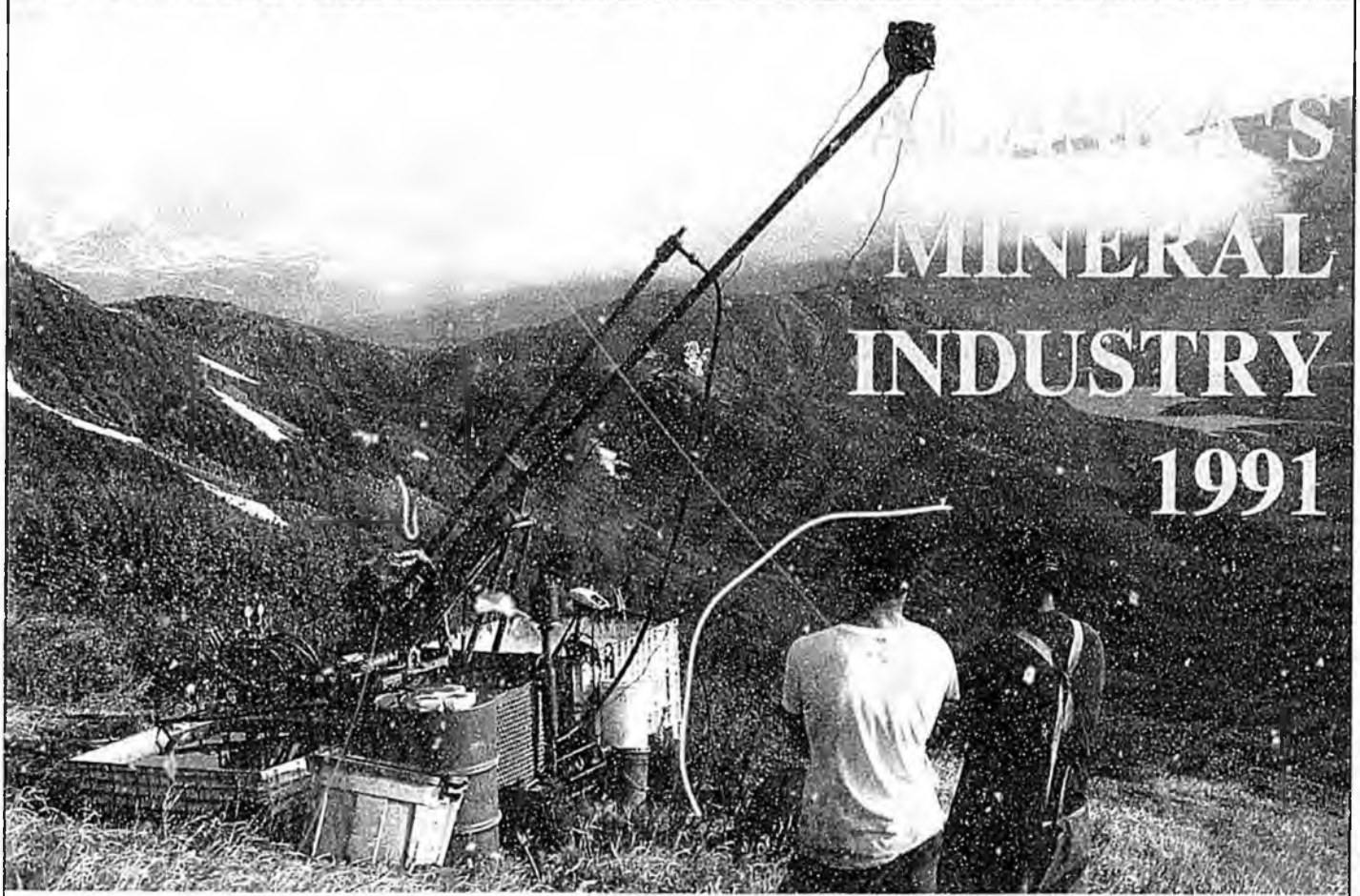




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SPECIAL REPORT 46





# ALASKA'S MINERAL INDUSTRY 1991







Byrnes Photo

**Hard rock** is not just music for our children. The resource, with its development throughout Alaska's history, has been music to our ears and money in our pocket.

These reports, year after year, inventory the magnitude of this incomparable resource and project the priorities essential for their appropriate development. In an **Owner State**, where the government of the people holds most of its vast natural resources in common, as Governor Hickel explains, the state must **initiate** and **advocate** as well as **regulate**. Our department is charged with entering into partnerships with the private sector to help bring these resources to market for the maximum benefit of our people.

We are grateful for the dedication and work that has brought this splendid report to publication.

**Glenn A. Olds, Commissioner**
**Department of Natural Resources**

## FRONT COVER PHOTOS

Top left. *Slab of nephrite jade from the Jade Mountains in the Kobuk River valley of northwestern Alaska. The jade is being cut and polished in the processing shop of Jade Mountain Products Inc. in Kotzebue. (Photo by NANA Regional Corporation)*

Top right. *NANA geologists Anita Williams and Rodney Hunnicutt prepare a jade boulder for transport from Jade Mountain. Photo by John Rense)*

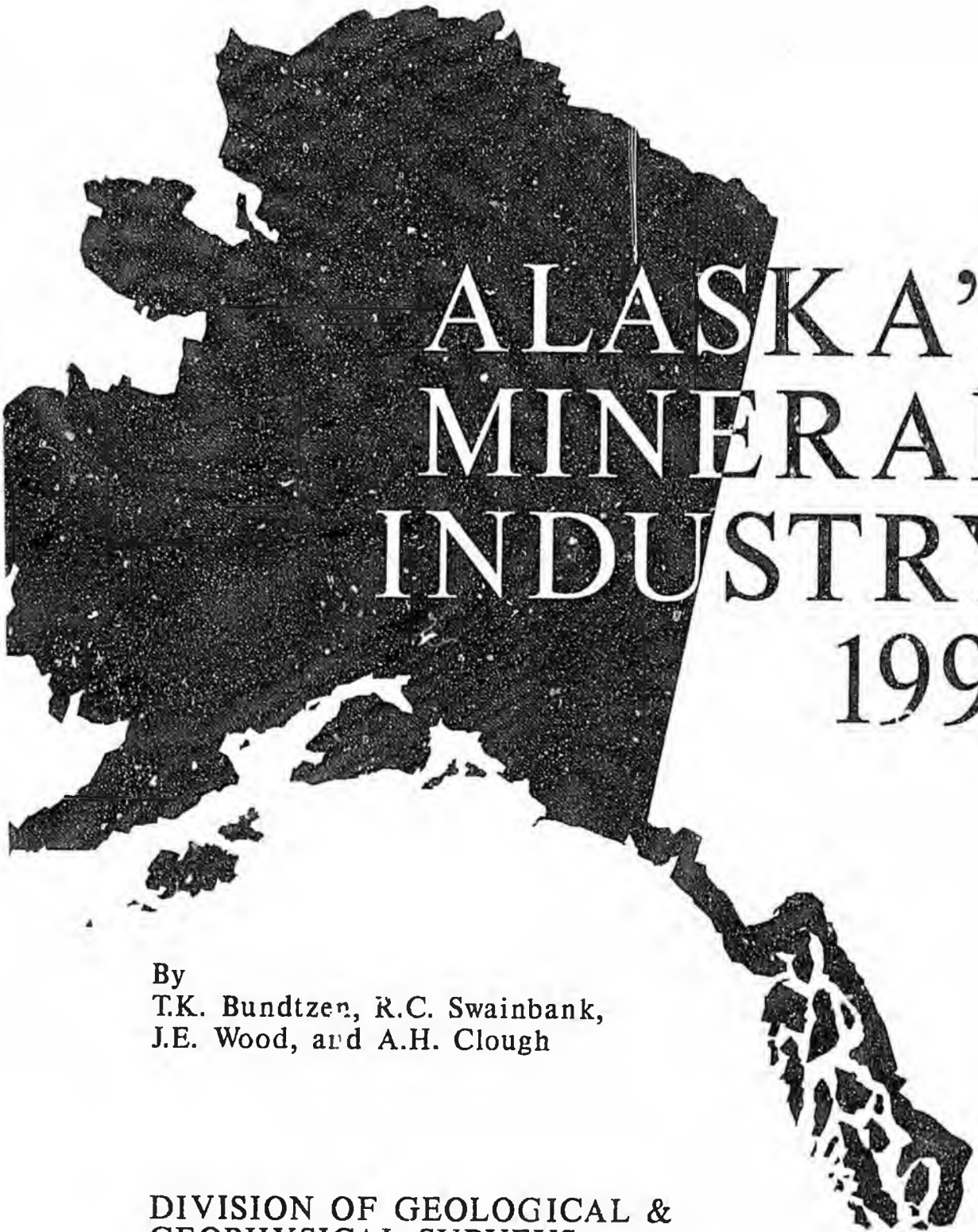
Center. *American Copper and Nickel Inc. drillers, using a diamond drill, explore a copper deposit south of Lake Iliamna in the Alaska Peninsula region. (Photo by T.K. Bundtzen)*

Bottom left. *Geologists from the Russian Far East examine Alaska Gold Company's Dredge 6. The dredge works a gold-bearing ancestral shoreline of Norton Sound west of the airport at Nome in western Alaska. Alaska Gold Company dredges provide about 75 jobs to residents of the Nome area. (Photo by T.K. Bundtzen)*

Bottom right. *Wiseman miner Paul Dionne holds a 22.75 oz nugget recovered from an underground drift mine in northern Alaska. Dionne mines underground with low-profile equipment during the winter months and stockpiles pay for summer sluicing. (Photo by Inside-Out Mining Company)*

## BACK COVER PHOTOS

*Aerial view of exploration and development work at the Fort Knox gold-bismuth deposit. Fairbanks, Alaska, 24 km (15 mi) southeast, can be seen top center in the photo. During 1991 Fairbanks Gold Ltd. began development of the deposit, and the company plans to begin operation in late fall, 1994. Projected annual output of about 10,855 kg (350,000 oz) will more than double current Alaska gold production and provide jobs for 250 Alaskans. The inset photos show an exploration trench at the Fort Knox deposit and its subsequent reclamation. Alaska law now requires reclamation of all mine activities on State, Federal, and private lands. (Photos by Fairbanks Gold Mining Inc.)*



# ALASKA'S MINERAL INDUSTRY 1991

By
T.K. Bundtzen, R.C. Swainbank,
J.E. Wood, and A.H. Clough

DIVISION OF GEOLOGICAL &
GEOPHYSICAL SURVEYS

SPECIAL REPORT 46

STATE OF ALASKA
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Glenn A. Olds, *Commissioner*

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# EXECUTIVE SUMMARY

*Alaska's Mineral Industry 1991*, Special Report 46, is the eleventh annual report produced by the Department of Natural Resources, Division of Geological & Geophysical Surveys, the Division of Mining, and the Division of Economic Development of the Department of Commerce and Economic Development.

The report is designed to provide current, accurate, and technically reliable information about Alaska's mineral industry. Its publication depends on the cooperation of individuals, private industry, and government agencies to provide information on their mining projects and activities.

Total expenditures for exploration and development and the value of production in 1991 was $611.9 million, about the same as the $610.6 million total for 1990. Value of 1991 mine production rose to $546.5 million, a 3% increase from the previous year. Exploration expenditures declined from $63.3 million in 1990 to about $39.9 million in 1991, down about one-third. Although development expenditures rose only modestly, to $25.6 million in 1991 from a 10-year low of $14.3 million in 1990, this increase reflects growing interest in developing new hardrock gold and coal mines in the State.

In 1991 Alaska produced about 57% of the total U.S. mine output of zinc, 16% of the silver, and 13% of the lead.

Gold production stabilized to 243,800 ounces, but fewer mines operated because of lower gold prices, exhaustion of reserves in some areas, and increasing demands of regulatory requirements.

Profits were down in all mines because of lower metal, coal, and industrial mineral demand caused by the international recessionary cycle.

The employment level remained stable at 3,650 jobs—good news that the Alaskan Mineral Industry held its own during difficult recessionary times.

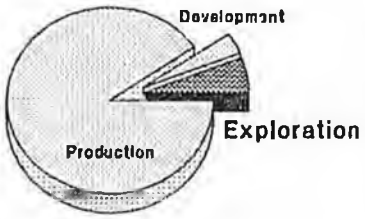
With anticipated development of one or more large gold and coal mines in interior, southcentral, and southeastern Alaska, growth in mining during the next few years appears likely.

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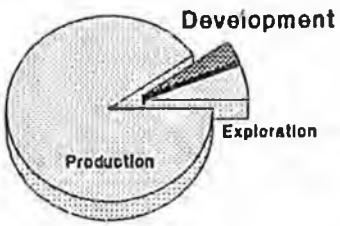
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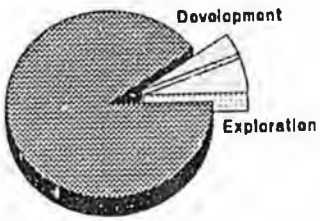
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# Alaska's Mineral Industry 1991

By T.K. Bundtzen,[1] R.C. Swainbank,[2] J.E. Wood,[3] and A.H. Clough[4]

## INTRODUCTION

Total value of the 1991 Alaska Mineral Industry as measured by the value of production and the sum of exploration and development expenditures was $612.0 million, close to the 1990 estimate of $610.6 million (fig. 1, table 1).

The final Alaska Department of Natural Resources' estimates of the value of Alaska's 1991 mineral production totaled $546.5 million. In spite of lower commodity price levels, production value increased over the 1990 total value of $533 million (fig. 2). During 1991 Alaska's mines produced about 57% of U.S. domestic mine output of zinc, about 16% of the silver, 13% of the lead, and 2.5% of the nation's gold. Red Dog and Greens Creek Mines were the main producers of the base metals and silver. Gold output from placer mines stabilized, but fewer mines operated due to low bullion prices, exhaustion of resources in some areas, and increasing regulatory requirements. Placer mining continues to be predominantly a small-business industry that provides many jobs in rural Alaska.

Mineral development expenditures grew from $14.3 million in 1990 to $25.6 million in 1991, an increase of

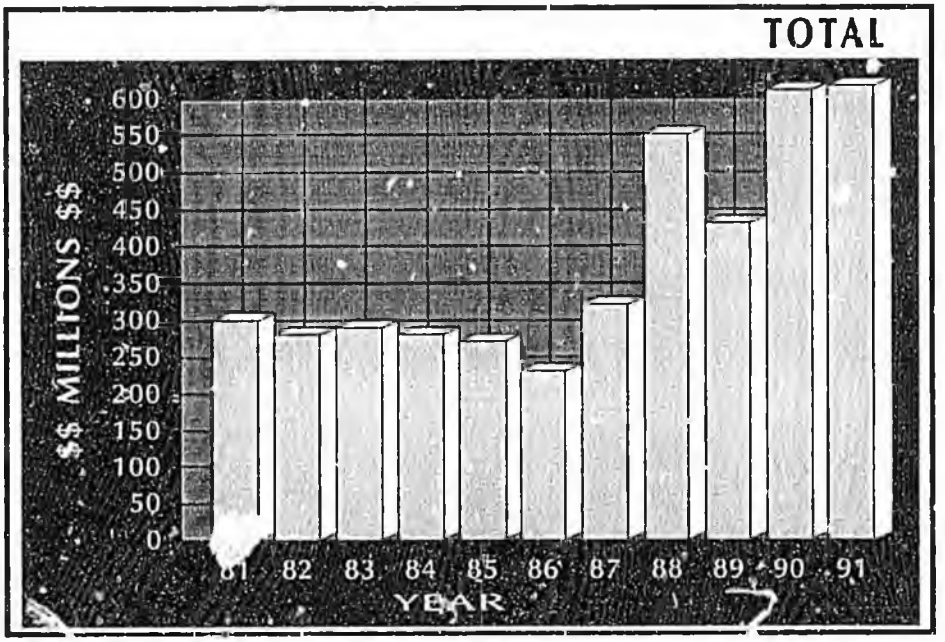



Figure 1. *Total exploration and development expenditures and value of production, 1980-91.*

79% (fig. 3). However, mineral exploration activities decreased 38% (fig. 4), with final 1991 values of $39.9 million, compared to a 1990 estimate of $63.3 million. Another contributing factor in the exploration decline was the delay of several large, advanced exploration projects that are still waiting for development decisions.

## EMPLOYMENT

The mineral industry provided about 3,650 year-round-equivalent jobs during the 1991 calendar year (table 2). Employment levels increased slightly from the 3,585 jobs reported to us in 1990 mainly because there were more mineral development and placer mining jobs. But balancing these job increases were employment declines in exploration, base metal and hard-rock gold mining, and miscellaneous mine activities, including jade, soapstone, and tin extraction. In other sectors of the mineral industry, employment has remained at the same level during the last two years.

Placer mine employment again topped the list with 1,240 jobs (34%) followed by sand and gravel extraction (685; 19%), base metals (415; 11%), recreational mining (320; 9%), mineral exploration (268; 7%), lode gold production (235; 6%), building stone extraction (165; 4%), mineral development (133; 4%), coal mining (115; 3%), and all other categories (70; 3%) (table 2).

In 1991 emphasis shifted from advanced exploration to development of several key metal, lode, and coal

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[2]Alaska Division of Economic Development, 1001 Noble St., Ste. 360, Fairbanks, AK 99701.
[3]Alaska Division of Mining, 3700 Airport Way, Fairbanks, AK 99709.
[4]Alaska Division of Economic Development, 9th Floor, State Office Bldg., Juneau, AK 99811.

Table 1. *Total value of the Alaska mineral industry, 1989-91*

| | 1989 | 1990 | 1991 |
|---|---|---|---|
| Exploration | $ 47,762,596 | $ 63,255,594 | $ 39,908,539 |
| Development | 134,272,350 | 14,326,500 | 25,574,350 |
| Production | 276,983,741 | 533,024,500 | 546,468,907 |
| **TOTAL** | **$459,018,687** | **$610,606,594** | **$611,951,796** |

projects. This shift could indicate that the industry should invest a substantial amount of new preproduction capital in Alaskan projects during the next several years. However, relatively weak metal and coal demand on the international market and a complicated permitting process could delay advanced exploration and development projects over the short term.

## PRODUCTION

Production of metals accounted for nearly four-fifths of total mineral industry output for 1991, and production volume and value increased above the record 1990 calendar year to $546.5 million (tables 1 and 7; fig. 1). However, the international recession caused low commodity prices and, therefore, only modest increases in monetary values from the previous year. For example, from 1990 levels, the price of zinc dropped 28%, lead dropped 31%, silver 21%, and gold 6%. The result was lower profit margins for most Alaskan metal mines.

In northwestern Alaska, production continued to improve at the Red Dog Mine, which is owned by NANA Corporation and operated by Cominco Alaska Inc. During the 1991 shipping season, from mid-summer to October 8, 1991, Red Dog shipped 472,913 tonnes (521,404 tons) of zinc, lead, and ISF composite-metal concentrates from the port of Kivalina to various overseas markets and to the Cominco smelter at Trail, British Columbia. The 1991 mine output increased 62% from the 291,782 tonnes (321,700 tons) of concentrate shipped to market in 1990. Silver in concentrate form is produced as a byproduct from the smelter feeds, but in 1991 silver recovery declined from 1990 levels because of metallurgical problems. Zinc production from the Red Dog project accounted for more than half the U.S. mine output, making it one of the world's largest zinc producers.

For the third consecutive year Kennecott's Greens Creek Mining Company mined zinc, silver, lead, and gold ores at its Greens Creek Mine on Admiralty Island near Juneau. The mine produced about the same amount as in 1990: about 236,360 kg (7.6 million oz) of silver, 1,150 kg (37,000 oz) of gold, and 53,286 tonnes (58,750 tons) of combined lead and zinc contained in concentrates. Once again, Greens Creek was the nation's largest silver mine. To improve profitability and overall economic viability during difficult times, Kennecott has submitted a modified plan of operation to the U.S. Forest Service to upgrade the mill and improve the quality of the concentrate produced.

About 202 placer and two lode mines produced approximately 7,585 kg (243,880 oz) gold worth $88.2 million, a 5% increase in volume from 1990. Almost all increased production can be attributed to the resumption of full-scale production at Cambior Alaska's Valdez Creek Placer Mine east of Cantwell. Alaska Gold Company continued to operate two bucketline stacker dredges in the Nome district and employed 75 workers to strip overburden, thaw frozen ground, and operate the dredges. Other large placer mines statewide include Polar Mining near Fairbanks, NYAC Mining Company near Aniak, Taiga Mining at Hogatza, Alaska Placer Development at Livengood, Sphinx-America Inc. near Ruby, GHD Resources at Candle, and Shoreham Resources near Manley Hot Springs. Throughout Alaska, there was a net loss of 16 mine operations—most of them small or medium-sized placer firms. Lower prices, reserve-base exhaustion, and regulatory oversight continue to slow this industry, which functions at about the same economic level as rural farming or Alaska-based commercial fishing enterprises.

Usibelli Coal Mine Inc. produced approximately 1.40 million tonnes (1.54 million tons) of coal worth about

Table 2. *Alaska's mineral industry employment, 1989-91*

| | 1989 | 1990 | 1991 |
|---|---|---|---|
| Mineral production | | | |
| Gold and silver mining | | | |
| Placer | 1,316 | 1,151 | 1,240 |
| Lode | 161 | 265 | 235 |
| Base Metals | 407 | 425 | 415 |
| Recreational | 325 | 315 | 320 |
| Sand and gravel | 625 | 645 | 685 |
| Building stone | 148 | 160 | 165 |
| Coal | 120 | 115 | 115 |
| Peat | -- | -- | 45 |
| Tin, jade, soapstone, ceramics, platinum | 40 | 40 | 25 |
| Mineral development[a] | 785 | 95 | 133 |
| Mineral exploration[a] | 350 | 374 | 268 |
| **TOTAL** | **4,277** | **3,585** | **3,646** |

-- = Information not available.
[a]Calculated for 260-day workyear.

$38.5 million from its Poker Flats and Gold Run pits near Healy. Six interior Alaska power plants used about half the coal and Usibelli shipped most of the rest through the Port of Seward to the Korean Electric Power Company in South Korea. Arctic Slope Consulting Group, operator for Arctic Slope Regional Corporation, mined 454 tonnes (500 tons) of bituminous coals at its Aluaq Mine north of Kotzebue and conducted home heating and power plant tests of the coal.

The sand and gravel and building stone industries functioned at the same levels as in the past five years. About 12.8 million tonnes (14.2 million tons) of sand and gravel worth $45.5 million were produced by 42 companies on the North Slope, along the Rail Belt, in the southeastern Panhandle, and in various bush locations. Stone production totaling 2.7 million tonnes (3.0 million tons) followed similar production patterns established by the sand and gravel industry.

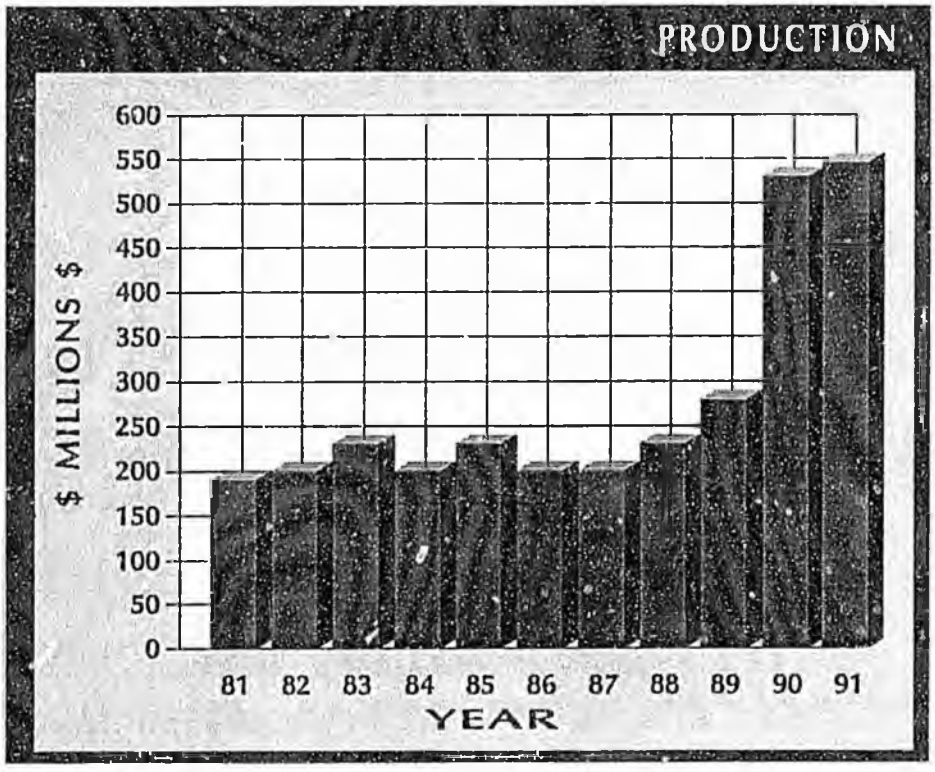



Figure 2. *Estimated production reported values, 1980-91.*

## DEVELOPMENT

Alaska mineral development expenditures increased from $14.3 million in 1990 to $25 6 million in 1991, an increase of nearly 79% (table 1). The number of jobs generated by these activities increased from 95 to 133 (tables 1 and 2; fig. 3).

Work by Fairbanks Gold Ltd. at the Fort Knox deposit 24 km (15 miles) northeast of Fairbanks highlighted statewide mineral development. The development effort consisted mainly of "condemnation" drilling to ascertain where to locate mine infrastructure for a proposed large-scale mine. Late in the year Amax Gold Inc. purchased all assets of Fairbanks Gold in a stock transfer worth about $150 million. Amax plans to acquire permits and construct mine facilities by the fourth quarter of 1994.

Coal developments continued in northern, interior, and southcentral Alaska, despite weak international coal prices and complex political issues surrounding the Mental Health Lands dispute. Idemitsu Alaska Inc. continued a diligent effort to develop their Washbone

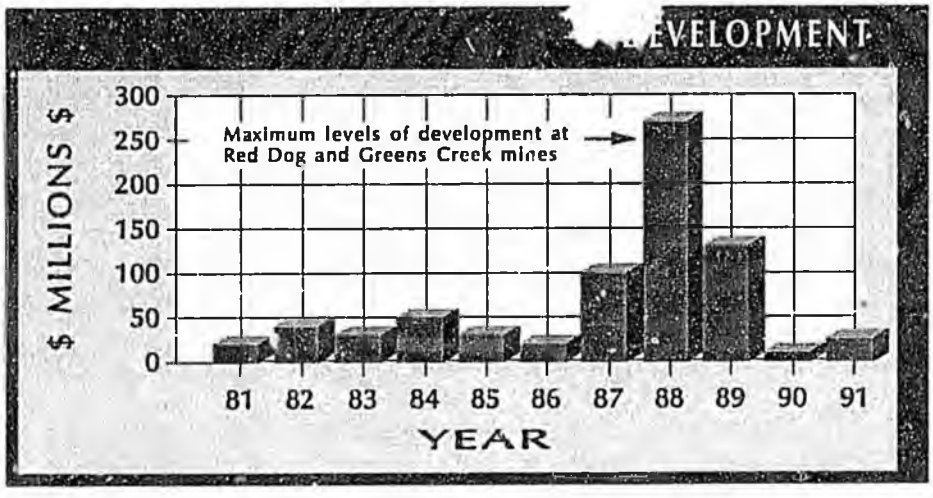



Figure 3. *Development expenditures reported, 1980-91.*

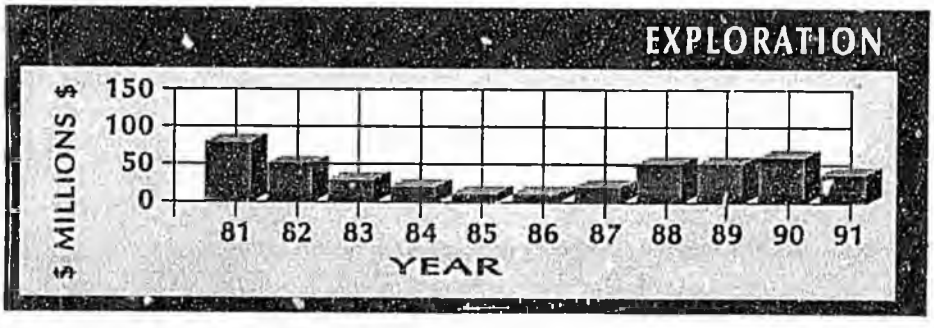



Figure 4. *Exploration expenditures reported, 1980-91.*

Hill bituminous coal deposit for a Far Eastern export market. Nearby Diamond Chuitna fulfilled ongoing permit requirements in the Beluga Coal Field; Hobbs Industries worked at the Evan Jones Coal Mine and collected bulk samples for testing; and Usibelli continued to plan for its participation in the Healy Clean Coal Project, which is designed to use state-of-the-art pollution control technologies in a 50-megawatt mine-mouth power plant.

### EXPLORATION

Our estimates of 1991 Alaskan exploration expenditures show a decline from $63.3 million in 1990 to $39.9 million in 1991. This decline was caused in part by a shift from exploration drilling to mine planning at advanced exploration projects (table 1; fig. 4). Poor international commodity prices and mine profitability also influenced exploration investment in Alaska.

Eighty returned DGGS questionnaires described exploration projects in 1991. Responding companies include Cominco Alaska, Amax Gold, Battle Mountain Exploration Company, North Pacific Mining Company, American Copper and Nickel Company Inc., Placer Dome U.S. Inc., La Teko Resources, Lac Minerals (USA), Central Alaska Gold Company, Echo Bay Alaska Inc., Arctic Slope Consulting Group, NANA Corporation, BHP Utah International, Pulsar Resources, Kennecott Corporation, and ASA Inc.

### GOVERNMENT ACTIONS

Regulations regarding rents and royalties were in effect for all of 1991, and the Alaska State reclamation statute became effective for all mines on October 15, 1991. The Alaska Division of Mining formed a bond pool that is available to operators on all classifications of land in Alaska.

The executive branch has worked diligently with plaintiffs of the 1985 Weiss vs. State of Alaska lawsuit, which demanded resolution of many complex issues surrounding the Alaska Mental Health Lands Trust. The Alaska Division of Lands has been the lead Department of Natural Resources agency that is attempting to satisfy provisions of the court order that demanded resolution and reconstitution of the Trust lands. The original one-million-acre territorial land grant enacted in 1956 was confirmed by the 1959 Alaska Statehood Act but was dissolved by the 1978 Alaska Legislature. Following the dissolution the State sold or otherwise relinquished about 55% of the Trust lands. The Hickel administration's preferred option, referred to as the Chapter 66 settlement, would reconstitute the remaining Trust lands, and add new hypothecated (pledged as security) lands that are judged to be of equal value to the original Trust lands that were sold or relinquished by the State. Another proposed solution to the problem would have reestablished remaining Trust lands (about 194,260 ha; 480,000 acres) and awarded the Trust a percentage of annual net State income.

Federal proposals to change the 1872 mining law received considerable attention during the year. The U.S. House of Representatives held a hearing on the Rahall Bill in Fairbanks during late May 1991, where extensive testimony opposing the changes dominated public input. About 24 million ha (50 million acres) or only 20% of Federal lands are currently open to claim staking under the 1872 mining law.

Proposals to tax in-place natural resources also received a good deal of attention during 1991. The Alaska legislature directed the Department of Community and Regional Affairs (DCRA) to study the in-place taxation issue and report findings back to the legislature by 1992. Municipal taxation of in-place resources, excluding petroleum, has been possible since statehood. Recent proposed legislation would provide the same exemption as that involving petroleum. DCRA recommended that in-place resources be permanently exempted from municipal taxation. This finding echoes conclusions from other State agencies (Departments of Commerce and Economic Development, Natural Resources, and Revenue), and the Alaska Municipal League. (Update: During the closing days of the 1992 session the State unanimously passed legislature SB 330, which provides a permanent exemption from municipal taxation of in-place mineral resources.)

## ACKNOWLEDGMENTS

This report is designed, produced, and distributed by the Alaska Department of Natural Resources Division of Geological & Geophysical Surveys (DGGS), Division of Mining (DOM), and the Department of Commerce and Economic Development Division of Economic Development (DED). Since Statehood (1959), DGGS and predecessor agencies published annual summaries of mining activity in the agency's annual report series. Beginning in 1982, DGGS adopted a more comprehensive format to provide more in-depth coverage of the industry, thanks to a healthy funding boost provided by the newly created Office of Mineral Development (now DED), which became a permanent partner in the project. The Division of Mining joined the team in 1984. The current annual *Alaska's Mineral Industry Report* is published in the DGGS Special Report series, and is available from the three participating agencies.

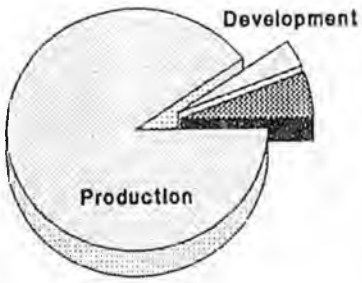
T.K. Bundtzen and E.E. Harris mailed 1,044 questionnaires on mining activity in Alaska to mineral exploration firms, Native corporations, mine production companies and partnerships, and government agencies involved in overseeing or regulating mining. Bundtzen and Harris received 177 completed forms. We thank all those who have given us information by phone and questionnaire. Such information is essential to the continuing usefulness and success of *Alaska's Mineral Industry Report.*

Bundtzen wrote the Introduction, Exploration, Production, Metal Recycling, and State Land Selection sections;

R.C. Swainbank wrote the Development and Drilling Activity summaries and part of the Exploration section; A.H. Clough provided much mineral activity data from southeast Alaska; J.E. Wood and Erik Hansen completed appendixes A, B, and C and wrote the Land Availability section, which includes calculated percentages of Alaskan lands open to mineral entry; Bundtzen and Swainbank updated appendixes D through G.

The production team included Ann-Lillian Schell for cover design, Greg Laird for graphics, Fran Tannian for editing, and Roberta Mann and Joni Robinson for desktop publishing.

In the fall of 1991 we asked our readers to tell us their preferences regarding the use of metric and English units of measurements in the text. Forty-six of our readers returned responses. Thirty-one (67%) prefer use of both metric and English conversions; nine (20%) want only English units; and six (13%) want only metric units of measure. Based on the results of this survey, we will continue to provide metric units and English conversions throughout the body of the report. We thank all those who responded.




# EXPLORATION

*Mineral industry exploration expenditures declined from 1990 levels to $39.9 million as several large exploration projects moved into development phases, concentrated on permit acquisition, or started mine design. Low commodity prices slowed the flow of investment dollars to Alaska exploration projects.*

Mineral exploration declined in 1991 from the near record-breaking levels established in 1990. Eighty firms reported $39.9 million in expenditures, a reduction of 37% from the $63.6 million recorded in 1990 (tables 1, 3, and 4; fig. 4). We believe the reduction in exploration occurred for several reasons. First, the Fort Knox project near Fairbanks, which was previously one of the State's largest exploration ventures, converted completely to development. Second, in southeast Alaska at the Kensington and Alaska-Juneau Mines, Echo Bay Alaska Inc. redirected its exploration and development efforts. In 1990 the emphasis was on definition drilling and onsite construction. In 1991 the focus shifted to less capital-intensive phases such as permit acquisition, environmental monitoring, and economic analyses. In general, grass-roots explo-ration continued at a relatively healthy rate, despite poor commodity prices. See figure 5 for locations of selected Alaskan exploration projects. However, some investment dollars were curtailed because of the international recession.

The number of active State and Federal mining claims continued a steady decline that began in 1989. Active claims totaled 57,666 in 1991, compared with 62,528 in 1990, 67,528 in 1989, and 75,542 in 1988 (fig. 6). The number of active claims is traditionally used as an indicator of mining activity in the State. There are several reasons why the claim count dropped during a time period when exploration activity was relatively high. We believe the main reasons are the modifications to Alaska State regulations that were enacted in 1990, and increasing exploration expenditures on Native corporation lands which require no claim staking.

Assessment work continued on 52,976 State and Federal claims in 1991; 1,299 new Federal and 3,391 new State claims were staked during the year (fig. 7). The State billed claims on State land at the required $0.50/acre annual fee, with the typical claim bill being $20 for a 16 ha (40 acre) claim. Holders of 27,231 claims made payment by the November 30, 1991, deadline; 3,236 were deemed null and void because of nonpayment of fees. In January, 1991, there were 30,467 active State claims and 32,061 active Federal claims. At the close of 1991 there were 30,622 active State claims and 27,044 active Federal claims.

## NORTHERN REGION

Exploration expenditures in the northern region, which includes the entire Brooks Range and Arctic coastal plain, totaled $955,900, a 17% decrease from the $1,152,000 reported for 1990 (table 4). Much of the area is included in several large, Federal conservation units that have been withdrawn from mineral entry. Additionally, the region is remote and lacks an integrated transportation system. Both factors limit the modern search for minerals. However, investigations continue in the world-class Noatak lead-zinc province, in the Ambler mineral belt, and in historic placer mining areas of the northern region.

## Metals

NANA Regional Corporation explored for lead, zinc, silver, and gold in the Ambler district and in the Candle-Inmachuk districts of northeast Seward Peninsula. Their 1991 work included geochemical surveys and site-specific geological mapping at the prospect level.

Dodies Dream Association searched for placer gold on its Federal mining claims along the south fork of the Koyukuk River within the Alyeska pipeline corridor. Robert Pelky surveyed nearby placer sites on Ironside Bar and the south fork of the Koyukuk River near Wiseman.

Chandalar Development Corporation tested placer ground before mine operations started on Tobin Creek in the Chandalar Mining district of east central Brooks Range. Chandalar also began an evaluation of the hardrock

Table 3. *Reported exploration expenditures in Alaska by commodity, 1982-91*

| | Base metals | Precious metals | Industrial minerals | Coal and peat | Other[a] | YEARS TOTAL |
|---|---|---|---|---|---|---|
| 1982 | $31,757,900 | $ 10,944,100 | $ -- | $ 2,900,000 | $ 15,300 | $ 45,617,300 |
| 1983 | 9,758,760 | 20,897,555 | 2,068,300 | 1,338,454 | 70,000 | 34,133,069 |
| 1984 | 4,720,596 | 14,948,554 | 270,000 | 2,065,000 | 279,500 | 22,283,650 |
| 1985 | 2,397,600 | 6,482,400 | -- | 270,000 | -- | 9,150,000 |
| 1986 | 1,847,660 | 6,107,084 | 170,000 | 790,000 | -- | 8,914,744 |
| 1987 | 2,523,350 | 11,743,711 | 286,000 | 1,150,000 | 31,000 | 15,734,061 |
| 1988 | 1,208,000 | 41,370,600 | 160,200 | 2,730,000 | -- | 45,468,800 |
| 1989 | 3,503,000 | 43,205,300 | 125,000 | 924,296 | 5,000 | 47,762,596 |
| 1990 | 5,282,200 | 57,185,394 | 370,000 | 321,000 | 97,000 | 63,255,594 |
| 1991 | 4,789,500 | 34,422,039 | 92,000 | 603,000 | 2,000 | 39,908,539 |
| TOTAL | $67,788,566 | $247,306,737 | $3,541,500 | $13,091,750 | $499,800 | $332,228,353 |

-- = No expenditures reported.
[a]Jade, diamonds, and colored gemstones.

Table 4. *Reported exploration expenditures and employment in Alaska by region, 1991*

| | Northern | Western | Eastern Interior | South-western | South-central | Alaska Peninsula | South-eastern | TOTAL |
|---|---|---|---|---|---|---|---|---|
| Exploration expenditures | | | | | | | | |
| Base metals | $ 110,000 | $ 815,000 | $ 162,500 | $ 14,000 | $2,648,000 | $ -- | $ 1,040,000 | $ 4,789,500 |
| Precious metals | | | | | | | | |
| Placer | 365,900 | 189,000 | 156,048 | 115,000 | 314,500 | -- | 2,200 | 1,142,648 |
| Lode | -- | 1,373,941 | 5,092,400 | 1,740,000 | 3,079,050 | 327,000 | 21,667,000 | 33,279,391 |
| Coal and peat | 450,000 | -- | -- | -- | 153,000 | -- | -- | 603,000 |
| Industrial minerals | 30,000 | -- | 5,000 | 5,000 | -- | -- | 52,000 | 92,000 |
| Other[a] | -- | -- | -- | -- | -- | -- | 2,000 | 2,000 |
| TOTAL | $955,900 | $2,377,941 | $5,415,948 | $1,874,000 | $6,194,550 | $327,000 | $22,763,200 | $39,908,539 |
| Exploration employment | | | | | | | | |
| Employment | | | | | | | | |
| Workdays | 3,701 | 4,866 | 7,893 | 3,932 | 13,712 | 345 | 35,235 | 69,684 |
| Workyears[b] | 14 | 19 | 30 | 15 | 53 | 1 | 136 | 268 |
| Number of companies reporting[c] | 8 | 10 | 24 | 8 | 18 | 2 | 10 | 80 |

-- = No expenditures reported.
[a]Jade, platinum, diamonds, and colored gemstones.
[b]Based on a 260 day workyear.
[c]Some companies were active in several areas.

gold-silver potential of the previously productive Mikado Mine, a high-grade mother lode vein system in greenschist facies metamorphic rocks.

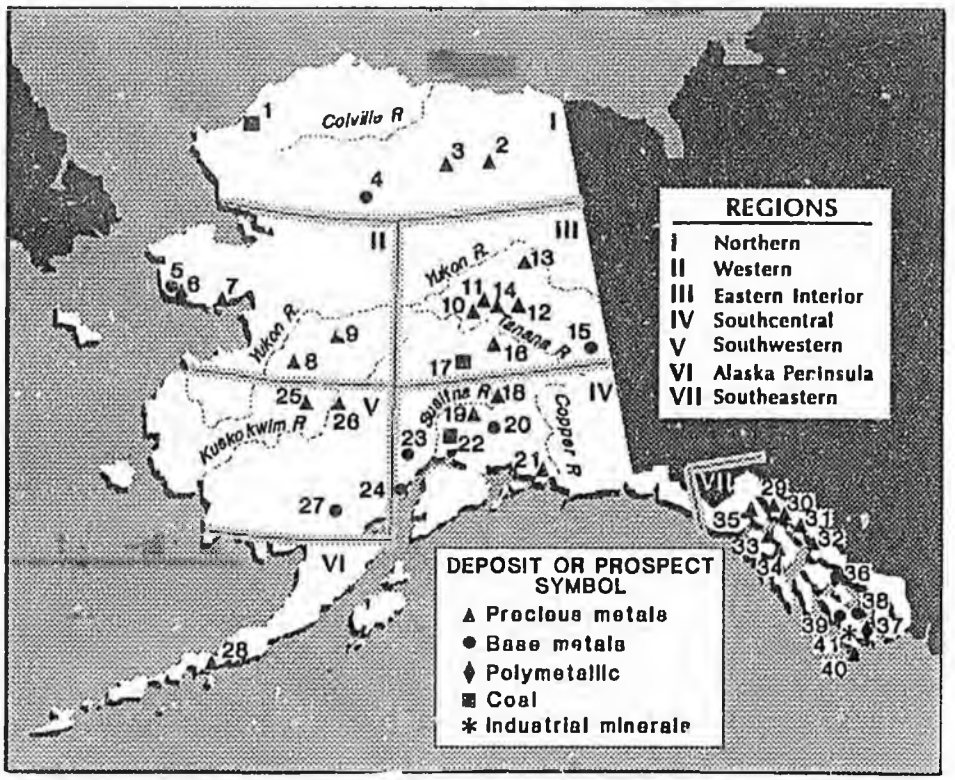
Paradise Valley Inc. completed 150 m (500 ft) of crosscuts while searching for gold, silver, zinc, and lead in the Flat Creek drainage east of Wild Lake in the central Brooks Range. The company also tested nearby limestone for potential agricultural and concrete production applications.

## Coal

Arctic Slope Consulting Group (ASCG), operator for Arctic Slope Regional Corporation, continued an assessment of high quality coal resources in the Deadfall syncline area of northwest Alaska. Coal resources in this area are found in the Cretaceous Corwin Formation of the Nanushuk Group (Chapman and Sable, 1960). According to Callahan (1992), ASCG has focused on three exploration targets: (1) a 7-m-thick (23-ft) coal seam on the Kukpowruk River 48 km (30 mi) from Point Lay; (2) at Cape Beaufort in the inshore portion of a synclinal basin; and (3) in the Deadfall syncline northeast of Cape Beaufort. Most of the recent exploratory work has concentrated on the two Cape Beaufort areas.

A 1983 reconnaissance drilling program funded by the State of Alaska confirmed the presence of multiple, thick coal seams in the axial area of the Deadfall syncline. In 1984 Howard Gray and Associates continued the exploration work for ASCG and assessed potential for a small-scale mine operation.

In 1991 ASCG began an additional 610 m (2,000 ft) of exploratory drilling to confirm the presence of sufficient reserves for an export market. This work included infill drilling to delineate reserves in the thickest coal seams and deep drilling for stratigraphic studies. ASCG used a mobile D-60 reverse-circulation drill rig during the 1991 work. Further work by ASCG on the coal resources is described in the




**I NORTHERN REGION**
1. Arctic Slope Consulting Gr. (Deadfall syncline)
2. Chandalar Development Corp. (Tobin Creek)
3. Paradise Valley Inc. (Flat Creek-Wild Lake)
4. NANA Corp. (Ambler district)

**II WESTERN REGION**
5. Kennecott Exploration (Aurora Creek, Gold Hill)
6. Aspen Exploration (Sophie Gulch, Rock Creek)
7. Bering Straits Native Corp. (Bluff area)
8. North Pacific Mining Co. (Illinois Creek)
9. Flat Creek Mining Co. (Timber and Flat Creeks)

**III EASTERN INTERIOR REGIOIN**
10. Citigold/LaTeko Resources (Ryan Lode)
11. American Copper and Nickel Co. (Fairbanks district)
12. Tri Valley Mining (Richardson district)
13. BHP Utah (Circle district)
14. Freegold Recovery (Fairbanks district)
15. Lodestar Exploration (Taurus)
16. Amax Gold (Liberty Belle)
17. Usibelli Coal Mine Inc.

**IV SOUTHCENTRAL REGION**
18. Rowallan Mine Partnership (Valdez Creek)
19. Placer Dome U.S. Inc. (Deadman Mountain)
20. North Pacific Mining (Toklat)
21. Polaris Group (Cliff Mine)
22. Hobbs Industries (Evan Jones)
23. Cathedral Gold (Cook Inlet)
24. Hunt Ware & Proffett (Johnson River)

**V SOUTHWESTERN REGION**
25. Battle Mountain Exploration (Beaver Mountains)
26. Central Alaska/Placer Dome (Vinasale Mountain)
27. Cominco Alaska (Pebble Copper)

**VI ALASKA PENINSULA REGION**
28. Battle Mountain (Unga Island)

**VII SOUTHEASTERN REGION**
29. Ivanhoe Partners (Ivanhoe Prospect)
30. Echo Bay Alaska (Kensington Mine)
31. Placer Dome U.S. Inc. (Jualin Mine)
32. Echo Bay Alaska (Alaska-Juneau Mine)
33. Alaska-Dano Mines (Funter Bay)
34. Kennecott Greens Creek Mining Co. (Greens Creek)
35. Dale Henkins/Roger Eichman (Dream)
36. Kennecott Exploration (Wrangell)
37. Red Dodson (Bokan Mountain)
38. Salisbury and Associates/ACNC (Dolomi)
39. Cominco Alaska (Big Harbor-Trocadero)
40. Boomer & Company (Dall Island)
41. Ashgrove Cement West (View Cove)

Figure 5. *Regions of mineral activity a· selected mineral exploration, 1991.*

Development and Production sections of this report.

## WESTERN REGION

The western region includes historic placer gold districts on the Seward Peninsula and the lower Koyukuk and middle Yukon River basins, where approximately 233,275 kg (7.5 million oz) of gold have been produced since the early 20th century. In addition, several favorable metallogenic terranes, as summarized by Hawley (1982) and Nokleberg and others (1987), contain a variety of base and precious metal deposits and rare earth element uranium associations.

However, exploration expenditures declined precipitously from $7.8 million in 1990 to $2.4 million in 1991, a 70% decrease (table 4). The chief reason for the decline was the cessation of large placer and lode gold exploratory projects in the Nome district and generally reduced hardrock gold exploration north of McGrath.

### Metals

Kennecott Exploration, in partnership with Bering Straits Native Corporation (BSNC), and Hawley Resource Group, conducted geological mapping, geochemical sampling, and hardrock drilling of the Aurora Creek stratiform zinc deposit in the Sinuk River drainage. (Herreid, 1970, described the geology of this mineral district.) The joint venture partnership also explored the Gold Hill gold system north of Nome. BSNC independently completed staking and mapping activities in the Bluff and Mount Distin gold and base-metal mineralized areas. According to Stevens (1991a), previous exploration work by BHP-Utah has shown that three structurally controlled mineralized areas—Daniels Creek, the Saddle prospect, and Koyana Creek—have the potential to contain at least 5.9 million tonnes (6.5 million tons) grading 3.4 g/tonne (0.1 oz/ton) gold. Stevens (1991b) also describes the mineral potential of the Mount Distin area about 19 km (12 mi) north of Nome, where thrust-fault-controlled gold, arsenic, and antimony values occur over a strike length of 6 km (4 mi) and widths of up to 610 m (2,000 ft).

Aspen Exploration applied for permits in late 1991 to test-mine a gold deposit at the Sophie Gulch-Rock Creek mineral zone. Previous exploration drilling by Placer Dome U.S. Inc. identified a nearby deposit containing 6.1 million tonnes (6.7 million tons) grading 2.4 g/tonne (0.07 oz/ton) gold.

North Pacific Mining Company continued exploration efforts to confirm and expand reserves at the Illinois Creek prospect southwest of the Kaiyuh Hills in the Yukon River basin. The deposit is an impressive gossan originally discovered by Anaconda Minerals in 1980 (fig. 8). Illinois Creek is the largest of several polymetallic, gold-bearing gossans in a 14-km (9 mi) stratigraphic belt in the Kaiyuh Hills (Gillerman, 1988). Three major deposits and many prospects are hosted in Paleozoic quartzite and are aligned parallel to the N. 70°E Kaltag fault system.

North Pacific Mining completed 1,564 m (5,130 ft) of diamond drilling during the 1991 season, finished a trenching program, and is in the process of acquiring mine permits (fig. 9). Geological reserves (all categories) using a cutoff grade of 0.7 g/tonne (0.02 oz/ton) are 1,858,440 tonnes (2,049,600 tons) grading 2.4 g/tonne (0.07 oz/ton) gold and 58.0 g/tonne (1.69 oz/ton) silver.

Five placer mining firms explored new paystreaks in anticipation of future mine operations—a sign that miners in the western region are acquiring future reserves for mining needs. Flat Creek Mining Company (Pete Haggland) explored for placer paystreaks and lode gold prospects on Timber and Flat Creeks in the Ruby-Poorman district with 823 m (2,700 ft) of reverse circulation drilling.

Allen Vezey, with Stevens Exploration and Management Corporation, drilled for placer gold and mapped potential sand and gravel resources in the Solomon district on the Seward Peninsula. If results continue to be favorable, anticipated mine development would involve production of 57,350 m³ (75,000 yd³) annually of gravel for the construction market and recovery of a significant byproduct of placer gold.

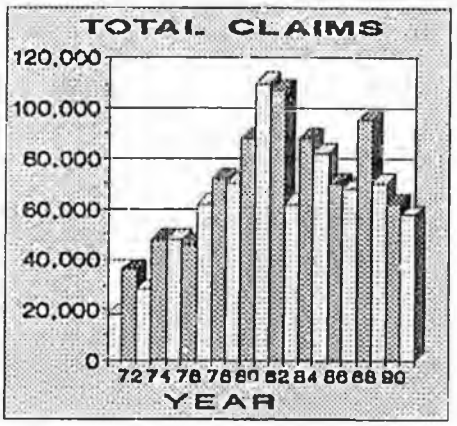



Figure 6. *Claim assessment work filed, 1970-91.*

Innoko River Enterprises prospected for gold on its Native allotment at Cripple Landing in the Innoko-Tolstoi district north of McGrath.

Tolstoi Mining Company (Doug Sherrer) thawed, sunk a shaft, drifted, and panned for placer gold and platinum on Boob Creek and in tributaries on Mount Hurst west of McGrath.

Interest in Norton Sound offshore gold placers near Nome resulted in issuance of Outer Continental Shelf Permits M91-06 and M92-01 to U.S. Deep Ocean Inc. by the U.S. Minerals Management Service in August 1991. The permits involve acquisition of core samples and high resolution seismic data in Federal waters offshore Nome.

## EASTERN INTERIOR REGION

The eastern Interior includes many of the State's largest placer districts and a variety of metallogenic terranes including volcanogenic massive sulfide (VMS), plutonic gold, and sedimentary exhalative (SEDEX) and Mississippi Valley type (MVT) base metal environments of Paleozoic and Mesozoic age.

Exploration expenditures for the eastern Interior totaled $5.4 million in

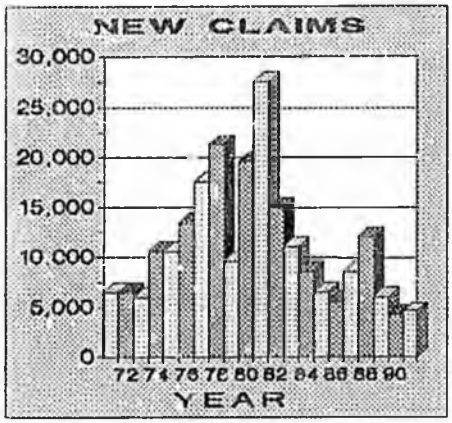



Figure 7. *New claims, 1970-91.*

1991, down from nearly $16 million spent in 1990, a reduction of nearly 66% (table 4). Fort Knox, the largest exploration project of 1990, shifted to development in 1991.

## Metals

There were two major exploration efforts on Ester Dome near Fairbanks during 1991—both for hardrock gold. Citigold Alaska Inc. (Citigold) operator for La Teko Resources Ltd.'s Ryan Lode project, drilled 23,170 m (76,000 ft) to confirm reserves in the main northeast-trending vein structure and in the subparallel Curlew area. The Ryan Lode deposit has been confirmed to depths of 305 m (1,000 ft) with proven and probable reserves totaling about 2.7 million tonnes (3 million tons) grading 2.3 g/tonne (0.068 oz/ton) gold. These new reserve estimates are based on data from 221 reverse circulation drill sites on 30.5 m (100 ft) centers. The Curlew area appears to contain about 0.907 million tonnes (1 million tons) of ore at grades of 2.0 g/tonne (0.06 oz/ton) gold and recoverable silver. Citigold also began to neutralize about 272,100 tonnes (300,000 tons) of spent cyanide leach pads and impoundment waters from previous operations. Citigold contracted Inco Exploration and Technical Services Inc., a subsidiary of Inco Ltd., to use the Inco $SO_2$/air cyanide destruction process (fig. 10). Inco's process reduced cyanide and contained metals in

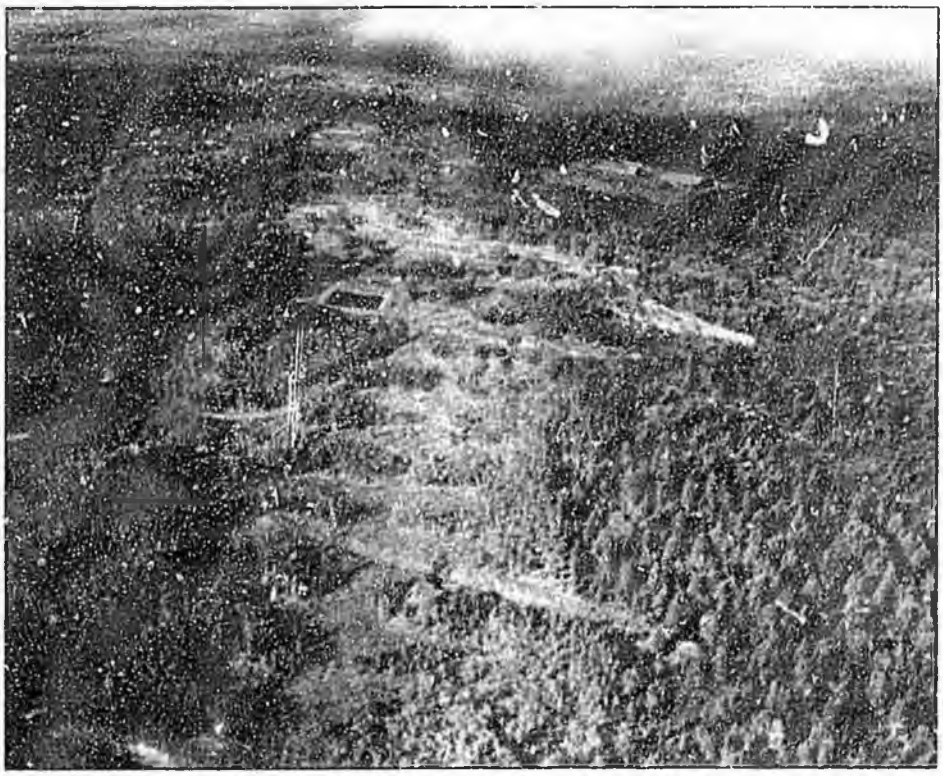


Figure 8. *Mineralized zone at Illinois Creek deposit in the Kaiyuh Hills district of western Alaska. High metal content of the mineral deposit prevents plant growth and creates a naturally occurring vegetation "kill zone." Exploration trenches crosscut this kill zone at uniform intervals. (Photo by John Wood)*




Figure 9. *This excavator has been used to trace mineralization for an additional 366 m (1,200 ft) along strike at the covered Illinois Creek deposit, Kaiyuh Hills, western Alaska (Photo by North Pacific Mining Company)*

pond waters to near drinking-water quality standard in a few days. More cyanide neutralization work will continue in 1992. In 1991, La Teko provided a $10,000 grant to the Mine Design Software Laboratory of the School of Mineral Engineering at University of Alaska Fairbanks.

Following an aerial geophysical survey and exploration conducted in 1990, American Copper and Nickel Co. (ACNC) explored target areas on Ester Dome and at Eagle Creek near Fairbanks (fig. 11). ACNC continued to evaluate the Grant Mine vein system in a joint venture with Silverado Mines Ltd. By year's end, the company defined 15 separate gold targets on a 36-km² (14-mi²) area of Ester Dome and drilled selected targets. Silverado reported that an area 2,440 m (8,000 ft) long, and 150 m (500 ft) wide contains anomalous gold in soils. Geochemical analyses of eight rock samples within the soil grid area ranged from 0.7 g/tonne (0.02 oz/ton) to 2.0 g/tonne (0.06 oz/ton) gold. ACNC continued to evaluate 13 km² (5 mi²) of State claims at Eagle Creek, a plutonic-hosted gold prospect north of Fairbanks. The company acquired this property from Canex several years ago.

ACNC has reclaimed former production pits and exploration trenches on Ester Dome and won praise from local residents for their efforts. In all, ACNC has spent $10 million in exploration in Alaska since 1987 and continues to carry on long-term property evaluations throughout the state.

Amax Gold Inc. explored Pedro Dome north of Fairbanks and at the Liberty Belle copper-bismuth-gold deposit east of Healy.

Tri-Valley Corporation, in an innovative joint venture with TsNIGRI (Central Research Institute of Geological Prospecting for Base and Precious Metals) of Moscow, Russia, fielded a nine-member crew in the Richardson district about 112 km (70 mi) east of Fairbanks during much of the summer and part of the fall. Their work included detailed geological mapping and intensive soil, stream sediment, and rock geochemical surveys. TsNIGRI had proposed using an Antonyev-AN2 biplane to conduct aerial geophysical surveys prior to the commencement of field work, but the Department of Defense objected to the deployment of the aircraft in Alaska. This impasse may be resolved in 1992. The professional dedication exhibited by the Russian team drew admiration from visiting Alaskan mineral geologists and mining engineers.



Figure 10. *Inco Exploration and Technical Services Inc. neutralize cyanide at the heap leach project at the Ryan Lode on Ester Dome. (Photo by R.C. Swainbank)*

Central Alaska Gold Company, in partnership with Caithness Gold Mining, conducted site-specific and regional reconnaissance exploration throughout eastern interior Alaska utilizing geological mapping and geochemical sampling surveys.

BHP-Utah conducted geochemical and geological mapping studies on bulk minable gold and polymetallic massive sulfide deposits in the Circle district.

Freegold Recovery reviewed the lode gold and silver potential in the Cleary Summit-Pedro Dome area in the Fairbanks district. Late in the year, the company announced that a major exploration effort would begin in the vicinity of the old Newsboy Mine, a former producer of hardrock gold on the north side of Cleary Summit. Freegold Recovery leases from Fairbanks Exploration Inc., which controls much of the ground in the Cleary Hill-Pedro Dome area.

In late 1991 Montague Gold entered into an agreement with ASA Inc., a company that has an agreement with Doyon Ltd., the Interior Native regional corporation. ASA has an agreement to explore 1.62 million ha (4 million acres) of Doyon land in central Alaska. Montague Gold has indicated that it will invest approximately $2.8 million in the program during the next two years.

Lodestar Exploration (VSE) researched the potential of the Taurus copper-gold-molybdenum porphyry system in the Tanacross Quadrangle about 73 k (46 mi) from the Alaska Highway in eastcentral Alaska. The company announced plans to undertake a 2,135 m (7,000 ft) drill program in 1992. Exploration by previous operators in the 1970s intersected 268 m (878 ft) grading 0.32% copper, 46 m (151 ft) 0.40% copper, 125 m (410 ft) 0.22% copper, and 0.55 g/tonne (0.016 oz/ton) gold, all in the East Taurus deposit. The larger 1,830 x 760 m (6,000 x 2,500 ft) West Taurus zone is judged to need more follow-up exploration before reserves can be determined.



Figure 11. *Drill program underway at Eagle Creek Property about 19 km (12 mi) north of Fairbanks. The gold mineralization is found with associated antimony in small granite porphyry bodies. (Photo by John Wood)*

Drilling estimates for the East Taurus zone are 126 million tonnes (140 million tons) grading about 0.30% copper and 0.34 g/tonne (0.01 oz/ton) gold.

Small firms and partnerships also searched for lode and placer deposits of gold and base metals in the eastern Interior region. Grateful Dog Mining examined the mineral potential of the Treasure Creek drainage and the old Love Site military installation in the Fairbanks district. Placer mining firms that conducted drilling, testing, and miscellaneous ground testing in the eastern Interior included: D'Log Industries in the Bonnifield district; Herning Exploration and Mining on Palmer Creek in the Chena River drainage; Sweepstakes Mining on Kokomo and Grouse Creeks in the Fairbanks district; Lyle College in the Circle district (unspecified location); 45-Pup Mining in the Fortymile district; Greenhorn Mining on Ketchum Creek in the Circle district; Windy Hill Mining on Little Boulder and Silverbow Creeks in the Tofty district; Alder Creek Mines on Fairbanks Creek in the Fairbanks district; Jensen Mining on Sears Creek in the Delta district; Rainbow Mining on Flat Creek in the Circle district; and Polar Mining on lower Goldstream Creek (Fairbanks district) and on Hinkley Gulch (Richardson district).

Several small mining firms examined the drift mining potential of deeply buried gold placer deposits in the Fairbanks district. RCL Mining (Ray Vogt) leased several levels of bench placers on lower Dome Creek and reopened underground workings, conducted surface drilling, and pumped out and repaired old drift shafts. Late in the year, ACE General Contractors Inc. began a drift exploration program in lower Goldstream valley near Fox, in anticipation of stockpiling pay in 1992.

## SOUTHCENTRAL REGION

Exploration in the southcentral region increased more than in any other part of the State. Exploration expenditures increased from $2.9 million in 1990 to $6.2 million in 1991, an increase of about 115% (table 4). The total region-wide effort included a well balanced evaluation of placer, bulk minable, and high-grade vein gold, and kuroko-like, massive sulfide polymetallic deposits.

### Metals

Work continued at the Johnsen River mineralized area in the southern Alaska Range, 200 km (125 mi) west of Anchorage. Originally discovered by Anaconda Minerals in 1983, the Johnson River zinc-gold-silver deposit consists of a metal-bearing stockwork of quartz-sulfide veinlets in sedimentary and volcanic rocks that are thought to be the same age as the Talkeetna Formation. Howard Keck from Cook Inlet Region (CIRI) leases the property and Hunt, Ware and Proffett manages it. During 1991, the search for a faulted section of the ore body involved 3,140 m (10,300 ft) of diamond drilling and detailed geological and geochemical mapping. Cumulative exploration of the Johnson River deposit(s) has shown a resource of about 16,795 kg (540,000 oz) of gold and 126,980 tonnes (140,000 tons) of zinc. This includes a 453,500 tonne (500,000 ton) zone that contains 19 g/tonne (0.62 oz/ton) gold and 9% zinc. The 1991 work showed favorable values north of the main mineralized zone.

A joint venture of Cathedral Gold, Pacific Sentinel and North Pacific Mining Company (NPMC) searched for copper-gold porphyry targets and in Jurassic units for deposits similar to the Johnson River deposit on the west side of Cook Inlet. The project used geological mapping, stream sediment, soil, and rock geochemical surveys, along with aerial photographic interpretation.

NPMC independently explored Chugach Alaska Corporation lands on the Kenai Peninsula employing various surface-sampling surveys. NPMC also conducted an extensive surface evaluation of their Toklat massive sulfide prospect in the Talkeetna Mountains, which is similar to the Johnson River deposit.

Placer Dome U.S. Inc. leased ground from Cominco Alaska Inc. and drilled the newly discovered Deadman Mountain deposit about 16 km (10 mi) south of the Denali Highway near the Valdez Creek mine. The company

drilled seven holes totaling 823 m (2,700 ft) to explore the high-grade gold-arsenic-antimony-silver deposit, which is hosted in biotite schist and gneiss of the McKlaren metamorphic belt.

Newmont Exploration conducted reconnaissance investigations for gold in the southcentral region, but did not report specific localities.

Ahtna Minerals Company, a subsidiary of Ahtna Corporation, initiated a minerals exploration program on Ahtna lands in the Copper River valley. Company goals for the future include: commence grassroots exploration; rating final land selections with an emphasis on economic values; and generate private sector interest in exploration.

Chugach Alaska Corporation continued reconnaissance level exploration for unspecified commodities in the Katalla, Port Graham, and English Bay areas.

Gold Tech Resources Inc. and KDT Exploration and Mining Company looked for both lode and placer deposits of platinum and gold in the Valdez Creek and Pass Creek areas north of Denali Highway; some of their 1991 work included reverse circulation drill programs.

The Polaris Group, an Alaska-based venture-capital fund, invested $300,000 through purchase of shares of NovaGold Resources, owner of the Cliff Gold Mine on Valdez Arm about 10 km (7 mi) west of Valdez. The financing includes a 15% net profit interest in the Cliff Mine property. In the last five years Watts, Griffis and McQuatt (WGM) has explored the formerly productive Cliff Mine, a high-grade gold-quartz deposit that intrudes meta-sedimentary rocks of the Valdez Group. WGM has dewatered the underground workings to a depth of nearly 150 m (500 ft) below sea level and sampled the old stopes to estimate the future underground ore potential of this historic gold property. Etruscan Enterprise, the financial partner of the project, anticipates that WGM Inc.'s exploratory work can prove up 1,866 kg (60,000 oz) in the next exploratory phase.

Historic placer mining camps throughout the southcentral region were explored for placer deposits. Cambior Alaska Inc., operator of Alaska's largest gold mine at Valdez Creek, conducted drill programs at two sites in the region—in the Valdez Creek fan-delta target, a downstream extension of the ancestral channels currently being exploited, and in the Windy Creek drainage south of Valdez Creek valley.

Randy Elliott mapped and prospected for placer gold in several undisclosed locations in the McCarthy Quadrangle.

John Whitney prospected in the old Sunrise district of the Kenai Peninsula in the search of small high-grade pockets of placer gold. Crow Creek Mine conducted dredging and mapping surveys on their placer prospects in the Girdwood area near Anchorage.

The Rowallan Mine Partnership continued a thorough assessment of a promising placer deposit near the confluence of White and Valdez Creeks upstream from the Cambior Alaska Inc. operation. A large reverse circulation drilling program that began several years ago has revealed a deposit containing at least 1,772 kg (57,000 oz) gold within a 364 ha (900 acre) claim block. Rowallan has leased the property to Caprock Corporation of Denver, Colorado. Caprock has rechecked the previous drill program with infill drilling and expanded minable ground with its own reverse circulation grid. In 1991, Caprock completed the exploratory drilling phase and started a pit design. Production could begin in 1992 or 1993.

Arnold and Sally Echola prospected for placer gold on Gold Creek in the Nelchina district by excavating small cuts and mapping placer pay exposures.

Lake Creek Placers continued evaluating gold-platinum placer deposits in Tertiary fluvial sediments of the Kenai Group at Lake Creek in the Cache Creek district west of Talkeetna. Lake Creek Placers has found, through careful channel sampling and follow-up analytical work, that quartz-pebble conglomerate near the base of the section contains the best precious-metal values. TC Mining also explored in the Cache Creek district on Cache Creek itself.

Finnbear Mining Company continued its ten-year program of assessing hardrock and placer gold-platinum potential of the Finnbear claims in the Kaniltna drainage southeast of Rainy Pass. Finnbear plans to use winter roads to haul heavy equipment during the 1992-93 season.

### Coal

Hobbs Industries completed various exploratory activities on two coal properties in the Matanuska Valley, the Evan Jones Mine near Sutton, and the Castle Mountain Mine near Chickaloon. Both mines previously supplied high quality, low-sulfur bituminous coal, which was sold to local markets including several military power plants near Anchorage. Hobbs drilled, trenched, excavated, and completed landslide remediation studies at the Evan Jones Mine. The company also transported about 635 tonnes (700 tons) of bulk sample and waste-pit coal from the Castle Mountain Mine to the Evan Jones Mine storage site, which will become a focus of future company activities. More of Hobbs's 1991 work is described in the development section.

## SOUTHWESTERN REGION

The southwestern region includes many of Alaska's historic bush placer camps including the Innoko, Iditarod, Aniak, and Goodnews Bay districts. Grassroots exploration continues to concentrate on assessing the potential for bulk minable gold-polymetallic deposits associated with Cretaceous-early Tertiary plutons and volcanic fields. In addition, new base and precious metal reserves have been discovered in the Lake Iliamna region. Reported expenditures for 1991 were $1.87 million, compared with about $2.14 million in 1990 (table 4).

### Metals

The most noteworthy exploration results in the southwestern region

centered on the promising results reported by Cominco Alaska at their Pebble Copper deposit west of Newhalen and about 24 km (15 mi) north of Lake Iliamna. Discovered by Cominco geologists in 1989, Pebble Copper is a disseminated porphyry copper-gold-molybdenum deposit associated with a 90-95-million-year-old composite stock of granodiorite composition that intrudes Mesozoic flysch of the Kahiltna terrane. The mineralized granodiorite is actually part of a complex, multiphased intrusion that ranges in composition from pyroxenite to granite, with associated and overlying dacite and andesite tuffs and flows. Stockwork-style, quartz-sulfide mineralization is found in the adjacent volcanics and hornfels as well as in the intermediate intrusive rocks (St. George, 1991). In the last two years drill holes spaced 150-305 m (500-1,000 ft) apart and averaging about 120 m (400 ft) deep have delineated a reserve of 453 million tonnes (500 million tons) grading 0.35% copper, 0.41 g/tonne (0.012 oz/ton) gold, and a probable byproduct of molybdenum in the 0.03 to 0.04% range.

Cominco initiated permitting and prefeasibility studies in mid-1991 (fig. 12) after definition drill programs had enlarged the estimated size of the deposit to favorable economic status. If Pebble Copper or another similar mineral property in the Bristol Bay-Iliamna region were developed, the need would exist to acquire 50-70 megawatts of electric power for mine and mill operation. This need could spur interest in a local electric power grid to service area communities where electric power is currently generated by costly diesel-powered plants. Cominco is also studying options of how to transport metal concentrates from mine site to a seaport facility. Alternatives range from constructing road access to Bristol Bay to barging across Lake Iliamna and using the existing Pile Bay road from the lake to lower Cook Inlet.

Another significant new discovery was explored on Vinasale Mountain about 29 km (18 mi) south of McGrath. Operator Central Alaska Gold Company and Placer Dome U.S. Inc. conducted a drill program to evaluate a disseminated gold-polymetallic deposit hosted in a 69-million-year-old quartz monzonite intrusion (Solie and others, 1991). In the 1920s a small placer deposit was developed in Alder Gulch on the south side of the Vinasale Mountains. Bismuth-gold-tungsten lode mineralization in the Alder Gulch area has also been described by Bundtzen (1986). Recent industry exploratory work on lands owned by Doyon Ltd. has shown good potential for large mineralized zones. Concealed deposits, referred to by Central Alaska as the central and northeast zones, were initially found by Central Alaska Gold with a detailed, soil-grid, geochemical survey. Structural style and mineralogical composition of the mineralization on Vinasale Mountain are similar to that in bulk-minable gold prospects in the nearby Iditarod-Flat, Donlin, Russian Mountains, and Candle Creek areas. All are hosted in Late Cretaceous-early Tertiary volcanic-plutonic complexes of the Kuskokwim region. After completing 4,800 m (16,000 ft) of diamond drilling and expending $1.6 million, the Placer Dome-Central Alaska joint venture announced that the central and northeast deposits contained an estimated 31,100 kg (1,000,000 oz) gold. The property, which is located on lands owned by Doyon Ltd., is expected to see more exploration activity in 1992.

Calista Corporation reported on two small reconnaissance exploration programs in the Donlin Creek area north of Crooked Creek on the Kuskokwim River, and at the Stuyahok placer camp in the Marshall district of the lower Yukon river drainage.

Battle Mountain Exploration carried out reconnaissance mapping and sampling at unspecified locations in the Iditarod Quadrangle.

Small placer firms were not only exploring placer paystreak but were also testing potential lode sources for possible hardrock reserves. Jualin Creek Mining Company explored for placer and lode gold in the Jualin Creek drainage

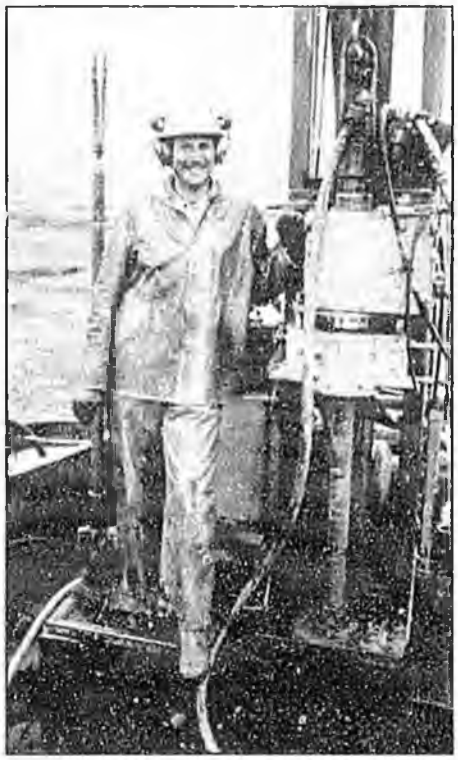


Figure 12. *Dan Franklin on drill rig at Cominco Alaska's Pebble Copper project near Iliamna. Since 1989, Cominco Alaska Exploration has identified about 454 million tonnes (500 million tons) of copper-gold-molybdenum mineralization hosted in a porphyry environment. (Photo by Phil St. George, Cominco Alaska Exploration)*

using a backhoe and an E-Z Panner gold-recovery unit. The company expects most of its 1992 work to be exploratory in nature, in contrast to its production activity of the last several years.

Little Creek Mine (Paul Sayer) searched for and proved up reserves of placer gold and scheelite in Little and Ester Creeks in the historic Ophir district.

Misco-Walsh Mining Company (Misco-Walsh) continued its multi-year effort to explore and develop the Golden Horn semi-residual deposit of gold-tungsten-silver in the Iditarod district. The company's 1991 efforts included trenching, sampling, and mineral processing with a rod mill, jig, and wilfley table. Late in 1991, Misco-Walsh began to work with Doyon Ltd., which owns several core townships in the Iditarod district, ASA Inc., and Placer Dome

U.S. Inc. to develop a systematic exploration program to assess the entire district for its bulk minable, gold-polymetallic potential.

Flat Creek Placers explored placer deposits in upper Flat Creek in the Iditarod district. In 1991 the company bulk-sampled various tailing sites left over from pre-1920 dredging activities of the Yukon Gold Company, which mined rich pay in the early gold rush years. The testing results showed that the tailings might yield enough gold to cover expenses of a mechanized placer mine and that bedrock missed by the dredge could yield a profit.

Howard Bowman, longtime southwestern Alaska miner, pilot, and prospector on Portage Creek along the shore of Lake Clark, received patents for four Federal mining claims on December 10, 1991. Since the early part of the 20th century the Bowman claim group has been active through the work of Howard and his father, Fred, one of the first blacksmiths in the gold rush town of Fairbanks.

## ALASKA PENINSULA REGION

Exploration expenditures in the Alaska Peninsula region were down considerably from previous years—to only $327,000 in 1991 (table 4). Major mining firms have shown limited interest in developing the epithermal gold-silver and porphyry copper deposits in this region.

### Metals

Battle Mountain Exploration Company mapped, sampled, and drilled (1,200 m; 4,000 ft) on Unga Island near the old Alaska Apollo gold mine.

Battle Mountain pioneered modern exploration of epithermal gold-silver deposits in the Alaska Peninsula region and identified significant resources at such properties as Centennial, Cathedral, and Mount Dana. In the mid 1980s, Battle Mountain also helped rediscover the economic potential of the high-grade deposits of gold, copper, and bismuth skarn at Nixon Fork near Medfra in the western region. Central Alaska Gold Company is currently developing these deposits. However, late in 1991, Battle Mountain announced that it would be leaving the Alaskan exploration scene and would not have a program in 1992.

### Industrial Minerals

Koniag Inc. conducted exploratory work with pit-run rock production at quarries on Womens Bay and Afognak Island.

## SOUTHEASTERN REGION

Although generally lacking in placer resources, the southeastern region contains the State's widest variety of metallogenic terranes. Deposits include volcanogenic massive sulfide deposits, uranium rare earth element resources in alkalic igneous rocks, platinum and iron-titanium resources in mafic-ultramafic complexes, and mother lode gold belts like the Juneau and Chichagof mining districts. The region contains copper-precious metal skarns on Prince of Wales Island and porphyry copper-molybdenum systems near Ketchikan and in Glacier Bay. Additionally, some of the State's most promising exports of marble and carbonate industrial mineral resources exist on Dall, Prince of Wales, Heceta, and Coronation Islands in the southeastern Panhandle.

The mineral exploration industry has not ignored the region s rich endowment and readily accessible terrane. Since 1984, the Panhandle has led other Alaska regions in exploration expenditures and total drill footage. The 1991 calendar year was no exception when southeastern Alaska projects accounted for $22.8 million, 57% of total statewide exploration expenditures (table 4).

### Metals

Hyak Mining of Juneau explored in northern southeast Alaska. Assessment work was undertaken at the Enterprise Mine, located to the north of Limestone Inlet, some 48 km (30 mi) southeast of Juneau. This small gold deposit lies along a shear zone in granitic rocks. Past production at the Enterprise was on the order of 3.1 kg (100 oz) of gold. Hyak's reconnaissance activities concentrated on northeastern Chichagof Island, where anomalous gold was found in pan concentrate samples at the East Point prospect, south of Freshwater Bay. This prospect is in an area where Newmont Mining reportedly drilled a copper-nickel anomaly in the 1950s. Hyak conducted follow-up soil sampling to further delineate the gold anomalies and plans additional exploration in the area during the 1992 season.

Hecla Mining dropped its option on the Red Diamond gold prospect, owned by Hyak and AJT Mining, located on southern Douglas Island above Nevada Creek. Gold mineralization at the prospect is contained in pyritiferous felsic schists with local quartz lenses and stringers. Drilling by Hecla during 1991 reportedly returned favorable results, but Hecla has decided to discontinue mineral exploration in Alaska in favor of exploration in Mexico and South America. Hyak and AJT continued with assessment work and exploration on the Red Diamond prospect during 1991.

Ivanhoe Partners conducted assessment work and exploration on the Ivanhoe prospect, north of Juneau. The Ivanhoe consists of at least four discontinuous quartz veins, with the largest vein ranging from 0.3 to 2.7 m (1 to 9 ft) thick. Past production (prior to 1903) was 10.5 kg (340 oz) gold.

Red Dodson of Ketchikan continued exploration at Bokan Mountain on southern Prince of Wales Island. Bokan Mountain is a past producing uranium-thorium deposit in southern Prince of Wales Island, west of Stonerock Bay. Recent work conducted by the U.S. Bureau of Mines (Barker and Warner, 1987) shows that a substantial resource of rare earth elements accompanies the radioactive metallogeny.

Cominco Alaska Exploration conducted exploration on the Big Harbor volcanogenic massive sulfide base metal deposit to the north of

Trocadero Bay, southeast of Craig on Prince of Wales Island. Mineralization at Big Harbor has been developed by multiple adits and levels, with several thousands of feet of underground workings, most of which are still accessible. Sealaska Corporation owns the surface and subsurface of Big Harbor. Cominco conducted surface diamond drilling at Big Harbor in the 1950s or 1960s, but has kept the results of this drilling confidential. Exploration in 1991 concentrated on geophysical prospecting. Previous aerial geophysical exploration in the Trocadero Bay area identified numerous VLF conductors that have not been drill tested, but includes some of the known mineralized horizons at the Big Harbor deposit.

