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MEMORANDUM OF UNDERSTANDING
BETWEEN THE ALASKA PERMANENT FUND
CORPORATION AND THE DEPARTMENT
OF COMMERCE & ECONOMIC DEVELOPMENT

I. PURPOSE:

The purpose of this Memorandum of Understanding is to express the willingness of the Alaska Permanent Fund Corporation (APFC) and the Department of Commerce and Economic Development (DCED) to share their knowledge, relationships and experience within the mandate, authority and budget of each organization in the marketing and promotion of Alaska's products and services by utilizing venues which exist in real estate owned by the APFC. This joint effort is hereafter known as "Celebrate Alaska!"

Cooperation between the parties includes the following:

- A. Exchanging information on activities in areas of common interest;
- B. Developing programs of mutual interest; and
- C. Establishing a working committee to review Celebrate Alaska! on a periodic basis.

II. RESPONSIBILITIES

The APFC will maintain a list of state agencies and organizations which are available to its Investment Managers as a resource for promotional material.

The DCED will identify suitable promotional materials for use by APFC Investment Managers and will facilitate their availability.

APFC Investment Managers are responsible for identifying opportunities and implementing Celebrate Alaska! in accordance with APFC Board Resolution 98-1 attached as Exhibit "1".

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A working committee is established to assure success of Celebrate Alaska! This committee will review the program on a periodic basis and will provide a written report of this review to the Commissioner of Commerce and the Executive Director of the APFC.

This project will be undertaken by a working committee consisting of the following:

Alaska Permanent Fund Corporation

Jim Kelly, Director of Communications

Peter Naoroz, Manager of Real Estate Investments

Department of Commerce & Economic Development

Becky Beck, Small Business Development Specialist, Division of Trade and Development

Dave Karp, Executive Director, Tourism Marketing Council

Tom Garrett, Director, Division of Tourism

III. BACKGROUND:

The Board of Trustees of the APFC has adopted a strategic plan relating to real estate investments, which outlines an allocation to direct equity real estate. The strategic plan also sets forth an active Alaska investment plan with an Alaska outreach component.

The DCED is involved in marketing Alaska's products and services thereby enhancing image and increasing demand. In addition, the Department of Commerce and Economic Development acts as a liaison and advocate for Alaska businesses.

The APFC and DCED recognize that it is to their mutual benefit to cooperate on marketing Alaska products and services by utilizing venues which exist in real estate owned by APFC.

IV. PERIOD AND CONDITIONS:

This Memorandum of Understanding is intended to provide a continuous communication link between APFC Investment Managers and the DCED and a framework for evaluating the program on a periodic basis.

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The Memorandum of Understanding adheres strictly to the guidelines of Resolution No. 98-1 adopted by the Alaska Permanent Fund Board of Trustees, Promoting Alaska through Utilization of Certain Real Estate Investments.

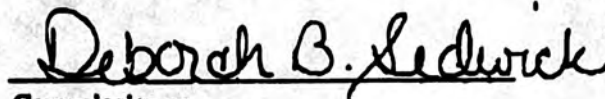
Nothing in this Memorandum of Understanding is intended to diminish or otherwise affect the authority of either organization to carry out its functions independently and in accordance with its existing authorities.

V. NAME AND SIGNATURE:

ALASKA PERMANENT
FUND CORPORATION


Executive Director
Alaska Permanent Fund Corporation
801 W 10th Street, Suite 302
Juneau, Alaska 99802

ALASKA DEPARTMENT OF COMMERCE
AND ECONOMIC DEVELOPMENT


Commissioner
Department of Commerce & Economic Development
3601 C Street, Suite 700
Anchorage, Alaska 99503

DATE: 6/10/98 ---

DATE: 10 June 1998

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Exhibit "1"

Alaska Permanent Fund Corporation

**RESOLUTION OF THE BOARD OF TRUSTEES
RELATING TO PROMOTING ALASKA THROUGH THE
UTILIZATION OF CERTAIN REAL ESTATE INVESTMENTS**

RESOLUTION NO. 98-1

The Board of Trustees of the Alaska Permanent Fund Corporation (APFC) has adopted a strategic plan relating to real estate investments which outlines a substantial allocation to direct equity real estate. The strategic plan also sets forth an active Alaska investment plan with an Alaska outreach component.

Investment staff, working in conjunction with investment managers and agencies of the State of Alaska, has implemented several preliminary strategies in order to fully develop this policy. These strategies range broadly and include placing informational brochures in sitting areas, running video tape featuring Alaska scenery, working with retailers in outfitting kiosks and promoting Alaska with well publicized vacation giveaways.

Staff has identified numerous issues through out this process in order to articulate a policy for future outreach. Staff has determined that certain types of real estate investments may provide an opportunity to promote Alaska at minimal costs and in a way that the investment returns are not affected.

Guidelines:

- Staff and investment managers shall promote Alaska after consideration of all the facts and circumstances.

Facts and circumstances which will be considered in determining whether a promotional opportunity exists include, but are not limited to, the following:

1. Location should be available without displacing or disrupting tenants.

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2. Existing tenants should benefit from promotion.
 3. Physical investment should be enhanced.
 4. Promotions should be easily maintained so as not to appear dated.
 5. Costs associated with promotion should be budgeted.
 6. Promotions should be demonstrably effective and verified by market research.
- List of state agencies and organizations which are available as a resource for promotional material shall be maintained at the APFC for investment manager consideration. Staff time and other APFC resources shall be minimized in the implementation of this policy. State agencies and organizations shall bear the appropriate costs associated with this promotional policy.
 - All promotion will be general in nature, sanctioned by the State of Alaska, and shall not identify ownership of the asset by the APFC.
 - Investment analysis (e.g. hold/sell, acquisition) by staff and investment managers shall be done in an appropriate fashion independent of any assessment of benefits associated with promoting Alaska.
 - Staff will not impose promotional policy on any co-investment partner through a vote of the APFC's interest relating to operational affairs of the investment.

BE IT RESOLVED:

That Board of Trustees hereby embraces the concept of utilizing APFC direct equity real estate assets to promote Alaska if it does not dilute in any way the investment return of these individual assets and in accordance with the above established guidelines.

PASSED AND APPROVED by the Board of Trustee's of the Alaska Permanent Fund Corporation this 29th day of January 1998.

***Chair, Board of Trustees
Alaska Permanent Fund Corporation***

STATE OF ALASKA

DEPARTMENT OF COMMERCE AND ECONOMIC DEVELOPMENT

OFFICE OF THE COMMISSIONER

TONY KNOWLES, GOVERNOR

P.O. BOX 110800
JUNEAU, ALASKA 99811-0800
PHONE: (907) 465-2500
FAX: (907) 465-5442
TDD: (907) 465-5437

March 17, 1999

Dear (CEO Name):
(Company Name)

The State of Alaska has confidence in your company and its potential in the future. As a result, we have invested \$(amount) in your stock through our holding in Alaska's Permanent Fund, a \$25 billion investment portfolio. We believe that (Company Name) will continue to do well under your leadership in today's economy.

As an investor with confidence in your company, I would like you to consider doing business in Alaska. It's an ideal place to do business that will help your company's bottom line. Here are some reasons:

Contrary to popular assumptions, Alaska has a bustling economy with a great wealth of fish, oil and gas, forest products, minerals, and coal. Alaska is at the center of the world's most active trading hemisphere, with ice-free, deep-water ports close to many major trade centers. Nearly equidistant from Tokyo, London and New York, Anchorage International Airport is the nation's busiest cargo airport, with more than 70 percent of all Asia to North America cargo setting down there. Alaska also has the fourth busiest seaport in the United States with an annual throughput of over 95 million tons.

We have a strong education system that supports business with excellent employees. In 1996, Alaska ranked second in per capita expenditures for education. As a result, Alaska led the nation in the percentage of our population that attained a high school diploma. In 1998, Expansion Management Magazine awarded blue ribbons to the school districts of our three largest cities.

Alaska's vast economic opportunity is only part of its appeal. This active economy is set in one of the world's most spectacular settings--a land of towering mountains and deep fjords, protected

inland waterways and rolling tundra plains. While Alaskans enjoy a wide variety of outdoor recreational activities, it does not mean that residents sacrifice cultural and intellectual pursuits. Alaska's oil revenues enabled the creation of performing arts, convention, and educational infrastructure statewide.

Please contact me to discuss a move or expansion of your headquarters, operations or investment in Alaska. Our strong economy and high quality lifestyle appeal make it an ideal place to do business.

Sincerely,

Byron I. Mallott, Executive Director
Alaska Permanent Fund Corporation

Deborah B. Sedwick, Commissioner
Alaska Dept of Commerce and Economic Development

Visit us on our sites!

<http://www.commerce.state.ak.us/>

<http://www.apfc.org/>

NEW JOBS NEW MONEY

The people of Alaska have a very powerful economic tool at their finger tips. The Permanent Fund investment holdings in corporate America are approximately nine billion dollars, with an additional four and one half billion dollars in international stock holdings. The Permanent Fund list of companies is over a hundred pages in length and covers all areas of corporate America. There is one group that these businesses listen to, cater to, and otherwise want to make happy; that group is the corporate shareholder.

This means that our ability to attract economic development opportunities to Alaska just got easier. Using our Permanent Fund stock ownership will allow access to the corporate decision-makers. We would not be asking for a competitive edge, simply the ability to make a business presentation to the right people, a chance to demonstrate that Alaskan business is competitive and very sophisticated. We would be facilitating meetings between Alaskan business people and corporate America decision-makers.

While our stock holdings in companies will not force companies to do business in Alaska, they can be used as a tool for communications with the decision-makers. For instance, if all things are equal with businesses in several different areas of the country, and Alaskans own millions of dollars in stock in a particular company, don't you think Alaskans would have the advantage concerning that company's business decision?

Our wage structure is comparable to other areas; freight would be negligible in high value, low weight products. Communications, technology, and information retrieval are competitive with other locations. Plus, we have many advantages that other areas don't have. For instance, we have natural resources, energy, capitalization, land, strategic location between Asia, America and Europe, and a can-do attitude in the private sector and state government.

Alaskans own about \$200,000,000 (two hundred million dollars) worth of shares of General Electric. When General Electric was contacted and the Permanent Fund was explained, and we stressed that Alaskans were interested in finding out how they could outsource parts, supplies, services, or technology. GE assigned three people to determine what Alaskan business could do for General Electric and its 36 subsidiaries.

The Permanent Fund owns hundreds of millions of dollars of shares in grocery store chains and national food outlets. We should have the ability to talk to the people that buy seafood products or other goods that Alaskan businesses produce. Can you imagine the Alaskan business that would be created if we had the ability to secure two feet of shelf space in every Wal-Mart, Albertson or Safeway store in the U.S. for Alaskan products? How about talking to the buyer about Alaskan food products for the many fast foods chains in which we own corporate stock?

We have the ability to attract to Alaska decision-makers of the safe and clean industries that we want located here. Our hundreds of million of dollars in computer

manufacturing and software firms could very well entice new investments to open in many parts of Alaska. The magic is we don't necessarily need to attract a full-scale plant, but we can create a lot of new jobs by assisting the existing Alaskan businesses to expand to serve our potential new markets. With fiber optics communications, even Nome, Alaska is just a half a "nano-second" from East Coast markets.

Contacting corporate America by State Legislators has proven to be effective in facilitating dialog between Alaskan business and corporate America. The facilitator identifies a business opportunity, informs that Alaskan business, and facilitates a contact to the appropriate decision-maker in corporate America. The Alaskan business then follows up. This new program does not require much expense. A consultant assists the Legislator or Legislative Committee by making telephone calls, utilizing computer time, or by sending letters. Additionally there could be some instate and out of state travel.

When contacting corporate America, it is stressed that we are shareholders and make money when a company is profitable. All we ask is to be able to talk to the decision-makers, get to the right person to make presentations, or find out which subsidiaries would be more appropriate for Alaskans when conducting business. This program would not be effective if the corporate shares of stock were used to try to intimidate or force decisions.

However, corporations or their subsidiaries not finding a need for Alaskan services could be encouraged to have corporate board meetings, training programs, or retreats in Alaska. Additionally, many corporations offer grants through their foundations that could benefit Alaskan social programs or projects. With some of our larger holdings we should have an Alaskan sitting on their board of directors protecting Alaskan interests and voting shares of stock. Alaskans have tremendous access to corporate and financial America. In the attempt to diversify our economy, we have the perfect communication tool in our Permanent Fund holdings, an ownership basis in Corporate America.

**ALASKA SCIENCE &
TECHNOLOGY FOUNDATION**

**Briefing on Long-term Economic
Development Strategy**

**Jamie Kenworthy
Executive Director**

Putting Innovation to Work for Alaska



PURPOSE

Briefing

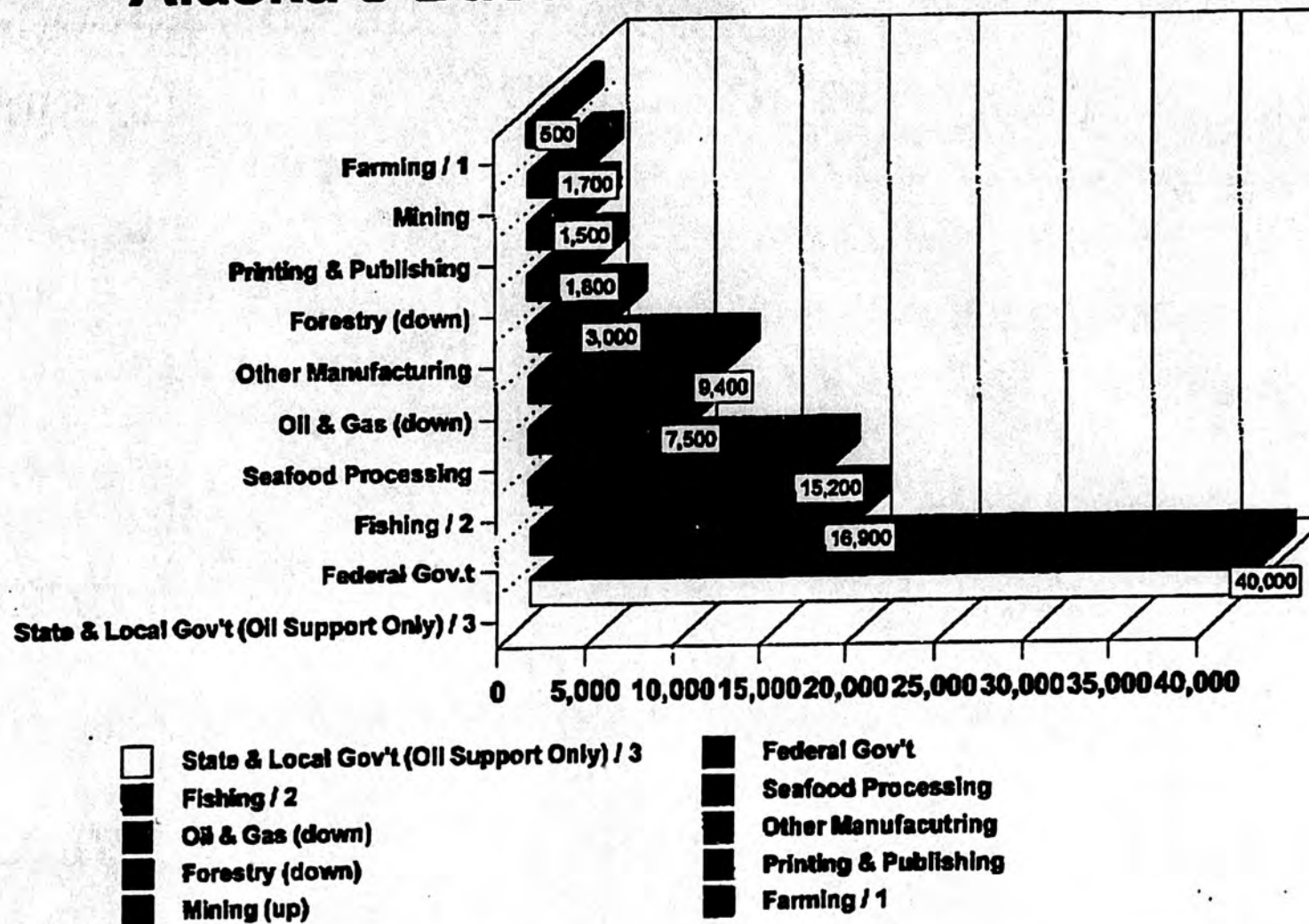
Focus on how to grow pie by replacing imports and expanding exports.