Cominco Alaska Exploration also worked near the Alaska-British Columbia border, west of Haines. This area, near the Mount Henry Clay and Glacier Creek deposits, contains numerous Kuroko-like massive sulfide and barite deposits along with gold skarns (Still and others, 1992). Mineralization has been located on both sides of the border. Exploration has been ongoing in this region for a number of years, though no prospect has advanced beyond the exploration stage.

Guy Comer of Ketchikan continued exploration at the Lucky Nell Mine near Hollis on Prince of Wales Island. Comer is attempting to reopen this small vein-gold deposit which was intermittently mined in the late 1930s and early 1940s. Work to date shows that a high value sulfide concentrate can be readily produced on site by gravity techniques. Exploration and metallurgical work, along with early permitting activity, is continuing.

During 1991 U.S. Borax ended its years of frustration with the Quartz Hill molybdenum deposit east of Ketchikan and sold the mineral rights to Cominco Ltd. for an undisclosed price. From its discovery by Borax in the early 1970s, the Quartz Hill deposit was taken from a raw prospect to a completely evaluated deposit that is estimated to contain up to one-sixth of the world's known molybdenum reserves. Borax obtained Federal patents on core claims that cover the deposits. Cominco has not announced its immediate intentions or long-term timetable for development of the property. Undoubtedly, future molybdenum price projections along with tailing disposal issues will be of vital importance in the eventual development of this world-class ore deposit.

Salisbury and Associates continued exploration and assessment on the PEEJ Claim Group near Point Couverden, 32 km (20 mi) west of Juneau. Stratiform base-metal and vein-type precious-metal mineralization are known in this area. Salisbury also continued as operator for American Copper and Nickel in the Dotomi district on Prince of Wales Island, where base- and precious-metal deposits are being investigated. During the year Salisbury donated an abridged collection of drill core from the Mirror Harbor nickel-copper-cobalt deposit to the Alaska Geological Materials Center in Eagle River, Alaska. Previous exploration had delineated several million tonnes of strategic metal mineralization in a gabbro pluton.

Kennecott Exploration crews from its Salt Lake City office explored for volcanogenic massive sulfide deposits in the Wrangell area. The geology of this area is similar to the Greens Creek Mine region. Some believe that the Triassic stratigraphy hosting the Greens Creek mineral deposits are found also in the Wrangell area due to offset along the Chatham Strait transcurrent fault.

Alaska-Dano Mines continued surface exploration on its 26 unpatented and 31 patented claims near Funter Bay, on northern Admiralty Island, west of Juneau. Several sets of quartz veins have been identified on the property, some of which host sulfide and gold mineralization. Work in 1991 was based on previous soil surveys which defined zoned base and precious metal anomalies. Several generations of veins were delineated. In addition, the 1991 program involved field mapping and surface geochemical sampling with the express purpose of ascertaining which vein sets were mineralized.

Juneau prospectors Roger Eichman, Floyd Branson, and Dale Henkins continued work on their claim groups at their Dream Mine in the Chilkat Range and Peterson Mine on the mainland north of Juneau. Widespread vein and stratiform(?) base- and precious-metal mineralization has been identified at Dream; however, work thus far has focused on gold-enriched massive sulfide pods (Bull, 1991).

Claim owners of the Peterson Mine conducted detailed stream sediment and pan concentrate sampling that defined several gold anomalies which they continue to investigate. The Peterson's mineralization consists of gold in quartz veins in black slates. Past production was approximately 6.2 kg (200 oz) gold from 1916 to 1921.

Dale Henkins and Roger Eichman continued surface sampling at the Gold Fork prospect on Carlson Creek northeast of Juneau. This fairly high-grade vein gold deposit was examined several years ago by Curator International under option from Henkins and Eichman. A major mining company has reportedly acquired a lease on the property for 1992 work. Mineralization at the Gold Fork prospect consists of sheared quartz veins in amphibolite grade schists. Veins pinch and swell but are readily traceable for approximately 914 m (3,000 ft) along strike.

Hyak Mining of Juneau holds the Jualin gold property which is 72 km (45 mi) northwest of Juneau, adjacent to the Kensington Mine. Placer Dome U.S. Inc. held an option to earn an equity interest in the property through various levels of work commitment and expenditure. During the year, Placer Dome continued work on the property drilling the Berners Tunnel anomaly, the upper Jualin soil anomalies, and the Empire dike to investigate potential gold resources. The company also conducted a geological evaluation of the high grade 4W vein system and geological

mapping and sampling at the DZ and 4W occurrences northwest of the Jualin deposit. Placer Dome relogged much of the core of the Main and Empire zones, which resulted in a revised geologic interpretation for these mineralized portions of the Jualin property. During the 1991 season Placer Dome's 10 diamond-drill holes totaled 1,864 m (6,115 ft). The total drilling on the property is now 25,100 m (82,337 ft) in 126 core holes (fig. 13).

Work by Placer Dome and others shows similarities between the Empire dike at Jualin and the Treadwell dike, which hosted the mineralization at the Treadwell Mine near Juneau. The Treadwell dike produced about 90,200 kg (2.9 million oz) gold at an average grade of 3.7 g/tonne (0.11 oz/ton) gold. Both the Empire and Treadwell dikes are thick felsic intrusives which dip steeply and intrude near major lithologic contacts. Both show albitic alteration and local quartz-sericite-pyritic alteration. Gold mineralization in the Empire dike is contained in ore shoots that exhibit a definable rake that needs to be further explored.

By the end of the year Placer Dome dropped its option on Jualin. Although considerable potential exists on the property, as shown by targets such as the Empire dike, Placer Dome was facing significant financial commitments and made the decision to relinquish the property without attaining an equity interest.

Kennecott Greens Creek Mining Company completed at least 15,245 m (50,000 ft) of core drilling at its Greens Creek Mine and succeeded in increasing reserve estimates. Proven, probable, and inferred reserve estimates have increased from 4.3 million tonnes (4.7 million tons) in 1990 to nearly 12.5 million tonnes (13.8 million tons) of high grade lead-zinc-silver-gold massive sulfide ores by the end of the 1991 season. Kennecott and consultant On-Line Exploration also expended considerable effort mapping and sampling prospective areas of the Mansfield Peninsula, northwest of Greens Creek Mine. The peninsula is thought to be an extension of the volcanic-sedimentary stratigraphic package hosting the known massive sulfide deposits at Greens Creek.

Boomer and Company Inc. acquired the Kaigani claim group on south Dall Island from Lac Minerals and Noranda Exploration. In 1991, Placer Dome U.S. Inc. completed assessment work for Boomer, and, if financing can be arranged, will design a drill program for the property.

Lac Minerals USA Inc. completed a small drilling program at the Niblack Anchorage on southern Prince of Wales Island. The stratiform copper-zinc deposit is enriched with precious metals. The company also relogged core from previous drill programs and worked up a regional geological map with consultant Dihedral Exploration.

Sealaska Corporation continued its aggressive assessment of mineral potential on its ANCSA-awarded lands throughout the southeastern Panhandle. Sealaska's 1991 efforts included geological mapping, sampling, geophysical surveying, and drilling (762 m, 2,500 ft) for base, precious metal, and rare-earth-element deposits at various locations on their lands. Currently Sealaska has one mineral agreement in place and two in negotiation with private mineral firms.

Klukwan Inc., a southeast Alaska Native village corporation, investigated diversifying its interest into minerals development during 1991. Klukwan has a fee-simple title to 9,310 ha (23,000 acres) of land, including both surface and subsurface ownership, throughout southeast Alaska. Klukwan hired a mineral manager and investigated metallic and industrial mineral opportunities on corporation lands. By years end, Klukwan had decided that the corporation would not actively pursue mineral development of its lands at this time. However, the corporation may enter into joint ventures or exploration agreements with private firms.

The Metlakatla Indian community requested the Bureau of Indian Affairs (BIA) and U.S. Geological Survey (USGS) to undertake a mineral assessment project on the Annette Island Reserve, 24 km (15 mi) south of Ketchikan. Preliminary results of these investigations were released in late 1991 (Horton and others, 1991). Following these government-sponsored investigations, the Metlakatla Indian community expressed interest in entering into exploration agreements with private partners to further identify and develop mineral deposits on the Reserve. Conclusions of the work by the BIA and



Figure 13. *Neil MacKinnon of Hyak Mining Company examining core recovered by Placer Dome U.S. Inc. at Jualin Mine, southeastern Alaska. (Photo by A.H. Clough)*

USGS identify high to moderate potential for vein-gold mineralization associated with major structural features. In addition, the Reserve has moderate potential for significant volcanogenic massive sulfide mineralization.

One small company searched for placer accumulations of precious metals. Snow Lion Mining Company (Jerry Fabrizio) worked on small placer and lode deposits in the Porcupine Creek drainage near Haines.

## ADVANCED EXPLORATION PROJECTS

### Kensington Project

Echo Bay, Alaska Inc., operator of the Echo Bay Mines-Coeur' Alaska Kensington joint venture, continued drilling and underground development at the Kensington Mine, 80 km (50 mi) north of Juneau. Through late 1991 the joint venture spent $78 million on all phases of exploration at Kensington. By November 1991, estimates for proven and indicated ore reserves had increased to 10.4 million tonnes (11.5 million tons) grading 4.9 g/tonne (0.143 oz/ton) gold. Underground work continued on the property in an effort to increase the ore reserve base (fig. 14) and also explored the relatively new, so-called "Horrible" ore body which is not part of the main Kensington vein system. The Horrible deposit, which was intersected by the main haulage drift, contains an additional inferred reserve of 3.56 million tonnes (3.93 million tons) grading 3.8 g/tonnes (0.11 oz/ton) gold (fig. 15). These reserves are not included in reserve estimates given above for Kensington. A review of the geology and exploration results of the Kensington deposit was summarized recently by Harvey and Kirkham (1991).

The Echo Bay Mines-Coeur Alaska Kensington joint venture also worked on environmental and permitting issues. The U.S. Forest Service, the lead Federal agency overseeing the project and responsible for the environmental impact statement (EIS), released the draft in June 1991. The final EIS

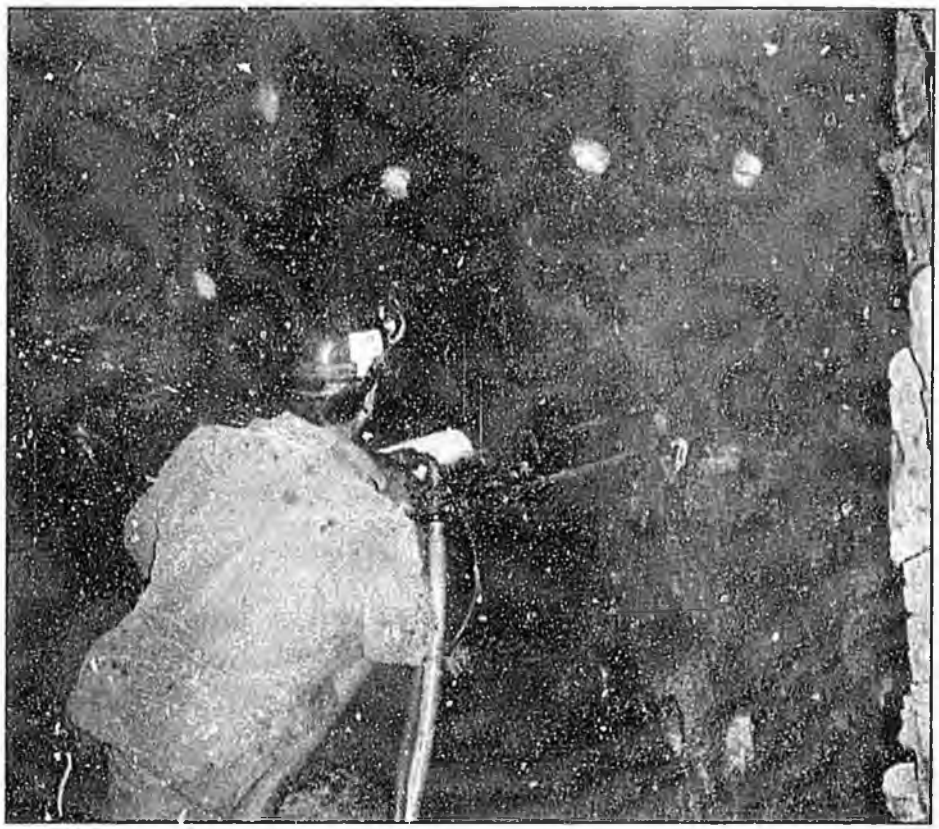


Figure 14. *Drilling out a round at an exploration face in the Kensington Mine, southeastern Alaska. Explosives will be put in each hole and when detonated, blast will remove the rock face. (Photo by Maggie Kuhleve, UAS Institute of Mining)*



Figure 15. *Low profile dump truck unloads waste rock from main haulage drift at Kensington Mine, southeast Alaska. (Photo by A.H. Clough)*

and record of decision was released in February 1992. Economic feasibility studies released by Echo Bay for the draft EIS show mine capital investment requirements at $205 million, with mine costs at $29/tonne ($26/ton) or $6.84/g ($213/oz) gold. Permitting activities are continuing and the joint venture partners are deciding at this time whether or not to develop the project to a producing mine.

The City and Borough of Juneau Planning Commission became actively involved in the Kensington project during 1991. Since the mine will be within the Juneau Borough, its development and operation are regulated under the Borough mining ordinance. The planning commission, which oversees development within the Borough, held numerous meetings on mine-related issues throughout the year in preparation for Echo Bay Alaska-Coeur Alaska joint venture development decision.

### Alaska-Juneau Project

Echo Bay continued its six-year exploration program of the historic Alaska-Juneau (A-J) Mine, the State's largest past producer of lode gold (fig. 16). Proven and probable reserves at the A-J Mine are 61.6 million tonnes (68 million tons) of 1.8 g/tonne (0.052 oz/ton) gold, with 30.03 million tonnes (33.4 million tons) grading 1.6 g/tonne (0.048 oz/ton) gold as possible ore. These reserves exceed Echo Bay's requirements for undertaking mine development, therefore, Echo Bay will not continue exploration as in previous years.

During 1991, A-J activity was focused on acquiring permits, working on the final draft of the environmental impact statement, and continuing metallurgical testing. This testing concentrates on milling and gold recovery. Echo Bay provided a $111,980 grant to the Mineral Industry Research Laboratory at the University of Alaska Fairbanks to assist in this work.

The final EIS and record of decision by the Bureau of Land Management, the lead Federal agency, is expected in late spring 1992. Until this key environmental document is released, a decision whether or not to proceed with mine development will not be made. Late in 1991, Echo Bay purchased the remaining 15% of the A-J unit from WGM Inc. This unit includes the Treadwell deposit and gives Echo Bay Alaska total control of both properties.

Echo Bay announced a major change in mine facility design during the year. Previously, Echo Bay had planned to conceal much of the mine infrastructure underground and behind berms. Following public comment and recommendations of a design group, the company is considering making the facility an architectural asset with the surface facilities located on Gastineau Channel in full view of the community. According to this plan, facility design would focus on the history of mining in Juneau. The plan includes an adjacent tourism facility with classroom space to serve as the permanent home of the University of Alaska Southeast Institute of Mining Technology and would operate in conjunction with the institute's ongoing mine training program.

## INDUSTRIAL MINERALS

Ashgrove Cement West of Portland, Oregon, continued exploration and feasibility studies on its Oswego limestone claims. These claims are at View Cove on eastcentral Dall Island, west of Prince of Wales Island in southern southeast Alaska. View Cove offers a well protected deep water port. The Oswego limestone is pure and suitable for Portland Cement.

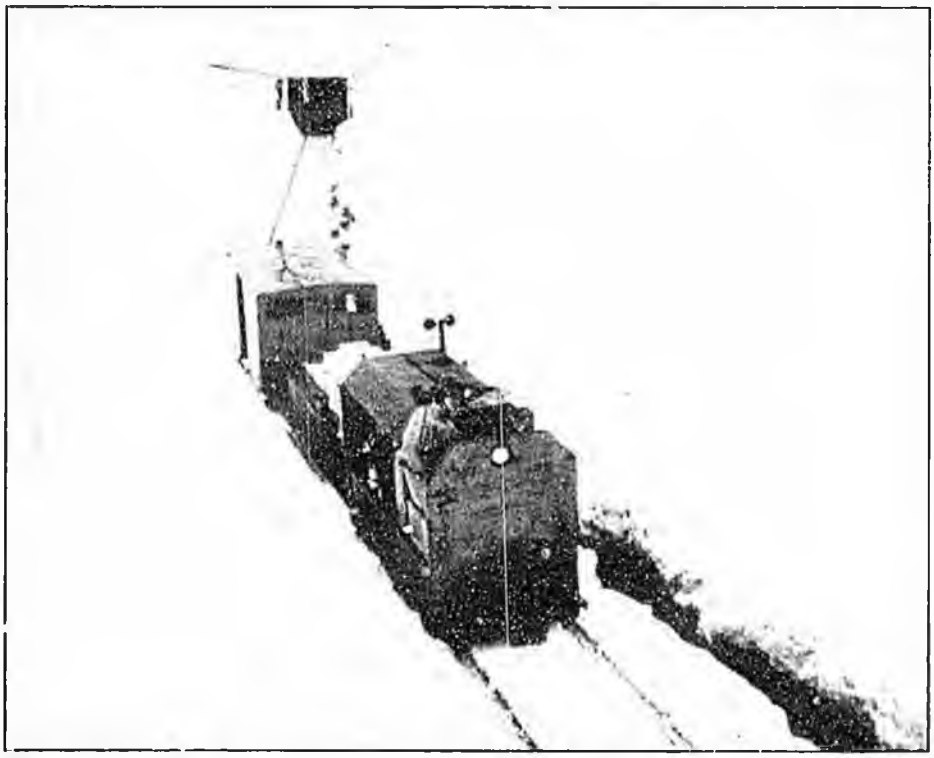
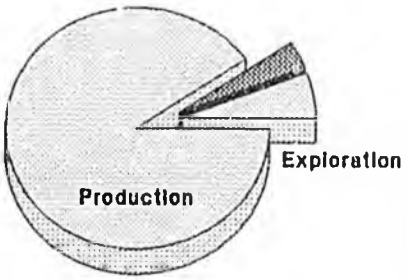


Figure 16. *Low profile underground train enters the Sheep Creek Portal at the Alaska-Juneau Mine near Juneau. (Photo by Lance Miller, Echo Bay Alaska Inc.)*




# DEVELOPMENT

*Mineral development expenditures grew by more than 70% to $25.6 million in 1991. A major gold property is being developed near Fairbanks. Coal properties were seriously studied for export and domestic markets.*

Alaskan mineral development expenditures increased nearly 79% from $14.3 million in 1990 to $25.6 million in 1991, and the number of jobs in mineral development increased from 95 to 133 (tables 5 and 6). Increased activities are centered around anticipated large-scale gold mining in the Fairbanks area, coal and placer gold development in the southcentral region, and development, drilling, and geotechnical analysis at the Greens Creek Mine near Juneau (fig. 17).

## METALS

Major development projects were reported at the Fort Knox deposit near

Table 5. *Reported mineral development expenditures in Alaska by commodity, 1982-91*

| | Base metals | Precious metals | Industrial minerals | Coal and peat | YEARS TOTAL |
|---|---|---|---|---|---|
| 1982 | $ 10,270,000 | $ 19,320,000 | $ 4,251,000 | $ 7,750,000 | $ 41,591,000 |
| 1983 | 19,500,000 | 7,112,500 | 1,000,000 | 250,000 | 27,862,500 |
| 1984 | 10,710,500 | 15,058,555 | 579,000 | 27,000,000 | 53,348,055 |
| 1985 | 13,000,000 | 16,890,755 | 1,830,000 | 2,400,000 | 34,120,755 |
| 1986 | 7,260,800 | 16,417,172 | 124,000 | 530,000 | 24,331,972 |
| 1987 | 62,080,000 | 37,640,848 | 188,000 | 342,000 | 100,250,848 |
| 1988 | 200,000,000 | 74,945,500 | -- | -- | 274,945,400 |
| 1989 | 118,200,000 | 6,876,350 | 7,000,000 | 2,196,000 | 134,272,350 |
| 1990 | 4,101,600 | 7,136,500 | 30,000 | 3,079,000 | 14,346,500 |
| 1991 | 4,000,000 | 18,994,350 | 262,000 | 2,318,000 | 25,574,350 |
| TOTAL | $449,122,300 | $220,392,530 | $15,264,000 | $45,643,730 | $730,643,730 |

-- = No expenditures reported.

Table 6. *Reported mineral development expenditures and employment in Alaska, 1991*

| | Northern | Western | Eastern interior | South-western | South-central | Alaska Peninsula | South-eastern | TOTAL |
|---|---|---|---|---|---|---|---|---|
| Exploration expenditures | | | | | | | | |
| Base metals | $ -- | $ -- | $ -- | $ -- | $ -- | $ -- | $ 4,000,000 | $ 4,000,000 |
| Precious metals | | | | | | | | |
| Placer | 79,000 | 2,050,000 | 308,300 | 1,090,000 | 5,338,000 | -- | -- | 8,865,300 |
| Lode | -- | -- | 6,000,000 | -- | 119,050 | -- | 4,010,000 | 10,129,050 |
| Coal and peat | | -- | | -- | 2,318,000 | -- | -- | 2,318,000 |
| Industrial minerals | -- | 110,000 | 150,000 | -- | -- | -- | 2,000 | 262,000 |
| TOTAL | $79,000 | $2,160,000 | $6,458,300 | $1,090,000 | $7,775,050 | $ -- | $8,012,000 | $25,574,350 |
| Exploration employment | | | | | | | | |
| Employment | | | | | | | | |
| Workdays | 633 | 940 | 12,613 | 290 | 13,420 | -- | 6,700 | 34,598 |
| Workyears[a] | 2 | 3 | 49 | 1 | 52 | -- | 26 | 133 |
| Number of companies reporting[b] | 3 | 2 | 10 | 3 | 9 | 0 | 3 | 30 |

-- = No expenditures reported.
[a]Based on a 260-day workyear.
[b]Some companies were active in several areas.

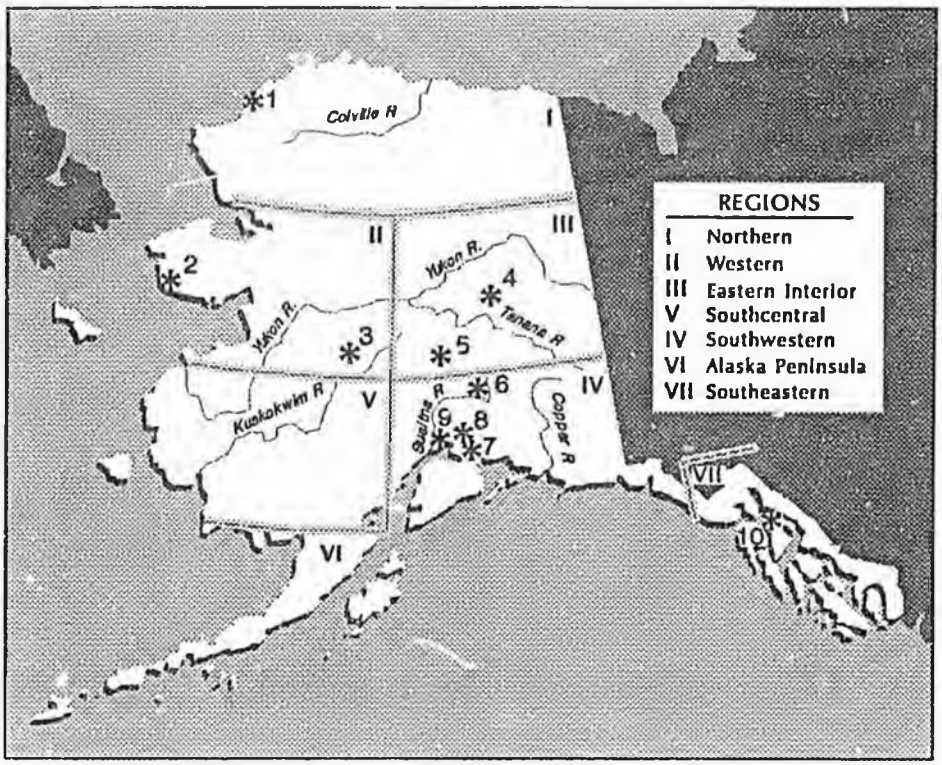
Fairbanks, at the Valdez Creek Mine near Cantwell, and the Greens Creek Mine. In addition, many smaller placer mines reported at least some development in 1991.

In the northern region near Wild Lake, Mick and Cecilia Manns continued to work their thawed placer ground and expand their recreational tourist mining operation. Paul Dionne, who mines underground on Nolan Creek, spent about a month cleaning out settling ponds and reclaiming previously mined ground.

In the western region, Alaska Gold Company continued thaw-field drilling and stripping in the Nome area, preparatory to operating two dredges in 1992 on its gold placer property. Central Alaska Gold Company operated a large condemnation and geotechnical program at the high-grade gold skarn deposit at Nixon Fork to assure that the placement of the airstrip and surface facilities will not interfere with the progress of the project. The company identified ore reserves (all categories) of the Nixon Fork skarn as 317,450 tonnes (350,000 tons) grading 30.85 g/tonne (0.9 oz/ton) gold, and 0.8% copper.

In the eastern Interior region, Fairbanks Gold Ltd. completed 9,340 m (32,600 ft) of RVC drilling at its Fort Knox deposit about 24 km (15 mi) northeast of Fairbanks. The geotechnical work during the year consisted mainly of condemnation drilling to ascertain where to locate a mill, tailings pond, and other support facilities for a proposed mine (fig. 18). Bulk sampling tests designed to assist in milling design continued (fig. 19). Fairbanks Gold reports that the Fort Knox deposit contains 99,520 kg (3.2 million oz) gold in proven and probable categories within about 113 million tonnes (125 million tons) of granite-hosted ore. The Fort Knox deposit is located on Alaska State lands where reclamation laws are rigorously enforced. During 1991 Fairbanks Gold reclaimed former exploration trenches and mine pits (figs. 20 and 21).

Late in the year Amax Gold Inc. announced its intention to purchase all assets of Fairbanks Gold Ltd. in a stock transfer worth about $150 million.




I NORTHERN REGION
1. Arctic Slope Consulting Gr.
Deadfall syncline—coal marketing studies, fire testing

II WESTERN REGION
2. Alaska Gold Co.
Nome district—placers, thaw-field drilling
3. Central Alaska Gold Co.
Nixon Fork deposit—airstrip/surface condemnation studies

III EASTERN INTERIOR REGION
4. Fairbanks Gold Mining Ltd.
Fort Knox deposit—geotechnical and condemnation drilling
5. Usibelli Coal Mine Inc.
Healy Clean Coal Project

IV SOUTHCENTRAL REGION
6. Cambior Alaska
Valdez Creek—stream diversion project
7. Hobbs Industries Inc.
Evan Jones mine site bonding, road access studies
8. Idemitsu Alaska
Wishbone Hill—engineering design, environmental studies
9. Diamond Chuitna
Beluga Coal Field—market studies

VII SOUTHEASTERN REGION
10. Kennecott Greens Creek Mining Company
Greens Creek—mill studies, reserve development

Figure 17. *Selected mineral development projects.*

Amax Gold plans to continue development work on the property, acquire necessary permits, conduct environmental assessments, and proceed toward production in late 1994 or early 1995. Mine development costs are estimated at $200 million. A work force of 250 would produce 9,330 kg (300,000 oz) gold annually, more than double Alaska's current gold production.

Development work was reported at many of the placer mines in the Interior. In the Circle district Stan Gelvin of Greenhorn Mining Co. and Steve Weber of Magic Circle Mining stripped overburden on Ketchum Creek preparing for mining in 1992. James Wilde reported stripping activity and some



Figure 18. *Drilling equipment at Fort Knox deposit near Fairbanks. Most of the drilling on the property in 1991 was condemnation drilling carried out so that future mining activity would not be compromised by the mine's infrastructure. (Photo by Fairbanks Gold Ltd.)*

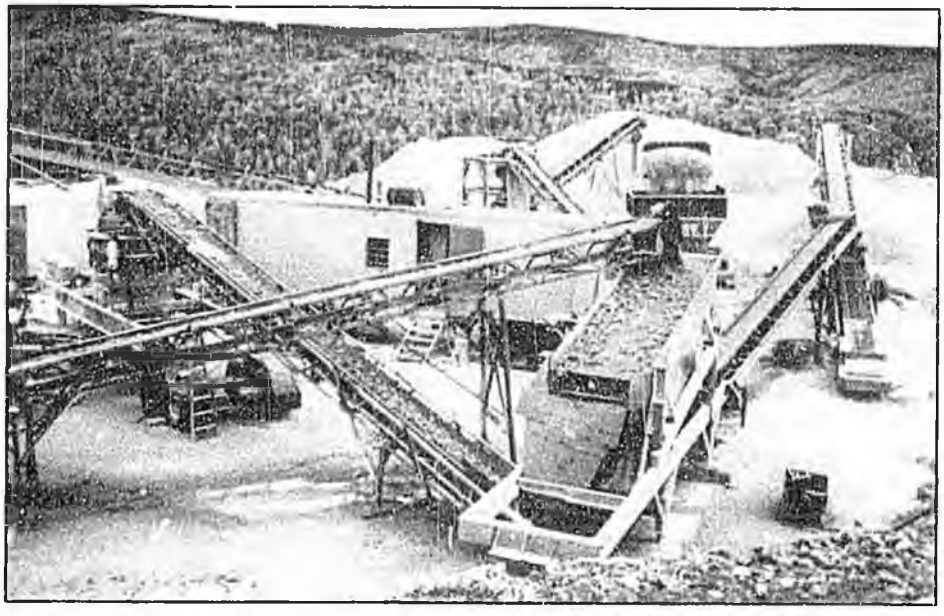


Figure 19. *Sampling conveyor and tower system used to evaluate bulk samples from Fort Knox deposit near Fairbanks. A local firm, H&H Contractors, operated the sizing and classifying equipment. (Photo by Fairbanks Gold Ltd.)*

reclamation on Switch Creek. Charles Cleveland constructed a bypass ditch on Harrison Creek.

In the Manley area Ed Salter stripped overburden on Joe Bush Creek. In the Fortymile area Charles Hammond of Fortyfive Pup Mining stripped ground on Fortyfive Pup Creek.

In the Fairbanks mining district Cooks Mining used a D9-L Caterpillar to strip 3-4 m (10-15 ft) of overburden on Deep Creek near the mouth of Fairbanks Creek. Roberts Mining continued drift mining and drift development on Dome Creek. Ray Vogt of RCL Mining reported development on Dome Creek, removing ice and muck from old workings. Earl Voytilla began drift mining on the right limit of Dome Creek using a road header rather than drilling and blasting.

In southwest Alaska, the Fullerton family performed development work in the old tailings on Flat Creek in the Iditarod district. Paul Sayer of Little Creek Mine stripped overburden on Little Creek near Ophir.

R.H. Hanson Inc. conducted extensive tests on clay-rich pay zones at its Goodnews Bay placer platinum properties and constructed flotation cells to improve platinum metal recovery. Previous operators determined that significant platinum remained in the clay-rich tailings. Dave Penz experimented with new water-recycling technologies at his Kako Creek Mine in the Marshall district (fig. 22).

In southcentral Alaska, Cambior Alaska constructed a major diversion ditch at its Valdez Creek Mine to channel the water around the openpit operations that are progressing up the valley. The diversion cost about $6.9 million, was completed in late spring of 1991, and full-scale mining resumed. Development activity at the mine consisted of a substantial reverse-circulation drill program and stripping of overburden.

Similar activity was reported by several other placer mining companies operating in Southcentral. Randy Elliot reported overburden removal at McCarthy. Ed Ellis's company Lake Creek Placers, evaluated conglomerate reefs in the Kenai Group rocks at Lake Creek in the Yentna Tertiary Basin. Gary McCarthy of Girdwood Mining Co. reported bulk sampling of placer ground

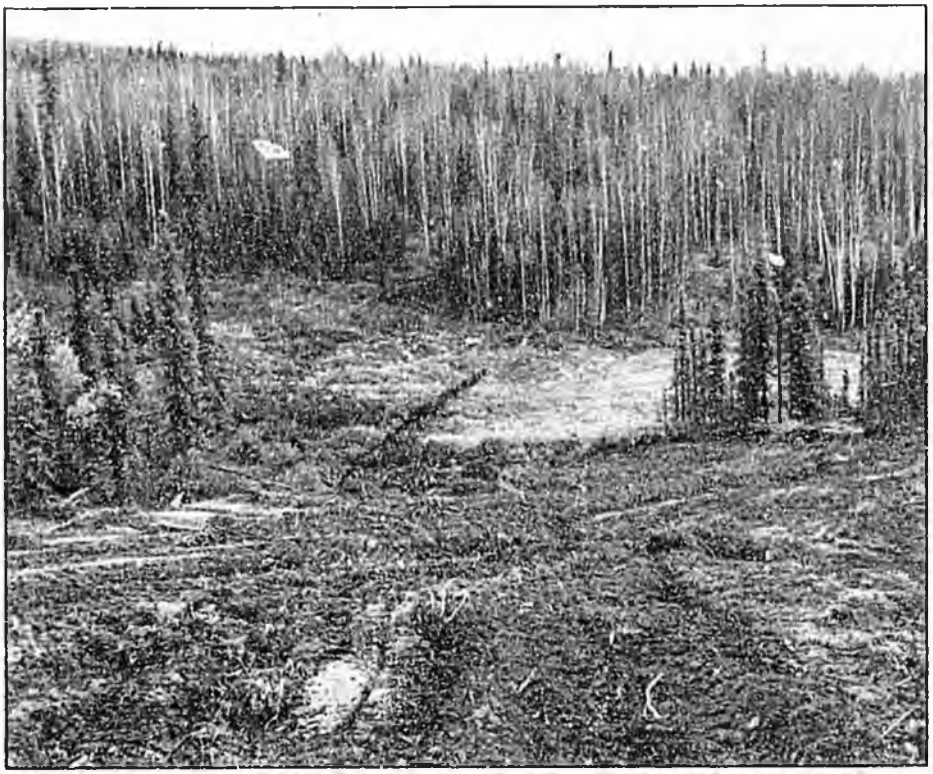


Figure 20. *Reclamation work in Nugget Creek, Fairbanks district, by Fairbanks Gold Inc. The company has filled in trenches and open pits and reseeded the area. Newly enacted State regulations require reclamation of all mined land in Alaska. (Photo by Fairbanks Gold)*

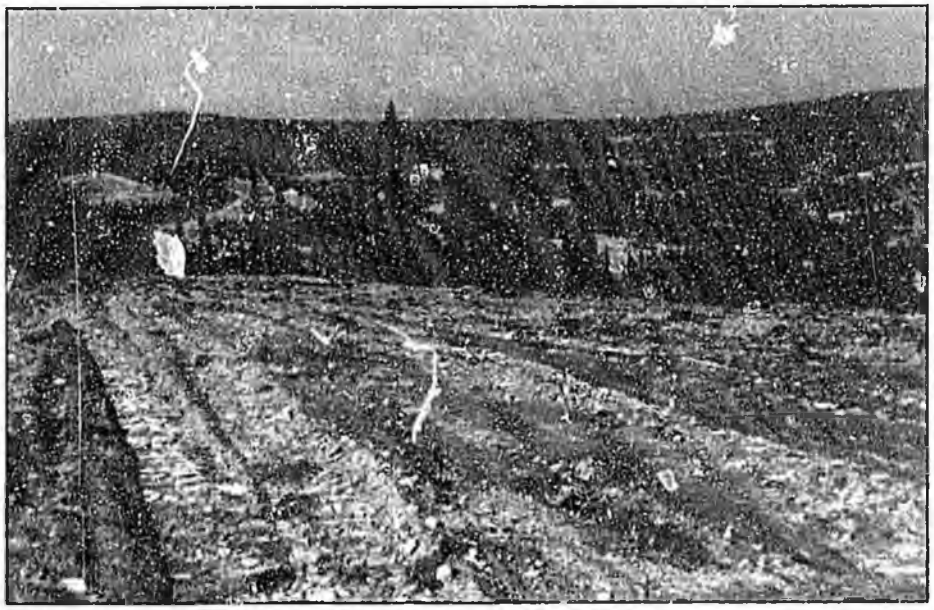


Figure 21. *A large exploration trench has been filled-in east of Melba Creek. Monte Cristo Creek near the Fort Knox deposit. (Photo by Fairbanks Gold Inc.)*

at Girdwood. Kevin Thompson of Gold Tech Resources Inc. reported development work in the Valdez Creek and Pass Creek drainages east of Cantwell.

Even though bears tried to share the kitchen table, Arne Murto of Finnbear Mining Co. Inc. managed to do further evaluation of precious and platinum-group metal placers in the Kahiltna River drainage.

There was no development activity on the Alaska Peninsula in 1991. In southeast Alaska, Jerry Fabrizio of Snow Lion Mining Co. reported stripping of vegetation and doing some testing on Porcupine Creek.

Kennecott Greens Creek Mining Company continued development on Greens Creek Mine west of Juneau, where more than 1,830 m (6,000 ft) of drifting now provides access to the greatly expanded ore reserves identified by drilling in the past two years. Pending approval from the U.S. Forest Service, the company also intends to upgrade the milling facility at the mine in the near future.

## COAL

In spite of political and economic problems coal development was reported in northern, eastern interior, and southcentral Alaska in 1991.

In northern Alaska the Arctic Slope Consulting Group conducted extensive coal marketing studies as part of its proposed development of the Aluaq Mine in the Deadfall syncline area near Cape Beaufort. In 1991 the Alaska legislature awarded $2 million to Arctic Slope Regional Corporation to continue exploration and feasibility studies. During the year bulk samples were shipped to facilities in Pennsylvania and Taiwan for testing. Export market possibilities include the Far East and Europe via a northern Arctic Ocean sea route.

In interior Alaska, Usibelli Coal Mine Inc. along with five other private and public organizations continued to work on the Healy Clean Coal Project (HCCP). The HCCP plant is estimated to cost $194 million, with about 50% of the cost to be supplied through a U.S. Department of Energy grant. The Alaska Industrial Development and Export Authority administers the State's investment.

Usibelli Coal Mine will provide the coal and Golden Valley Electric Association will purchase the power

from HCCP. The project will begin construction in spring 1993, with startup testing of plant facilities scheduled for late 1995. When completed, the HCCP plant will generate 50 megawatts of electric power using state-of-the-art technologies designed to reduce sulfur, nitrogen, and particulate matter emissions.

In southcentral Alaska there was coal development work in both the Beluga and Matanuska Valley coalfields. Diamond Chuitna continued development and fulfillment of permit requirements for its 299-million-tonne (330-million-ton) coal reserve in the Beluga coalfield, northwest of Cook Inlet. Diamond Chuitna continues to examine potential Asian market opportunities for its subbituminous coal, which contains heating values and physical characteristics similar to coal produced by Usibelli Coal Mine.

During the last three years, Idemitsu-Alaska Inc. has conducted extensive development of its proposed surface coal mine and conducts ongoing environmental studies. The company continued reserve evaluation drilling, engineering design, and environmental studies at its Wishbone Hill Coal Mine northeast of Palmer in the Matanuska Valley (fig. 23). In September 1991, Idemitsu-Alaska Inc. acquired the requisite State coal-mining permit for the proposed operations. The Wishbone Hill project has been negatively affected by the Mental Health Lands litigation. Although the Asian market opportunities for steam coal have recently declined, markets are expected to improve later in the decade. Idemitsu-Alaska anticipates that mine construction could begin in 1994 or early 1995 if pending legal issues can be resolved. The mine plan calls for production of up to 1.36 million tonnes (1.5 million tons) of high-quality bituminous coal annually, employing a year-round work force of 150-200.

Farther up the Matanuska Valley, Hobbs Industries Inc. delayed development of the Castle Mountain Mine because of the Mental Health Lands injunction and the loss of an important market. The market loss was caused by the Federal government's termination of a radar site near Glennallen which would have used Castle Mountain coal for its power plant. Following this delay, Hobbs began development of the nearby Evan Jones Mine. A new portal pad was constructed during 1991 and a multiplate culvert-type portal was placed at the face of the Number-3 coal seam. By year's end, a tunnel 24 m (79 ft) long was driven using a Joy 12CM5 "continuous miner." Issues to be settled before Hobbs can put a mine into production include road access, bond payments, and market assurance.

## INDUSTRIAL MINERALS

The only reported development of any sand or gravel resources was in southeast Alaska. A small amount of stripping of overburden was done at the Ludwig pit, along the Juneau-Douglas Highway near Juneau.

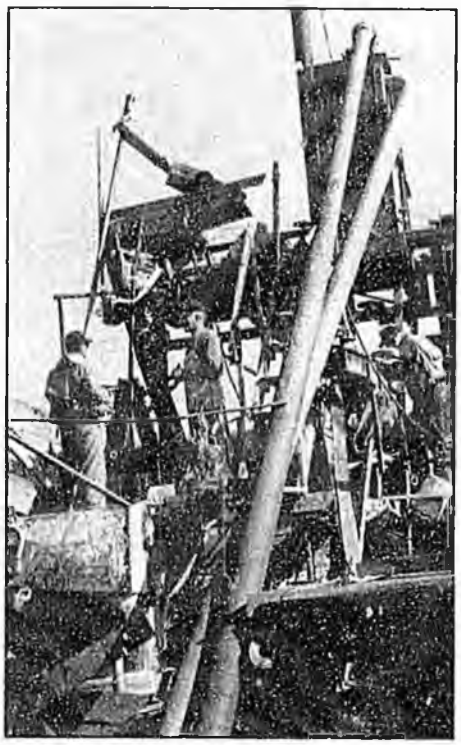
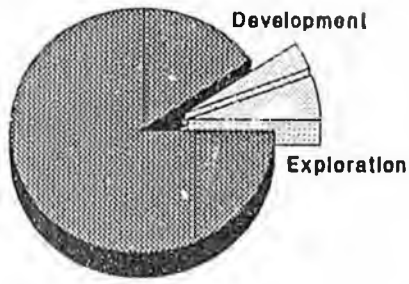


Figure 22. *Dave Penz explains his gold recovery plant to DGGS geologist Jeff Kline at his Kako Creek Mine near Russian Mission. Like many Alaskan placer miners, Penz strives to reduce water use to more easily comply with State and Federal water-quality standards. (Photo by T.K. Bundtzen)*



Figure 23. *Consulting biologists use a mild shocking technique to evaluate the effects of mineral development on the number of coho salmon in the habitat near the proposed Wishbone Hill coal mine. (Photo by McKinley Mining Consultant)*

# PRODUCTION




*Production volume increased from Alaska metallic mines although low metal prices hurt profitability. A net loss of sixteen placer mines occurred in the year; the industry awaits better gold prices. Alaska has become a major producer of zinc, lead, silver, and gold.*

The value of mineral production in 1991 is estimated to total $546.5 million, an increase of 3% above the 1990 level of $533 million, and 98% more than the $277 million produced in 1989 (table 7). Estimated percentage of the total gross value of mineral production for each commodity is zinc 51%, gold 16%, sand and gravel 8%, silver 7%, coal 7%, lead 6%, and all other commodities 5% (fig. 24). Mineral production statistics, as summarized in table 7, originated from approximately 275 coal, placer, and lode metal mines, and sand and gravel and stone quarries and pits that were operated in every region of the State (fig. 25).

Our production estimates are based on data compiled from 177 questionnaires returned by companies, individuals, Native corporations, and government agencies; phone conversations with 19 sand, gravel, peat and stone quarry operators; regional summaries provided by the U.S. Forest Service and Alaska Department of Transportation and Public Facilities; and bullion sale volume estimates from selected precious metal refiners. Figures 26, 27, and 28 illustrate the history of the production of gold, sand and gravel, and coal. Annual production estimates for 10 metals and four nonmetallic and undifferentiated commodities are summarized in appendixes F and G. These tables show that Alaska has produced a variety of mineral commodities for over 100 years.

Metals have dominated mineral production for the last five consecutive years. The value of metals in 1991 accounted for 80% of total Alaskan mineral product value. A single commodity—zinc—dominated and accounted for 51% of the total dollar value. Gold came in second in value, but its extraction still employs the most people—1,240 or one of three mining jobs. The dominance of zinc can be attributed to production of sulfide concentrates from the Red Dog Mine in northwestern Alaska and the Greens Creek Mine on Admiralty Island. These two properties accounted for about 57% of U.S. domestic mine output of zinc, helping the country to reduce the net import reliance of this metal from 61% in 1989 to about 45% in 1991. However, lower zinc prices nearly negated the large increase in production volume.

Silver again sparkled in the sulfide concentrates of both the Red Dog and Greens Creek Mines, but low prices reduced its luster. The 281 tonne total (9,076,854 oz) accounted for nearly 16% of U.S. mine production of silver, but average bullion prices dropped by 21% from 1990 levels. When inflationary factors are considered, the 1991 average price of just over $0.14/g ($4.06/oz) is near historical lows.

Lead production, although considered a byproduct of production at the Red Dog and Greens Creek Mines, amounted to about 13% of the nations total mine output. The 28% price drop for lead that took place from 1990 to 1991, however, severely compromised the 57% increase in volume of metal from both mines.

In 1991, at least temporarily, gold mines reversed the significant downhill trend of 1989 to 1990. An estimated 202 placer and two lode mines produced 7,585 kg (243,000 oz) gold, a 5% increase in volume from the 1990 season. But because of lower prices, there was a slight decrease in value from $89.2 million in 1990 to $88.3 million in 1991. Resumption of full-scale operations by Cambior Inc. at Valdez Creek accounted for virtually all of the gold production increase. In fact, there was a net loss of 16 placer mine operations statewide, with the hardest hit areas being the western and eastern interior regions (table 8).

The decline in operations reflects generally complex interacting factors such as: (1) declining easy-to-exploit reserves in key districts such as Circle, Livengood, Bonnifield, and Manley-Eureka; (2) an 8% price decline at a time when the gold price was already considered soft (this factor mainly affected high-cost, large-scale producers who produce gold with significantly higher capital costs and energy consumption); and (3) increasing regulatory oversight concerning water quality, reclamation, and access issues that tend to add costs to operations already being negatively affected by decreasing gold prices.

The 10 largest Alaskan gold producers are (not necessarily in order) Cambior Alaska, Kennecott Greens Creek Mining Company, Alaska Gold Company, Polar Mining, NYAC Mining Company, Alaska Placer Development, Sphinx America, Thurman Oil and Mining, Rosander Mining Company, and GHD Resources. These companies produced an estimated

4,380 kg (138,900 oz) gold or 57% of the statewide total.

In previous years the 10 largest producers accounted for 49% (1990), 61% (1989), 59% (1988), and 58% (1987) of total gold output. The results in 1991 were fairly typical of the gold distribution of the industry. In 1991 lode gold accounted for 15% of the total output whereas placer sources accounted for the remaining 85%. The Alaska gold industry remains dominated by placer sources operated by relatively small, rural-based firms.

The mean average output for an average Alaska gold mine in 1991 was 37 kg (1,195 oz) compared to 28 kg

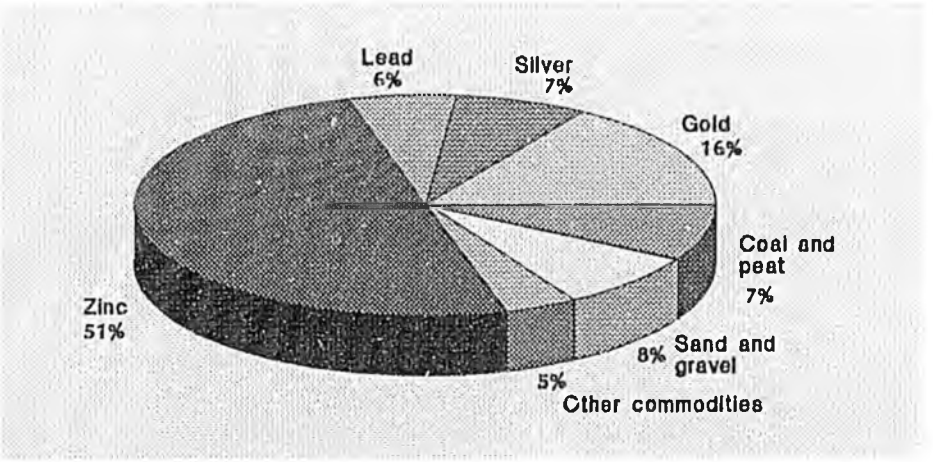



Figure 24. *Relative percentages of estimated mineral production in Alaska, 1991.*

Table 7. *Estimated mineral production in Alaska, 1989-91*[a]

| | Quantity | | | Estimated values[b] | | |
|---|---|---|---|---|---|---|
| | 1989 | 1990 | 1991 | 1989 | 1990 | 1991 |
| Metals | | | | | | |
| Gold (ounces) | 284,617 | 231,700 | 243,900 | $108,723,694 | $ 89,204,000 | $ 88,291,800 |
| (kilograms) | 8,852 | 7,206 | 7,585 | | | |
| Silver (ounces) | 5,211,591 | 10,135,000 | 9,076,854 | 27,360,852 | 50,675,000 | 39,114,490 |
| (kilograms) | 162,102 | 315,199 | 281,382 | | | |
| Platinum (ounces) | W | -- | 15 | W | W | 5,325 |
| (grams) | W | -- | 465 | | | |
| Lead (tons) | 9,585 | 44,220 | 69,591 | 7,672,009 | 30,954,000 | 33,403,680 |
| (tonnes) | 8,698 | 40,106 | 63,119 | | | |
| Zinc (tons) | 19,843 | 181,200 | 278,221 | 29,383,400 | 253,680,000 | 278,221,000 |
| (tonnes) | 18,007 | 164,350 | 252,346 | | | |
| Mercury (pounds) | W | -- | -- | W | -- | -- |
| Tin (pounds) | 194,000 | 57,000 | 6,800 | 672,000 | 200,000 | 22,100 |
| (kilograms) | 87,988 | 25,855 | 3,084 | | | |
| Subtotal | | | | $173,811,955 | $424,713,000 | $439,058,395 |
| Industrial minerals | | | | | | |
| Jade and soapstone (tons) | 57.0 | W | 16.0 | $ 1,140,000 | $ W | $ 12,000 |
| (tonnes) | 51.7 | W | 14.5 | | | |
| Sand and gravel (million tons) | 14.4 | 15.0 | 14.2 | 39,875,000 | 40,821,500 | 45,448,512 |
| (million tonnes) | 13.1 | 13.6 | 12.8 | | | |
| Building stone (million tons) | 2.9 | 3.2 | 3.0 | 20,340,000 | 22,100,000 | 22,500,000 |
| (million tonnes) | 2.6 | 2.9 | 2.7 | | | |
| Subtotal | | | | $61,355,000 | $62,921,500 | $67,960,512 |
| Coal (tons) | 1,452,353 | 1,576,000 | 1,540,000 | $ 41,464,800 | $ 44,990,000 | $ 39,000,000 |
| (tonnes) | 1,317,574 | 1,429,000 | 1,396,780 | | | |
| Peat (cubic yards) | 51,000 | 65,000 | 75,000 | 352,000 | 400,000 | 450,000 |
| (cubic meters) | 38,995 | 49,699 | 57,345 | | | |
| Subtotal | | | | $ 41,816,800 | $ 45,390,000 | $ 39,450,000 |
| TOTAL | | | | $276,983,755 | $533,024,500 | $546,468,907 |

[a]Production data from DGGS questionnaires, phone interviews with mine operators, Alaska Department of Transportation and Public Facilities, and other sources.
[b]Values calculated from 1991 annual price averages of gold ($362/oz), zinc ($0.50/lb), lead ($0.24/lb), platinum ($355/oz), and tin ($3.25/lb) as published in the "Mining Journal"; other values supplied directly by mine operators. Coal-value estimates provided by mine operators.
-- = Not reported.
W = Withheld.

(892 oz) in 1990, 35 kg (1,143 oz) in 1989, and 40 kg (1,282 oz) in 1988. These fluctuations of average gold volumes reflect the rise and fall of production from a few major operations. For example, when the Valdez Creek Mine remained dormant for most of 1990, the average gold output dropped 22%; when it resumed operation in 1991, the average gold output jumped back up to previously established levels.

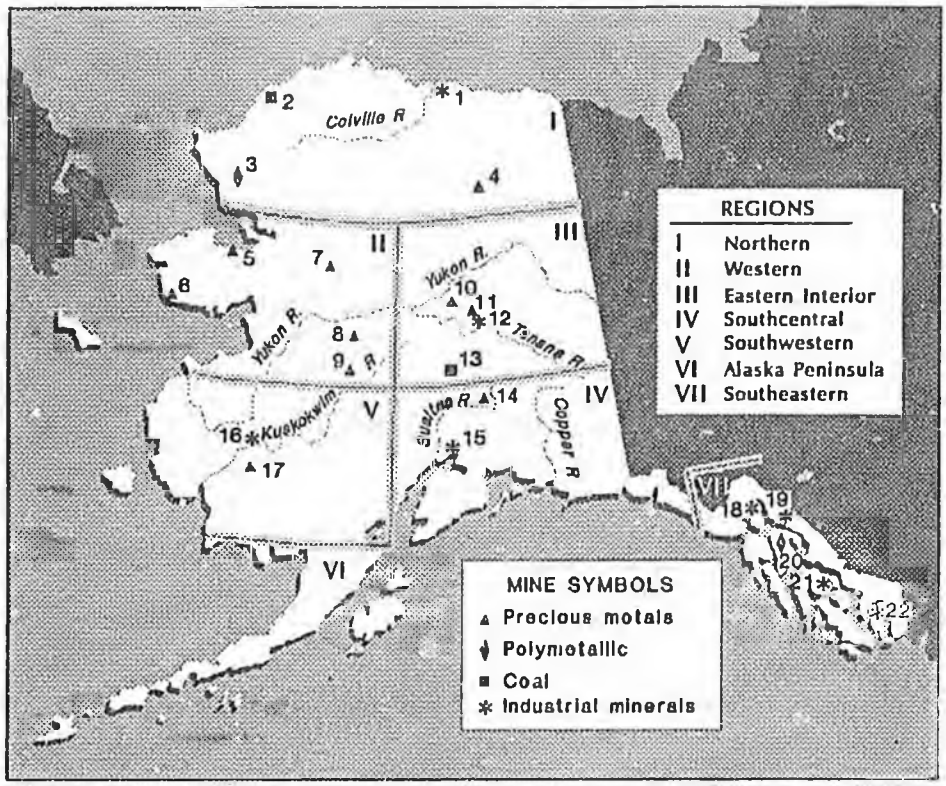
Unit-cost data of selected placer mines for 1989-91 is summarized in table 9. These figures are based on company estimates of the cost of producing an ounce of gold during the 1989-91 seasons. Although the mine population represents only 12% of the total mechanized placer mines in the three calendar years (79 cost-data estimates, 640 total mines in operation), the same general trends occurred in all three years. The largest producers continue to have higher costs than the medium- or smaller-scale producers. The average cost to produce gold during 1989-91 was $10.86/g ($338/oz).

## METALS

### Northern Region

From August to the close of the shipping season on October 8, 1991, Cominco Alaska Inc. shipped to market 69,463 tonnes (76,585 tons) lead concentrate, 372,508 tonnes (410,704 tons) zinc concentrate, and 30,942 tonnes (34,115 short tons) ISF composite metal concentrates milled from approximately 1.99 million tonnes (2.2 million tons) of massive sulfide ore at the Red Dog Mine in northwestern Alaska. The 472,913 tonnes (521,404 tons) of concentrates is 62% more than the 291,782 tonnes (321,700 tons) shipped during the mine's first year in 1990. Cominco indicates that 1992 production will be about the same as 1991.

Red Dog is a stratiform deposit, probably SEDEX (sedimentary exhalative) type, hosted in shale, and containing zinc, lead, and silver. It lies 145 km (90 mi) north of Kotzebue in the De Long Mountains of the northwestern Brooks Range. The mine is owned by




**I NORTHERN REGION**

Metallic mines 14
Industrial mineral producers 3

1. Sagavanirktok, Kuparuk, and Prudhoe Units (gravel site)
2. Aluaq Mine (coal)
3. Red Dog Mine(lead-zinc-silver)
4. Chandalar Development Inc. (gold)

**II WESTERN REGION**

Metallic mines 35
Industrial mineral producers 2

5. GHD Resources (gold)
6. Alaska Gold Co. (two gold dredges)
7. Taiga Mining/Hogatza (gold)
8. Sphinx America (gold)
9. Rosander Mining (gold)

**III EASTERN INTERIOR REGION**

Metallic mines 105
Industrial mineral producers 13

10. Alaska Placer Development (gold)
11. Polar Mining Co., Thurman Oil & Mining (gold)
12. Fairbanks Sand and Gravel and Earthmovers (gravel)
13. Usibelli Coal Mine Inc. (coal)

**IV SOUTHCENTRAL REGION**

Metallic mines 22
Industrial mineral producers 11

14. Valdez Creek Mine (gold)
15. Palmer/Wasilla area (gravel pits)

**V SOUTHWESTERN REGION**

Metallic mines 25
Industrial mineral producers 3

16. Chuathbaluk (gravel)
17. NYAC Mining Co. (gold)

**VII SOUTHEASTERN REGION**

Metallic mines 4
Industrial mineral producers 7

18. Red Samni Construction (gravel)
19. Hildre Sand and Gravel (gravel)
20. Greens Creek Mine (zinc, silver, gold, lead)
21. U.S. Forest Service (rock)
22. Ketchikan Gateway Borough (rock)

Figure 25. *Location of principal gold mining camps, coal mines, and industrial mineral sites in Alaska, 1991. The total number of metallic mines and industrial mineral producers is given for each region.*

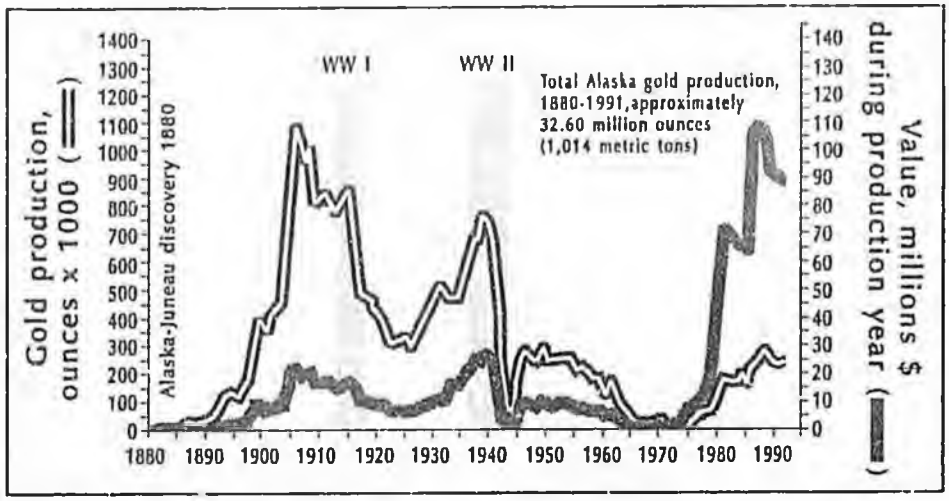



Figure 26. *Gold production in Alaska, 1880-1991.*

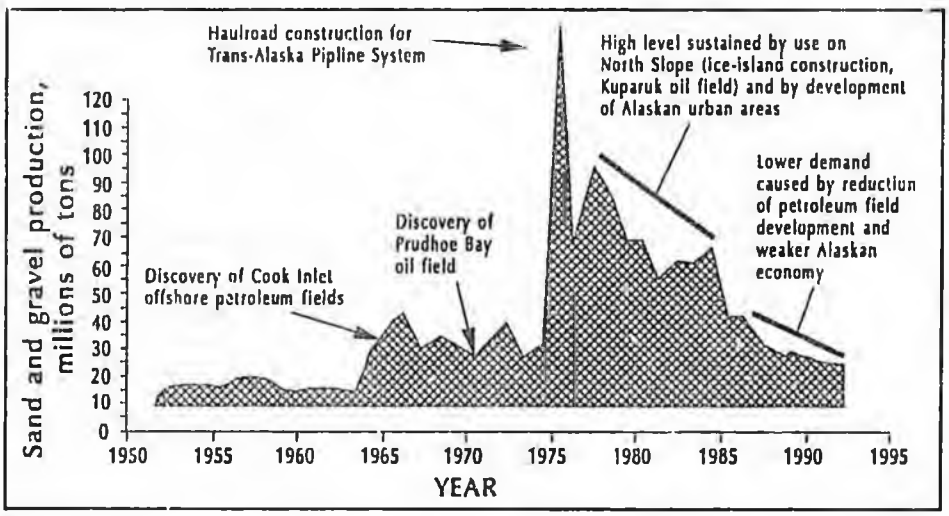



Figure 27. *Sand and gravel production in Alaska, 1950-91.*

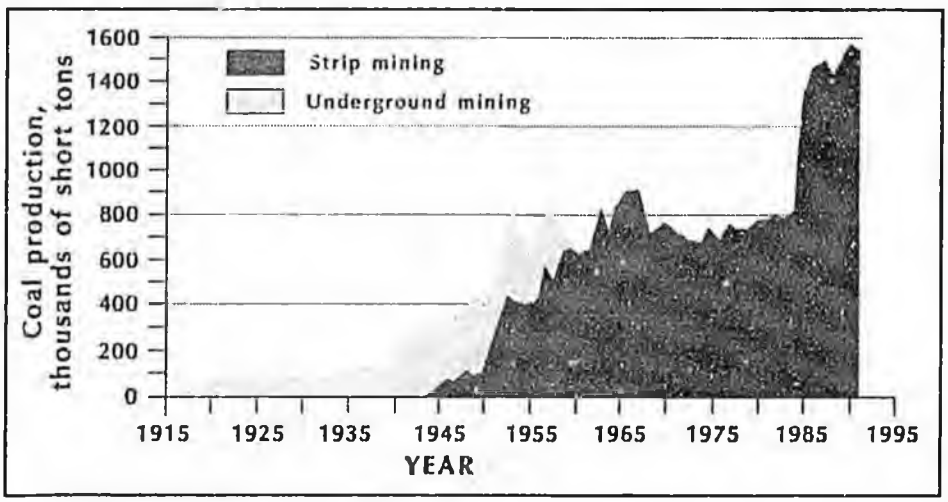



Figure 28. *Coal production in Alaska, 1915-91.*

NANA Regional Corporation and leased to Cominco, which owns and operates the mining and processing facilities. NANA is paid a royalty which will increase after the capital investment plus interest is recovered by Cominco. The mine development, which was carried out from 1987 to 1989, cost $415 million and involved the cooperation of the owner (NANA Corporation), the mine operator (Cominco), and the State of Alaska. The State financed the De Long Mountains transportation system, which is administered by the Alaska Industrial Development and Export Authority. The system includes the port near Kivalina as well as the 83 m (52 mi) mine road. About 265 employees mine and mill year round. More than half the workers are permanent residents and shareholders of the NANA Corporation.

According to Cominco's statistical summaries, the Red Dog deposits contain measured and indicated reserves of about 59 million tonnes (65 million tons) grading 18.5% zinc, 5.4% lead, and 82 g/tonne (2.4 oz/ton) silver, and an additional inferred reserve amounting to 14.5 million tonnes (16 million tons) grading 10% zinc, 2.7% lead, and 41 g/tonne (1.2 oz/ton) silver. A large and significant, but presently unrecoverable, barium resource also exists at the mine site. The nearly flat, shallow ore bodies are being mined with opencut mining methods.

Ore is milled near the mine and concentrates are trucked to the port site near Kivalina on the Chukchi Sea 84 km (52 mi) from the main camp. During a 108-day shipping season Foss Maritime Inc. of Seattle barged concentrates from shallow port-site waters to 11 ocean-going ore carriers that ranged in capacity from 25,000 to Panamax-class 60,000 tonnes. The ore carriers deliver concentrates to customers in Japan, Korea, Europe and to trains bound for the refining facility in Trail, British Columbia.

Like many base-metal producers worldwide, Cominco suffered from low product prices that averaged about $0.52/lb zinc in 1991. However, by the end of the fourth quarter of 1991, zinc

prices began to improve, which should boost Cominco's operational profitability at Red Dog in 1992.

Cominco has been experiencing problems with metallurgical recovery from the Red Dog deposit because of the complex nature of ore mineralization. These problems resulted in a significant net reduction of the amount of silver recovered from concentrates in 1990 and 1991. Cominco will implement technology that separates the different ores and will process each ore separately through the mill circuits.

All other metallic production from the northern region originated from placer gold mines in the Wiseman, Chandalar, and Kobuk River areas. Thirteen placer companies produced 183 kg (5,900 oz) of gold worth $2.12 million and employed 35 seasonal workers.

Paradise Valley Inc. (Mick and Cecilia Manns) again mined and extracted gold from an opencut mining operation on Flat Creek east of Wild Lake in the central Brooks Range. The ground is shallow and thawed and is expected to yield substantial quantities of gold in future years. Paradise Valley also operates a recreational mining enterprise that offers up to 100 recreational miners a two-week adventure panning for and recovering gold, which somtimes includes coarse nuggets.

Chandalar Development Corporation mined Tobin Creek for the second consecutive year in the historic Chandalar district east of the Trans-Alaska pipeline corridor (fig. 29). Six people worked for 148 days, using a dry-land jig recovery plant, similar to those installed aboard modern dredges. In 1991 Chandalar was the largest gold producer in the northern region for the second consecutive year.

Inside-Out Mining (Paul Dionne) spent 10 months in an underground drift operation on Nolan Creek in the Wiseman district north of Bettles. Inside-Out Mining worked the pay using low-profile excavating equipment, and stockpiled pay for summer sluicing. One unique feature of the operation is the discovery of large nuggets using a metal detector.

Frank and Vivian Willford continued their activities in the Koyukuk-Nolan district as they have in past years. In October 1991, an unknown arsonist burned down their cabin, shop, and woodshed, which will cause costly delays for the 1992 season.

Don Knutson and Mary McKinstry hand-mined placer gold on Smith Creek in the Nolan-Wiseman area.

Other placer mine operators who produced gold include Glenn Bouton (Middle Fork, Koyukuk River. Koyukuk-Nolan district); Mascot Mining Inc. (Vermont Creek, Koyukuk-Nolan district); Bill Nordeen (Emma Creek, Koyukuk-Nolan district); Light Mining (Nolan and Acme Creeks, Koyukuk-Nolan district); Mike Shupe (Boulder Creek, Chandalar district); Mitch Fleming (Myrtle Creek, Wiseman area); and Tricon Mining (Archibald Creek, Koyukuk-Nolan district).

Table 8. *Reported refined gold production, number of operators, and industry employment in Alaska, 1990-91*

| Region | Number of operators | | Production in ounces of gold | | Number of employees | |
|---|---|---|---|---|---|---|
| | 1990 | 1991 | 1990 | 1991 | 1990 | 1991 |
| Northern | 11 | 13 | 4,750 (148 kg) | 5,900 (183 kg) | 55 | 55 |
| Western | 42 | 35 | 79,100 (2,460 kg) | 56,100 (1,744 kg) | 400 | 295 |
| Eastern interior | 115 | 105 | 78,480 (2,441 kg) | 73,600 (2,288 kg) | 495 | 490 |
| Southcentral | 20 | 22 | 16,670 (518 kg) | 55,070 (1,712 kg) | 160 | 265 |
| Southwestern | 26 | 25 | 14,400 (448 kg) | 15,650 (487 kg) | 100 | 105 |
| Southeastern | 4 | 4 | 38,300 (1,191 kg) | 37,560 (1,168 kg) | 135[a] | 170[a] |
| **TOTAL** | **218** | **204** | **231,700 (7,206 kg)** | **243,880 (7,585 kg)** | **1,325** | **1,380** |

[a]Assumes that only 60 percent employment levels at Greens Creek project (other 40 percent assumed to base metal production).

Table 9. *Production costs for selected Alaskan placer gold mines, 1989-91*

| Mine size | 1989 | 1990 | 1991 | 1989 | 1990 | 1991 |
|---|---|---|---|---|---|---|
| | Number of mines | | | Production in ounces | | |
| Small[a] | 11 | 8 | 21 | 2,977 | 1,856 | 3,582 |
| Medium[b] | 5 | 11 | 8 | 6,461 | 12,132 | 8,431 |
| Large[c] | 5 | 5 | 5 | 98,816 | 54,497 | 84,539 |
| **TOTAL** | **21** | **24** | **34** | **108,254[d] (3,359 kg)** | **68,485[e] (2,124 kg)** | **96,552[f] (3,002 kg)** |
| | Unit cost/ounce | | | Total reported mine cost | | |
| Small[a] | $263 | $302 | $284 | $ 784,177 | $ 560,600 | $1,018,606 |
| Medium[b] | 238 | 273 | 298 | 1,538,000 | 3,314,000 | 2,518,239 |
| Large[c] | 324 | 348 | 376 | 31,972,300 | 18,990,000 | 31,857,228 |
| **TOTAL** | **$317** | **$333** | **$366** | **$34,294,477** | **$22,864,600** | **$35,394,073** |

[a]25-650 oz gold/yr
[b]650-2,500 oz gold/yr
[c]>2,500 oz gold/yr
[d]43% total placer gold.
[e]36% total placer gold.
[f]46% total placer gold.

## Western Region

The western region has dominated statewide gold production for nearly a

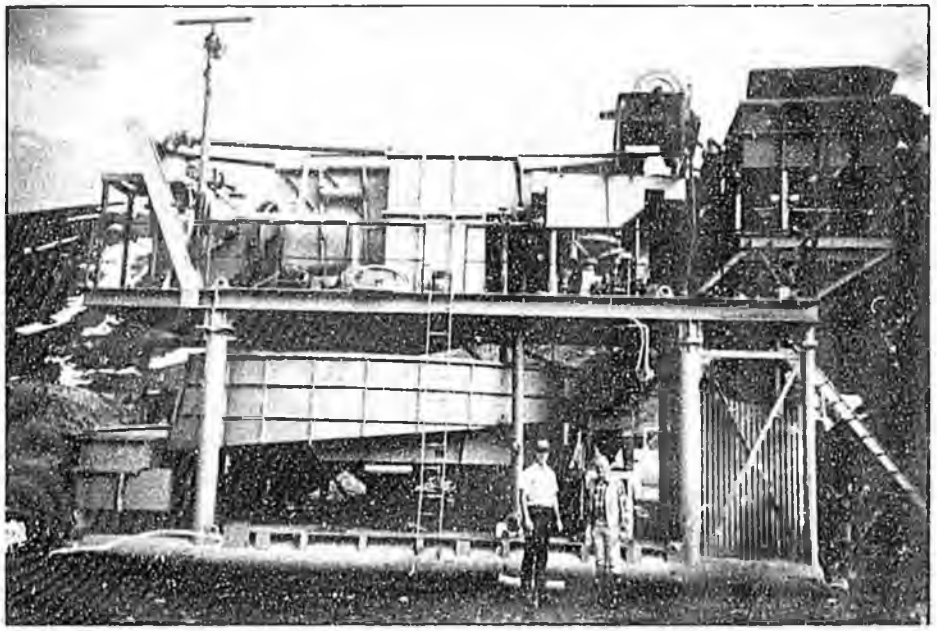


Figure 29. *Odin Strandberg Jr. and Del Ackels with HIC jig plant, that was freighted up the pipeline haul road into the Chandalar district during the 1990-91 winter season. (Photo by Eskil Anderson)*

decade. The strength of the region's gold mining industry was based on large onshore and offshore dredge and non-float placer mines in the Nome district. However, such dominance ended in 1991 when Westgold's Bima offshore dredge and the opencut mines of Anvil and Windfall Mining Companies ceased operations. The decrease in gold mining activities was precipitous—production dropped from 2,460 kg (79,100 oz) in 1990 to 1,744 kg (56,100 oz) in 1991, a decline of 29%. Employment in the region's gold mines dropped from 400 in 1990 to 295 in 1991, a loss of 105 seasonal jobs, mainly for the Nome area. There was a net loss regionwide of seven placer mining operations.

However, in the Nome district one of the mainstays of Alaska's gold mining industry, Alaska Gold Company, continued to operate two Yuba onshore floating bucketline stacker dredges. Dredge 5 worked about 5 km (3 mi) northeast of Nome on the Monroeville Beachline where it is intersected by Dry Creek (fig. 30). Dredge 6 worked further westward along an ancient strandline known as the Submarine Beach immediately west of the Nome Airport. Both have 255 liter (9 ft³) capacity buckets with displacements of 3,084 tonnes (3,400 tons) for Dredge 5 and 1,868 tonnes (2,060 tons) for Dredge 6. The electric-powered motors that operate the dredges require approximately 1,520 kw which is supplied by Alaska Gold's 5,000 kw power plant. The power plant is integrated into the Nome power grid. The company supplied 75 year-round-equivalent jobs in Nome and produced 684 kg (22,000 oz) gold in 1991. The company plans to operate both dredges in 1992 and run one thaw-point field.

GHD Resources operated the Seward Peninsula's largest opencut placer mine for the company's final year at Kiwalik Flats in the Candle district near the village of Buckland. The placer deposit at Kiwalik Flats lies at the intersection of the ancestral channel system of Candle Creek and a series of strandline deposits. Some of the placer gold currently being mined was reworked along ancient marine strandlines. An eight-man crew stripped 11,464 m³ (15,000 yd³) of overburden and washed 53,500 m³ (70,000 yd³) of pay during 857 hours of sluicing activity. Because of the flaky nature of gold on the Kiwalik Flats, GHD installed a RAHCO jig plant in 1991 to improve recovery and determine the efficiency of conventional sluice-box operations of previous years. The 12.5 tonne (11.3 ton) plant was flown into Candle aboard a C-130 Hercules aircraft. The jig proved easy to assemble and operated trouble-free for the entire season. Fed at a rate of 38 m³ (50 yd³) per hour, there were no detectable gold losses. However, a large 6,117 m³ (8,000 yd³) bulk sample of tailings from the previous year's sluicing operation that was run through the jig plant yielded only minor amounts of gold, indicating that the standard sluice box operation of previous years was probably at least 90% efficient. GHD concluded that a well designed standard sluice box is sufficient to recover the fine flaky gold found on Kiwalik Flats and, perhaps, in other Alaska mining districts.

Other large operations worked the ancestral channel deposits of Candle Creek. Au Mining Inc. (Mike Vial) worked ground immediately behind Candle townsite, adjacent to a similar opencut, front-end-loader-fed operation of Clara Bet Inc. (fig. 31). Both companies employed an average of 10 workers during the 140-day mining season. Several miles upstream on the left limit of Candle Creek, Alan Olson and Victor Layer worked pay left over from previous drift mine activities. Frozen newspaper print dating back to the turn of the century was found in ice within the drift shafts. The Rheinhart-Berg partnership mined Mud Creek, another possible stream placer reworked along marine strandlines. Problems handling deep overburden continue to plague this mining operation.

For the last 17 years, Jack Hoogendorn has drift mined gravels underneath Pliocene basalt lava flows in the nearby Inmachuk district south of Deering. Hoogendorn mines by hand using limited, low-profile, rail-mounted equipment; pay stockpiled in the winter is sluiced in June and July (fig. 32). Hoogendorn's only concern for the year was an invasion of willow moths that denuded the underbrush throughout the Inmachuk River drainage. Willows are under attack throughout the State from several

species of insects. According to the U.S. Forest Service (1992), the rusty tussock moth populations increased to epidemic proportions throughout areas of the Kuskokwim River drainage and portions of the Seward Peninsula. Willow along the Yukon River was primarily defoliated by leaf and blotch miners, so-called because they "mine" the cells between the surfaces of the leaves. No other mine activity was reported from the Inmachuk area.

N.B. Tweet and Sons operated their small, 58 liter (2 ft³) bucket-capacity floating dredge in the Kougarok district north of Nome. This third-generation Alaska mining venture alternates annually between dredge operation and ground preparation, which requires thawing and stripping of overburden. Dick Creek Mining operated a small opencut placer on Dick Creek also in the Kougarok district. Cheryl Jong maintained a small scale mine effort on Washington Creek also in the Kougarok district.

Other Seward Peninsula placer mines that reported production include: Ed Hatch (Sweepstake Creek, Koyuk district); Homer Hoogendorn (Buster Creek, Nome district); D.B. Parent (Bear Creek, Koyuk district); Roger Nordlum (Candle Creek, Candle district); Swanson Mining (Dime Creek, Koyuk district); the Dozette and Gardner operations (Bear Creek, Koyuk district); Ed Schwoyer (Bluestone River, Port Clarence district); the Global Resources American Creek Dredge (Cripple Creek; Nome district) and Dave Gerke (Solomon district). Pat Bliss did not operate his 113 liter (4 ft³) bucketline dredge on the Ungalik River north of Unalakleet in 1991. This floating dredge last produced gold in 1987 or 1988.

Further east of the Seward Peninsula and into the Yukon River Basin, placer mining activities were maintained at about the same level as in previous years. Taiga Mining Company Inc. (Jerry Birch and Kevin Greenfield) again leased and operated the Alaska Gold Company Hogatza Dredge on Bear Creek of the Middle Koyu'uk River Drainage. This 170 liter (6ft³) bucketline, stacker dredge originally worked in the Livengood district, was transported to Hogatza by the USSR&M Company in the mid-1950s, and was operated continuously until 1975 and again from 1981 to 1983. During past production years the operation provided jobs to residents of Selawik, Huslia, and other villages in this remote area of the Alaska bush. Taiga reactivated the Hog River dredge two years ago and is working extensions of bench pay left by previous operators.

Flat Creek Mining Co. (Pete Haggland) mined on Federal claims on Flat Creek in the Ruby Mining district south

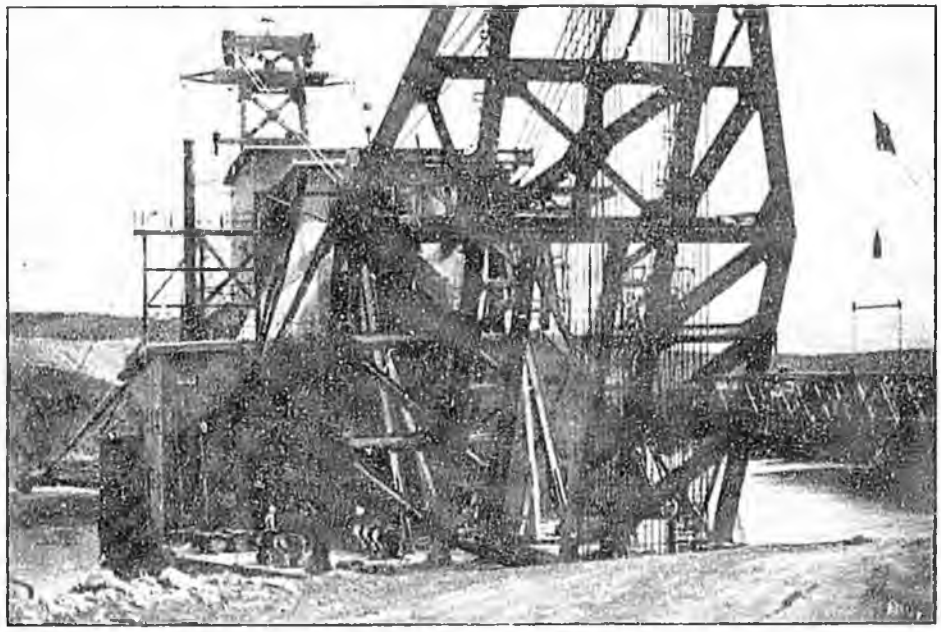


Figure 30. *Alaska Gold Company's Gold Dredge 5 working the Monroeville Beachline, an ancestral gold-bearing shoreline of the Bering Sea near Nome. (Photo by T.K. Bundtzen)*

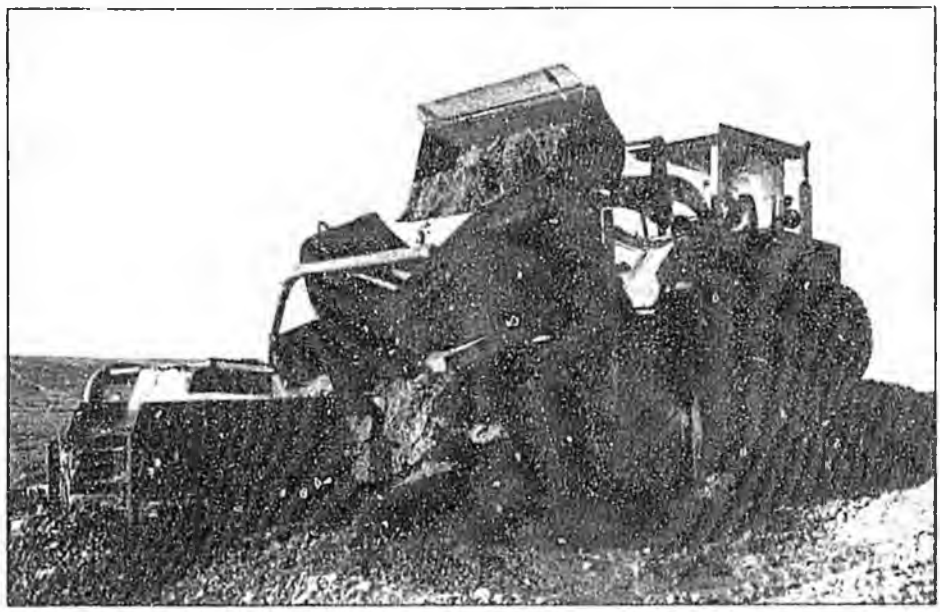


Figure 31. *Clara Bea Mining feeding-and-washing plant on the mine site at Candle bench, an ancestral channel system in the Candle district on the Seward Peninsula. (Photo by T.K. Bundtzen)*



Figure 32. *Jack Hoogendorn inspects the entrance to his underground drift mine on the right limit of the Inmachuk bench in the Inmachuk district near Deering on the Seward Peninsula. Jack covers the entrance to prevent the frozen gravels from thawing and caving during summer months. (Photo by T.K. Bundtzen)*

of the Yukon River (fig. 33). In this district, wind-blown loess buries many paystreaks, and the locations of some ancestral channels of major trunk streams in the Sulatna River drainage continue to elude mining firms.

Other operators active in the Ruby-Poorman district include: 7.5 Ounce Mining (Trail Creek); Short Gulch Mining (Ophir Creek); Sphinx Mining Inc. (Monument Creek); Swift Creek Mining Company (Swift Creek); Tilleson Mining and Reclamation (California Creek); Miscovich Mining Company (Poorman Creek); and Green Mining and Exploration (Long Creek).

Alamin Mining Company continued activities on its Bear Creek claims in the Innoko-Tolstoi district, as in past years. Middle Fork Mining optioned Bear Creek ground from Alamin in 1988 and operated throughout that season; the agreement was terminated at the end of the year. In 1989 Shell Mining Company of Arizona optioned the

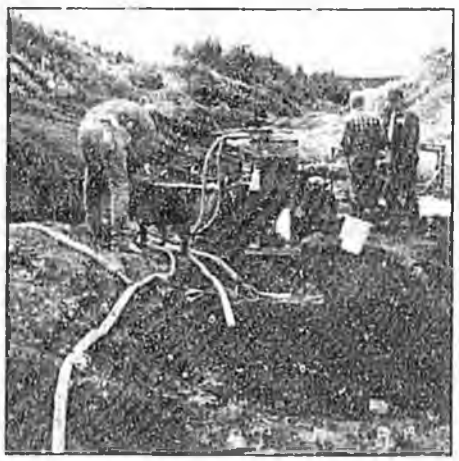


Figure 33. *Pete Haggland (far right) preparing for production on Flat Creek in the historic Ruby-Poorman district of western Alaska. (Photo by Flat Creek Mining Co.)*

property, sluiced pay, and conducted bulk sampling tests. Alamin reprocessed the ground at the end of 1989 and conducted production tests and drill programs in 1990 and 1991. Remaining pay is found on both Crippie and Bear Creeks, which are part of the same drainage system that erodes the mineralized Cripple Mountains.

Over the hill from Alamin's ground is the operation of Rosander Mining Company on Colorado Creek, one of Alaska's most successful family-operated placer mines. Since 1979 Rosander Mining Company has worked several ancestral channels on the right bench of Colorado Creek, a northerly drainage from the Cripple Mountains. In late 1982 the company discovered the preserved remains of a mammoth in muck overburden. Rosander Mining contacted the University of Alaska Fairbanks museum, and a museum crew went to the site to excavate the mammoth remains and investigate the stratigraphy of the site. Results of the mammoth excavation are described in Thorson and Guthrie (1992) and Betts (1985). The "Rosander mammoth skull" is now on display as a centerpiece exhibit at the University of Alaska Museum in Fairbanks. In 1991 Rosander Mining continued to mine upstream from the broader alluvial-filled valley and is no longer developing ground in the area that is rich with fossils.

Bob and Manzie Magnuson mined pay at Madison Creek northwest of the old mining town of Ophir. Doug Sherrer recovered gold and platinum in production tests at Boob Creek near the Madison Creek operation. Yukon Mining Company (Joel Ramsted) was again active on Golden and Illinois Creek in the Kaiyuh Hills district near Kaltag.

### Eastern Interior Region

The eastern Interior region includes the following districts: Fairbanks, Circle, Hot Springs, Fortymile, Tolovana, Rampart, Richardson, Kantishna and Bonnifield. Since the late 19th century 351,461 kg (11.3 million oz) gold has been mined, mainly from placer deposits.

The Interior region took over as the number-one producer of gold in Alaska in 1991; however, this was more a function of production losses in the western region than gains in the eastern Interior. Gold production in 1991 totaled 2,288 kg (73,600 oz) compared with 2,441 kg (78,480 oz) in 1990, a decline of about 6%. Employment remained at about the same level during the two years (495, 1990; 490, 1991). However, a number of mechanized placer mines decreased from 115 in 1990 to 105 in 1991, a decrease of 9%. Several large operations in the Fairbanks district offset mine losses in the Circle, Bonnifield, and Fortymile camps.

The Fairbanks district was again the largest producing placer camp in the eastern Interior. Significantly, the district is seeing an increasing focus on exploration and development for hard-rock minerals. We estimate that 23 placer mines produced 914 kg (29,400 oz) gold and 182 kg (5,850 oz) byproduct silver and employed 175 workers on a year-round equivalent basis.

Polar Mining operated two large placer mines on lower Goldstream and Fish Creeks in the Fairbanks district.

The eastern Interior region's largest gold producer, Polar Mining, ranked fourth statewide behind Cambior Mines at Valdez Creek, Kennecott Greens Creek Mining Company near Juneau, and Alaska Gold Company at Nome. During 1991, the lower Goldstream operation processed about 458,750 $m^3$ (600,000 $yd^3$), during the summer production season. About 680,400 kg (1.5 million lbs) of ANFO explosive was used to blast frozen overburden during winter months. About 119,000 $m^3$ (155,000 $yd^3$) pay was processed at Fish Creek, which, like lower Goldstream, requires year round employment. Mine activities include winter drilling, blasting, removal of overburden, and summer pay extraction (fig. 34). By the end of 1991, Polar Mining had 57 employees on its payroll (fig. 35).

Thurman Oil and Mining also operated a large opencut placer mine on Fairbanks Creek, employing a crew of 15 to strip overburden and process pay. Cook's Mining employed five workers for four-and-a half months in an opencut placer venture on Fairbanks Creek downstream from the old hardrock McCarty Mine (fig. 36). Cook's Mining also prepared ground on Deep Creek for future production. Patricia Franklin (Alder Creek Mines) cleaned a small section of bedrock 18 x 24 m (60 x 80 ft) on Fairbanks Creek to determine whether or not it would be worthwhile to work old dredge tailings. Placers on Fish Creek are derived in part from lodes in the recently discovered Fort Knox deposit (fig. 37).

Al Hopen worked two placer mines in the Fairbanks district, one on Cleary Creek near the Cleary Hill Mine mill and the other on Little Eldorado Creek, a stream which was formerly dredged and drift mined. Both are on patented mining claims controlled by the Alaska Gold Company, a major land owner in the Fairbanks North Star Borough.

T.J. Mining worked Homestake Creek at 74 Mile Steese Highway on the northeastern edge of the Fairbanks district and reported that heavy equipment breakdowns were its biggest 1991 concerns.

Herning Exploration and Mining and operator Doug Clark mined Palmer Creek in the upper Chena River drainage. The company intends to initiate patent procedures on Federal claims and lease parts of other claim blocks in 1992.

Other opencut placer operators in the Fairbanks area were: Don Stein (Twin Creek); Lucky Seven Mining (Fish Creek); Jack Neubauer (Fox Gulch); Andy Miscovich Sr. (Chatham Creek); Andy Miscovich Jr. (Dome Creek, new operation); Layne Gardner (Dome Creek, new operation); Goldstream Exploration (Gilmore Creek); Gerald Hassel (Ester Creek); John McLain (Ester Creek, new operation); Vince Monzualla (Virginia Creek); and Carson Holt (Ester Creek).

Interest continued to grow in drift mining of deep frozen placer in the Fairbanks district (fig. 38). Roberts Mining mined 11,470 $m^3$ (15,000 $yd^3$) of rich placer pay at its Dome Creek Drift Mine, reworking old drifts and removing side pay left by the early 20th century hand miners. Roberts Mining drilled with a jack leg, blasted with ANFO explosive, and hauled pay to stockpiles with low profile, diesel haul trucks. RCL Mining hauled test runs of drift gravels to the surface from reactivated drift shafts on lower Dome Creek downstream from the Roberts Mining operation. Increased levels of activities are expected from this venture in 1992. Don Read continued a mining venture using a decline to access gravels on Vault Creek. EVECO-ACE Construction began a drift operation on Goldstream Creek near the U.S. Corps of Engineers's Fox permafrost tunnel.

For seven of the last eleven years the Circle district was the largest producer of gold in the eastern Interior. However, starting in 1990, the number of placer mines began a slow decline but it is hoped that better bullion prices will reverse this downward trend. In 1991, there were 24 active placer mines that employed 95 miners, compared with 36 placer mines that employed an estimated 144 miners in 1990.

Magic Circle Inc. (Steve Weber) finished a multi-year project on Deadwood Creek and processed 19,115 $m^3$ (25,000 $yd^3$) during a 165-day sluicing season. The company will begin development of its new property on Ketchum Creek in 1992.

Greenhorn Mining (Stan Gelvin) worked pay on Ketchum Creek for 120 days. Paul and Company, Mack Rite, and Harold Dunham leased placer ground on Porcupine Creek from Helen Warner and George Horner and worked for most of the season processing pay. Jim Wilde completed a small test on Switch Creek and expects to be in full production during 1992 or 1993.

Other operators in the Circle district were: George Seuffert (Butte Creek); Steve Olsen (Eagle Creek); Ed Lapp and Earl Beistline (Mastodon Creek); Mike Dugger (North Fork, Harrison Creek ); John Sipes (Deadwood Creek); Ed Gelvin (Crooked Creek); Fred Wilkenson (Ketchum Creek); Bob Cacy, Eddra Ziegler, and John Cole (Portage Creek); Vern Stepp (Bottom Dollar Creek); and Sam Koppenberg (Faith Creek; sometimes listed as in the Fairbanks district).

Activity levels in the Rampart and Eureka-Manley areas were at about the same levels as in previous years. Shoreham Resources again operated its opencut placer operation on the Sullivan Bench in the historical Tofty-Hot Springs district west of Manley Hot Springs. Shoreham stripped 237,026 $m^3$ (310,000 $yd^3$) of overburden, sluiced 79,518 $m^3$ (104,000 $yd^3$) of pay, and recovered 54 kg (1,746 oz) gold, 10 kg (324 oz) silver, and 3,084 kg (6,800 lb) tin metal as cassiterite during 1,004 hours of sluicing (fig. 39).

Bob Bettisworth (Eleven Pup Mining ) worked a small placer deposit on Hunter Creek in the Rampart district and will try again in 1992 in spite of disappointing 1991 results. Ed Salter and Associates mined gold on Joe Bush Creek in the Eureka-Manley area. Their biggest obstacle was the removal of 1.8 m (6 ft) of blue clay just above the pay

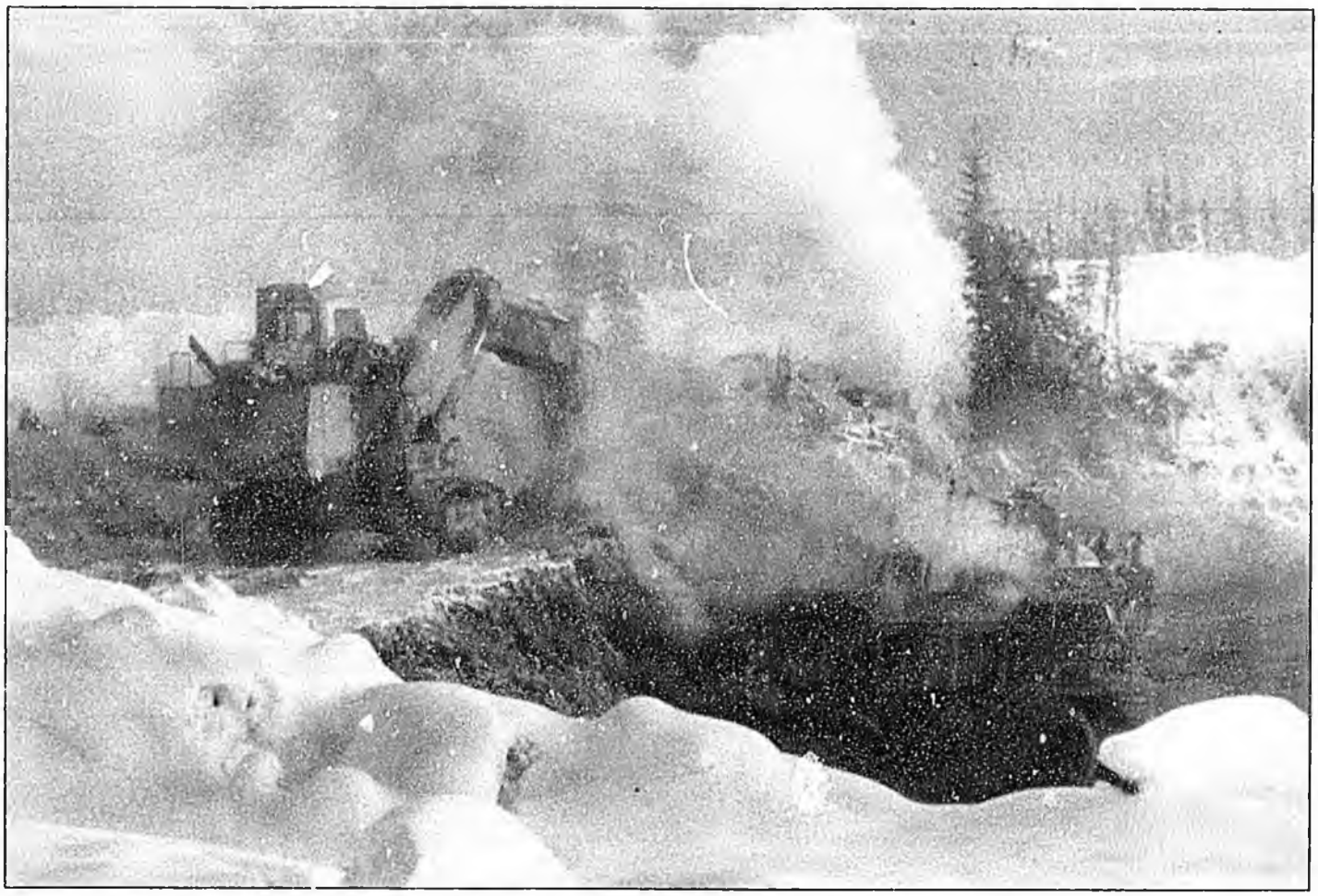


Figure 34. *Overburden removal at -40°F on Lower Goldstream Creek, Fairbanks district, by Polar Mining Inc. Large scale, year-round operations have made Polar Mining one of Alaska's largest producers of gold and a significant employer in the Fairbanks North Star Borough. (Photo by Don May)*

gravels. The clay had to be excavated carefully to preserve the auriferous zones.

Kelly Mining recovered placer gold from his claim on North Fork Creek near Eureka but reported pay values were lean and overburden averaged 12 m (40 ft) in depth.

Ross Novak finished his developed pay zone on the Pioneer Bench and began to move his operation to Eureka Creek. Don Delima and Jeff Knaebel continued to work American Creek.

Other operations in the Rampart and Hot Springs districts include the following: Williams Mining (Ruby Creek); Lucas Mining (Hoosier Creek); Steve Losonsky (Hunker Creek); Munsell Mining (Little Minook Creek, new operator); Thurman Oil and Mining (Eureka Creek); Rick Swenson (Doric Creek); and J.L. Wood (Little Boulder Creek).

Only two operations reported activities in the Livengood district, but one was among Alaska's largest placer mines. Alaska Placer Development employed eight workers during a 155-day season to exploit a relatively high-grade paystreak on the Livengood Bench just north of the old townsite of Livengood. The operation processed about 91,750 $m^3$ (120,000 $yd^3$) of auriferous gravel after hydraulically removing and containing overburden.

Heflinger Mining and Equipment Company (Carl Heflinger) took out a small cut on Livengood Creek during a two-month mining season. Exploration has proven about 30,584 $m^3$ (40,000 $yd^3$) of pay covered by about 97,870 $m^3$ (128,000 $yd^3$) of overburden. As contractor to an Alaskan environmental cleanup effort, Heflinger spent the remainder of his summer removing gasoline tanks and contaminated soil.

The Fortymile district functioned at about the same level of activity as in previous years, with an estimated 24 small placer mines at work. Ham Mining Company, with a crew of two, mined from a small opencut operation on Chicken Creek. Fortyfive Pup Mining (Charles Hammond) again mined two small cuts on Fortyfive Pup, using a newly constructed trommel to wash pay. The trommel worked well in its first year of operation. Hammond reported that using screening and sizing principles advocated by Clarkson (1990) has resulted in a significant increase in gold recovery—maybe as much as 45% better efficiency for his washing plant.

Alice Bayless and Kachemak Mining (Mike Buzby) mined a Chicken

Creek placer gold paystreak, which they leased from the Alaska Gold Co.

Other producers in the Fortymile area include: John Burns (Chicken Creek); Dennis Eich and Angess Purdy (Meyers Fork); G.A. Hanks and Sons (Lost Chicken Creek); Brandt Goodall (Mosquito Fork); Forest Hayden (Baby Creek); Fred Heflinger (Walker Fork); Harold Nevers (American Creek); Leo Regner (Ingle Creek); Robert Roberts (Skookum Creek); and the Boundary VIA Company (Walker Fork).

Activity in the Bonnifield and Delta districts continued at about the same level as in previous years, but some paystreaks appear to be playing out and operators are moving elsewhere. Alaska Unlimited Inc. (Warren Taylor) on Gold King Creek was again the largest placer mine in the district. The gold mined by Alaska Unlimited is believed to be derived from the Tertiary Nenana Gravel. Tom Faa worked pay on upper Moose Creek, one of the district's historically largest producers of gold. Jackson Mining Company continued to extract fine-grained gold from high energy, modern placers of the Totatlanika River. Jim Roland worked his Annebelle Property on Lower Moose Creek. Former longtime Bonnifield district operator Jack LaCross removed his efficient plant from the California Creek drainage after exhausting minable reserves and moved to the Cache Creek-Collinsville area of southcentral Alaska. Jensen Mining and Construction (Don Jensen) of Delta Junction mined his McCumber Creek properties near the Granite Mountains south of Delta Junction. He estimates that only one more year of reserves remain there.

### Southcentral Region

The southcentral region experienced the only significant increase in Alaskan gold production, when the 1990 total climbed from 518 kg (16,670 oz) to 1,712 kg (55,070 oz) in 1991, an increase of more than 200%. All this increase was due to the resumption of fullscale mining by Cambior Alaska Inc. at Valdez Creek, which began in the fall of 1990. About 22 mines employing 265 workers operated regionwide.

Cambior Alaska Inc. recovered 1,339 kg (43,057 oz) refined gold (1,572 kg; 50,537 oz raw gold) from 372,360 $m^3$ (487,000 $yd^3$) of processed pay at their Valdez Creek Placer Mine approximately 88 km (55 mi) east of Cantwell (fig. 40). An estimated



Figure 35. *Concerned citizens, legislators, local government officials, and regulatory personnel visit the operation of Polar Mining on lower Goldstream Creek, Fairbanks district. In the right center is the late Senator Bettye Fahrenkamp, a longtime advocate of responsible mineral resource development in Alaska. (Photo by Polar Mining Inc.)*

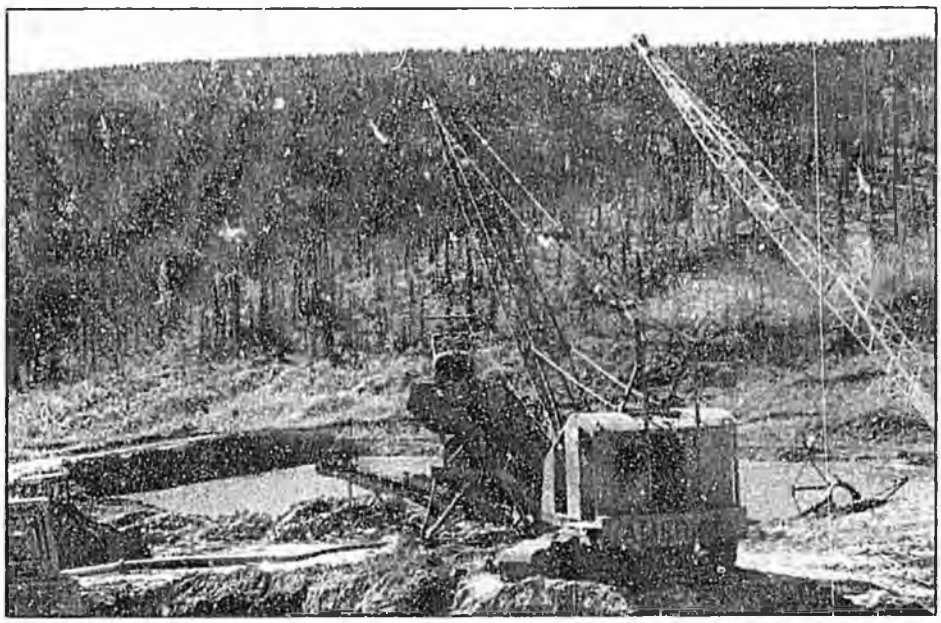


Figure 36. *Cooks Mining operation in the upper Fairbanks Creek drainage of the Fairbanks district. This efficient operation illustrates the effectiveness of a dragline. (Photo by T.K. Bundtzen)*

5,661,860 $m^3$ (7,405,000 $yd^3$) of overburden was stripped off the pay zone resulting in a stripping ratio of about 15:1. The company mines rich pay (1991 average grade = 3.0 g/tonne [.088 oz/$yd^3$] gold) from several superimposed ancestral channels of Valdez Creek which are now buried by colluvium and glacial drift. The Valdez Creek placer mine has been Alaska's largest producer of placer gold for six of the last seven years. The company provided 219 full-time-equivalent mining jobs during 1991. An expensive stream diversion project was required by the Alaska Department of Fish and Game. The company hopes to expand production substantially in 1992 to offset low gold prices and costly stream diversion efforts.



Figure 37. *Melba Creek stamp mill and circular concentrating table that was in operation prior to World War II. Left to right: Bob Tsigonis, Charlie Lazeration, Glenn Hanneman, Jack Williams, and Jim Moody. Lazeration was one of the early prospectors who recognized the significance of mineralization at Fort Knox. (Photo by Earl Beistline)*

Hoffman Mining (Russell Hoffman) again mined on the middle fork of the Chistochina River with a crew of three during a 150-day-season. Hoffman estimates that indicated gold resources on his properties are sufficient for another six to eight years.

Mrak Placer Mine (William Mrak) worked about 100 days with a two-person crew in the Willow Creek drainage near Hatcher Pass. This longtime, small-scale operator conducted some flotation testing under contract to Lakefield Research and Alaska Assay Inc. in order to improve recovery by liberation of previously unrecoverable gold.

Randy Elliott mined patented claims at Dan Creek within Wrangell-St. Elias National Park Preserve. Elliott

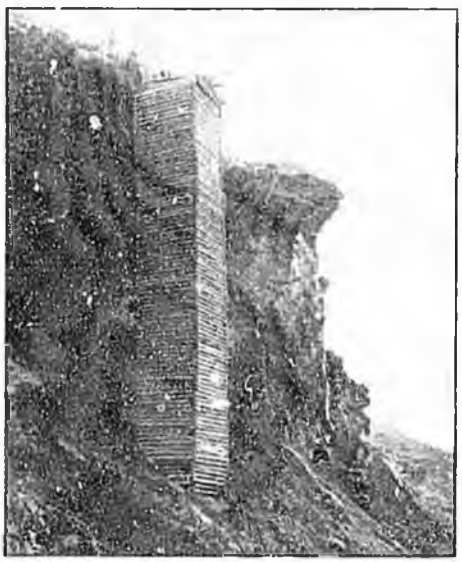


Figure 38. *Cribbed shaft exposed in Fish Creek drainage, Fairbanks district, during overburden removal. In early days, hundreds of these shafts penetrated the deep frozen overburden of the Fairbanks district in search of rich, but deeply buried, placer gold deposits. (Photo by Bob Tsigonis)*



Figure 39. *Hydraulic removal of overburden at Shoreham Resources' Tofty operation, Hot Springs district. This time-tested method can still be used to efficiently move overburden, provided effluents are contained and water quality maintained. (Photo by Shoreham Resources)*

June 1 to September 30 with a crew of four. Little Creek Mine (Paul Sayer) continued his longtime venture on Little Creek in the Innoko district for a total of nearly 200 days using a crew of four.

Tragedy struck the Innoko Camp mid-way through the summer when veteran placer miner John O'Carroll was killed in an airplane crash while flying to McGrath from his mine. O'Carroll had been mining on Spruce Creek since 1982 and was preparing ground on Dodge Creek west of the old mining town of Ophir at the time of his death. He will be missed by his family, colleagues, and friends in the Innoko district.

Larry Wilmarth (Julian Creek Mine) and partners worked out the paystreak on Julian Creek in the George River using a work force of two. Later in the year Wilmarth prospected the placer and lode potential of the area. Better bullion prices and larger equipment are needed to resume placer production.

Misco-Walsh Mining Company continued production testing and processing of a complex gold-silver-tungsten-antimony-mercury concentrate at the Golden Horn deposit in the Iditarod district. Misco-Walsh used a rod mill, jigs, and wilfley tables to process and concentrate ore minerals.

John and Tad Fullerton (Flat Creek Placers Inc.) recovered gold from dredge tailings in Flat Creek of the Iditarod district. He concluded that if the mine is carefully engineered and operated, selective remining of tailings left over from the pre-1920 Yukon Gold Dredging operation there could be profitable.

Dick Wilmarth continued mining on lower Chicken Creek near its confluence with Bonanza Creek. Like the Fullerton operation, careful exploration is required to determine the location of remaining, unmined fractions in the previously mined stream drainage.

Alvin Agoff again took out a cut in Prince Creek on the south side of Chicken Mountain also in the Iditarod district. Agoff has now begun to develop ancestral channels of Prince Creek as opposed to his previous emphasis on auriferous modern stream channels.

Dave Penz mined an ancestral paystreak of Buster Creek, tributary to Kako Creek in the old Marshall district of lower Yukon River (fig. 41). With a crew of three, Penz had to remove more overburden than expected to get to the edge of his pay zone. He evidently was off-center from the paystreak while preparing ground in the previous year. Now that he knows the pay configuration, Penz believes that his production will increase in the future.

Ernie Chase of Anvik operated on Stuyahok River in the easternmost Marshall district. A lease from Calista Corporation made it possible to resume mining several years ago.

### Southeastern Region

For the third consecutive year, mineral production in the southeastern region was dominated by the activities of Kennecott Greens Creek Mining Company on Admiralty Island about 29 km (18 mi) west of Juneau.

During 1991, the Greens Creek Mine produced 236,380 kg (7.6 million oz) silver, 1,150 kg (37,000 oz) gold, 37,966 tonnes (83,700,000 lb) zinc, and 15,330 tonnes (33,800,000 lb) lead from approximately 344,660 tonnes (380,000 tons) of ore. The company employed 238 year-round workers and continues to provide a significant boost to the Juneau economy (fig. 42). Despite the high metal output, the mine reported a financial loss during the year, mostly due to low metal prices. The company reported receiving the following prices for silver, $4.04/oz; gold, $354.86/oz; zinc, $0.49/lb; and lead, $0.24/lb. Another problem concerns the quality of the complex sulfide concentrates produced; current concentrate shipments are assessed large penalties at customer smelters.

Greens Creek Mine requires additional waste-rock disposal sites. Excavation and disposal of unstable marine clays produced during mill construction used much of the capacity of areas originally designated as waste rock disposal sites. Ground stability problems were eventually solved by excavation and drilling a series of horizontal dewatering wells.

Greens Creek Mine was originally developed and awarded permits for a

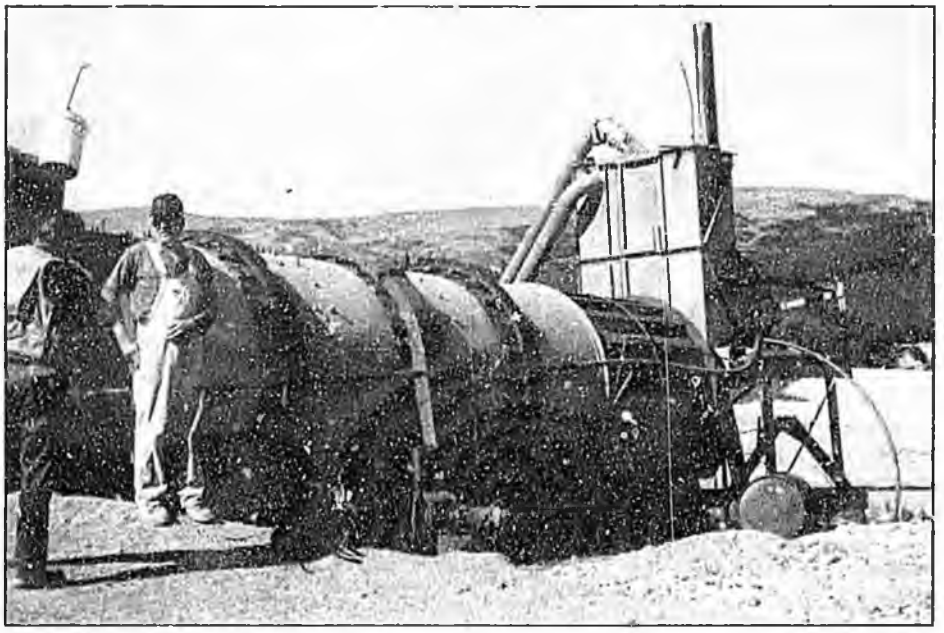


Figure 41. *Dave Penz describes the operation of his trommel-equipped washing plant at Kako Creek near Russian Mission to Greg Laird, DGGS. (Photo by T.K. Bundtzen)*

3.17 million tonne (3.5 million ton) ore body. In 1991 estimates of minable reserves were expanded significantly to 12.5 million tonnes (13.8 million tons). In order to deal with large increases in cumulative waste rock disposal, an environmental assessment was prepared by the U.S. Forest Service to identify waste disposal issues and locate additional storage and disposal sites.

In addition, during 1991 Kennecott began to make major mill improvements and upgrades. The addition of tower mills and column flotation cells into the overall mill circuit will improve grinding capabilities. With these changes in the mill, Greens Creek Mine will produce a higher value and more readily saleable concentrate. This upgrade, which is estimated to cost over $7.5 million, began in late 1991 and should be completed by late spring 1992. These improvements are designed specifically to improve concentrate quality and will not significantly change annual mill production.

A few small placer mining companies reported production activities. Big Nugget Mine operated on State and Federal ground in the Porcupine Mining district near Haines. Approximately 3,058 $m^3$ (4,000 $yd^3$) pay was processed during a 100-day season; the mine duration also included ground preparation and heavy equipment repair.

Jerry Fabrizio produced minor amounts of placer gold on Porcupine Creek from a 2 ha (4 acre) stripped pay zone.

## INDUSTRIAL MINERALS

Production of industrial minerals, mainly sand and gravel and building stone, continued at about the same level as during the last several years. We based our estimates on information provided by 42 sand and gravel firms and 16 stone quarry companies. We estimate that in 1991 the Alaska industry produced 12.8 million tonnes (14.2 million tons) of sand and gravel worth $45.4 million and 2.7 million tonnes (3.0 million tons) of stone worth $22.5 million, a marginal value increase of about 8% from 1990 levels (tables 7 and 10).



Figure 42. *Ore face being drilled at Greens Creeks Mine, Admiralty Island. (Photo by Kennecott Greens Creek Mining Company)*

Industrial mineral production remained stable through large highway construction or repair efforts near Anchorage and Fairbanks. Infrastructure development in the Alaska Peninsula Region also generated industrial mineral demand. The development is in support of the onshore processing facilities servicing Alaska's large commercial fishing fleet.

### Northern Region

ARCO Alaska used 571,410 tonnes (630,000 tons) of gravel to service

Table 10. *Reported sand and gravel production and industry employment in Alaska by region, 1991*

| Region | Companies reporting[a] | Tons | Estimated unit value[b] ($/ton) | Total value | Number of employees |
|---|---|---|---|---|---|
| Northern | 3 | 1,509,977 | $3.96 | $ 5,979,512 | 125 |
| Western | 2 | 427,350 | 1.17 | 500,000 | 35 |
| Eastern Interior | 13 | 4,389,939 | 3.28 | 14,399,000 | 175 |
| Southwestern | 3 | 570,000 | 4.50 | 2,565,000 | 55 |
| Southcentral | 11 | 4,862,745 | 3.06 | 14,880,000 | 165 |
| Alaska Peninsula | 3 | 750,000 | 4.00 | 3,000,000 | 50 |
| Southeastern | 7 | 1,650,000 | 2.50 | 4,125,000 | 80 |
| **TOTAL** | **42** | **14,160,011 (12,846,000 tonnes)** | -- | **$45,448,512** | **685** |

[a]27 returned questionnaires and 15 phone canvas responses.
[b]Values are based on price and cost estimates made available to us by about 45 percent of the operators.

production facilities and site facilities at Prudhoe Bay and about 253,960 tonnes (280,000 tons) for similar purposes at the Kuparuk field facilities. ARCO announced river flood-plain reserves of about 7.6 million tonnes (8.4 million tons) of gravel at the Prudhoe Bay unit and 3.17 million tonnes (3.5 million tons) at the Kuparuk River unit. ARCO recycled 57,141 tonnes (63,000 tons) of reclaimed gravel facilities and washed drill cuttings for use in pad construction. BP Exploration Alaska used 67,900 tonnes (74,860 tons) of gravel for construction and maintenance purposes.

Neither oil firm predicted any increased need for sand and gravel in the near future. Both firms lease materials from the State of Alaska at approved extraction sites. Excavation of sand and gravel in some areas on the Sagavanirktok River flood plain has created large artificial lakes, which have been found to be excellent winter rearing habitat for arctic char, grayling, and other northern fish species.

The remaining sand and gravel and riprap from the northern region was used to repair roads, tailings, dams, and mill support structures at the Red Dog Mine north of Kotzebue.

NANA Corporation continued to produce high quality jade from its properties in the Jade Mountains of upper Kobuk River area. The large boulders of jade extracted from this area are slabbed with large diameter diamond saws and eventually made into saleable products by its Kotzebue operational subsidiary, Jade Mountain Products Inc. (fig. 43).

### Western Region

The Alaska Department of Transportation and Public Facilities (DOTPF) expanded airport facilities at Teller and Nome and began to rebuild major of portions of the Nome-Kougarok and Nome-Council road systems.

Bering Straits Native Corporation supplied the gravel for a 16 km (10 mi) section of the Nome-Council road project. Total volume of gravel from the western region (387,606 tonnes; 427,350 tons) was provided to three operations involved in DOTPF funded work.

### Eastern Interior Region

The eastern Interior region again accounted for a large part of total sand and gravel and building stone consumption. Fourteen companies and two government agencies used a total of 3.98 million tonnes (4.39 million tons) gravel and about 426,290 tonnes (470,000 tons) stone, 31% and 16% of statewide estimates respectively. The Geist Road-Johansen Expressway, a new major modern highway trunk in central Fairbanks, was the largest single project and accounted for nearly one-third of the total gravel used in the eastern Interior. Repair work along the Alaska Highway for the 50-year celebration of the road construction effort also accounted for sand and gravel and stone use.

Earthmovers Inc. operated three gravel pits in the Fairbanks area and produced approximately 1.36 million tonnes (1.5 million tons) for DOTPF construction projects. H&H Contractors also mined pit run sand and pea gravels and some tailings for similar government-funded construction.

Fairbanks Sand and Gravel Inc., owned by Sealaska Corporation, mined 86,929 tones (95,843 tons) of pit-run sand and gravel with their floating clamshell dredge and used their product for road fill, landscaping, and manufacture of concrete block at their south Fairbanks plant. Late in the year, owner Sealaska Corporation announced that Fairbanks Sand and Gravel was for sale, and if there are no bids, the long-active gravel producer may close. Many Interior contractors and builders have used Fairbanks Sand and Gravel products for various construction projects. Since 1981 Fairbanks Sand and Gravel has provided us with valuable information for this report series, and they will be missed.

ACE General Contractors (ACE) produced and sold about 63,490 tonnes (70,000 tons) of dredge tailings in the Fox area near Fairbanks. Great Northwest Inc. leased ground from the University of Alaska and produced sand, gravel, and peat from the College Road mine site in Fairbanks. R.B. Gravel (Jerry Hassel) produced gravel and a byproduct of gold from its mine in Goldstream Valley.

Popo Agee Inc. again operated at Dry Creek on the George Parks Highway and supplied gravel to local Healy markets. Harold Dell (Caswell Creek Aggregate) mined at Mile 85 on the Parks Highway, but reported that business was slow during the year. Delta Concrete Production Inc. mined gravel from the Delta River and screened and washed it for concrete aggregate and D-1 road metal applications.

Alyeska Pipeline Service Company used about 90,700 tonnes (100,000 tons) of sand, gravel, and rock along unspecified locations of the Trans-Alaska Pipeline right-of-way north of Fairbanks and south of the Yukon River.

The Alaska Department of Transportation and Public Facilities extracted

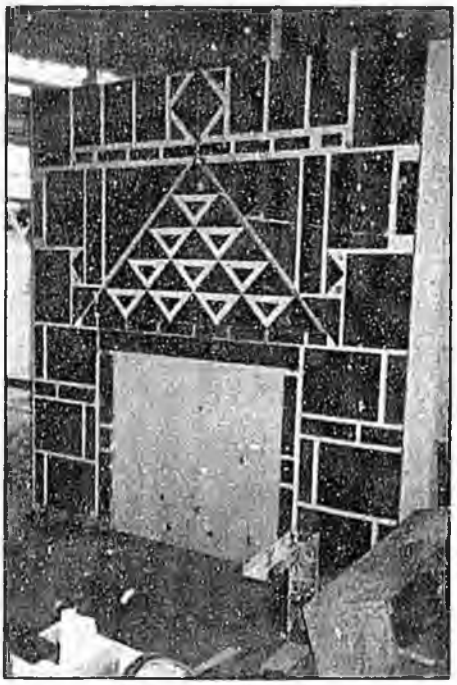


Figure 43. *Jade-faced wall being built for a client by Jade Mountain Products, a subsidiary of NANA Regional Corporation. Jade Mountain designs walls and murals from jade slabs. (Photo by NANA Regional Corporation)*

185,890 tonnes (204,952 tons) of gravel from BLM pits; 737,570 tonnes (813,200 tons) from ADL pits (State of Alaska sites); and 160,490 tonnes (176,948 tons) from unspecified locations throughout the eastern Interior region. DOTPF used most of the material for Alaska Highway repair and airport construction.

### Southcentral Region

The southcentral region used the largest amount of sand, gravel, and stone in the entire State during the heavy summer construction season. Eleven companies, the Alaska Railroad, and DOTPF indicated total production of 4.40 million tonnes (4.86 million tons) of gravel and about 353,730 tonnes (390,000 tons) of stone, about 34% and 13% respectively of total statewide output.

The Alaska Railroad hauled 1,745,600 tonnes (1,925,000 tons) of gravel from the Palmer-Wasilla area to Anchorage markets. This amount is down from the 2,222,150 tonnes (2,450,000 tons) hauled in 1990 but is about the same level as 1989. Most of the gravel was used to rebuild portions of the Seward Highways and additional [illegible].

DOTPF reported that approximately 544,200 tonnes (600,000 tons) of combined sand, gravel, and 136,050 tonnes (150,000 tons) of stone were used in construction of the controversial Cordova Road. Because this road is utilizing portions of the old Copper River and Northwestern railroad bed, new-materials use is not as high as one might expect.

Jackson Construction mined, washed, and screened gravel from pits in the Kenai-Soldotna area. This company, which formerly provided 40 year-round jobs and now provides work for seven, reports that new restrictions and regulations and weak markets have forced them to scale down the size of its business.

Rock Products Inc. reported only modest activity at its Wasilla area material sites. The company rented much of its heavy equipment for DOTPF-funded soils reclamation work in scattered areas of southcentral Alaska. SAFAR Construction, operating on State of Alaska leases, extracted gravel from its Portage River valley pit near Girdwood. J. Harold Michael of Valdez used gravel to build roads into Fireweed Mountain subdivision, though most of this work was completed in 1990.

Herman Brothers Construction Company Inc. of Palmer continued its long active gravel pit venture in Palmer but reported that weakness in the gravel market has limited its growth in recent years. AAA Valley Gravel Inc. of Wasilla also continued its longtime venture on Trunk Road near Palmer, expecting 1992 sales to be about the same as 1991 (about 90,700 tonnes [100,000 tons]). Spring Creek Sand and Gravel depleted its Chugiak sand and gravel pit; reclamation efforts should be completed in 1992.

K's Concrete Service and Luke's Mining Company of Homer both reported only minor activity at their material sites near Homer. Weak local markets have limited their work to sporadic production to satisfy single construction contracts.

### Southwestern Region

Approximately 172,330 tonnes (190,000 tons) of sand and gravel were produced from Calista Corporation lands mainly for unspecified airport construction needs.

Bristol Bay Native Corporation and village corporation partners mined 122,450 tonnes (135,000 tons) of gravel for airport and road maintenance in and north of Dillingham.

DOTPF processed and used 222,215 tonnes (245,000 tons) of gravel, sand, and riprap for road maintenance in the Dillingham area and for airport repairs at McGrath.

### Alaska Peninsula Region

The increasing use of stone, sand, and gravel for construction in the fish processing industry helped boost the economy of the Alaska Peninsula Region. About 680,250 tonnes (750,000 tons) of sand and gravel and 544,200 tonnes (600,000 tons) of riprap-grade stone were employed mainly for these purposes. In addition, some road maintenance also took place near villages and for timber extraction.

Koniag Inc. produced pit run rock from Women's Bay and Afognak Island. The Women's Bay rock pit is leased to Brechan Inc. and consists of graywacke rock used primarily for local driveway and roadbed subgrade. The Afognak Native Corporation and Koncor Ltd. use similar pitrun rock for logging roads and log transfer sites on the coast. In addition, small villages throughout the Koniag Region utilized pit-run sand and gravel and graywacke for many community needs.

Bristol Bay Native Corporation and Choggiung Ltd. in Dillingham provided sand and gravel for State capital improvement projects throughout the Bristol Bay region, with the largest demand in King Salmon and Neilman.

Westwood Foods is completing its Unalaska Fish Processing Facility and used nearly 200,000 tonnes (220,500 tons) of basalt rock for harbor armoring to protect the facility from winter storms. Similar work was completed on St. Paul Island where storms destroyed part of a seawall constructed several years ago.

### Southeastern Region

Use of materials in the southeastern region increased about 10% from 1990 levels, due mainly to construction related to the logging industry. About 1.39 million tonnes (1.54 million tons) of stone and 1.49 million tonnes (1.65 million tons) of sand and gravel amounted to 51% and 12% of total

statewide extraction efforts. The largest outlets were contractors working on Tongass National Forest road and log transfer sites.

Hildre Sand and Gravel (Scott LaFavour) mined 52,600 tonnes (58,000 tons) of pit-run gravel and sand, which was sold to Juneau Ready Mix for processing and product upgrades. LaFavour reported that three years of reserves remain at his Acme Pit Mine site.

Red Samm Construction Company of Bellevue, Washington, operated on private lands at unspecified sites throughout the Panhandle. Ron Thomas mined gravel from a State lease at the head of Portland Canal, and sold it to an unspecified contractor. Three years ago the company built a dock for Kennecott Greens Creek Mining Company on Admiralty Island but in 1991 W.S. Construction Inc. operated at maintenance level only. The city of Thorne Bay produced shot rock and gravel at the South Thorne Bay and Deer Creek subdivision sites for U.S. Forest Service and other unspecified users. Bruce Morley mined pit-run gravel from his Ludwig pit for repair work on the Douglas Highway. Contractors continued to extract shot rock from various pits in the Ketchikan Gateway Borough (fig. 44).

The Wrangel and Petersburg offices of the Forest Service mined pit-run rock and gravel for road construction in the Stikine area of the Tongass Forest.

## COAL AND PEAT

Usibelli Coal Mine Inc. produced nearly all coal mined in Alaska during 1991. Approximately 1.39 million tonnes (1.54 million tons) of subbituminous coal mined in the Healy coal field fueled six interior Alaska power plants and the Korean Electric Power Company power house in Honam, South Korea. Usibelli mined 226,750 tonnes (250,000 tons) from its Gold Run pit and 1,173,660 tonnes (1,294,000 tons) from the main extraction site at its Poker Flats pit. The company operates on land leased from the State of Alaska. About half the coal is destined for export and half stays in Alaska for power generation (fig. 45). The coal is rated subbituminous-C with extremely low sulfur, but moderate to high ash and high moisture, factors that have contrasting marketability issues for the world's coal users. Usibelli's low pollutant coal characteristics may eventually become premium qualities in an increasingly environmentally sensitive market place.

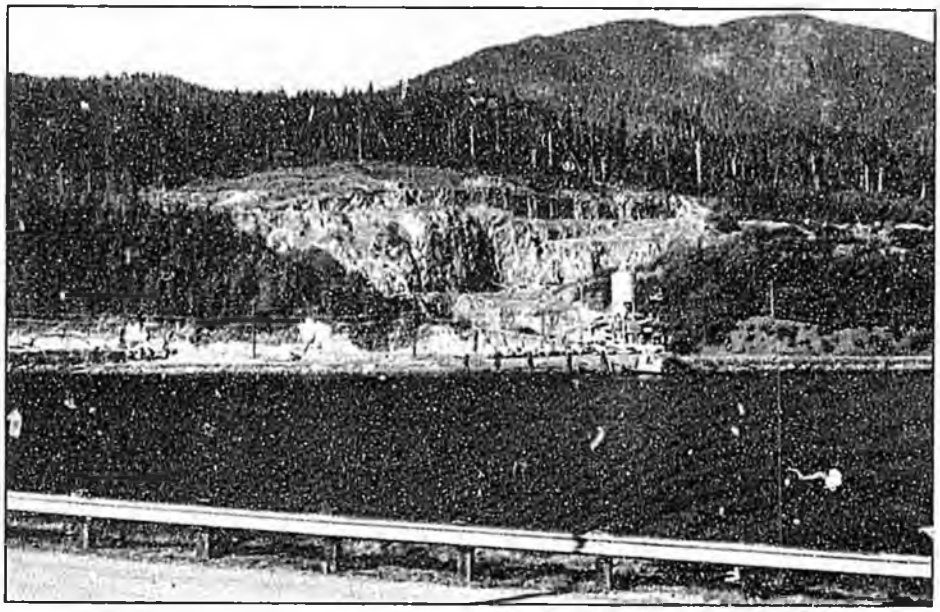


Figure 44. *Greenstone rock quarry operated by Ketchikan rock producers provides riprap and material for road construction in Ketchikan Gateway Borough. (Photo by T.K. Bundtzen)*

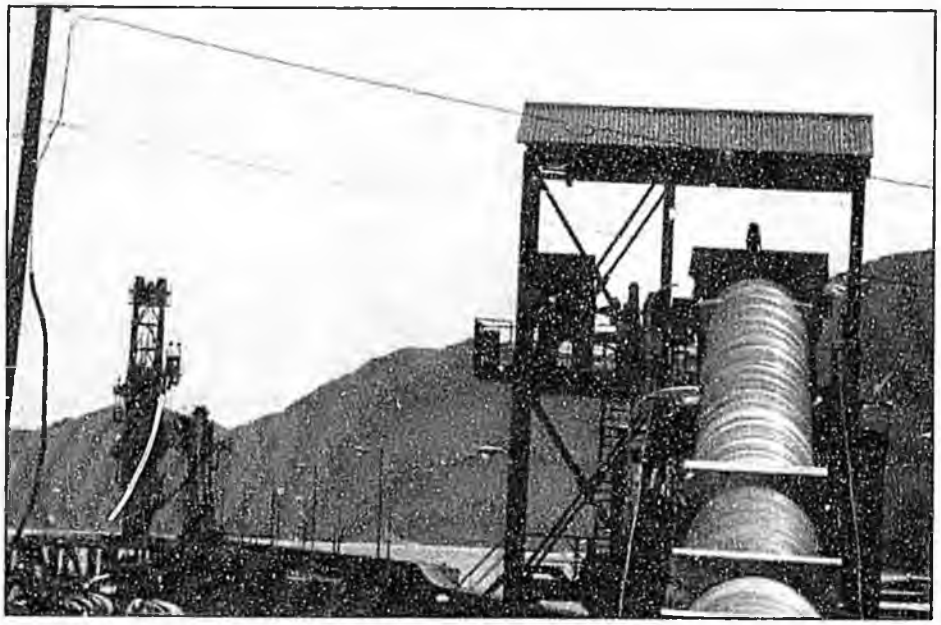


Figure 45. *Coal loading facility of the Sun Eel Shipping Company at Seward. From here, about 680,250 tonnes (750,000 tons) of coal from the Healy Coal Field are loaded onto Panamex carriers bound for the Korean Electric Power Company power plant at Honam, South Korea. (Photo by C.B. Green)*

Progress continues to be made on the Healy Clean Coal Project, which will result in construction of a state-of-the-art power plant capable of decreasing gaseous and particulate matter emissions to extremely low levels.

Arctic Slope Consulting Group (ASCG) mined 454 tonnes (500 tons) of bituminous coals at their Aluaq mine site in the Deadfall syncline area of northwest Alaska. Most of this coal was used in local north slope villages as part of an ongoing effort to supply local heating fuels and offset the demand for expensive petroleum-based fuels in this remote region.

A portion of the Aluaq coal is undergoing laboratory tests as part of an ongoing international marketing effort to supply coal to Far Eastern and European markets. The ASCG coal resource is of high grade (bituminous to semi-anthracite), contains low sulfur values, and is close to potential tidewater shipping sites.

Peat production continues to improve slightly from low levels following the 1985-1988 Alaskan economic recession. Most of Alaska's peat resources are used in horticultural applications (gardens, landscaping, golf courses), although some remote villages have researched the possibility of its use as an energy resource.

Great Northwest Inc., which leases peat bogs from the University of Alaska, was the largest producer in the Fairbanks area. Peat producers in the Matanuska Valley-Anchorage area include A&A Services, The Dirt Company, and Landscape Supply Corporation. These four companies mined all the peat reported in this survey (table 7).

## DRILLING ACTIVITY

The total reported drill footage in Alaska in 1991 was 156,950 m (514,796 ft), a decrease of 47% from the 293,927 m (964,080 ft) drilled in 1990. Most of the reduction was caused by a shift in emphasis from advanced exploration to acquiring permits and continuing development work at the Kensington, Alaska-Juneau, and Fort Knox deposits, and the Greens Creek Mine.

Twenty-four companies reported significant drilling programs in 1991, nine fewer than in 1990. There were four coal projects (two categorized as exploration and two as development), seven placer programs (five exploration, one development, and one production), and the remaining 13 were hardrock drill programs (one development and 12 exploration). Some companies had programs in more than one region or category.

Table 11 compares drilling footage reported from 1982 through 1991. Geographic distribution of drilling in 1991 is reported in table 12. Note that 153,660 m (504,000 ft) of blast-hole drilling reported is not included in the totals. Table 13 lists the companies that reported drilling programs in Alaska in 1991.

### PLACER DRILLING

Thawfield drilling at 39,635 m (130,00 ft) was up slightly from the 32,012 m (105,000 ft) reported in 1990, but exploration drilling was down 35% from 1990. The downward trend was statewide, and only in southwestern and southcentral Alaska were there any major placer drilling programs. Much of the southcentral drilling done by Cambior Alaska Inc. at Valdez Creek was developmental, rather than strictly exploratory. Cambior's work accounted for almost 80% of the 1991 placer drilling in the State. Flat Creek Mining in southwestern, Polar Mining in the eastern interior, and Kowallen Mine Partnership upstream of Cambior's operation in southcentral Alaska were the other significant placer drill projects reported.

### COAL DRILLING

In 1991, Idemitsu-Alaska Inc. and Hobbs Industries reported drill programs in southcentral Alaska. Usibelli Coal Mines Inc. had a small program in interior Alaska. Arctic Slope Regional Corporation had a substantial exploratory program in the Deadfall syncline of northwest Alaska, accounting for 50% of all 1991 coal drilling.

### HARDROCK DRILLING

Core drilling (62,740 m; 205,800 ft) continued to be the preferred method for hardrock exploration. However, the largest drill project in Alaska in 1991 was a reverse circulation drill program at the Ryan Lode on Ester Dome near Fairbanks by Citigold Alaska Inc. American Copper and Nickel Company had a large diamond-drill program in the same area of interior Alaska.

In western Alaska, North Pacific Mining Company continued its evaluation of the Illinois Creek deposit with a drilling program. Central Alaska Gold Company, in a joint venture with Placer Dome U.S. Inc., had a large drilling project on Vinasale Mountain in southwest Alaska. Cominco Alaska Exploration Inc. was active at its Pebble Copper porphyry deposit north of Lake Iliamna, in southcentral Alaska. This diamond-drilling program was designed to confirm and expand estimates of reserves. About 128 km (80 mi) to the east, Hunt Ware and Proffett continued exploration of the Johnson River polymetallic deposit with a major diamond-drill program.

The second largest hardrock drilling program in the State in 1991 was the Echo Bay and Coeur Alaska joint venture diamond-drill program at the Kensington Mine in southeast Alaska. Placer Dome U.S. Inc. also had a substantial drilling program at the nearby Jualin Mine about 80 km (50 mi) north of Juneau. The third largest drilling project was that of Kennecott at the Greens Creek Mine southwest of Juneau. In terms of purely exploratory drilling, southeast Alaska continued to lead other areas of the State, with the eastern Interior a close second.

The only hardrock developmental drilling reported was a condemnation and geotechnical program using reverse-circulation drilling by Fairbanks Gold Ltd. at its Fort Knox deposit northeast of Fairbanks.

Table 11. *Drilling footage reported in Alaska, 1982-91*

| | 1982 | 1983 | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 |
|---|---|---|---|---|---|---|---|---|---|---|
| Placer exploration | 30,000 | 23,000 | 31,000 | 46,000 | 32,400 | 50,250 | 152,000 | 97,250 | 78,930 | 51,247 |
| Placer thawfield | 94,000 | 30,000 | 98,000 | 34,000 | 227,000 | 130,000 | 300,000 | 210,000 | 105,000 | 130,000 |
| **Subtotal** | **124,000** | **53,000** | **129,000** | **80,000** | **259,400** | **180,250** | **452,000** | **307,250** | **183,930** | **181,247** |
| Coal | 80,000 | 12,000 | 25,700 | 8,700 | 28,800 | 19,900 | 26,150 | 38,670 | 18,195[a] | 16,894[a] |
| **Subtotal** | **80,000** | **12,000** | **25,700** | **8,700** | **28,800** | **19,900** | **26,150** | **38,670** | **18,195** | **16,894** |
| Hardrock (core) | -- | -- | -- | -- | -- | 95,600 | 223,630 | 242,440 | 648,600 | 205,805 |
| Hardrock (rotary) | -- | -- | -- | -- | -- | 19,500 | 130,220 | 89,790 | 112,355 | 110,850[a] |
| **Subtotal** | **200,000** | **180,500** | **176,000** | **131,700** | **50,200** | **115,100** | **353,850** | **332,230** | **760,955** | **316,655** |
| **TOTAL (feet)** | **404,000** | **245,500** | **330,700** | **220,400** | **338,400** | **315,250** | **832,000** | **678,170** | **963,080** | **514,796** |
| **TOTAL (meters)** | **123,139** | **74,828** | **100,797** | **67,177** | **103,144** | **96,088** | **253,593** | **206,700** | **293,547** | **156,910** |

[a]503,885 feet of blasthole drilling not included.
-- = Not specifically reported. Prior to 1987 no distinction was made in reporting hardrock core and hardrock rotary drilling footage.

Table 12. *Drilling footage by region in Alaska, 1991*

| Type of drilling | Northern | Western | Eastern interior | South-central | South-western | Alaska Peninsula | South-eastern | TOTAL |
|---|---|---|---|---|---|---|---|---|
| Placer exploration | -- | 5,300 | 1,950 | 43,997 | -- | -- | -- | 51,247 |
| Placer thawfield | -- | 130,000 | -- | -- | -- | -- | -- | 130,000 |
| **Subtotal** | **--** | **135,300** | **1,950** | **43,997** | **--** | **--** | **--** | **181,247** |
| Coal | 8,400 | -- | 750[a] | 7,744 | -- | -- | -- | 16,894 |
| **Subtotal** | **8,400** | **--** | **750** | **7,744** | **--** | **--** | **--** | **16,894** |
| Hardrock core | 550 | 5,130 | 21,500 | 43,500 | 16,000 | -- | 119,125 | 205,805 |
| Hardrock rotary | --** | -- | 106,850 | -- | -- | 4,000[b] | -- | 110,850 |
| Subtotal | 550 | 5,130 | 128,350 | 43,500 | 16,000 | 4,000[b] | 119,125 | 316,655 |
| **TOTAL (feet)** | **8,950** | **140,430** | **131,050** | **95,241** | **16,000** | **4,000[b]** | **119,125** | **514,796** |
| **TOTAL (meters)** | **2,728** | **42,803** | **39,944** | **29,030** | **4,877** | **1,219** | **36,309** | **156,910** |

-- = No activity reported.
[a]Does not include 503,885 feet of blasthole drilling.
[b]Auger

## METAL RECYCLING

Alaskan metal recyclers again battled low commodity prices and complex economic and political factors during 1991. Estimated 1991 value of recycled metals was $2,634,650, a decrease of 26% from the $3,570,000 we estimated for the 1990 effort. We emphasize that our lower values and volume figures are influenced by both weak commodity prices—which discouraged metal recycling especially by small operators—and by fewer industry replies. Only 5 of the 20 outlets that we know are exporting metals provided production and activity data. However, Alaska's four largest exporters of metal products did share with us detailed information about their operations. We hope this narrative offers interested readers a brief glimpse of the Alaskan metal recycling industry. Volume and value estimates summarized for both 1990 and 1991 are regarded as conservative (table 14).

K&K Recycling of Fairbanks and the Anchorage Recycling Center (ARC) were probably responsible for about 75% of nonferrous output in Alaska, excluding lead (fig. 46). Both indicated that activity levels were approximately

the same as 1990. ARC continues to expand rural transfer locations and has received non-baled material from many of Alaska's remote villages as well as from several hundred small outlets in the Anchorage area.

K&K Recycling bales most of the aluminum- and copper-based product in the Fairbanks area and transfers materials in tractor trailers to consignment buyers in the lower 48.

Alaskan Battery Supply (Fairbanks) and Battery Specialists Inc. (Anchorage) continue to lead Alaska in the recycling of lead-based batteries.

Former battery recycler Earl Romans is using technology he developed in Alaska to manufacture batteries in the Russian Far East, despite difficulties encountered with the Russian bureaucracy. Alaskan Battery Supply (ABS) continues to make a high quality Alaskan battery in Fairbanks for sale throughout Alaska.

Only two companies, K&K Recycling and BP Exploration, provided information on ferrous metal exports. Most of the material is derived from scrap on the North Slope and shipped to the Port of Anchorage via the Dalton Highway and Alaska Railroad.

## STATE LAND SELECTION PROJECT

As a result of the 1959 Alaska Statehood Act, the State of Alaska gained selection rights to 42.6 million ha (104.6 million acres) of land from the U.S. Government, nearly 28% of the total land area of Alaska. Congress made available this land grant in order to foster future economic and resource development, which would make the future State independent of Federal support assistance. The Statehood Act confirmed four territorial land grants (Mental Health, School, University, and University-Tanana) totaling about 494,000 ha (1.22 million acres) leaving 41.0 million ha (102.6 million acres) of general grant lands and 323,760 ha (800,000 acres) of community grant lands available for selection. In 1976 the State of Alaska received an additional 283,290 ha (700,000 acres) of land to select as part of the "Cook Inlet Land Exchange" (Public Law 94-204), which conveyed lands to Cook Inlet Region Incorporated (CIRI) (table 15).

The general grant lands were to be selected by the State within 25 years of the passage of the Statehood Act. However, a ten-year extension was granted to the State mainly as the result of the 1971 Alaska Native Claims Settlement Act (ANCSA) and the 1980 Alaska National Interest Conservation Act (ANILCA), which froze Alaska's selection rights for previously open Federal lands. So far, Alaska has received title to 34.4 million ha (85.1 million acres), which leaves approximately 8 million ha (20 million acres) of land to acquire.

Table 13. *Companies reporting significant drilling projects, 1991*

| | |
|---|---|
| Alaska Gold | Fairbanks Gold |
| AMAX Gold Exploration | Flat Creek Mining |
| American Copper and Nickel | Hobbs Industries |
| Arctic Slope Regional Corporation | Hunt Ware & Proffett |
| Battle Mountain | Idemitsu Alaska |
| Cambior Alaska | Kennecott Greens Creek |
| Central Alaska Gold Co. | North Pacific Mining Co. |
| Citigold Alaska Inc. | Placer Dome U.S. Inc. |
| Cominco Exploration | Polar Mining |
| Cominco Red Dog Mine | Rowallen Mine Partnership |
| Echo-Bay-AJ | Sealaska Corporation |
| Echo Bay-Kensington | Usibelli Coal Mine |

Table 14. *Reported scrap metal exports from Alaska, 1990-91*

| Commodity | 1990 Quantity pounds | 1990 Quantity kilograms | 1990 Value[a] | 1991 Quantity pounds | 1991 Quantity kilograms | 1991 Value |
|---|---|---|---|---|---|---|
| Aluminum | 1,500,000 | 679,650 | $ 580,000 | 1,340,000 | 607,824 | $ 536,000 |
| Copper | 585,000 | 265,064 | 600,000 | 482,100 | 218,680 | 520,650 |
| Brass | -- | -- | -- | 49,012 | 22,230 | 85,000 |
| Radiators | -- | -- | -- | 17,393 | 7,889 | 35,000 |
| Stainless steel | 6,475 | 2,933 | 30,000 | 851 | 386 | 8,000 |
| Lead | 3,600,000 | 1,634,040 | 1,260,000 | 3,000,000 | 1,360,800 | 750,000 |
| Ferrous scrap | 25,000,000 | 11,327,500 | 1,100,000 | 4,630,860 | 2,100,560 | 700,000 |
| TOTAL | | | $3,570,000 | | | $2,634,650 |

- - = None reported.
[a]Values determined from average price levels of refined commodities, and by information provided by four recycling companies.



Figure 46. *Baled aluminum at Anchorage Recycling Center facility in Anchorage. Metal recyclers battled low metal prices in 1991. (Photo by Tom Turner, Anchorage Recycling Center)*

The final deadline for the State of Alaska to file for its remaining lands under the Statehood Act is January 3, 1994.

Mining and the Alaskan economy have been interwoven since the United States purchased the Territory from Imperial Russia in 1867. Total value of Alaska's past mineral production—excluding oil and gas—amounts to nearly $19 billion at 1991 commodity prices. Gold, copper, platinum, coal and other commodities were all important to the Territory's economy prior to statehood. Today, zinc, gold, silver, lead, and coal make important contributions to the economic welfare of many of Alaska's citizens, particularly in rural areas.

With the continuing decline of Prudhoe Bay petroleum production, Alaska will be faced with steady revenue declines and reduced job opportunities in the private and public sectors. One of the most important actions of State government is to identify and select additional lands that can generate revenues, supply jobs, ensure access, provide for future business opportunities, and guarantee traditional uses of land such as farming, hunting, fishing, trapping, petroleum production, and mining. Table 16 summarizes the resource values of lands now owned by the State of Alaska.

## PROGRAM ORGANIZATION

The Department of Natural Resources Divisions were directed by former Commissioner Harold Heinze to establish a selection team to review remaining Federal lands that are eligible for State selection and to finalize or relinquish existing (but unpatented) State selections by the 1994 deadline. The team consists of the Divisions of Land, Water, Oil and Gas, Forestry, Mining, Geological & Geophysical Surveys, Parks and Outdoor Recreation, the State Pipeline Coordinators Office (SPCO), the Departments of Fish and Game, Transportation and Public Facilities, Commerce and Economic Development, Community and Regional Affairs, and the Alaska Energy Authority.

The Division of Geological & Geophysical Surveys has been assigned the task of evaluating the eligible Federal lands for their mineral and energy potential and providing SPCO with geotechnical information for potential transportation corridors.

## SELECTION METHOD

The selection team is reviewing approximately 21.1 million ha (52 million acres) of Federal public domain land managed by the U.S. Bureau of Land Management. These lands are shown in figure 47; also shown are areas where DGGS staff made field investigations in 1991 and where they anticipate doing field work in 1992. The Federal lands have been subdivided into 35 separate tracts on the basis of legal and geographic characteristics. The largest blocks of land are found in the western and southwestern parts of the State.

## MINERAL ASSESSMENT

Mineral resource assessment is a key element in the land selection project. Separate phases of the mineral assessment program are shown in figure 48. The first phase of each tract evaluation involves compiling previously published geologic, geochemical, and geophysical information. The most comprehensive source of broad, regional geologic data has been the U.S. Geological Survey's Alaska Mineral Resource Assessment Program (AMRAP), which provides regional geological mapping and geochemical, geophysical, and radiometric age-dating coverage for about 30% of the land selection areas. Other important data sources are the

Table 15. *Total Statehood entitlement summary*[a]

| | Acres | Hectares |
|---|---|---|
| Statehood Grants | | |
| General Grant | 102,550,000 | 41,501,985 |
| Community Grant | 400,000 | 161,880 |
| National Forest Grant | 400,000 | 161,880 |
| Territorial Grants | | |
| Mental Health | 1,000,000 | 407,700 |
| University | 100,000 | 40,470 |
| School (rounded) | 104,000 | 42,088 |
| University-Tanana (rounded) | 11,000 | 4,451 |
| Other Grants | | |
| ANILCA School Lands | 75,000 | 30,352 |
| Cook Inlet Land Exchange (net, rounded) | 691,000 | 279,648 |
| Other (rounded) | 1,000 | 408 |
| **TOTAL** | **105,332,000** | **42,614,910** |

[a]Data from Alaska Division of Lands

Table 16. *Table illustrating overlapping resource values of land currently owned by the State of Alaska (84.6 million acres; 34.2 million hectares)*[a]

| Values[b] | Percent | Acres (million) | Hectares (million) |
|---|---|---|---|
| Settlement | 4 | 3.39 | 1.37 |
| Agriculture | ≤1 | .74 | .30 |
| Grazing | 25 | 20.80 | 8.42 |
| Forestry | 7 | 5.92 | 2.40 |
| Public recreation | 16 | 13.23 | 5.35 |
| Wildlife habitat | 26 | 21.96 | 8.89 |
| Minerals | 16 | 13.31 | 5.39 |
| Oil and gas | 28 | 24.13 | 9.77 |
| Coal | 10 | 8.50 | 3.44 |
| General uses | 27 | 22.46 | 9.09 |
| Low values | 16 | 13.50 | 5.46 |

[a]Data from Alaska Division of Lands

[b]The value and percentage relates to the primary land value recognized; under the principles of multiple use, other values are also implied.

NOTE: Some State lands are assigned multiple values, therefore, the total is greater than 100% and greater than the 84.6 million acres (34.2 million hectares) that has been selected by the State of Alaska.

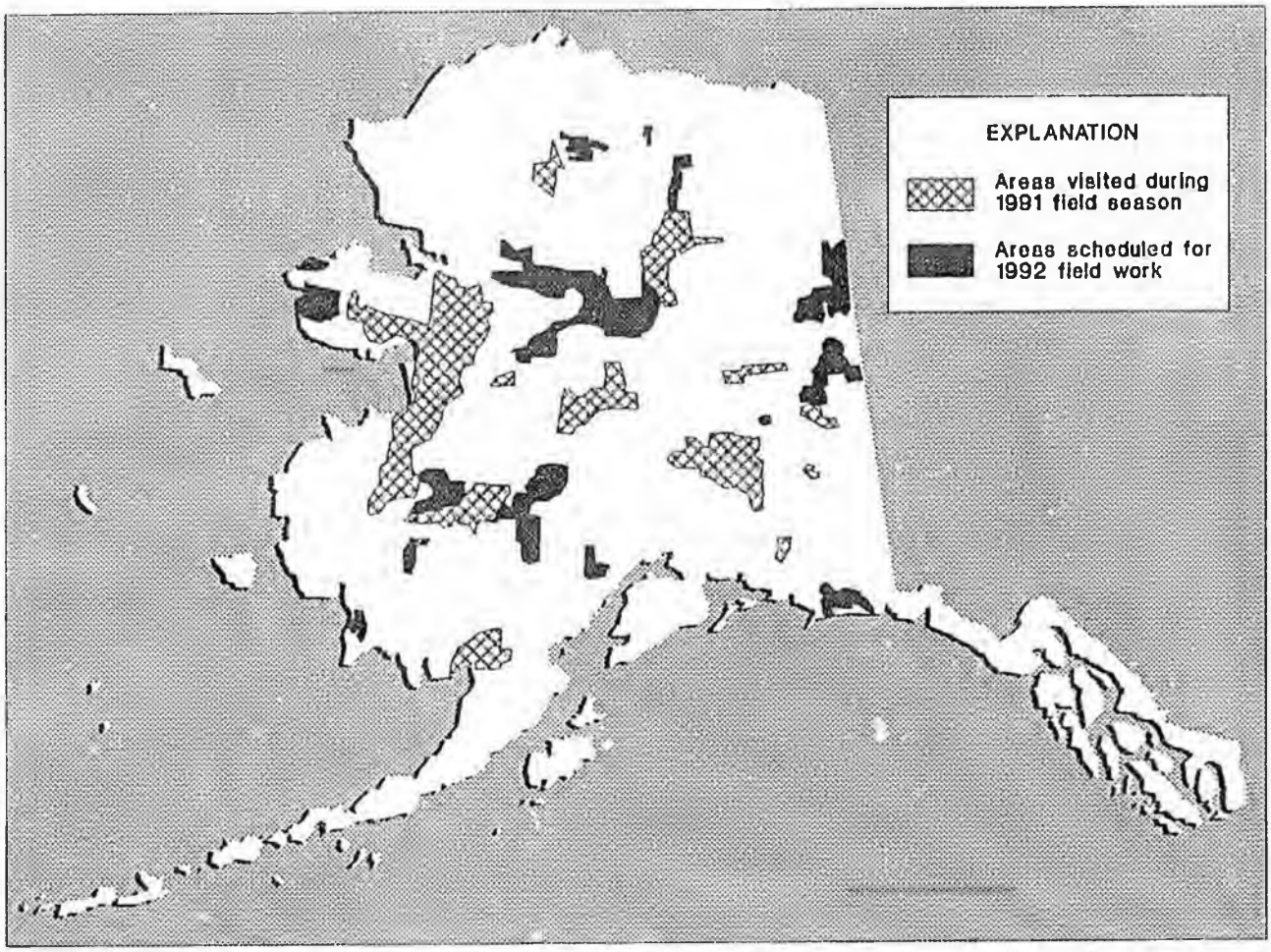



Figure 47. *Location of lands available for State selection that have been evaluated by geologists of the Division of Geological & Geophysical Surveys.*

U.S. Department of Energy's National Uranium Resource Evaluation (NURE) project, which provides regional geochemical and geophysical coverage for many of the land tracts, and the U.S. Bureau of Mines computerized mineral deposit MAS data file. Detailed geological and mineral deposit studies conducted by DGGS in southeastern Alaska (Haines-Skagway project), in southcentral Alaska (Clearwater Mountains and northern Talkeetna Mountains), on the Seward Peninsula (Sinuk and Bendeleben areas) in southwestern Alaska (Iditarod, Innoko, and Farewell districts) and in the pipeline corridor (Wiseman district) cover portions of six land selection areas, and are valuable sources of detailed mineral endowment information (fig. 49).

Claim information is coordinated through the Alaska Division of Mining and the U.S. Bureau of Mines; a computerized, section-level map of Alaska showing current and most historical claim activity has recently been produced on the DGGS computer system in Fairbanks for the endowment analysis.

Data for geothermal resources, construction materials, and coal are derived mainly from USGS and DGGS geological reports and DOTPF file reports.

The compilation of existing and newly acquired data is depicted on a series of overlays for each land selection area, which allows the respective mineral assessment teams to integrate all the data and arrive at specific conclusions concerning mineral deposit and terrane classification schemes.

The biggest problem facing the project is the lack of quality information for many selection areas in the State, particularly for large tracts in remote western and northern Alaska where only brief, reconnaissance geological surveys have been conducted. We estimate that only about 7% of Alaska has been geologically mapped at a scale of 1:63,360 or better—an obvious shortcoming for a project like this.

Field work began in 1991 and will continue through 1992. About 55% of the selection tracts have been investigated by DGGS staff, and we expect to complete the remaining areas during 1992 (fig. 47). Because of the time constraints and the enormous scope of the project, our field investigations have concentrated on acquiring data to outline permissive mineral terranes and to define mineral deposit types that occur in each land selection tract. This task has proved difficult in areas where little previous geological information is

available. However, progress was made in delineating mineral terrane and mineral deposit trends in virtually all land selection areas examined in 1991 (figs. 50, 51).

DGGS is using probabilistic modelling to estimate mineral endowment in the eligible Federal land areas. The DGGS endowment model (which was originally developed with the U.S. Bureau of Mines) is known as ROCKVAL and is one of several such models used by economic geologists at this time. The U.S. Geological Survey independently developed its own probabilistic mineral endowment model, which was used in the evaluation of mineral potential for the Tongass Timber Reform Act (Brew and others, 1991) and earlier in an evaluation of tin resources of the Seward Peninsula (Reed and others, 1989). We emphasize that our mineral endowment estimates do not determine economic viability of the mineral resources, but instead define a range of gross in-place values for comparisons between tracts of land.

The strength or weakness of the probabilistic method depends on how well understood the mineral deposit types or mineral terranes are in a given area (fig. 48). If the existing or newly acquired information cannot establish specific deposit classifications, then the method is replaced by more traditional methods of assessing mineral potential. When we are confident of deposit classification, we can compare the deposit and its host terrane with other worldwide examples as summarized in studies by Cox and Singer (1986), Laznika (1985), Nokleberg and others (1987), Hawley (1982), and Root and Scott (1988). Assignment of deposits and terranes to specific classifications permits comparisons of size, grade, and overall quality with thousands of ore deposits all over the world, and the computer simulation provides a range of sizes and grades (mineral content) of each deposit or terrane in the land tract

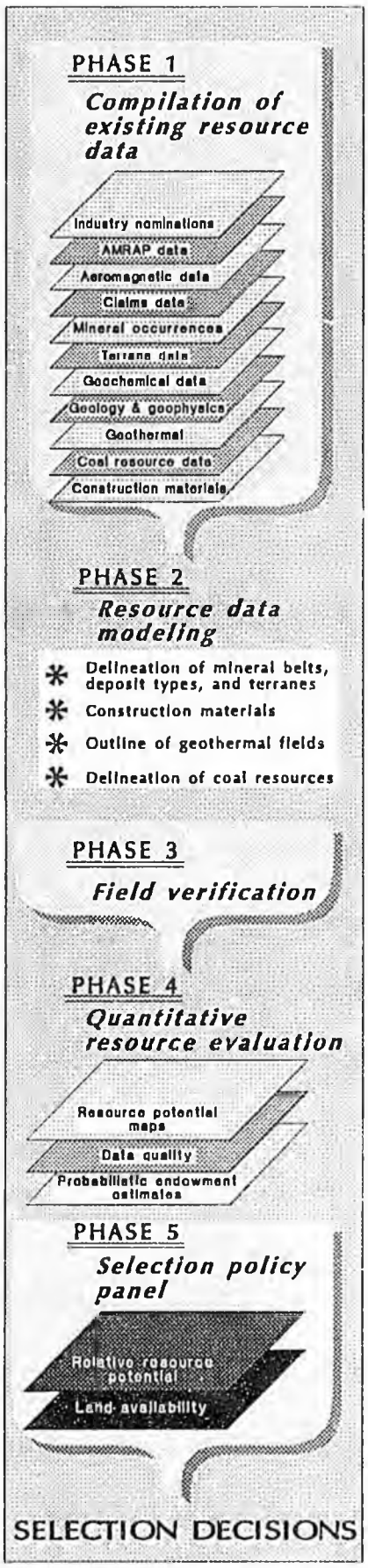



Figure 48. *Method used in compiling data for State Land Selection Program.*



Figure 49. *Haines barite deposit examined by Jan Still (U.S. Bureau of Mines) and Wyatt Gilbert (DGGS) in land selection area near Haines. The U.S. Bureau of Mines and DGGS conducted joint investigations on these lands through much of the 1980s. (Photo by T.K. Bundtzen)*



Figure 50. *Heavy-mineral concentrate being collected in the surf in State land selection area, north of Unalakleet. (Photo by T.K. Bundtzen)*



Figure 51. *G.M. Laird of DGGS samples a material site along the Kuskokwim River in State land selection area. (Photo by T.K. Bundtzen)*

evaluated. This portion of the land selection effort benefits from voluminous deposit information compiled by Dr. Rainer Newberry and his students at the Department of Geology of the University of Alaska in Fairbanks.

In addition, DGGS is using new discriminant models developed by Newberry and others (1990) from worldwide deposits. These models estimate the favorability of gold-bearing plutonic rocks.

### PRIVATE SECTOR INPUT

Last spring DGGS sent 124 land-selection mineral questionnaire packets to mining companies, consultants, and Native regional corporations to solicit their direct input into the State land selection process. The Alaska Miners Association (AMA) assisted us in formulating the mailing lists and information request. The Division of Mining provided additional land-status information. The packets contained a Series E Alaska Land Status Map (scale 1:2,500,000) which contains color-coded land status information. The mineral questionnaire asked for nonconfidential land nominations, mineral deposit type or terrane information, identification of specific mineral commodities in each nominated tract, a relative mineral-potential ranking, and any comments that might help the State select valuable mineral lands. We also supplied the questionnaire recipients with a mineral deposit summary published by Nokleberg and others (1987) that compared Alaskan ore deposits with the models of Cox and Singer (1986).

As this report is being written (June 1992), 14 mining companies and consultants and two Native corporations have identified mineralized areas, suggested priorities for access, and helped clarify land status questions in key areas. This information will be used along with mineral information from other sources. We thank all participants who responded to our questionnaire and hope that more will do so before the land selections are made.

### SUMMARY

By January 1994, mineral, energy, and construction material synopses of candidate lands will be forwarded to the land selection steering committee. The information used to arrive at tract boundaries, deposit types, and mineral endowment estimates will ultimately be released as a DGGS Public-data file report and made available to the general public.

## LAND AVAILABLE FOR MINERAL DEVELOPMENT

The following discussion summarizes an earlier U.S. Bureau of Mines (USBM) summary report by Bottgé (1989) entitled *Availability of Land for New Mineral Entry and Development in Alaska: A Summary Report*. The USBM study conducted between 1983 and 1987 investigated the Federal, State and private lands then available for mineral exploration and development in Alaska. All land status research was done at the 1:250,000 scale, and reflects accuracy to the section level. Acreage figures include bodies of water because the water area could not be accurately deleted at the scale used. USBM recently reviewed its summary data and concluded that the percentages of land ownership and availability had not varied by more than 1% or 2% since the Bottgé (1989) effort. Three regional reports (Roberts, 1985; Bottgé and Northam, 1987; and Bottgé, 1987) consist of three parts: (1) a review of the land ownership and availability of State, Federal, and private land for new mineral entry and development in Alaska, (2) a comparison of mineral terranes and land availability categories, and (3) a comparison of mineral deposits and mineral terranes to land availability categories.

Table 17 contains a detailed synopsis of land availability and ownership in Alaska, and shows that in 1986, 67% of Alaska land was Federally owned, 23% State owned, and 10% was privately owned. Private land in Alaska is 99% owned by Native corporations or individual Natives. The remaining land is municipality land or private land obtained for homesite, trade and manufacturing site, homestead, patented mining claim, or headquarters sites. By way of comparison, land ownership in the 11 western states is approximately 50% Federal, 7% State, and 43% private. By the year 2000, when all land selections have been adjudicated, the Federal Government will own about 60% of Alaska, the State 28% and Alaska Natives 11.5%. All other privately-owned land in Alaska will amount to about 0.5%.

While most of the land in Alaska is currently administered by the Federal government (103 million ha, 255 million acres), most of the land available for development is administered by the State (nearly 32.6 million ha, 78 million acres). While 80% of the Federal land is unavailable for new mineral entry, approximately 90% of the State-owned land is available. Approximately one-third of the land administered by the Bureau of Land Management and two-thirds of the Forest Service land is available or available with restrictions. None of the land administered by the Department of Defense, the Fish and Wildlife Service, or the National Park Service was considered available for new mineral location and development (fig. 52). Some of the BLM land that has been closed by the selection process will be available once all selections are adjudicated. All land owned by the Native corporations was deemed available with restrictions.