Overview of changes in state's economic base

Highlight key competitive issues in different sectors

Examine changes in industry structure, technology, global competition, and Alaska capability to provide a longer range view of economic development

Alaska's Base Industries Jobs 1999



1/ Estimate from July Summary

2/ Source: National Institute for Occupational Safety and Health and Alaska Seafood Industry Study, McDowell Corporation

3/ Represents 70% of total state and local employment

SOURCE: Alaska Department of Labor, Research and Analysis of 12/98 and footnote estimates

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Purpose of Briefing, continued

Caveats

Not highlight ASTF role.

Not focus on short term issues or ones easiest to fix by public sector.

Some numbers somewhat out of date; plan to revise annually statewide data and different sectors if you find this helpful.

This report still in draft form; appreciate comments direct to me and limited circulation.

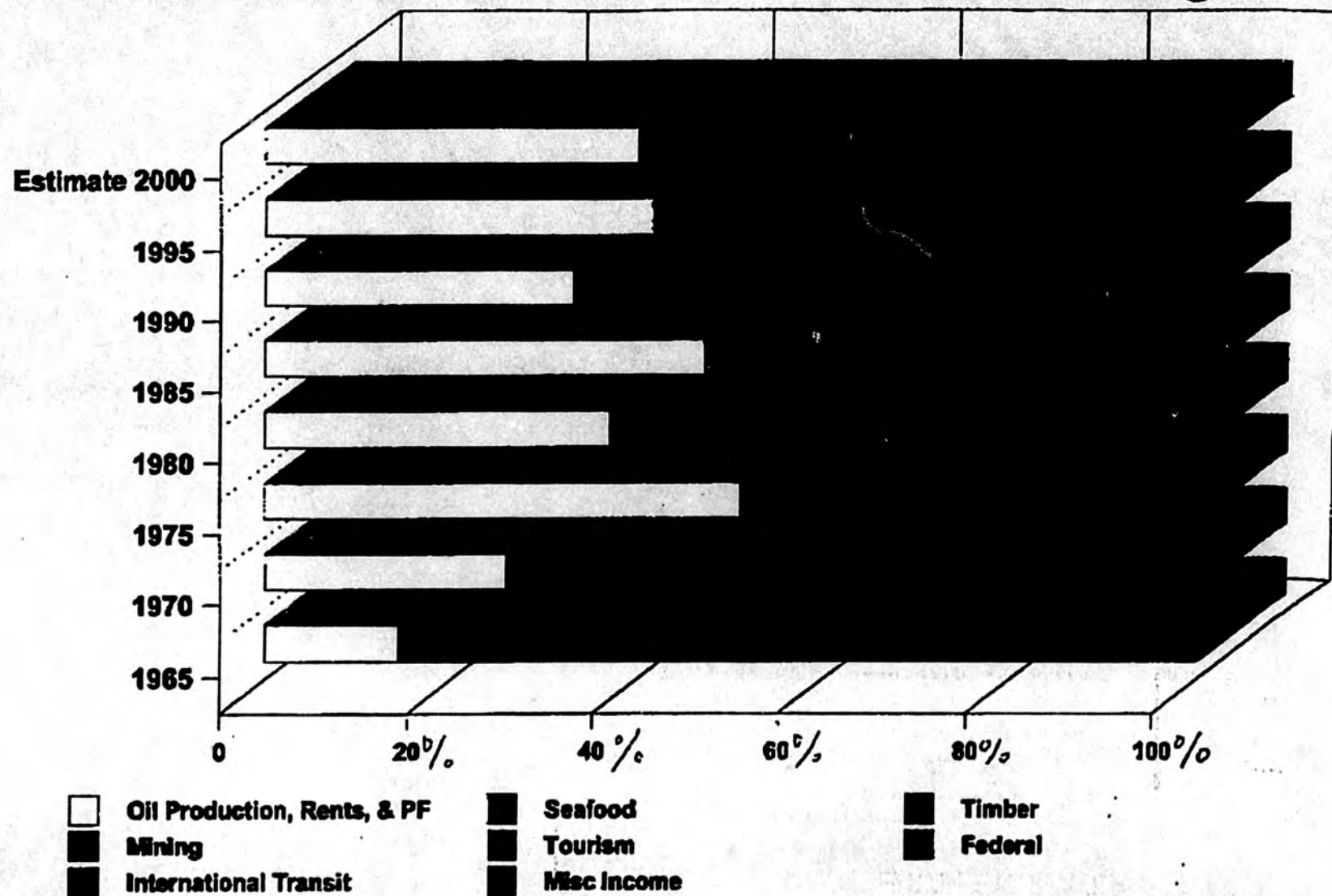
SHARES OF ALASKA PERSONAL INCOME ATTRIBUTABLE TO SECTOR

	1965	1970	1975	1980	1985	1990	1995	2000*
OIL PRODUCTION	1.8%	6.2%	30.5%	13.7%	14.3%	12.6%	11.5%	10%
OIL RENTS	12.5%	12.2%	15.5%	23.3%	29.2%	22.5%	23.9%	22%
PERMANENT FUND	0.0%	0.0%	0.0%	0.0%	3.5%	6.4%	6.1%	8%
SEAFOOD	8.2%	8.6%	5.6%	9.5%	6.7%	9.7%	7.4%	7%
TIMBER	5.0%	4.5%	3.1%	4.1%	2.3%	2.8%	1.8%	1%
MINING	3.5%	1.4%	0.9%	1.5%	1.4%	1.8%	1.7%	3%
TOURISM	1.4%	1.6%	2.0%	3.9%	3.8%	3.8%	4.8%	5%
FEDERAL CIVILIAN	33.0%	31.7%	24.3%	26.2%	22.7%	24.1%	27.6%	27%
FEDERAL MILITARY	32.8%	31.3%	16.0%	14.5%	11.5%	11.9%	10.0%	10%
INTERNATIONAL TRANSIT	0.6%	0.8%	1.0%	1.1%	1.1%	1.0%	1.2%	2%
AGRICULTURE	0.0%	0.0%	0.0%	0.0%	0.1%	0.1%	0.1%	.2%
MISCELLANEOUS INCOME	1.2%	1.7%	1.2%	2.2%	3.2%	3.4%	3.9%	5%
	100%	100%	100%	100%	100%	100%	100%	100%

*Estimate

Source—Institute of Social & Economic Research, University of Alaska Anchorage

How Alaska's Economic Base has Changed



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MINING

Assets

Quality of resources and prospects

Unlike fish + timber, small share of value in final processing resource so higher share of value for resource.

Existing solid DNR geotechnical mapping program can be integrated with newly declassified radar tools to produce better maps.

Have current ability to co-finance near bankable projects (AIDEA-Comino) and develop science behind key regulatory issues (ASTF-Total Dissolved Solids project with Producers Council, ADEC, ADF&G)

MINING

Challenges

Dependent on world commodity prices for coal, gold, and other minerals

Small placer miners and majors have separate needs and capability.

State relatively unmapped geologically

AK higher cost environment competing for global investment

Perception of regulatory uncertainty

Headquarters and central evaluation staff for majors all out of state

Forest Products Challenges, continued

No supply chains in state; each mill must do it all and isn't organized to attack both high and low end of market

Low Canadian \$ + Asian flu

70-90 MMBF/year of graded lumber; almost all imported (McDowell report)

Historical perception of Alaska box stores of lower quality from Alaska mills.



Forest Products

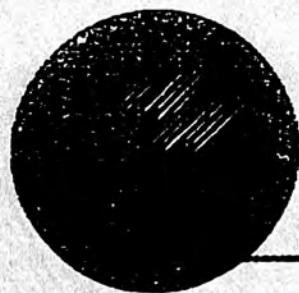
Challenges

Historically, value losing industry (increasing share of harvesters than processors) and steady decline of industry.

Few high throughput mills with modern kiln drying.

AK companies undercapitalized and most structured to export cants and intermediate products.

Ketchikan, Sitka mills closure took away both jobs and demand for low end timber use.



Forest Products

Assets

Local Market in non-SE Alaska which could compete with Seattle transportation costs.

2 Mills (Kenai and Ketchikan) approaching economic scale + prospect of Ketchikan veneer plant

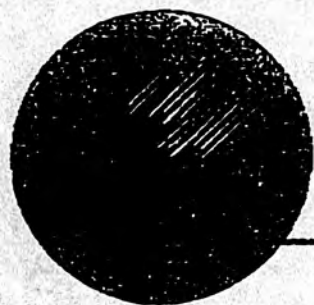
More state/private control of timber supply in Southcentral and Interior.

New grading program by WWPA at 9 mills to replace imported lumber. Technical assistance now available statewide.

Forest Products Assets, continued

Technical quality of AK white/Sitka spruce, yellow cedar, and hemlock far higher than SPF grade

New Forest Practices Act brings more regulatory certainty to permitting process.