As part of this project, land underlain by currently recognized mineral terranes was compared with the various land categories. A mineral terrane is an assemblage of related rocks likely to contain mineral deposits that formed under similar geologic processes. A knowledge of the relationships between mineral occurrences and terranes can greatly aid in the exploration for new mineral deposits. This same knowledge can be useful to determine the types of minerals that can likely be found if exploration is encouraged. For purposes

Table 17. *Approximate availability of lands open to mineral entry in Alaska in 1989 (in millions of acres, millions of hectares)*

| | Available | Available with restrictions | Unavailable | Total acres | Percent of total land |
|---|---|---|---|---|---|
| Federal lands | | | | | |
| Bureau of Land Management | 29.1 | 2.2 | 63.3 | 94.6 | 25.0 |
| Fish and Wildlife Service | 0 | 0 | 81.2 | 81.2 | 21.4 |
| National Park Service | 0 | 0 | 54.3 | 54.3 | 14.4 |
| Forest Service | 10.2 | 5.1 | 8.0 | 23.3 | 6.1 |
| Department of Defense | 0 | 0 | 1.8 | 1.8 | 0.4 |
| Subtotal ( acres) | 39.3 | 7.3 | 208.6 | 255.2[a] | 67.3 |
| Subtotal (hectares) | 15.9 | 3.0 | 84.3 | 103.3 | |
| State lands | | | | | |
| Division of Lands | 75.7 | 0 | 5.1 | 80.8 | 21.4 |
| Division of Parks and Outdoor Recreation | 0 | 0 | 3.0 | 3.0 | 1.0 |
| Division of Forestry | 2.0 | 0 | 0 | 2.0 | 0.5 |
| Department of Fish and Game | 0 | 0 | 1.8 | 1.8 | 0.4 |
| Subtotal (acres) | 77.7 | 0 | 9.9 | 87.6 | 23.3 |
| Subtotal (hectares) | 31.4 | -- | 4.0 | (35.5) | |
| Private land[b,c] | | | | | |
| Native corporations | 0 | 34.9 | 0 | 34.9 | 9.2 |
| Municipalities | 0 | 0 | .5 | .5 | 0.2 |
| Subtotal (acres) | 0 | 34.9 | .4 | 35.3 | 9.4 |
| Subtotal (hectares) | 0 | 14.1 | 0.2 | 14.3 | |
| TOTAL (acres) | 117.0 | 42.2 | 218.9 | 378.1[d] | 100.0 |
| (Percent of total Alaska land) | (31%) | (11%) | (58%) | | |
| TOTAL (hectares) | 47.3 | 17.0 | 88.6 | 153.0 | |

SOURCE: Modified from Bottgé, 1989.

[a]Includes 54,828,000 acres selected by the State of Alaska or Native corporations under the appropriate laws. In thousands of acres (thousands of hectares):

| | | |
|---|---|---|
| Nativelands | 13,653 | (5,525) |
| State lands | 13,622 | (5,513) |
| State and Native lands | 7,638 | (3,091) |
| Native selections in closed Federal lands | 16,157 | (6,539) |
| State selections in closed Federal lands | 2,837 | (1,148) |
| State and Native selections in closed Federal lands | 921 | (373) |
| TOTAL | 54,828 | (22,189) |

[b]Federal lands selected for conveyance to individuals in all land categories under "Federal lands" above, and cannot be separated from the U.S. Bureau of Land Management, U.S. Fish and Wildlife Service, and National Park Service lands listed. In thousands of acres (thousands of hectares):

| | | |
|---|---|---|
| Native allotments, selected | 1,136 | (460) |
| Native allotments, conveyed | 185 | (75) |
| Other private lands, selected | 447 | (181) |
| Other private lands, conveyed | 970 | (393) |
| TOTAL | 2,738 | (1,109) |

[c]Information on State land transferred to private ownership is not available.

[d]Includes 365.2 million acres (147.8 million hectares) of land and 12.9 million acres (5.2 million hectares) of water.

of this study, a generalized mineral terrane map of Alaska adopted from Hawley's 1982 *Mineral Terranes of Alaska* was used as the source document. According to Hawley, only one-third of the State's mineral terranes were recognized at the time of the 1982 study.

Table 18 shows the availability of land underlain by recognized mineral terranes for new mineral exploration and development. The Federal government, which once owned all of Alaska, still owns two-thirds of the land and retains 70% of the land underlain by mineral terranes. Only 15% of the 37.4 million ha (92.5 million acres) of mineral terranes underlaying Federal land is

available for new mineral exploration and development (6.4 million ha, 15.7 million acres) versus approximately 91% of the mineral terrane encompassed by State-owned land (10.4 million ha, 25.72 million acres). All Native-owned land is designated here as land available with restrictions. Even if all of the land selected by the State government and the Native corporations is conveyed to them, two-thirds of the Federal land underlain by mineral terranes will be closed to mineral entry.

If one-third of the State is underlain by mineral terranes, and one-third of that land is actually available for new mineral exploration and development, then for all of Alaska, just over 10% of the land is both underlain by mineral terranes and also available for mineral exploration and development, 15%, if the Native lands are included. Bottgé (1989) also included the preparation of a data base that contains a total of 6,192 mineral deposits and occurrences in the State. Tabulations were made comparing the mineral deposits and mineral terranes against land availability categories . These tabulations are summarized by land category in table 19.

This database shows that the largest number of known mineral deposits is on Federal land (3,310), but there are more than twice as many mineral deposits on available State land (1,979) as there are on available Federal land (940).

Table 18. *Number of mineral deposits in each land available category, by deposit type. (From Bottgé 1989)*

| Land category | Placer | Lode | Total |
|---|---|---|---|
| Available | | | |
| Open Federal | 267 | 673 | 940 |
| Open State | 1,170 | 809 | 1,979 |
| Total available | 1,437 | 1,482 | 2,919 |
| Available with restrictions | | | |
| Open Federal | 135 | 133 | 268 |
| Patented Native | 253 | 402 | 655 |
| Total restricted | 388 | 535 | 923 |
| Unavailable | | | |
| Closed Federal | 348 | 744 | 1,092 |
| State/Native select | 564 | 446 | 1,010 |
| Total Federal | 912 | 1,190 | 2,102 |
| Closed State | 78 | 71 | 149 |
| Closed municipality | 21 | 78 | 99 |
| Total State/municipality | 99 | 149 | 248 |
| Total unavailable | 1,011 | 1,339 | 2,350 |
| TOTAL | 2,836 | 3,356 | 6,192 |

Table 19. *Recognized mineral terranes (in millions of acres). (From Bottgé, 1989)*

| Land category | Volcanic rocks | Intrusive | Sediments | Total | % of total Alaska land (365.3) | % of recognized mineral terrane (132.9) |
|---|---|---|---|---|---|---|
| Available | | | | | | |
| Open Federal | 7.78 | 3.01 | 3.25 | 14.04 | | |
| Open State | 7.47 | 5.24 | 13.01 | 25.72 | | |
| Total available | 15.25 | 8.25 | 16.26 | 39.76 | 10 | 30 |
| Available with restrictions | | | | | | |
| Open Federal | 0.48 | 0.86 | 0.32 | 1.66 | | |
| Patented Native | 4.14 | 1.27 | 6.78 | 12.19 | | |
| Total restricted | 4.62 | 2.13 | 7.10 | 13.85 | 5 | 10 |
| Unavailable | | | | | | |
| Closed Federal | 17.65 | 6.68 | 31.11 | 55.44 | | |
| State/Native select | 7.67 | 3.82 | 9.83 | 21.32 | | |
| Total Federal | 25.32 | 10.50 | 40.94 | 76.76 | 20 | 58 |
| Closed State | .72 | .38 | 1.13 | 2.23 | | |
| Closed municipality | .11 | .01 | .15 | .27 | | |
| Total State/municipality | .83 | .39 | 1.28 | 2.5 | 1 | 2 |
| Total unavailable | 26.15 | 10.89 | 42.22 | 79.26 | | |
| TOTAL | 46.02 | 21.27 | 65.58 | 132.87 | 35 | 100 |

## SUMMARY

As of July 1986, expressed as a total of Alaska's 153 million ha (378.2 million acre) area, 47.3 million ha (116.9 million acres) (31%) of the study areas were available for new claim location and development; 17.0 million ha (42.2 million acres) (11%) were available with restrictions; and 88.7 million ha (219.1 million acres) (58%) were unavailable for mineral development.

About one-third of the State (16.1 million ha; 132.9 million acres) is underlain by currently recognized mineral terranes. Only one-third of the lands underlain by mineral terranes (16.1 ha, 39.8 million acres) is open for new claim location and development. Therefore, only 10% of the State is currently recognized as being both available and favorable for mineral exploration.

A total of 6,192 recognized metallic mineral deposits and occurrences are found in the State—3,356 lode and 2,836 placer deposits. The greatest number of deposits occur on Federal land, but two thirds of those deposits are unavailable for new mineral entry and development. More than twice as many deposits occur on available State land as on available Federal land.

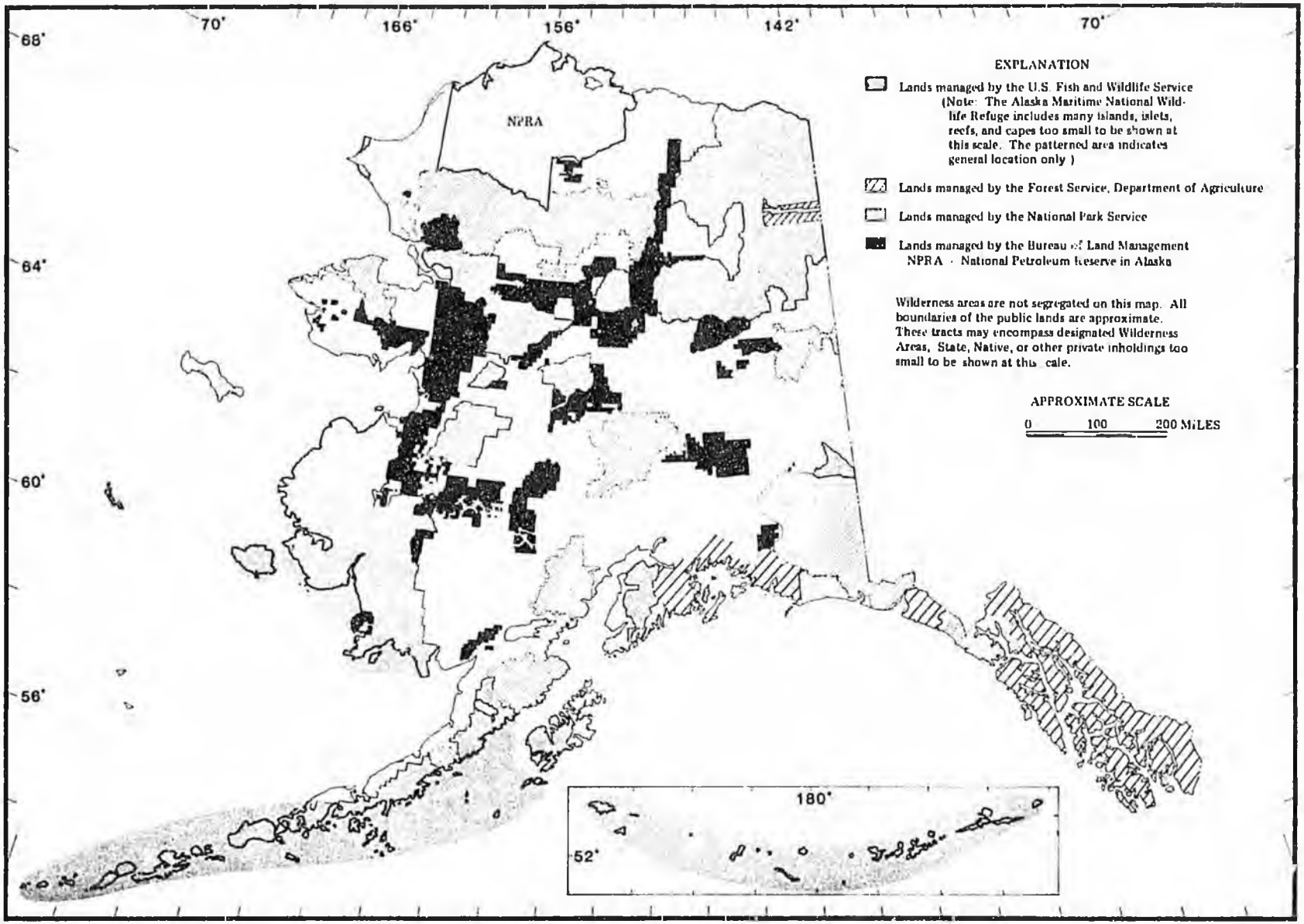



Figure 52. *Federal land ownership in Alaska.*

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# APPENDIX A
## Total active claims and new claims staked in 1989, 1990, and 1991[a] (listed by quadrangle)[b]
## Compiled by Erik Hansen (DOM)

| | | Active claims assessment work | | | New claims staked | | | | | | Total active claims[c] | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Federal | | | State | | | | | |
| | Quadrangle | 1989 | 1990 | 1991 | 1989 | 1990 | 1991 | 1989 | 1990 | 1991 | 1989 | 1990 | 1991 |
| 13 | Umiat | 0 | 0 | 0 | 0 | 0 | 15 | 0 | 0 | 0 | 0 | 0 | 15 |
| 14 | Sagavanirktok | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| 15 | Mt. Michelson | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 17 | Point Hope | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 18 | De Long Mts. | 1,350 | 1,386 | 1,388 | 0 | 0 | 0 | 107 | 0 | 0 | 1,457 | 1,386 | 1,388 |
| 23 | Phillip Smith Mts. | 9 | 9 | 5 | 2 | 2 | 3 | 1 | 1 | 2 | 12 | 12 | 10 |
| 26 | Noatak | 187 | 66 | 66 | 0 | 0 | 0 | 0 | 0 | 0 | 187 | 66 | 66 |
| 27 | Baird Mts. | 130 | 114 | 126 | 0 | 0 | 0 | 0 | 2 | 0 | 130 | 116 | 126 |
| 28 | Ambler River | 104 | 110 | 111 | 0 | 0 | 0 | 0 | 7 | 0 | 104 | 117 | 111 |
| 29 | Survey Pass | 37 | 34 | 34 | 0 | 0 | 0 | 0 | 0 | 0 | 37 | 34 | 34 |
| 30 | Wiseman | 1,393 | 1,385 | 1,346 | 3 | 4 | 2 | 90 | 90 | 7 | 1,486 | 1,479 | 1,355 |
| 31 | Chandalar | 828 | 752 | 645 | 0 | 0 | 17 | 8 | 24 | 12 | 836 | 776 | 674 |
| 32 | Christian | 2 | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 1 | 2 |
| 35 | Kotzebue | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 36 | Selawik | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 37 | Shungnak | 6 | 1 | 28 | 0 | 0 | 0 | 0 | 0 | 0 | 6 | 1 | 28 |
| 38 | Hughes | 54 | 54 | 54 | 0 | 0 | 0 | 0 | 0 | 0 | 54 | 54 | 54 |
| 39 | Bettles | 366 | 298 | 360 | 48 | 29 | 5 | 0 | 4 | 0 | 414 | 331 | 365 |
| 43 | Teller | 380 | 488 | 382 | 0 | 0 | 0 | 98 | 30 | 60 | 478 | 518 | 442 |
| 44 | Bendeleben | 1,107 | 839 | 819 | 2 | 0 | 0 | 249 | 32 | 75 | 1,358 | 871 | 894 |
| 45 | Candle | 453 | 486 | 470 | 0 | 0 | 8 | 16 | 16 | 7 | 469 | 502 | 485 |
| 47 | Melozitna | 131 | 125 | 117 | 0 | 0 | 0 | 9 | 4 | 0 | 140 | 129 | 117 |
| 48 | Tanana | 1,296 | 1,027 | 914 | 0 | 0 | 0 | 123 | 117 | 168 | 1,419 | 1,144 | 1,082 |
| 49 | Livengood | 3,578 | 3,335 | 4,187 | 0 | 0 | 0 | 328 | 116 | 143 | 3,906 | 3,502 | 4,330 |
| 50 | Circle | 4,582 | 3,394 | 3,296 | 0 | 41 | 8 | 446 | 301 | 270 | 5,028 | 3,736 | 3,574 |
| 51 | Charley River | 146 | 183 | 182 | 0 | 0 | 0 | 18 | 0 | 0 | 164 | 183 | 182 |
| 52 | Nome | 687 | 697 | 625 | 0 | 0 | 61 | 103 | 33 | 64 | 790 | 730 | 750 |
| 53 | Solomon | 329 | 396 | 332 | 0 | 0 | 0 | 256 | 16 | 95 | 585 | 412 | 427 |
| 54 | Norton Bay | 91 | 110 | 110 | 0 | 0 | 0 | 0 | 0 | 0 | 91 | 110 | 110 |
| 55 | Nulato | 3,175 | 3,175 | 1,632 | 0 | 0 | 0 | 78 | 0 | 0 | 3,253 | 3,175 | 1,632 |
| 56 | Ruby | 1,057 | 846 | 764 | 0 | 0 | 0 | 52 | 1 | 18 | 1,109 | 847 | 782 |
| 57 | Kantishna River | 244 | 243 | 133 | 1 | 9 | 15 | 0 | 0 | 0 | 245 | 252 | 148 |
| 58 | Fairbanks | 2,209 | 2,158 | 2,252 | 0 | 0 | 0 | 303 | 206 | 149 | 2,512 | 2,364 | 2,401 |
| 59 | Big Delta | 2,430 | 1,998 | 2,677 | 0 | 10 | 541 | 105 | 398 | 789 | 2,535 | 2,406 | 4,007 |
| 60 | Eagle | 2,480 | 1,973 | 1,268 | 0 | 1 | 5 | 113 | 129 | 84 | 2,593 | 2,103 | 1,357 |
| 63 | Unalakleet | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 64 | Ophir | 654 | 657 | 365 | 0 | 0 | 0 | 36 | 9 | 12 | 690 | 666 | 377 |
| 65 | Medfra | 250 | 281 | 254 | 0 | 0 | 0 | 9 | 24 | 1 | 259 | 305 | 255 |
| 66 | Mt. McKinley | 313 | 233 | 338 | 0 | 0 | 0 | 0 | 20 | 25 | 313 | 253 | 363 |
| 67 | Healy | 3,301 | 4,307 | 3,536 | 135 | 605 | 42 | 187 | 84 | 204 | 3,623 | 4,996 | 3,782 |
| 68 | Mt. Hayes | 3,273 | 2,871 | 3,339 | 41 | 240 | 16 | 188 | 15 | 23 | 3,502 | 3,126 | 3,378 |
| 69 | Tanacross | 1,185 | 1,144 | 1,360 | 0 | 0 | 0 | 79 | 19 | 166 | 1,264 | 1,163 | 1,526 |
| 72 | Holy Cross | 0 | 5 | 6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 6 |
| 73 | Iditarod | 1,586 | 1,399 | 664 | 54 | 0 | 0 | 63 | 10 | 6 | 1,703 | 1,409 | 670 |
| 74 | McGrath | 348 | 329 | 75 | 0 | 0 | 0 | 0 | 0 | 0 | 348 | 329 | 75 |
| 75 | Talkeetna | 2,197 | 1,758 | 1,514 | 0 | 0 | 0 | 141 | 111 | 89 | 2,338 | 1,869 | 1,603 |
| 76 | Talkeetna Mts. | 1,528 | 770 | 629 | 0 | 3 | 0 | 177 | 120 | 109 | 1,705 | 893 | 738 |
| 77 | Gulkana | 24 | 20 | 18 | 0 | 0 | 0 | 2 | 0 | 10 | 26 | 20 | 28 |
| 78 | Nabesna | 189 | 354 | 304 | 0 | 0 | 0 | 71 | 4 | 39 | 260 | 358 | 343 |
| 81 | Russian Mission | 48 | 51 | 44 | 0 | 0 | 0 | 0 | 0 | 0 | 48 | 51 | 44 |
| 82 | Sleetmute | 267 | 185 | 155 | 0 | 0 | 0 | 0 | 0 | 0 | 267 | 185 | 155 |
| 83 | Lime Hills | 122 | 102 | 12 | 0 | 0 | 0 | 0 | 0 | 3 | 122 | 102 | 15 |

[a]Total count based on all documents recorded through January 1, 1992.
[b]Quadrangles numbered northwest to southeast according to DGGS-DOM numbering and Kardex systems.
[c]Excluding an undetermined number of claims on State selected land.

## APPENDIX A—Continued

| | Quadrangle | Active claims assessment work 1989 | 1990 | 1991 | New claims staked Federal 1989 | 1990 | 1991 | State 1989 | 1990 | 1991 | Total active claims 1989 | 1990 | 1991 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 84 | Tyonek | 5,340 | 5,137 | 4,307 | 0 | 0 | 0 | 11 | 26 | 44 | 5,351 | 5,163 | 4,351 |
| 85 | Anchorage | 407 | 689 | 607 | 2 | 0 | 17 | 89 | 181 | 182 | 498 | 870 | 806 |
| 86 | Valdez | 414 | 465 | 268 | 145 | 10 | 4 | 20 | 7 | 41 | 579 | 482 | 313 |
| 87 | McCarthy | 186 | 103 | 193 | 0 | 0 | 0 | 0 | 0 | 0 | 186 | 103 | 193 |
| 91 | Bethel | 485 | 380 | 59 | 0 | 0 | 0 | 48 | 0 | 2 | 533 | 380 | 61 |
| 92 | Taylor Mts. | 273 | 263 | 290 | 0 | 0 | 0 | 12 | 0 | 0 | 285 | 263 | 290 |
| 93 | Lake Clark | 588 | 387 | 386 | 0 | 0 | 0 | 10 | 0 | 1 | 598 | 387 | 387 |
| 94 | Kenai | 12 | 14 | 12 | 0 | 0 | 0 | 0 | 0 | 0 | 12 | 14 | 12 |
| 95 | Seward | 2,024 | 1,484 | 1,523 | 131 | 38 | 141 | 20 | 36 | 5 | 2,175 | 1,558 | 1,669 |
| 96 | Cordova | 0 | 0 | 2 | 1 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 3 |
| 97 | Bering Glacier | 283 | 274 | 298 | 0 | 0 | 0 | 0 | 0 | 4 | 283 | 274 | 302 |
| 101 | Goodnews | 39 | 75 | 39 | 0 | 0 | 0 | 0 | 0 | 0 | 39 | 75 | 39 |
| 102 | Dillingham | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 103 | Iliamna | 700 | 780 | 1,194 | 0 | 0 | 0 | 133 | 86 | 450 | 833 | 866 | 1,644 |
| 104 | Seldovia | 9 | 10 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 9 | 10 | 2 |
| 105 | Blying Sound | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 |
| 107 | Icy Bay | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 0 |
| 108 | Yakutat | 1 | 1 | 1 | 0 | 0 | 0 | 2 | 0 | 0 | 3 | 1 | 1 |
| 109 | Skagway | 485 | 473 | 493 | 2 | 27 | 1 | 19 | 0 | 0 | 506 | 500 | 494 |
| 111 | Mt. Fairweather | 4 | 4 | 2 | 0 | 4 | 0 | 0 | 2 | 0 | 4 | 10 | 2 |
| 112 | Juneau | 3,251 | 3,947 | 2,807 | 293 | 255 | 174 | 49 | 54 | 1 | 3,593 | 4,056 | 2,982 |
| 113 | Taku River | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 114 | Sitka | 432 | 289 | 379 | 0 | 94 | 11 | 0 | 4 | 0 | 432 | 387 | 390 |
| 115 | Sumdum | 143 | 121 | 176 | 19 | 97 | 38 | 0 | 0 | 0 | 162 | 218 | 214 |
| 116 | Port Alexander | 184 | 107 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 185 | 107 | 1 |
| 117 | Petersburg | 480 | 448 | 482 | 23 | 89 | 26 | 0 | 0 | 2 | 503 | 537 | 510 |
| 118 | Bradfield Canal | 107 | 361 | 294 | 262 | 134 | 2 | 0 | 0 | 0 | 469 | 495 | 296 |
| 119 | Craig | 905 | 943 | 938 | 262 | 24 | 115 | 0 | 0 | 0 | 1,167 | 967 | 1,051 |
| 120 | Ketchikan | 391 | 391 | 398 | 137 | 107 | 32 | 1 | 51 | 15 | 529 | 549 | 445 |
| 121 | Dixon Entrance | 181 | 186 | 184 | 0 | 65 | 0 | 0 | 0 | 0 | 181 | 251 | 184 |
| 122 | Prince Rupert | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 123 | Hagemeister Island | 374 | 216 | 240 | 0 | 0 | 0 | 0 | 0 | 0 | 374 | 216 | 240 |
| 126 | Mt. Katmai | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 127 | Afognak | 2 | 2 | 2 | 0 | 0 | 0 | 0 | 36 | 0 | 2 | 38 | 2 |
| 130 | Karluk | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 133 | Chignik | 71 | 71 | 71 | 0 | 0 | 0 | 0 | 0 | 0 | 71 | 71 | 71 |
| 135 | Trinity Islands | 437 | 380 | 373 | 0 | 0 | 0 | 49 | 83 | 14 | 486 | 463 | 387 |
| 138 | Port Moller | 17 | 16 | 17 | 0 | 0 | 0 | 9 | 0 | 0 | 26 | 16 | 17 |
| 143 | Unalaska | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 |
| | TOTAL | 64,123 | 58,067 | 52,976 | 1,664 | 2,573 | 1,299 | 8,062 | 1,888 | 3,391 | 67,948 | 62,528 | 57,666 |

# APPENDIX B
## 1991 Prospecting sites on State lands
## Compiled by Erik Hansen (DOM)

| | Quadrangle | New sites | Extensions | Total |
|---|---|---|---|---|
| 23 | Philip Smith Mts. | 3 | 0 | 3 |
| 27 | Baird Mts. | 7 | 0 | 7 |
| 30 | Wiseman | 0 | 4 | 4 |
| 31 | Chandalar | 1 | 6 | 7 |
| 44 | Bendeleben | 8 | 0 | 8 |
| 45 | Candle | 21 | 0 | 21 |
| 48 | Tanana | 57 | 0 | 57 |
| 49 | Livengood | 33 | 1 | 34 |
| 50 | Circle | 131 | 58 | 189 |
| 52 | Nome | 18 | 7 | 25 |
| 53 | Solomon | 0 | 9 | 9 |
| 57 | Kantishna River | 6 | 0 | 6 |
| 58 | Fairbanks | 25 | 16 | 41 |
| 59 | Big Delta | 154 | 63 | 217 |
| 60 | Eagle | 41 | 0 | 41 |
| 64 | Ophir | 2 | 0 | 2 |
| 67 | Healy | 17 | 11 | 28 |
| 68 | Mt. Hayes | 14 | 20 | 34 |
| 69 | Tanacross | 23 | 7 | 30 |
| 73 | Iditarod | 1 | 0 | 1 |
| 75 | Talkeetna | 27 | 0 | 27 |
| 76 | Talkeetna Mts. | 30 | 0 | 30 |
| 78 | Nabesna | 8 | 0 | 8 |
| 82 | Sleetmute | 3 | 0 | 3 |
| 84 | Tyonek | 51 | 0 | 51 |
| 85 | Anchorage | 28 | 18 | 46 |
| 91 | Bethel | 8 | 0 | 8 |
| 95 | Seward | 8 | 0 | 8 |
| 103 | Iliamna | 0 | 14 | 14 |
| 135 | Trinity Islands | 3 | 0 | 3 |
| TOTAL | | 728 | 234 | 962 |

# APPENDIX C

## State and Federal agencies, and private interest groups involved in mineral development activities, 1991

(Note: The *1992 Service Directory of the Alaska Miners Association* lists technical and professional consultants and companies available for work in Alaska. The report is available for $12 from the Association's Anchorage office. See p. 61 for the address.)

### STATE OF ALASKA AGENCIES

**DEPARTMENT OF COMMERCE AND ECONOMIC DEVELOPMENT**
State Office Building, 9th Fl.
P.O. Box 110800 (mailing)
Juneau, AK 99811-0800
(907) 465-2500
Commissioner-Paul Fuhs (Acting)

Function: *Promotes economic development in Alaska.*

Division of Economic Development
State Office Building, 9th Fl.
P.O. Box 110804 (mailing)
Juneau, AK 99811-0804
(907) 465-2017
Acting Director-Diane Mayer
Deputy Director Vacant
Development Specialist- Al Clough

1001 Noble St., Ste. 360
Fairbanks, AK 99701
(907) 452-7464
Development Specialist-Richard Swainbank

Function: *Primary advocacy agency in state government for economic growth. Researches and publishes economic data on Alaska's mining industry. Provides information and assistance to new or developing businesses. Attracts capital investment by advertising Alaska's resources potential. Provides research staff aid for the Alaska Minerals Commission.*

**DEPARTMENT OF ENVIRONMENTAL CONSERVATION**
410 Willoughby Ave., Ste. 105
Juneau, AK 99801-1795
(907) 465-5000
Public Information (907) 465-5060
Commissioner-John A. Sandor
(907) 465-5050

Function: *Issues permits for activities, including mining, that affect air or water quality or involve land disposal of wastes. Sets air- and water-quality standards. Inspects, monitors, and enforces environmental quality statutes, regulations, and permits. Reviews all federal permits.*

Northern Regional Office
1001 Noble St., Ste. 350
Fairbanks, AK 99701
(907) 451-2101
Regional Supervisor-William McGee

Southcentral Regional Office
601 C St., Ste. 1334, Frontier Bldg.
Anchorage, AK 99503
(907) 563-6529
Permit Information (907) 563-6529
(collect calls accepted)
Regional Administrator-Svend Brandt-Ericksen

Nome District Office
P.O. Box 1815
Nome, AK 99762
(907) 443-2600
(907) 443-5961(fax)
District Manager-Randy Romenesko

Southeastern Regional Office
410 Willoughby Ave., Ste. 105
Juneau, AK 99801-1795
(907) 465-5350
Permit Information (907) 465-2615
(collect calls accepted)
Regional Administrator-Dick Stokes

**DEPARTMENT OF FISH AND GAME**
Capital Office Park
P.O. Box 25526 (mailing)
Juneau, AK 99802-5526
Commissioner-Carl L. Rosier
(907) 465-4100

Habitat Division Director-Frank Rue
(907) 465-4105

Function: *Protects habitat in fish streams and manages refuges, sanctuaries, and critical habitats. Requires permits for any work involving: the blockage of fish passage; equipment crossings or operation in streams with anadromous fish; use, diversion, or pollution of streams containing anadromous fish; construction, exploration, or development work in state game refuges, game sanctuaries, and critical habitat areas.*

Central Regional Office
Habitat Division
1300 College Rd.
Fairbanks, AK 99701
(907) 451-6192
Regional Supervisor-Alvin Ott

Southcentral Regional Office
Habitat Division
333 Raspberry Rd.
Anchorage, AK 99518-1599
(907) 267-2335
Regional Supervisor-Lance Trasky

Southeastern Regional Office
Habitat Division
803 3rd St., 1st Fl.
P.O. Box 240020 (mailing)
Douglas, AK 99824
(907) 465-4290
Regional Supervisor-Rick Reed

**OFFICE OF MANAGEMENT AND BUDGET**
Division of Governmental Coordination
431 North Franklin St.
P.O. Box 110030 (mailing)
Juneau, AK 99811-0030
(907) 465-3562
Director-Paul Rusanowski

Function: *Conducts coordinated state review of permits for mining projects within Alaska's Coastal Management Zone. Provides information to applicants on project design for consistency with the policies and standards of the Alaska Coastal Management Program. Coordinates state response to direct federal actions, including proposed regulations, that affect Alaska's mining industry.*

Northern Regional Office
675 Seventh Ave.
Station H (mailing)
Fairbanks, AK 99701-4596
(907) 451-2818
Project Coordinator-Patti Wightman

Southcentral Regional Office
3601 C St., Ste. 370, Frontier Bldg.
Anchorage, AK 99503-2798
(907) 561-6131
Fax: (907) 561-6134
Project Review Coordinator-
Molly K. Birnbaum

Southeastern Regional Office
431 North Franklin St.
P.O. Box 110030(mailing)
Juneau, AK 99811-0030
(907) 465-3562
Project Review Coordinator-
Lorraine Marshall

**DEPARTMENT OF NATURAL RESOURCES**
400 Willoughby Ave., 5th Fl.
Juneau, AK 99801
(907) 465-2400
Commissioner-Glenn A. Olds

Division of Forestry
3601 C St., Ste. 1058, Frontier Bldg.
P.O. Box 107005 (mailing)
Anchorage, AK 99510-7005
(907) 762-2501
Director-Malcolm R. Dick, Jr.

Function: *Establishes guidelines to manage mining in state forests.*

Northern Regional Office
3700 Airport Way
Fairbanks, AK 99709-4699
(907) 451-2660
Regional Forester-Lester Fortune

Southcentral Regional Office
3601 C St., Ste. 1008, Frontier Bldg.
P.O. Box 107005 (mailing)
Anchorage, AK 99510-7005
(907) 762-2117
Regional Forester-Dave Wallingford

Southeastern Regional Office
400 Willoughby Ave., 5th Fl.
Juneau, AK 99801
(907) 465-2491
Regional Forester-Jim McAllister

**Division of Geological & Geophysical Surveys**
794 University Ave., Ste. 200
Fairbanks, AK 99709-3645
(907) 474-7147
State Geologist-Thomas E. Smith

Function: *Conducts geological and geophysical surveys to determine the potential of Alaskan land for production of metals, minerals, fuels, and geothermal resources; locations and supplies of construction materials; potential geologic hazards to buildings, roads, bridges, and other installations and structures; and other surveys and investigations as will advance knowledge of the geology of Alaska and general geologic inventories. Publishes a variety of reports that contain the results of these investigations. Advises the public and government agencies on geologic issues. Maintains a library of geologic bulletins, reports, and periodicals. Maintains a drill-core storage facility at Eagle River.*

Southcentral Regional Office
400 Willoughby Ave., 3rd Fl.
Juneau, AK 99801
(907) 465-2520
Geologist-Roman J. Motyka

**Division of Land**
3601 C St., Ste. 814, Frontier Bldg.
P.O. Box 107005 (mailing)
Anchorage, AK 99510-7005
(907) 762-2692
Director-Ron Swanson

Function: *Manages surface estate and resources, including materials (gravel, sand, and rock). Handles statewide and regional land-use planning. Issues leases, material-sale contracts, mill-site permits, land-use permits, and easements for temporary use of State land and access roads.*

Northern Regional Office
3700 Airport Way
Fairbanks, AK 99709-4699
(907) 451-2700
Regional Manager-Rick Smith

Southcentral Regional Office
3601 C St., Ste. 1080, Frontier Bldg.
P.O. Box 107005 (mailing)
Anchorage, AK 99510-7005
(907) 762-2253
Regional Manager-Richard Thompson

Southeastern Regional Office
400 Willoughby Ave., Ste. 400
Juneau, AK 99801
(907) 465-3400
Regional Manager-Andrew Pekovich

**Division of Mining**
3601 C St., Ste. 800, Frontier Bldg.
P.O. Box 107016 (mailing)
Anchorage, AK 99510-7016
(907) 762-2165
Acting Director-Sam Dunaway
Mining Information-Bob Stuvek

Function: *Principal agency for management of mining and reclamation on state land in Alaska. Maintains a mining information office in Fairbanks. Issues property rights to leasable minerals; adjudicates locatable mineral filings. Issues permits for hard-rock and placer-mining activity. Maintains records of mineral locations, permits, and leases. Provides technical, legal, and land-status information. Administers the Alaska Surface Mining Control and Reclamation Act (ASMACRA), which includes permitting and inspection of coal mining activity and reclamation of abandoned mines.*

Northern Regional Office
3700 Airport Way
Fairbanks, AK 99709-4699
(907) 451-2790
Regional Manager-John Wood
Mining Information-Erik Hansen

**Division of Parks and Outdoor Recreation**
3601 C St., Ste. 1200, Frontier Bldg.
P.O. Box 107001 (mailing)
Anchorage, AK 99510-7001
(907) 762-2600
Director-Neil Johannsen

Function: *Manages approximately 3,000,000 acres of state park lands primarily for recreational uses, preservation of scenic values, and watershed. Responsible for overseeing mining access, recreational mining activity, and valid mining claim inholdings within state park lands.*

Northern Regional Office
3700 Airport Way
Fairbanks, AK 99709-4699
(907) 451-2695
Regional Manager-Mike Lee

Southcentral Regional Office
3601 C St., Ste., 1280, Frontier Bldg.
P.O. Box 107001 (mailing)
Anchorage, AK 99510-7001
(907) 762-2617
Regional Manager-Al Meiners

Southeastern Regional Office
400 Willoughby Ave., 3rd Fl.
Juneau, AK 99801
(907) 465-4563
Regional Manager-William Garry

History and Archaeology Section
3601 C St., Ste. 1278, Frontier Bldg.
P.O. Box 107001 (mailing)
Anchorage, AK 99510-7001
(907) 762-2626
Section Chief and State Historic Preservation Officer-Judith Bittner
State Archaeologist-Robert Shaw

**Division of Water**
3601 C St., Ste. 822, Frontier Bldg.
P.O. Box 107005 (mailing)
Anchorage, AK 99510-7005
(907) 762-2575
Director-Ric Davidge

Function: *Manages water resources of the State; issues water-appropriation permits and certificates; responsible for safety of all dams in Alaska; conducts surveys to determine the locations, quantity, and quality of ground and surface water.*

Northern Regional Office
3700 Airport Way
Fairbanks, AK 99709-4699
(907) 451-2772
Hydrologist-Scott Ray
Water Quality Lab-474-7713

Eagle River Office
18225 Fish Hatchery Road
P.O. Box 772116 (mailing)
Eagle River, AK 99577-2116
(907) 696-0070
Section Chief-William E. Long

Southeastern Regional Office
400 Willoughby Ave., 3rd Fl.
Juneau, AK 99801
(907) 465-2533
Hydrologist-Rick Noll

**DEPARTMENT OF PUBLIC SAFETY**
450 Whittier St.
P.O. Box 111200 (mailing)
Juneau, AK 99801-1200
(907) 465-4322
Commissioner-Richard Burton

**Division of Fish and Wildlife Protection**
5700 East Tudor Rd.
Anchorage, AK 99507
(907) 269-5509
Director-Jack W. Jordan

Function: *Enforce state laws, in particular AS Title 16. Acts as enforcement arm for Alaska Department of Fish and Game.*

**DEPARTMENT OF REVENUE**
State Office Bldg.
11th Fl., Entrance A
P.O. Box 110400 (mailing)
Juneau, AK 99811-0400
(907) 465-2300
Commissioner-Darrel Rexwinkel

**Income and Excise Tax Audit Division**
State Office Bldg.
P.O. Box 110420 (mailing)
Juneau, AK 99811-0420
(907) 465-2320
Audit Office Supervisor-Nestor Catli

Function: *Issues licenses (including mining) for production and sale of minerals.*

**Division of Audit**
550 W. 7th Ave., Ste. 320A
Anchorage, AK 99501
(907) 276-5364
Director-Larry E. Meyers

Function: *Administers mining-license tax, which is based on net income, including royalties. On application, will grant certificate of tax exemption for first year of new mining operations, except for mining of sand and gravel. Tax returns must be filed annually.*

**UNIVERSITY OF ALASKA**
Fairbanks, AK 99775-0760

**College of Natural Sciences**
Department of Geology & Geophysics
408 Brooks Building
(907) 474-7565
Department Head-Samuel E. Swanson

Function: *Provides undergraduate and graduate education in geology and geophysics and conducts basic and applied research in geologic sciences. Offers B.S., M.S., and Ph.D. program options in general geology, economic geology, petroleum geology, geophysics, and ice-snow-permafrost geophysics.*

**School of Mineral Engineering**
Duckering Bldg., Rm. 437
(907) 474-7366
Acting Dean-Russell Ostermann

Function: *Provides undergraduate and graduate education programs in geological engineering, mining engineering, mineral preparation engineering, and petroleum engineering. Offers mining extension programs in both urban and rural areas. Through research programs conducts laboratory and field studies to promote mineral and energy development.*

**Mineral Industry Research Laboratory (MIRL)**
O'Neill Resources Bldg., Rm. 212B
(907) 474-7135
Acting Director-Russell Ostermann
Associate Director-P.D. Rao

Function: *Conducts applied and basic research in exploration, development, and utilization of Alaska's mineral and coal resources with emphasis on coal characterization, coal preparation, mineral beneficiation, fine gold recovery, hydrometallurgy, and environmental concerns. Publishes reports on research results and provides general information and assistance to the mineral industry.*

**Mining Extension Program**
Duckering Bldg., Rm. 401
(907) 474-7702

Function: *Offers prospecting and introductory mineral and mining courses under an open admissions policy.*

**Mining and Petroleum Training Service**
University of Alaska Anchorage
155 Smithway, Ste. 101
Soldotna, AK 99669
Director-Dennis D. Steffy
Asst. Director-Debbie J. Kendrick
(907) 262-2788

Function: *Provides direct training and assistance to mine operators, service and support companies and governmental agencies in mine safety and health, mining extension, vocational mine training and technical transfer. Specialized training services in hazardous materals, first aid and CPR, industrial hygiene and professional safety education and consulting are available on demand.*

**University of Alaska Southeast**
Institute of Mining Technology
Airport Office Center
9085 Glacier Hwy, Suite 301
Juneau, AK 99801
(907) 463-4840
Director-Lee Paavola
Chief Instructor-Robert Greig

Function: *The IMT is designed to train students for entry level positions in the mining industry. Students receive classroom and hands on underground mine experience in the Institute's training mine. The Maggie-Kathleen Program graduates complete all required SHA training for certification.*

## FEDERAL AGENCIES

**U.S. DEPARTMENT OF THE INTERIOR**
Office of the Secretary
1689 C St., Ste. 100
Anchorage, AK 99501-5151
(907) 271-5485
Special Assistant to the Secretary-Curtis V. McVee
Staff Coordinator-Ronald B. McCoy

Function: *Coordinates the Department of the Interior's policy and stewardship with DOI bureaus for the management of over 200 million acres of public land in Alaska. The Special Assistant to the Secretary also serves as the Chairman of the Federal Subsitence Management Board.*

**Bureau of Land Management**
Alaska State Office
22 West 7th Ave., #13
P.O. Box 13 (mailing)
Anchorage, AK 99513-7599
State Director-Edward F. Spang
Mineral Resources Deputy State Director-John Santora
(907) 271-3343
Mineral Law Branch Chief-Ruth Stockie
(907) 271-3791
Public Room - (907) 271-5960

Function: *Administers federal public lands (except national parks, wildlife refuges, national monuments, national forests, and military withdrawals). Issues leases for all federal leasable minerals including oil and gas, coal, phosphates, and oil shale. Arranges for sale of minerals other than leasable or salable materials, including sand, gravel, or stone. Issues right-of-way and special-use permits. Monitors mining operations to insure protection of surface resources. Maintains land-status plats and issues patents. Records federal mining claims and annual assessment affidavits.*

Anchorage District Office
6881 Abbott Loop Rd.
Anchorage, AK 99507
(907) 267-1248
District Manager-Dick Veminen

Arctic District Office
1150 University Ave.
Fairbanks, AK 99709-3844
(907) 474-2302
District Manager-Dee Ritchie

Nome Field Office
P.O. Box 925 (mailing)
Nome, AK 99762
(907) 443-2177
Natural Resource Specialist-Norm Messenger

Glennallen District Office
P.O. Box 147 (mailing)
Glennallen, AK 99588
(907) 822-3217
District Manager-Gene Keith

Kobuk District Office
1150 University Ave.
Fairbanks, AK 99709-3844

(907) 474-2332
District Manager-Helen Hankins

Steese-White Mountain Office
1150 University Ave.
Fairbanks, AK 99709-3844
(907) 474-2352
District Manager-Roger Bolstad

Kotzebue Field Office
P.O. Box 1049 (mailing)
Kotzebue, AK 99752
(907) 442-3430
(907) 442-2720 (fax)
Natural Resource Specialist-Larry Whalon

Tok Field Office
P.O. Box 309 (mailing)
Tok, AK 99780
(907) 883-5121
Manager-Bob Burritt

**Fairbanks Support Center and Land Information Office (Public Room)**
1150 University Ave.
Fairbanks, AK 99709-3844
(907) 474-2250
Support Center Manager-James Murray

Function: *Primary contact for information on Interior and northern regions.*

**U.S. Bureau of Mines**
Alaska Field Operations Center
3301 C. St., Ste. 525
Anchorage, AK 99503-3935
(907) 271-2455
Chief - Donald P. Blasko
Branch Chief-Martin D. Conyac

Function: *Alaska programs are designed to aid development of a viable mineral industry in Alaska with emphasis on field programs focused towards the identification of type, amount and distribution of mineral deposits in Alaska. The field information is augmented by other Bureau programs which provided information on beneficiation technologies (research); economic feasibility studies (potential supply); and economic and environmental effects of mineral development (policy analysis). Information is provided to other government agencies to aid land planning and land use decisions, and to the private sector to identify targets of opportunity for further exploration and/or development.*

Anchorage Branch - AFOC
3301 C. St., Ste. 525
Anchorage, AK 99501
(907) 271-2455
Contact Person-Donald W. Baggs

Juneau Branch - AFOC
P.O. Box 20550 (mailing)
Juneau, AK 99802-0550
(907) 364-2111
Branch Chief-R. David Cames

**U.S. Fish and Wildlife Service**
Region 7 Office
1011 East Tudor Rd.
Anchorage, AK 99503
(907) 786-3542
Regional Director-Walter O. Stieglitz
Assistant Regional Director (Fish and Wildlife Enhancement)-
Rowan W. Gould

Function: *Administers the federal public lands in national wildlife refuges, issues special-use permits for activities on refuges, reviews permits and applications for various mining activities on all private and public lands and waters, and provides information to regulatory agencies on fish and wildlife and their habitat. Makes recommendations to regulatory agencies to mitigate adverse environmental impacts.*

Fairbanks Fish and Wildlife Enhancement
Ecological Service/Endangered Species Branch
101 12th Ave., Rm. 232
Box No. 20 (mailing)
Fairbanks, AK 99701
(907) 456-0203
Field Supervisor-Patrick Sousa

Juneau Fish and Wildlife Enhancement
Federal Bldg., Rm. 417
P.O. Box 21287 (mailing)
Juneau, AK 99802
(907) 586-7240
Field Supervisor-Nevin Holmberg

Anchorage Fish and Wildlife Enhancement
605 West 4th Ave., Rm. 62
Anchorage, AK 99501
(907) 271-2787
Field Supervisor-Dave McGillivary

**U.S. Geological Survey**
Geological Division
4200 University Dr.
Anchorage, AK 99508-4663
(907) 786-7495
Chief, Branch of Alaskan Geology-
Willis H. White

Water Division
4230 University Dr.
Anchorage, AK 99508
(907)786-7100

Alaska Distribution USGS Section
(for maps and brochures)
Federal Bldg.
101 12th Ave.
Fairbanks, AK 99701
(907) 456-0244

U.S. Geological Survey Earth Science Information Center
Geologic Division
4230 University Dr., Rm. 101
Anchorage, AK 99508-4667
(907) 786-7012

Function: *Investigates and reports on physical resources; configuration and character of land surface; composition and structure of underlying rocks; and quality, volume, and distribution of water and minerals. Conducts 1:250,000-scale geologic mapping under the auspices of the Alaska Mineral Resource Assessment Program (AMRAP). Publishes and distributes nearly all available topographic maps of Alaska.*

**National Park Service**
Alaska Regional Office
2525 Gambell St.
Anchorage, AK 99503
(907) 257-2634
Regional Director-John Moorehead
Chief, Minerals Management-Floyd Sharrock
(907) 257-2626
Mining Engineer-Lynn S. Griffiths
(907) 257-2629

Function: *Administers lands within the national park system in Alaska. Manages valid prior-right mining claims in parklands through plans of operation under Mining in Parks Act, National Park Service regulations, and other applicable federal and state laws and regulations.*

**U.S. DEPARTMENT OF LABOR**

**Mine Safety and Health Administration**
117 107th Ave. NE., Rm. 100
Bellevue, WA 98004
(206) 442-7037
Bellevue Field Office Supervisor-
Walter Turner (administers portions of Alaska south of Yukon River)

Juneau Field Office
Federal Building
107 West 9th
P.O. Box 22049 (mailing)
Juneau, AK 99802
(907) 586-7165
Inspector-Bob Casey

**Mine Safety and Health Administration**
205 North 4th St., Rm. 103
Coeur d'Alene, ID 83814
(208) 667-6680
Coeur d'Alene Field Office Supervisor-
Coltin Galloway (administers portions of Alaska north of Yukon River)

Function: *Administers health and safety standards to protect the health and safety of metal, nonmetal and coal miners. Cooperates with the State to develop health and safety programs and develops training programs to help prevent mine accidents and occupationally caused diseases. Under agreement with the Coal Mine Safety and Health Office, the MSHA metal/nonmetal section has assumed responsibility for enforcement and training activities at coal mines in Alaska.*

**Mine Safety and Health Administration**
Coal Mine Safety and Health, District 9
P.O. Box 25367
Denver, CO 80225
(303) 231-5458
District Manager-William A. Holgate

Function: *Administers health and safety standards according to the Code of Federal Regulations to protect the health and safety of coal miners; requires that each operator of a coal mine comply with these standards. Cooperates with the State to develop health and safety programs and develops training programs to help prevent coal or other mine accidents and occupationally caused diseases in the industry.*

## U.S. DEPARTMENT OF AGRICULTURE

**U.S. Forest Service**
Regional Office
Federal Bldg.
P.O. Box 21628 (mailing)
Juneau, AK 99802-1628
(907) 586-7847
Regional Forester-Michael A. Barton

Function: *Helps meet national mineral and energy needs by encouraging and supporting environmentally sound mineral enterprises on national forest system lands. Provides joint administration of general mining laws on national forest system lands with the Bureau of Land Management. Cooperates with Department of Interior agencies in the review and issuance of mineral leases. Issues permits for disposal of sand, gravel, and stone.*

## U.S. ENVIRONMENTAL PROTECTION AGENCY

**Region 10 Regional Office**
1200 6th Ave.
Seattle, WA 98101
(206) 553-1200
Regional Administrator-Dana Rasmussen

Function: *Issues National Pollutant Discharge Elimination System (NPDES) permits under the Clean Water Act to regulate effluent discharges. Maintains regulatory and review authority over wetland and NEPA/EIS-related issues.*

Alaska Operations Office
222 West 7th Ave., #19
Anchorage, AK 99513
(907) 271-5083
Assistant Regional Administrator-
Alvin L. Ewing

Alaska Operations Office
410 Willoughby Ave., Ste. 100
Juneau, AK 99801
(907) 586-7619
Chief, State Operations Section-
Steven Torok

## U.S. DEPARTMENT OF THE ARMY

**Corps of Engineers**
Regulatory Branch
P.O. Box 898
Anchorage, AK 99506-0898
District Engineer-Col. John W. Pierce
Write: Attention: NPACO-R-S, or CENPA-CO-R
Call: Chief of Compliance Section
(907) 753-2712 or (800) 478-2712
(in Alaska only)

Function: *Regulates work in navigable waters of United States and discharge of dredged or fill material into United States waters, including wetlands. Examples of regulated mining activities include construction of berms, dikes, diversion pads, stockpiles, and reclamation activities.*

## COOPERATIVE STATE-FEDERAL AGENCIES

**Alaska Public Lands Information Center**
250 Cushman St., Ste. 1A
Fairbanks, AK 99701
(907) 451-7352
Manager-Karla Zervos
Assistant Manager-Lenore Heppler

Function: *Clearinghouse for general information on outdoor recreation in Alaska. Information sources include U.S. Forest Service, U.S. Fish and Wildlife Service, U.S. Bureau of Land Management, U.S. Geological Survey, Alaska Departments of Natural Resources and Fish and Game, and Alaska Division of Tourism.*

## BOARDS AND COMMISSIONS

**Alaska Minerals Commission**
P.O. Box 80148
Fairbanks, AK 99708
(907) 479-6240
Chairman-Earl H. Beistline

Function: *The Mineral Commission was created by the Alaska State Legislature in 1986 to make recommendations to the Governor and the Legislature on ways to mitigate constraints on the development of minerals in Alaska. The Commission has published annual reports since 1987.*

**Citizens' Advisory Commission on Federal Areas**
250 Cushman St., Ste. 4H
Fairbanks, AK 99701
(907) 456-2012
Chairperson-Lou Williams
Executive Director-Stan Leaphart

Function: *The Citizens' Advisory Commission on Federal Areas was established in 1981 by the Alaska Legislature to protect the rights of Alaskans to continue their traditional uses of federal lands throughout the state. This was done in response to Congressional enactment in December 1980 of the Alaska National Interest Lands Conservation Act (ANILCA), which placed millions of acres of federally owned lands into conservation system units with restrictive land-use and management requirements.*

**Alaska Water Resources Board**
P.O. Box 107005
Anchorage, AK 99510
Acting Chairperson-Stosh Anderson
(907) 762-2575

Function: *The Alaska Water Resources Board serves as an advisory group to the Governor on all matters relating to use and appropriation of water in theState of Alaska. The board has been particularly supportive of water resources legislation, including amendments to the Alaska Water Use Act for reservations of water and instream uses, basin-wide water rights adjudications, and housekeeping amendments to improve water-rights adjudication. The board has taken a keen interest in the state's water quality programs and water quality standards.*

**Alaska Science & Technology Foundation**
550 West 7th Ave., Ste. 360
Anchorage, AK 99501-3555
(907) 272-4333
Executive Director-John W. Sibert

Function: *The Foundation was created to make public funds available for long-term investment in economic development and technological innovation within theState and to improve the health status of its residents. Through the awarding of grants for basic and applied research, the Foundation will enhanc the State's economy and help build its science and engineering capabilities.*

## CHAMBERS OF COMMERCE

**Alaska State Chamber of Commerce**
415 E St., Ste. 201
Anchorage, AK 99501
(907) 278-2722
Chairman-Margy Johnson
Vice President-Kathleen Tarr

Function: *The State Chamber of Commerce researches and formulates positions on Alaskan resource development. Recommendations for consideration are submitted to the State Chamber of Commerce board of directors.*

Juneau Chamber of Commerce
1107 W. 8th, Suite #1
Juneau, AK 99801

(907) 586-6420
Executive Director-Joe Poor

Greater Fairbanks Chamber of Commerce
709 2nd Ave.
Fairbanks, AK 99701
(907) 452-1105

Anchorage Chamber of Commerce
437 E St., Ste. 300
Anchorage, AK 99501
(907) 272-2401

## NONGOVERNMENTAL GROUPS AND ASSOCIATIONS

**Alaska Miners Association, Inc.**
Statewide Office
501 West Northern Lights Blvd., Ste. 203
Anchorage, AK 99503
(907) 276-0347
Statewide President-Tom Crafford
Executive Director-Steven C. Borell

Anchorage Branch
Chairman-Joe Ruzicka
P.O. Box 190509
Anchorage, AK 99519-0509
(907) 243-2856

Fairbanks Branch
Chairman-Josh Moore
P.O. Box 82524
Fairbanks, AK 99708
(907) 455-6777

Juneau Branch
Chairman-Dennis DeBolt
Sealaska Corp.
1 Sealaska Plaza, Ste. 400
Juneau, AK 99801
(907) 586-1512

Kenai Branch
Chairman-Mike Busby
Kachemak Mining
47660 Falls Creek Dr.
Homer, AK 99603
(907) 235-6396

Nome Branch
Chairman-Irene Anderson
P.O. Box 1974
Nome, AK 99762
(907) 443-5296

**Alaska Women in Mining**
Fairbanks Branch
President-Sandra Stillion
P.O. Box 83542
Fairbanks, AK 99708
(907) 455-6208

Anchorage Branch
President-Ronna Bissonette
P.O. Box 240334
Anchorage, AK 99524
(907) 276-6762

**Society of Mining Engineers**
P.O. Box 625002
Littleton, CO 80162-5002
(303) 973-9550

Alaska Section
Chairman-Richard Swainbank
1001 Noble St., Ste. 360
Fairbanks, AK 99701
(907) 452-7464

Secretary Treasurer John Rishel
1505 Atkinson Dr.
Anchorage, AK 99504
(907) 337-0511

**American Institute of Professional Geologists**
7828 Vance Dr., Ste. 103
Arvada, CO 80003
(303) 431-0831
President-Erik Opstad

Alaska Section
P.O. Box 9-2082
Anchorage, AK 99509
(907) 562-3279

**Miners Advocacy Council**
President-John Korobko
P.O. Box 73824
Fairbanks, AK 99707
(907) 479-0471

**Northwest Mining Association**
President-David Holmes
414 Peyton Bldg.
Spokane, WA 99201
(509) 624-1158

**Placer Miners of Alaska**
P.O. Box 83151
Fairbanks, AK 99708

**Resource Development Council for Alaska, Inc.**
President-Bill Schneider
Executive Director-Becky L. Gay
121 N. Fireweed, Ste. 250
Anchorage, AK 99503
(907) 276-0700

**Western Mining Council**
Kenai Peninsula Chapter
President-Oscar H. Bailey
Old Nash Rd.
Seward, AK 99664
(907) 224-5963

## ORGANIZED MINING DISTRICTS

Circle Mining District
Helen "Beaver" Warner
P.O. Box 80674
Fairbanks, AK 99708
(907) 488-6058

Fairbanks Mining District
President-Don Stein
105 Dunbar
Fairbanks, AK 99701
(907) 456-7642

Forty-Mile Miners Association
President-Mike Busby
47660 Falls Creek Dr.
Homer, AK 99603
(907) 235-6396

Haines Mining District
John Schnabel
P.O. Box 149
Haines, AK 99827
(907) 766-2228

Iditarod Mining District
President-John Miscovich
General Delivery
Flat, AK 99384
(907) 561-1591

Juneau Mining District
President-Roger Eichman
P.O. Box 20765
Juneau, AK 99802
(907) 789-4065

Kantishna Mining District
Dan Ashbrook
P.O. Box 84608
Fairbanks, AK 99708

Koyukuk Mining District
Bill Nordeen
P.O. Box 9142
Coldfoot, AK 99701

Livengood-Tolovana Mining District
President-Rose Rybachek
P.O. Box 55698
North Pole, AK 99707
(907) 488-6453

Valdez Creek Mining District
Kevin Thompson
P.O. Box 875534
Wasilla, AK 99687-5534

Yentna Mining District
President-John Jacobsen
13004 NE 9th Ave.
Vancouver, WA 98685

## MINERAL EDUCATION PROGRAM

**ALASKA MINERALS AND ENERGY RESOURCE EDUCATION FUND (AMEREF)**
P.O. Box 190927
Anchorage, AK 99519-0927
(907) 274-2211

Function: *A nonprofit corporation formed to help prepare students in grades four through*

*eight to make informed decisions about Alaska's mineral and energy resources.*

Alaska Department of Education
801 W. Pent St., Ste. 200
Juneau, AK 99801-1894
(907) 465-2841
Commissioner-Jerry Covey
Educational Specialist-Terri Campbell,
State C[illegible]dinator of AMEREF

## ENVIRONMENTAL ORGANIZATIONS

Note: *The following two organizations submitted addresses to be included in this appendix. They have been actively involved in statewide mining issues including water quality, reclamation, rent, and royalty reform. Litigation has been sometimes used and resulted in court rulings. Both organizations state their primary interests and perspective as maintenance of environmental quality and adherence to environmental laws and regulations.*

Trustees for Alaska
725 Christensen Dr., Ste. 4
Anchorage, AK 99501
Executive Director-Randall M. Weiner

Alaska Environmental Assembly
419 - 6th St., Ste. 328
Juneau, AK 99801
Executive Director-Karla Hart

## NATIVE REGIONAL CORPORATIONS

### ATHNA INCORPORATED
Main Office
P.O. Box 649
Glennallen, AK 99588-0649
(907) 822-3476
(907) 822-3495 (fax)
President & CEO-Wilson Justin
Lands & Resource Manager-John Davenport

Anchorage Office
406 Fireweed Lane
Anchorage, AK 99503
(907) 274-7662
(907) 274-6614 (fax)

### THE ALEUT CORPORATION
4000 Old Seward Hwy, #300
Anchorage, AK 99503
(907) 561-4300
(907) 563-4328 (fax)
President-Alice Petrivelli
Director of Lands & Resources-
Robert Stanton
Lands & Real Estate Assistance-Lisa Evans

### ARCTIC SLOPE REGIONAL CORPORATION
P.O. Box 129
Barrow, AK 99723-0129
(907) 852-8633
(907) 852-5733 (fax)
President-Jacob Adams
CAO-Conrad Bagne
Lands-William Thomas

Anchorage Office
301 Danner Ave., Suite 200
Anchorage, AK 99518
(907) 349-2369
(907) 349-5476

### BERING STRAITS NATIVE CORPORATION
P.O. Box 1008
Nome, AK 99762-1008
(907) 443-5252
(907) 443-2985 (fax)
President-Jack Carpenter
Land Manager-Guy Martin
Resource Development Specialist-Thomas Sparks

### BRISTOL BAY NATIVE CORPORATION
800 Cordova Street
Anchorage, AK 99501
(907) 248-3602
(907) 276-3924 (fax)
President & CEO-James W. Hart
Land-John C. Moores and Paul C. Roehl

### CALISTA CORPORATION
601 W. 5th Ave., Suite 200
Anchorage, AK 99501
(907) 279-5516
(907) 272-5060 (fax)
President & CEO-Johnny T. Hawk
V.P. Lands & Natural Resources-Mike Miemeyer

### CHUGACH ALASKA CORPORATION
3000 A St., Suite 400
Anchorage, AK 99503
(907) 563-8866
(907) 563-8402 (fax)
President-Neil Anderson
Manager Lands Division-Paul Twelten

### COOK INLET REGION INC.
P.O. Box 93330
Anchorage, AK 99509-3330
(907) 274-8638
(907) 279-8836 (fax)
President & CEO-Roy Huhndorf
Senior V.P.-Carl Marrs
Lands Manager-Mike Franger

### DOYON LTD.
201 1st Ave.
Fairbanks, AK 99701
(907) 452-4755
(907) 456-6785 (fax)
President & CEO-Morris Thompson
V.P. Lands & Resources-Jim Mery
Natural Resources Manager-Harry Noyes

### KONIAG INCORPORATED
4300 B St., Suite 407
Anchorage, AK 99503
(907) 561-2668
(907) 562-5258 (fax)
President-Frank Pagano
CEO-Uwe L. Gross
Lands-John Merrick

### NANA REGIONAL CORPORATION
P.O. Box 49
Kotzebue, AK 99752
(907) 442-3301
(907) 442-2866
President-Ross Schaeffer
V.P. Resources-John Rense
V.P. Lands-Walter Sampson

Anchorage Office
1601 E. Benson Blvd.
Anchorage, AK 99508
(907) 265-4100
(907) 265-4311

### SEALASKA CORPORATION
One Sealaska Plaza
Juneau, AK 99801
(907) 586-1512
(907) 586-9223 (fax)
President & CEO-Byron Mallott
V.P. Planning & Administration-
Richard Harris
Lands Manager-Ernie Hillman

# APPENDIX D
## Selected significant mineral deposits in Alaska (locations shown in figures 53-55)*

Map no.

1 **Lik-Su** - Major strata-bound massive sulfide (Zn-Pb-Ag-Ba) deposits in black shale and chert. Proven reserve (Lik) estimate of 21.77 million tonnes (24 million tons) of 9% Zn, 3.1% Pb, and 48 g/tonne (1.4 oz/ton) Ag (fig. 53).

2 **Red Dog** - At least two major strata-bound massive sulfide deposits hosted in Pennsylvanian or Mississippian shale; similar to locality 1. Prior to mining, main deposit at Red Dog contained proven, probable, and inferred reserves of at least 77 million tonnes (85 million tons) of 17.1% Zn, 5% Pb, 82 g/tonne (2.4 oz/ton) Ag; nearby Hilltop deposit contains significant undisclosed reserves (fig. 53).

3 **Drenchwater** - Mississippian and Pennsylvanian shales and cherts contain three strata-bound base metal occurrences spatially related to acid volcanics. In the lowest unit a siliceous mudstone contains a 0.6 m (2-ft) layer with up to 23% Zn. An overlying gray chert contains up to 11% Zn and up to 5% Pb with some Ag in fracture fillings. At the top of the overlying tuffaceous layer, Ag-bearing Zn and Pb mineralization outcrops discontinuously for at least 1,982 m (6,500 ft), and contains up to 26% Zn and 51% Pb in grab samples (fig. 53).

4 **Ginny Creek** - Epigenetic, disseminated Zn-Pb-Ag deposits with barite in sandstone and shale of Noatak Sandstone of Late Devonian through Early Mississippian age. Random grab samples of surface float contain 0.3% to 3.0% Zn and highly variable amounts of Pb and Ag (fig. 53).

5 **Story Creek** - Epigenetic replacement deposits of Zn-Pb-Ag-Cu-Au hosted in brecciated zones in Devonian Kanayut Conglomerate or Lower Mississippian Kayak Shale. Grab samples of high-grade material contain up to 0.43% Cu, 34% Pb, 28.8% Zn, 1.4 g/tonne (0.04 oz/ton) Au, and 1,028 g/tonne (30 oz/ton) Ag ((fig. 53).

5a **Kivliktort Mountain** - Mineralized float is widespread on the north flanks of the mountain, apparently spatially related to the contact between shales at the base of the hills and coarse-grained siliceous clastic rocks on the upper slopes. Rock samples containing up to 30% Zn have been reported (fig. 53).

6 **Whoopee Creek** - Epigenetic replacement deposits of Zn-Pb-Cu-Ag-Au-Cd in breccia zones in Devonian Kanayut Conglomerate or Lower Mississippian Kayak Shale. Random grab samples of mineralized material contain 0.24% Cu, 0.37% Cd, 46% Zn, 44% Pb, 4.8 g/tonne (0.14 oz/ton) Au, and 507 g/tonne (14.8 oz/ton) Ag (fig. 53).

7 **Omar** - Epigenetic replacement deposits of Paleozoic age; include bedded barite occurrences. Grab samples contain 15.3% Cu, 0.15% Pb, 0.95% Zn, 0.05% Co, and 10 g/tonne (0.3 oz/ton) Ag (fig. 53).

7a **Frost** - Possible 8.2 million tonnes (9 million tons) barite in pods, lenses, and wavey-banded quartz-calcite-barite veins. Chalcopyrite and galena occur in the veins which cross cut Paleozoic limestone and dolomite for a minimum distance of 1.6 km (1 mi). Selected samples contain up to 13.2% Zn (fig. 53).

8 **Bornite** - Major strata-bound Cu-Zn deposit in brecciated carbonate rock of Devonian age; 4.56 million tonnes (5.0 million ton) orebody contains 4.0% Cu and accessory Zn and Co. Larger reserve estimate of 36.2 million tonnes (40 million tons) of about 2% Cu and undisclosed amount of Zn and Co. At grade of 1.2% Cu, reserves are 91 million tonnes (100 million tons) (fig. 53).

9 **Arctic** - Major volcanogenic (Cu-Zn) massive sulfide deposit hosted in sequence of metarhyolite, metatuff, and graphitic schist of Devonian age; indicated reserves of 36.3 million tonnes (40 million tons) grade 4.0% Cu, 5.5% Zn, 0.8% Pb, 55 g/tonne (1.6 oz/ton) Ag, and .69 g/tonne (0.02 oz/ton) Au (fig. 53).

10 **Sun** - Major (Cu-Pb-Zn-Ag) massive sulfide deposit in sequence of middle Paleozoic metarhyolite and metabasalt. Average grades are 1 to 4% Pb, 6 to 12% Zn, 0.5 to 7% Cu, 103 to 377 g/tonne (3 to 11 oz/ton) Ag (fig. 53).

11 **Smucker** - Middle Paleozoic volcanogenic massive sulfide deposit; 915 m (3,000 ft) long and up to 58 m (190 ft) wide contains significant tonnage of Cu-Pb-Zn ore that grades 1.5% Pb, 5 to 10% Zn, 103 to 343 g/tonne (3 to 10 oz/ton) Ag, with minor Au (fig. 53).

12 **Avan Hills** - Disseminated chromite in layered ultramafic rocks; grab samples contain up to 4.3% Cr with 0.51 g/tonne (0.015 oz/ton) PGM (fig. 55).

13 **Misheguk Mountain** - Chromite occurrences similar to those in Avan Hills (fig. 55).

14 **Klery Creek** - Lode and placer Au deposits worked intermittently from 1909 through 1930s. Total production through 1931, mostly from placer deposits, estimated at 974 kg (31,320 oz) Au (fig. 55).

15 **Ernie Lake** - (Ann Creek) Strata-bound massive sulfide occurrence in metarhyolite, metatuff, and marble. Gossan zones strongly anomalous in Cu-Pb-Zn and Ag (fig. 53).

16 **Koyukuk-Nolan mining district** - Major placer Au district; from 1893 to 1991, produced an estimated 9,900 kg (318,300 oz) Au. Significant deep placer reserves remain (fig. 55).

17 **Chandalar mining district** - Major Au producing district; substantial production in excess of 1,894 kg (60,908 oz) Au from lode and placer sources; lode Au found in crosscutting quartz veins that intrude schist and greenstone. Active development of placer deposits and lodes in progress. Inferred lode reserves estimated to be 40,800 tonnes (45,000 tons) with grade of 69 g/tonne (2 oz/ton) Au (fig. 55).

18 **Porcupine Lake** - Stratiform fluorite occurrences and argentiferous enargite, tetrahedrite associated with felsic volcanic rocks of late Paleozoic age. Reported grades of up to 25% to 30% fluorite ($CaF_2$) reported, with grab samples of 4.8% Cu (fig. 54).

19 **Wind River** - Strata-bound Pb-Zn massive sulfide prospects; reported grades of up to 5% Pb (fig. 53).

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*This generalized summary does not describe all of the known 6,400 mineral deposits in Alaska. In cooperation with DGGS, the USGS released Bulletin 1786, "Significant metalliferous lode deposits and placer districts in Alaska," which describes 262 significant mineral deposits and 43 placer districts.

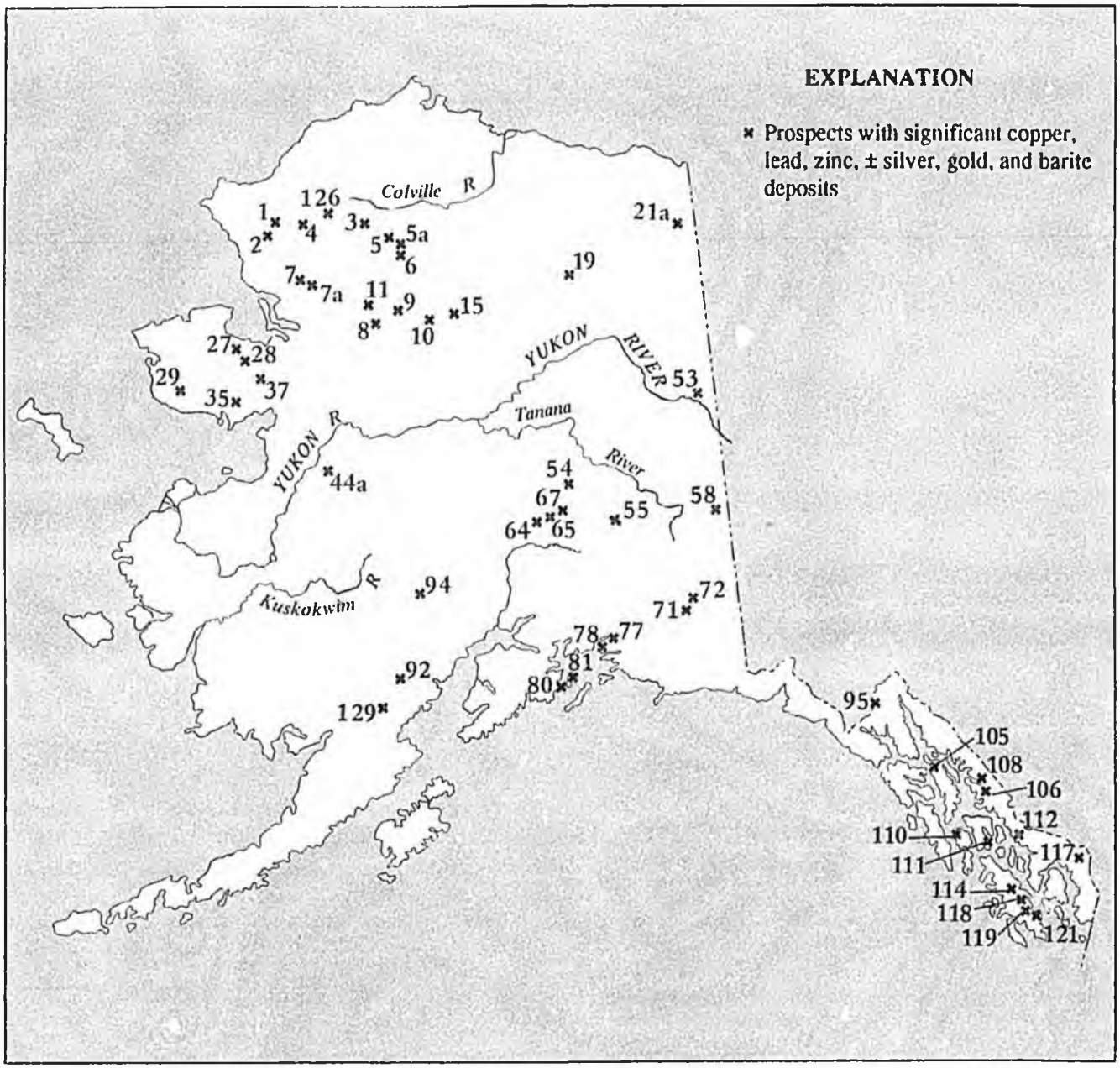



Figure 53. *Significant copper, lead, zinc with credits of silver, gold, and barite deposits in Alaska, 1991.*

20 **Esotuk Glacier** - Disseminated Mo-Sn-W-Pb-Zn mineralization in skarns associated with Devonian(?) schistose quartz monzonite. Grab samples contain up to 0.08% Sn and 0.15% W (fig. 54).

21 **Bear Mountain** - Major stockwork Mo-W-Sn occurrence in intrusive breccia. Rock samples containing up to 0.8% Mo and 0.6% W occur within a 14 ha (35 acre) area where soil samples average more than 0.2% $MoS_2$, and an adjacent 10 ha (25 acre) area where rubble contains wolframite has soils averaging greater than 0.12% $WO_3$. Rubble crop in this area indicates a Tertiary porphyry system as the source of the Mo and W (fig. 54).

21a **Galena Creek** - Steeply dipping veins contain up to 21% Cu, 3.5% Zn, and 1.3% Pb with 189 g/tonne (5.5 oz/ton) Ag on the east side of the creek, and a large area of disseminated mineralization and veinlets contains predominantly Zn on the ridge west of the creek (fig. 53).

22 **Cape Creek** - Major placer Sn producer. More than 454 tonnes (500 tons) Sn produced from 1935 to 1941; from 1979 to 1990, produced 940 tonnes (1,040 tons) Sn. Derived from Cape Mountain in contact zone of Cretaceous granite and limestone (fig. 54).

23 **Buck Creek** - Major placer Sn producer. More than 998 tonnes (1,100 tons) Sn produced from 1902 to 1953 (fig. 54).

24 **Lost River** - Major Sn, fluorite, W, and Be deposit associated with Cretaceous Sn granite system. More than 317 tonnes (350 tons) Sn produced from skarn and greisen lode sources. Measured reserves amount to 22.3 million tonnes (24.6 million tons) that grade 0.15% Sn, 16.3% $CaF_2$, and 0.03% $WO_3$, based on 13,720 m (45,000 ft) of diamond drilling (fig 54).

25 **Ear Mountain** - Placer Sn district and Sn-Cu-Au-Ag-Pb-Zn skarn mineralization of Cretaceous age. Area also anomalous in U (fig. 54).

26 **Kougarok Mountain** - Sn deposit hosted in quartz-tourmaline-topaz greisen of Cretaceous age. Grades may average 0.5% Sn and 0.01% Ta

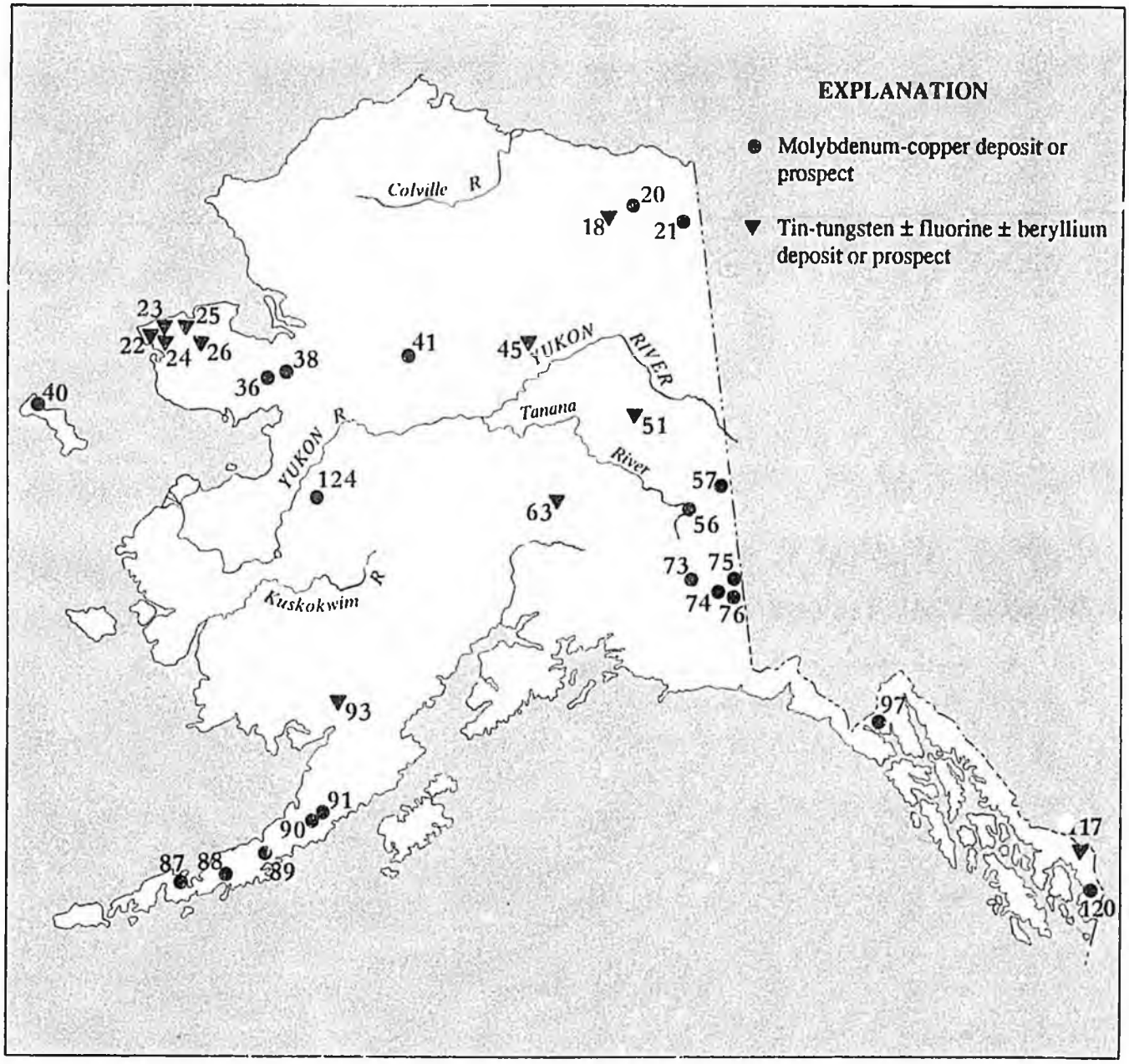



Figure 54. *Significant molybdenum-copper, and tin-tungsten with credits of fluorite and beryllium deposits in Alaska, 1991.*

and Nb, but a high grade resource of 136,050 tonnes (150,000 tons) grading 1% + Sn has been identified, with incrementally higher tonnage at lower grades (fig. 54).

27 **Hannum** - Stratiform, carbonate-hosted Pb-Zn-Ag massive sulfide deposit of mid-Paleozoic age in heavily oxidized zone that ranges from 9 to 46 m (30 to 150 ft) thick. Mineralized zone reported to assay up to 10% Pb, 2.2% Zn, 1.4 g/tonne (0.04 oz/ton) Au, and 60.3 g/tonne (1.76 oz/ton) Ag (fig. 53).

28 **Independence Creek** - Pb-Zn-Ag massive sulfide deposit; high-grade ore shipped in 1921 contained 30% Pb, 5% Zn, up to 5,141 g/tonne (150 oz/ton) Ag. Mineralization restricted to shear zone in carbonates (fig. 53).

29 **Sinuk River** - Stratiform Pb-Zn-Ag-Ba-F massive sulfide deposits and layered Fe deposits of Paleozoic age. Mineralized zones extend over 2,440 m (8,000 ft) along strike. Stratiform Zn deposit at Aurora Creek thought to extend for at least 1,220 m (4,000 ft) along strike (fig. 53).

30 **Nome mining district** - Major placer Au producer. Production in excess of 148,336 kg (4,769,219 oz) Au all from placers. Sporadic Sb and W production in past (fig. 55).

31 **Rock Creek** - About 6.6 million tons grading 2.5 g/tonne (0.072 oz/ton) Au in vein swarms and stringers in an area 457 m (1,500 ft) long, 152 m (500 ft) maximum width and 91 m (300 ft) deep (fig. 55).

32 **Big Hurrah** - Epigenetic vein deposit in black slate and metasedimentary rocks of York Slate. Deposit contains some W mineralization and has produced over 840 kg (27,000 oz) Au from nearly 45,350 tonnes (50,000 tons) milled ore. Proven, inferred, and indicated reserves total 94,328 tonnes (104,000 tons) that grade 21 g/tonne (0.61 oz/ton) Au, 19 g/tonne (0.55 oz/ton) Ag, and credits of $WO_3$ (fig. 55).

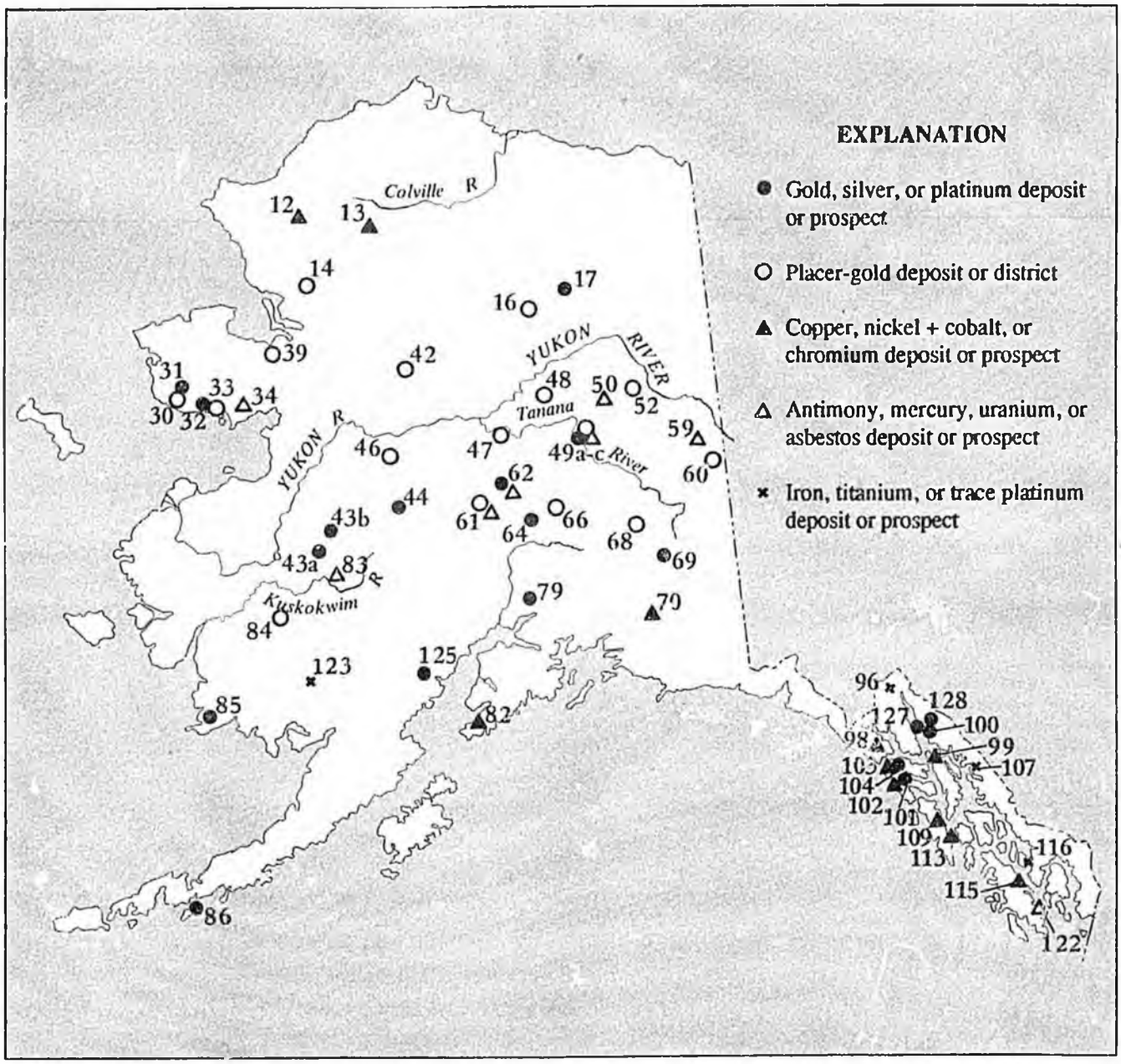



Figure 55. *Significant gold, silver, platinum, and strategic mineral deposits in Alaska, 1991.*

33 **Solomon mining district** - Major placer Au district; produced over 12,449 kg (400,250 oz) Au. Three structurally controlled Au deposits in Bluff area—Daniels Creek, Saddle, and Koyana Creek—contain minimum inferred reserves of 5.9 million tonnes (6.5 million tons) grading 3.4 g/tonne (0.1 oz/ton) Au (fig. 55).

34 **Kachaufk** - U prospect in Cretaceous alkalic intrusive rocks. Highly anomalous geochemical values and U concentrations of 1,000 ppm reported (fig. 55).

35 **Omalik** - Vein-type Pb-Zn-Ag massive sulfide prospect in Paleozoic carbonate rocks; from 1881 to 1900, produced 363 tonnes (400 tons) of Pb-Zn ore that averaged about 10% Pb and 1,371 g/tonne (40 oz/ton) Ag. Grades of oxidized Zn ore reported to be up to 34% Zn (fig. 53).

36 **Windy Creek** - Disseminated Mo-Pb-Zn mineralization in quartz veins and skarns with reported values as high as 0.15% Mo (fig. 54).

37 **Quartz Creek** - Significant Pb-Zn-Ag mineralization; reported grades of 15% combined Pb-Zn and 343 g/tonne (10 oz/ton) Ag (fig 53).

38 **Placer River** - Significant Mo-F mineralization disseminated in intrusive rocks. Reported values of 0.2% Mo (fig. 54).

39 **Candle Creek** - Placer Au deposits with 7,559 kg (243,040 oz) of past Au production from placers; significant reserves remaining in a large ancestral channel system. Large base metal sulfide concentrations and U values in concentrates (fig. 55).

40 **Poovookpuk Mountain** - Porphyry Mo mineralization. Reported grades of up to 0.25% Mo (fig. 54).

41 **Purcell Mountain** - Mo and Ag occurrences associated with Cretaceous alkalic igneous plutons, alaskite, and bostonite dikes (fig. 54).

42 **Koyukuk-Hughes mining district** - Production of 6,878 kg (221,140 oz) Au from 1930 to 1975, mainly from Alaska Gold dredging operation at Hogatza; dredge reactivated in 1981, but deactivated in 1984, and reactivated again in 1990. Nonfloat mechanized operation on Utopia Creek produced significant amount of placer Au from 1930 to 1962 (fig. 55).

43a **Iditarod district** - Major placer Au district; produced 48,368 kg (1,555,100 oz) Au through 1990. Significant reserves of lode-Au and lode-W at Golden Horn deposit Chicken Mountain, and other known lodes in region associated with shear zones and monzonite intrusive rocks of Late Cretaceous age (fig. 55).

43b **Innoko-Tolstol mining district** - Major placer Au district with significant lode Au-Sb-Hg potential; lode sources for placers are volcanic-plutonic complexes of Late Cretaceous and dike swarms that intrude Mesozoic flysch; mining district produced 18,170 kg (584,182 oz) Au almost all from placer deposits. New discovery on Vinasale Mountain south of McGrath is Au-polymetallic deposit in monzonite stock (fig. 55).

44 **Nixon Fork** - Promising Au-Cu deposits; Nixon Fork mine produced 1,851 kg (59,500 oz) Au from Late Cretaceous skarns associated with quartz monzonite-Devonian limestone contact zones. Indicated reserve of about 10,886 kg (350,000 oz) Au in 258,500 tonnes (285,000 tons) of ore (fig. 55).

44a **Illinois Creek** - Reserves (all categories) of about 1,858,440 tonnes (2,049,000 tons) grading 2.4 g/tonne (0.07 oz/ton) Au and 58 g/tonne (1.69 oz/ton) Ag (fig. 53).

45 **Bonanza Creek** - Skarn-type W mineralization along intrusive contact; no published information available (fig. 54).

46 **Ruby mining district** - Placer Au-Sn district; produced more than 14,220 kg (457,200 oz) Au from 1931 to 1991; mining district also contains Pb-Ag prospects with grades reportedly as high as 2,811 g/tonne (82 oz/ton) Ag (fig. 55).

47 **Hot Springs mining district** - Placer Au-Sn district; produced more than 16,919 kg (543,958 oz) Au and over 326,590 kg (720,000 lb) cassiterite through 1990. Includes Eureka and Tofty subdistricts (fig. 55).

48 **Livengood-Tolovana mining district** - Placer Au district; produced more than 14,631 kg (470,413 oz) Au since discovery in 1914to 1991. Substantial reserves remain mainly on Livengood Bench, a Pliocene ancestral channel (fig. 55).

49 **Fairbanks mining district** - Nationally ranked Au-producing district; largest producer in Alaska. Produced about 245,890 kg (7,905,721 oz) Au from placer deposits. Major lode-Au and lode-Sb producer; produced more than 9,472 kg (304,548 oz) Au and over 1.8 million kg (4 million lb) Sb from veins and shear zones through 1990. Production of W exceeded 4,000 STU since 1915, all derived from skarn near Cretaceous quartz monzonite (no map reference).

49a **Fort Knox** - Disseminated Au deposit within granodiorite/quartz monzonite pluton near Fairbanks. Prefeasibility study in 1990 indicates proven or probable resource of 96,418 kg (3.1 million oz), in about 113 million tonnes (125 million tons) of intrusive-hosted ores (fig. 55).

49b **Ryan lode** - Complex shear zone with high-grade gash-veins in schist with estimated inferred reserves of 3.0 million tonnes (3.3 million tons) of auriferous veins and shears. Work in 1990 identified the shear at a depth of 309 m (1,000 ft), and demonstrated a subparallel Au-bearing shear within monzodioritic igneous rocks open along strike and at depth. Most recent drilled-out reserve is 2,660,503 tonnes (2,933,300 tons) grading 2.6 g/tonne (0.076 oz/ton) Au with waste-ore ratio of 4.6/1 in the Ryan Lode, and about 907,000 tonnes (1,000,000 tons) grading 2.1 g/tonne (0.06 oz/ton) Au in the igneous-hosted Curlew area (fig. 55).

49c **Grant Mine** - A series of subparallel Au-bearing quartz veins in the schist and quartzite of Ester Dome. Indicated reserves, 1990, on one vein system, the O'Dea, are 192,285 tonnes (212,000 tons) of 12 g/tonne (0.36 oz/ton) Au. Other similar vein systems have been identified within the property (fig. 55).

50 **Mt. Prindle** - Significant U-rare-earth mineralization in Mesozoic alkaline igneous rocks. Rock geochemical values of up to 0.7% U; up to 15% rare-earth elements reported (fig. 55).

51 **Twin Mountain** - Significant W mineralization associated with skarn development along contact zone of quartz monzonite stock of Cretaceous age (fig. 54).

52 **Circle mining district** - Currently one of Alaska's largest producing placer-Au district; produced 31,077 kg (999,155 oz) Au since discovery in 1893 to 1991. Has significant potential for Sn, W, and Au mineralization from variety of lode sources (fig. 55).

53 **Three Castle Mountain, Pleasant Creek, Cascu VABM** - Strata-bound Pb-Zn massive sulfide mineralization. Reported grades of up to 17% Zn and 2% Pb (fig. 53).

54 **Bonnifield District massive sulfide deposits (Anderson Mountain, Dry Creek, Sheep Creek, Virginia Creek, BT, Liberty Belle)** - Significant volcanogenic Cu-Pb-Zn-Ag massive sulfide deposits of Devonian to Mississippian age in Bonnifield mining district. Potential for high-grade deposits reported. Includes Liberty Bell strata-bound Au-B deposit and mineralization in Sheep Creek; latter contains Sn as well as base metals (fig. 53).

55 **Delta massive sulfide belt** - Contains at least 30 known volcanogenic massive sulfide deposits and occurrences. Grades from 0.3% to 1.1% Cu, 1.7% to 5.7% Zn, 0.5% to 2.3% Pb, 24 to 69 g/tonne (0.7 to 2.0 oz/ton) Ag, and 0.61 to 2.1 g/tonne (0.018 to 0.061 oz/ton) Au; estimated potential reserve of 34.6 million tonnes (40 million tons) for all deposits (fig. 53).

56 **Mosquito, Petermle** - Porphyry Mo prospects of early Tertiary age; reported grades of up to 0.17% Mo (fig. 54).

57 **Taurus** - Significant major porphyry Cu-Au prospect of Paleocene age. East Taurus Zone contains inferred reserves of 126 million tonnes (140 million tons) grading about 0.30% Cu and .34 g/tonne (0.01 oz/ton) Au, and 0.03% Mo (fig. 54).

58 **Big Creek, Ladue** - Strata-bound Pb-Zn-Ag massive sulfide prospects in metavolcanic rocks (fig. 53).

59 **Slate Creek** - At least 50 million tonnes (55 million tons) of 6.3%, high-quality chrysotile asbestos in serpentinized ultramafic rocks of Permian(?) age (fig. 55).

60 **Fortymile mining district** - Major placer Au district. Produced over 16,272 kg (523,154 oz) placer Au since discovery in 1886 to 1991 (fig. 55).

61 **Kantishna mining district** - Major placer Au and lode Ag-Au-Pb-Zn-Sb-W district. Produced 3,089 kg (99,307 oz) placer and lode-Au, about 9,549 kg (307,000 oz) lode Ag, and 2.3 million kg (5million lb) Sb from shear zones and vein deposits hosted in metamorphic units of Yukon-Tanana terrane. Nearly 90 lode deposits have been identified; potential exists for significant Ag-Au-Pb-Zn resources. Metalliferous strata-bound base metal deposits occur in schist and quartzite (fig. 55).

62 **Stampede mine** - Major Sb deposit; produced more than 1.42 million kg (3.5 million lb) Sb from large shear zone in polymetamorphic rocks of Yukon-Tanana terrane (fig. 55).

63 **Coal Creek** - Greisen-hosted Sn-Cu-W deposit in "McKinley" age pluton (55 million-year-old). Reported reserves of 4.54 million tonnes (5 million tons) of ore that grade 0.28% Sn and 0.3% Cu with credits of W, Ag, and Zn (fig. 54).

64 **Golden Zone mine** - Major Au-Cu-Ag deposits in Late Cretaceous breccia pipe. Produced more than 49 kg (1,581 oz) Au, 268 kg (8,617 oz) Ag, and 79,051 kg (42,000 lb) Cu. Estimated reserves are 7,153 kg (230,000 oz) of Au in about 1.8 million tonnes (2 million tons) ore (figs. 53 and 55).

65 **Nim Prospect** - Porphyry Cu-Ag-Au deposit of Late Cretaceous age. Reported grades of up to 5.0% Cu and 309 g/tonne (9 oz/ton) Ag (fig. 53).

66 **Valdez Creek** - 9,526 kg (306,263 oz) of past production through 1991; about 7,776 kg (250,000 oz) of proven placer reserves and 11,819 kg (380,000 oz) Au in possible or inferred category. Alaska's largest Au producer (Cambior Inc.) currently in operation (fig. 55).

67 **Denali Prospect** - At least six small, strata-bound Cu lodes in volcanic sedimentary rocks of Triassic age that may contain 4.54 million tonnes (5 million tons) ore that grade about 2% Cu with credits of Ag (fig. 53).

68 **Chistochina** - Porphyry Cu prospects of Tertiary age and placer-Au district; produced more than 5,594 kg (179,851 oz) Au and small amount Pt from placer deposits (fig. 55).

69 **Nabesna mine** - Classic high-grade Au skarn that envelopes quartz diorite of Jurassic(?) age; produced over 2,068 kg (66,500 oz) Au from about 79,816 tonnes (88,000 tons) of ore from 1930 to 1941 (fig. 55).

70 **Spirit Mountain** - Massive and disseminated Cu-Ni mineralization in mafic-ultramafic complex (fig. 55).

71 **Kennecott deposits** - Major stratiform Cu-Ag massive sulfide deposits localized near contact between Chitistone Limestone and Nikolai Greenstone of Triassic age; contained some of highest grade Cu lodes mined in North America. From 1911 to 1938, produced more than 544 million kg (1.2 billion lb) Cu and 311,028 kg (10 million oz) Ag from 4.35 million tonnes (4.8 million tons) ore. Some reserves remain (fig. 53).

72 **Binocular and other prospects** - Kennecott-type Cu-Ag massive sulfide deposits (fig. 53).

73 **Bond Creek - Orange Hill** - Two major porphyry Cu-Mo deposits of Late Cretaceous age; reported inferred reserves of 770 million tonnes (850 million tons) ore that grade 0.3 to 0.5% Cu and 0.03% Mo (fig. 54).

74 **Carl Creek** - Porphyry Cu prospect in altered intrusive complex; similar to locality 73 (fig. 54).

75 **Boultoff** - Porphyry Cu prospect in altered intrusive rocks; inferred reserves of 132 million tonnes (145 million tons) of 0.20% Cu similar to locality 73 (fig. 54).

76 **Horsfeld** - Porphyry Cu prospect; similar to locality 73 (fig. 54).

77 **Midas mine** - Significant strata-bound Cu (Ag-Au-Pb-Zn) massive sulfide deposit in volcanic sedimentary rocks of Tertiary Orca Group. Produced more than 1.5 million kg (3.3 million lb) Cu from 44,760 tonnes (49,350 tons) ore (fig. 53).

78 **Ellamar** - Strata-bound Cu-Zn-Au massive sulfide deposit in sediment of Eocene(?) Orca Group. Produced more than 7.3 million kg (16 million lb) Cu, 1,595 kg (51,307 oz) Au, and 5,960 kg (191,615 oz) Ag from about 273,764 tonnes (301,835 tons) ore (fig. 53).

79 **Willow Creek, Independence, Lucky Shot, War Baby** - Major lode-Au (Ag-Cu-Pb-Zn-Mo) in veins that cut Mesozoic quartz diorite. Produced more than 18,860 kg (606,400 oz) Au from lode sources and about 1,729 kg (55,600 oz) Au from associated placer deposits (fig. 55).

80 **Latouche, Beatson** - Major strata-bound Cu-Zn-Ag massive sulfide deposits in Orca Group sedimentary rocks and mafic volcanic rocks. Produced more than 93 milion kg (205 million lb) Cu from 5.4 million tonnes (6 million tons) ore. Inferred reserves of 4.53 million tonnes (5 million tons) ore that grade 1% Cu, 1.5% Pb+Zn (fig 53).

81 **Rua Cove** - Major strata-bound Cu-Zn massive sulfide deposit in complex ore shoots enclosed in mafic volcanic rocks of Orca Group. Reported reserves of over 1 million tonnes (1.1 million tons) ore that grade 1.25% Cu (fig. 53).

82 **Red Mountain and Claim Point** - Significant Cr occurrence associated with layered ultramafic complexes of Tertiary age at Red Mountain near Seldovia. More than 35,419 tonnes (39,951 tons) metallurgical-grade ore shipped through 1976; huge low-grade Cr resource may remain, of which 27 million tonnes (30 million tons) grade 5.1% $Cr_2O_3$ (fig. 55).

83 **Red Devil** - Major Hg-Sb deposit; high-grade epithermal Hg-Sb deposit hosted in shear zones in Kuskokwim Group sedimentary rocks. More than 1.24 million kg (35,000 flasks) Hg produced from 68,025 tonnes (75,000 tons) ore (fig. 55).

84 **Aniak/Nyac mining district** - Significant placer Au district. Aniak mining district produced 16,358 kg (525,920 oz) Au from placer deposits, mainly from the NYAC and Donlin Creek areas (fig. 55).

85 **Goodnews Bay** - Major placer Pt district; estimated to have produced over 16,796 kg (540,000 oz) refined PGE metals from 1934 to 1976; one of the largest known PGE metal resources in United States. Possible resources of 45 million $m^3$ (60 million $yd^3$) of deep, PGE-bearing gravels remain. Lode source believed to be Alaskan-type zoned ultramafic complex of Jurasssic or Cretaceous age. Possible significant offshore placer potential (fig. 55).

86 **Apollo-Sitka mines** - Major lode Au deposits; produced more than 3,347 kg (107,600 oz) Au from ore that averaged about 7.5 g/tonne (0.22 oz/ton) Au. Inferred reserves are 678,440 tonnes (748,000 tons) grading 26 g/tonne (0.76 oz/ton) Au, 74 g/tonne (2.16 oz/ton) Ag, with base metal credits (fig. 55).

87 **Pyramid** - Late Tertiary porphyry Cu-Mo deposit; inferred reserves of 113 million tonnes (125 million tons) ore that grade 0.4% Cu and 0.03% Mo reported (fig. 54).

88 **Ivanof** - Late Tertiary porphyry Cu prospect; grades of up to 0.72% Cu reported. Potential for large tonnages (fig. 54).

89 **Weasel Mountain, Bee Creek** - Porphyry Cu-Mo prospect of late Tertiary to Quaternary age; grades of up to 0.48% Cu and 0.035% Mo reported. Potential for moderate tonnages of low-grade mineralization (fig. 54).

90 **Mike deposit** - Porphyry Mo prospect of late Tertiary age; grades of up to 0.21% Mo reported. Potential for large tonnages of low-grade Mo mineralization (fig. 54).

91 **Rex deposit** - Porphyry Cu prospect similar to locality 90; grades of up to 0.3% Cu reported. Potential for moderate reserves of low-grade mineralization (fig. 54).

92 **Kasna Creek** - Major stratiform Cu-Pb-Zn and skarn-sulfide deposits of Mesozoic age in mafic, volcanic, and sedimentary rocks; reported reserves

of over 9,070,000 tonnes (10 million tons) ore that grade more than 1% Cu (fig. 53).

93 **Sleitat Mountain** - High-grade east-west-trending, Sn-W-Ag topaz-quartz greisen system hosted in 59 million-year-old old binary granite and in hornfels. Zone up to 1,915 m (3,000 ft) long and 152 m (500 ft) wide. One drill-hole showed 26 m (85 ft) of 1.8% Sn, and 0.4% W. Inferred resources are 58 to 96 million kg (128 to 212 million lb) Sn in 26.3 million tonnes (29 million tons) ore (fig. 54).

94 **Jimmy Lake** - Complex Cu-Ag-Sn mineralization of late Tertiary(?) age; reported grades of up to 3,599 g/tonne (105 oz/ton) Ag and 3% Cu (fig. 53).

95 **Haines Barite** - Major stratiform Ba-Pb-Zn-Cu-Ag deposit in pillow basalt-dominated section of Paleozoic or Triassic age; consists of 15- to 18-m (48- to 60-ft)-thick zone of 60-percent barite with upper zone [0.6 to 2.4 m (2 to 8 ft) thick] of massive sulfides that contain 2% Pb, 3% Zn, 1% Cu, up to 137 g/tonne (4 oz/ton) Ag, and 4 g/tonne (0.12 oz/ton) Au. Estimated to contain 680,250 tonnes (750,000 tons) of 65% barite with Zn and Ag credits (fig. 53).

96 **Klukwan** - Major Fe-Ti deposits in zoned ultramafic complex of Mesozoic age; reported to contain 2.7 billion tonnes (3 billion tons) of material that contains 16.8% Fe and 1.6 to 3.0% Ti (fig. 55).

97 **Nunatak** - Porphyry Mo deposit; reported reserves of 7.7 million tonnes (8.5 million tons) ore that grades 0.125% Mo and 117 millions tonnes (129 million tons) of 0.04% Mo (fig. 54).

98 **Brady Glacier** - Major Ni-Cu deposit in layered gabbro-pyroxenite complex of Tertiary age. Proven reserves of 91 million tonnes (100 million tons) ore that grade 0.5% Ni, 0.3% Cu reported and about 0.03% Co; also contains PGE concentrations (fig. 55).

99 **Mertie Lode and Funter Bay mining district** - Contains substantial reserves of lode Au mineralization. Past production totaled about 466 kg (15,000 oz) Au. Deposits also contain significant Ni-Cu and Pb-Zn-Ag mineralization. Funter Bay deposit contains reported reserves of 507,920 tonnes (560,000 tons) that grade 0.34% Ni, 0.35% Cu, and 0.15% Co in gabbro-pipe system (fig. 55).

100 **Alaska-Juneau** - Major lode Au deposit that consists of 30 to 90 m (100- to 300-ft) wide zone that contains en echelon, Au-bearing quartz veins in metamorphic rocks; produced more than 109,482 kg (3.52 million oz) Au from 80 million tonnes (88.5 million tons) ore from 1893 to 1944. Reserves (all categories), of 96 million tonnes (105.7 million tons) of 1.7 g/tonne (0.05 oz/ton) Au remain (fig. 55).

101 **Chichagof and Hirst Chichagof** - Major lode-Au deposits in quartz veins that cut Mesozoic graywacke; produced more than 23,949 kg (770,000 oz) Au, most of which was produced at Chichagof mine. Inferred leased reserves estimated to be 3,110 kg (100,000 oz) Au (fig. 55).

102 **Mirror Harbor** - Ni-Cu mineralization in layered-gabbro complex of Mesozoic age; reported proven reserves of 7,256 tonnes (8,000 tons) of 1.57% Ni and 0.88% Cu and reported inferred reserves of several million tons ore that grade 0.2% Ni and 0.1% Cu (fig. 55).

103 **Bohemia Basin** - Major Ni-Cu-Co mineralization in layered mafic complex similar to locality 102; reported reserves of 20 million tonnes (22 million tons) ore that grade 0.33 to 0.51% Ni, 0.21 to 0.27% Cu, and 0.02% Co, all of which are recoverable with standard flotation technology (fig. 55).

104 **Apex-El Nido** - Significant lode Au-W deposits that occur as crosscutting veins in graywacke; produced more than 1,555 kg (50,000 oz) Au (fig. 55).

105 **Greens Creek** - Major sediment-hosted Pb-Zn-Cu-Ag-Au volcanogenic massive sulfide deposit of Devonian or Triassic age; most recent reserve estimate is about 12.5 million tonnes (13.8 million tons) ore that grades about 456 g/tonne (13.3 oz/ton) Ag, 4.1 g/tonne (0.12 oz/ton) Au, 12.8% Zn, and 4.0% Pb (fig. 53).

106 **Sumdum** - Volcanogenic Cu-Pb-Zn massive sulfide deposit in Mesozoic metamorphic complex with potential strike length of over 3,048 m (10,000 ft). Inferred reserves of 24 million tonnes (26.7 million tons) ore that grade 0.57% Cu, 0.37% Zn, and 10 g/tonne (0.3 oz/ton) Ag reported (fig. 53).

107 **Snettisham** - Fe-Ti deposit in mafic zoned-intrusive complex; reported grades of about 18.9% Fe and 2.6% Ti (fig. 55).

108 **Tracy Arm** - Strata-bound Cu-Zn-Pb massive sulfide prospect in Mesozoic schist; over 335 m (1,100 ft) long and up to 3.7 m (12 ft) thick. Reported grades of 1.5% Cu, 3.9% Zn, 26 g/tonne (0.76 oz/ton) Ag, and 0.44 g/tonne (0.013 oz/ton) Au (fig. 53).

109 **Red Bluff Bay** - Significant chrome mineralization in Mesozoic ultramafic complex (probably ophiolite); reported reserves of 517 tonnes (570 tons) of material that grade 40% Cr and 26,303 tonnes (29,000 tons) that grade 18 to 35% Cr (fig 55).

110 **Cornwallis Peninsula** - Volcanogenic Cu-Pb-Zn-Ag-Ba massive sulfide deposit of Triassic(?) age; reported grades of up to 20% Pb-Zn and 788 g/tonne (23 oz/ton) Ag 9 (fig. 53).

111 **Castle Island** - Stratiform barite deposit of Triassic age hosted in carbonate and pillow basalt; about 776,390 tonnes (856,000 tons) of raw and refined barite produced from 1963 to 1980; also contains Zn, Pb, and Cu sulfides. Reported to be mined out (fig. 53).

112 **Groundhog Basin** - Area contains several massive sulfide prospects in Mesozoic schist and gneiss whose origins are now thought to be plutonic associated. Reported grades of up to 8% Pb, 994 g/tonne (29 oz/ton) Ag, and 17 g/tonne (0.5 oz/ton) Au. Sn has also been recently identified. Area also contains potential for porphyry Mo deposits (fig. 53).

113 **Snipe Bay** - Ni-Cu deposit in zoned mafic-ultramafic complex; inferred reserves of 390,000 tonnes (430,000 tons) of 0.3% Ni, 0.3% Cu, and 4.4 g/tonne (0.13 oz/ton) Ag reported (fig. 55).

114 **Kasaan Peninsula** - Major skarn-type Cu-Fe-Au massive sulfide deposit of Jurassic age; area has produced over 12.7 million kg (28 million lb) Cu, and 1,711 kg (55,000 oz) Ag. Reported reserves of 3.6 million tonnes (4 million tons) ore that grade 50% Fe and less than 2% Cu (fig. 53).

115 **Salt Chuck** - Cu-PGM-Ag-Au deposit in contact zone between pyroxenite and gabbro within Alaskan-type zoned mafic-ultramafic pluton. From 1900 to 1941, 2.3 million kg (5 million lb) Cu, over 622 kg (20,000 oz) PGM, and Au and Ag credits were produced from 294,775 tonnes (325,000 tons) ore (fig. 55).

116 **Union Bay** - Significant Fe-Ti mineralization in ultramafic complex; area also contains Pt and V concentrations (fig. 55).

117 **Hyder mining district** - Area produced more than 22,675 tonnes (25,000 tons) high-grade W-Cu-Pb-Zn-Ag ore from 1925 to 1951 from crosscutting ore shoots in Texas Creek granodiorite of Tertiary age. Area also contains potential for porphyry Mo-W mineralization and massive sulfide-skarn Pb-Ag-Au-W deposits (figs. 53 and 54).

118 **Jumbo** - Cu-Fe-Mo-Ag skarn deposit; produced more than 4.5 million kg (10 million lb) Cu, 8,708 kg (280,000 oz) Ag, and 218 kg (7,000 oz) Au from 113,375 tonnes (125,000 tons) ore. Zoned magnetite-Cu skarns are associated with epizonal granodiorite pluton of Cretaceous age. Reported

reserves of 589,550 tonnes (650,000 tons) ore that grade 45.2% Fe, 0.75% Cu, 0.3 g/tonne (0.01 oz/ton) Au, and 2.74 g/tonne (0.08 oz/ton) Ag (fig. 53).

119 **Copper City** - Stratiform Cu-Zn-Ag-Au massive sulfide deposit hosted in late Precambrian or earliest Paleozoic Wales Group. Reported grades of up to 12.7% Cu, 2.7% Zn, 86 g/tonne (2.5 oz/ton) Ag, and 6.9 g/tonne (0.2 oz/ton) Au (fig. 53).

120 **Quartz Hill** - World-class porphyry-Mo deposit in composite felsic pluton (25 million-year-old); proven reserves of 1.36 billion tonnes (1.5 billion tons) ore that grades 0.136% $MoS_2$, including 444 million tonnes (490 million tons) with grades of 0.219% $MoS_2$ (fig. 54).

121 **Niblack** - Volcanogenic Cu-Pb-Au-Ag massive sulfide deposit hosted in Precambrian(?) Wales Group or Ordovician to Silurian Descon Formation; produced more than 635,000 kg (1.4 million lb) Cu, 342 kg (11,000 oz) Au, and 467 kg (15,000 oz) Ag (fig. 53).

122 **Bokan Mountain** - Numerous U-Th prospects associated with Jurassic peralkaline intrusive complex; from 1955 to 1971, produced more than 108,840 tonnes (120,000 tons) ore that graded about 1% $U_3O_8$. Contains inferred reserves of about 36.2 million tonnes (40 million tons) of 0.126% Nb and up to 1% REE metals (fig. 55).

123 **Kemuk Mountain** - Magmatic Fe-Ti deposit hosted in Cretaceous(?) pyroxenite. Inferred reserves of 2.17 billion tonnes (2.4 billion tons) that average 15 to 17% Fe, 2 to 3% $TiO_2$, and 0.16% $P_2O_5$ (fig. 55).

124 **McLeod** - Porphyry Mo deposit that contains quartz-molybdenite fissure veins in quartz-feldspar porphyry. Chip samples contain up to 0.09% Mo (fig. 54).

125 **Johnson River** - Epigenetic(?) quartz-sulfide stockwork or massive sulfide deposit hosted in volcaniclastic, pyroclastic, and volcanic rocks of Jurassic Talkeetna Formation. Deposit has drilled out reserves containing 16,795 kg (540,000 oz) Au and 126,980 tonnes (140,000 tons) of Zn (fig. 55).

126 **Nimiuktuk River** - Small hill of massive, high-grade barite estimated to contain at least 1.36 million tonnes (1.5 million tons) barite. Widespread stream-sediment Ba anomalies in area indicate further barite potential (fig. 53).

127 **Kensington** - Stockworks of quartz veins in sheared and chloritized quartz diorite produced 9,886 tonnes (10,900 tons) grading 6 g/tonne (0.18 oz/ton) Au prior to 1930. Recent reserve estimates indicate at least 10.4 million tonnes (11.5 million tons) grading 4.9 g/tonne (0.143 oz/ton) Au. Subparallel Horrible vein system contains 3.56 million tonnes (3.93 million tons) grading 3.7 g/tonne (0.11 oz/ton) Au (fig. 55).

128 **Juneau** - Five quartz-fissure veins in Cretaceous quartz diorite, more than 4,573 m (15,000 ft) of underground workings; produced 1,505 kg (48,387 oz) Au, mainly prior to 1930. Reserves estimated at 0.97 million tonnes (1.07 million tons) of 12 g/tonne (0.349 oz/ton) Au (fig. 55).

129 **Pebble Copper** - Cu-Au porphyry with identified resource of 454 million tonnes (500 million tons) grading 0.35% copper and 0.4 g/tonne (0.012 oz/ton) Au with Mo in the 0.03% to 0.04% range (fig. 53).

# APPENDIX E

## Mining licenses issued by and received from the Alaska Department of Revenue, 1991

[The entries include in this order: company name, (region), address, resource, site of operation, mining district, and licence number. Alaska Peninsula Region (APR), Eastern Interior Region (EIR), Northern Region (NR), Southcentral Region (SCR), Southwestern Region (SWR), Southeastern Region (SER),Undistributed (UR), Western Region (WR), and - - indicates specific site or district not provided.]

Alamin Mining Co. (WR)
112 Park Ave.
Int'l Falls, MN 56649
Gold
Bear, Cripple, and Graham Creeks
Innoko District
ML 91 0221 1

Alaska Aggregate Corp. (SCR)
240 W 68th Ave.
Anchorage, AK 99518
Sand and gravel
--
Palmer District
ML 91 0254 1

Alaska Apollo Gold Mines Ltd. (APR)
P.O. Box 10438
Phoenix, AZ 85064
Gold
Unga Island
Point Moller District
ML 91 0216 1

Alaska Cab Garage (WR)
Board of Trade Inc.
P.O. Box 967
Nome, AK 99762
Sand and gravel
Cape Nome
Nome District
ML 91 0442

Alaska Gold Co. (WR)
P.O. Box 640
Nome, AK 99762
Gold
Submarine Beach
Nome District
ML 91 0088 1

Alaska Gold Co. (WR)
P.O. Box 640
Nome, AK 99762
Gold
3rd Beachline
Nome District
ML 91 0089 1

Alaska Gold Co. (WR)
Taiga Mining Co. Inc.
P.O. Box 640
Nome, AK 99762
Gold
Bear Creek
Hughes/Nulato District
ML 91 0092 1

Alaska Gold Co. (EIR)
Alf Hopen
P.O. Box 74246
Fairbanks, AK 99707
Gold
Cleary Creek
Fairbanks District
ML 91 0054 1

Alaska Mining & Minerals Inc. (SWR)
4159 Hood Ct.
Anchorage, AK 99517
Gold
Fortyseven Creek
Aniak District
ML 91 0465

Alaska Placer Development Inc. (EIR)
P.O. Box 81467
Fairbanks, AK 99708
Gold
Livengood Bench
Livengood/Tolovana District
ML 91 0386 1

Alaska Unlimited Co. (EIR)
Warren W. Taylor
P.O. Box 60782
Fairbanks, AK 99706
Gold
Gold King Creek
Bonnifield District
ML 91 0112 1

Albert Creek Mining (SCR)
Clavin W. Hutcheson
P.O. Box 1258
Seward, AK 99664
Gold
Albert Creek
Nelchina District
ML 91 0421 1

Aleutian Materials Inc. (APR)
James H. Graham
P.O. Box 223
Kodiak, AK 99615
Sand and gravel
Bells Flats Tracts B1
Kodiak District
ML 91 0376 1

AMAX Gold Exploration Inc. (EIR)
350 Indiana St., Suite 800
Golden, CO 80401
Gold
Fort Knox Project
Fairbanks District
ML 91 0370 1

American Copper and Nickel Co. Inc. (EIR)
4860 Robb St.
Wheat Ridge, CO 80033
Gold
Ester Dome
Fairbanks District
ML 91 0384 1

American Copper & Nickel Co. Inc. (EIR)
P.O. Box [illegible]359
Fairbanks, AK 99708
Gold
Old Murphy Dome Rd.
Fairbanks District
ML 91 0389 1

American Copper & Nickel Co. Inc. (SWR)
F.G. Kruger
2690-666 Burrard St.
Vancouver, BC, Canada V6C 2X8
Gold
Canyon Creek/Paint River
Iliamna District
ML 91 0301 1

Gerald Irvin Anderson (SCR)
8225 Hartzell Rd.
Anchorage, AK 99507
Yacko Creek
Nelchina District
ML 91 0425 1

Anderson & Son Mining (SWR)
Allan G. Anderson
P.O. Box 277
McGrath, AK 99627
Gold
Yankee Creek
Innoko District
ML 91 0006 1

Annabelle Mine (EIR)
James Roland
710 McGrath Rd.
Fairbanks, AK 99712
Gold
Moose Creek
Bonnifield District
ML 91 0167 1

Anvil Mining Inc. (WR)
Noel S. Tanner
P.O. Box 1369
Nome, AK 99762
Gold
Anvil Creek
Nome Distnct
ML 91 0342 1

AOS Mining & Engineering (EIR)
Roy W. Ferrenbach
1215 Bunnell, Apt. 11
Fairbanks, AK 99701
Gold
Cleary, Eora, and Lulu Creeks
Fairbanks District
ML 91 0368 1

Adam Arnariuk, Sr (APR)
P.O. Box 95
Togiak, AK 99678
Gold
--
Bristol Bay Region
ML 91 0299 1

Merwin Arnesen (SCR)
P.O. Box 737
Palmer, AK 99645
Sand and gravel
--
Various Districts
ML 91 0297 1

Aspen Exploration Corp. (WR)
5031 S. Ulster, Suite 310
Denver, CO 80237
Gold
Rock Creek and Sophi Gulch
Nome District
ML 91 0274 1; ML 91 0275 1

Associated Construction (SCR)
Joseph J. Rollins
P.O. Box 266
Anchor Point, AK 99556
Sand and gravel
Mile 160
Homer District
ML 91 0341 1

AU Mining Inc. (WR)
Michael L. Vial
General Delivery
Candle, AK 99728
Gold
Candle Creek, Kewalik River
Fairhaven District
ML 91 0466

B.C. Mining (EIR)
Cliff Knowlton
2245 John Evans Lane
Fairbanks, AK 99712
Gold
Half Dollar Creek
Circle District
ML 91 0047 1

Back Pack Mining Co. (SCR)
Paul Barry
HC 32 Box 6665-A5
Wasilla, AK 99687
Gold
Mills Creek and Tributaries
Yentna District
ML 91 0314 1

George Bailey (EIR)
P.O. Box 2052
Fairbanks, AK 99707
Gold
Eureka Creek
Kantishna District
ML 91 0360 1

Randolph Bailey/Edwin Grover (SCR)
7031 Gibbs Hill Circle
Anchorage, AK 99504
Gold
East Fork of Chulitna River
Valdez Creek District
ML 91 0150 1

Barnett's Precious Metal (SCR)
Steve Barnett
P.O. Box 86
Sand Point, AK 99661
Gold
Little Dollar and Stony Creeks
Yentna District
ML 91 0445 1

**Alice Bayless/Michael Bushy (EIR)**
Drawer F
Copper Center, AK 99573
Gold
Chicken Creek
Fortymile District
ML 91 0168 1

**Beaver Loop Sand & Gravel (SCR)**
Patrick and Mary Doyle
HC01 Box 1225
Kenai, AK 99611
Sand and gravel
Beaver Loop Rd.
Kenai District
ML 91 0285 1

**Beaver State Mining (EIR)**
Becky McCallum
1108 California Ave.
Libby, MT 59923
Gold
Gold Dust Creek
Circle District
ML 91 0105 1

**Beehive Mining (EIR)**
Layne Gardner
1967 Yankovich Rd.
Fairbanks, AK 99709
Gold
Bear and Sheridan Creeks
Koyuk District
ML 91 0354 1

**Beehive Dome (EIR)**
Stanley C. Rybachek
1967 Yankovich Rd.
Fairbanks, AK 99709
Gold
Cleary Creek
Fairbanks District
ML 91 0483

**W.J. Beerman (SCR)**
2416 S. First St.
Yakima, WA 98901
Gold
Big Four Creek
Chistochina District
ML 91 0263 1

**Donald D. Belew (EIR)**
Tom Domeier
P.O. Box 1231
Palmer, AK 99645
Gold
Confederate Creek
Fortymile District
ML 91 0077 1

**Rhinehart Berg (WR)**
General Delivery
Candle, AK 99728
Gold
Short and Independance Creeks
Fairhaven District
ML 91 0353 1

**Arthur and Jeanne Berglund (SCR)**
HC01, Box 6275
Palmer, AK 99645
Gold
Willow Creek
Willow Creek District
ML 91 0004 1

**Bering Straits Native Corp. (WR)**
Thomas S. Sparks
P.O. Box 1008
Nome, AK 99762
Sand and gravel
--
Nome District
ML 91 0489

**Bering Straits Native Corp. (WR)**
Thomas S. Sparks
P.O. Box 1008
Nome, AK 99762
Sand and gravel
Nome River
Nome District
ML 91 0490

**Big G Mining Inc. (EIR)**
Hank Gradney
P.O. Box 7400
Fairbanks, AK 99707
Gold
Deadwood Creek
Circle District
ML 91 0046 1

**Russell Birdsell (EIR)**
P.O. Box 1908
Cave Creek, AZ 85331
Gold
Cherry Creek
Fortymile District
ML 91 0170 1

**Black Velvet Mining Co. (EIR)**
Ray Thomas George
General Delivery
Chicken, AK 99732
Gold
South Fork Fortymile River
Fortymile District
ML 91 0407 1

**Patrick Bliss (WR)**
c/o Howard Grey & Associates
711 H St., Suite 450
Anchorage, AK 99501
Gold
Ungalik River
Koyuk District
ML 91 0325 1

**Robert Wayne Blondeau (SCR)**
P.O. Box 602
Valdez, AK 99686
Gold
Mineral Creek
Prince William Sound District
ML 91 0003 1; ML 91 0016 1

**Bonanza Mining (EIR)**
Douglas L. Miller
P.O. Box 127
Central, AK 99737
Gold
Bonanza Creek
Circle District
ML 91 0022 1

**Glenn D. and Lela Bouton (NR)**
665 Farmers Loop Rd.
Fairbanks, AK 99712
Gold
Middle Fork/Koyukuk River
Koyukuk District
ML 91 0026 1; ML 91 0430 1

**Curl A. Bracale, Jr. (WR)**
733 W. 4th Ave., #605
Anchorage, AK 99501
Gold
Camp Creek
Hughes District
ML 91 0205 1

**Charlotte Bradley/Todd Baur (SCR)**
P.O. Box 871501
Wasilla, AK 99687
Gold
Mills Creek
Yentna District
ML 91 0306 1

**Brooks Range Exploration Co. Inc. (NR)**
Wallace Gordon
3035 Madison Way
Anchorage, AK 99508
Gold
Spring and Hilltop Creeks
Koyukuk District
ML 91 0249 1

**Brooks Range Ventures (NR)**
Wallace E. Gordon
3035 Madison Way
Anchorage, AK 99508
Gold
Lake Creek
Koyukuk District
ML 91 0238 1

**Broxson Mining Co. (EIR)**
Richard Knudson
2900 Boniface Parkway, Suite 511
Anchorage, AK 99504
Gold
East Broxson Gulch
Delta District
ML 91 0366 1

**Ken Bruhn (SCR)**
P.O. Box 784
Cooper Landing, AK 99572
Gold
Cresent Creek
Seward District
ML 91 0415 1

**Norman R. Bucy (SCR)**
3638 Dunkirk Court
Anchorage, AK 99502
Gold
Canyon Creek
Seward District
ML 91 0317 1

**John Burns (EIR)**
P.O. Box 5
Chicken, AK 99732
Gold
Davis Creek
Fortymile District
ML 91 0209 1

**Al & Paula Bute (SCR)**
**Gary & Linda Superman**
HCO 1510
Kenai, AK 99611
Gold
Stetson Creek
Seward District
ML 91 0118 1

**CM Mining (EIR)**
Joe Cange
SVL Box 7626
Victorville, CA 92392
Gold
Olive Creek
Livengood District
ML 91 0468

**Robert J. Cacy, Jr. (EIR)**
P.O. Box 106
Central, AK 99730
Gold
Portage Creek
Circle District
ML 91 0327 1

**Calista Corp. (SWR)**
Ernest Marvin Chase
P.O. Box 141
Anchorage, AK 99558
Gold
Stuyahok River
Marshall District
ML 91 0084 1

**Camp Creek Mining (EIR)**
Eric, Alvin and Elizabeth Kile
P.O. Box 140424
Anchorge, AK 99514
Gold
Canyon, Camp, and Woods Creeks
Fairbanks District
ML 91 0248 1

**Carlo & Sons Mining Co. (EIR)**
William Carlo (now deceased)
2113 Southern
Fairbanks, AK 99701
Gold
Hunter Creek
Rampart District
ML 91 0152 1

**Robert Carlson (SCR)**
P.O. Box 771375
Eagle River, AK 99577
Gold
Upper Cache Creek
Yentna District
ML 91 0378 1

**Caswell Creek Sand & Gravel (SCR)**
Harold Bell
P.O. Box 147
Willow, AK 99688
Sand and gravel
--
Matanuska-Susitna District
ML 91 0064 1

**CEK Co. (SCR)**
Clifford Leach, Jr.
102 Drake Mews
Sonoma, CA 95476
Gold
Chisna River
Chistochina District
ML 91 0149 1

Chandalar Mines (NR)
Del Ackels
P.O. Box 72151
Fairbanks, AK 99707
Gold
Tobin Creek
Chandalar District
ML 91 0239 1

Ernest M. Chase (SWR)
P.O. Box 141
Anvik AK 99558
Gold
Stuyahok River
Marshall District
ML 91 0463

Jim Childs (EIR)
P.O. Box 56587
North Pole, AK 99705
Gold
Nugget Creek
Fairbanks District
ML 91 0185 1

Li-Hsiang Chiou (EIR)
P.O. Box 98513
Des Moines, WA 98188
Gold
Boulder Creek
Hot Springs District
ML 91 0208 1

Chugach Rock Corp. (SCR)
P.O. Box 91219
Anchorage, AK 99509
Sand and gravel
Placer River
Seward District
ML 91 0441 1

Circle Mining Co. (EIR)
Frank R. Warren
P.O. Box 58077
Fairbanks, AK 99711
Gold
Crooked Creek
Circle District
ML 91 0098 1

Citigold Alaska Inc. (EIR)
2173 University Ave., Suite 101
Fairbanks, AK 99709
Gold
Nome Creek
Fairbanks District
ML 91 0460 1

Clara Bea Inc. (WR)
D.B. Vial and B.W. Comstock
P.O. Box 853
Kotzebue, AK 99752
Gold
Candle Creek
Fairhaven District
ML 91 0159 1

Douglas M. Clark (EIR)
711 H Street, Suite 450
Anchorage, AK 99501
Gold
Palmer Creek/Middle Fork, Chena River
Fairbanks District
ML 91 0429 1; ML 91 0433 1

Joann Clark (EIR)
Roger Sayer
P.O. Box 73513
Fairbanks, AK 99707
Gold
Pine Creek
Richardson District
ML 91 0040 1

Joseph L. Cloud (NR)
Mike C. Shupe
HCO-1 Box 875
Kenai, AK 99611
Gold
Boulder Creek
Chandalar District
ML 91 0106 1

Lyle Colledge (EIR)
P.O. Box 60478
Fairbanks, AK 99706
Gold
Bottom Dollar Creek
Circle District
ML 91 0336 1

Cominco Alaska Exploration (SWR)
5660 B Street
Anchorage, AK 99518
Gold
--
Iliamna District
ML 91 0121 1

Cominco Alaska Inc. (NR)
P.O. Box 1230
Kotzebue, AK 99752
Zinc
Red Dog Mine
Noatak District
ML 91 0375 1

Compass Mining Co. (NR)
John B. Hall
P.O. Box 9052
Coldfoot, AK 99701
Gold
Linda Creek
Koyukuk District
ML 91 0153 1

Congdon Construction & Mining (EIR)
Carl J. Congdon
925 Commerce St.
Fairbanks, AK 99701
Gold
Quail Creek
Livengood/Tolovana District
ML 91 0103 1

Colin Conkle (EIR)
Marvin Mahrt
P.O. Box 56044
North Pole, AK 99705
Gold
Dry Creek
Bonnifield District
ML 91 0251 1

Ron J. Conner (SCR)
P.O. Box 875228
Wasilla, AK 99687
Gold
Peters Creek
Yentna District
ML 91 0212 1

James Conway (EIR)
HC02 Box 7660
Palmer, AK 99645
Gold
Bullfrog Creek
Fairbanks District
ML 91 0334 1

Fred Cook (EIR)
P.O. Box 311
Delta Junction, AK 99737
Gold
Portage Creek
Fairbanks District
ML 91 0404 1

Cook's Mining (EIR)
John Cook
P.O. Box 70393
Fairbanks, AK 99707
Gold
Deep Creek
Fairbanks District
ML 91 0067 1

Cook's Mining (EIR)
Patricia S. Franklin
P.O. Box 70393
Fairbanks, AK 99707
Gold
Fairbanks Creek
Fairbanks District
ML 91 0068 1

Cooper Landing (SCR)
Ed Ellis/Sherman C. Smith
P.O. Box 824
Cooper Landing, AK 99572
Gold
Lake Creek
Yentna District
ML 91 0063 1

Bobby G. Corder, Sr. (SCR)
1508 W. 32nd St.
Anchorage, AK 99503
Gold
Quartz Creek
Seward District
ML 91 0060 1

Frank Arthur Couch (SCR)
149 Farnsworth Blvd.
Soldotna, AK 99669
Gold
Stetson Creek
Seward District
ML 91 0009 1

Patrick and Clair Coyle (SCR)
290 S. Park St.
Anchorage, AK 99508
Gold
Kahiltna River
Yentna District
ML 91 0277 1

Crawford Walsh Construction (WR)
John D. Walsh
P.O. Box 2095
Nome, AK 99762
Gold
Dry Creek
Nome District
ML 91 0491

Bill Croley (EIR)
P.O. Box 191
Tok, AK 99780
Gold
Liberty Creek
Fairbanks District
ML 91 0131 1

Crooked Dog Mine (SCR)
Byron Henshaw/Charles Barnes
P.O. Box 193
Cantwell, AK 99729
Gold
Grogg Creek
Valdez Creek District
ML 91 0414 1

Verl Douglas Cushman, Sr. (EIR)
445 Riverton Rd.
Blackfoot, ID 83221
Gold
40 Mile River
Fortymile District
ML 91 0206 1

Dan Creek Partners (SCR)
Randy Elliott
P.O. Box 401
Gig Harbor, WA 98335
Gold
Dan Creek
Nizina District
ML 91 0394 1

James Charles Dart (EIR)
P.O. Box 18
Manley Hot Springs, AK 99756
Gold
Bolder Creek
Hot Springs District
ML 91 0420 1

Delima Placers (EIR)
Don P. Delima
P.O. Box 56106
Manley Hot Springs, AK 99756
Gold
American Creek
Hot Springs District
ML 91 0204 1

**Dibble Creek Rock (SCR)**
Clifford Shafer
HC67 Box 530
Anchor Point, AK 99556
Sand and gravel
--
Kenai District
ML 91 0288 1

**Dick Creek Mining (WR)**
Robin Gumaer
P.O. Box 1682
Nome, AK 99762
Gold
Dick Creek
Kougorok District
ML 91 0056 1

**Roy Diehl (SCR)**
General Delivery
Anchorage, AK 99501
Gold
Lowe River
Prince William Sound District
ML 91 0308 1; ML 91 0315 1

**Discovery Mining (EIR)**
James W. Belford
P.O. Box 1934
Fairbanks, AK 99701
Gold
None
Fairbanks District
ML 91 025[illegible] 1

**Patrick D[illegible] and Clair Edward (SCR)**
290 South Park
Anchorage, AK 99508
Gold
Lake Creek
Yentna District
ML 91 0129 1

**Clifford H. Driscall (SCR)**
Tod Bauer
P.O. Box 871502
Wasilla, AK 99687
Gold
Gold Creek
Nelchina District
ML 91 0081 1

**Michael B. Dugger (EIR)**
5218 Half Moon Dr.
Colorado Springs, CO 80915
Gold
Mastadon Creek
Circle District
ML 91 0261 1

**Dugger Mining Co. (EIR)**
Michael Dugger
5218 Half Moon Dr.
Colorado Springs, CO 80915
Gold
North Fork Harrison Creek
Circle District
ML 91 0246 1; ML 91 0467
ML 91 0243 1

**Eagerton Mining (EIR)**
HC01M VIX 6937-V
Palmer, AK 99645
Gold
Napoleon Creek
Fortymile District
ML 91 0411 1

**Ed's Gravel Pit (SCR)**
Joanna Hollier
P.O. Box 366
Kenai, AK 99611
Sand and gravel
--
Kenai District
ML 91 0226 1

**Dennis Elch & Angess Purdy (EIR)**
Vernon Weaver
6314 W. Stockton Ave.
Atwater, CA 95301
Gold
Meyers Fork
Fortymile District
ML 91 0093 1

**Robert C. Emerson (EIR)**
1811 Phillips Field Rd.
Fairbanks, AK 99701
Gold
St. Patricks and Eva Creeks
Fairbanks District
ML 91 0482

**Krister Erikson (SCR)**
P.O. Box 103130-199
Anchorage, AK 99510
Gold
Falls Creek
Cache Creek District
ML 91 0310 1

**Thomas E. Faa (EIR)**
P.O. Box 666
Wamic, OR 97063
Gold
Moose Creek
Bonnifield District
ML 91 0021 1

**Fairbanks Exploration (EIR)**
Ronald Thole
P.O. Box 82549
Fairbanks, AK 99708
Gold
Bonanza Trend
Circle District
ML 91 0159 1

**Fairbanks Gold Inc. (EIR)**
P.O. Box 73726
Fairbanks, AK 997[illegible]
Gold
Fish Creek Draina[illegible]e
Fairbanks District
ML 91 0391 1

**Fairbanks Gold Inc. (EIR)**
P.O. Box 73726
Fairbanks, AK 99707
Gold
Melba and Monte Cristo Lodes
Fairbanks District
ML 91 0241 1

**Fairbanks Mining Co. (EIR)**
James L. Munsell
P.O. Box 81155
Fairbanks, AK 99708
Gold
Little Minook and Junior Creeks
Rampart District
ML 91 0074 1

**Fairbanks Sand & Gravel (EIR)**
P.O. Box 1511
Fairbanks, AK 99707
Sand and gravel
2-Mile Pit, Old Rich.
Fairbanks District
ML 91 0262 1

**Mark C. Farrar (SWR)**
P.O. Box 1032
Hood River, OR 97031
Gold
Fortyseven Creek
Aniak-Sleetmute District
ML 91 0464

**Herbert F. Fassler (SCR)**
P.O. Box 670181
Chugiak, AK 99567
Gold
Willow Creek
Willow Creek District
ML 91 0117 1

**Flat Creek Mining Co. (WR)**
James P. Haggland
P.O. Box 81464
Fairbanks, AK 99708
Gold
Flat Creek
Ruby District
ML 91 0247 1

**Flats Creek Placers (SWR)**
John E. Fullerton
16935 Maplewild S.W.
Seattle, WA 98066
Gold
Flat Creek
Iditarod District
ML 91 0307 1

**Flat Pick Mining (EIR)**
Gordon Fulton
P.O. Box 115
Central, AK 99730
Gold
Switch Creek
Circle District
ML 91 0267 1

**Mitch Fleming (NR)**
P.O. Box 9102
Coldfoot, AK 99701
Gold
Myrtle Creek
Koyukuk District
ML 91 0268 1

**James L. and Sharon Fogarty (EIR)**
3034 Dyke Rd.
North Pole, AK 99705
Gold
Walker Creek
Fairbanks District
ML 91 0027 1

**James Fogarty/Frank Darnell (EIR)**
3034 Dyke Rd.
North Pole, AK 99705
Gold
Myrtle Creek
Livengood/Tolovana District
ML 91 0328 1

**Randi Forester (SCR)**
General Delivery
Cooper Landing, AK 99572
Gold
Dry Creek
Seward District
ML 91 0443 1

**Fortune Mining Co. (SCR)**
Ernest Bennett and Rena Harrell
2025 Village Drive
Wasilla, AK 99687
Gold
Willow Creek
Seward District
ML 91 0114 1

**Elmer Foss/Harold Osborg (EIR)**
P.O. Box 73252
Fairbanks, AK 99707
Gold
Bedrock Creek
Circle District
ML 91 0473

**Four Brothers Mining (EIR)**
Clark H. Billings
P.O. Box 81117
Fairbanks, AK 99708
Gold
Totatlanika River
Bonnifield District
ML 91 0337 1

**Fox Gulch Trio (EIR)**
Jack Neubauer
413 Cowles
Fairbanks, AK 99701
Gold
Fox Creek
Fairbanks District
ML 91 0019 1

**Franklin Exploration Mining Co. Inc. (APR)**
Oliver C. Reese
10411 San Gabriel N.E.
Albuquerque, NM 87111
Gold
Unga Island
Point Moller District
ML 91 0217 1

**Patricia S. Franklin (EIR)**
1213 Coppet St.
Fairbanks, AK 99709
Gold
Fairbanks Creek
Fairbanks District
ML 91 0050 1

**Freedom Mining & Exploration Inc. (EIR)**
Roy Ruble
P.O. Box 80351
Fairbanks, AK 99708
Gold
Rebel Creek
Circle District
ML 91 0362 1

**Freedom Mining & Exploration Inc. (EIR)**
Roy L. Ruble
P.O. Box 80351
Fairbanks, AK 99708
Gold
Robinson Creek
Fortymile District
ML 91 0365 1

**Frontier Mining Inc. (SCR)**
Empire Exploration Inc.
P.O. Box 142593
Anchorage, AK 99514
Gold
All tributaries of Cotton Creek
Yentna District
ML 91 0001 1

**G.A. Hanks & Sons (EIR)**
P.O. Box 2533
W. Sacramento, CA 95691
Gold
Lost Chicken Creek
Fortymile District
ML 91 0190 1

**Tom Gaddis/Mike Machel (EIR)**
P.O. Box 82124
Fairbanks, AK 99708
Gold
Bonanza Creek
Circle District
ML 91 0469

**Mark A. Gaede (SCR)**
P.O. Box 2192
Soldotna, AK 99669
Gold
Canyon Creek
Seward District
ML 91 0148 1

**Paul & Ann Gapen (EIR)**
510 Cottonwood
Cheyenne, WY 83002
Gold
Eldorado Creek
Livengood District
ML 91 0479

**Stanley M. Gelvin (EIR)**
P.O. Box 30149
Central, AK 99730
Gold
Ketchum Creek
Circle District
ML 91 0075 1

**Stanley M. Gelvin (EIR)**
Edwin C. Gelvin
P.O. Box 30149
Central, AK 99730
Gold
Crooked Creek
Circle District
ML 91 0104 1

**Geosearch Inc. (SCR)**
7920 King St.
Anchorage, AK 99518
Gold
Liberty and Five Mile Creeks
Nizina District
ML 91 0423 1

**David L. Gerke (WR)**
4324 Thompson, Suite 2
Anchorage, AK 99508
Gold
Solomon River
Solomon District
ML 91 0324 1

**GHD Resources Partners, Ltd. (WR)**
Berg and Wetlesen
316 Rio Verde
El Paso, TX 79912
Gold
Kiwalik Flats
Candle District
ML 91 0087 1

**Wayne E. Gibson/Lee Eastman (EIR)**
1610 Southern Ave.
Fairbanks, AK 99701
Gold
Lawson Creek
Circle District
ML 91 0478

**Global Resources (WR)**
Perry or George Massie
P.O. Box 3040
Fallbrook, CA 92028
Gold
Cripple Creek
Nome District
ML 91 0154 1

**Don Glassburn (EIR)**
P.O. Box 107
Central, AK 99730
Gold
Birch Creek
Circle District
ML 91 0410 1

**Phil Godfrey (SER)**
P.O. Box 3097
Bellevue, WA 98009
Sand and gravel
Lemon Creek Area
Juneau District
ML 91 0142 1

**Gold Gulch Co. (SCR)**
9191 Old Seward Hwy., Suite 21
Anchorage, AK 99515
Gold
Kahiltna River
Yentna District
ML 91 0211 1

**Gold Tech Resources Inc. (SCR)**
Kevin Dale Thompson
P.O. Box 875534
Wasilla, AK 99687
Gold
North of Valdez Creek
Valdez Creek District
ML 91 0477

**Goldstream Mining Co. (EIR)**
John T. Larson
P.O. Box 80772
Fairbanks, AK 99708
Gold
Mastadon and Gilmore Creeks
Circle and Fairbanks Districts
ML 91 0383 1; ML 91 0475

**Golovin Native Corp. (WR)**
P.O. Box 62099
Golovin, AK 99762
Sand and gravel
Golovin Native Lands
Golovin District
ML 91 0059 1

**Brandt N. Goodall (EIR)**
Mile 64 Taylor Highway
P.O. Box 8
Chicken, AK 99732
Gold
Mosquito Fork and Fortymile River
Fortymile District
ML 91 0032 1

**Brandt Goodall/Clyde Baldwin (EIR)**
6330 N. Douglas Hwy.
Juneau, AK 99801
Gold
Mosquito Fork
Fortymile District
ML 91 0379 1

**Gene Alfred Granath (SCR)**
P.O. Box 574
Kenai, AK 99611
Gold
Falls Creek
Seward District
ML 91 0462

**Grateful Dog Mining (EIR)**
Roger McPherson
1100 Southwood Lane
Fairbanks, AK 99712
Gold
Unspecified
Fairbanks District
ML 91 0363 1

**Scott Greger/Jamin Klopman (SWR)**
P.O. Box 101
Red Devil, AK 99656
Gold
Taylor Creek
Aniak District
ML 91 0303 1

**Green Mining & Exploration (WR)**
Douglas Green
P.O. Box 61455
Fairbanks, AK 99706
Gold
Long Creek
Ruby District
ML 91 0335 1

**Grizzlee Mining (EIR)**
Dan Lee
HC03 Box 8383
Palmer, AK 99645
Gold
Liberty Creek
Fortymile District
ML 91 0329 1

**Mark Gunnar (WR)**
Richard Redmond
P.O. Box 157
Girdwood, AK 99587
Gold
Macklin Creek
Koyukuk District
ML 91 0055 1

**Gypsy Luck Mining Co. (EIR)**
Glen C. Parr
624 Maple
Shelton, WA 98584
Gold
Walker Creek
Fairbanks District
ML 91 0107 1

**Albert Hagen (EIR)**
P.O. Box 53
Manley Hot Springs, AK 99756
Gold
Cooney Creek
Hot Springs District
ML 91 0177 1

**Joe B. Hall (EIR)**
Lau Iosua
711 Hillcrest
Fairbanks, AK 99712
Gold
Rainy Creek
Delta District
ML 91 0069 1

**Ham Mining Co. (EIR)**
Harold Mitchell
P.O. Box 65
Chicken, AK 99732
Gold
Mosquito Fork
Fortymile District
ML 91 0192 1

**Charles R. Hammond (EIR)**
P.O. Box 7
Chicken, AK 99732
Gold
45 Pup
Fortymile District
ML 91 0102 1

**Hard Rock Inc. (SER)**
Debra J. Schnabel
P.O. Box 129
Haines, AK 99827
Sand and gravel
Mile 5 Haines Hwy.
Porcupine District
ML 91 0124 1

Michael G. Hartman (WR)
P.O. Box 74921
Fairbanks, AK 99707
Gold
Poorman Creek
Ruby District
ML 91 0023 1

Edwin L. Hatch (WR)
P.O. Box 1801
Nome, AK 99762
Gold
Sweepstake Creek
Koyuk District
ML 91 0322 1

Hawley Resource Group Inc. (WR)
#300 941 E. Dowling
Anchorage, AK 99516
Gold
Sinuk River Area; Gold Hill
Nome District
ML 91 0401 1

Hayden Exploration & Mining (EIR)
Forest Hayden
P.O. Box 110930
Anchorage, AK 99511
Gold
Baby Creek
Eagle District
ML 91 0199 1

James Henley/Greg Mallinger (SER)
P.O. Box 210212
Auke Bay, AK 99821
Gold
Boulder Creek
Juneau District
ML 91 0228 1

Heflinger Mining & Equipment Co. (EIR)
Carl F. Heflinger
665 10th Ave., # 307
Fairbanks, AK 99701
Gold
Livengood Creek
Tolovana District
ML 91 0164 1

Fred Heflinger (EIR)
P.O. Box 82390
Fairbanks, AK 99708
Gold
Walker Fork
Fortymile District
ML 91 0396 1

Jack Hendrickson (EIR)
P.O. Box 10154
Fairbanks, AK 99710
Gold
Sourdough Creek
Circle District
ML 91 0347 1

Hennya Rock & Gravel Inc. (SER)
P.O. Box 161
Klawock, AK 99925
Sand and gravel
Three Mile Creek
Ketchikan District
ML 91 0292 1

Hennya Rock & Gravel Inc. (SER)
P.O. Box 161
Klawock, AK 99925
Sand and gravel
Three Mile Creek
Ketchikan District
ML 91 0293 1

Hennya Rock & Gravel Inc. (SER)
P.O. Box 161
Klawock, AK 99925
Sand and gravel
Three Mile Creek
Ketchikan District
ML 91 0294 1

Hennya Rock & Gravel Inc. (SER)
P.O. Box 161
Klawock, AK 99925
Sand and gravel
Three Mile Creek
Ketchikan District
ML 91 0295 1

Herning Exploration & Mining (EIR)
Bruce Herning
P.O. Box 73846
Fairbanks, AK 99707
Gold
Palmer Creek
Fairbanks District
ML 91 0448 1

Martin M. and Jean A. Herzog (SCR)
3817 S. Carson St. #428
Carson City, NV 89701
Gold
Cache Creek
Yentna District
ML 91 0237 1

Hoffman Mining (SCR)
Russell Hoffman
HC 60 Box 153
Copper Center, AK 99573
Gold
Limestone Creek
Chistochina District
ML 91 0352 1

Jerry Jr. and Velma Holly (SCR)
P.O. Box 365
Soldotna, AK 99669
Gold
Peters Creek
Yentna District
ML 91 0252 1

Homer & William Hoogendorn (WR)
P.O. Box 84
Nome, AK 99762
Gold
Buster Creek
Nome District
ML 91 0157 1

Hope Mining Co. (SCR)
P.O. Box 101827
Anchorage, AK 99510
Gold
Various Creeks
Seward District
ML 91 0280 1

Alf Hopen (EIR)
P.O. Box 74246
Fairbanks, AK 99707
Gold
Little Eldorado and Cleary Creeks
Fairbanks District
ML 91 0134 1

Interior Alaskana Association (EIR)
Richard Loud
742 Bennet Rd.
Fairbanks, AK 99712
Gold
Gilmore Creek
Fairbanks District
ML 91 0132 1

Interior Alaskana Association (EIR)
Richard L. Loud
742 Bennet Rd.
Fairbanks, AK 99712
Gold
Mammoth and Independence Creeks
Circle District
ML 91 0266 1

Jackson Mining Co. (EIR)
Roy Traxler/Naimy Birklid
936 Coppet St.
Fairbanks, AK 99709
Gold
Totatlanika River
Bonnifield District
ML 91 0173 1

John Jenks; and
Glenn and Lela Bouton (NR)
200-535 Thurlow St.
Vancouver, BC, Canada V6E 3L2
Gold
Chapman Creek/Koyukuk River
Koyukuk District
ML 91 0109 1

Dan Jensen (EIR)
P.O. Box 12
Delta Junction, AK 99737
Gold
Alder Creek
Fortymile District
ML 91 0470

Daniel D. Jensen (EIR)
P.O. Box 12
Delta Junction, AK 99737
Gold
McCumber Creek
Delta District
ML 91 0419 1

Jim Cline's Enterprises (SCR)
James A. Cline
P.O. Box 2
Glenn Allen, AK 99588
N/A
N/A
N/A
ML 91 0253 1

Jim/Mar Mining Ventures (SCR)
James Luhrs/Marva DeJong
3333 Lake Shore Dr. #8
Anchorage, AK 99517
Gold
Evans Creek
Yentna District
ML 91 0318 1

Martha H. Johnson (EIR)
Curtis Johnson
602 Steward St.
Fairbanks, AK 99701
Gold
Mastadon Creek
Circle District
ML 91 0094 1

Jones & Co. (SCR)
HCR 68 Box 1120
Moose Pass, AK 99631
Gold
Roaring, Weber, and Wilson Creeks
Seward District
ML 91 0227 1

Martin Junge (EIR)
P.O. Box 981
Dillingham, AK 99576
Gold
South Fork Fortymile River
Fortymile District
ML 91 0408 1

K.C. Mining Co. (EIR)
Richard Schmoll
P.O. Box 741
Townsend, MT 59644
Gold
Faith Creek
Fairbanks District
ML 91 0171 1

K.C. Mining Co. (EIR)
Kenneth C. Hanson
P.O. Box 10657
Fairbanks, AK 99710
Gold
Faith Creek
Fairbanks District
ML 91 0138 1

**K.D.T. Exploration & Mining Co. (SCR)**
Kevin Thompson
P.O. Box 875534
Wasilla, AK 99687
Gold
Gold Hill
Valdez Creek District
ML 91 0312 1

**Robert W. Keller (EIR)**
P.O. Box 113
Healy, AK 99743
Gold
Totatlanika River
Bonnifield District
ML 91 0356 1

**Kelly Mining (EIR)**
Tim Kelly
2120 E. 36th Ave.
Anchorage, AK 99508
Gold
North Fork Creek
Rampart District
ML 91 0049 1

**Klana Corp. (SER)**
Debra J. Schnabel
P.O. Box 129
Haines, AK 99827
Sand and gravel
Mile 5 Haines Hwy.
Porcupine District
ML 91 0287 1

**Tim Kiehl (EIR)**
3210 Marneet Lane
North Pole, AK 99705
Gold
Gold King Creek
Bonnifield District
ML 91 0127 1

**Leslie K. Kirk (EIR)**
P.O. Box 261
Delta Junction, AK 99737
Gold
Rainy Creek
Delta District
ML 91 0382 1

**Susan Knapman (EIR)**
P.O. Box 254
Central, AK 99730
Gold
[illegible] Pup
Circle District
ML 91 0259 1

**S & M Koppenberg (EIR)**
T.J. Koppenberg
H.C.O. 4-9068
Palmer, AK 99645
Gold
Homestake Creek
Circle District
ML 91 0091 1

**Sam Koppenberg (EIR)**
P.O. Box 130
Denali, AK 99755
Gold
Faith Creek
Fairbanks District
ML 91 0350 1

**Lawrence Kordecki (EIR)**
300 Howland Rd. 3
Fairbanks, AK 99712
Gold
McManns Creek
Circle District
ML 91 0038 1

**Kougarok Mining (WR)**
Elmer Martinson
P.O. Box 452
Nome, AK 99762
Gold
Kougarok River
Kougarok District
ML 91 0346 1

**Jan Kralik/Ed Schwayer (WR)**
P.O. Box 1793
Nome, AK 99762
Gold
Alder and Bluestone Rivers
Port Clarence District
ML 91 0200 1

**Mark Krenzke (EIR)**
P.O. Box 422
Nenana, AK 99750
Gold
Eureka
Hot Springs District
ML 91 0079 1

**Kristi-Phylee Mining (EIR)**
James M. Parry
P.O. Box 71656
Fairbanks, AK 99707
Gold
No Grub Creek
Richardson District
ML 91 0053 1

**Rudy Krizak (WR)**
General Delivery
Nome, AK 99762
Gold
Dome Creek
Solomon District
ML 91 0323 1

**Reginald D. Krkovich (EIR)**
P.O. Box 20557
Juneau, AK 99802
Gold
Bear Creek
Koyuk District
ML 91 0422 1

**Kurt's Construction (EIR)**
Kurt A. Ueeck
1900 Granite View Dr.
Delta Junction, AK 99737
Sand and gravel
Milton Road Area
Fairbanks District
ML 91 0339 1

**L & B Mining (WR)**
DB Parent
1015 10th Ave.
Fairbanks, AK 99701
Gold
Bear Creek
Koyuk District
ML 91 0156 1

**L.B.M.B. Co. (SWR)**
Longbotham & Associates
1536 Martinette Ave.
Exeter, CA 93221
Gold
Murray and New York Creeks
Aniak District
ML 91 0230 1

**Jack LaCross (SCR)**
P.O. Box 331
Soldotna, AK 99669
Gold
Mills Creek and Tributary
Yentna District
ML 91 0151 1

**Lapp & Son (EIR)**
Earl H. Beistline
P.O. Box 80148
Fairbanks, AK 99708
Gold
Eagle Creek and Tributaries
Circle District
ML 91 0033 1

**Lapp & Son Mining (EIR)**
Ed L. Lapp
P.O. Box 117
Central, AK 99730
Gold
Eagle Creek
Fairbanks District
ML 91 0289 1

**Juanita K. Larson (SCR)**
George W. Zimmer
9449 Braylon Dr. #116
Anchorage, AK 99507
Gold
Quartz Creek
Seward District
ML 91 0012 1

**Juanita R. Larson (SCR)**
George W. Zimmer
9499 Braylon Dr. #116
Anchorage, AK 99507
Gold
Quartz Creek
Seward District
ML 91 0061 1

**Donald C. Lasley (EIR)**
P.O. Box 30047
Central, AK 99730
Gold
North Fork Harrison Creek
Circle District
ML 91 0080 1

**James Lefto (EIR)**
General Delivery
Chicken, AK 99732
Gold
40 Mile River
Fortymile District
ML 91 0330 1

**Albert Lemons/WM Studebaker (EIR)**
P.O. Box 73222
Fairbanks, AK 99707
Gold
Portage Creek
Circle District
ML 91 0409 1

**Lester Mines (EIR)**
Ray Lester
732 Old Steese Hwy.
Fairbanks, AK 99712
Gold
Birch Creek
Circle District
ML 91 0025 1

**Light Mining (NR)**
Bill and Clara Light
P.O. Box 74804
Fairbanks, AK 99707
Gold
Nolan and Acme Creeks
Koyukuk District
ML 91 0048 1

**David Likins (EIR)**
Fortymile River
Eagle, AK 99738
Gold
Fortymile River
Fortymile District
ML 91 0108 1; ML 91 0361 1

**Lillian Creek Mine Inc. (EIR)**
Gladys H. Blood
P.O. Box 60334
Fairbanks, AK 99706
Gold
Lillian Creek
Livengood/Tolovana District
ML 91 0388 1

**George Livermore (SCR)**
P.O. Box 241449
Anchorage, AK 99503
Gold
Ruby Gulch
Chitina District
ML 91 0332 1

**George Livermore (SCR)**
P.O. Box 241449
Anchorage, AK 99503
Gold
Shale Creek
Chistochina District
ML 91 0343 1

**Lodestar Explorations Inc. (EIR)**
J.H. and M.K. O'Neill
Box 39 280-815 W. Hastings St.
Vancouver, BC, Canada V6C 1B4
Gold
McCord Creek
Fortymile District
ML 91 0381 1

**Lone Spruce Mining (EIR)**
George Roger Strickler
16900 Ransom Ridge Rd.
Anchorage, AK 99516
Gold
Squaw Creek
Fortymile District
ML 91 0030 1

**Steve Milan Losonsky (EIR)**
P.O. Box 80321
Fairbanks, AK 99708
Gold
Hunter Creek
Rampart District
ML 91 0052 1

**Lindon M. Loudermilk (SCR)**
10441 Loudermilk Circle
Anchorage, AK 99516
Gold
Long and Coal Creeks
Yentna District
ML 91 0005 1

**James G. and George H. Lounsbury (NR)**
365 Henderson Rd.
Fairbanks, AK 99709
Gold
Union Gulch
Koyukuk District
ML 91 0351 1

**Marin Lovs/Theodore Knutson (EIR)**
2326 St. Elias Dr.
Anchorge, AK 99517
Gold
Mastadon and Mammoth Creeks
Circle District
ML 91 0309 1

**Luke's Mining Co. (SCR)**
Tony Neal
2396 Kachemak Bay Drive
Homer, AK 99603
Sand and gravel
Luke's Pit
Homer District
ML 91 0018 1

**Lyman Resources In Alaska Inc. (SWR)**
P.O. Box 192
McGrath, AK 99627
Gold
Snow Gulch/Crooked Creek
Aniak District
ML 91 0213 1

**Rocky MacDonald (EIR)**
P.O. Box 81035
Fairbanks, AK 99708
Gold
Treasure Creek
Fairbanks District
ML 91 0140 1

**Magnuson Mining Co. (SWR)**
P.O. Box 55
McGrath, AK 99627
Gold
Ganes Creek
Innoko District
ML 91 0431 1

**Magnuson Mining Co. (SWR)**
Warren E. Magnuson
P.O. Box 55
McGrath, AK 99627
Gold
Ganes Creek
Innoko District
ML 91 0036 1

**Robert L. Magnuson, Jr. (SWR)**
P.O. Box 101
McGrath, AK 99627
Gold
Madison Creek
Innoko-Tolstoi District
ML 91 0304 1

**Dan Mandrones (EIR)**
4212 Rose Valley Rd.
Kelso, WA 98626
Gold
Loper Creek
Circle District
ML 91 0203 1

**Cecilia and Albert M. Manns (NR)**
Paradise Valley
Bettles, AK 99726
Gold
Birch Creek
Koyukuk-Wild Lake District
ML 91 0066 1

**Paul Manuel (EIR)**
George R. Horner
P.O. Box 83102
Fairbanks, AK 99708
Gold
Porcupine Creek
Circle District
ML 91 0024 1

**Paul Manuel (EIR)**
Fred Wilkenson
P.O. Box 2702
Fairbanks, AK 99707
Gold
Procupine Creek
Circle District
ML 91 0111 1

**Martin Mining Co. (SCR)**
Edward D. Martin, Jr.
P.O. Box 521
Cooper Landing, AK 99572
Gold
Hargood Creek
Seward District
ML 91 0403 1; ML 91 0418 1

**Perry Massie & Adam Anthony (WR)**
P.O. Box 3040
Fallbrook, CA 92028
Gold
American Creek
Nome District
ML 91 0198 1

**Mascot Mining Inc. (NR)**
Thomas L. Byrant
County Rd. 1
P.O. Box 264
Ridgeway, CO 81432
Gold
Hammond River and Vermont Creek
Koyukuk District
ML 91 0197 1

**Arnold J. Mason (SCR)**
4545 San Roberto
Anchorage, AK 99508
Gold
North Creek
Anchorage District
ML 91 0316 1

**Mark D. Matter (SWR)**
P.O. Box 44
Aniak, AK 99557
Gold
Marvel Creek
Aniak District
ML 91 0220 1

**Guy Matthews (EIR)**
P.O. Box 241
Tok, AK 99780
Gold
Abandoned Creek
Fairbanks District
ML 91 0331 1

**Guy Matthews (EIR)**
P.O. Box 241
Tok, AK 99780
Gold
Kenyon Creek
Fairbanks District
ML 91 0349 1

**Rocky McDonald (EIR)**
P.O. Box 81035
Fairbanks, AK 99708
Gold
Frying Pan Creek
Circle District
ML 91 0472

**Keith Mendenhall, Jr. (EIR)**
P.O. Box 1406
Fairbanks, AK 99707
Gold
Bonnifield Creek
Bonnifield District
ML 91 0110 1

**Mespelt & Almasy Mining Co. (WR)**
Theodore Almasy
Nixon Fork Mine
McGrath, AK 99627
All types
Nixon Fork Mine
McKinley/McGrath District
ML 91 0291 1

**Metco Inc. (SCR)**
Frank Dieckgraeff
HCR 64 Box 300
Seward, AK 99664
Sand and gravel
--
Seward District
ML 91 0340 1

**Miller Creek Mining Co. (EIR)**
Fred D. Wilkinson
P.O. Box 1
Central, AK 99730
Gold
Ketchum Creek
Circle District
ML 91 0338 1

**Minex Alaska Inc. (APR)**
Yoram Palkovitch
P.O. Box 103
Girdwood, AK 99587
Gold
Trinity Islands
Kodiak District
ML 91 0143 1

**The Mining Co. (EIR)**
John E. and Floretta McClain
P.O. Box 436
Soldotna, AK 99669
Gold
Ester Creek
Fairbanks District
ML 91 0028 1

**The Mining Management Corp. (SCR)**
Stella Darlene Lavender
P.O. Box 91725
Anchorage, AK 99509
Gold
Valdez and Roosevelt Creeks
Valdez Creek District
ML 91 0085 1

**Andrew W. Miscovich (EIR)**
P.O. Box 1489
Fairbanks, AK 99707
Gold
Chatham Creek
Fairbanks District
ML 91 0122 1

John A. Miscovich (SWR)
General Delivery
Flat, AK 99584
Gold
Otter Creek
Iditarod District
ML 91 0083 1

John W. Miscovich (EIR)
P.O. Box 1439
Fairbanks, AK 99707
Gold
Captain, Pilot, and Cripple Creeks
Fairbanks District
ML 91 0461 1

Miscovich Mining Co. (WR)
Howard P. Miscovich
P.O. Box 262
Galena, AK 99741
Gold
Poorman Creek
Ruby District
ML 91 0135 1

M.I.T. Inc. (WR)
Howard Smith
P.O. Box 1369
Nome, AK 99762
Gold
Little Rocker Creek
Nome District
ML 91 0344 1

Mohawk Oil Co., Ltd. (EIR)
6400 Roberts St.
Burnaby, BC, Canada V5G 4G2
Gold
Pedro Dome
Livengood District
ML 91 0455 1

Melvin or Lois Montgomery (EIR)
1836 Davenport Rd.
Delta Junction, AK 99737
Gold
Gilliland Creek
Fortymile District
ML 91 0258 1