Seafood

Challenges

Value/profit largely post-Alaska

AK salmon declining share of world market and now overtaken by farm fish in Japan. Chile and Norway have both increased share of domestic market and size of market.

Structure of industry with different gear groups and between harvestors and processors has added uncompetitive costs and weak chain of custody. Result is weak capitalization of AK firms and AK branch plants.

Seafood Challenges, continued

Domestic market perception of inconsistent quality of wild Alaska salmon. (Direct deals exception.)

No clear third party verification of quality to educate consumers ("Copper Rivers reds" exception?)

Seasonal supply of wall of fish vs. dependable quality and supply for farm fish.



SEAFOOD

ASSETS

When quality maintained, world class product.

AK now 60% of US seafood industry

Industry is statewide. 75% active commercial permits in Alaska. Anchorage home to 30 + processors.

ASMI has now adopted quality standards. Emerging industry consensus to attack quality issues and focus marketing. (Salmon Forum)

Seafood Assets, continued

Most jobs of any base industry (though lower wage and more seasonal than others.)

Shortfall in Chile production this summer provides a one-time opportunity.

A few healthy niches are shellfish production, salmon direct marketing, and surimi production.

Alaska Seafood International plant has scale to effect industry and demonstrate logic of strategy of Alaska direct to 48 supermarkets.

Industry consensus for harvesters and processors to work on quality and transport issues. (Salmon Forum)



Technology

Challenges

Far from cutting edge customers and suppliers

Low production of programmers and software engineers and other knowledge workers. (National shortage.)

To date high rates for high-speed Internet connections

Many procurement decisions for Alaska operations made outside.

Technology, continued

Assets

Growth in Internet has reduced location disadvantage.

Ak life style choice for certain type of techie entrepreneurs

At least one additional cable to Alaska will create excessive supply so rates will improve

Close to customers starting to do real time, digital technology to add efficiency

Fast growing sector in state at faster rate than national rate



Some Conclusions

Manufacturing Matters

Economic Development = Capital + Technology + Production skills + Business Know-how

Need to Focus Public and Private sector on growing the base because all other jobs in retail, service, commercial, and government dependent on health of base.

Private sector leads but need infrastructure to add value.

Need to grow our own economy and not just depend on outside investment in one time projects.

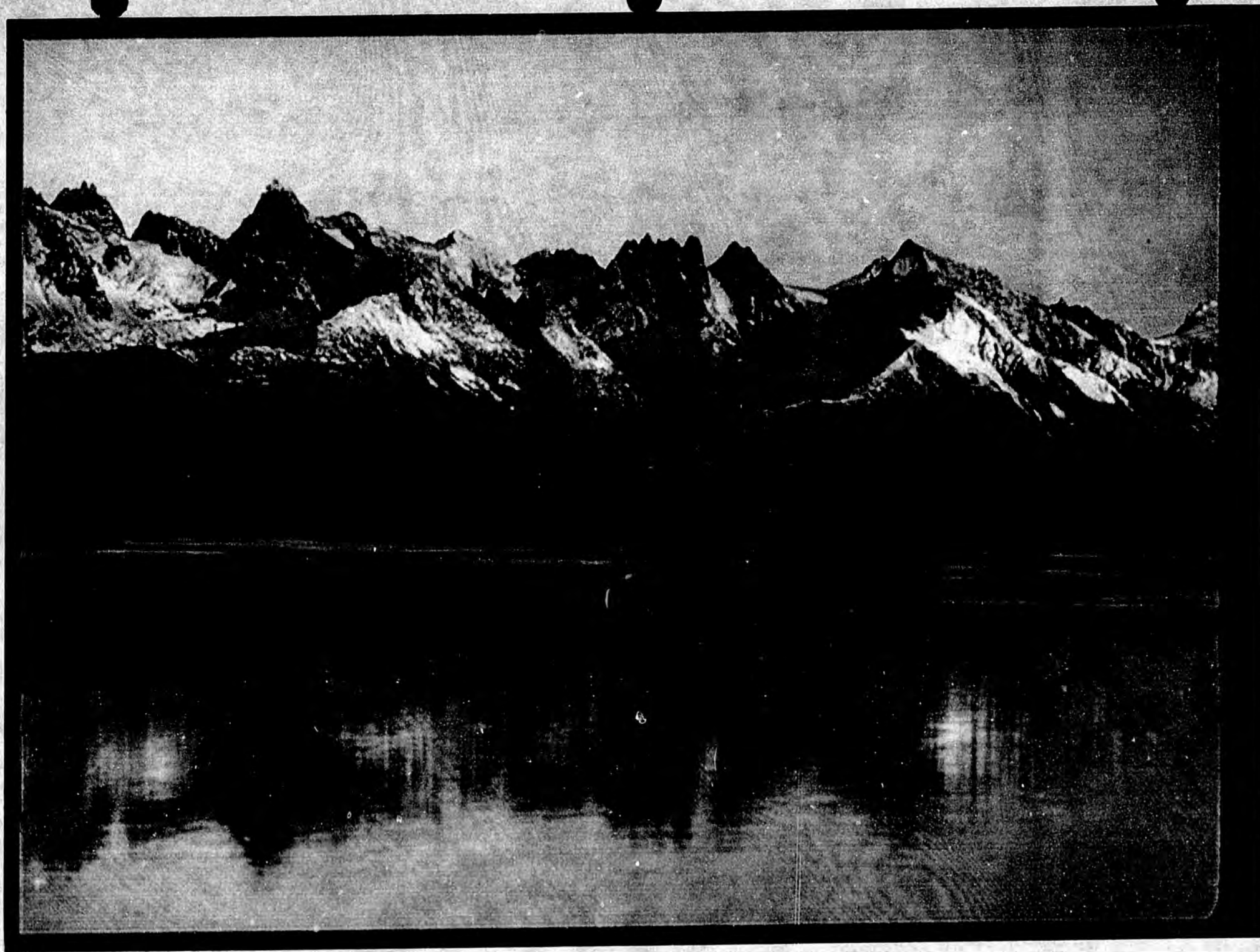
Increase business and R&D capability through local expansion of local firms.



Celebrate Alaska!

Alaska Permanent Fund Corporation
Alaska Dept. of Commerce
& Economic Development

3/17/99



Celebrate Alaska!

- Use allure of Alaska to increase the value of APFC real estate investments for tenants
- Showcase Alaska businesses, products and artists

Opportunities to showcase
and share our rich cultural
heritage and diversity

- **Totem carving**
- **Chilkat blanket weaving**
- **Native Singing and dancing**

Celebrate **ALASKA**



Fiesta Mall
September 28 - October 4, 1998

Retail success
stories:

Fiesta Mall

**Tyson's
Corner**











Native doll exhibit

Provided by Alaska State Council on the Arts









Opportunities

- Gift Baskets
- Food promotions
- Travel Fairs
- Art purchases and displays
- Cultural exhibits
- Historical displays



**Trade wall in
Anchorage,
Juneau, and
Washington
DC offices**

Working w/ the Offices & Apartments that we own to use Ak products in their business

Internet pages for information sharing and purchases for art and gift baskets

- all the pertinent information on *Celebrate Alaska!* readily available to managers
- easy to identify and purchase products and services via the Internet
- simplify the development of custom gift baskets to suit the needs and characteristics of individual properties

Other benefits:

- Annual events calendar and coordinated services for all pertinent PFC properties and *Celebrate Alaska!* promotions
- Greater understanding by Alaskans and other Americans of the Permanent Fund Corporation investments and their benefits
- Clear measurable increase in Alaska trade and tourism, growth in markets and appreciation of Alaska

Celebrate Alaska!

It's
good for
everybody



edt 3/17/99

DRAFT

Strategic Plan

March 25, 1998

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APPENDICES

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Strategic Plan & Sector Analyses Executive Summary

The Need for a Long-term Economic Strategy for Alaska

The Alaska Science & Technology Foundation (ASTF), was not asked to draft a long-term economic strategy for Alaska. Yet, today, too much appropriate technology is not being deployed in Alaska, too many good ideas are not being turned into products and businesses, and too many new businesses are having to move manufacturing, R&D, and headquarters functions out of the state in order to grow. This strategy is the Foundation's first attempt to address more systematically the factors we believe are necessary for Alaska's economic growth. Three reasons led the ASTF Board to assign this admittedly immodest task to themselves.

First Reason—ASTF's Mission

First, the legislature, in creating and funding the Foundation, made the state's longer-term economic development a part of ASTF's mission. With state officials and the media naturally focused on current efforts to balance the state's budget and ameliorate the immediate dislocations caused by the decline of oil revenues, ASTF believed it important to turn its attention to the longer term and more fundamental issue of the state's economic development. While no one doubts that the state's economy will adjust to declining oil revenues, this report seeks to be an evidence-based constructed argument for why Alaska must also now take additional steps to grow a more competitive and healthy economy.

Put another way, in the short term the state may balance its budget but unless other steps are taken to grow the non-oil economic base of the state's economy, the state's economy will inevitably shrink. So, the first reason ASTF produced this report is our mission to take the longer view and start a discussion of what those steps must be to diversify and grow Alaska's economy.

Second Reason—Asset & Infrastructure Gaps

The second reason for undertaking an economic strategy for Alaska is ASTF's learned belief that there are a number of missing ingredients, or undeveloped assets, which must be put in place for the state's economic potential to be realized. The Foundation has funded a wide variety of science and technology projects from the most cutting edge fundamental science done by Ph.D.'s in university labs to the development of inventions by entrepreneurs in rural Alaska. ASTF is proud of its track record in funding projects and believes that their long-term economic benefits to Alaska will prove significantly larger than their cost.

This experience has reinforced ASTF's belief that technology is only one of a number of key ingredients that must be in place for economic development to happen. Just as necessary are the skills of the entrepreneur and the workers in a new business, the funds or capital needed to turn ideas into products, and the assets and resourcefulness of the local community to provide a know-how network of services and resources to draw upon. Alaska entrepreneurs face external problems in turning ideas into marketable products, just as Alaska researchers face external problems in translating their work into real world applications. These external problems, or limitations, are due to barriers in the state's economy and to the structure of the state's basic industries. Failing to address these limitations imperils the ability of the state to diversify its economy.

Funding good people and projects is not the only, or even possibly the largest, problem Alaska faces. Alaska must also look at the structural barriers to long-term economic development and technology development. We must improve the efficiency of the "innovation pipeline"—that is, the stages of commercialization as research or ideas are turned into a prototype, and the prototype becomes a product that is later produced and marketed on a large-scale.

Third Reason—Differing Perspectives

Finally, ASTF has come to realize that its understanding of how economic development happens is often substantially different from what many other individuals and organizations in Alaska's public and private sectors believe or act upon as necessary for economic growth. Whether ASTF's perspective is right or wrong, as a public body with public resources ASTF believes it should articulate its viewpoint so fair public debate can begin on how Alaska secures long-term economic development.

The broad-based perspective of the Foundation is defined by the Foundation's role as investors working with public resources. This is contrasted to the more optimistic, and predictable, marketing orientation of those private and public sector individuals seeking public funds to carry out projects and continue programs. Proposers often believe that only the absence of money stands in the way of success. This difference may also be partly attributed to the fact that the ASTF Board and staff have often observed and participated in the full process of economic development from idea to product to established business and so have a different perspective than participants who often know well only their own role.

So, for example, professors and other researchers often insist that for a problem to be solved "more research is needed" with insufficient appreciation for what must be done for an idea or infant technology to be produced and marketed. Similarly, business people often believe research is easy and "many good ideas and technologies are already available," but the difficult part is manufacturing and marketing. Similarly, entrepreneurs often complain about risk aversion in bankers and venture capitalists to new business ideas, while the providers of capital are equally insistent that there is plenty of capital for competent individuals with good business plans.

There is a measure of truth to each of these particular perspectives. But, by viewing the economic world through a single perspective, no one in this standoff moves closer to understanding the process of long-term economic development in a way that will help individuals to play their roles more productively to increase innovations and build businesses. Though the ASTF Board and staff is drawn from these different worlds of business, research, banking, and the public sector, our backgrounds and the lessons learned from projects that have succeeded and others that have failed, has led the Foundation to develop an essentially consistent viewpoint on the process of economic development.

The Foundation—A Brief History of ASTF

The Alaska Science & Technology Foundation was created in 1988 as a public corporation with a nine-member Board of Directors appointed by the Governor for staggered four-year terms. The mission of the Alaska Science & Technology Foundation is to "promote and enhance, through basic and applied research, economic development and technological innovation in Alaska, public health, telecommunications, and sustained growth and development of Alaska science and engineering capabilities".

In addition to these duties, ASTF, through Executive Order #90, which transferred ASTF from Department of Revenue to Department of Commerce & Economic Development, was also given the responsibilities of the former Alaska Science & Engineering Advisory Commission. As a result of this transfer, ASTF now also serves a science advisory role for the Legislative and Executive Branches.

ASTF's approach to economic development is through shared investment in Alaska's science and technology development. The Foundation invests in projects at an early stage of technology development, and by providing financial resources, business expertise, and a workable model for success, encourage every ASTF grantee and proposer to think about all the elements required for success before they start their project. ASTF is interested in funding projects that are vertically integrated—that is, that address the issues of technology development, the market, management, and government or regulatory requirements.

The Foundation funds projects that fall into two general categories. One category is projects that advance Alaska's understanding and utilization of Alaska's resources and the state of technology and projects in management, harvesting, processing, or restoration. The other general category is technology based businesses. These are projects which are undertaken by businesses or entrepreneurs, and research, develop, and apply technology for profit.

The Board adopted strict criteria for successful proposals. The principal one being a clear benefit to Alaska and Alaskans. The other criteria were specifically designed to ensure that successful projects are actually implemented - success is determined by project results. These criteria include technical merit, a competent and complete project team, market need, participation of end users during the course of the project, and adequate co-investment. Grant funds are disbursed based upon completion of project benchmarks, and all projects are audited. In addition, the grant agreements contain provisions for repayment of the grant into the corpus of the endowment if the enterprise is successful.

In evaluating previous grant programs in Alaska and elsewhere, it was evident that providing money was not the secret for successful economic development and diversification. Providing money is usually the easiest part of establishing small business and new products. Put very simply, there are three requirements for success in business: money, markets and management. The focus is usually put on the money, but we have learned that the market or need, and the management team are far more important.

A Unifying Vision and Acknowledgments

The Board and staff include successful entrepreneurs who have built significant companies, scientists or engineers who have both done good research and translated it effectively in working with industry and government, managers of technology programs in corporations, and managers of nationally recognized technology and risk capital programs in other states. Coming from different backgrounds and possessing different politics, appointed by three different Governors, the Board and staff nevertheless have developed a unified perspective on the requirements for Alaska's long-term economic development.

That common perspective was strengthened by coming to terms with research ASTF commissioned on Alaska's economy. ASTF acknowledges the excellent research on Alaska's economic base done by Professor Oliver Scott Goldsmith of the University of Alaska Anchorage and on the competitiveness of different sectors of Alaska's economy done by Tom Lane of the Alaska Department of Labor. The economic analysis of both economists cited in Chapter 2 offers some key insights into understanding Alaska's economy. The Appendix contains the full reports of both economic analysis; the reader will find both stand on their own merits. However, the interpretation of this analysis and policy directions drawn from this evidence is solely the responsibility of ASTF.

The first two chapters interpreting Alaska's economic history were drafted as a volunteer activity by then ASTF Board member Jamie Kenworthy who also took the first cut at the Forestry section. The chapter on Mining as drafted by Don Stevens, on Agriculture by Carol Lewis, Roger Pearson, and Charles Knight, on Non-Oil Energy and Coal by Warrick Wilson, on Fish and Groundfish by Sandra Tavanis, Roger Painter, and Steve Street. The commentators on these draft chapters are too numerous to mention but ASTF remains welcome to all. Future sector analysis is planned on the

telecommunications, research, and energy. It is also expected that these sector analysis will be continually updated as the Alaska economy matures.

Sector Analysis and Appendices

ASTF's purpose behind focusing on economic sectors of the Alaska economy was to create a mechanism for beginning a constructive dialogue between various competing and cooperative interests in the state: both private and public. Successful dialogues will identify changes and change-agents that can develop long-term solutions and opportunities that will strengthen both the private and public sectors of Alaska's economy.

Each of these sector analysis has been written with the objective of presenting a concise picture of each sector and its place in Alaska's economy. It is hoped that critical details have not been overlooked in this effort.

Three appendices are included with this report. Appendix One is a Structural Analysis of the Alaska economy done through the Institute of Social and Economic Research (ISER) by Scott Goldsmith. Appendix Two is a Shift-Share analysis that was prepared by Tom Lane of the Alaska Department of Labor.