Vincent C. Monzulla (EIR)
2920 Monzulla Lane
Fairbanks, AK 99712
Gold
Victoria Creek
Fairbanks District
ML 91 0194 1

William Morgan (WR)
600 W. 58th, Unit J
Anchorage, AK 99518
Gold
Unspecified location
Nulato District
ML 91 0233 1

William Morgan (SWR)
600 W. 58th, Unit J
Anchorage, AK 99518
Gold
4th of July Creek
Iditarod District
ML 91 0234 1

William Morgan (SWR)
600 W. 58th, Unit J
Anchorage, AK 99518
Gold
Granite Creek
Iditarod District
ML 91 0235 1

William Morgan (SWR)
600 W. 58th Unit J
Anchorage, AK 99518
Gold
--
Mt. McKinley District
ML 91 0236 1

William Morterud (WR)
P.O. Box 200065
Anchorage, AK 99501
Gold
Flat and Indian Creeks
Ruby District
ML 91 0270 1

MRAK Placer Mine (SCR)
Mrak, Aklestad, and Hennon
P.O. Box 1963
Palmer, AK 99645
Gold
Willow, Craige, and Grubs Creeks
Willow Creek District
ML 91 0182 1

Mud Creek Mining (WR)
Rhiney Berg
P.O. Box 809
Fairbanks, AK 99707
Gold
Mud Creek
Candle-Fairhaven District
ML 91 0057 1

Donald E. Mullikan (WR)
P.O. Box 790
Homer, AK 99603
Gold
Black, Buzzard, and Grouse Creeks
Seward Peninsula District
ML 91 0456 1

Donald E. Mullikin (WR)
P.O. Box 790
Homer, AK 99603
Gold
Boulder Creek
Seward Peninsula
ML 91 0458 1

Nana Regional Corp. Inc. (NR)
1001 E. Benson Blvd.
Anchorage, AK 99508
Silver, Lead, Zinc
Red Dog Creek
Noatak District
ML 91 0286 1; ML 91 0010 1

N.B. Tweet & Sons (WR)
P.O. Box 1107
Nome, AK 99762
Gold
Kougarok River
Kougarok District
ML 91 0086 1

Paul W. Nelson (NR)
Rt 2, Box 753
Soldotna, AK 99669
Gold
Nugget and Victor Creeks
Koyukuk District
ML 91 0174 1

Harold A. Nevers (EIR)
8148 Pinewood Dr.
Juneau, AK 99801
Gold
American Creek
Fortymile District
ML 91 0178 1

Dick Newton, Bill Farmer (SWR)
P.O. Box 2213
Takotna, AK 99675
Gold
--
Innoko District
ML 91 0402 1

Fred Noden (SWR)
P.O. Box 47
Dillingham, AK 99576
Gold
Chunak Region
Lake Clark District
ML 91 0116 1

Noram Mining Inc. (SCR)
P.O. Box 112367
Anchorage, AK 99511
Gold
Peters Creek
Yentna District
ML 91 0393 1; ML 91 0424 1

William H. Nordeen (NR)
P.O. Box 9013
Coldfoot, AK 99701
Gold
Enuma Creek
Koyukuk District
ML 91 0031 1

Roger Nordlum (WR)
P.O. Box 171
Kotzebue, AK 99752
Gold
Candle Creek
Candle-Fairhaven District
ML 91 0345 1

North Pacific Mining Corp. (WR)
121 W. Fireweed Lane, Suite 102
Anchorage, AK 99503
Gold
Illinois Creek (Lode)
Kaiyuh District
ML 91 0387 1

Northern Lights Mining Inc. (UR)
Ben Batty
544 North 600 West
Cedar City, UT 94720
Gold
Rye and Jay Creeks
Valdez Creek District
ML 91 0029 1

Ross Novak (EIR)
P.O. Box 83200
Fairbanks, AK 99708
Gold
Eureka Creek
Hot Springs District
ML 91 0264 1

Ross Novak (EIR)
P.O. Box 83200
Fairbanks, AK 99708
Gold
Boothby Creek
Hot Springs District
ML 91 0195 1

Ross Novak (EIR)
P.O. Box 83200
Fairbanks, AK 99708
Gold
Skookum Creek
Hot Springs District
ML 91 0193 1

Nuway Mining (SCR)
Michael W. Bolstridge
P.O. Box 1455
Soldotna, AK 99669
Gold
N/A
Seward
ML 91 0281 1; ML 91 0184 1;
ML 91 0417 1

Franklin L. O'Donnell, Jr. (EIR)
7110 Canady Rd.
Salcha, AK 99714
Gold
Moose Creek
Fortymile District
ML 91 0257 1

Ol Yeller Mine (EIR)
Robert Wayne and Susan Keller
P.O. Box 113
Healy, AK 99743
Gold
Totatlanika River
Bonnifield District
ML 91 0072 1

Alan Olson & Victor Loyer (WR)
P.O. Box 165
Palmer, AK 99645
Gold
Candle Creek
Candle-Fairhaven District
ML 91 0158 1

Steven Olson (EIR)
Robert W. Ault
6.5 Old Richardson Hwy.
P.O. Box 58443
Fairbanks, AK 99711
Gold
Eagle Creek
Circle District
ML 91 0044 1

**On-Line Exploration Services Inc. (EIR)**
11976 Wilderness Dr.
Anchorage, AK 99516
Gold
West Fork Tolovana River
Livengood/Tolovana District
ML 91 0176

**ORA-Tech (WR)**
Jeff Keener
P.O. Box 1955
Nome, AK 99762
Gold
Iron and Benson Creeks
Kougarok District
ML 91 0357 1

**Outsider Mining Co. (SCR)**
P.O. Box 909
Girdwood, AK 99587
Gold
Canyon Creek
Seward District
ML 91 0279 1

**Oxy Minerals Corp. (UR)**
P.O. Box 300
Tulsa, OK 94102
Copper
Various
Various Districts
ML 91 0397 1

**P & P Mining (EIR)**
Paul W. White
2551 Peede Rd.
North Pole, AK 99705
Gold
Newman Creek
Fairbanks District
ML 91 0037 1

**Pacific Mining Inc. (EIR)**
1300 E 74th
Anchorage, AK 99518
Gold
Porcupine Creek
Circle District
ML 91 0090 1

**Cacy Patton/Bedrock Co. (EIR)**
Richard Loud/Int. AKN Assn.
742 Bennet Rd.
Fairbanks, AK 99707
Gold
Gilmore Creek
Fairbanks District
ML 91 0272

**D. Paulson/B. Pederson/D. Rian/ Carson P. Holt (EIR)**
P.O. Box 52
Fairbanks, AK 99706
Gold
Ester Creek
Fairbanks District
ML 91 0034 1

**Mac Payne (EIR)**
1079 Victor
North Pole, AK 99705
Gold
Hoosier Creek
Rampart District
ML 91 0447 1

**Jon M. Peckenpaugh (WR)**
928 Morningside Dr.
Twin Falls, ID 83301
Gold
Inmachuk River, Pinnell Creek
Candle-Fairhaven District
ML 91 0155 1

**David Penz (SWR)**
P.O. Box 29
Russian Mission, AK 99657
Gold
Buster Creek
Marshall District
ML 91 0017 1

**Wayne M. Peppler (EIR)**
1006 22nd St.
Fairbanks, AK 99701
Gold
Holdem Creek
Circle District
ML 91 0435 1

**Roy Philpott (NR)**
115 Charles St.
Fairbanks, AK 99701
Gold
Smith Creek
Koyukuk District
ML 91 0041 1

**Pioneer Placer Co. (EIR)**
Robert H. Roberts
General Delivery
Manley Hot Springs, AK 99756
Gold
Ohio, Caribou, and Flat Creeks
Hot Springs District
ML 91 0453 1

**Placer Dome U.S. Inc. (WR)**
Benno Patsch
5631 Silverado Way, Suite A
Anchorage, AK 99518
Various commodities
Lost River
Port Clarence District
ML 91 0395 1

**Daniel and Cynthia Plano (SWR)**
P.O. Box 878275
Wasilla, AK 99687
Gold
Anvil Creek
Innoko District
ML 91 0300 1

**Polar Mining (EIR)**
4545 Woodriver
Fairbanks, AK 99709
Gold
Goldstream and Little Nugget Creeks
Fairbanks District
ML 91 0474

**Polar Mining (EIR)**
Don May
4545 Woodriver Dr.
Fairbanks, AK 99709
Gold
Goldstream Creek
Fairbanks District
ML 91 0166 1

**Polar Mining Co. (EIR)**
Donald J. May, Jr.
4545 Woodriver Dr.
Fairbanks, AK 99709
Gold
Hinkley Gulch Extension
Richardson District
ML 91 0380 1

**Portage Creek Sand & Gravel (EIR)**
Robert Cacy
P.O. Box 106
Central, AK 99730
Sand and gravel
Portage Creek
Circle District
ML 91 0484

**Ralph James Porter (SCR)**
P.O. Box 72
Soldotna, AK 99699
Gold
Cresent Creek
Seward District
ML 91 0097 1

**Willard & Ruppert H. Powers (SCR)**
4202 E. University Dr.
Phoenix, AZ 85934
Gold
Johnson Creek
Yentna District
ML 91 0232 1

**Prince Creek Mining Co. (SWR)**
Alvin Agoff
General Delivery
Flat, AK 99584
Gold
Prince Creek
Iditarod District
ML 91 0305 1

**Jerry Robert Pushcar (WR)**
P.O. Box 1604
Nome, AK 99762
Gold
Lower Willow Creek
Council District
ML 91 0137 1

**Quartz Creek Exploration Inc. (SCR)**
Milo Ellsworth Flothe
P.O. Box 242
Sterling, AK 99672
Gold
Quartz Creek
Seward District
ML 91 0231 1; ML 91 0320 1; ML 91 0446 1

**R.A. Hanson Co. Inc. (SWR)**
P.O. box 7400
Spokane WA 99207
Gold
Salmon River and Tributary
Goodnews Bay District
ML 91 0013 1; ML 91 0014 1; ML 91 0015 1

**RB Gravel (EIR)**
Gerald L. Hassel
P.O. Box 49
Ester, AK 99725
Gold
Ready Bullion Creek
Fairbanks District
ML 91 0051 1

**RCL Mining (EIR)**
Ray A. Vogt/Richard T. Nelson
2108 Central Ave.
Fairbanks, AK 99701
Gold
Dome Creek
Fairbanks District
ML 91 0364 1

**Rainbow Mining (EIR)**
Dennis Gilbreath
P.O. Box 10048
Fairbanks, AK 99710
Gold
Flat Creek
Fairbanks District
ML 91 0371 1

**Rainbow Mining & Exploration Corp. (SCR)**
Walter Bangell
P.O. Box 697
Palmer, AK 99645
Gold
Peters Creek
Yentna District
ML 91 0313 1

**Rasmos (SCR)**
Robert D. Rasmussen
P.O. Box 875464
Wasilla, AK 99687
--
--
Palmer
ML 91 0406 1

**Red Fox Mining (EIR)**
James Crabb/Harold Wheelock
P.O. Box 10
Central, AK 99730
Gold
Half Dollar Creek
Circle District
ML 91 0245 1

**Red Samm Construction Inc. (SER)**
Phil Godfrey
P.O. Box 3097
Bellevue, WA 98009
Sand and gravel
Lemon Creek
Juneau District
ML 91 0141 1

**Carl Roger Reinstorm (EIR)**
Ted Leonard
P.O. Box 51
Salcha, AK 99714
Gold
Porcupine Creek/Salcha River
Richardson District
ML 91 0070 1

**Leo Regner (EIR)**
P.O. Box 72733
Fairbanks, AK 99707
Gold
Ingle Creek
Fortymile District
ML 91 0269 1

**Leo Regner (EIR)**
P.O. Box 72733
Fairbanks, AK 99707
Gold
Lilly Wig and Ingle Creeks
Steese/White Mountain District
ML 91 0165 1

**Richard Busk & Family (SWR)**
Richard Busk
P.O. Box 100971
Anchorage, AK 99510
Gold
Synneva Creek
Iliamna District
ML 91 0145 1

**Lynn W. Rill (EIR)**
215 Ellingsen St.
Fairbanks, AK 99701
Gold
Bullion Creek
Fortymile District
ML 91 0451 1

**Lynn Rill/William Burke (EIR)**
215 Ellinsgon St.
Fairbanks, AK 99701
Gold
Hope Creek
Fortymile District
ML 91 0452 1

**John Ritter (EIR)**
P.O. Box 73792
Fairbanks, AK 99707
Gold
Ketchum Creek
Circle District
ML 91 0256 1

**Robbies Bonanza Mining (SWR)**
Roger Roberts
P.O. Box 26
Nome, AK 99762
Gold
Ophir and Gold Run Creeks
Ophir District
ML 91 0225 1

**Roberts Mining (EIR)**
Mike or Ellen Roberts
P.O. Box 82182
Fairbanks, AK 99708
Gold
Dome Creek
Fairbanks District
ML 91 0196 1

**Robert H. Roberts (EIR)**
General Delivery
Manley Hot Springs, AK 99756
Gold
Skookum Creek
Hot Springs District
ML 91 0454 1

**Robert W. Roberts (EIR)**
P.O. Box 225
Tok, AK 99780
Gold
Chicken Creek
Fortymile District
ML 91 0100 1

**Rock Products Inc. (UR)**
Nanette E. Ameson
P.O. Box 876010
Wasilla, AK 99687
Sand and gravel
Various
Various Districts
ML 91 0298 1

**Ron Roman (EIR)**
P.O. Box 71614
Fairbanks, AK 99707
Gold
Fish Creek
Fairbanks District
ML 91 0283 1

**John Roop (EIR)**
P.O. Box 44
Chicken, AK 99732
Gold
40 Mile River
Fortymile District
ML 91 0392 1

**Rosander Mining Co. (WR)**
Ronald and T.J. Rosander
P.O. Box 129
McGrath, AK 99627
Gold
Colorado Creek
Innoko-Telstoi District
ML 91 0128 1

**Rowallan Mine Partnership (SCR)**
Vince Halverson
P.O. Box 91495
Anchorage, AK 99509
Gold
Valdez and White Creeks
Valdez Creek District
ML 91 0321 1

**RSH Co. (SER)**
Ralph Horecny
P.O. Box 211474
Auke Bay, AK 99821
Sand and gravel
Lemon Creek
Juneau District
ML 91 0180 1

**John D. Rubel (EIR)**
8183 Richardson Hwy.
Salcha, AK 99714
Gold
Democrat-Junction Creek Bench
Richardson District
ML 91 0367 1

**7.5 Oz. Mining (WR)**
Michael A. Sweetsir
P.O. Box 170
Ruby, AK 99768
Gold
Trail Creek
Ruby District
ML 91 0385 1

**Wallace P. Saline (SCR)**
P.O. Box 231
Girdwood, AK 99587
Gold
Canyon Creek
Seward District
ML 91 0123 1

**Salter & Associates Inc. (EIR)**
Ed Salter
P.O. Box 30
Manley Hot Springs, AK 99756
Gold
Joe Bush Creek
Hot Springs District
ML 91 0263 1

**Dwayne Savage (EIR)**
P.O. Box 10613
Fairbanks, AK 99710
Gold
Last Change Creek
Fairbanks District
ML 91 0373 1

**Paul Sayer (SWR)**
P.O. Box 10
Homer, AK 99603
Gold
Little, Bedrock, and Ester Creeks
Innoko District
ML 91 0229 1

**Beatrice and Terry Schafer (EIR)**
P.O. Box 55074
North Pole, AK 99705
Gold
Little Boulder Creek
Hot Springs District
ML 91 0240 1

**Earl Louis Schene (EIR)**
P.O. Box 66
Chicken, AK 99732
Gold
Uhler Creek
Fortymile District
ML 91 0244 1

**John J. Schnabel (SER)**
P.O. Box 149
Haines, AK 99827
Gold
Porcupine Creek
Porcupine District
ML 91 0065 1

**David Schwegel and Richard Duthie (EIR)**
2030 Yellow Snow Rd.
Fairbanks, AK 99709
Gold
Skoogie Creek
Fairbanks District
ML 91 0405 1

**Jackie R. See (SCR)**
541 Riviera Court
Fullerton, CA 90635
Gold
Mineral Creek
Copper River District
ML 91 0218 1

**George Seuffert, Jr. (EIR)**
7705 Port Orford Dr.
Anchorage, AK 99516
Gold
22 Pup
Circle District
ML 91 0188 1

**George Seuffert, Jr. (EIR)**
7705 Port Orford Dr.
Anchorage, AK 99516
Gold
Butte Creek
Circle District
ML 91 0191 1

**Dennis Shepard (EIR)**
P.O. Box 82504
Fairbanks, AK 99709
Gold
Dome Creek
Fairbanks District
ML 91 0457 1

**John A. Shilling (EIR)**
P.O. Box 81424
Fairbanks, AK 99708
Gold
Thanksgiving Creek
Rampart District
ML 91 0035 1

**Shishmaref Native Corp. (WR)**
General Delivery
Shishmaref, AK 99772
Sand and gravel
Region wide
Seward Peninsula
ML 91 0214 1

**Shorham Resources (EIR)**
W.L. Shaffer
316 Rio Verde
El Paso, TX 79912
Gold
Cache and Sullivan Creeks
Hot Springs District
ML 91 0189 1

**Short Gulch Mining (WR)**
Keith E. Tryck
P.O. Box 310
Girdwood, AK 99587
Gold
Ophir Creek
Ruby District
ML 91 0260 1

**John Sipes (EIR)**
2741 Perimeter Dr.
North Pole, AK 99705
Gold
Deadwood Creek
Circle District
ML 91 0097 1

**Sivuqaq Inc. (WR)**
P.O. Box 101
Gambell, AK 99742
Sand and gravel
Region wide
Seward Peninsula
ML 91 0002 1

**Skookum Mining (EIR)**
John Cole/Richard Blevins
P.O. Box 10139
Fairbanks, AK 99710
Gold
Portage Creek
Circle District
ML 91 0161 1

**Sky Raven Inc. (EIR)**
Norman Gordon Lafrum Boise
11 Nightingale Dr.
North Bay, ON, Canada P1A 2R1
Gold
Turch and Minnesota Creeks
Fortymile District
ML 91 0450 1

**Slate Creek Mining (EIR)**
M.H. Budd Williams
1724 Southgold St.
Centralia, WA 98531
Gold
Slate Creek
Rampart District
ML 91 0369 1

**William Smith (SCR)**
906 Cunningham
Anchorage, AK 99501
Gold
Silvertip Area
Seward District
ML 91 0224 1

**Snow Lion Mining Co. (SER)**
Jerry L. Fabrazio
1615 13th Ave.
Seattle, WA 98122
Gold
Porcupine Creek
Porcupine District
ML 91 0115 1

**Hans Sobanja (EIR)**
P.O. Box 10196
Fairbanks, AK 99710
Gold
Nome Creek
Circle District
ML 91 0372 1

**Betty & Harold Soule (SCR)**
2840 E. 142nd Ave.
Anchorage, AK 99516
Gold
Windy Creek
Yentna District
ML 91 0319 1

**Sound Quarry Inc. (WR)**
P.O. Box 2011
Nome, AK 99762
Sand and gravel
Cape Nome
Nome District
ML 91 0290 1

**Spernak & Son Inc. (SCR)**
James A. Spernak
8223 Sand Lake Rd.
Anchorage, AK 99502
Sand and gravel
--
Anchorage District
ML 91 0276 1

**Sphinx Mining Inc. (WR)**
P.O. Box 81978
Fairbanks, AK 99708
Gold
Monument Creek
Ruby District
ML 91 0471

**Kelly Sprague (EIR)**
**Tom C. Van Ostrand**
P.O. Box 314
Healy, AK 99743
Gold
Platt Creek
Bonnifield District
ML 91 0096 1

**Spruce Creek Mining Co. (SWR)**
John J. O'Carroll
1086 Coppet St.
Fairbanks, AK 99709
Gold
Spruce Creek
Innoko District
ML 91 0377 1

**Stebbins Native Corp. (SCR)**
P.O. Box 110
Stebbins, AK 99671
Sand and gravel
--
Anchorage District
ML 91 0179 1

**Donald Stein (EIR)**
105 Dunbar Ave.
Fairbanks, AK 99701
Gold
Twin and Pedro Creeks
Fairbanks District
ML 91 0186 1

**Stepp-a-Long (EIR)**
Vern Stepp/Grant Stepp
290 Pearl Dr.
Fairbanks, AK 99712
Gold
Bottom Dollar Creek
Circle District
ML 91 0101 1

**Stevens Exploration (WR)**
Vezey S. Allen
1048 W. Int. Airport Rd.
Anchorage, AK 99518
Gold
Hastings Creek
Nome District
ML 91 0058 1

**Jackie J. Stewart (EIR)**
P.O. Box 2607
Fairbanks, AK 99709
Gold
No Name Creek
Richardson District
ML 91 0071 1

**Stone Boy Inc. (EIR)**
**WGM Inc.**
P.O. Box 100059
Anchorage, AK 99510
Gold
N/A
Fairbanks District
ML 91 0432 1

**Richard Stough (EIR)**
P.O. Box 711
Wrangell, AK 99929
Gold
Dome Creek
Eagle District
ML 91 0078 1

**Rosalyn Stowell (EIR)**
177 Simpson Way
Fairbanks, AK 99712
Gold
Eureka Creek
Hot Springs District
ML 91 0163 1

**Philip D. Strange (SCR)**
P.O. Box 871478
Wasilla, AK 99687
Gold
Sidney Creek
Willow Creek District
ML 91 0476

**Dennis Leon Stull (NR)**
P.O. Box 55931
North Pole, AK 99705
Gold
Slate Creek
Koyukuk District
ML 91 0359 1

**James W. Swan (NR)**
452 Winter Ave.
Fairbanks, AK 99712
Gold
Gold Creek
Chandalar District
ML 91 0042 1

**Ralph Swarthout (SCR)**
**Oscar H. Bailey**
P.O. Box 14-1801
Anchorage, AK 99514
Gold
Ocean Beach
Yakataga District
ML 91 0120 1

**Richard Swenson (EIR)**
P.O. Box 16205
Two Rivers, AK 99716
Gold
Doric Creek
Hot Springs District
ML 91 0481

**Swift Creek Mining Co. (WR)**
Conrad H. House
3911 Tillison Way
North Pole, AK 99705
Gold
Swift Creek
Ruby District
ML 91 0020 1

**Wayne Tachick (EIR)**
P.O. Box 3503
Soldotna, AK 99669
Gold
Moose Creek
Bonnifield District
ML 91 0043 1

**Joseph Taylor (EIR)**
P.O. Box 80814
Fairbanks, AK 99708
Gold
Cleary Creek
Fairbanks District
ML 91 0487

**Joseph Taylor (EIR)**
P.O. Box 80814
Fairbanks, AK 99708
Gold
Phelan Creek
Delta District
ML 91 0271 1

**Nell Thorneau (EIR)**
P.O. Box 50
Chicken, AK 99732
Gold
Younger Creek
Fortymile District
ML 91 0273 1

**Three M Mining (SCR)**
Jack P. LaCross
P.O. Box 331
Soldotna, AK 99669
Gold
Twin Creek
Yentna District
ML 91 0113 1

**Thurman Oil & Mining (EIR)**
James L. Thurman
925 Aurora Dr.
Fairbanks, AK 99709
Gold
Fish Creek
Fairbanks District
ML 91 0355 1

**Thurman Oil & Mining (EIR)**
James L. Thurman
925 Aurora Dr.
Fairbanks, AK 99709
Gold
Eureka Creek
Hot Springs District
ML 91 0485

**Robert L. Ticheval (SCR)**
7808 Honey Suckle
Anchorage, AK 99502
Gold
Busch Creek
Nelchina District
ML 91 0146 1

**Tilleson Mining & Reclamation (WR)**
Harold C. and Naomi R. Tilleson
P.O. Box 55832
North Pole, AK 99705
Gold
California Creek
Ruby District
ML 91 0039 1

**Tillcum Resources (EIR)**
G. Bailey/Fred Cornelius
1615 Madison Dr.
Fairbanks, AK 99709
Gold
Fox Creek
Fairbanks District
ML 91 0130 1

**Toklat Mining (SCR)**
Jerry Lynn Jennings
744 E 13th, Suite 105
Anchorage, AK 99501
Gold
Bird Creek
Yentna District
ML 91 0183 1

**Cynthia D. Toohey (SCR)**
P.O. Box 113
Girdwood, AK 99587
Gold
Crow and Winner Creeks
Seward District
ML 91 0311 1

**Totat 3 (EIR)**
Thomas L. Swartwood
HC03 Box 8100-L
Palmer, AK 99645
Gold
Totatlanika River
Bonnifield District
ML 91 0374 1

**Trans Alas-Can Gold (SCR)**
3605 Arctic Blvd., #1382
Anchorage, AK 99503
Gold
White and Big Rusty Creeks
Valdez Creek District
ML 91 0278 1

**Treasure Creek Mining (EIR)**
Donald M. Read
P.O. Box 71638
Fairbanks, AK 99707
Gold
Vault Creek
Fairbanks District
ML 91 0099 1

**Tri-Con Mining Inc. (NR)**
P.O. Box 93730
Fairbanks, AK 99708
Gold
Nolan, Fay, and Archibald Creeks
Koyukuk District
ML 91 0413 1

**Trinity Mining (WR)**
Cheryl Jong
P.O. Box 1107
Nome, AK 99762
Gold
Washington Creek
Kougarok District
ML 91 0201 1

**Tri-Valley Corp. (EIR)**
2001 Westwind Dr.
Bakersfield, CA 93301
Gold
Democrat Creek
Richardson District
ML 91 0160 1; ML 91 0181 1

**Tuluksak Dredging Ltd. (SWR)**
Charles Awe, Jr.
737 E St.
Anchorage, AK 99501
Gold
Upper Tuluksak River
Aniak District
ML 91 0284 1

**Tuluksak Dredging Ltd. (SWR)**
NYAC Mining Co.
737 E St.
Anchorage, AK 99501
Gold
Granite Creek/Tuluksak River
Aniak District
ML 91 0119 1

**Willis Umholtz (EIR)**
316 Wedgewood, Apt. G-35
Fairbanks, AK 99701
Gold
Pedro Creek
Fairbanks District
ML 91 0180

**Usibelli Coal Mine Inc. (EIR)**
P.O. Box 1000
Healy, AK 99743
Coal
Poker Flats Mine
Bonnifield District
ML 91 0296 1

**Betty K. Vellkanje (WR)**
2600 Draper Dr.
Anchorage, AK 99517
Gold
Salmon River
Kougarok District
ML 91 0223 1

**Rudy Vetter/Bill Studebaker (EIR)**
P.O. Box 70342
Fairbanks, AK 99707
Gold
Half and Bottom Dollar Creeks
Circle District
ML 91 0412 1

**Vision Valley Resources (NR)**
Martha L. Warren Thomas
P.O. Box 10949
Fairbanks, AK 99710
Gold
Prospect Creek
Koyukuk District
ML 91 0126 1

**Voytilla Mining Ventures (EIR)**
Earl W. Voytilla
P.O. Box 58211
Fairbanks, AK 99711
Gold
Tenderfoot Creek
Richardson District
ML 91 0136 1

**Betty Wagner-Krutzsch (WP)**
P.O. Box 2496
Del Mar, CA 92014
Gold
Specimen Creek
Nome District
ML 91 0434 1

**Wales Native Corp. (WR)**
Walter Weuapuk
P.O. Box 529
Wales, AK 99783
Sand and gravel
Mile 2.6 E. Village Creek
Cape Nome District
ML 91 0398 1

**Wales Native Corp. (WR)**
Walter Weuapuk
P.O. Box 529
Wales, AK 99783
Sand and gravel
Mile .5 E Village Creek
Cape Nome District
ML 91 0399 1; ML 91 0400 1

**James Walker/Dana Ostler (EIR)**
2021 Pembroke St.
Anchorage, AK 99504
Gold
S. Fork 40 Mile River
Fortymile District
ML 91 0390 1

**Jerald F. Walker (EIR)**
P.O. Box 1046
Rough & Ready, CA 95975
Gold
South Fork of 40 Mile River
Fortymile District
ML 91 0210 1

**Ross E. Walton (EIR)**
1247 Hartzog Loop
North Pole, AK 99705
Gold
Dome Creek
Fairbanks District
ML 91 0169 1

**Thomas P. Warhus (SCR)**
P.O. Box 763
Cooper Landing, AK 99572
Gold
Dry Creek
Seward District
ML 91 0428 1

**Helen H. Warner (EIR)**
P.O. Box 80674
Fairbanks, AK 99708
Gold
Porcupine Creek
Circle District
ML 91 0162 1

**Jim Watkins (SCR)**
c/o Ron Mistler
P.O. Box 2871
Palmer, AK 99645
Gold
Falls Creek
Yentna District
ML 91 0302 1

**Donald L. Watts (EIR)**
P.O. Box 81515
Fairbanks, AK 99708
Gold
Grubstake and Pup Creeks
Bonnifield District
ML 91 0133 1

**Douglas Weathers (SCR)**
P.O. Box 8082
Nikiski, AK 99635
Gold
Cache Creek
Yentna District
ML 91 0326 1

**Vernon Weaver (EIR)**
Dennis Eich
6314 W Stockton Ave.
Atwater, CA 95301
Gold
Meyers Fork and Chicken Creek
Fortymile District
ML 91 0095 1

**Steve Weber (EIR)**
332 Slater Dr.
Fairbanks, AK 99701
Gold
Ketchum Creek
Circle District
ML 91 0139 1

Adrew Wescott (EIR)
1132 Lakeview Terrace
Fairbanks, AK 99701
Gold
Fox Creek
Fairbanks District
ML 91 0175 1

Western Arctic Mining (WR)
Kerry Blake
P.O. Box 543
Nome, AK 99762
Gold
Dome, Telegram, and Ready Creeks
Seward Peninsula District
ML 91 0242 1

W.G.M. Mining (SCR)
P.O. Box 187
Cantwell, AK 99729
Gold
White Creek
Valdez Creek District
ML 91 0427 1

White Bear Mining (SWR)
Harry Faulkner, Jr.
P.O. Box 1307
Bethel, AK 99559
Gold
Ophir Creek and Tributaries
Aniak District
ML 91 0416 1

Mark E. Whitmore (EIR)
P.O. Box 927
Slana, AK 99586
Gold
Moose Creek
Kantishna District
ML 91 0187 1

Wilbur or Ann Williams (SWR)
P.O. Box 93025
Anchorage, AK 99509
Gold
Granite Creek
Iditarod District
ML 91 0147 1

Wilder Construction Co. (SCR)
2006 N. State St.
Bellingham, WA 98225
Sand and gravel
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Palmer District
ML 91 0282 1

Frank E. & Vivian D. Williford (EIR)
P.O. Box 10570
Fairbanks, AK 99710
Gold
Hoosier Creek
Rampart District
ML 91 0125 1

M.H. Budd Williams/W. Smith (EIR)
1724 South Gold St.
Centralia, WA 98531
Gold
Ruby Creek
Rampart District
ML 91 0358 1

Michael William/G. Matthews (EIR)
P.O. Box 603
Tok, AK 99780
Gold
Alien Creek
Fairbanks District
ML 91 0348 1

Willis Mine Services (EIR)
Willis Dean/Stanley M. Gelvin
P.O. Box 30063
Central, AK 99730
Gold
Ketchum Creek
Circle District
ML 91 0076 1

Willis Mine Services (EIR)
Eleanor G. Hosner
P.O. Box 30063VE
Central, AK 99730
Gold
Slate Creek, Green Horn Gulch
Hot Springs District
ML 91 0486

David L. Wilmarth and
Whaley M. Dickmann (SWR)
P.O. Box 111037
Anchorage, AK 99511
Gold
Julian Creek
Iditarod District
ML 91 0008 1

Richard Wilmarth (SWR)
P.O. Box 33
Red Devil, AK 99656
Gold
Chicken Creek
Iditarod District
ML 91 0219 1

Lavia L. Wilson-Shemel (SCR)
HC 31, Box 5187-A
Wasilla, AK 99687
Gold
Little Dollar Creek
Seward District
ML 91 0144 1

Kenneth Wise (EIR)
P.O. Box 212313
Anchorage, AK 99521
Gold
Mosquito Fork 40 Mile River
Fortymile District
ML 91 0202 1

Wolff Mining Co. (EIR)
Robert V. Wolff
Boundary Via
Tok, AK 99780
Gold
Walker Fork
Fortymile District
ML 91 0207 1

James Lee Wood (EIR)
P.O. Box 58597
Fairbanks, AK 99711
Gold
Little Boulder Creek
Hot Springs District
ML 91 0045 1

Charles B. Woodruff (WR)
P.O. Box 2278
Fairbanks, AK 99707
Gold
Bitzshtini Mountain
Mt. McKinely/McGrath District
ML 91 0333 1

Bill Woodward & Karl Schmitz (SCR)
801 Airport Heights, #297
Anchorage, AK 99508
Gold
Peters and Deep Creeks

Yentna District
ML 91 0222 1

L.E. and Marilyn Wyrick (SWR)
P.O. Box 261
McGrath, AK 99627
Gold
Granite and Homestake Creeks
Iditarod District
ML 91 0082 1

Yukon Mining Co. Inc. (WR)
P.O. Box 101454
Anchorage, AK 99510
Gold
Golden and Illinois Creeks
Gold Hill-Melozitna District
ML 91 0073 1

Yutana Construction Co. (EIR)
Lewis F. Vondra
P.O. Box 71775
Fairbanks, AK 99707
Basalt Rock
Browns Hill
Fairbanks District
ML 91 0215 1

Eddra Ziegler/T.E. Holloway (EIR)
5253 Calle Redona
Phoenix, AZ 85018
Gold
Portage Creek
Circle District
ML 91 0172 1

George Zimmer (SCR)
P.O. Box 140174
Anchorage, AK 99514
Gold
Quartz Creek
Seward District
ML 91 0062 1

George W. Zimmer (SCR)
P.O. Box 140174
Anchorage, AK 99514
Gold
Quartz Creek
Seward District
ML 91 0011 1
Fairbanks, AK 99707
Gold
Upper Dome Creek
Fairbanks District
ML 91 0250 1

# APPENDIX I
## Primary metals production in Alaska, 1880-1991[a]

| Year | Gold (oz) | Gold (m$) | Silver (oz) | Silver (t$) | Mercury (flask[b]) | Mercury (t$) | Antimony (lb) | Antimony (t$) | Tin (lb) | Tin (t$) | Lead (tons) | Lead (t$) | Zinc (tons) | Zinc (m$) | Platinum (oz) | Platinum (t$) | Copper (lb) | Copper (m$) | Chromium (tons) | Chromium (t$) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1880-1899 | 1,153,889 | 23.85 | 496,101 | 329.0 | -- | -- | -- | -- | -- | -- | 250 | 17.0 | -- | -- | -- | -- | -- | -- | -- | -- |
| 1900 | 395,030 | 8.17 | 73,300 | 45.5 | -- | -- | -- | -- | -- | -- | 40 | 3.4 | -- | -- | -- | -- | -- | -- | -- | -- |
| 1901 | 335,369 | 6.93 | 47,900 | 28.6 | -- | -- | -- | -- | -- | -- | 40 | 3.4 | -- | -- | -- | -- | 250,000 | 0.04 | -- | -- |
| 1902 | 400,709 | 8.28 | 92,000 | 48.5 | -- | -- | -- | -- | 30,000 | 8.0 | 30 | 2.5 | -- | -- | -- | -- | 360,000 | 0.04 | -- | -- |
| 1903 | 420,669 | 8.68 | 143,600 | 77.8 | -- | -- | -- | -- | 50,000 | 14.0 | 30 | 2.5 | -- | -- | -- | -- | 1,200,000 | 0.16 | -- | -- |
| 1904 | 443,115 | 9.16 | 198,700 | 114.9 | -- | -- | -- | -- | 28,000 | 8.0 | 30 | 2.5 | -- | -- | -- | -- | 2,043,596 | 0.28 | -- | -- |
| 1905 | 756,101 | 15.63 | 132,174 | 80.2 | -- | -- | -- | -- | 12,000 | 4.0 | 30 | 2.6 | -- | -- | -- | -- | 4,805,236 | 0.75 | -- | -- |
| 1906 | 1,065,030 | 22.04 | 203,300 | 136.4 | -- | -- | -- | -- | 68,000 | 38.6 | 30 | 3.4 | -- | -- | -- | -- | 5,871,811 | 1.13 | -- | -- |
| 1907 | 936,043 | 19.35 | 149,784 | 98.8 | -- | -- | -- | -- | 44,000 | 16.8 | 30 | 3.2 | -- | -- | -- | -- | 6,308,786 | 1.26 | -- | -- |
| 1908 | 933,290 | 19.29 | 135,672 | 71.9 | -- | -- | -- | -- | 50,000 | 15.2 | 40 | 3.4 | -- | -- | -- | -- | 4,585,362 | 0.61 | -- | -- |
| 1909 | 987,417 | 20.41 | 147,950 | 76.9 | -- | -- | -- | -- | 22,000 | 7.6 | 59 | 5.9 | -- | -- | -- | -- | 4,124,705 | 0.54 | -- | -- |
| 1910 | 780,131 | 16.13 | 157,850 | 85.2 | -- | -- | -- | -- | 20,000 | 8.3 | 75 | 6.6 | -- | -- | -- | -- | 4,241,689 | 0.54 | -- | -- |
| 1911 | 815,276 | 16.85 | 460,231 | 243.9 | -- | -- | -- | -- | 122,000 | 52.8 | 51 | 4.5 | -- | -- | -- | -- | 27,267,778 | 3.40 | -- | -- |
| 1912 | 829,436 | 17.14 | 515,186 | 316.8 | -- | -- | -- | -- | 260,000 | 119.6 | 45 | 4.1 | -- | -- | -- | -- | 29,230,491 | 4.82 | -- | -- |
| 1913 | 755,947 | 15.63 | 362,563 | 218.9 | -- | -- | -- | -- | 100,000[c] | 44.1[c] | 6 | 0.6 | -- | -- | -- | -- | 21,659,958 | 3.35 | -- | -- |
| 1914 | 762,596 | 15.76 | 394,805 | 218.3 | -- | -- | -- | -- | 208,000 | 66.6 | 28 | 1.3 | -- | -- | -- | -- | 21,450,628 | 2.85 | -- | -- |
| 1915 | 807,966 | 16.70 | 1,071,782 | 543.3 | -- | -- | 520,000 | W | 204,000 | 78.8 | 437 | 41.1 | -- | -- | -- | -- | 86,509,312 | 15.14 | -- | -- |
| 1916 | 834,068 | 17.24 | 1,379,171 | 907.4 | -- | -- | 1,200,000 | W | 278,000 | 121.0 | 820 | 113.2 | -- | -- | 8 | 0.7 | 119,654,839 | 29.50 | -- | -- |
| 1917 | 709,049 | 14.66 | 1,239,150 | 1,020.6 | -- | -- | 500,000 | W | 200,000 | 123.2 | 852 | 146.6 | -- | -- | 53 | 5.5 | 88,793,400 | 24.40 | 1,100 | W |
| 1918 | 458,641 | 9.48 | 847,789 | 847.8 | -- | -- | 540,000 | W | 136,900 | 118.0 | 564 | 80.1 | -- | -- | 284 | 36.6 | 69,224,951 | 17.10 | 1,100 | W |
| 1919 | 455,984 | 9.42 | 629,708 | 705.3 | -- | -- | -- | -- | 112,000 | 73.4 | 687 | 72.1 | -- | -- | 569 | 73.7 | 47,220,771 | 8.80 | -- | -- |
| 1920 | 404,633 | 8.37 | 953,546 | 1,039.7 | -- | -- | -- | -- | 32,000 | 16.1 | 875 | 140.0 | -- | -- | 1,478 | 160.1 | 70,435,363 | 13.00 | -- | -- |
| 1921 | 390,558 | 8.07 | 761,085 | 761.1 | 45 | 1.5 | -- | -- | 8,000 | 2.4 | 759 | 68.3 | -- | -- | 40 | 2.7 | 57,011,597 | 7.40 | -- | -- |
| 1922 | 359,057 | 7.42 | 729,945 | 729.9 | -- | -- | -- | -- | 2,800 | 0.9 | 377 | 41.5 | -- | -- | 29 | 2.8 | 77,967,819 | 10.50 | -- | -- |
| 1923 | 289,539 | 5.98 | 814,649 | 668.1 | -- | -- | -- | -- | 3,800 | 1.6 | 410 | 57.4 | -- | -- | -- | -- | 85,920,645 | 12.60 | -- | -- |
| 1924 | 304,072 | 6.29 | 669,641 | 448.6 | 2 | 0.3 | -- | -- | 14,000 | 7.1 | 631 | 100.9 | -- | -- | 28 | 2.6 | 74,074,207 | 9.70 | -- | -- |
| 1925 | 307,679 | 6.36 | 698,259 | 482.4 | 44 | 3.6 | W | W | 28,600 | 15.4 | 789 | 140.6 | -- | -- | 10 | 1.2 | 73,055,298 | 10.30 | -- | -- |
| 1926 | 324,450 | 6.70 | 605,190 | 377.0 | 22 | 1.7 | W | W | 16,000 | 10.4 | 778 | 124.4 | -- | -- | 3,570 | 274.5 | 67,778,000 | 9.49 | -- | -- |
| 1927 | 296,720 | 5.97 | 350,430 | 215.0 | -- | -- | -- | -- | 53,400 | 24.0 | 1,008 | 127.0 | -- | -- | -- | -- | 55,343,000 | 7.25 | -- | -- |
| 1928 | 331,140 | 6.85 | 351,730 | 187.0 | -- | -- | -- | -- | 82,000 | 41.0 | 1,019 | 118.0 | -- | -- | 120 | 9.0 | 41,424,000 | 5.96 | -- | -- |
| 1929 | 375,438 | 7.76 | 472,960 | 252.0 | 4 | 0.5 | -- | -- | 77,200 | 35.0 | 1,315 | 166.0 | -- | -- | 475 | 32.0 | 40,570,000 | 7.13 | -- | -- |
| 1930 | 408,983 | 8.47 | 408,570 | 157.3 | -- | -- | -- | -- | 29,400 | 9.3 | 1,365 | 136.5 | -- | -- | -- | -- | 32,651,000 | 4.24 | -- | -- |
| 1931 | 459,000 | 9.51 | 352,000 | 102.0 | 15 | 1.2 | -- | -- | 8,200 | 2.0 | 1,560 | 126.0 | -- | -- | 393 | 14.0 | 22,614,000 | 1.88 | -- | -- |
| 1932 | 493,860 | 10.20 | 234,050 | 66.0 | 8 | 0.5 | -- | -- | -- | -- | 1,260 | 75.6 | -- | -- | -- | -- | 8,738,500 | 0.55 | -- | -- |
| 1933 | 469,286 | 9.70 | 154,700 | 55.0 | -- | -- | -- | -- | 5,800 | 2.3 | 1,157 | 85.6 | -- | -- | 605 | 18.6 | 29,000 | 0.02 | -- | -- |
| 1934 | 537,281 | 8.78 | 154,700 | 100.0 | -- | -- | -- | -- | 8,200[c] | 4.3 | 839 | 62.1 | -- | -- | 2,555 | 85.6 | 121,000 | 0.06 | -- | -- |
| 1935 | 469,495 | 16.43 | 286,600 | 206.0 | -- | -- | -- | -- | 98,800 | 49.8 | 815 | 65.2 | -- | -- | 8,685 | 259.6 | 15,056,000 | 1.25 | -- | -- |
| 1936 | 540,580 | 18.92 | 484,306 | 375.0 | -- | -- | -- | -- | 226,000 | 105.0 | 941 | 86.6 | -- | -- | 5,654 | 241.9 | 39,267,000 | 3.72 | -- | -- |
| 1937 | 627,940 | 21.98 | 494,340 | 382.0 | -- | -- | 962,000 | 147.6 | 372,000[c] | 202.3[c] | 823 | 97.1 | -- | -- | 9,823 | 313.4 | 36,007,000 | 4.74 | -- | -- |
| 1938 | 662,000 | 23.17 | 479,853 | 310.0 | 8 | 0.6 | 444,000 | 54.8 | 210,000 | 89.1 | 994 | 91.5 | -- | -- | 41,000 | 2,460.0 | 29,760,000 | 2.98 | -- | -- |
| 1939 | 676,780 | 23.68 | 201,054 | 136.5 | -- | -- | 210,000 | 25.9 | 66,000 | 38.0 | 937 | 88.1 | -- | -- | 33,900 | 2,034.0 | 278,500 | 0.04 | -- | -- |
| 1940 | 755,900 | 26.45 | 191,679 | 136.3 | 156[c] | 130.9 | 306,000 | 42.8 | 92,000 | 52.0 | 840 | 72.0 | -- | -- | 28,886 | 1,093.0 | 110,000 | 0.02 | -- | -- |
| 1941 | 692,314 | 24.23 | 199,700 | 142.0 | W | W | 774,000 | 87.3 | 93,660[c] | 61.0[c] | 742 | 58.0 | -- | -- | 22,630 | 813.0 | 144,000 | 0.02 | -- | -- |
| 1942 | 487,657 | 17.07 | 135,200 | 96.0 | W | W | 316,000 | 41.0 | 5,600 | 2.5 | 523 | 44.0 | -- | -- | 22,000 | 779.0 | 48,000 | 0.01 | -- | -- |
| 1943 | 99,583 | 3.49 | 31,700 | 22.0 | 786 | 153.4 | 368,000 | 33.3 | 2,000[c] | 1.0[c] | 200 | 22.0 | -- | -- | 27,900 | 1,020.0 | 54,000 | 0.01 | 5,564 | 186.3 |
| 1944 | 49,296 | 1.73 | 15,240 | 10.8 | 841 | 165.0 | 70,080 | 30.0 | -- | -- | 44 | 5.8 | -- | -- | 33,616 | 2,017.0 | 4,000 | 0.01 | 1,845 | 64.6 |
| 1945 | 68,117 | 2.38 | 9,983 | 6.2 | 275 | 180.0 | W | W | -- | -- | 11 | 1.8 | -- | -- | 22,949 | 1,377.0 | 10,000 | 0.01 | -- | -- |
| 1946 | 226,781 | 7.93 | 41,793 | 26.3 | 699 | 68.7 | W | W | -- | -- | 115 | 25.0 | -- | -- | 22,882 | 1,418.7 | 4,000 | 0.01 | -- | -- |
| 1947 | 279,988 | 9.79 | 66,150 | 46.3 | 127 | 10.6 | 52,000 | 16.1 | 2,000 | 2.2 | 255 | 76.5 | 226 | 0.15 | 13,512 | 1,351.2 | 24,000 | 0.06 | -- | -- |
| 1948 | 248,395 | 8.69 | 67,341 | 58.7 | 108 | 7.8 | 88,000 | 29.3 | 10,000 | 10.8 | 317 | 88.9 | 226 | 0.15 | 13,741 | 1,209.2 | 28,000 | 0.07 | -- | -- |
| 1949 | 229,416 | 8.03 | 36,056 | 32.4 | 107 | 7.9 | 88,000 | 31.3 | 114,000 | 100.8 | 49 | 11.2 | 226 | 0.15 | 17,169 | 1,545.2 | 7,700 | 0.02 | -- | -- |

[a]From 34 State and Federal documents.
[b]76-lb flask.
[c]When state and federal figures differ significantly, state figures are used.
[d]Not traceable by year.
[e]Crude platinum; total production of refined metal is about 575,000 oz.

W = Withheld.
-- = Not reported.
t$ = Thousand dollars.
m$ = Million dollars.

Continued on next page

# APPENDIX F
## continued

| Year | Gold (oz) | Gold (m$) | Silver (oz) | Silver (t$) | Mercury (flask[b]) | Mercury (t$) | Antimony (lb) | Antimony (t$) | Tin (lb) | Tin (t$) | Lead (tons) | Lead (t$) | Zinc (tons) | Zinc (m$) | Platinum (oz) | Platinum (t$) | Copper (lb) | Copper (m$) | Chromium (tons) | Chromium (t$) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1950 | 289,285 | 10.13 | 52,638 | 48.0 | W | W | W | W | 158,000 | 170.3 | 144 | 27.5 | -- | -- | W | W | 12,000 | 0.03 | -- | -- |
| 1951 | 239,628 | 8.38 | 32,870 | 29.8 | 28 | W | 1,718,000 | 2,061.6 | 138,000 | 198.0 | 21 | 7.2 | -- | -- | W | W | 2,000 | 0.01 | -- | -- |
| 1952 | 240,571 | 8.42 | 31,825 | 28.7 | 40 | W | 740,000 | 1,406.0 | 180,000 | 243.9 | 1 | 0.3 | -- | -- | W | W | -- | -- | W | W |
| 1953 | 253,771 | 8.88 | 35,387 | 32.1 | 1,023 | 270.0 | W | W | 98,000 | 105.9 | -- | -- | -- | -- | W | W | -- | -- | W | W |
| 1954 | 248,511 | 8.70 | 33,694 | 31.8 | 1,046 | 276.0 | -- | -- | 398,000 | 409.9 | -- | -- | -- | -- | W | W | 8,000 | 0.02 | 2,953 | 208.0 |
| 1955 | 249,294 | 8.73 | 33,693 | 30.4 | 43 | 12.0 | -- | -- | 172,000 | 182.5 | 1 | 0.3 | -- | -- | W | W | 2,000 | 0.01 | 7,082 | 625.3 |
| 1956 | 204,300 | 7.33 | 26,700 | 24.1 | 3,414 | 837.0 | 134,400 | 150.0 | -- | -- | 1 | 0.3 | -- | -- | W | W | -- | -- | 7,200 | 711.5 |
| 1957 | 215,467 | 7.54 | 28,862 | 26.0 | 5,461 | 1,349.0 | 71,120 | 80.0 | -- | -- | 9 | 3.0 | -- | -- | W | W | -- | -- | 4,207 | 431.0 |
| 1958 | 186,000 | 6.53 | 24,000 | 22.0 | 3,380 | 774.0 | -- | -- | -- | -- | -- | -- | -- | -- | W | W | 10,000 | 0.03 | -- | -- |
| 1959 | 171,000 | 5.99 | 22,000 | 20.0 | 3,750 | 852.0 | -- | -- | -- | -- | -- | -- | -- | -- | W | W | 72,000 | 0.04 | -- | -- |
| 1960 | 180,000 | 6.30 | 23,000 | 21.0 | 4,450 | 938.0 | W | W | -- | -- | -- | -- | -- | -- | W | W | 82,000 | 0.04 | -- | -- |
| 1961 | 114,228 | 3.99 | -- | -- | 4,080 | 816.0 | -- | -- | -- | -- | -- | -- | -- | -- | W | W | 184,000 | 0.06 | -- | -- |
| 1962 | 165,142 | 5.78 | -- | -- | 3,843 | 711.0 | -- | -- | -- | -- | -- | -- | -- | -- | W | W | -- | -- | -- | -- |
| 1963 | 99,000 | 3.48 | 6,1[illegible]9 | 9.0 | 400 | 76.0 | W | W | -- | -- | 5 | 1.1 | -- | -- | W | W | -- | -- | -- | -- |
| 1964 | 58,000 | 2.05 | 7,200 | 6.0 | 303 | 95.0 | 46,400 | 60.3 | -- | -- | -- | -- | -- | -- | W | W | 22,000 | 0.01 | -- | -- |
| 1965 | 43,000 | 1.51 | 5,000 | 6.0 | 180 | 104.0 | 46,400 | 60.3 | -- | -- | 14 | 4.0 | -- | -- | W | W | 64,000 | 0.03 | -- | -- |
| 1966 | 27,325 | 0.96 | 7,000 | 9.0 | 185 | 101.0 | 16,000 | 19.2 | -- | -- | 19 | 4.3 | -- | -- | W | W | -- | -- | -- | -- |
| 1967 | 22,948 | 0.80 | 6,000 | 9.0 | 161 | 79.0 | 20,000 | 22.0 | -- | -- | -- | -- | -- | -- | W | W | W | W | -- | -- |
| 1968 | 21,000 | 0.81 | 3,000 | 6.5 | 156 | 78.0 | 6,000 | 6.0 | -- | -- | -- | -- | -- | -- | W | W | -- | -- | -- | -- |
| 1969 | 21,227 | 0.88 | 2,000 | 4.2 | 238 | 100.0 | 94,000 | 100.0 | -- | -- | 2 | 0.5 | -- | -- | W | W | -- | -- | -- | -- |
| 1970 | 38,400 | 1.38 | 4,000 | 7.0 | 3,100 | 1,260.0 | 365,000 | 410.0 | -- | -- | -- | -- | -- | -- | W | W | W | W | -- | -- |
| 1971 | 34,000 | 1.36 | 2,000 | 4.0 | 675 | 285.0 | 68,000 | 74.0 | 34,000 | 47.0 | -- | -- | -- | -- | W | W | -- | -- | -- | -- |
| 1972 | 8,639[c] | 0.56 | 1,000 | 2.0 | 125 | 44.0 | 160,000 | 185.0 | W | W | -- | -- | -- | -- | W | W | -- | -- | -- | -- |
| 1973 | 15,000[c] | 1.86 | 13,200 | 22.0 | 70 | 52.5 | 420,000 | 515.0 | 10,000 | 12.0 | 6 | 2.0 | -- | -- | W | W | -- | -- | -- | -- |
| 1974 | 16,000[c] | 2.56 | 1,500 | 3.5 | 70 | 52.5 | 80,000 | 95.0 | W | W | -- | -- | -- | -- | W | W | -- | -- | -- | -- |
| 1975 | 14,980[c] | 3.35 | 6,000 | 25.0 | -- | -- | 120,000 | 145.0 | 22,000 | 60.0 | -- | -- | -- | -- | W | W | -- | -- | -- | -- |
| 1976 | 22,887[c] | 6.90 | 6,500 | 24.0 | -- | -- | 160,000 | 165.0 | W | W | 14 | 6.0 | -- | -- | W | W | -- | -- | 8,000[c] | 1,200.0[c] |
| 1977 | 50,000 | 7.80 | 8,000 | 20.0 | -- | -- | W | W | W | W | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 1978 | 60,000[c] | 12.00 | 6,000 | 50.0 | -- | -- | W | W | W | W | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 1979 | 65,000[c] | 18.00 | 6,500 | 93.0 | -- | -- | 100,000 | 125.0 | 100,000 | 830.0 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 1980 | 75,000[c] | 32.00 | 7,500 | 111.0 | -- | -- | -- | -- | 120,000 | 984.0 | 31 | 29.0 | -- | -- | -- | -- | -- | -- | -- | -- |
| 1981 | 134,200[c] | 55.20 | 13,420 | 111.3 | W | W | -- | -- | 105,000 | 700.0 | -- | -- | -- | -- | 900 | 200.0 | -- | -- | -- | -- |
| 1982 | 175,000[c] | 69.90 | 22,000 | 198.0 | -- | -- | -- | -- | 198,000 | 1,365.0 | -- | -- | -- | -- | W | W | -- | -- | -- | -- |
| 1983 | 169,000[c] | 67.60 | 33,200 | 332.0 | -- | -- | 22,400 | 45.0 | 215,000 | 1,100.0 | -- | -- | -- | -- | W | W | -- | -- | -- | -- |
| 1984 | 175,000[c] | 62.13 | 20,000 | 159.0 | 5 | 1.5 | 135,000 | 225.8 | 225,000 | 400.0 | -- | -- | -- | -- | W | W | -- | -- | -- | -- |
| 1985 | 190,000 | 61.18 | 28,500 | 171.0 | 27 | 10.0 | 65,000 | 98.0 | 300,000 | 650.0 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 1986 | 160,000[c] | 60.80 | 24,000 | 134.4 | 12 | 2.8 | 45,000 | 67.5 | 340,000 | 890.0 | -- | -- | -- | -- | W | W | -- | -- | -- | -- |
| 1987 | 229,707 | 104.51 | 54,300 | 391.0 | -- | -- | -- | -- | 288,000 | 460.0 | -- | -- | -- | -- | W | W | -- | -- | -- | -- |
| 1988 | 265,50[illegible] | 112.84 | 47,790 | 382.0 | W | W | -- | -- | 300,000 | 950.0 | -- | -- | -- | -- | 25 | 13.8 | -- | -- | -- | -- |
| 1989 | 284,6[illegible] | 108.7 | 5,211,591 | 27,300.0 | -- | -- | -- | NR | 194,000 | 672.0 | 9,585 | 7,700.0 | 19,843 | 29,400.0 | -- | -- | -- | -- | -- | -- |
| 1990 | 231,[illegible]00 | 89.20 | 10,13[illegible],000 | 50,675.0 | -- | -- | -- | -- | 57,000 | 200.0 | 44,220 | 30,954.0 | 181,200 | 253,680.0 | -- | -- | -- | -- | -- | -- |
| 1991 | 243,900 | 88.29 | 9,076,854 | 39,110.0 | | | | | 6,800 | 22.1 | 69,591 | 33,403.7 | 278,221 | 278,221.0 | 15 | 5.3 | -- | -- | -- | -- |
| Other[d] | -- | -- | -- | -- | 1,438 | -- | -- | -- | -- | -- | -- | -- | -- | -- | 333,936 | 46,940.3 | -- | -- | -- | -- |
| TOTAL (metric) | 32,600,371 (1,014 tonnes) | 1,716.51 | 44,441,130 (1,379 tonnes) | 133,432.4 | 40,945 (1,411,521 kg) | 9,910.5 | 11,070,800 (5,021 tonnes) | 6,655.1 | 7,265,200 (3,295 tonnes) | 12,467.0 | 149,696 (135,744 tonnes) | 75,066.8 | 479,234 (434,665 tonnes) | 561,221.4 | 668,537[e] (20,793 kg) | 65,811.2 | 1,373,793,932 (632,152 tonnes) | 228.04 | 39,951 (35,419 tonnes) | 3,425.7 |

[a]From 34 State and Federal documents.
[b]76-lb flask.
[c]When state and federal figures differ significantly, state figures are used.
[d]Not traceable by year.
[e]Crude platinum; total production of refined metal is about 575,000 oz.

W = Withheld.
-- = Not reported.
t$ = Thousand dollars.
m$ = Million dollars.

# APPENDIX G

## Production of industrial minerals, coal, and other commodities in Alaska, 1880-1991

| Year | Coal | | Sand and gravel | | Building stone[a] | | Barite | | Other[b] |
|---|---|---|---|---|---|---|---|---|---|
| | s. tons | m$ | s. tons | m$ | s. tons | m$ | s. tons | t$ | $ |
| 1880-1899[c] | 19,429 | 0.14 | -- | -- | 7,510 | 0.04 | -- | -- | -- |
| 1900 | 1,200[d] | 0.02[d] | -- | -- | 510 | 0.01 | -- | -- | -- |
| 1901 | 1,300[d] | 0.02[d] | -- | -- | 700 | 0.01 | -- | -- | 500 |
| 1902 | 2,212[d] | 0.02[d] | -- | -- | 800 | 0.01 | -- | -- | 255 |
| 1903 | 1,447 | 0.01 | -- | -- | 920 | 0.01 | -- | -- | 389 |
| 1904 | 1,694 | 0.01 | -- | -- | 1,080 | 0.02 | -- | -- | 2,710 |
| 1905 | 3,774 | 0.02 | -- | -- | 970 | 0.02 | -- | -- | 740 |
| 1906 | 5,541 | 0.02 | -- | -- | 2,863 | 0.03 | -- | -- | 19,965 |
| 1907 | 10,139 | 0.05 | | -- | 3,899 | 0.03 | -- | -- | 54,512 |
| 1908 | 3,107[d] | 0.01[d] | -- | -- | 2,176 | 0.03 | -- | -- | 81,305 |
| 1909 | 2,800 | 0.02 | -- | -- | 1,400 | 0.01 | -- | -- | 86,027 |
| 1910 | 1,000[d] | 0.01[d] | -- | -- | W | W | -- | -- | 96,408 |
| 1911 | 900[d] | 0.01[d] | -- | -- | W | W | -- | -- | 145,739 |
| 1912 | 355[d] | 0.01[d] | -- | -- | W | W | -- | -- | 165,342 |
| 1913 | 2,300 | 0.01 | -- | -- | W | W | -- | -- | 286,277 |
| 1914 | 1,190 | 0.01 | -- | -- | W | W | -- | -- | 199,767 |
| 1915 | 1,400 | 0.03 | -- | -- | W | W | -- | -- | 205,061 |
| 1916 | 12,676 | 0.05 | -- | -- | W | W | -- | -- | 326,731 |
| 1917 | 54,275 | 0.27 | -- | -- | W | W | -- | -- | 203,971 |
| 1918 | 75,816 | 0.41 | -- | -- | W | W | -- | -- | 171,452 |
| 1919 | 60,894 | 0.35 | -- | -- | 50,014 | 0.29 | -- | -- | 214,040 |
| 1920 | 61,111 | 0.36 | -- | -- | 37,044 | 0.27 | -- | -- | 372,599 |
| 1921 | 76,817 | 0.49 | -- | -- | 59,229 | 0.31 | -- | -- | 235,438 |
| 1922 | 79,275 | 0.43 | -- | -- | 54,251 | 0.30 | -- | -- | 266,296 |
| 1923 | 119,826 | 0.76 | -- | -- | 83,586 | 0.41 | -- | -- | 229,486 |
| 1924 | 99,663 | 0.56 | -- | -- | 35,294 | 0.26 | -- | -- | 348,728 |
| 1925 | 82,868 | 0.40 | -- | -- | 32,193 | 0.19 | -- | -- | 454,207 |
| 1926 | 87,300 | 0.46 | -- | -- | 33,283 | 0.20 | -- | -- | 423,000 |
| 1927 | 104,300 | 0.55 | -- | -- | 41,424 | 0.22 | -- | -- | -- |
| 1928 | 126,100 | 0.66 | -- | -- | 63,347 | 0.31 | -- | -- | -- |
| 1929 | 100,600 | 0.53 | -- | -- | 54,766 | 0.26 | -- | -- | 194,000 |
| 1930 | 120,100 | 0 63 | -- | -- | 66,234 | 0.33 | -- | -- | 157,300 |
| 1931 | 105,900 | 0.5[illegible] | -- | -- | 59,175 | 0.29 | -- | -- | 108,000 |
| 1932 | 102,700 | 0.53 | -- | -- | 54,167 | 0.27 | -- | -- | 223,400 |
| 1933 | [illegible],200 | 0.48 | -- | -- | 56,291 | 0.28 | -- | -- | -- |
| 1934 | 107,500 | 0.45 | -- | -- | 64,234 | 0.36 | -- | -- | 46,155 |
| 1935 | 119,425 | 0.50 | -- | -- | 74,049 | 0.38 | -- | -- | 46,755 |
| 1936 | 136,593 | 0.57 | -- | -- | 76,379 | 0.38 | -- | -- | 45,807 |
| 1937 | 131,600 | 0.55 | -- | -- | 50,057 | 0.25 | -- | -- | 147,048 |
| 1938 | 159,230 | 0.62 | -- | -- | 189,090 | 0.21 | -- | -- | 125,302 |
| 1939 | 143,549 | 0.60 | 42,332 | 0.02 | -- | -- | -- | -- | -- |
| 1940 | 170,174 | 0.88 | 515,011 | 0.10 | -- | -- | -- | -- | -- |
| 1941 | 241,250 | 0.97 | 530,997 | 0.09 | -- | -- | -- | -- | 1,367,000 |
| 1942 | 246,600 | 0.99 | W | W | -- | -- | -- | -- | 1,124,000 |
| 1943 | 289,232 | 1.84 | W | W | -- | -- | -- | -- | -- |
| 1944 | 352,000 | 2.37 | 712,496 | 0.50 | -- | -- | -- | -- | 2,350,309 |
| 1945 | 297,644 | 1.87 | W | W | -- | -- | -- | -- | 5,910,704 |
| 1946 | 368,000 | 2.36 | W | W | -- | -- | -- | -- | 2,005,241 |
| 1947 | 361,220 | 2.55 | W | W | 219,000 | 1.00 | -- | -- | 5,927,319 |
| 1948 | 407,906 | 2.79 | W | W | 67,341 | 0.33 | -- | -- | 1,257,699 |
| 1949 | 455,000 | 3.60 | W | W | W | W | -- | -- | 7,181,886 |

[a]Building-stone production figures for 1880-1937 are for the southcentral and interior regions of Alaska only.
[b]Includes 2.4 million lb $U_3O_8$ (1955-71); 505,000 tons gypsum (1905-26); 286,000 lb $WO_3$ (intermittently 1916-80); 94,000 lb asbestos (1942-44); 540,000 lb graphite (1917-18; and 1942-50); and undistributed amounts of zinc, jade, peat, clay, soapstone, miscellaneous gemstones, and other commodities (1880-1985).
[c]Production not traceable by year.
[d]When state (territorial) and federal figures differ significantly, state figures are used. Figures for sand and gravel production in 1974 show state estimates (118,740,000 s. tons; 240.94 m$) and federal (42,614,000 s. tons; 88.96 m$). The federal estimate was not added to total production.
[e]Marble quarried on Prince of Wales Island, southeastern Alaska (1900-41).
m$ = Million dollars.
t$ = Thousand dollars.
-- = Not reported.
W = Withheld.

| Year | Coal | | Sand and gravel | | Building stone[a] | | Barite | | Other[b] |
|---|---|---|---|---|---|---|---|---|---|
| | s. tons | m$ | s. tons | m$ | s. tons | m$ | s. tons | t$ | $ |
| 1950 | 421,455 | 3.03 | 3,050,020 | 2.38 | W | W | -- | -- | 2,100,000 |
| 1951 | 494,333 | 3.77 | 6,818,000 | 3.54 | W | W | -- | -- | 3,600,000 |
| 1952 | 648,000 | 5.77 | 6,817,800 | 3.54 | W | W | -- | -- | 9,052,000 |
| 1953 | 861,471 | 8.45 | 7,689,014 | 5.08 | 47,086 | 0.17 | -- | -- | 1,231,350 |
| 1954 | 666,618 | 6.44 | 6,639,638 | 4.90 | 283,734 | 0.47 | -- | -- | 1,572,150 |
| 1955 | 639,696 | 5.76 | 9,739,214 | 8.24 | 265,740 | 0.29 | -- | -- | 1,552,427 |
| 1956 | 697,730 | 6.37 | 9,100,000 | 8.30 | 50,000 | 0.02 | -- | -- | 1,551,500 |
| 1957 | 842,338 | 7.30 | 6,096,000 | 8.79 | 528,000 | 1.95 | -- | -- | 2,751,000 |
| 1958 | 759,000 | 6.93 | 4,255,000 | 3.87 | 615,000 | 2.07 | -- | -- | 695,000 |
| 1959 | 602,000[d] | 5.88[d] | 5,600,000 | 5.10 | 54,000 | 0.20 | -- | -- | 1,338,000 |
| 1960 | 669,000[d] | 5.95[d] | 5,892,000 | 5.35 | 80,000 | 0.30 | -- | -- | 975,000 |
| 1961 | 650,000[d] | 5.87[d] | 5,241,000 | 4.19 | -- | -- | -- | -- | -- |
| 1962 | 675,000[d] | 6.41[d] | 5,731,000 | 5.36 | -- | -- | -- | -- | -- |
| 1963 | 853,000 | 5.91 | 16,926,000 | 22.01 | W | W | W | W | 2,589,000 |
| 1964 | 745,000 | 5.01 | 26,089,000 | 18.49 | W | W | W | W | 4,912,000 |
| 1965 | 860,000[d] | 5.88[d] | 29,959,000 | 33.93 | W | W | W | W | 5,296,000 |
| 1966 | 927,000 | 6.53 | 17,457,000 | 21.79 | W | W | 44,000 | 350.0 | 6,167,000 |
| 1967 | 930,000 | 7.18 | 22,300,000 | 26.25 | W | W | W | W | 4,924,000 |
| 1968 | 812,000[d] | 5.03[d] | 17,515,000 | 20.73 | W | W | 91,000 | W | 4,117,000 |
| 1969 | 728,000[d] | 4.65[d] | 16,205,000 | 18.62 | 1,954,000 | 3.90 | 90,000 | 850.0 | 5,163,000 |
| 1970 | 786,000[d] | 5.28[d] | 20,375,000[d] | 26.07[d] | 6,470,000 | 10.01 | 134,000[d] | 1,875.0 | 7,994,000 |
| 1971 | 748,000[d] | 5.05[d] | 26,391,000 | 41.99 | 2,658,000 | 5.07 | 102,000[d] | 1,075.0 | -- |
| 1972 | 720,000[d] | 6.26[d] | 14,187,000 | 15.21 | 652,000 | 3.01 | W | W | -- |
| 1973 | 700,000[d] | 6.23[d] | 19,350,000 | 19.01 | 5,967,000 | 12.00 | 112,000 | 1,792.0 | 12,846,000 |
| 1974 | 700,000 | 7.34 | 118,740,000[d] | 240.94[d] | 5,484,000 | 12.95 | 110,000 | 1,895.0 | 14,495,000 |
| | | | 42,614,000 | 88.96 | | | | | |
| 1975 | 766,000 | 7.81 | 48,145,000 | 95.78 | 8,877,000 | 26.65 | 2,000[d] | 30.0 | 12,731,000 |
| 1976 | 705,000 | 8.00 | 74,208,000[d] | 204.73[d] | 6,727,000 | 20.09 | W | W | 14,019,000 |
| 1977 | 780,000[d] | 12.00[d] | 66,126,000 | 134.25 | 4,008,000 | 17.47 | -- | -- | 14,486,000 |
| 1978 | 750,000 | 15.00 | 51,100,000 | 122.00 | 3,437,000 | 14.65 | 22,000 | 750.0 | -- |
| 1979 | 750,000 | 16.00 | 50,900,000 | 104.90 | 3,650,000 | 15.45 | 20,000 | 800.0 | 930,000 |
| 1980 | 800,000 | 16.00 | 40,000,000 | 86.00 | 3,700,000 | 15.40 | 50,000 | 2,000.0 | 97,500 |
| 1981 | 800,000 | 17.60 | 46,000,000 | 88.20 | 4,200,000 | 19.30 | -- | -- | 256,000 |
| 1982 | 830,000 | 18.00 | 45,000,000 | 91.00 | 3,400,000 | 15.60 | -- | -- | 150,000 |
| 1983 | 830,000 | 18.00 | 50,000,000 | 105.00 | 5,270,000 | 25.00 | -- | -- | 242,000 |
| 1984 | 849,161 | 23.75 | 27,000,000 | 95.00 | 2,700,000 | 16.00 | -- | -- | 875,875 |
| 1985 | 1,370,000 | 39.73 | 28,184,000 | 112.06 | 2,500,000 | 12.00 | -- | -- | 559,000 |
| 1986 | 1,492,707 | 40.10 | 20,873,110 | 75.76 | 4,200,000 | 20.32 | -- | -- | 384,800 |
| 1987 | 1,508,927 | 42.35 | 16,696,374 | 42.66 | 1,805,000 | 11.62 | -- | -- | 388,400 |
| 1988 | 1,551,162 | 44.30 | 17,264,500 | 48.75 | 3,600,000 | 24.65 | -- | -- | 389,000 |
| 1989 | 1,452,353 | 41.46 | 14,418,000 | 39.88 | 2,914,000 | 20.34 | -- | -- | 1,492,000 |
| 1990 | 1,576,000 | 44.99 | 15,013,500 | 40.82 | 3,200,000 | 22.10 | -- | -- | 400,000 |
| 1991 | 1,540,000 | 39.00 | 14,160,011 | 45.45 | 3,000,000 | 22.50 | -- | -- | 462,000 |
| Other[d] | -- | -- | -- | -- | 2,300,000[r] | W | 79,000 | W | -- |
| TOTAL (metric) | 42,100,083 (38,184,775 tonnes) | 625.2 | 1,055,052,095 (956,932,250 tonnes) | 2,108.03 | 96,139,836 (87,198,831 tonnes) | 377.88 | 856,000 (776,563 tonnes) | 11,417.0 | 175,592,877 |

Table 20. *Conversion factors for U.S. customary units and International System of units (metric) of measurement*

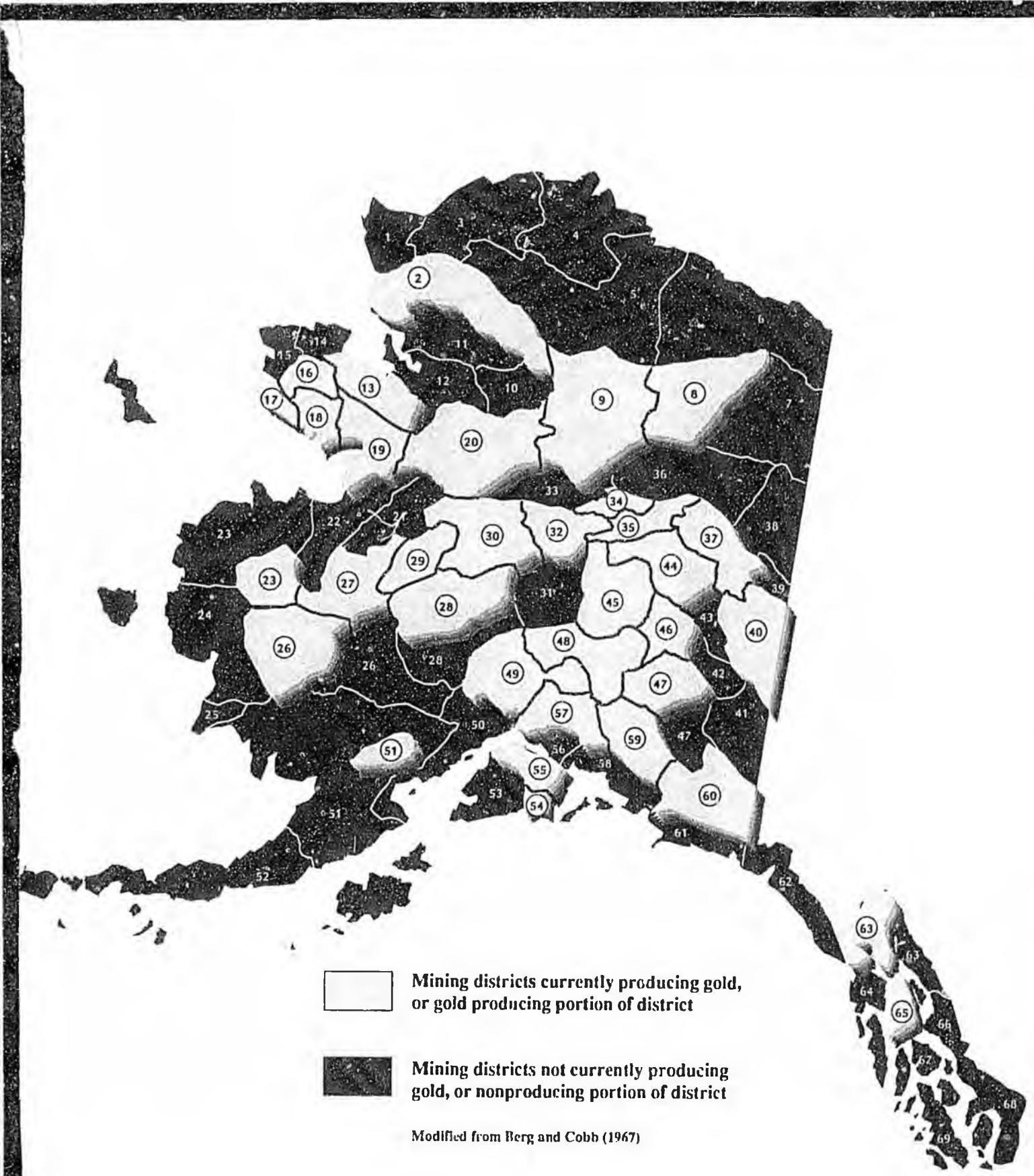
| U.S. unit | Multiply by | Metric unit |
|---|---|---|
| | **MASS** | |
| ounce, troy (oz tr) | 0.0311 | kilogram (kg) |
| ounce, avoirdupois (oz avdp) | 0.0283 | kilogram (kg) |
| pound, avoirdupois (lb) | 0.4536 | kilogram (kg) |
| ton, short (2,000 lb) | 0.9072 | tonne (mg) |
| tonne (mg) | 1.102 | ton (2,000 lb) |
| | **LENGTH** | |
| foot (ft) | 0.3048 | meter (m) |
| mile (mi) | 1.609 | kilometer (km) |
| | **AREA** | |
| mile$^2$ (mi$^2$) | 2.590 | kilometer$^2$ (km$^2$) |
| acre | 2.471 | hectare |
| | **VOLUME** | |
| yard$^3$ (yd$^3$) | 0.7646 | meter$^3$ (m$^3$) |
| gallon | 3.785 | liter |

SOURCE: Hansen, W.R., ed., 1991, Suggestions to authors of the United States Geological Survey (7th ed.).

# NOTES

## ALASKA MINING DISTRICTS

1. Lisburne district
2. Noatak district
3. Wainwright district
4. Barrow district
5. Colville district
6. Canning district
7. Sheenjek district
8. Chandalar district
9. Koyukuk district
10. Shungnak district
11. Kiana district
12. Selawik district
13. Fairhaven district
14. Serpentine district
15. Port Clarence district
16. Kougarok district
17. Nome district
18. Council district
19. Koyuk district
20. Hughes district
21. Kaiyuh district
22. Anvik district
23. Marshall district
24. Bethel district
25. Goodnews Bay district
26. Aniak district
27. Iditarod district
28. McGrath district
29. Innoko-Tolstoi district
30. Ruby district
31. Kantishna district
32. Hot Springs district
33. Melozitna district
34. Rampart district
35. Tolovana district
36. Yukon district
37. Circle district
38. Black district
39. Eagle district
40. Fortymile district
41. Chisana district
42. Tok district
43. Goodpaster district
44. Fairbanks district
45. Bonnifield district
46. Delta River district
47. Chistochina district
48. Valdez Creek district
49. Yentna district
50. Redoubt district
51. Iliamna district
52. Port Moller/Kodiak Island district
53. Homer district
54. Seward district
55. Hope district
56. Anchorage district
57. Willow Creek district
58. Prince William Sound district
59. Nelchina district
60. Nizina district
61. Yakataga district
62. Yakutat district
63. Porcupine district
64. Chichagof district
65. Admiralty district
66. Petersburg district
67. Kupreanof district
68. Hyder district
69. Ketchikan district


Mining districts currently producing gold, or gold producing portion of district
Mining districts not currently producing gold, or nonproducing portion of district
Modified from Berg and Cobb (1967)

# Welcome to the

# Department of Natural Resources

# Division of Land







*Ron Swanson* ..... *Director*
*Dick LeFebure* ..... *Project Manager*
*Sue Doggett* ..... *Administrative Unit*
*Mary Kaye Hession* ..... *Coordination and Procedures Unit*
*Martha Welbourn* ..... *Land and Resource Section*
*Carol Shobe* ..... *Title and Contracts Section*
*Rick Smith* ..... *Manager, Northern Region*
*Rick Thompson* ..... *Manager, Southcentral Region*
*Andy Pekovich* ..... *Manager, Southeast Region*

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# A Message from the Director...

Welcome to the Division of Land. Our division is the primary manager of Alaska's landholdings, which include 86 million acres of state-owned uplands and 65 million acres of tidelands, shore lands, and submerged lands. Each year the division manages approximately one million additional acres of uplands as a result of continuing statehood land transfers which will eventually total 105 million acres.

The division's goals are to fulfill and sustain environmental and economic vitality by balancing use and development of the state's land and resources to provide for future generations. We do this by working with other agencies and the public to make informed decisions for wise land and resource use.

As developer, the division selects, secures clear title, and plans for use of state-owned land and natural resources. It provides access through rights-of-way, and secures long-standing public access and public use sites. As conservator, the division establishes and enforces conditions to protect the environment when authorizing land use, stops unauthorized uses, and plans for land and resource conservation.

As land owner, the division provides land for Alaskans to own and use. The division issues and maintains approximately 5,000 sale contracts for parcels of land purchased by Alaskans. The division also issues leases (almost 4,000 in all) that range in scale from set-net fishing sites and aquatic farms to oil industry support leases on the North Slope. It also makes gravel and other materials available for residential, commercial, and industrial development; and acts as the state's survey authority to establish property boundaries.

Finally, the division is responsible for stewardship of land retained in state ownership for public access, energy development, commercial and public recreation, scenic values, and a host of other public purposes.

The division carries out its responsibilities with approximately 175 employees and an annual operating budget of less than $12 million. If all state-owned land were divided equally among tho division's employees to manage, each would be in charge of almost 757,000 acres - and would manage it at a cost of about 8 cents per acre per year. Unlike many other state agencies, the division generates revenue for the state in excess of our operating expenses: approximately $15 million annually.



Ron Swanson, Director

# HOW DIVISION OF LAND HAS CONTRIBUTED TO DNR'S PROGRESS

We issue thousands of authorizations to individuals, state agencies, and corporations each year to use state land for a wide variety of purposes.

Our state selections project will enable the department to meet the 1994 deadline for identifying land to fulfill the state's remaining land entitlement of 105 million acres. We will collect resource information on potential selections, inventory existing state holdings, and facilitate public involvement in the selection process. The result of the selections project will complete the real estate portfolio for the Owner State.

We provide expertise and exhibits to state and federal courts, including the U.S. Supreme Court, for such leases as offshore boundary disputes, in which thousands of acres of offshore oil and gas leases are at stake.

We administer professional survey contracts for the state's land disposal program for numerous projects such as the Bradley Lake power project, tract maps, and legal descriptions for oil and gas lease sales located in the Beaufort Sea, the North Slope and Cook Inlet.

We prepare survey instruction and review plats for private surveyors under contract with applicants to facilitate issuance of title and leases for remote parcels, homestead, open-to-entry, agricultural, tidelands, and other parcels. We also prepare survey instructions and review plats for government agencies for the survey of municipal entitlements and other state agency needs such as airports, parks, and schools.