In Closing—Releasing a Draft Strategic Document

While differing members of the ASTF Board came to consider Alaska's economy from different perspectives, all felt an equal responsibility to modify their beliefs in the face of clear facts. Rather than examining what should be done in terms of our individual political beliefs about the proper role of the public or private sector or our individual roles in different parts of the Alaskan economy, ASTF sought to ground its recommendations in terms of an analysis of Alaska's economy and known evidence and experience about what steps have worked elsewhere or in Alaska to address these challenges.

This draft strategy is written then in the hope that an Alaskan reader may by a similar process suspend prior opinions about the state's economy long enough to test his or her beliefs against the economic analysis and reasoning presented here. The authors hope that in this process the reader will either agree with the description of the problem presented here or be willing to suggest how this analysis is faulty or incomplete. And from that revised understanding of Alaska's situation, Alaskans may begin a more productive and focused discussion of what must be done to grow the state's economic base.

Rather than consider this draft strategy a one-time event soon forgotten (the fate of many government strategic plans), the Board hopes this draft strategy is the start of an ongoing conversation with Alaskans about their understanding of their future and what Alaskans must do to secure the state's prosperity.

This report is not intended as a one-way lecture on what must be done. Rather, ASTF offers this draft report as a start of an ongoing discussion about Alaska's economic future. Where the assumptions, evidence, or reasoning of this strategy are open to challenge, the authors of this report are willing to listen and modify recommendations in the face of new facts and sharper reasoning. The Foundation welcomes comments, critical or otherwise, on its understanding of Alaska's economy and its suggested directions for the future. Written comments may be addressed to: ASTF, 4500 Diplomacy Drive, Suite 515, Anchorage, AK 99508-5918.

Chapter I

Alaska's Economy

Understanding Alaska's economy does not automatically provide clear guideposts for the state's future. But a clearer understanding of what has driven Alaska's economy in the past is a necessary first step for any discussion of Alaska's long-term economic development. So the authors commissioned research on how key sectors of the Alaska's economy have performed since statehood. (A full copy of that research is in Appendix A.) This analysis of Alaska's economic structure and competitive performance will be used to answer two broad questions.

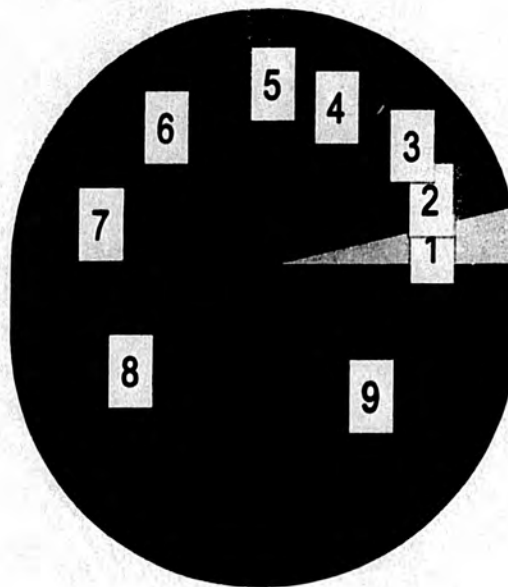
First, how has Alaska's economic base changed and grown? More particularly, what changes in the private and public sectors have resulted in today's economy? Even with a higher cost of living, Alaskans still have above-average personal incomes compared to other states, and they remain relatively wealthy compared to most of the world. Yet, as will be seen in an examination of the state's economic foundation, it is of some concern that Alaska's future economy depends primarily on two sets of decisions made outside with little input from Alaskans—the decision of world markets concerning what to pay for a barrel of oil and the decision of the federal government on how many federal dollars should be spent in Alaska. An examination of Alaska's changing economic structure should provide a clearer sense of how malleable the state's economy is, that is how much Alaskans can shape their economic prospects.

Second, how competitive is Alaska's economy? If we take a microscope rather than a telescope to the Alaskan economy, can we see in the performance of certain sectors signs that Alaska is able to compete in world markets? Rather than expect new industry to come to Alaska or the federal government to make decisions which increase Alaska's wealth, can Alaska grow its own economy? Comparing the performance of Alaska's firms with their competitors nationally provides some clues of how a higher wage, higher value Alaskan economy can emerge from an economy now primarily based on federal spending and the extraction of natural resources.

First, a brief picture of Alaska's economy. The state currently provides jobs for nearly 280,000 people. Some people are self-employed but most work in the state's approximately 40,000 businesses. As in other states, most of these jobs are in retail, services, transportation and government.

In fact, only about one in seven jobs in Alaska is in natural resources and the processing and manufacturing of those resources—primarily oil, seafood, timber, and mining. In the Lower 48 approximately one job in four is in these sectors of manufacturing, natural resources, and agriculture. Alaska has a significantly smaller share of its economy devoted to producing a good or service sold outside the state.

Total Employment 1997



- 1. Mining & Oil---9,954
- 2. Construction---12,782
- 3. Manufacturing---16,092
- 4. Transportation, Communication---23,854
- 5. Wholesale Trade---8,818
- 6. Retail Trade---47,067
- 7. Finance, Insurance, Real Estate---12,061
- 8. Services---64,798
- 9. Government---73,210

Source: U.S. ADOL, Annual Average, November 1997

SPLAN:EMPLOY7.JNK

Alaska's Economic Base

Economists call the jobs which sell a good or service outside the state the state's "economic base." While Alaska's economic base is narrower than other states, this economic base is just as important in driving the entire state economy.

While every job in an economy is important, all jobs are not equal in terms of the impact they have on the state's economy. Broadly speaking, economic base industries bring new money into Alaska by selling to customers in the rest of the world. By contrast, jobs in the local market economy simply recirculate that money within the state.

For example, the out-of-state buyer of timber from Ketchikan, seafood from Kodiak, zinc ore from Kotzebue, and, most important, oil from Alaska, is putting money into the pockets of the sawmill workers, the seafood workers, the miners, and oil field workers in Alaska. Even more important, that money then recirculates to the many businesses which supply goods and services to those economic base industries—the utilities, the parts suppliers, the trucking firms, the business firms providing such services as accounting and legal work, and the banks. Employees in those economic base firms and the firms which supply them goods or services then circulate their wages and profits by buying goods and services in the local market economy—housing, clothes, food, such private sector services as medicine or entertainment, and public services such as education, roads, public health, and law enforcement.

In addition, an Alaskan firm is also part of the state's economic base if it sells a product or service to an Alaskan resident who otherwise would have purchased that product from outside. By providing a substitute for an import into the state, such firms provide the same ultimate benefit as an exporting firm—they make the state wealthier.

Economists call the impact of outside dollars circulating through the local economy the "multiplier effect" and on average estimate that every \$1 dollar brought into the state generates more than three dollars of economic impact before it is fully absorbed by the local market and is used by an Alaskan to purchase a good or service from outside the state.

In terms of economic impact, all jobs are not equal because jobs in the economic base and, to an even greater degree, higher wage jobs in that base, make the state wealthier by bringing dollars into Alaska which then multiply through the state's economy. In contrast, an Alaskan restaurant, store, or bank which sells a product or service to a state resident is not bringing money into the state. Such an Alaskan business simply moves dollars from one resident—its customer—to another resident—its employee. The amount of money in the state has not been increased, only recirculated. However, when that restaurant or store sells a product or service to a tourist visiting Alaska, then a proportion of that business becomes part of another of Alaska's base industries—tourism.

While the growing service and retail sector contribute significantly to the quality of our lives, they are not part of the economic base. In fact, these local market activities exist only because economic-base industries bring money into the state and pay their employees, who then in turn can afford to purchase a home, buy a suit, pay for a meal, or see a doctor for a checkup. Local market activities compete with each other for the income ultimately brought into Alaska by the industries in the economic base. So, in effect, the ultimate source of jobs in Alaska is the industries in the state's economic base.

While it is theoretically true that a more efficient, lower cost local market sector can act as a magnet to attract new economic base firms, this is a minor or second order effect. In Alaska, with a small local market and a higher-priced service sector, this is an inefficient way to build a larger economic base. There is weak public policy justification for the state focusing on assisting local market firms; rather in carrying out its economic development responsibilities, the state in partnership with the private sector, needs to help grow the state's economic base. The local market or service sector firms can then compete for the increased number of customers that result from these efforts in a service sector now larger and more competitive.

CONCLUSION 1

For all practical purposes, a state becomes more prosperous in only one way—by increasing the value of the goods and services that its economic base industries sell, directly or indirectly, outside the state. This increases the earnings of residents who work for those industries. As these workers earn more, they have more to spend and so they create more jobs and income in the local market economy. Therefore, the central focus of any state economic development efforts must be the expansion of the state's economic base.

Government and Alaska's Economic Base

The relationship of government jobs to the state's economic base requires special consideration. The latest official statistics from November, 1997 show that there were 16,700 civilian and military federal employees in Alaska, not counting another approximately 19,000 active-duty military personnel. This number of federal employees is twice the 8257 jobs in the oil and gas industry and more than the 17,000 jobs in manufacturing, which includes seafood, forestry, mining, printing and publishing, and all the other goods producing sectors. Since the jobs of federal workers in Alaska are supported by the taxes paid by all U.S. residents, more than 99% of whom live outside, all these jobs should be considered a large part of Alaska's economic base. (While Alaskans pay taxes to support federal services in all states, Alaska's proportion of federal employees is three times the national average.)

In November 1997 there were 57,400 jobs in state and local government, of which approximately 27,700 were in education. In other states these jobs are supported by the local taxes collected primarily from state residents and so they are considered as part of the local market economy and not part of the state's economic base.

However, as is well known, in Alaska oil revenue supports 85% of the state's General Fund unrestricted revenues, including state aid to local government, and the oil industry pays a third of local property taxes. So approximately 70% of these 57,400 jobs, or 40,000, can be considered the largest number of jobs in the state's economic base. These public sector jobs are in effect the result of oil being purchased by consumers and corporations located outside Alaska.

While the oil and gas industry in Alaska directly employs less than 9,000 people, oil revenue directly supports 40,000 public jobs. So the impact of the oil industry on the state is far larger than its apparent size. The following chart of Alaska compares employment in Alaska's basic industries. (A later discussion of Alaska's economic base

will focus on income, not jobs, and include the impact of tourism and other activities which bring money into the state.)

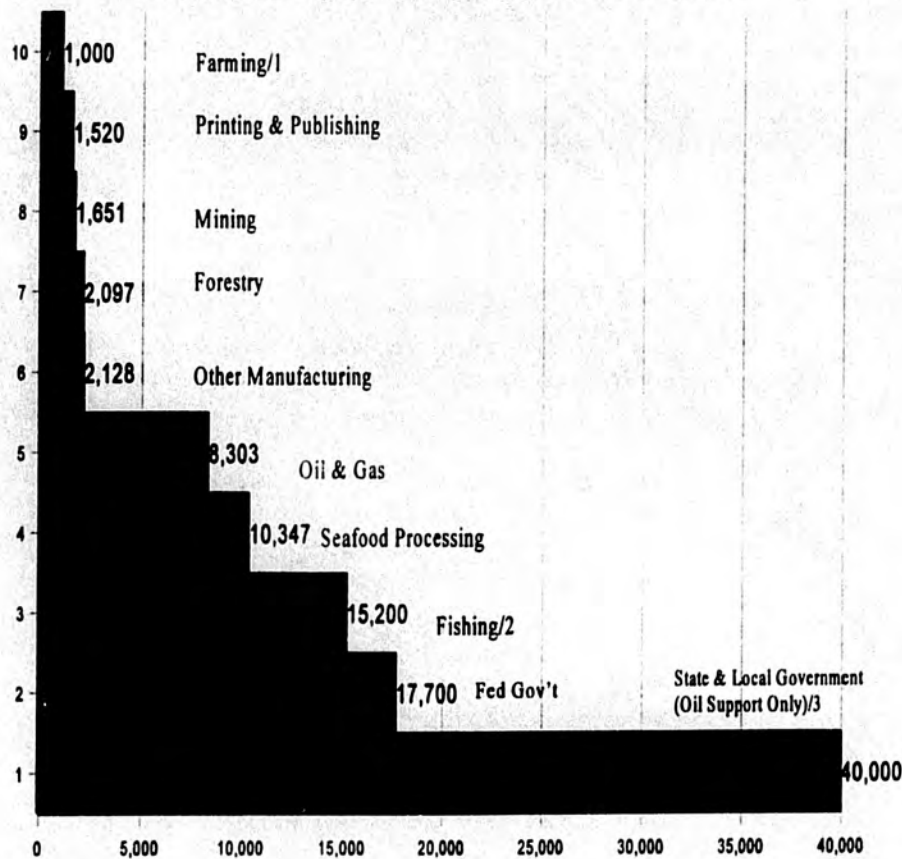
Because of the multiplier effect of jobs and income being added to the base rippling through the local economy, even a small increase or decrease in the economic base has a much larger impact on the whole economy. This is particularly true for some durable goods like the price and availability of housing where a small increase or decrease in the number of jobs in an area will have a much larger effect on the price of existing housing and the pace of new construction. A sudden change in the demand for workers in an area can also have a dramatic effect in bidding up or down the wages employers pay their employees.

Economists may talk drily of "multiplier effects" and "shifting demands for labor" but longer-term Alaska residents have little trouble remembering what happened during the construction of the pipeline in 1975-76 to the price and availability of housing in Anchorage or the number of construction jobs in Fairbanks and the higher wages paid these workers.

The changes triggered when a state's economic base contracts are equally severe and can be even more distressing. In the recent past, Alaska's economy has had at least four turning points. The first low point was the postpipeline economy of 1978 with government employment still increasing while private sector employment had bottomed out. The Alaskan economy then peaked in 1985, an upswing brought on by high oil prices and an oil-financed state government construction boom. With the collapse of oil prices and state revenues, Alaska entered a steep recession in 1987 characterized by a sharp drop in housing prices. By 1997, the latest year figures are available, the economy has recovered but Alaska's employment growth has lagged the five year national expansion.

Alaska's recent history underscores the point that changes in Alaska's economic base have larger impacts on the rest of the state economy. To stretch a familiar metaphor, when Alaska's economic base has had the sniffles, the rest of the economy came down with a cold. And when the base caught a cold, the economy came down with pneumonia.

Alaska's Base Industries Jobs 1997



Government

1. 40,000---State & Local Government (Oil Support Only)/3
2. 17,700---Federal Government

Goods-Producing

3. 15,200---Fishing/2
4. 10,347---Seafood Processing
5. 8,303---Oil & Gas
6. 2,128---Other Manufacturing
7. 2,097---Forestry
8. 1,651---Mining
9. 1,520---Printing & Publishing
10. 1,000---Farming/1

1/ Based on survey of employment for the week of 7-13, this number is not an annual average. Source---USDA.

2/ Source---National Institute for Occupational Safety and Health and Alaska Seafood Industry Study, McDowell Corporation.

3/ Represents 75 percent of total state and local employment.

Source---U.S. Bureau of Labor Statistics, Alaska Department of Labor, Research and Analysis, USDA, and private forecast for fishing.

SPLAN:AKBASE97

Alaska's Changing Economic Structure

Because of the importance of the state's economic base, the authors of this report commissioned research on the structure of Alaska's economy from statehood to the present. That research focused both on the jobs in the economic base and, more important, on income attributed to that base. While the number of jobs in the economic base is important, even more important is the income which supports the base and is paid as wages to employees, purchase of goods and services to suppliers, and taxes and fees to government. It is important to calculate the income flows generated by different sectors because some industries pay higher wages or purchase more supplies and services from local businesses; that is, some industries have a higher "multiplier." In addition, income flows to the state's economic base defines the impact of the state's oil industry.