The Submerged Lands Recalculation Project allows the state to select an additional half million acres of federal land. This project amended township survey plats that were filed in the early years of Statehood to 1983 to exclude the acreage under meanderable water bodies. A side benefit to this project is the introduction of improved hydrography into our Geographic Information System (GIS) database.

We prepare land use plans and classify state land for multiple uses. We have completed area plans in the Northern Region for Northwest Alaska, and the Tanana Valley; in Southcentral Region for the Susitna Valley, Bristol Bay, and Copper River Basin; and in the Southeast Region for Prince of Wales Island.

We are working on area plans for Central Southeast, the City and Borough of Juneau (this plan will allow projects such as Goldbelt's port facility, Kensington Mine and the Echo Bay AJ mine to proceed), Yakataga (an area rich in timber, wildlife habitat, commercial and subsistence fisheries, world class sport fisheries, gold and other minerals, a range of hunting, and recreation and tourism opportunities) and the Kenai Peninsula (where tourism, grazing, recreation, and use of tidelands are important).

We have completed special management plans for forest management and timber access in the Susitna Valley, and for six recreation rivers in the Susitna Valley. We are currently working on a management plan for the Glacier-Winner Creek area at Girdwood that has the potential for significant economic and recreation benefits for the state and Municipality of Anchorage.

We currently maintain 7,400 sale and lease contracts with a combined worth of over $35 million.

We work to help development for major mining projects such as the AJ Mine, U.S. Borax molybdenum prospect, Wishbone Hill coal, Fort Knox, Red Dog, and Pebble Beach.

We opened a joint office on the North Slope to support the high level of activity on state land. The joint office allows the oil industry and its subcontractors to deal with state agencies at one location. Combining office space enhances communication and cooperation between the agencies, which helps to more effectively serve private industry and protect the public interest.

We are achieving our North Slope cleanup goal, which is to have all lease tracts in compliance with lease stipulations, within an eight-year period. To reach this aim, the division is working with the North Slope Borough in selecting and authorizing a new and more adequate landfill site for North Slope wastes. We also actively monitor various forms of cleanup technology for contaminated sites that have become operational in the past year.

The division conveys land to municipal governments that will support local projects and community needs. These conveyances range from tidelands at Unalaska for fish processing and port needs, to land in Valdez for refinery expansion and development, to industrial commercial tract development at Hollis.

We work with private industry to develop recreation and commercial areas. Recently, we issued a Request for Proposal (RFP) for private development of an all season resort at Hatcher pass. The division also worked with the Matanuska-Susitna Borough to ensure that success will be attained in seeing this project completed, while making a profit for both the state and the borough.

We are now emphasizing a program of "public trust" leases and permits. Public trust lands are state-owned tidelands, shorelands, and submerged lands. These leases and permits authorize activities such as log storage, log transfer facilities, commercial docks, floathomes, aquatic farming, set net leases, and sea food processing.

We issue "Public and Charitable" leases to aid Alaskans. One example is a lease we issued to the Interior Athabascan Cultural Heritage Education Institute, of approximately 40 acres of land, within the Minto Flats State Game Refuge, at the Old Minto Village at no charge.

We issue authorizations for research and scientific study. The Healy Clean Coal Project is a pilot program in the development of a coal-fired electrical generation system that does not contribute to air pollution. The new technology is being developed that, if successful, would be used as a model on a nationwide basis. We have also issued a lease to the University of Alaska for the construction of the National Arctic Space and Environmental Research Center. This $30 million world-class research facility will be constructed on 600 acres of state land about 20 miles from Fairbanks.

We received a grant from the Alaska Legislature for acquisition of wetlands in the Anchorage area. This Business Parks Wetlands has been identified as critical waterfowl nesting and rearing habitat for geese and ducks. The areas are being managed cooperatively between the division, the Business Parks Wetlands Coalition, and the Audubon Society.

We spearheaded construction of improvements on Caribou Creek and the Matanuska River. These improvements will provide public access for the purpose of conducting recreational gold panning. The improvements consist of an upgraded access road, a pullout along the Glenn Highway, a parking area at the road's terminus, an access trail to the creek, and sanitation and refuse facilities.

We responded to the need created by the erosion of the Matanuska River. Several adjacent landowners lost land and improvements to the constantly changing channels of the river. After making an emergency declaration we made other state land available to the affected landowners without charge.

# DIVISION GOALS

## Constitution:

*"It is the policy of the state to encourage the settlement of its land and the development of its resources by making them available for maximum use consistent with the public interest."*

*Article VIII Natural Resources*
*Section 1 - Statement of Policy*

## Statute/Policy:

*"...it is the policy of the State of Alaska to plan and manage state-owned land to establish a balanced combination of land available for both public and private purposes."*

*AS 38.04.005. Policy (a)*

## Mission:

To serve as stewards of state land for the benefit of Alaska's people.

## Goals:

### A. Asset Acquisition

*Objectives:*

1. To Acquire State Land

This objective provides the foundation for Alaska's unique position as an owner-state. Alaska's vast portfolio of real estate and resources not only funds almost all of state government but produces dividends distributed annually to individual Alaskans. The project includes selecting and securing Alaska's full entitlement under the Statehood Act (105 million acres of uplands and approximately 65 million acres of land beneath navigable waters, tidelands, and submerged lands), exchanging land with other owners to assemble strategic blocks of state-owned property, and ensuring that the chain of title is clear of encumbrances before the state invests funds in its landholdings.

2. To Protect and Defend State Land Ownership Rights

This objective defends the state's real estate holdings against title encumbrances and other adverse claims. It surveys state land and coastal boundaries to protect against boundary and acreage disputes, especially in contests with the federal government over offshore mineral

lease revenues or where submerged lands have erroneously been charged against Alaska's Statehood Act entitlement. It audits the federal government's land conveyances to the state to ensure that the state secures its full entitlement in each grant category and to correct erroneous land transfers from the federal government (Native allotments, prior federal mining claims, other legitimate land entries and withdrawals).

## B. Asset Identification and Allocation

*Objective:*

1. To evaluate state-owned natural resources and allocate them for maximum use consistent with the public interest

Our constitution mandates that state-owned land and resources be managed for "maximum use consistent with the public interest." The sheer size of the state's landholdings, the preliminary state of knowledge regarding their resources and revenue opportunities, and access problems owing to remoteness and mixed land ownership make the fulfillment of this mandate very complex. This project analyzes what is known about the state's inventory of resources and compares possible combinations of uses, yielding the array that produces the greatest benefits (both economic and non-economic) for all Alaskans. It gives the Alaskan public - as co-owners and shareholders - a voice in that decision. The project results in site-specific guidelines for putting the land to use by resource developers, land purchasers, and the general public.

## C. Asset Management and Development

*Objectives:*

1. To Provide for Economic Development and Settlement of State Land

This objective serves the state as a real estate development and property management enterprise on a scale commensurate with the huge size of its portfolio. It appraises the fair market value of state land and surface resources, funds special assessments to install improvements such as roads and water lines, and auctions sand and gravel. It issues and administers leases ranging from individual setnet fishing sites to a land base for the entire North Slope oil support industry, then ensures compliance with lease terms (both financial and in the field). It offers state land for Alaskans to purchase for businesses, homesites, or recreational use and fulfills the state's guarantee of land grants to cities and boroughs. It also markets major development projects utilizing state land such as world-class winter recreation resorts.

2. To Maintain and Protect the State's Land and Resource Assets

This objective provides for management of land to be maintained in public ownership. Through proper design of permit conditions, it ensures that short-term resource development activities will not cause long-term impacts. It provides field personnel to find and abate unauthorized uses such as theft of state-owned gravel. It assures that activities on state land are consistent with the Alaska Coastal Management Program. It supports non-commercial uses of state land, including management of legislatively designated areas such as the recreation river system. It defends state land against contamination by toxic substances and supplies personnel for cleanup of sites damaged by oil spills or other mishaps. Finally, for federal and municipal land as well as the state's own land, it ensures that former gravel pits, quarries, and peat mines will be reclaimed for productive use.

3. To Provide and Protect Access

This objective ensures that Alaskans have legal access to state-owned lands and waters for resource development, travel, hunting, fishing, recreation, and other uses. It asserts and defends the public's claim to RS 2477 rights-of-way, secures public easements before the federal government grants land to ANCSA corporations and other private owners, and provides for easements across uplands and along public waters before the state itself conveys land. Where necessary to restore public access or reach landlocked state parcels, it utilizes an access fund to purchase easements.

4. To Ensure Stewardship of State Land and Resource Assets

The state's land assets must be put to work for Alaskans where it is for active and passive recreation use or for development and settlement. This objective facilitates the division stewardship responsibility and provides the policy and guidance necessary for implementation of the asset management program throughout the state and helps to explain and provide information about the state's land and resource assets, economic opportunities and other programs. It supports and coordinates among the Division of Land's regional and area offices and provides policy direction statewide. It answers questions about state programs and ensures public and private sector participation in major program development, keeps both informed through media releases, briefings for community and industry groups, responses to written or oral inquiries, and personal assistance to help people understand requirements, research maps, and fill out applications.

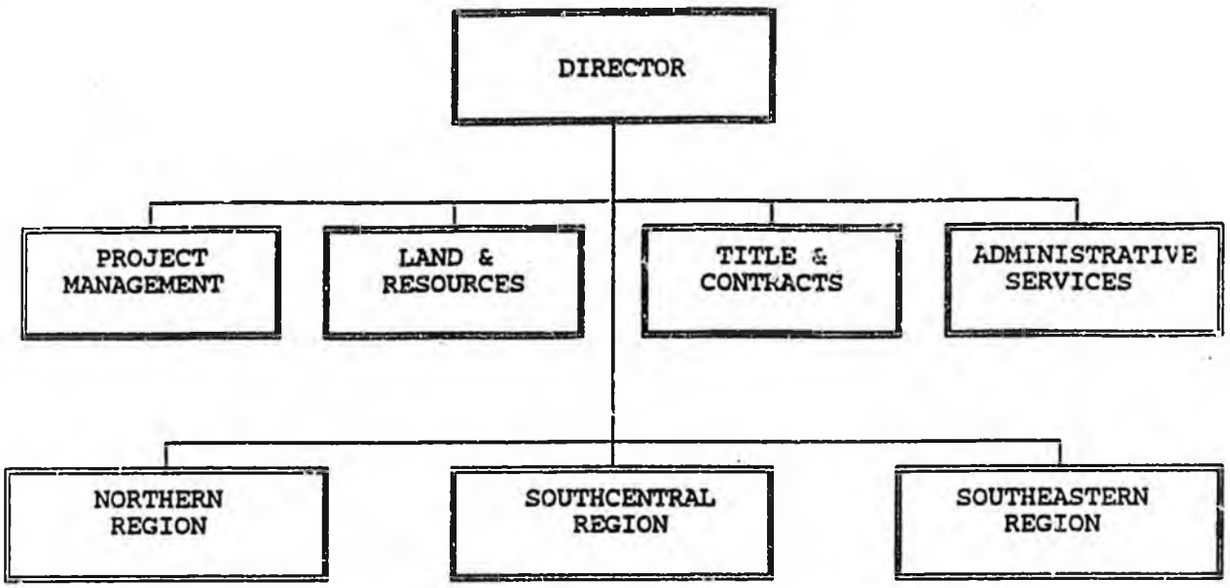
# Division of Land

# Organization



# *ORGANIZATION CHART*

## *The Division is organized as follows:*



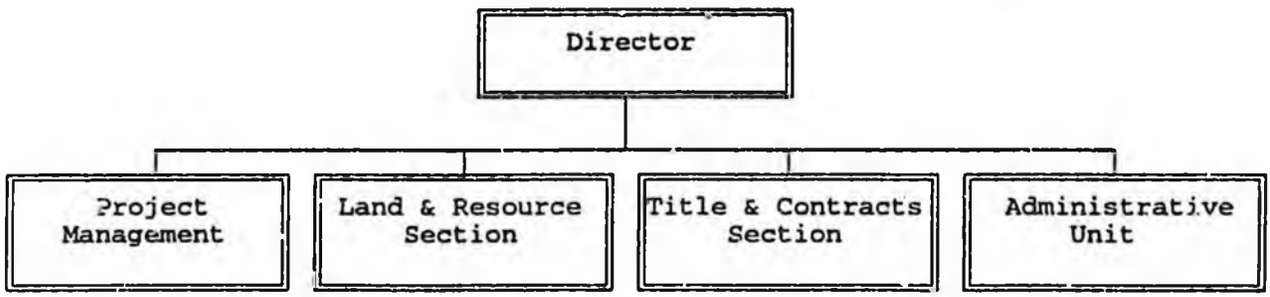
# CENTRAL OFFICE

The Central Office consists of the director, project manager, including public trust leasing, major projects, coordination and procedures, administrative services, and two sections:

- Land and Resources Section
- Title and Contracts Section

***The Director's Office***

- is headquartered in Anchorage
- provides policy direction
- is involved in statewide issues
- works on federal, state and local levels of government to promote, manage, and protect state interests
- is the primary contact with commissioner's office, governor's office and legislature

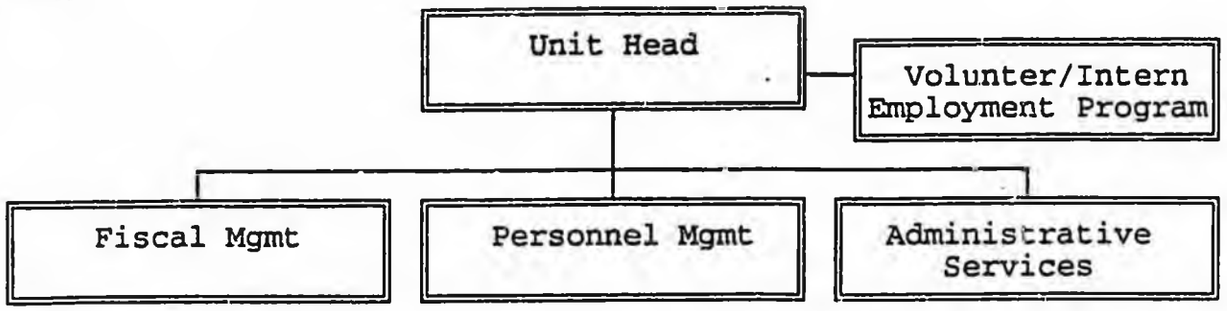


# ADMINISTRATIVE UNIT

***Purpose:***

The purpose of the unit is to provide administrative guidance and support to the division in a timely and effective manner. To assure compliance with pertinent laws and regulations.

***Staff:***




***Major Areas of Responsibility:***

*Budget / Finance*

planning, preparing, analyzing and submitting the annual operating and CIP budgets

- allocate funds to the division managers
- monitor and control expenditures throughout the year
- seek alternate funding sources
- auditing

*Personnel / Staffing*

- funding and tracking of approximately 200 positions statewide
- prepare layoff plans (when applicable)
- determine financial impacts of personnel actions and provide appropriate direction
- oversee State Personnel Rules, labor contracts, Administration Code, etc.
- monitor personal services funds and expenditures
- review decisions concerning positions upgrades, overtime, leave without pay, transfers, retirement, benefit increases, wage increases, etc.

*Administrative Direction / Oversight*

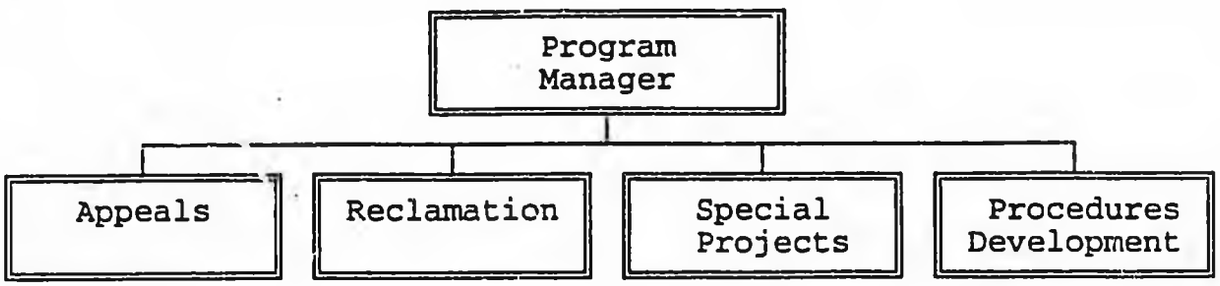
- provide administrative guidance to division supervisors and employees
- develop guidelines and procedures to assure work required is done timely, efficiently and consistently
- work on prevention programs to avoid complaints, appeals, and lawsuits
- audit delegations and monitor levels of authority division-wide
- program manager (division-wide) for employment programs thoughout the state

# PROJECT MANAGEMENT

***Purpose:***

Program Management is responsible for the public trust leasing program, overall project management of major projects, program review and coordination and procedures. Staff serve as liaisons and coordinators between the Director's Office and the Division of Land's field operations. This linkage is necessary for orderly administration of the department's largest, most diverse, and most decentralized division.

***Staff:***




***Major Areas of Responsibility:***

*Program Management*

- directs the public trust leasing program
- project manager for the Fort Knox project
- directs program receipts operations
- oversee involvement in other major projects
- provides operational guidance to section chiefs and regional managers

*Policies and Procedures*

- develop policies and regulations to implement the laws within the division's jurisdiction
- develop procedures that the regional offices use in administering the state's land management and conveyance programs, translating them into an on-line operations manual that runs on the state's mainframe computer system
- coordinate Division of Land's response to proposed legislation
- coordinate the division's interaction with Land Administration System, the Department of Natural Resources' computerized system of public land records

*Communicating with the Public*

- research and resolve appeals of decisions made by Division of Land regional managers or section chiefs
- assist Commissioner's Office in responding to appeals of Division of Land director's decisions
- coordinate enhancements to LAS, the electronic version of the state's public land records system

*Special Projects*

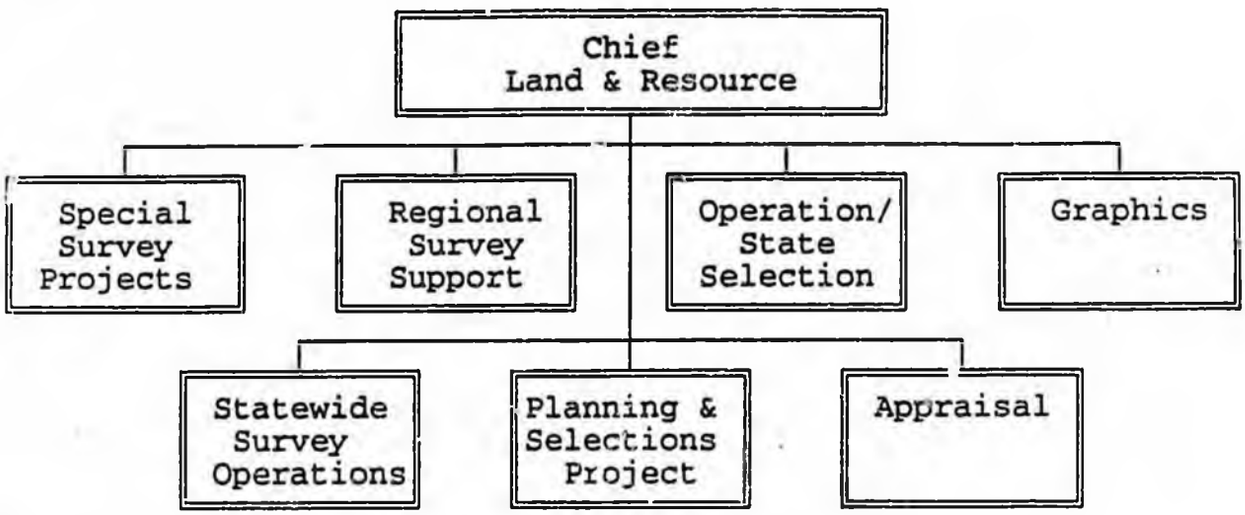
- develop the division's aquatic farming program, which provides sites for commercial shellfish raising in southcentral and southeast Alaska
- staff special projects, such as the settlement of the University of Alaska's land claims, litigation support in the resulting lawsuit over timber rights at Icy Bay, and negotiations to repurchase those timber rights as required by recent legislation
- deal with Alaska Coastal Management Program issues and policy proposals on a statewide level
- develop the division's regulatory program for reclamation of gravel mines, rock quarries, and other material sites
- develop long range development project initiatives
- oversee preparation of CIP program budget
- assist in division's operational budget and preparation of new program increments
- draft legislation

# LAND AND RESOURCE SECTION

***Purpose:***

The Land and Resource Section consists of seven units that carry out large programs of state-wide concern as well as provide program support functions to the three regional offices of the division. There are fifty-five employee , in the section.

***Staff:***




***Major Areas of Responsibility:***

*Operations Unit*

- protect the public interest in federal conveyances to private individuals and to ANCSA corporations. Conveyances include surface estate to village corporations, surface and subsurface estate conveyances to regional corporations and conveyances of Native allotment parcels. Public interests include public access to isolated public lands and public easements in state land reconveyances.
- produce easement atlases to depict locations to users of public use easements and navigable waters
- negotiate large land exchanges or land exchanges with state wide concerns
- coordinate state-wide land dispcsal offerings
- certify municipal land grant entitlements for newly incorporated cities and boroughs
- audit status of municipal land grant entitlements established by AS 29.6S and former AS 29.18.

- coordinate RS 2477 activities of state-wide concern
- coordinate state selection activities with BLM and maintain state selection priority list
- select and acquire lands to fulfill the state's entitlement
- work with the federal agencies to ensure that state selections are conveyed in a timely manner, and that high priority selections are conveyed first

*Graphics Unit*

- provide graphic support for the division
- research and map land ownership, land use data, and resource information
- produce camera ready maps and supporting text for publications
- provide graphic support by producing public information brochures, posters, ads, books, displays, public meeting graphics, etc.

*Planning and Selections Unit*

- address resource planning and large scale land selections
- identify eight million acres of land to select to fulfill the state's general grant, community grant, and school grant land entitlement; also will coordinate the public involvement process for the selections project
- develop plans for state lands, including:
  - designation of lands for sale to private individuals and retention in public ownership;
  - guidelines for private use of state lands, including leases, permits, and areas open and closed to new mineral entry; and
  - guidelines for public use of state lands including protection of public trails, streams, wetlands, recreation sites, and fish and wildlife habitat, and guidelines for timber harvesting
- coordinate interagency teams to prepare land use plans to resolve land management controversies and develop guidelines for use of state lands. Interagency team recommendations are presented to the commissioners of Natural Resources and Fish and Game for adoption.
- design and conduct programs for public involvement in state land use planning including public meetings and work with citizens' advisory boards
- reviews land use plans prepared by federal agencies to protect state land interests and to coordinate land management
- provides land planning and public participation support to other divisions

*Appraisal Unit*

- determine the fair market value of state land that will be sold, leased, or exchanged
- reappraise existing state leases
- review and approve appraisal reports prepared by private appraisers for purchase or lease of state land
- review real estate appraisals completed for other divisions within the department (e.g. the Division of Parks and Outdoor Recreation)
- review and approve appraisals prepared for land exchanges
- contract for private market appraisal services

***Land Survey Units***

The Land Survey Units subdivide and contract for the subdivision of state land to meet the development needs of various state agencies. Because of the differences between statewide and regional programs and the need to respond to special projects, survey operations is comprised of three units. The state receives the majority of its land as unsubdivided townships, making surveys necessary before conveying to others. The location of property boundaries, both on the ground and in the public record, is a necessary component of landownership and usage.

*Statewide Land Survey Operations*

Programs supported by this unit span the state. Clientele are often outside the Division of Land. This unit administers the survey of coastlines, power projects & rights-of-ways, large scale subdivisions, rectangular net (sections) extensions and subdivision, and tidal datum determinations. Most field work is performed by the private sector, therefore, contracting is a major activity of the unit. The following is an outline of this activity:

- develop individual project scope
- write survey specifications for each project
- request and review proposals
- negotiate contracts
- administer contracts
- inspect and accept the products

Surveys are conducted to define the states offshore interests and delineate upland property and ownership boundaries. Funding is through both Operating and CIP budgets and through Reimbursable Services Agreements with other agencies.

In addition to the above, a sub-unit attends to sea boundary and natural resource leasing issues. The following is an outline of this activity:

- write tract descriptions and prepare tract maps for Oil and Gas lease sales. (less frequently, the same for coal, offshore gold, and geothermal leases)

- manage all state-federal boundary working group field projects, either force account or contracted, and all BWG equipment and accounts
- support the Department of Law in offshore boundary litigation
- provide input and staff assistance to the Surveying and Mapping Advisory Committee (SMAC)

*Regional Operations*

The main function of this unit is to provide professional survey support to the regional managers and their staff on survey related matters. Professional land surveyors and staff from this unit provide expertise in matters of boundary law, survey practices and procedures which will produce clear, correct legal descriptions and survey plats to be used in land conveyance documents.

Responsible for the professional/technical direction of surveys to facilitate the transfer of title or other interest in state lands, determine extent of trespass on state land, grant right-of-ways or easements, comply with court orders, and for administrative purposes relating to the following:

- remote parcel survey (Chapter 85, SLA 1979)
- homestead surveys (Chapter 103, SLA 1983)
- municipal entitlement surveys
- agriculture
- preference right surveys
- tide and submerged lands
- statewide platting under AS 40.15.075, section line easement vacations, access easements along navigable waters
- rights-of-way
- platting and recordation of all survey plats of state land
- accretion surveys
- public and charitable use
- other state/federal agency
  court-ordered surveys

Supply professional guidance and advice on surveying and platting to other sections and units within the Department of Natural Resources, municipal governments and private surveyors on riparian and littoral rights, agriculture development projects and municipal entitlement surveys.

Give professional advice to the Department of Law, Department of Commerce and Economic Development, Occupational Licensing, division attorneys on survey and platting methods and procedures. Assist the Attorney General's Office in resolving boundary disputes and quiet title actions, by providing research, expert witnesses, and exhibit preparation.

Write survey instructions and perform plat reviews for surveys of state lands (both uplands and tidelands) executed by surveyors in the private sector and other government agencies. The requirement for surveys before title may be

transferred, assures that use and development is not hindered by delays and litigation caused by incorrect or ambiguous lease or land boundaries.

Perform field surveys and inspections for special projects on a statewide bases. Prepare, recommend and review legislation, regulations and procedures and prepare program budgets for the divisions; relative to engineering and survey disciplines for various programs.

Contact and coordinate for survey matters with:

- various municipal land managers
- Attorney General's Office
- private registered land surveyors
- private parties and individuals
- other sections/divisions within the department
- LAS liaison
- other state and federal agencies

*Special Survey Projects*

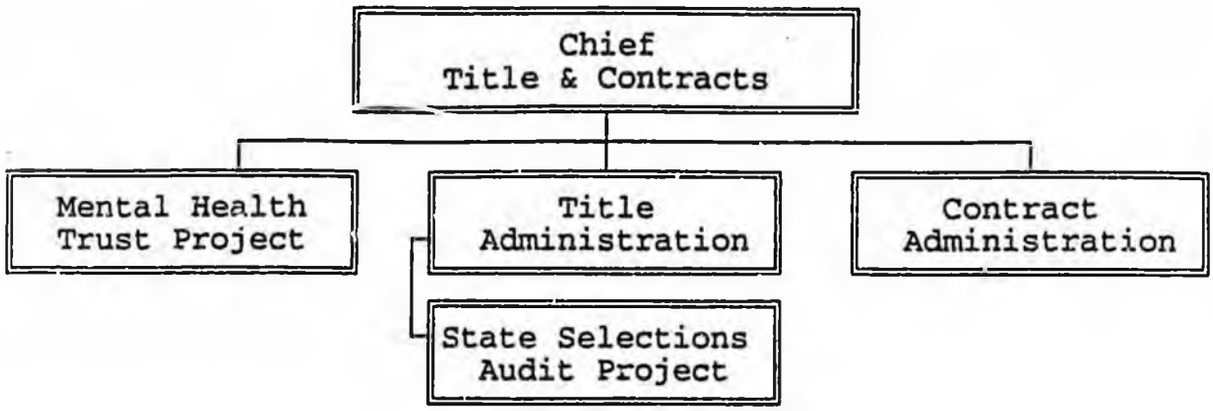
This unit provides survey support to projects such as the Mental Health Lands Settlement, the Prince William Sound land avulsion issue, implementation of statewide platting authority, working with local platting authorities and other special or one-time projects as needed.

# TITLE AND CONTRACTS SECTION

***Purpose:***

This section is the land status-related technical arm of the division and is comprised of two distinct units and two special projects which provide division-wide, department-wide and inter-departmental services related to land title and land sale contracts and leases.

***Staff:***




***Major Areas of Responsibility:***

*Title Administration Unit*

- is the title plant for the division and department
- select land
- accept land title
- provide title reports and analysis
- defend the state's title
- issue conveyance documents to the municipalities and private sector in fulfillment of a variety of disposal authorities

*State Selections*

- review proposed selections for sufficiency and compliance
- initiate and file all paperwork with respect to state selections
- review and accept all incoming decisions, TAs and patents for sufficiency, correctness, limitations, and reservations
- audit acreage for all entitlements
- audit all files and protection of all title documents

*Title Research and Analysis/Reconveyances*

The exact interest or limitations of the state's title is often challenged or needs defining. The more difficult issues are researched by this group and their goal is to identify and resolve potential and/or real conflicts. They work closely with the Attorney General's office providing technical assistance as needed.

- identify, research and assert state title
- research and draft recommendations in response to litigation against state title
- process any Land Registration/Repurchase applications
- reconvey to the federal government lands erroneously conveyed to the state, thereby reducing title conflicts and litigations
- respond to accretion and tidelands litigations
- research and respond to title situations where federal mining claims were not included from the state's title
- special Projects related to land title

*State Title*

- process oil and gas title reports are over one-half of the groups tasks in direct support of the Department's oil and gas program with initial and updated title reports provided to meet specific time lines
- prepare general title reports are in support of the land disposal program, any action resulting in the transfer of fee title, actions that have a significant impact such as the TAGS pipeline right-of-way or for another department, such as Fish and Game as to certain refuge land
- DNR and DOT/PF are the only two state agencies able to hold fee title to land. This group reviews and accepts title for DNR and other departments.
- in compliance with AS 38.05.030(b), verify, process and record any interest in land within 90 days of acquisition
- identify, assert, and place on the state land record system all submerged land
- prepare conveyance documents

*State Selection Audit Project*

The State Selection Audit Project is a special project of auditing the approximately 5,850 general grant entitlement state selection case files. The purpose of this project is: 1) to insure that all lands selected by the state have been accounted and adjudicated properly by BLM; 2) to update and/or correct the state's graphic and computer records and review BLM's records identifying any errors; 3) identify parcels of land that may be available for selection to the state selection task force; and 4) provide accurate records to aid in the automated drafting project.

To date, the project has identified 300,000 additional acres that may be selected by the state by the deadline of January 3, 1994.

*Contract Administration Unit*

- administer all of the revenue producing contracts and leases for the division resulting from various land disposal programs and administrative decisions
- create, execute, and administer contracts and leases. Approximately 14,000 active contracts and leases are administered.
- issue the contracts and leases resulting from various land disposal programs (land lotteries or land auctions)
- convert leases to land sale contracts
- conversion of homesite and homesteads to land sale contracts or pay-offs
- determine and apply residency and veterans' discounts
- change interests rates
- maintain Revenue and Billing system
- survey and appraise as they relate to specific land disposal actions
- contract maintenance
- final adjudication to determine if all requirements have been met and to determine the limitations and reservation to be placed in a patent
- work closely with Title Administration to request a final title check and patent be issued, and then transmit the patent to the purchaser or applicant
- assignments
- amendments
- homestead audits
- corporate qualifications
- performance bonds
- extensions
- reappraisals
- name changes, deaths, divorce, probate
- relinquishments
- defaults
- terminations
- foreclosures

*Mental Health Trust Lands Project*

Ch. 66, SLA 1991 was signed into law June 19, 1991. This law, known as the Alaska Mental Health Trust Settlement Act, proposed a settlement of Weiss v. State of Alaska for the plaintiffs and court to accept. The settlement would reconstitute the mental health trust created by the Alaska Mental Health Enabling Act of 1956. The Division of Land is the lead division for this department wide project which implements the settlement.

- negotiate a settlement agreement
- respond to litigation requests and impacts
- develop a study and design for the project

- review and adjudicate all of the original 1,000,000 acres of mental health land to determine the land to reconstituted to the trust and which are viewed as encumbered land
- conduct a comprehensive use characteristics of all of the encumbered land
- complete a Fair Market Value appraisal of the encumbered land
- Identify with the plaintiffs substitute land to reconstitute the trust.
- complete on the substitute land:
  - comparable use characteristic analysis
  - conduct a hazardous substance inventory
  - complete a Fair Market Value appraisal.
- negotiate the land exchanges with written determinations.
- issue interim conveyances and deeds to both original mental health lands and substitute land.
- survey the land conveyed to the trust.
- issue final conveyance documents to the Trust Authority.

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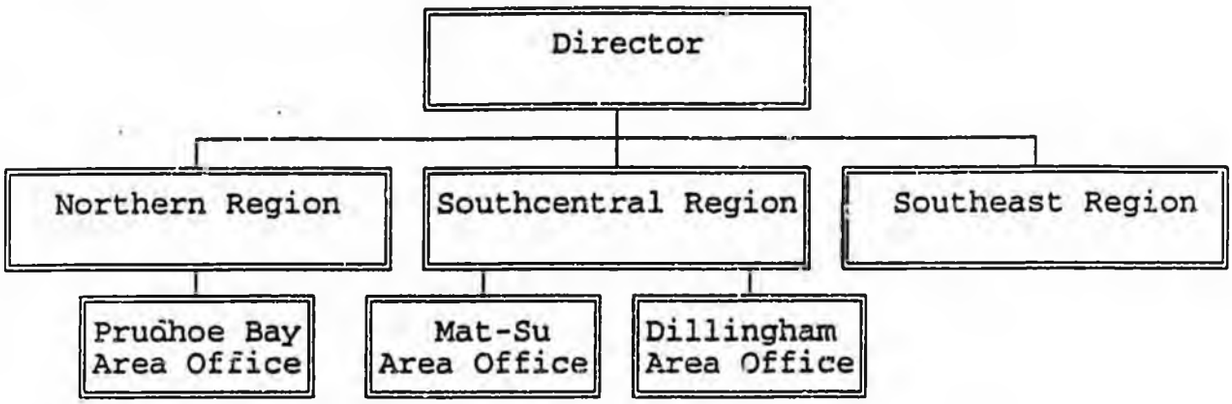
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# REGIONAL OFFICES

***Purpose:***

The Regional Offices are headquartered in Fairbanks, Juneau and Anchorage. They are responsible for implementation of the division's policies for settlement and resource development. Because the workload in the Regional Offices is based to a large extent on applicant initiated requests, different programs are emphasized in each locale. The division also operates an area office in Wasilla, as well as seasonal area offices in Dillingham, Homer and Prudhoe Bay.

***Staff:***




***Major Areas of Responsibility:***

- Land classification
- Mental Health Liaison
- Land grants
- Survey waivers
- Project development
- Special use areas
- Land sales via lottery and auction
- Tideland/upland leasing, negotiated competitive, commercial leasing
- Land use, personal use and trapping cabin construction permits
- Rights-of-way, private and public
- Mineral orders
- land exchanges
- Municipal entitlements
- Material sales
- Homestead/homesite permit administration
- Federal reconveyances
- Preference rights
- Tideland conveyances
- RS 2477 rights-of-way
- Aqua farming
- Management rights
- Alaska Energy Authority division liaison
- Reclamation plan review
- Public and charitable use conveyance
- Managing public use areas

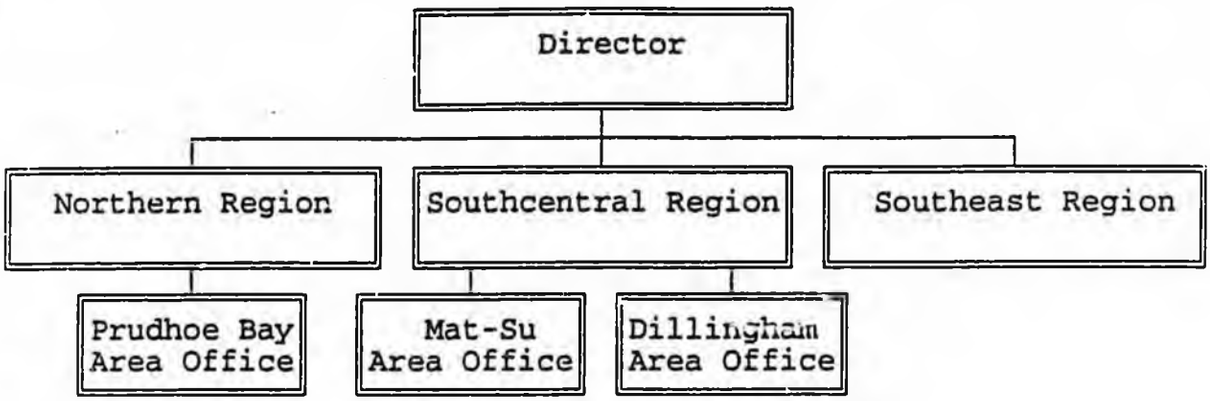
- Managing state land/unauthorized use abatement
- Land classifications
- Shore fishery development (leases)
- Alaska Coastal Management Program review
- Interagency land management assignments
- Shipwrecks
- Contingency plans
- Field operations
- Memoranda of Understanding

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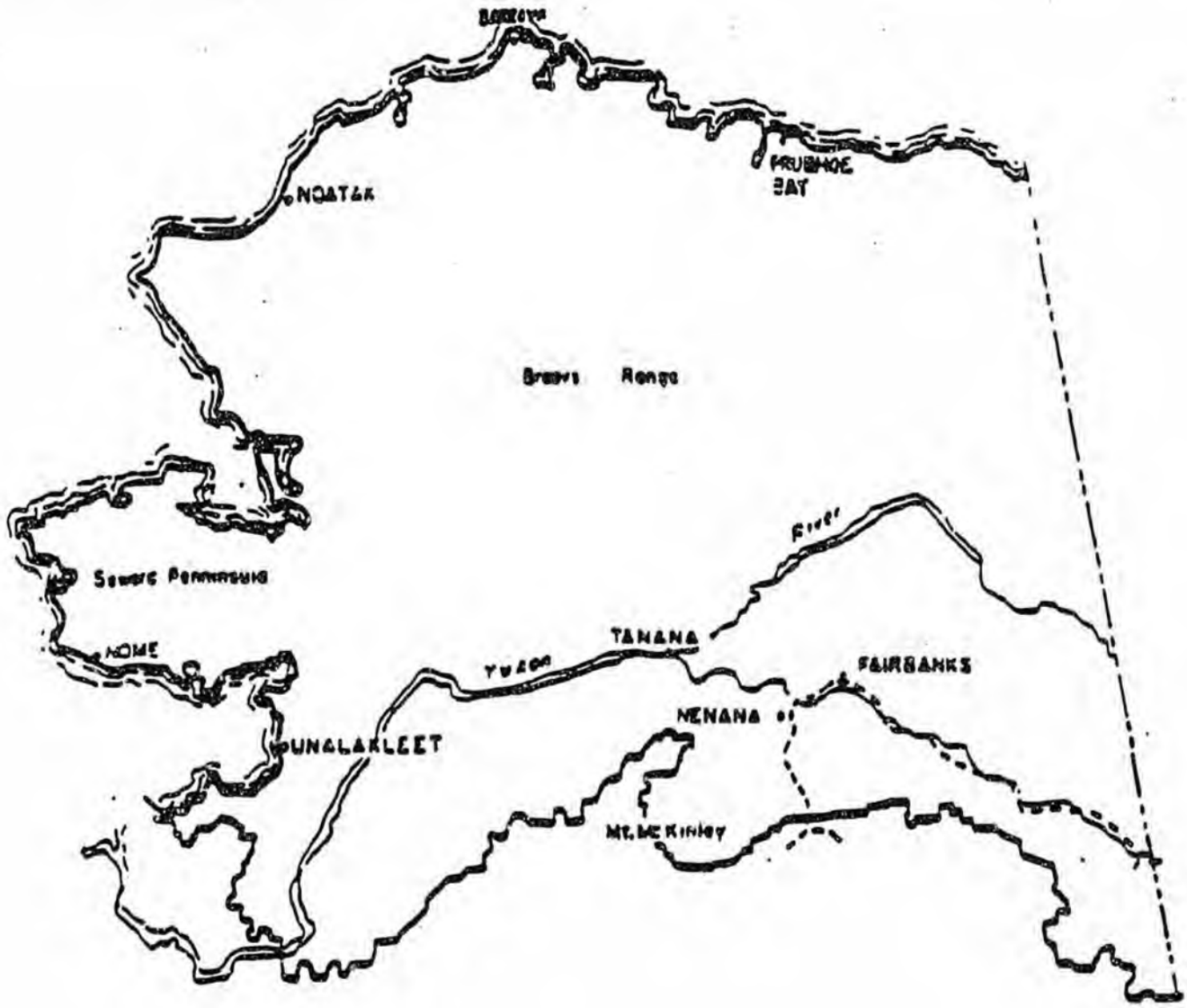



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- Aqua farming
- Management rights
- Alaska Energy Authority division liaison
- Reclamation plan review
- Public and charitable use conveyance
- Managing public use areas

## NORTHERN REGIONAL OFFICE

The Northern Regional Office manages state land resources in the northern half of the state. This includes surface resource management of the North Slope oil fields. Other program emphasis includes access, surface management of mining areas, realty services for guides and other small businesses, and community development. The Northern Regional Office has taken the lead in North Slope cleanup, material sale procedures, and until the Office of the Pipeline Coordinator was re-established, common carrier pipelines.

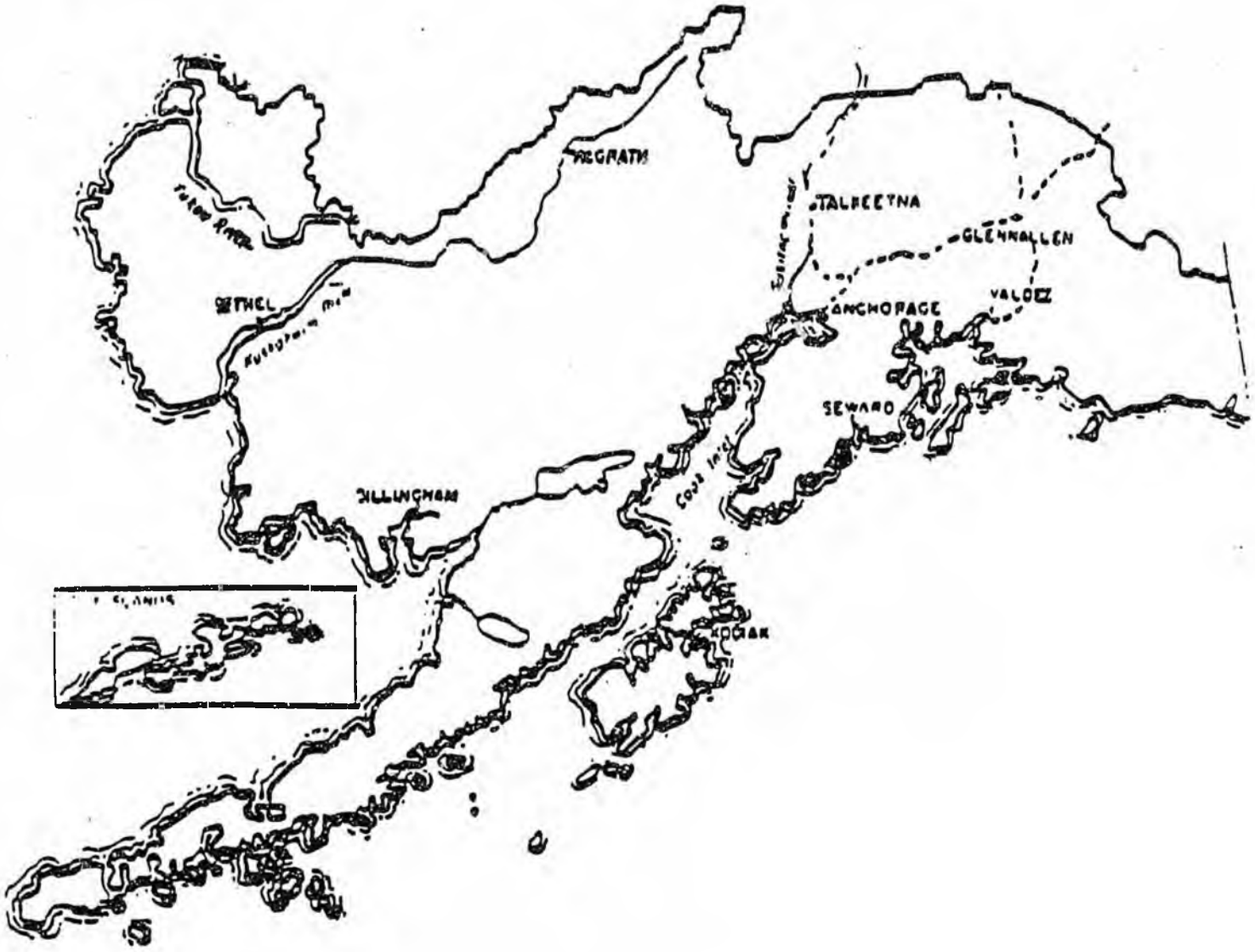



Rick Smith, Regional Manager
Division of Land
Northern Regional Office
4420 Airport Way
Fairbanks, Alaska 99701

Please direct questions to: (907) 451-2700

## SOUTHCENTRAL REGIONAL OFFICE

The Southcentral Regional Office shares characteristics and some program emphasis with each of the other two regions. In addition, the large urban populations result in emphasis on resolution of recreation/mining conflicts, tidelands management, municipal entitlements, and preference rights. Policy development in the Southcentral Regional Office centers on commercial leasing, management plans and grazing.

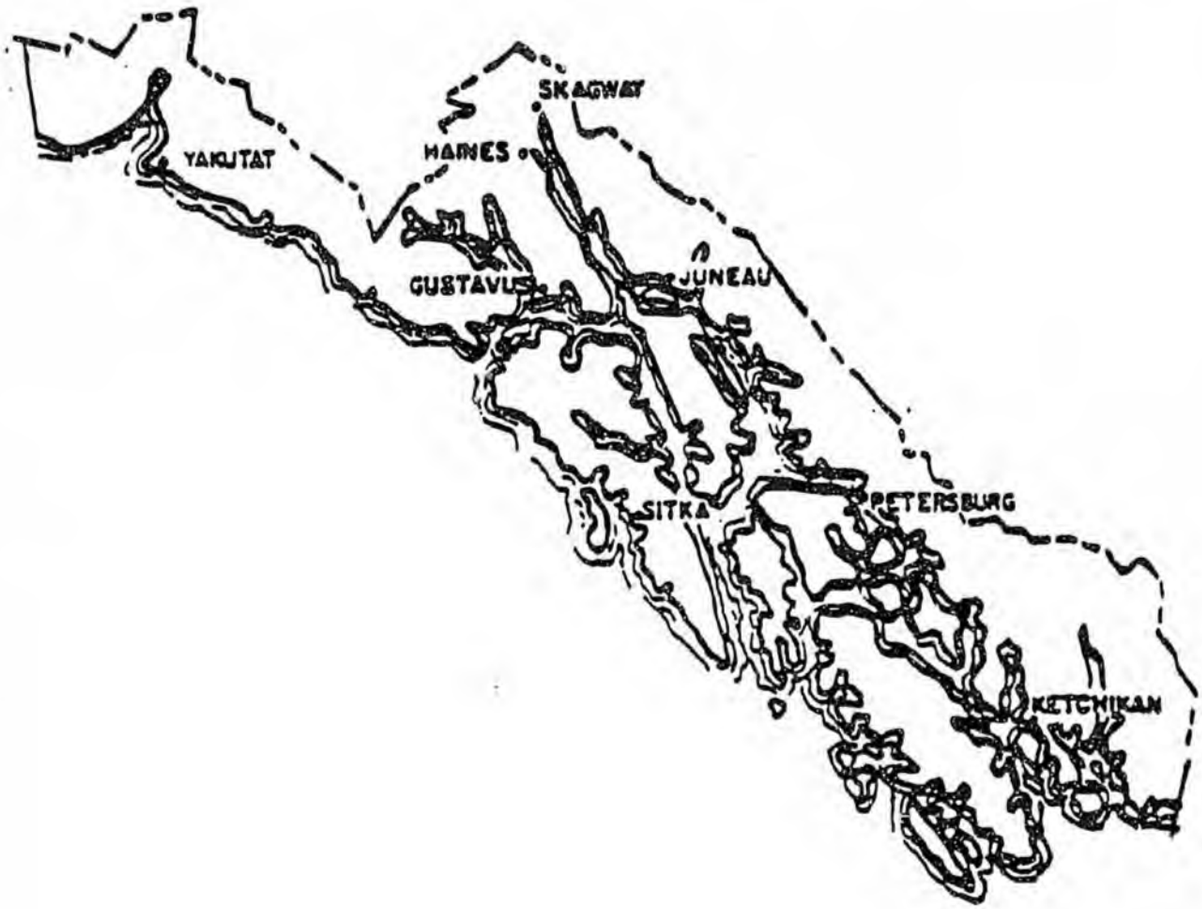



Rick Thompson, Regional Manager
Division of Land
Southcentral Regional Office
P.O. Box 107005
Anchorage, Alaska 99510-7005

Please direct questions to: (907) 762-2251

# SOUTHEAST REGIONAL OFFICE

The Southeast Regional Office manages twelve million acres of tide and submerged lands. The state lands surrounded for the most part by the Tongass National Forest. While these acres may not be numerous, they have high public and private value due to their location, their general proximity to communities, their resource values, and the development taking place on adjacent lands. A very high proportion of the state-owned uplands in southeast are Mental Health Lands. The programs emphasized in the Southeast Regional Office include National Forest community grant selections, tidelands leases and preference rights, accretion actions, and coastal management.




Andy Pekovich, Regional Manager
Division of Land
Southeast Regional Office
400 Willoughby Ave., 4th Floor
Juneau, Alaska 99801

Please direct questions to: (907) 465-3400

THE FOLLOWING DOCUMENT
HAS NOT BEEN FILMED
BUT IS AVAILABLE IN THE
ORIGINAL FILE

# ALASKA WATER RIGHTS ADJUDICATION PROCESS

**Application reviewed for completeness.**
Time/Date Stamped.
11 AAC 93.040

**Complete Applications**
Initiated by computer entry.
Assign LAS Number.
Plot point of take from maps.
Enter Water Rights & Well log info.
Request plat add function.
Confirmation letter sent to applicant.

**Incomplete Applications**
Returned to applicant for proper documentation.
File not initiated.
11 AAC 93.050.

**Determine if project is within Coastal Zone boundaries.**

**oastal Zone.**
010-190

**Not within Coastal Zone.**

**Review Project** for compliance with water management statutes and regulations 11 AAC 93.040.
Verify possessory interest/ or management responsibility.
Evaluate quantities requested.
Evaluate legal description for pt. of take and use.
Check LAS and/ or Recorders Office for prior water rights on property.
Check well logs and enter on LAS

**OCESS**

Questionare
an one agency
Agency Review.

Single Agency Review

APP

Obj
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**Objection not valid.**
Detemined project will not adversely affect prior appropriator(s) of the public interest. AS 46.15.080

**Written Determination sent** certified mail to objector(s) and applicant.

Objector(s)/Applicant ap

Director's Decision/ Hea

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**Application reviewed for completeness.**
Time/Date Stamped.
11 AAC 93.040

**Complete Applications**
Initiated by computer entry.
Assign LAS Number.
Plot point of take from maps.
Enter Water Rights & Well log info.
Request plat add function.
Confirmation letter sent to applicant.

**Incomplete Applications**
Returned to applicant for proper documentation.
File not initiated.
11 AAC 93.050.

**Determine if project is within Coastal Zone boundaries.**

**Within Coastal Zone.**
6 AAC 50.010-190

## CZM PROCESS

**Review Coastal Zone Questionare**
to determine if more than one agency permit required Multi-Agency Review.

**Multi-Agency Review**
Send application to OMB/DGC for consistency determination.
(15, 30, or 50 day review.)
Include DNR comment/concerns.

**Found inconsistent.**
Written notification sent to applicant and distribution list (if requested).

**Single Agency Review**
Make project packets.
Mail to all State and Federal Agencies, Boroughs, Native Corps, Private Land Owners, and Coastal Resource Districts.
Coordinate agency requests for additional info.
Conduct 15, 30, or 50 day review.
Make consistency determination.

**Not within Coastal Zone.**

**Review Project** for compliance with water management statutes and regulations 11 AAC 93.040.
Verify possessory interest/ or management responsibility.
Evaluate quantities requested.
Evaluate legal description for pt. of take and use.
Check LAS and/ or Recorders Office for prior water rights on property.
Check well logs and enter on LAS.
Check for required Rights of Way/ Easements.
Check for jurisdictional dams (11 AAC 93.151).

**Public & Agency Notice**
AS 46.15.133
11 AAC 93.080

If water use is for more than 5,000 gpd then...

If water use is for less than 5,000 gpd then public notice is

## APPEAL PROCESS
AS 46.15.133 (e)

**Objection evaluated for validity.**
May require additional info or study by hydrologist.

**Objection not valid.**
Detemined project will not adversely affect prior appropriator(s) of the public interest. AS 46.15.080

**Written Determination sent** certified mail to objector(s) and applicant.

**Objection determined valid.**

**Notice sent of intent to close;** with option to appeal.

**No response.**
Case closed.
LAS update.

**Project revised by applicant to mitigate objections.**
All parties concur.

**Objector(s)/Applicant appeals.**

**Director's Decision/ Hearing.**

**Permit/Cert. issued.**
*(See Permit/Cert. issued box).*

**Permit/Cert. denied.**

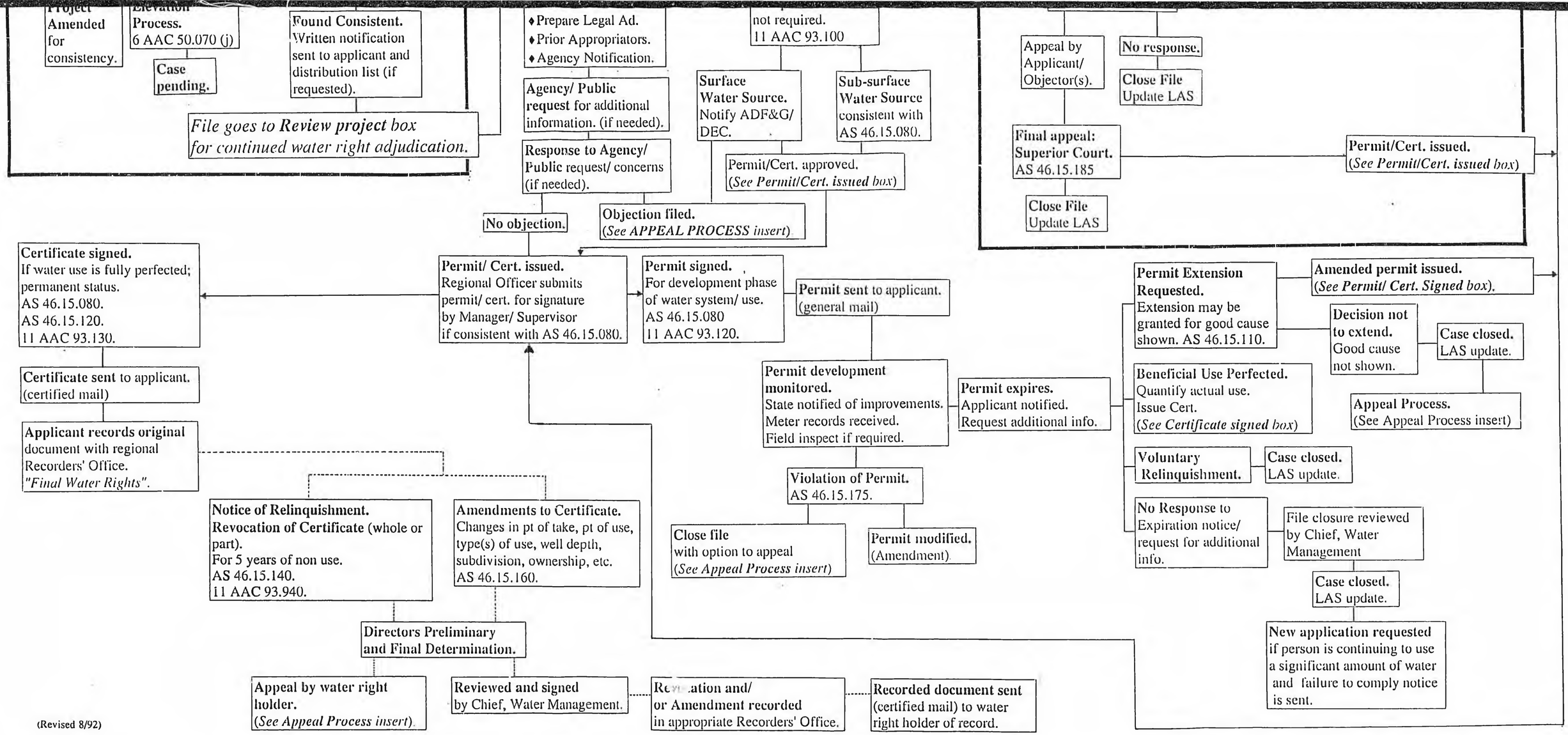
Appeal by Applicant/ Objector(s).

**No response.**
Close File
Update LAS

**Commissioner's Hearing.**

**Permit/Cert. issued.**
*(See Permit/Cert. issued box).*

**Permit/Cert. denied.**


Project Amended for consistency.
Elevation Process. 6 AAC 50.070 (j)
Case pending.
Found Consistent. Written notification sent to applicant and distribution list (if requested).
File goes to Review project box for continued water right adjudication.
♦Prepare Legal Ad.
♦Prior Appropriators.
♦Agency Notification.
Agency/ Public request for additional information. (if needed).
Response to Agency/ Public request/ concerns (if needed).
No objection.
Objection filed. (See APPEAL PROCESS insert)
not required. 11 AAC 93.100
Surface Water Source. Notify ADF&G/ DEC.
Sub-surface Water Source consistent with AS 46.15.080.
Permit/Cert. approved. (See Permit/Cert. issued box)
Appeal by Applicant/ Objector(s).
No response.
Close File Update LAS
Final appeal: Superior Court. AS 46.15.185
Close File Update LAS
Permit/Cert. issued. (See Permit/Cert. issued box)
Certificate signed. If water use is fully perfected; permanent status. AS 46.15.080. AS 46.15.120. 11 AAC 93.130.
Certificate sent to applicant. (certified mail)
Applicant records original document with regional Recorders' Office. "Final Water Rights".
Permit/ Cert. issued. Regional Officer submits permit/ cert. for signature by Manager/ Supervisor if consistent with AS 46.15.080.
Permit signed. For development phase of water system/ use. AS 46.15.080 11 AAC 93.120.
Permit sent to applicant. (general mail)
Permit development monitored. State notified of improvements. Meter records received. Field inspect if required.
Permit expires. Applicant notified. Request additional info.
Violation of Permit. AS 46.15.175.
Close file with option to appeal (See Appeal Process insert)
Permit modified. (Amendment)
Permit Extension Requested. Extension may be granted for good cause shown. AS 46.15.110.
Amended permit issued. (See Permit/ Cert. Signed box).
Decision not to extend. Good cause not shown.
Case closed. LAS update.
Appeal Process. (See Appeal Process insert)
Beneficial Use Perfected. Quantify actual use. Issue Cert. (See Certificate signed box)
Voluntary Relinquishment.
Case closed. LAS update.
No Response to Expiration notice/ request for additional info.
File closure reviewed by Chief, Water Management
Case closed. LAS update.
New application requested if person is continuing to use a significant amount of water and failure to comply notice is sent.
Notice of Relinquishment. Revocation of Certificate (whole or part). For 5 years of non use. AS 46.15.140. 11 AAC 93.940.
Amendments to Certificate. Changes in pt of take, pt of use, type(s) of use, well depth, subdivision, ownership, etc. AS 46.15.160.
Directors Preliminary and Final Determination.
Appeal by water right holder. (See Appeal Process insert).
Reviewed and signed by Chief, Water Management.
Revocation and/ or Amendment recorded in appropriate Recorders' Office.
Recorded document sent (certified mail) to water right holder of record.

(Revised 8/92)

# ARTICLE VIII

# NATURAL RESOURCES

SECTION 1. It is the policy of the State to encourage the settlement of its land and the development of its resources by making them available for maximum use consistent with the public interest.

SECTION 2. The legislature shall provide for the utilization, development, and conservation of all natural resources belonging to the State, including land and waters, for the maximum benefit of its people.

SECTION 3. Wherever occurring in their natural state, fish, wildlife, and waters are reserved to the people for common use.

SECTION 4. Fish, forests, wildlife, grasslands, and all other replenishable resources belonging to the State shall be utilized, developed, and maintained on the sustained yield principle, subject to preferences among beneficial uses.

SECTION 5. The legislature may provide for facilities, improvements, and services to assure greater utilization, development, reclamation, and settlement of lands, and to assure fuller utilization and development of the fisheries, wildlife, and waters.

SECTION 6. Lands and interests therein, including submerged and tidal lands, possessed or acquired by the State, and not used or intended exclusively for governmental purposes, constitute the state public domain. The legislature shall provide for the selection of lands granted to the State by the United States, and for the administration of the state public domain.

SECTION 7. The legislature may provide for the acquisition of sites, objects, and areas of natural beauty or of historic, cultural, recreational, or scientific value. It may reserve them from the public domain and provide for their administration and preservation for the use, enjoyment, and welfare of the people.

SECTION 8. The legislature may provide for the leasing of, and the issuance of permits for exploration of, any part of the public domain or interest therein, subject to reasonable concurrent uses. Leases and permits shall provide, among other conditions, for payment by the party at fault for damage or injury arising from noncompliance with terms governing concurrent use, and for forfeiture in the event of breach of conditions.

SECTION 9. Subject to the provisions of this section, the legislature may provide for the sale or grant of state lands, or interests therein, and establish sales procedures. All sales or grants shall contain such reservations to the State of all resources as may be required by Congress or the State and shall provide for access to these resources. Reservation of access shall not unnecessarily impair the owners' use, prevent the control of trespass, or preclude compensation for damages.

SECTION 10. No disposals or leases of state lands, or interests therein, shall be made without prior public notice and other safeguards of the public interest as may be prescribed by law.

SECTION 11. Discovery and appropriation shall be the basis for establishing a right in those minerals reserved to the State which, upon the date of ratification of this constitution by the people of Alaska, were subject to location under the federal mining laws. Prior discovery, location, and filing, as prescribed by law, shall establish a prior right to these minerals and also a prior right to permits, leases, and transferable licenses for their extraction. Continuation of these rights shall depend upon the performance of annual labor, or the payment of fees, rents, or royalties, or upon other requirements as may be prescribed by law. Surface uses of land by a mineral claimant shall be limited to those necessary for the extraction or basic processing of the mineral deposits, or for both. Discovery and appropriation shall initiate a right, subject to further requirements of law, to patent of mineral lands if authorized by the State and not prohibited by Congress. The provisions of this section shall apply to all other minerals reserved to the State which by law are declared subject to appropriation.

SECTION 12. The legislature shall provide for the issuance, types and terms of leases for coal, oil, gas, oil shale, sodium, phosphate, potash, sulfur, pumice, and other minerals as may be prescribed by law. Leases and permits giving the exclusive right of exploration for these minerals for specific periods and areas, subject to reasonable concurrent exploration as to different classes of minerals, may be authorized by law. Like leases and permits giving the exclusive right of prospecting by geophysical, geochemical, and similar methods for all minerals may also be authorized by law.

SECTION 13. All surface and subsurface waters reserved to the people for common use, except mineral and medicinal waters, are subject to appropriation. Priority of appropriation shall give prior right. Except for public water supply, an appropriation of water shall be limited to stated purposes and subject to preferences among beneficial uses, concurrent or otherwise, as prescribed by law, and to the general reservation of fish and wildlife.

SECTION 14. Free access to the navigable or public waters of the State, as defined by the legislature, shall not be denied any citizen of the United States or resident of the State, except that the legislature may by general law regulate and limit such access for other beneficial uses or public purposes.

SECTION 15. No exclusive right or special privilege of fishery shall be created or authorized in the natural waters of the State. State. This section does not restrict the power of the State to limit entry into any fishery for purposes of resource conservation, to prevent economic distress among fishermen and those dependent upon them for a livelihood and to promote the efficient development of aquaculture in the State.

SECTION 16. No person shall be involuntarily divested of his right to the use of waters, his interests in lands, or improvements affecting either, except for a superior beneficial use or public purpose and then only with just compensation and by operation of law.

SECTION 17. Laws and regulations governing the use or disposal of natural resources shall apply equally to all persons similarly situated with reference to the subject matter and purpose to be served by the law or regulation.

SECTION 18. Proceedings in eminent domain may be undertaken for private ways of necessity to permit essential access for extraction or utilization of resources. Just compensation shall be made for property taken or for resultant damages to other property rights.

## Title 38

#3 (enacted 1957)

Article 1, 2, 3...
Organization, Definition, General

Article 4...
Land Sale

Article 5...
Lease

Article 6...
Timber & Materials

Article 7...
Residual Rights

Article 8...
Mineral Leasing

Article 9...
Oil & gas

Article 10...
Mining Rights

Article 11...
Multiple Use

Article 12...
Land Selection

Article 13...
Parks & Recreation

Article 14...

# In Brief:

## Return of Municipal Entitlement Land to the Mental Health Trust

Alaska Department of NATURAL RESOURCES

Division of Land • October, 1991

Background: The Alaska Legislature has enacted a proposed settlement to the Mental Health Trust Land litigation under SB 65; Ch. 66, SLA, 1991. This law will not become effective until it is approved by the Alaska Superior Court. Under the proposed settlement, original Mental Health Trust Land that has been conveyed or approved for conveyance to municipalities/boroughs may remain with the municipality/borough and need not be returned to the trust.

Part of the settlement is to reconstitute as much of the original one million acres of Mental Health Trust Land as possible. Some municipalities/boroughs have expressed an interest in returning some of the original Mental Health Land they have received. The following information is provided for guidance in returning these lands to the State of Alaska, Department of Natural Resources (DNR).

**In what situations should a municipality/borough return original Mental Health Trust Land to DNR?**

A municipality/borough must first determine if there is sufficient available State land (as defined in AS 29.65.130) within the boundary of the municipality/borough to compensate for the acreage entitlement if it returns original Mental Health Trust Land to DNR. In that determination it must be remembered original Mental Health Trust Land selected by, but not approved for conveyance to a municipality/borough will be returned to the Trust without any action by the municipality/borough.

**What other criteria must be met to return original Mental Health Trust Land to DNR?**

- The municipality/borough has not created any third-party rights which would result in a fee title interest on the parcel to be returned. If these rights have been created, the third-party parcels must be excluded by survey before the Mental Health parcel is returned to DNR and the acreage of these third-party rights will remain charged against the municipality's/ borough's entitlement.

- If the municipality/borough has created leases on parcels to be returned, report these leased parcels to DNR and DNR will contact the plaintiffs or the Alaska Mental Health Trust Authority (AMHTA) to determine if they want the land subject to the lease.

- If the municipality/borough has created rights of way or easements through the action of the platting authority on parcels proposed to be returned, these parcels will be subject to negotiation with the AMHTA or the plaintiffs prior to DNR acceptance.

- Parcels that have been *approved for conveyance* by DNR, and not yet patented, must be returned to DNR by Quitclaim Deed (QCD). The QCD must use a surveyed legal description or a metes and bounds legal description approved by DNR, Division of Land. If the final decision approving land for conveyance has been recorded, a citation of the recording office, book and page numbers and recording date must be included in the QCD. If the final decision has not been recorded, the municipality/borough must record the decision first and use the citations described above in the QCD to DNR.

- The municipality/borough will convey a *patented parcel* to the DNR by a QCD using a surveyed description or a metes and bounds description approved by the DNR, Division of Land. The QCD must cite the recording office, book and page numbers and recording date of the patent.

- In lieu of title insurance, which is costly, DNR will accept a Certificate of Title stating the municipality/borough has created no third-party right not identified in the conveyance document. The Certificate of Title will be signed by an authorized officer of the municipality/borough. If the municipality/borough prefers to purchase title insurance, DNR will consider this an adequate alternative.

- Each QCD must be accompanied by a copy of a resolution of the municipal/borough assembly agreeing to the conveyance of the original Mental Health Trust Land.

**How will the municipality/borough receive credit for the conveyed land?**
Upon acceptance of the conveyance document by DNR, the appropriate Regional Office will notify the municipality/borough that under the application (ADL file) originally filed for the parcel conveyed, the municipality/borough now has a credit of x acres on the acreage entitlement. Or the original application (ADL file) has been reopened and the municipality/borough now has a credit of x acres on the acreage entitlement.

**What will happen to the original Mental Health Trust Land conveyed to DNR?**
When the QCD is accepted by DNR the land will be considered as unencumbered Mental Health Trust Land and will be reconstituted to the Trust.

**What is the timeframe to convey original Mental Health Trust Land back to DNR?**
DNR would like to know which lands the municipalities/boroughs are interested in conveying as soon as possible. No QCD will be accepted until after the Alaska Superior Court has ruled on the acceptance of Ch. 66, SLA 1991 as the settlement of *Weiss v. State of Alaska*.

If you need further information, please contact Bruce Phelps, Mental Health Trust Land Project Manager at 762-2316, or Dennis Daigger, Municipal Entitlement Project Manager at 762-2660.

# In Brief:

# MENTAL HEALTH LAND

Alaska Department of NATURAL RESOURCES

Division of Land and Water • January, 1991

*The Mental Health Enabling Act*

In 1956, the U.S. Congress granted the Territory of Alaska one million acres of land to be used first to fund mental health programs. Any funds left over could be used for other public purposes at the discretion of the legislature.

Land was selected under the Mental Health Enabling Act between 1956 and 1966[1], and included areas along transportation routes and near the state's population centers. Mental health lands were managed by the state as trust land, and, in 1976, the Mental Health Trust Board was established to provide oversight.

Under the enabling act, mental health land could be sold. By 1978, 19,800 acres had been sold to individuals. Income received from mental health land and resources was placed in a separate account within the general fund. As the state's population grew, so did pressure to use these lands for purposes that might produce little or no revenue. Among those uses were municipal expansion, public facilities, utilities, recreation and charitable activities.

*Redesignation and Litigation*

In 1978, the legislature redesignated the mental health land as general statehood grant land to be managed similar to other state land. In return, the legislature was to annually appropriate 1.5 percent of the state's annual income from land and resources to the mental health trust. However, the legislature did not appropriate the money,[2] and on November 26, 1982, a class action law suit was filed in Superior Court on behalf of several mental health beneficiaries (Weiss v. State of Alaska).

In 1984, the Superior Court directed the state to pay the trust for the mental health land redesignated as general statehood grant land in 1978. In order to value that land, the state produced an accounting of mental health land and assembled a panel of three appraisers to assign a 1978 value to the redesignated lands.[3]

The Superior Court decision was appealed to the Alaska Supreme Court and, on October 4, 1985 that court invalidated the 1978 redesignation. The court required the state to restore the mental health land holdings as much as possible to their pre-1978 status and to compensate the trust for the value of the land already conveyed, minus prior state expenditures made for mental health programs[4]. The Supreme Court decision also returned the case to the Superior Court so that the remaining issues could be decided. As a result, income from mental health land transactions again began to flow into a specially designated mental health trust account within the state's general fund. In addition, the Department of Natural Resources adopted safeguards to prevent further diminution of the trust (Department Order 121); appointed an Interim Mental Health Trust Officer; and audited mental health land status as of the 1985 court decision.[5]

*Legislative Action*

In 1986, the legislature passed two bills affecting mental health land. The bills established two bodies: a five-member Interim Mental Health Trust Commission to oversee management of mental health trust land and to develop recommendations for legislation relating to those lands and mental health programs of the state; and a Joint Special Committee on Mental Health Trust Land to hold public hearings and develop a proposal to resolve the mental health trust litigation, particularly from the aspect of annual funding levels for mental health programs.

Based upon the recommendations of the Commission and the Committee, the 1987 legislature passed a bill initiating a mechanism for settlement. A three-member Interim Mental Health Trust Commission was established and charged with approving procedures for the Department of Natural Resources' commissioner to use to determine the fair-market-value of mental health land as of September 7, 1987 (the effective date of the bill); selecting land within legislative designations to equal the value of the original mental health land granted to the state; and continuing oversight of mental health land management. The framers of the bill envisioned a designation "switch," that would release existing mental land from trust status, and replace it with land within legislative designations, such as parks and refuges. The designated land would then be

The proposal would secure the trust with land already removed from the Public Domain, and provide income to the trust through rental of the land. The 1987 bill also established a separate board to consider state mental health needs and funding levels.

*Valuation*

In 1988, the commission contracted with nine independent fee appraisers to determine the fair-market-value of the surface estate of mental health land. The appraisers set that value at $511.9 million. However, attorneys for the plaintiffs and intervenors disagreed and hired their own review appraisers. These review appraisers, operating under the direction to determine "the highest value supported by market data" concluded that the surface estate was worth $833.3 million.

The commission initially decided that there were insufficient data to establish a sub-surface value. Instead, lands with mineral potential were to be replaced with land of similar potential. However, the attorneys for the plaintiffs and intervenors hired a consultant who established a sub-surface value of $1.5 billion. This value was challenged by several independent experts who concluded that it was not fair-market-value and could not be supported.

In December, 1989, the commission adopted a value of $2.23 billion for all mental health land. A minority report was prepared by the department establishing the fair-market-value of mental health land at $564 million. The Commissioner of Natural Resources disagreed with both values, stating that they did not reflect the fair-market-value required by the legislation, and declared an impasse.

*1990 Actions*

In the 1990 legislative session, several alternatives were proposed to resolve this issue. A bill was introduced removing the fair-market-value requirement from the 1987 legislation, adopting the commission's $2.23 billion figure and providing for a periodic land revaluation index would then be the basis for future mental health program expenditures. However, many legislators opposed this approach because it would cause the mental health revenue account to exceed the entire state general fund within a relatively short time-frame.

The 1990 legislature eventually passed SB 493 allocating up to six percent of the state's annual unrestricted general fund revenue to the mental health income account, and redesignating over nine million acres of legislatively designated land as mental health land to secure the trust. In return, the original mental health trust land was redesignated to general state land status. The legislature remains responsible for determining mental health program expenditure levels. However, mental health advocates did not support the bill.

On July 9, 1990, the Superior Court granted a temporary injunction preventing the state from taking any further action on mental health land. On September 7, 10, and 11, attorneys for the mental health litigants filed a Notice of Lis Pendens on the million acres of mental health land. The notice warns people that the title to the property is in litigation, and that they are in danger of being affected by an adverse judgement. This notice is affecting many private transactions as Alaskans attempt to sell their properties, or use them as collateral.

The state petitioned the court to mitigate the effects on third party owners of mental health land and allow the state to issue patent for land that has been paid for. The court refused, however, stating that the plaintiffs "would be within their rights to litigate the issue of third-party rights." Still pending is a motion by the state for declaratory judgement to determine whether the plaintiffs are entitled only to monetary compensation for the prior transfer of mental health land to third parties.

Another outstanding issue yet to be addressed by the court is whether the 1990 legislation complies with the 1985 Supreme Court Weiss decision.

# *Endnotes*

1. State records show that 1,005,843.38 acres of mental health land have been received by the state under the mental health grant. The state is involved in a survey recalculation project to rectify this apparent over-conveyance.

2. The 1.5% appropriation would have amounted to approximately $71 million by the end of FY 82; it would have grown to $147 million by the 1985 Supreme Court decision.

3. The 1978 value of mental health land in state ownership as of the redesignation in 1978 was established under this process as $281,997,805. Brought forward to July, 1985 at 10.5% settlement interest, the total was estimated at $567,259,354.

4. Total income for mental health land from 1959-1977 was $25,110,430. State mental health expenditures during this same period were $115,364,054 with an additional $16,430,771 being spent on alcohol and drug abuse programs.

5. 1985 mental health land status:

   Mental Health Land no longer in state ownership

   The following conveyances were not disputed by mental health plaintiffs in 1985:
   46,000 acres were sold to individuals
   5,000 acres were condemned for the Chena River Lakes flood control project.
   (Total remaining mental health land: 949,000 acres)

   The following conveyances were disputed by the mental health plaintiffs:
   43,000 acres conveyed to municipalities
   *36,000 acres were conveyed to Native corporations
   *3,000 acres were conveyed to the University of Alaska
   (Total remaining mental health land: 867,000 acres)
   *These conveyances were made under litigation settlement agreements and land exchanges.

   Encumbrances

   368,000 acres were legislatively designated for parks, etc.
   6,685 acres were under land lease
   54,600 acres were under coal lease
   131,900 were under oil & gas lease
   4,500 acres were covered by inter-agency land management assignments or transfers (e.g. for state facilities)
   1,900 acres were covered by material sales
   28,000 acres supported timber sales
   62,000 acres were covered by state mining claims

# Fact sheet:

# MENTAL HEALTH LAND SETTLEMENT

Alaska Department of NATURAL RESOURCES

Division of Land • August, 1991

On June 19, 1991, Governor Hickel signed Senate Bill 65 into law. This law, known as the Alaska Mental Health Trust Settlement Act, proposes a settlement of Weiss v. State of Alaska for the plaintiffs and court to accept. The settlement would reconstitute the mental health land trust created by the Alaska Mental Health Enabling Act of 1956.

*Background:* Prior to statehood, Alaska was granted title to one million acres of federal land to generate revenue to support Alaska's mental health programs. Over the next ten years, land with high income-producing potential was selected to fulfill this trust entitlement. The original trust lands included coal and mineral deposits, commercial forests and agricultural areas. Additional land was selected in and around existing communities to allow growth and to return income to the trust.

As Alaska's population increased, some Alaskans wanted certain of these lands for non-income-producing activities such as parks, municipal expansion and public facilities. In 1978, the legislature waived the trust status of mental health trust land, and redesignated it as general statehood grant land. In return, the legislature was to appropriate 1.5 percent of all income from state lands to the Mental Health Trust Fund.

No appropriation was made, and in 1982, mental health advocates sued the state (Weiss v. State of Alaska, 4FA-82-2208 Civ.). The suit went to the Alaska Superior and Supreme Courts over the next few years. The Supreme Court ruled in favor of the plaintiffs and ordered the state to "reconstitute, as nearly as possible the holdings which comprised the trust when the 1978 law became effective." The 1990 legislature passed a bill providing a revenue stream to the trust. The plaintiffs considered this only a partial solution and, at their request, in July 1990, the court placed an injunction on all activities and conveyances of title to the original mental health trust land.

It was against this background that SB 65 was crafted by the Hickel administration, the plaintiffs' attorneys, and the 1991 legislature.

The Mental Health Trust Lands Settlement Act establishes an independent Mental Health Trust Authority made up of financial managers appointed by the Governor (after considering nominations by groups representing beneficiaries of the trust) to manage the assets of the trust. It reconstitutes the land trust with all unencumbered land from the original mental health trust and provides replacement land through an exchange process for land conveyed out of the trust. While the Mental Health Trust Lands Settlement Act has become law (Ch. 66, SLA 1991), it is not yet in effect. It will only become effective upon dismissal of Weiss v. State by the Superior Court and the expiration of the time for appeal. Although many questions remain about how the Act will be implemented, this fact sheet gives a general description of how the state will fulfill its obligation to reconstitute the mental health trust.

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***What lands are available for transfer to the trust?***

The Act establishes three categories of lands that can be returned to the trust: (1) certain **original mental health lands**; (2) other state lands to be conveyed to the trust in **exchange** for original mental health lands not returned to the trust; and (3) "**hypothecated lands**"--lands held as security--that can be transferred to the trust if the state does not make the trust whole within the time specified under the Act.

***How much of the original mental health land is available to return to the trust?***

More than half of the original one-million acres is available for return to the trust. Land without permits or leases, land leased for oil and gas or coal development, land with current timber contracts, rights-of-way, and

land with other encumbrances acceptable to the plaintiffs will be returned to the trust. Land selected under the Municipal Entitlement Act but not yet conveyed will or formally approved for conveyance also return to the trust.

***What original mental health land will not be returned to the trust?***
Under the Act, land sold to individuals, transferred to a municipality under the Municipal Entitlement Act, and land within legislative designations such as parks and refuges will not be returned to the trust. However, the legislation requires that the original mental health land now within the Haines and Tanana State Forests be returned to the trust. In addition, some lands with long-term use authorizations not specifically listed in the bill are being reviewed by the plaintiffs to see if they are acceptable to be returned to the trust.

***What state land is being considered for exchange?***
The potential exchange land parcels will be chosen on the basis of similarity to the original trust lands. These parcels should be as similar as possible in character (including terrain, use, location, income and development potential, and accessibility) to the land not being returned to the trust. The land will be exchanged on an equal value basis. The exchanges will be negotiated solely between the commissioner and the plaintiffs in the lawsuit. State tide and submerged land, land within legislative designations and School Trust Lands are not available for exchange.

***When will the trust be reconstituted?***
The Act specifies that the reconstitution process be completed by December 1, 1994.

***What is the Hypothecated Lands List and what is its purpose?***
"Lands Hypothecated to the Mental Health Trust, May 1991" in the Act, is a pool of land pledged to the trust without transferring possession or title, and works as security for the land compensation to the trust. If the state does not complete the exchange process by the time specified in the Act, the plaintiffs can have the court "foreclose" appropriate land from the hypothecated lands list and transfer it to the trust.

Department of Natural Resources staff worked with the plaintiffs in the Mental Health Land Trust litigation to assemble this land pool. The land on the hypothecated list will either be used as replacement or exchange lands, or released from the list as exchanges are accomplished.

***What lands are on the Hypothecated Lands List?***
As with the exchange lands, the hypothecated land pool is primarily made up of land similar to the original trust land. It includes subdivision lots; large tracts of land such as the Willow Capitol site; land with timber or mineral resources; land designated for settlement in area plans; land with existing commercial leases; and land with mental health facilities such as the Alaska Psychiatric Institute in Anchorage and the Fahrenkamp Center in Fairbanks. The complete Hypothecated Lands List is available for inspection at the Department of Natural Resources offices noted below.

***If a property is on the hypothecated list, what impact will that have on Department of Natural Resources management decisions?***
Although inclusion in the hypothecated list precludes the sale of the parcels, it does not place an injunction on these lands. The department must manage these lands so that their value is not diminished, but this does not preclude development. The department will continue to manage all land in the pool under these guidelines until specific parcels are either conveyed to the trust or released from the list.

***Will unsold lots, access lands and/or public or common lands in state subdivision disposals be put in the pool as exchange lands?***
Unsold subdivision lots which would otherwise be available for sale "over-the-counter" will be available as exchange land. Not available will be rights-of-way and public or common land which are considered part of the subdivision.

*Does the state have sufficient land to reconstitute the trust on a comparable character and equal-value basis, and still meet the other land needs of the state?*
Yes. The state's vast holdings (85 million acres not including tide and submerged land), which will soon be augmented by the state's final statehood land selections (an additional 20 million acres), should be sufficient to answer all of the state's needs. The state has more than 76 million acres of land currently available for exchange.

*What public notice requirements apply to the transfer of lands into the trust?*
The Commissioner of the Department of Natural Resources must give 30 days public notice in local and statewide newspapers and other methods specified by law. These additional requirements can be found in Alaska Statute 38.05.945 (b) and (c). The purpose of the notice is to announce the pending transfers of original mental health land or to announce the decision of the commissioner and the plaintiffs with respect to exchange land. Public hearings are not contemplated in the Act.

*What factors will be considered in selecting land for exchange?*
The Act specifies that the lands to be exchanged must be of comparable character and equal value. Additional factors to be considered in selecting land for exchange are the resulting diversity of both the trust and state land portfolios, revenue generating potential for the trust, public benefits to both the trust and to the state, and resulting efficiencies of land management. The actual process for these considerations has not yet been determined, but there will be a reviewable administrative record.

*Does the commissioner have to reclassify lands or amend land-use plans in order to convey land to the trust?*
No. Land-use plans will eventually be amended to reflect the change in land status. When lands currently covered by land-use plans are conveyed to the trust, the lands are exempt from the area plan provisions.

*After land is transferred to the Trust, what public notice requirements will apply to decisions made by the Alaska Mental Health Trust Authority?*
The Trust Authority must give 30 days notice in statewide and local newspapers and by other methods specified in the law before taking an action. These additional requirements can be found in Alaska Statute 38.05.945 (b) and (c).

*Do multiple use requirements on state lands apply to management of the trust?*
No. The purpose of the trust is to generate revenue to meet the expenses of its beneficiaries.

*For more information, or to review the complete Hypothecated Lands List, contact one of the DNR offices listed below:*

Department of Natural Resources
Division of Land

Southcentral Regional Office
3601 C Street, Suite 1080
P.O. Box 107005
Anchorage, AK 99510-7005
(907) 762-2492

Southeast Regional Office
400 Willoughby Avenue, 4th Floor
Juneau, AK 99801
(907) 465-3400

Northern Regional Office
3700 Airport Way
Fairbanks, AK 99709
(907) 451-2700

# MENTAL HEALTH LANDS TRUST RECONSTITUTION
# PROJECT OVERVIEW

This briefing paper summarizes the central aspects of the Mental Health Trust Project. It also includes a discussion of the 1991 enacting legislation, a summary of the Settlement Agreement, the status of associated legal efforts, and a short description of the Department Order. A project management timeline is also included.

1. Chapter 66, SLA 1991

This legislation provides the conceptual basis for the settlement of the mental health trust litigation through reconstitution of the Mental Health Trust. Although passed by the 1991 Legislature, Chapter 66 must be approved by the courts before it becomes effective. At its heart, Chapter 66 provides for the following:

a. The establishment of a Mental Health Trust Authority (Trust Authority) to oversee the state's mental health programs and to manage the reconstituted land trust.

b. The reconveyance to the Trust Authority of as much Original Trust land as possible, including approximately 35,000 acres of unencumbered Original Trust Land and approximately 300,00 acres of conveyable, encumbered Original Trust Land. The conveyable encumbered Original Trust Land remains subject to the encumbrance (e.g. rights-of-way, leases) and the state compensates the Trust with additional land equal in value to the value of the "interest in the land" not returned to the Trust because of the encumbrance.

c. The conveyance of other state land to the Trust Authority, to compensate for the inability of the State to reconvey encumbered Original Trust land or interests therein. There is about 665,000 acres of non-conveyable encumbered Original Trust Land which will not be conveyed to the Trust Authority.

d. The conveyance is, however, subject to certain restrictions; that is, to the extent practicable, the other state land should be comparable in characteristics to the encumbered Original Trust land, equal in fair market value, and generally be in the public interest for conveyance to the Trust Authority.

e. The hypothecation of land as security to the Trust for successful reconstitution of the Trust under Chapter 66. If the reconstitution is otherwise unsuccessful, an appropriate amount of Hypothecated Land may be foreclosed under the direction of the Alaska Supreme Court or special master to complete the reconstitution.

2. Settlement Agreement

Chapter 66 becomes effective once the mental health lands trust litigation is dismissed by the courts and the time for appeal has run. Because the litigation is a class action and because Chapter 66 contains only the framework of the reconstitution process, the state and three of the four mental health plaintiff groups negotiated and drafted a Settlement Agreement. (The remaining plaintiff group opposes the settlement in large part because they believe it provides too much land and not enough money to the reconstituted trust). The Settlement Agreement is before the Superior Court for review and approval.

The Settlement Agreement is built around the structure of Chapter 66 and provides for specific procedures and requirements in the Trust reconstitution process to be met by the State and Plaintiffs. It also establishes processes for the interim management of state land affected by the settlement, provides for the funding of the Plaintiffs efforts, establishes remedies in the event of failure of the Trust reconstitution process under Chapter 66, and establishes principles governing long term state/trust relations. A selection of its more important aspects as it relates to this Project includes the following:

a. The parties will work together to develop exchanges and will jointly share information.

b. A process similar to the "smallest practicable tract" determinations under the Alaska Native Claims Settlement Act will be followed for Original Trust lands, the intent being to convey as much of these Original Trust lands as possible.

c. Procedures are laid out for the valuation of lands, and a specific process is described for the exchange of properties involving the mineral estate.

d. Hazardous materials are covered, with specific procedures to be followed in the event such materials are found on properties to be conveyed to the Trust Authority.

e. The State will survey the lands to be conveyed to the Trust Authority within a time-frame determined by available funding.

f. The State will convey state land by patent after survey is completed and through interim conveyance documents prior to survey and platting.

A more complete listing of the highlights of the Settlement Agreement is attached as is a copy of the Settlement Agreement.

3. Mental Health Project

The Mental Health Project (Project) is that process of technical, legal, and administrative work conducted by ADNR and the Plaintiffs that will successfully implement the Settlement Agreement and Chapter 66 (the Legislation) by the legislatively imposed deadline of December, 1994. It is important to recognize that this is a joint, interactive project involving the Department and the Plaintiffs. The Project began in earnest in October, 1991. Substantial work has already been accomplished, and large amounts of work are now underway.

The Project is structured around the requirements of the Legislation, the Settlement Agreement, the needs of the upcoming 1993 legislative session, and the legislative deadline of December, 1994.

For reasons of understanding, the Project can be broken into separate work components. Although these components are described separately, they are functionally interrelated.

a. Title Research

The Title Research process identifies all Original Trust land, categorizes this land into the types established in the Settlement Agreement, identifies title encumbrances related to the establishment of value, performs title analyses of replacement land, and creates the conveyance documents for conveyable Original Trust land and replacement land. This work is done by the Mental Health Project staff of Contracts and Title, Division of Land.

A more specific listing of this Unit's major activities includes:

• The identification of non-conveyable Original Trust land. This is important because it tells us the lands for which we must provide other state land in exchange.

• The identification of "elective" Original Trust land. This is land that the Plaintiffs may or may not wish to be conveyed to the Trust Authority.

• The identification of conveyable Original Trust land. This is land that must be conveyed to the Trust Authority.

• The identification of encumbrances (right-of-ways, easements, etc.) on Original Trust land and replacement land. This is done to support the appraisal analyses of Original Trust land and replacement land.

b. Comparable Characteristics Analyses

The Comparable Characteristics Analyses are performed to identify the attributes of non-conveyable Original Trust land and replacement land. Under the terms of the Legislation and Settlement Agreement, replacement land should be comparable in character to that land that was previously part of the Trust. The idea behind Chapter 66 is to re-establish the Mental Health Trust with land that matches the original inventory of Mental Health Trust properties to the greatest extent possible.

To accomplish this, the non-conveyable Original Trust land and replacement land have been separated into their principal resource attributes. Since 'land' refers to the fee estate, the resource attributes include oil and gas, coal, and minerals of the mineral estate. Comparable Characteristics Analyses are to be performed for the following resource attributes: surface land, extraction sites, commercial forest tracts, coal, oil and gas, and minerals. These evaluations are for both the non-conveyable Original Trust land and replacement land. In terms of responsibility, DNR is to prepare the surface land, forest tract, oil and gas, and coal evaluations. The Plaintiffs are responsible for preparing the comparable characteristics analyses for mineralized areas. It should be noted that the surface land evaluations have or will be prepared by consultants under contract to DNR.

The results of these analyses are to be incorporated within a relational data base accessible to both parties through a third party, independent vendor. The data is structured for ease of manipulation through a specific software language; this flexibility should prove critical to developing land exchanges, as required under the Settlement Agreement and Legislation.

c. Value Analyses

Valuation analyses are required to identify the (fair market) value of the resources associated with each parcel of conveyable Original Trust land and replacement land. The type of evaluation and whether an evaluation is required varies with the type of resource.

• Valuations of 'surface land' are to be made by independent appraisers jointly selected by the parties, with appraisals to be performed using a specific set of agreed upon procedures.

• Valuations of forest resources are also to be made by independent contractors jointly selected by the two parties, with the evaluations to follow typical industry standards and methods.

•Valuations of mineral resources will be required if, based upon the results of the comparable characteristics analyses, satisfactory alternative replacement land cannot be found. The Settlement Agreement provides for the development of a valuation method but does not specify who will conduct such analyses. The procedures and responsibility for methodology development have yet to be determined.

The results of these valuations should establish the aggregate resource value of each non-conveyable Original Trust land and replacement land parcel. This data, on a per parcel basis, will be incorporated within the aforementioned, jointly accessible computer system.

d. Replacement Land Identification

Each party has the ability to select replacement land or interests in land, and this selection can be for either the mineral or land estate. The intention is to select the entire fee estate.

The Plaintiffs have selected 150,000 acres of surface land fee estate; DNR has objected to slightly less than 10,000 acres of this selection. Processes are underway to resolve these contested selections. DNR will nominate replacement land when the next round of replacement land is received from the Plaintiffs, which is expectedly within the next several weeks.

Although the vast bulk of replacement land should be nominated within the next several months, there will be additional selections over the period of the Project.

e. Land Exchange Analysis

The legislation provides for a 'land exchange' process wherein replacement land is exchanged for comparable non-conveyable Original Trust land. If the criteria of comparability and value are satisfied between the non-conveyable Original Trust land and the replacement land, then an 'exchange' is recognized and the replacement land will be eventually conveyed to the Trust Authority. The 'exchange' must also be in the overall public interest.

The exchange analysis is to be based upon the results of the valuation and comparable characteristics analysis. Essentially, this process will involve a comparison, largely using the aforementioned information system, of sets of non-conveyable Original Trust land and replacement land of generally similar resource attributes. For example, the commercial forest tracts of non-conveyable Original Trust land are to be compared to similar tracts of replacement land. A similar matching approach will be used for surface land, extraction sites, and mineral areas. These comparisons will involve large groupings of parcels having generally similar attributes, and the subsequent matches will be comprised of parcels within those groups. The software system (FoxPro) is designed to readily manipulate the vast amounts of attribute data in a convenient, rapid manner.

It can be expected that not all the 'matched' non-conveyable Original Trust land parcels will be comparable in value to that of the replacement land parcels. The differences in value will be identified, and subsequently used as the basis for the selection of certain replacement land by the Plaintiffs.

f. Surveying and Platting

Under the terms of the Settlement Agreement, the State must survey all parcels that are to be conveyed to the Trust Authority. The level of survey would be that required to meet established State and local government standards. Because of inadequate funding by the Legislature, survey and platting activities are not underway. They could begin next fiscal year. Because of the amount of land to be conveyed, we expect survey and platting activities to extend many years beyond the end of the Project.

g. Support Functions

(1) Mapping. To properly manage state land affected by the Legislation, standard 1:63360 scale U.S. Geologic Survey maps depicting Original Trust land, hypothecated land, and replacement land, must be prepared. Maps showing Original Trust land and hypothecated land have already been prepared. Maps depicting replacement land are under preparation.

(2) Information Systems. There are three information sub-systems to support the Project: that accommodating title research information, including a project management capability; another holding all comparable characteristics and appraisal data; and another that comprises all exchange data. The data within these systems is to be centralized at an independent data repository. The repository, which is a contractor to DNR, will provide all Project data to the Plaintiffs and the public. The data repository is in the process of being established. All of the requisite information systems have been developed by DNR and are available for data upload.

(3) Revenue Reporting. Revenue on Original Trust land and hypothecated land must, under the Settlement Agreement, be reported to the Plaintiffs at periodic intervals. These systems have been set up and are operational.

h. Public Review Functions

There are two sets of regional public meetings scheduled to review proposed replacement land: the first is scheduled in July, 1993, and the second, in March, 1994. These meetings are to be used to establish the overall public interest in conveying (or retaining) proposed replacement land. These meetings, at a minimum, will occur in Fairbanks, the Anchorage area, and Juneau.

i. <u>Project Status</u>

Since the initiation of the Project in October, 1991, much has been accomplished and significant progress is being made currently on various aspects of the Project. For ease of understanding, these tasks are organized according to the previously described project components. Activities that are scheduled to occur between January and June, 1993, are also identified. A Project time frame is included as an attachment.

(1) Activities Accomplished

Title

- Identified non-conveyable and elective Original Trust land parcels.
- Identification of native allotment and smallest practicable tract affected parcels.
- Identification of title encumbrances of 11(a)(2) and replacement land.

Comparable Characteristics

- Identified comparable characteristics attributes for surface land, forestry tracts, oil and gas, coal, and mineral areas.

Valuation Analyses

- Identified process and methods for surface appraisal analyses.
- Surface appraisals of 11(a)(2) affected land, totaling in excess of 30,000 acres.

Replacement Land

- Identified 150,000 acres of replacement land by the Plaintiffs with subsequent review by DNR.

Support Functions

- Mapping of Original Trust land and Hypothecated Land.
- Developed the title research, comparability-appraisal, and land exchange sub-systems.
- Established the Original Trust land and Hypothecated Land revenue reporting systems.

(2) Activities Underway or About to be Underway

Title

- Identify conveyable Original Trust land, with requisite information on title stipulations necessary to the preparation of conveyance documents.

Comparable Characteristics Analysis

- Initiate comparable characteristics analyses for replacement land, including surface land, forest tracts, and mineralized areas. The surface land and forestry evaluations will be done by contractors to DNR.

Valuation Analyses

- Initiate surface land appraisals by contractors to DNR for non-conveyable Original Trust land and replacement land.

Replacement Land

- Review proposed replacement land nominations by Plaintiffs.
- Nominate proposed replacement land by DNR.

Support Functions

- Prepare map(s) showing replacement land.
- Upload data into the Title Research and Comparability/Appraisal Sub-systems.
- Initiate the Data Repository function by a contractor to DNR.

(3) Activities within Immediate Future (February-June 1993)
Title

- Continue previous title functions

Comparable Characteristics Analysis

- Complete all comparable characteristics analyses, including the upload of data into the Title Research and Comparability/Appraisal Sub-system.

Valuation

- Complete all surface land and forest tract valuations, including the upload of data to the Comparability/Appraisal Sub-systems.

Land Exchange

- Identify (tentative) land exchanges for surface land, forest tracts, and mineralized areas.

J. Project Management Time-Frame

A Project Time-Frame is attached that identifies the principal Project tasks by time period. This is our best estimate of the time it will take to do the work associated with the tasks of this complex Project. It bears repeating that this is an interdependent project between the Plaintiffs and the Department of Natural Resources, and each party is reliant upon the efforts of the other.

4. 11(a)(2) Replacement Land Process

A side agreement to the Settlement Agreement requires the state to convey additional land to the trust to replace Original Trust Land withdrawn by 11(a)(2) of the Alaska Native Claims Settlement Act and selected by Native Corporations. There are three areas, totaling some 9,270 acres, that are affected by this side agreement: tracts selected by the Tyonek, Knik, and Toghottle Native Corporations. Under the terms of the side agreement, the State will compensate the Trust Authority with other, similar state land that is equal in value to the Original Trust land tracts, discounting for the value of state land that would be ordinarily selected by the Trust under their remaining Mental Health Enabling Act Entitlement Act (over-selection land). This process requires the identification of the 11(a)(2) affected land, the over-selection land, and the replacement land; the valuation of the fee estate of the 11(a)(2) affected land, the over-selected land, and the surface estate of the replacement land; and the eventual conveyance of the replacement land to the Trust Authority through AS 38.05.810(a) (Public and Charitable conveyance). This process is to be completed within six months, and began in May, 1992. Essentially all of the steps of this process have been completed except for the determination of sub-surface value at Tyonek and the publication of public notice under the 810 conveyance process.

5. Department Order

Department order #135 was developed by the Department of Natural Resources and the Plaintiffs, and is designed to provide DNR staff with guidelines for the management of state land affected by the Settlement Agreement and the Legislation. A copy is attached. Essentially, it establishes separate procedures for each category of affected land:

- Original Trust land; all departmental actions on such land must be reviewed by the Plaintiffs and there must be written concurrence to any proposed action. This is a formalization of the court imposed requirements for review.

- Hypothecated land; all departmental actions on such land must be reviewed by the Plaintiffs, although they have only the right to review and comment on proposed actions; they do not have concurrence authority.

- Replacement land; all departmental actions on such land must be reviewed by the Plaintiffs and there must be written concurrencee to any proposed action.

5. Summary

Much has been accomplished by both the Plaintiffs and the State in developing this Project, in defending and promoting the Settlement Agreement before the court, and in establishing procedures for the interim management of state land affected by the Settlement Agreement.

The upcoming months and the period between January through May, 1993, will be a critical time for the Project and, therefore, for the successful resolution of the Mental Health Trust lands dilemma that has affected the State for so many years. The Project will analyze the value and comparability attributes of replacement land this fall and winter and, together with the available comparability data on non-conveyable Original Trust land, we should know what lands and/or interests in land will/should be eventually conveyed to the Trust Authority by early 1993.

MENTAL HEALTH LANDS PROJECT STATUS
December, 1992

Since the initiation of the Project in October, 1991, much has been accomplished and significant progress is being made currently on various aspects of the Project. For ease of understanding, these tasks are organized according to the previously described project components. Activities that are scheduled to occur between January and June, 1993, are also identified. A Project time frame is included as an attachment.

## Activities Accomplished

### Title

- Identified non-conveyable and elective Original Trust land parcels.
- Identified native allotment and smallest practicable tract affected parcels.
- Identified title encumbrances of 11(a)(2) and replacement land.

### Comparable Characteristics

- Identified comparable characteristics attributes for surface land, forestry tracts, oil and gas, coal, and mineral areas.

### Valuation Analyses

- Identified process and methods for surface appraisal analyses.
- Surface appraisals of 11(a)(2) affected land, totaling in excess of 30,000 acres.

### Replacement Land

- Identified 500,000 acres of replacement land by the Plaintiffs with subsequent review by DNR.

### Support Functions

- Mapping of Original Trust land and Hypothecated Land.
- Developed the title research, comparability-appraisal, and land exchange sub-systems.
- Established the Original Trust land and Hypothecated Land revenue reporting systems.

## Activities Underway or About to be Underway

### Title

- Identify conveyable Original Trust land, with requisite information on title stipulations necessary to the preparation of conveyance documents.

### Comparable Characteristics Analysis

- Initiate comparable characteristics analyses for replacement land, including surface land, forest tracts, and mineralized areas. The surface land and forestry evaluations will be done by contractors to DNR.

Valuation Analyses

- Initiate surface land valuations by contractors to DNR for non-conveyable Original Trust land and replacement land. A new methodology is being developed.

Replacement Land

- Review proposed replacement land nominations by Plaintiffs.
- Nominate proposed replacement land by DNR.
- The 11(a)(2) process has been completed (see attached) with PFDs prepared for six acres. The public comment period on the PFDs is now closing.

Support Functions

- Prepare map(s) showing replacement land.
- Upload data into the Title Research and Comparability/Appraisal Sub-systems.
- Initiate the Data Repository function by a contractor to DNR.

Activities within Immediate Future (February-June 1993)

Title

- Continue previous title functions.

Comparable Characteristics Analysis

- Complete all comparable characteristics analyses, including the upload of data into the Title Research and Comparability/Appraisal Sub-system.

Valuation

- Complete all surface land and forest tract valuations, including the upload of data to the Comparability/Appraisal Sub-systems.

Land Exchange

- Identify (tentative) land exchanges for surface land, forest tracts, and mineralized areas.

# ALASKA DEPARTMENT OF NATURAL RESOURCES

## SOIL AND WATER CONSERVATION BOARD

The following is a brief overview of tne Alaska Soil and Water Conservation District Program. It will hopefully provide information on the unique structure of this organization, its relationship to state government, the significant roll Districts play in the delivery of federal, state, and local assistance to resource users and land owners, and the need to consider proposed legislative changes to A.S. 41.10.

**HISTORY:** Conservation districts are local, "special purpose" units of government charged under state law with carrying out a variety of natural resource conservation and management programs. In the 1930"s, the Federal government provided all states and with model legislation to provide for consistency in the delivery of national programs while recognizing constitutional variability at the state level. Since then all 50 states have enacted legislation to provide for local Soil and Water Conservation Districts. To date there are approximately 3,000 Districts in the United States served by 17,000 locally elected officials that contribute without compensation to local land use planning efforts and in providing technical assistance to District cooperators. Districts currently serve the resource needs of appro imately 2.3 million land owners and resource users across the natio . It is through the efforts of this grass roots organization, that local land owners and resource users receive an approximate $800 million in Federal and $660 million in State funding for financial and technical assistance.

In Alaska, the Soil and Water Conservation Districts were first authorized in 1947. In 1960, the Territorial Law was abolished and all District functions were transferred to the Department of Natural Resources under AS 41.10. The Law was again repealed in 1983 to expand the roll of Districts within the department. The administration of District programs were housed in the Dept. of Natural Resources, Div. of Agriculture until Dec. 1991 at which time the Executive Directors position was transferred to the Commissioners Office.

Since 1947, District programs in Alaska have slowly expanded to address all forms of land use with emphasis on planning and development based on resource capability and sustained use. All 10 Districts are designed to be locally driven and regionally focussed on resource management issues. Districts are the "people" part of resource management. It is the quasi public/private status of the organization that provides such an effective mechanism for program implementation; and until only recently has this quality received so much attention.

Alaska Association of Soil and Water Conservation Districts

# 1992

# DIRECTORY OF

# DISTRICT SUPERVISORS

CONSERVATION - DEVELOPMENT - SELF-GOVERNMENT

**SOIL AND WATER CONSERVATION DISTRICTS**
**SCHEDULE OF MONTHLY MEETINGS**

**Salcha-Big Delta**
First Thursday of Every Month

**Kenny Lake**
First Thursday of Every Month

**Fairbanks**
Third Tuesday of Every Month

**Palmer**
Second Wednesday of Every Month

**Homer**
Second Thursday of Every Month

**Upper Susitna**
Third Monday of Every Month

**Kenai**
Third Thursday of Every Month

**Wasilla**
Last Wednesday of Every Month

**Kodiak**
Meets Every Other Month

# ALASKA SOIL AND WATER CONSERVATION DISTRICTS

## FAIRBANKS SOIL AND WATER CONSERVATION DISTRICT

GERRY YOUNG, Chair
1275 Summit Drive
Fairbanks, AK 99712
457-2025

LUCY KNOLL
6983 No Name Lane
Fairbanks, AK 99712
488-9036

EDWIN BOSTRON
Box 56822
North Pole, AK 99705
488-3940

ROBERT TSIGONIS
PO Box 73726
Fairbanks, AK 99707
452-4653

CHARLES BODDY
122 First Avenue, #302
Fairbanks, AK 99705
452-2625

GENA DELUCHI, Alt.
Box 82692
Fairbanks, AK 99708
455-6229

## PALMER SOIL AND WATER CONSERVATION DISTRICT

RAY DePRIEST, Chair
P.O. Box 2581
Palmer, AK 99645
745-6753

WAYNE BOUWENS
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Palmer, AK 99645
745-3681

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Palmer, AK 99645
745-2993

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Palmer, AK 99645
745-6276

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PO Box 3572
Palmer, AK 99645
745-7767

BILL LONG, Alt.
PO Box 1831
Palmer, AK 99645
745-5948

## ALASKA SOIL AND WATER CONSERVATION DISTRICTS

### KENAI SOIL AND WATER CONSERVATION DISTRICT

MIKE SWAN, Chair
PO Box 987
Soldotna, AK 99669
262-1014

ABBY ALA
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Soldotna, AK 99669
262-4616

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262-6208

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Soldotna, AK 99669
262-5135

BILLIE HARDY
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Kenai, AK 99611
262-9811

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Soldotna, AK 99669
262-5135

### WASILLA SOIL AND WATER CONSERVATION DISTRICT

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376-5640

TED BERRY
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Wasilla, AK 99687
745-9752

BONNIE FRIEDMAN
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Palmer, AK 99645
376-2131

CLAUD OXFORD, Alt.
373-1702

JOHN SCHRIACK, Alt.
373-3202

### KODIAK SOIL AND WATER CONSERVATION DISTRICT

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PO Box 1805
Kodiak, AK 99615
486-6202

CHARLES DORMAN
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Kodiak, AK 99615
486-5395

BARBARA ZIMMERMAN
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Kodiak, AK 99615
486-4497

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486-3949

BILL BURTON
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487-2436

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486-5578

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486-3949

**STATE OF ALASKA**
**DEPARTMENT OF NATURAL RESOURCES**

Glenn A. Olds, Commissioner

**COMMISSIONER'S OFFICES**

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465-2400
Fax: 586-2754

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Anchorage, AK 99510-7005
762-2483
Fax: 562-4871

## ALASKA SOIL AND WATER CONSERVATION BOARD

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P.O. Box 286
Willow, AK 99688
495-6823

Doug Witte, Exec. Director
P.O. Box 107005
Anchorage, AK 99510-7005
762-2452

Norman Cosgrove — 6/95
P.O. Box 861
Delta Junction AK 99737
895-4578

Marcia Ward — 6/95
P.O. Box 356
Soldotna, AK 99669
638-3971

Susan Brook — 6/93
P.O. Box 93
Gustavus, AK 99826
697-2340

Tom Gray — 6/95
P.O. Box 24
White Mountain, AK 99784
638-3971

**To apply** for a volunteer position, complete the application and send it to the area or areas in which you would like to work, or to the Statewide Volunteer Coordinator.

**For more information** please contact any of the following Department of Natural Resources' Division of Parks and Outdoor Recreation Offices:

Statewide Volunteer Coordinator
P.O. Box 107001
Anchorage, AK 99510-7001

Northern Region
3700 Airport Way
Fairbanks, AK 99709-4613
(907) 451-2695

Mat-Su/Copper Basin Area
HC 32 Box 6706
Wasilla, AK 99687
(907) 745-3975

Anchorage/Chugach/Southwest
HC 52 Box 8999
Indian, AK 99540
(907) 345-5014




Kenai Peninsula
P.O. Box 1247
Soldotna, AK 99669
(907) 262-5581

Kodiak Area
SR Box 3800
Kodiak, AK 99615
(907) 486-6339

Southeast Region
400 Willoughby Avenue
Juneau, AK 99801
(907) 465-4563



***Sixty-seven campgrounds in Alaska depend on volunteer hosts to answer questions and provide information for park visitors.***

# Volunteers In Parks Application

Name _____ Date of birth _____

Address _____ Telephone ( ) _____

City _____ State _____ Zip _____ Soc. Sec. # _____

Message phone/address _____

Driver's license: state and # _____ Do you prefer? ☐ ongoing project ☐ short-term project

Area, park and/or campground you prefer: _____

In what other area or park would you accept a job? _____

Are you available? Weekdays: ☐ morning ☐ afternoon ☐ evening Dates available _____

Weekends: ☐ morning ☐ afternoon ☐ evening _____

If volunteering for campground host, do you have an RV or trailer? _____

Employment status: ☐ full-time ☐ part-time ☐ not employed Do you want school credit? _____

Occupation _____ May we contact your references and employers? _____

| Reference or most recent employers | Address/phone number | Dates of employment |
|---|---|---|
| 1) | | |
| 2) | | |

Education: ☐ high school ☐ college Field: _____

Volunteer experience _____

Outdoor interests, hobbies or special training _____

_____ Have you ever been convicted of a misdemeanor or felony? _____

Physical or medical condition affecting kind of work you can do _____

How did you learn about the V.I.P. program? _____

Signature _____ Date _____

ALASKA STATE PARKS

Alaska Department of NATURAL RESOURCES

Place Postage Here

# Volunteer in Alaska State Parks



## You can be a V.I.P.

Do you enjoy helping people, sharing your skills and talents, and the outdoors? Would you like to spend several weeks in one of Alaska's scenic state parks learning about the natural and cultural history of the area? Then Alaska State Parks has a place for you. There are positions for Volunteers in Parks statewide, from the rain forests and fjords of southeast Alaska to the salmon streams of the Kenai Peninsula to the rolling hills and birch forests of the Interior.

Alaska State Parks depends on volunteers to help manage and maintain the parks and to provide services that would not otherwise be offered.

**Volunteers in Parks** help others enjoy Alaska's state parks by serving in one of the many V.I.P positions:

***Campground Hosts*** welcome campers, acquaint them with the park and provide information about activities and facilities. They help with special projects suited to their skills and interests, such as interpretive programs. Hosts do light maintenance work and report safety and law enforcement problems to park rangers. In return they receive a free campsite during their stay. Hosts provide their own camping equipment and RV or trailer.

***Backcountry Hosts*** patrol and monitor the more remote areas in parks. They inform visitors about backcountry regulations, safety and no-trace camping. They also repair and replace signs and clean up campsites.

***Information Services Volunteers*** are trained to work at a state park visitor center and provide information to the public on the park's natural and cultural history.



***Trail Crew Members*** clear brush, remove stumps and downed trees, build bridges and boardwalks, and dig drainage ditches.

***Special Project Volunteers*** help with land-use planning, research, surveys or coordinating the Volunteers in Parks program.

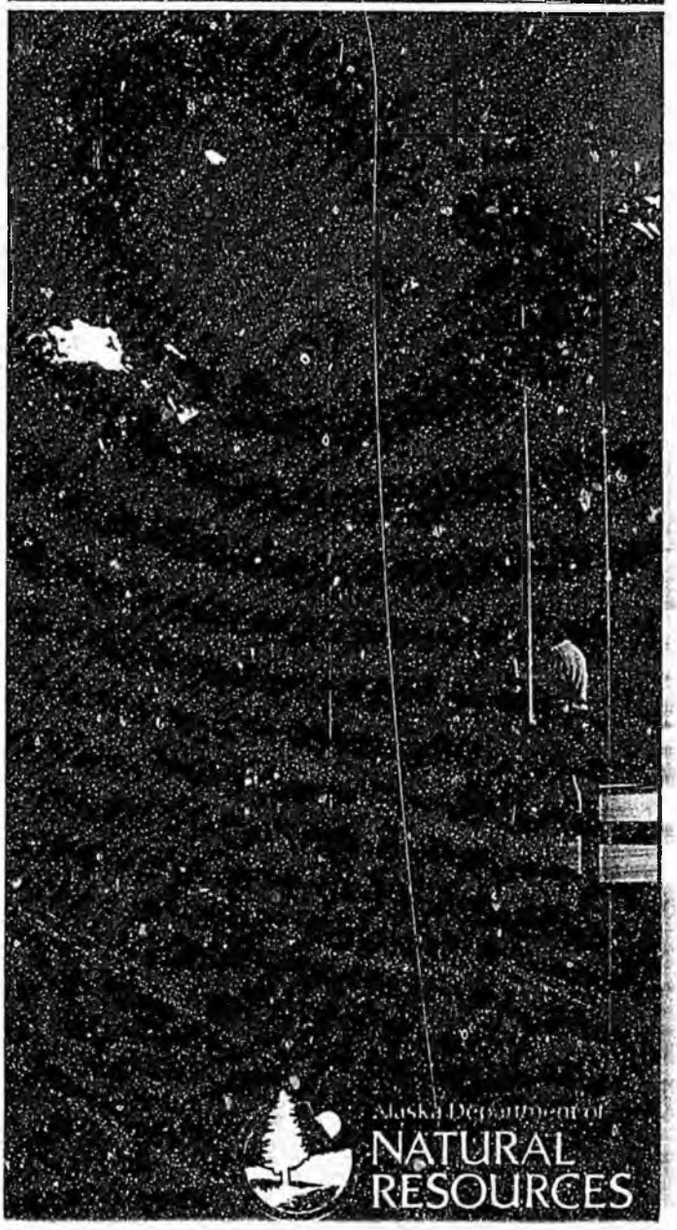
**Volunteers receive** valuable training and experience for their service. Transportation within the state and a subsistence allowance may be available for some positions. Eligibility for these benefits usually requires a six-week, full-time commitment. Worker's Compensation Injury Insurance covers state park volunteers while they are on the job.



If you would like to volunteer for a position not described here, please discuss your idea with the volunteer coordinator.

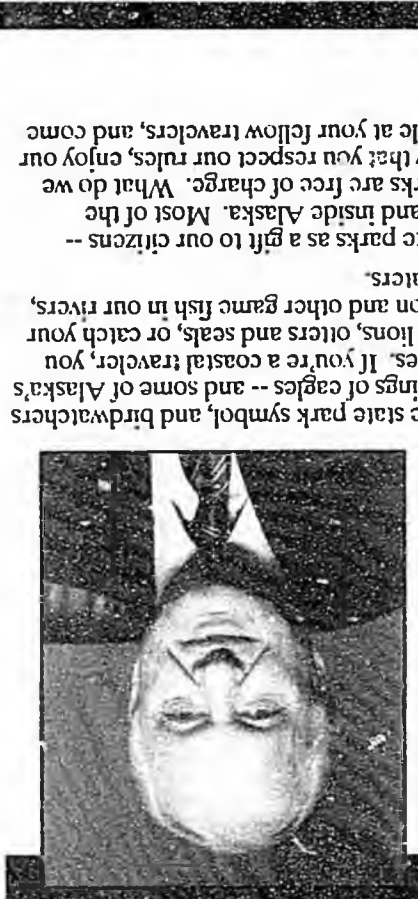
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# ALASKA STATE PARKS



Alaska Department of
NATURAL RESOURCES

# WELCOME...
## to Alaska's State Parks
*from Governor Walter J. Hickel*



*Governor Walter J. Hickel*

Welcome to our parks. I hope this brochure will guide you through many happy journeys in Alaska's State Parks.

With over three million acres, ours is the largest state park system in the United States and it holds nearly one-third of America's state park acreage.

More than 100 state park units stretch from the rain forests and fjords of Southeast through the glacier-carved mountains of central Alaska and to the rolling hills and birch forests of the Interior. Our parks range from scenic roadside campgrounds where visitors can find trails to hike, beaches to comb, and fish to catch -- to the large wilderness parks where backcountry recreation opportunities seem endless.

Whether you are a roadside traveler, backcountry explorer, history buff, or out for a Sunday stroll, our parks offer experiences as diverse as the state itself.

You will find links to Alaska's past that are protected and interpreted at historical parks and sites across the state.

Hundreds of wildlife and bird species are at home in our parks. We hope you'll play a favorite Alaskan sport -- wildlife spotting -- and be rewarded by seeing moose, caribou, mountain goats, and sheep, and maybe even a grizzly bear.

The bald eagle is the state park symbol, and birdwatchers enjoy frequent sightings of eagles -- and some of Alaska's 337 other bird species. If you're a coastal traveler, you may see whales, sea lions, otters and seals, or catch your share of trout, salmon and other game fish in our rivers, lakes and coastal waters.

We think of our state parks as a gift to our citizens -- those from outside and inside Alaska. Most of the pleasures of our parks are free of charge. What do we ask in return? Only that you respect our rules, enjoy our beautiful parks, smile at your fellow travelers, and come back soon.


ALASKA STATE PARKS
Department of Natural Resources
Division of Parks & Outdoor Recreation
3601 'C' Street
P.O. Box 107001
Anchorage, Alaska 99510-7001


ALASKA STATE PARKS
. . . as vast and varied as the state itself.


This publication was released by the Department of Natural Resources to inform the public of activities and services available in Alaska State Parks. Printed in Anchorage, Alaska at a cost of 18.5 cents per copy.



March 1992


## Look out for



**WILDLIFE:** Creatures in the wild are fun to watch, but must be treated with respect, for your safety and their protection. Animal signs are everywhere and can add interest to your park visit. Look for tracks, signs of feeding (nibbled branches, chewed bark) and animal droppings. They will all help tell you which animals are nearby.



Brown bear

**BEARS** are unpredictable and should always be considered dangerous. Keep your campsite clean and wash food odors from your hands and clothing. Never take food into your tent. Put garbage in the proper containers or take it out of the park with you.

**MOOSE** feed on young birch and other tender vegetation. *Do not approach moose.* They can be very dangerous, especially females with their young. Take pictures but keep a respectful distance!

**BEAVERS** and their lodges abound in Alaska's lakes, ponds and streams. A quiet observer can watch these beautiful animals go about their work.

**OTHER ANIMALS** seen in state parks are caribou, Dall sheep, mountain goats, wolves and many of the smaller mammals such as foxes, porcupines, marmots, and lynx.



Caribou

**NESTING WATER BIRDS** are fascinating to observe. Ducks, geese, swans and other birds are beautiful. Watch, take pictures, but please don't disturb.



Willow ptarmigan

**BALD EAGLES** can be seen in great numbers in many of our parks. Watch for this majestic bird near salmon streams, but do not enter feeding areas.

**WILLOW PTARMIGAN,** Alaska's state bird, can be spotted in all seasons unless their camouflage works too well. Look for a mottled, brown bird in the summer and a snow-white one in winter.

## For your outdoor safety and comfort

**FILE A TRIP PLAN** before heading into the backcountry. Contact the nearest ranger station and let them know where you're going and when you plan to return. They will have information on backcountry travel conditions, equipment and safety.

**WEATHER** can change rapidly and with little warning. Even in summer, visitors may encounter cold temperatures, strong winds, and rain or snow. Be prepared with adequate clothing and, when planning a long hike or boat trip, carry extra food and water in anticipation of delays due to weather.

**MOSQUITOS** are famous in Alaska and can be a problem from June through August. Be prepared with your favorite repellent and a long-sleeved shirt.

**GIARDIASIS,** an intestinal disease contracted from water containing the parasite *Giardia lamblia*, is a growing problem in Alaska. All water, even icy cold or fast moving water, must be boiled for at least one full minute, or filtered with a commercial filter, or treated with chemicals to make it safe to drink.

**GLACIERS** may be covered with snow that hides deep crevasses. Park visitors should not venture onto a glacier unless well-equipped and experienced.

**TIDES** in many coastal areas of Alaska are extreme, with powerful currents as fast as 20 miles per hour. Some of Alaska's tide flats are composed of a gray clay that acts as a binding quicksand which, along with rushing, incoming high tides, makes a dangerous combination. Bore tides near Anchorage are interesting to watch, but do not walk out onto tide flats.

**BOATING, CANOEING, RAFTING & KAYAKING** in Alaska require special precautions because of Alaska's cold, and often treacherous, water. If you capsize, it is usually wise to stay with the boat, wait for rescue help, and not try to swim to shore. Hypothermia and death can result after only a few minutes of exertion in cold water. Check with park rangers for information on boating trips and proper equipment.

**WILDLIFE** should never be approached or fed. Don't surprise wildlife. Make noise or ring bells when in the woods to warn animals of your presence.



Moose

# ALASKA STATE PARKS



Alaska Department of NATURAL RESOURCES






*Bald eagles gather at the Chilkat River each fall.*

**ALASKA CHILKAT BALD EAGLE PRESERVE,** near Haines, is the site of the largest congregation of bald eagles in North America. Three thousand eagles flock to this five-mile stretch of the Chilkat River each fall to feed upon salmon. The ranger office in Haines has information on the best areas to view eagles without disturbing them.





*Camping on Kesugi Ridge above Byers Lake in Denali State Park.*

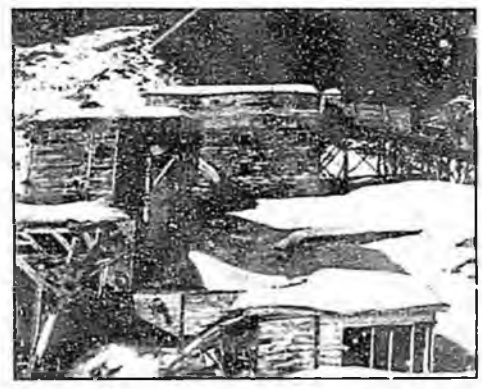


**DENALI STATE PARK** takes its name -- Denali -- from the tallest peak in North America (also known as Mt. McKinley). Denali means "the great one" in the Tanaina Indian dialect. The park, about 130 miles north of Anchorage, offers outstanding views of Denali from the highway, and the trails to Kesugi Ridge afford famous views of the mountain. A brochure is available that tells about camping, boating, hiking trails and other features of the park.



*Rika's Roadhouse, circa 1909, is located at Big Delta State Historical Park.*

**BIG DELTA STATE HISTORICAL PARK,** located on the Tanana River, commemorates the days of roadhouses in Alaska's history. Rika's Roadhouse, located in the park, was a major stop for travelers. Guided tours through the building, a museum and a food concession are available. There is an interesting view of the trans-Alaska pipeline from this site.



*The mill building at Independence Mine.*

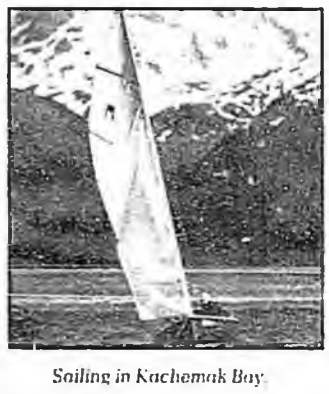


*Dog mushing is a favorite sport in Interior Alaska.*

**INDEPENDENCE MINE STATE HISTORICAL PARK** features the abandoned buildings and machinery of a 200-worker camp and hardrock gold mining operation which was one of Alaska's greatest gold producers in the 1930s. This park, less than a two-hour drive from Anchorage, is located in the rugged Talkeetna Mountains. The mine manager's house and assay building have been restored and offer interpretive displays and visitor information. The historical spirit and a ghost-town flavor of the area can be experienced on a walking tour of the mining camp. Heavy winter snowfalls offer great cross-country skiing.

**CHENA RIVER STATE RECREATION AREA,** on the Chena Hot Springs Road, is less than an hour's drive from Fairbanks. It offers a full range of recreation including fishing, boating, and camping. Canoeing on the Chena River and hiking to prominent granite formations in the alpine country are popular summer activities. Winter adds snowmachining, cross-country skiing and dog sledding. Beavers, moose and bears are numerous and often spotted by visitors to the park.





*Sailing in Kachemak Bay.*

**KACHEMAK BAY STATE PARK** is undeveloped, but accessible by plane or boat from Homer, at the tip of the Kenai Peninsula. Alaskans rate this park extremely high for its scenic, wild mountain terrain, fjords, coves and vast glacier fields. Boating, fishing and beachcombing are outstanding. There are primitive campsites and trails to high mountain lakes & glaciers.



*The Kenai Peninsula is the most popular fishing area in Alaska.*

**CAPTAIN COOK STATE RECREATION AREA,** 30 miles north of Kenai, has about 3,500 acres of saltwater beaches, forests, lakes and rivers. There are several drive-in and remote campgrounds as well as picnic areas on high bluffs overlooking Cook Inlet. The area has trails for skiing and hiking, good fishing, a small boat launch and a swimming beach.



*The Chugach Mountains dominate Anchorage's skyline.*



*Kayaking in Prince William Sound.*

**PRINCE WILLIAM SOUND STATE MARINE PARKS** are undeveloped parks on the shores of Prince William Sound, about 60 miles east of Anchorage. The Sound offers views of tidewater and upland glaciers, forested islands, and fjords surrounded by mountains rising to 13,000 feet. The scenery and wildlife, including brown and black bears, whales, otters, eagles, salmon and many species of marine birds, make it a favorite area for boating, hiking, and photography. Boats can be chartered in Whittier and Valdez.

**CHUGACH STATE PARK** is an accessible wilderness in the backyard of Anchorage, home of half of Alaska's population. Wildlife viewing and mountain scenery are year-round pleasures and campers can choose developed campgrounds or secluded backcountry valleys. The 495,000 acre park is popular with hikers, climbers and cross-country skiers. The Eagle River Visitor Center and the Potter Section House Historic Site offer interpretive displays and programs.

**TOTEM BIGHT STATE HISTORICAL PARK,** near Ketchikan, is dedicated to Southeastern Alaska's Native cultures. An interpretive trail winds through the rain forest to a clan house and Tlingit and Haida totem poles, then on to a fine view of the Tongass Narrows.



*Rangers interpret totem tales at Totem Bight State Historical Park.*



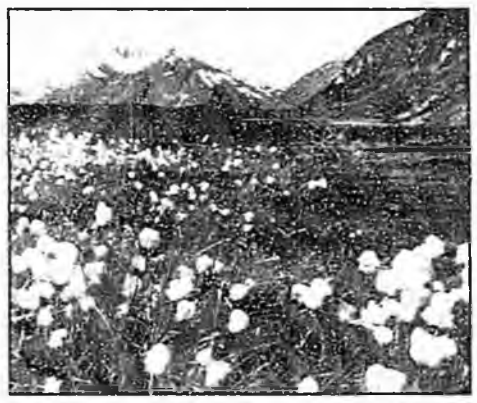
*A view from the coastline trail in Chilkat State Park.*

**CHILKAT STATE PARK,** south of Haines on the Chilkat Peninsula, offers spectacular views of glaciers across the Chilkat Inlet. Visitors often spot whales, seals and other wildlife from the coastline trail. There are campgrounds, picnic areas and a boat ramp.

**NANCY LAKE STATE RECREATION AREA** is one of the few lake-studded landscapes in Alaska preserved in its natural state for recreation. It's ideal for canoeing, fishing and boating on a network of more than 130 lakes and ponds. Visitors will find camping areas, hiking and skiing trails, a system of canoe portages, and twelve public rental cabins. The area is well used in winter by dog mushers, skiers and snowmachiners. The park is just south of Willow on the Parks Highway. Call 495-6273 for a recorded message on recreation opportunities and conditions.



*Winter in Alaska has its own special beauty and outdoor activities.*



*Alaska cotton grass grows in alpine tundra near Worthington Glacier.*

**WORTHINGTON GLACIER STATE RECREATION AREA** features a short trail leading right to the blue ice of the glacier. High alpine tundra and many hanging glaciers make this an excellent area for photographers. A log cabin visitor center at Glennallen is filled with displays on the area's wildlife, geology, and recreational opportunities.

**FORT ABERCROMBIE STATE HISTORICAL PARK** is perched on a forested headland northeast of Kodiak Island. Visitors can explore the remains of an artillery fort which commemorates the history of World War II in Alaska. There are a campground, a picnic area, a fresh water lake and spectacular ocean views. Trails wind through open meadows and under massive Sitka spruce stands. A ranger station provides visitor information.



*A bunker built at Fort Abercrombie during World War II.*



*With 1.5 million acres of wilderness, Wood-Tikchik is the largest state park in the United States.*

**WOOD-TIKCHIK STATE PARK,** bounded by rugged mountains to the west and open tundra to the east, is Alaska's most remote state park, and the largest state park in the United States. Visitors are attracted by superb fishing and boating in the Tikchik Lakes and Wood River Lakes. Private lodges offer visitor services and sport fishing packages by advance reservations only. The park is 300 air miles west of Anchorage and is accessible by charter flight from Dillingham.

## CHUGACH/SOUTHWEST AREA OFFICE

3601 C Street, Suite 1280
P.O. Box 107001
Anchorage, Alaska 99510-7001
(907) 345-5014

| Unit # | Unit Name | Acreage | CAMP SITES * | CAMPING LIMIT (DAYS) | PICNIC SITES | TOILETS | DRINKING WATER | PICNIC SHELTERS | TRAILS | HISTORICAL FEATURES | BOAT LAUNCH | FISHING | NEAREST COMMUNITY | Location |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 77 | Chugach SP | 495,294 | | | | | | | | | | | | |
| | • Eklutna Campground | | 50 | 15 | | | | | | | | F | Eagle River | 26.5 Glenn Hwy. |
| | • Thunderbird Falls ST | | 3 | | | T | | Tr | | | | | Anchorage | 25.5 Glenn Hwy. |
| | • Eagle River Campground | | 50 | 4 | 12 | | S | | | | | F | Anchorage | 12.6 Glenn Hwy. |
| | • Eagle River Visitor Center | | | | | | | | | | | F | Anchorage | 12 Eagle River Road |
| | • McHugh Creek Picnic Area | | | | | | | Tr | | | | | Anchorage | 111 Seward Hwy. |
| | • Bird Creek Campground | | 25 | 7 | | W | S | | | | | F | Anchorage | 101.5 Seward Hwy. |
| | • Old Johnson Trail | | | | | | | Tr | | | | | Anchorage | 101-114 Seward Hwy. |
| HILLSIDE TRAIL SYSTEM | | | | | | | | | | | | | | |
| | • Prospect Heights | | | | | | | Tr | | | | | Anchorage | Up. O'Malley/Prospect |
| | • Upper Huffman | | | | 8 | | | Tr | | | | | Anchorage | Upper Huffman |
| | • Glen Alps | | | | | W | | Tr | | | | | Anchorage | Upper Huffman |
| 78 | Potter Section House SHS | 5 | | | | W | | | | | | | Anchorage | 115 Seward Hwy. |

**SOUTHWEST** (See Chugach/Southwest address) Dillingham office (907) 842-2375

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 79 | Wood-Tikchik SP | 1,555,200 | 3 | 15 | T | | | | | | | F | Dillingham | Access by plane & boat |

**PUBLIC RENTAL CABINS** are available in several state parks. There are cabins at Chena River SRA near Fairbanks and Nancy Lake SRA near Willow. Cabins at Oliver Inlet, a southeast state marine park, and in Shuyak Island State Park north of Kodiak, are accessible by plane or boat. Regional park offices have information on cabin rentals.

**CAMPGROUND FEES** A $6 or $8 per night overnight camping fee is charged at most developed campgrounds, except Eagle River ($12) and Eklutna Lake ($10) in Chugach State Park near Anchorage, and Chena River State Recreation Site in Fairbanks ($12 per night). An annual camping pass, which authorizes unlimited camping for the calendar year, subject to the camping stay limit in each campground, is available. Annual camping passes cost $75, and may be purchased at any state park office or from state park rangers. To order a pass by mail, send a check or money order payable to "State of Alaska" to Annual Camping Pass, P. O. Box 107001, Anchorage, AK 99510-7001. Fee levels are subject to change.

## KENAI PENINSULA AREA OFFICE

Mile 85 Sterling Hwy. P.O. Box 1247
Soldotna, AK 99669
(907) 262-5581

KENAI PENINSULA

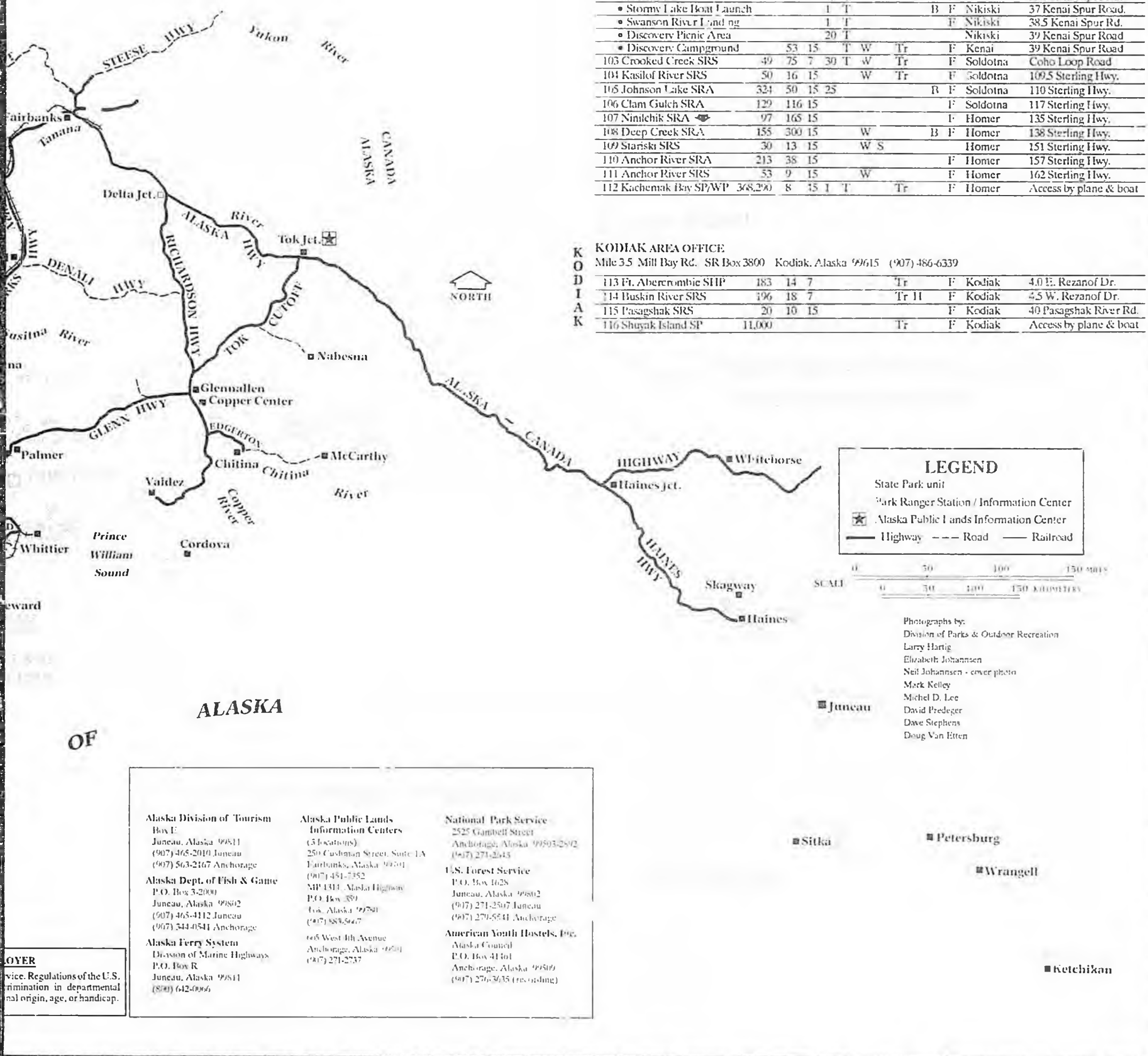
| Unit # | Unit Name | Acreage | CAMP SITES * | CAMPING LIMIT (DAYS) | PICNIC SITES | TOILETS | DRINKING WATER | PICNIC SHELTERS | TRAILS | HISTORICAL FEATURES | BOAT LAUNCH | FISHING | NEAREST COMMUNITY | Location |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PRINCE WILLIAM SOUND STATE MARINE PARKS | | | | | | | | | | | | | | |
| 80 | Bettles Bay SMP | 680 | | | | UNDEVELOPED | | | | | | F | Whittier | Port Wells |
| 81 | Zeigler Cove SMP | 720 | | | | UNDEVELOPED | | | | | | F | Whittier | Port Wells |
| 82 | Surprise Cove SMP | 2,280 | | | | UNDEVELOPED | | | | | | F | Whittier | Cochrane Bay |
| 83 | South Esther Island SMP | 3,360 | | | | UNDEVELOPED | | | | | | F | Whittier | Esther Island |
| 84 | Horseshoe Bay SMP | 970 | | | | UNDEVELOPED | | | | | | F | Seward | Latouche Island |
| 85 | Sawmill Bay SMP | 2,320 | | | | UNDEVELOPED | | | | | | F | Valdez | Valdez Arm |
| 86 | Shoup Bay SMP | 4,560 | | | | UNDEVELOPED | | | | | | F | Valdez | Valdez Arm |
| 87 | Jack Bay SMP | 811 | | | | UNDEVELOPED | | | | | | F | Valdez | Valdez Arm |
| 88 | Boswell Bay SMP | 766 | | | | UNDEVELOPED | | | | | | F | Cordova | Gulf of Alaska |
| 89 | Canoe Passage SMP | 2,735 | | | | UNDEVELOPED | | | | | | F | Cordova | Hawkins Island |
| 90 | Decision Point SMP | 460 | | | | UNDEVELOPED | | | | | | F | Whittier | Passage Canal |
| 91 | Entry Cove SMP | 370 | | | | UNDEVELOPED | | | | | | F | Whittier | Point Pigot |
| 92 | Granite Bay SMP | 2,105 | | | | UNDEVELOPED | | | | | | F | Whittier | Esther Island |
| 93 | Kayak Island SMP | 1,437 | | | | UNDEVELOPED | | | | | | F | Cordova | Gulf of Alaska |
| SEWARD AREA STATE MARINE PARKS | | | | | | | | | | | | | | |
| 94 | Driftwood Bay SMP | 840 | | | | UNDEVELOPED | | | | | | F | Seward | Day Harbor |
| 95 | Safety Cove SMP | 660 | | | | UNDEVELOPED | | | | | | F | Seward | Day Harbor |
| 96 | Sandspit Point SMP | 600 | | | | UNDEVELOPED | | | | | | F | Seward | Eldorado Narrows |
| 97 | Sunny Cove SMP | 300 | | | | UNDEVELOPED | | | | | | F | Seward | Resurrection Bay |
| 98 | Thumb Cove SMP | 300 | | | | UNDEVELOPED | | | | | | F | Seward | Resurrection Bay |
| 99 | KENAI RIVER SPECIAL MANAGEMENT AREA | | | | | | | | | | | | | |
| | • Kenai Keys | 193 | | | | UNDEVELOPED | | | | | | F | Sterling | 78 Sterling Hwy. |
| | • Bings Landing | 126 | 37 | 7 | | | | | | | B | F | Sterling | 79 Sterling Hwy. |
| | • Izaak Walton | 8 | 38 | 7 | | | | | | | B | F | Sterling | 81 Sterling Hwy. |
| | • Morgans Landing | 279 | 50 | 7 | | | | | | | | F | Sterling | 85 Sterling Hwy. |
| | • Scout Lake | 195 | 8 | 7 | | | | | Tr | | | F | Sterling | 85 Sterling Hwy. |
| | • Funny River | 336 | 5 | 7 | | | | | | | | F | Sterling | 10 Funny River Rd. |
| | • Nilnunqa SHS | 42 | | | | UNDEVELOPED | | | | | | | Sterling | Funny River Road |
| | • Kenai River Islands | 69 | | | | UNDEVELOPED | | | | | | F | Sterling | River Miles 11-41 |
| | • Slikok Creek | 40 | | | | 5 | | | | | | F | Soldotna | Kalifonsky Beach Rd. |
| | • Big Eddy | 16 | | | | | | | | | | F | Soldotna | Big Eddy Road |
| | • Ciechanski | 34 | | | | | | | | | | F | Soldotna | Ciechanski Road |
| | • Kenai River Flats | 832 | | | | T | | | | | | F | Kenai | Kalifonsky Beach Rd. |
| 100 | Caines Head SRA | 5,961 | 4 | 15 | 4 | T | | S | Tr | 11 | | F | Seward | Access by boat |
| 101 | Bernice Lake SRS | 152 | 11 | 15 | 1 | | W | | | | B | | Kenai | 23 Kenai Spur Road |
| 102 | Captain Cook SRA | 3,466 | | | | | | | | | | | | |
| | • Bishop Creek | | 12 | 15 | | T | | | Tr | | | F | Nikiski | 36 Kenai Spur Road |
| | • Stormy Lake Swim Beach | | | | | T | | | | | | F | Nikiski | 36 Kenai Spur Road |
| | • Stormy Lake Picnic Area | | | | 48 | T | | | | | | F | Nikiski | 36.5 Kenai Spur Rd. |
| | • Stormy Lake Boat Launch | | | | 1 | T | | | | | B | F | Nikiski | 37 Kenai Spur Road. |
| | • Swanson River Landing | | | | 1 | T | | | | | | F | Nikiski | 38.5 Kenai Spur Rd. |
| | • Discovery Picnic Area | | | | 20 | T | | | | | | | Nikiski | 39 Kenai Spur Road |
| | • Discovery Campground | | 53 | 15 | | T | W | | Tr | | | F | Kenai | 39 Kenai Spur Road |
| 103 | Crooked Creek SRS | 49 | 75 | 7 | 30 | T | W | | Tr | | | F | Soldotna | Coho Loop Road |
| 104 | Kasilof River SRS | 50 | 16 | 15 | | | W | | Tr | | | F | Soldotna | 109.5 Sterling Hwy. |
| 105 | Johnson Lake SRA | 324 | 50 | 15 | 25 | | | | | | B | F | Soldotna | 110 Sterling Hwy. |
| 106 | Clam Gulch SRA | 129 | 116 | 15 | | | | | | | | F | Soldotna | 117 Sterling Hwy. |
| 107 | Ninilchik SRA | 97 | 165 | 15 | | | | | | | | F | Homer | 135 Sterling Hwy. |
| 108 | Deep Creek SRA | 155 | 300 | 15 | | | W | | | | B | F | Homer | 138 Sterling Hwy. |
| 109 | Stariski SRS | 30 | 13 | 15 | | | W | S | | | | | Homer | 151 Sterling Hwy. |
| 110 | Anchor River SRA | 213 | 38 | 15 | | | | | | | | F | Homer | 157 Sterling Hwy. |
| 111 | Anchor River SRS | 53 | 9 | 15 | | | W | | | | | F | Homer | 162 Sterling Hwy. |
| 112 | Kachemak Bay SP/WP | 368,290 | 8 | 15 | 1 | T | | | Tr | | | F | Homer | Access by plane & boat |

## KODIAK AREA OFFICE

KODIAK

Mile 3.5 Mill Bay Rd. SR Box 3800 Kodiak, Alaska 99615 (907) 486-6339

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 113 | Ft. Abercrombie SHP | 183 | 14 | 7 | | | | | Tr | | | F | Kodiak | 4.0 E. Rezanof Dr. |
| 114 | Buskin River SRS | 196 | 18 | 7 | | | | | Tr | 11 | | F | Kodiak | 4.5 W. Rezanof Dr. |
| 115 | Pasagshak SRS | 20 | 10 | 15 | | | | | | | | F | Kodiak | 40 Pasagshak River Rd. |
| 116 | Shuyak Island SP | 11,000 | | | | | | | Tr | | | F | Kodiak | Access by plane & boat |




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OF ALASKA

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Box E
Juneau, Alaska 99811
(907) 465-2010 Juneau
(907) 563-2167 Anchorage

**Alaska Dept. of Fish & Game**
P.O. Box 3-2000
Juneau, Alaska 99802
(907) 465-4112 Juneau
(907) 344-0541 Anchorage

**Alaska Ferry System**
Division of Marine Highways
P.O. Box R
Juneau, Alaska 99811
(800) 642-0066

**Alaska Public Lands Information Centers**
(3 locations)
250 Cushman Street, Suite 1A
Fairbanks, Alaska 99701
(907) 451-7352
MP 1311 Alaska Highway
P.O. Box 389
Tok, Alaska 99780
(907) 883-5667

605 West 4th Avenue
Anchorage, Alaska 99501
(907) 271-2737

**National Park Service**
2525 Gambell Street
Anchorage, Alaska 99503-2892
(907) 271-2645

**U.S. Forest Service**
P.O. Box 1628
Juneau, Alaska 99802
(907) 271-2507 Juneau
(907) 279-5541 Anchorage

**American Youth Hostels, Inc.**
Alaska Council
P.O. Box 41161
Anchorage, Alaska 99509
(907) 276-3635 (recording)


**LOYER**
vice. Regulations of the U.S.
rimination in departmental
nal origin, age, or handicap.

## SOUTHEAST

**SOUTHEAST REGION OFFICE**
400 Willoughby Bldg., 3rd Floor
Juneau, Alaska 99801 (907) 465-4563

| Unit # | Unit Name | Acreage | Camp Sites * | Camping Limit (days) | Picnic Sites | Toilets | Drinking Water | Picnic Shelters | Trails | Historical Features | Boat Launch | Fishing | Nearest Community | Location |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Totem Bight SHP | 11 | | | | | | | | | | | Ketchikan | 10 Tongass Road |
| 2 | Refuge Cove SRS | 13 | | | 14 | T | | | | | | F | Ketchikan | 8.7 Tongass Road |
| 3 | Settlers Cove SRS | 38 | 12 | 11 | | | | | Tr | | | F | Ketchikan | 18 N. Tongass Road |
| 4 | Pioneer Park SRS | 3 | | | | T | | | Tr | | | | Sitka | 2 Halibut Road |
| 5 | Baranof Castle SHS | 1 | | | | | | | | H | | | Sitka | Lincoln Street |
| 6 | Halibut Point SRS | 22 | | | 9 | T | W | S | Tr | H | | F | Sitka | 4.4 Halibut Road |
| 7 | Old Sitka SHP | 51 | | | | | | | | | B | F | Sitka | 7.5 Halibut Road |
| 8 | Juneau Trail System ST | 15 | | | | | | | Tr | H | | F | Juneau | Juneau Area |
| 9 | Johnson Creek SRS | 65 | | | UNDEVELOPED | | | | | | | | Juneau | 15.5 N. Douglas Hwy. |
| 10 | Wickersham SHS | 5 | | | | | | | | | | | Juneau | 7th Street |
| 11 | Point Bridget SP | 2,800 | | | | | | | Tr | | | F | Juneau | 38.5 Glacier Hwy. |
| 12 | Chilkoot Lake SRS | 80 | 32 | 7 | | | | W | S | | | B F | Haines | 10 Lutak Road |
| 13 | Portage Cove SRS | 7 | 9 | 7 | 3 | T | W | | | | | F | Haines | 1 Beach Road |
| 14 | Chilkat SP | 6,045 | 15 | 15 | | | | W | S | Tr | | B F | Haines | 7 Mud Bay Road |
| 15 | Ak-Chilkat Bald Eagle P. | 49,320 | | | UNDEVELOPED | | | | | | | F | Haines | 8-30 Haines Hwy. |
| 16 | Mosquito Lake SRS | 5 | 10 | 15 | | T | W | | | | | B F | Haines | 27.2 Haines Hwy. |
| 17 | Gruening SHP | 12 | | | | | | | | H | | F | Juneau | 24 Glacier Hwy. |
| SOUTHEAST ALASKA STATE MARINE PARKS | | | | | | | | | | | | | | |
| 18 | Dall Bay SMP | 585 | | | UNDEVELOPED | | | | | | | F | Ketchikan | Gravina Island |
| 19 | Thom's Place SMP | 1,198 | | | UNDEVELOPED | | | | | | | F | Wrangell | Wrangell Island |
| 20 | Beecher Pass SMP | 660 | | | UNDEVELOPED | | | | | | | F | Wrangell | Mitkof Island |
| 21 | Joe Mace Island SMP | 62 | | | UNDEVELOPED | | | | | | | F | Wrangell | Sumner Strait |
| 22 | Security Bay SMP | 500 | | | UNDEVELOPED | | | | | | | F | Petersburg | Chatham Strait |
| 23 | Taku Harbor SMP | 700 | | | UNDEVELOPED | | | | | | | F | Juneau | Stephens Passage |
| 24 | Oliver Inlet SMP | 500 | | | | T | | | Tr | | B | F | Juneau | Admiralty Island |
| 25 | Funter Bay SMP | 162 | | | UNDEVELOPED | | | | | | | F | Juneau | Admiralty Island |
| 26 | Shelter Island SMP | 3,560 | | | 6 | T | | | Tr | | | F | Juneau | Lynn Canal |
| 27 | St. James Bay SMP | 10,220 | | | UNDEVELOPED | | | | | | | F | Juneau | Lynn Canal |
| 28 | Sullivan Island SMP | 2,163 | | | UNDEVELOPED | | | | | | | F | Juneau | Lynn Canal |
| 29 | Chilkat Islands SMP | 6,560 | | | UNDEVELOPED | | | | | | | F | Haines | Lynn Canal |
| 30 | Magoun Islands SMP | | | | UNDEVELOPED | | | | | | | F | Sitka | Krestof Sound |
| 31 | Big Bear/Baby Bear SMP | | | | UNDEVELOPED | | | | | | | F | Sitka | Peril Strait |

## NORTHERN

**NORTHERN REGION OFFICE**
3700 Airport Way Fairbanks, Alaska 99709-4613 (907) 451-2695

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 32 | Tok River SRS | 38 | 50 | 15 | | | | | Tr | | | | Tok | 1309 Alaska Hwy. |
| 33 | Eagle Trail SRS | 640 | 40 | 15 | 4 | T | W | S | Tr | H | | | Tok | 109.5 Tok Cutoff |
| 34 | Moon Lake SRS | 22 | 15 | 15 | | | W | | | | B | | Tok | 1332 Alaska Hwy. |
| 35 | Fielding Lake SRS | 300 | 7 | 15 | | T | | | | | B | F | Delta Jct. | 200.5 Richardson Hwy. |
| 36 | Donnelly Creek SRS | 42 | 12 | 15 | | T | W | | | | | | Delta Jct. | 238 Richardson Hwy. |
| 37 | Clearwater SRS | 27 | 18 | 15 | | T | W | | | | B | F | Delta Jct. | 141.5 Alaska Hwy. |
| 38 | Delta SRS | 7 | 22 | 15 | 6 | T | W | | | | | | Delta Jct. | 267 Richardson Hwy. |
| 39 | Big Delta SHP | 10 | | | | | | | | | | | Delta Jct. | 274.5 Richardson Hwy. |
| 40 | Quartz Lake SRA | 600 | 16 | 15 | | | | S | Tr | | B | F | Delta Jct. | 277.8 Richardson Hwy. |
| 41 | Birch Lake SRS | 191 | 10 | 15 | | T | | | | | B | F | Delta Jct. | 305.5 Richardson Hwy. |
| 42 | Harding Lake SRA | 169 | 89 | 15 | 52 | | | | Tr | | B | F | Delta Jct. | 321.4 Richardson Hwy. |
| 43 | Salcha River SRS | 61 | 25 | 15 | 20 | | W | | | | B | F | Delta Jct | 323.3 Richardson Hwy. |
| 44 | Chena River SRS | 27 | 59 | | 30 | | | | | | B | F | Fairbanks | University Avenue |
| 45 | Chena River SRA | 254,080 | | | | | | | | | | | | |
| | • Rosehip Campground | | 38 | 15 | | | | | Tr | | | F | Fairbanks | 27 Chena Hot Sp.Rd. |
| | • Tors Trail Campground | | 23 | 15 | | | | | Tr | | | F | Fairbanks | 39 Chena Hot Sp.Rd. |
| | • Red Squirrel Picnic Area | | | | 12 | | | | | | | F | Fairbanks | 43 Chena Hot Sp.Rd. |
| | • Lower Chena Dome Tr Hd. | | | | | T | W | | Tr | | | | Fairbanks | 49 Chena Hot Sp.Rd. |
| | • Upper Chena Dome Tr Hd. | | | | | T | | | Tr | | | | Fairbanks | 50.5 Chena Hot Sp.Rd. |
| | • Angel Rocks Trailhead | | | | 1 | T | | | Tr | | | | Fairbanks | 49 Chena Hot Sp.Rd. |
| 46 | Upper Chatanika River SRS | 73 | 25 | 15 | | T | W | | | | | F | Fairbanks | 39 Steese Highway |
| 47 | Lower Chatanika R. SRA | 570 | | | | | | | | | | | | |
| | • Whitefish Campground | | 15 | 15 | | | | | | | B | F | Fairbanks | 11 Elliott Highway |
| | • Olnes Pond | | 50 | 15 | | T | W | | | | | F | Fairbanks | 10.5 Elliott Highway |

## MAT-SU

**MATANUSKA-SUSITNA / VALDEZ / COPPER RIVER AREA OFFICE**
HC32 Box 6706 Wasilla AK 99687 (907) 745-3975

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 48 | Denali SP | 324,240 | | | | | | | | | | | | |
| | • Little Coal Creek Trailhead | | | | | | T | | Tr | | | | Trapper Cr. | 163.9 Parks Hwy. |
| | • AK Veteran's Memorial | | | | | 10 | | | | | | | Trapper Cr. | 147.1 Parks Hwy. |
| | • Byers Lake Campground | | 66 | 15 | 15 | T | | | Tr | | B | F | Trapper Cr. | 147 Parks Hwy. |
| | • Upper Troublesome Cr. Tr.Hd. | | | | | T | | | Tr | | | F | Trapper Cr. | 137.6 Parks Hwy. |
| | • Lower Troublesome Cr. Tr.Hd. | | 26 | 15 | 10 | T | | S | Tr | | | F | Trapper Cr. | 137.2 Parks Hwy. |
| | • Denali Viewpoint South | | | | | | | | | | | | Trapper Cr. | 135.2 Parks Hwy. |
| 49 | Montana Creek SRS | 82 | 89 | 15 | 28 | | | | | | | F | Talkeetna | 97.6 Parks Hwy. |
| 50 | Willow Creek SRA | 3,583 | | | | T | W | | | | | F | Willow | 70 Parks Hwy. |
| | • Deception Creek Cpgd. | | 7 | 15 | | | | | | | | F | Willow | 48 Hatcher Pass Road. |
| 51 | Nancy Lake SRA | 22,685 | | | | | | | | | | | Willow | 67.2 Parks Hwy. |
| | • Winter Trailhead | | | | | | | | Tr | | | | Willow | 1.8 Nancy Lk. Pkwy. |
| | • Tulik Nature Trail | | | | | T | | | Tr | | | | Willow | 3.5 Nancy Lk. Pkwy. |
| | • Canoe System Trailhead | | | | 6 | T | | | Tr | | | F | Willow | 4.8 Nancy Lk. Pkwy. |
| | • South Rolly Lake Cpgd. | | 98 | 15 | 20 | T | W | S | Tr | | B | F | Willow | 6.5 Nancy Lk. Pkwy. |
| 52 | Nancy Lake SRS | 30 | 30 | 15 | 30 | | W | | | | B | F | Willow | 66.5 Parks Hwy. |
| 53 | Rocky Lake SRS | 48 | 10 | 7 | | T | W | | | | B | F | Big Lake | 3.5 Big Lake Road |
| 54 | Big Lake North SRS | 19 | 60 | 7 | | | | | | | B | F | Big Lake | 5 N. Big Lake Road |
| 55 | Big Lake South SRS | 16 | 20 | 7 | 10 | | W | | | | B | F | Big Lake | 5.2 S. Big Lake Road |
| 57 | Kepler-Bradley Lakes SRA | 344 | | | | | | | | | | | | |
| | • Matanuska Lake | | | | | | | | | | | | Palmer | 36.4 Glenn Hwy. |
| | • Canoe Lake | | | | | | | | Tr | | | F | Palmer | 38.0 Glenn Hwy. |
| | • Irene Lake | | | | | | | | Tr | | | F | Palmer | 38.0 Glenn Hwy. |
| | • Long Lake | | | | | | | | Tr | | | F | Palmer | 38.0 Glenn Hwy. |
| 58 | Finger Lake SRS | 47 | 41 | 7 | 10 | T | W | | Tr | | B | F | Palmer | Bogard Road |
| 59 | Wolf Lake SRS | 23 | 4 | 7 | 4 | | | | | | | F | Palmer | 2.5 Engstrom Dr. |
| 60 | Independence Mine SHP | 761 | | | | | W | | | | | | Palmer | 18 Hatcher Pass Rd. |
| 61 | Summit Lake SRS | 360 | | | | | | | Tr | | | | Palmer | 20 Hatcher Pass Rd. |
| 62 | Moose Creek SRS | 40 | 12 | 7 | 4 | | W | | Tr | | | F | Palmer | 54.4 Glenn Hwy. |
| 63 | King Mountain SRS | 20 | 22 | 15 | 2 | T | W | S | | | | | Palmer | 76 Glenn Hwy. |
| 64 | Bonnie Lake SRS | 129 | 8 | 15 | | T | | | | | B | F | Palmer | 83.3 Glenn Hwy. |
| 65 | Long Lake SRS | 480 | 9 | 15 | | T | W | | | | B | F | Palmer | 85.3 Glenn Hwy. |
| 66 | Matanuska Glacier SRS | 229 | 12 | 15 | | | | | Tr | | | | Palmer | 101 Glenn Hwy. |

## COPPER BASIN

(See Mat-Su/Copper Basin address) Glennallen Office (907) 822-5536

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 67 | Little Nelchina SRS | 22 | 11 | 15 | | T | | | Tr | | B | F | Glennallen | 137.4 Glenn Hwy. |
| 68 | Lake Louise SRA | 90 | 36 | 15 | | | W | | | | B | F | Glennallen | 160 Glenn Hwy. |
| 70 | Dry Creek SRS | 372 | 58 | 15 | 4 | T | | S | Tr | | | F | Glennallen | 117.5 Richardson Hwy. |
| 71 | Porcupine Creek SRS | 240 | 12 | 15 | | | | | Tr | | | F | Tok | 64 Tok Cut-off |
| 72 | Liberty Falls SRS | 10 | 8 | 4 | | T | | | Tr | | | | Chitina | 23.5 Edgerton Hwy. |
| 73 | Squirrel Creek SRS | 350 | 14 | 15 | | T | W | | | | | F | Copper Ctr. | 79.5 Richardson Hwy. |
| 74 | Little Tonsina SRS | 103 | 8 | 15 | | T | W | | | | | F | Copper Ctr. | 65 Richardson Hwy. |
| 75 | Worthington Glacier SRS | 113 | | | | | | | Tr | | | | Valdez | 28.7 Richardson Hwy. |
| 76 | Blueberry Lake SRS | 192 | 15 | 15 | | | | | Tr | | | F | Valdez | 23 Richardson Hwy. |

# Please help protect our parks



Mountain goat

**RESERVATIONS** are not required for any park facilities except rental cabins. Permits are required for large groups or commercial activities.

**PETS** must be on leashes at developed facilities, such as campgrounds and picnic areas, and under control in other areas at all times.

**LITTER** is an eyesore and a disappointment to park visitors. All refuse should be removed or placed in litter containers provided. In the backcountry, please pack out what you pack in and leave your campsite as you found it. Practice "no trace" camping.

**MOTOR VEHICLES** are generally restricted to roads and parking lots. For information on specific areas open to off-road vehicles, contact a park office.

**HORSEBACK RIDING** is allowed in designated areas of park units. Call a park office for information on specific areas.

**FISHING & HUNTING** regulations can be obtained from the State Dept. of Fish and Game. Check campground bulletin boards or call a park office for current information.

**DISCHARGE OF FIREARMS** Check with park office for area closures and for 1/4 or 1/2 mile restrictions near developed facilities. Target shooting is prohibited.

**FIRES** must be confined to designated sites. Portable stoves should be used in the backcountry.

**FIREWORKS** are strictly prohibited.

**WILDFLOWERS,** trees, ferns and grasses are found in abundance in Alaska's parks. Enjoy them, but please don't pick wildflowers or peel bark from trees. Leave the beauty for the next person to appreciate.

*** Camp Sites:**
Most campsites accommodate RVs up to 35 ft. in length.
Electrical hook-ups are not available.
indicate available handicap accessible facilities.

- = Sanitary dump station
- SP = State Park
- SRS = State Recreation Site
- SRA = State Recreation Area
- SHP = State Historical Park
- SHS = State Historic Site
- ST = State Trail
- WP = Wilderness Park
- SMP = State Marine Park
- P = Preserve







**AN EQUAL OPPORTUNITY EMPL**

This agency receives Federal funds from the National Park Se Department of the Interior strictly prohibit unlawful dis Federally Assisted Programs on the basis of race, color, nati

## CHUGACH / SOUTHWEST

HOUSE RESOURCES COMMITTEE

**DATE:** January 18, 1993

**PLACE:** Capitol, Room 124

**SUBJECT OF MEETING:**

Department of Natural Resources
Overview

| NAME | REPRESENTING | BUSINESS/PERSONAL MAILING ADDRESS | ZIP | (H) PHONE | (W) PHONE | DO YOU WANT TO TESTIFY? | | WHAT SUBJECT/ WHICH BILL? |
|---|---|---|---|---|---|---|---|---|
| Glenn A Olds | DNR | 400 Willoughby | 99801 | 465-2400 | -7 | (Y) | N | Overview of Dept. |
| | | | | | | Y | N | |
| | | | | | | Y | N | |
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