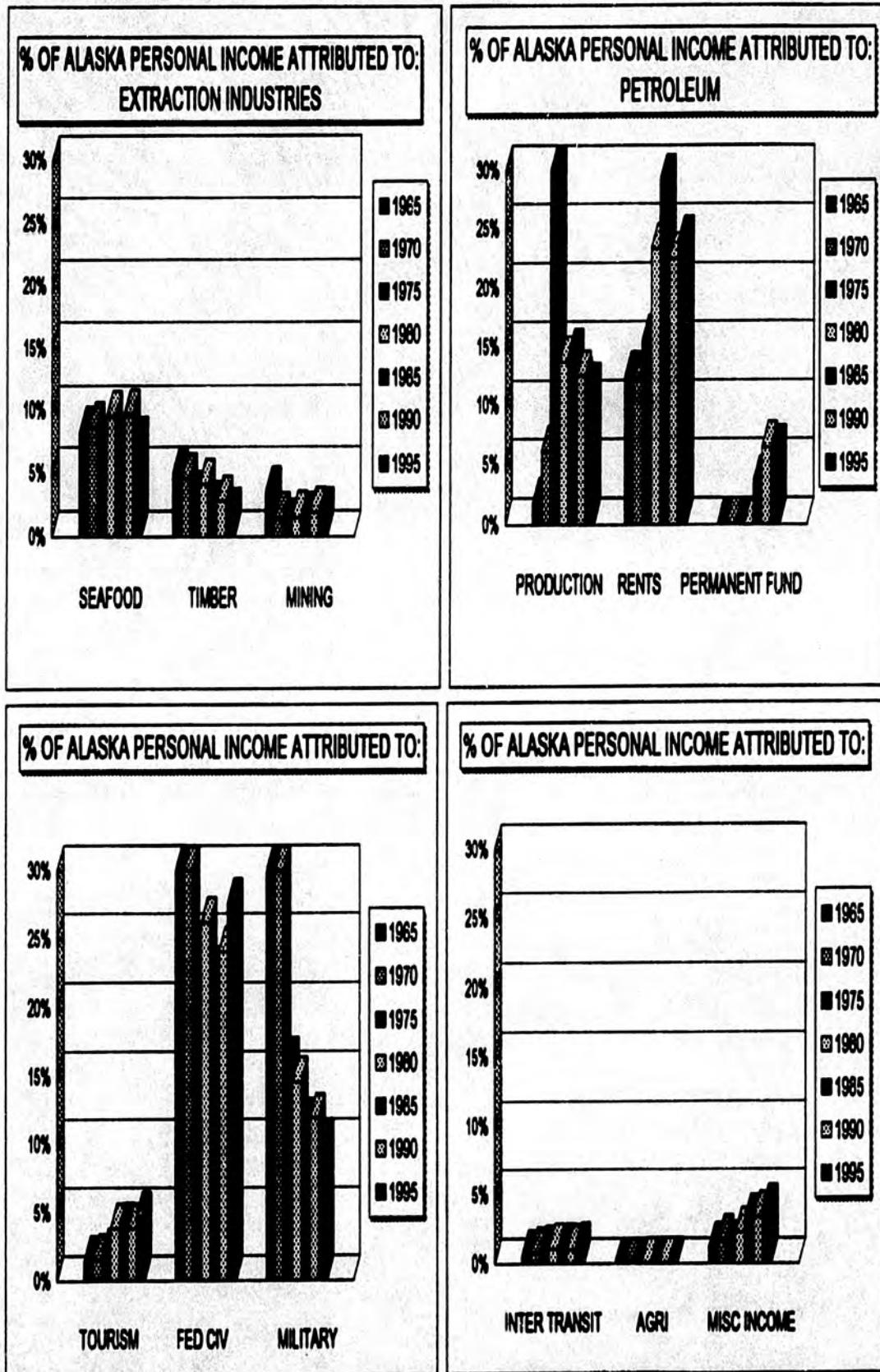
Rather than being stable, Alaska's economic base is dynamic and it has shifted dramatically within the relatively recent past. Looking at the income flowing from outside the state into Alaska shows significant changes in the composition of the

SHARES OF ALASKA PERSONAL INCOME ATTRIBUTABLE TO SECTOR

	1965	1970	1975	1980	1985	1990	1995
OIL PRODUCTION	1.8%	6.2%	30.5%	13.7%	14.3%	12.6%	11.5%
OIL RENTS	12.5%	12.2%	15.5%	23.3%	29.2%	22.5%	23.9%
PERMANENT FUND	0.0%	0.0%	0.0%	0.0%	3.5%	6.4%	6.1%
SEAFOOD	8.2%	8.6%	5.6%	9.5%	6.7%	9.7%	7.4%
TIMBER	5.0%	4.5%	3.1%	4.1%	2.3%	2.8%	1.8%
MINING	3.5%	1.4%	0.9%	1.5%	1.4%	1.8%	1.7%
TOURISM	1.4%	1.6%	2.0%	3.9%	3.9%	3.8%	4.8%
FEDERAL CIVILIAN	33.0%	31.7%	24.3%	26.2%	22.7%	24.1%	27.6%
FEDERAL MILITARY	32.8%	31.3%	16.0%	14.5%	11.5%	11.9%	10.0%
INTERNATIONAL TRANSIT	0.6%	0.8%	1.0%	1.1%	1.1%	1.0%	1.2%
AGRICULTURE	0.0%	0.0%	0.0%	0.0%	0.1%	0.1%	0.1%
MISCELLANEOUS INCOME	1.2%	1.7%	1.2%	2.2%	3.2%	3.4%	3.9%
	100%	100%	100%	100%	100%	100%	100%

state's economic base since 1965.

Source—Institute of Social & Economic Research, University of Alaska Anchorage



Source—Institute of Social & Economic Research, University of Alaska Anchorage

On this chart the revenue from jobs in the oil industry and suppliers are separated from the "economic rents" attached to the oil industry, primarily revenue flowing to the state. Entrepot includes those jobs created by moving goods through Alaska or from Alaska to another state so the Federal Express job in Anchorage is a part of the state's economic base but not the job of an Anchorage bus driver. Miscellaneous Income includes all funds flowing from the federal government to Alaska (social security, Medicare, etc.) and the income from the assets owned by state residents such as dividends on stocks.

A close examination of the changing composition and size of Alaska's economic base divides Alaska's economic history since statehood into three rough periods.

Stage 1—Colonial Economy

When Alaska became a state in 1959, its population and economy were less than half its current size. Tracing the impact of all forms of federal spending, including federal civilian and military employees and the federal purchase of Alaskan products and services, shows that in 1960 this spending created 66,000 jobs or approximately 74% of all jobs in the state's economic base. This is **not** to say that in 1960 74% of Alaskans were employed by the federal government or employed providing goods or services to the federal government. Rather 74% of the economic base was attributed to federal spending including federal employment so, in effect, if in 1960 all federal spending had been withdrawn from the economy, the ripple effect of this loss of federal dollars on all the other sectors of the economy would have led three Alaskans out of four to lose their jobs.

Since 1960 federal civilian employment has been relatively steady at 20,000 jobs, while military personnel has declined from 35,000 to 23,000 jobs. The state's dependence on the federal government has steadily lessened as the state's economic base has grown and diversified. While approximately 20% of Alaskans worked for the federal government in 1960, less than half that proportion work for the federal government today.

By 1974, the year before pipeline construction, the federal spending composed half of the outside dollars in the state's economic base. Since 1974, while the number of federal jobs and federal spending has been relatively steady, the growth of the oil industry and other basic sectors has lowered the federal share of income to the state's economic base to approximately 38% today.

In effect, Alaska's economy in 1960 was almost twice as dependent on federal spending as it is today; in prepipeline 1974 Alaska's economy was 40% more dependent on federal spending than it is today. As Alaskans wonder what impact the end of the Cold War will have on military spending and look at various efforts to lower the federal budget deficit and the relative size of the federal government, it should be considered good news that Alaskans have developed a lessened dependence on federal spending to drive the state's economy. Nevertheless, with the exception of the Washington, D.C., area, no other state's economic base depends so heavily on federal spending.

Yet the declining importance of federal spending holds some important lessons for Alaska's economic future. This history shows it is possible to change the structure of a state's economy and alter its economic base. A state's economic base can be broadened and diversified relatively rapidly. This change is positive and relatively

painless if a state can, like Alaska in the 1960s and 1970s, diversify its economy into other sectors from a relatively steady base.

However, when a region has an eroding or collapsing base, a local economy can suffer painful losses of income, population, and social turmoil as it seeks to find a new economic base. When the textile and shoe industry moved south from New England in the 1950s, Massachusetts and New Hampshire led the nation in unemployment. When Boeing downsized in the late 1960s, Seattle's economy collapsed with it. Michigan's economy contracted sharply in the early 1980s when U.S. automakers lost markets to foreign-based companies. Currently California's economy is restructuring as jobs in electronics and entertainment replace a smaller Defense sector.

Some regional economies recover as their lead industry recovers or new basic industries expand, but there is nothing natural or automatic or painless about this process. Some auto workers in Detroit, oil workers in Texas, and Defense workers in California will never recover their lost jobs and incomes. And some communities never replace a lost economic base; when the mines closed in some Western towns, the communities simply disappeared.

Conclusion 2

States are in a better position to grow their economy by building on an existing base rather than waiting until its economic base is eroding and then seeking to replace it.

Stage 2—The Postpipeline Economy

With the completion of the pipeline in 1977, Alaska's economic base shifted to depend primarily on petroleum. The subject of Alaska's dependence on oil revenue is such a familiar, even painfully obvious, topic that it may appear to require no further comment. However, the information cited to describe this dependence vary significantly as do the assumptions behind different presentations of data. With varying diagnoses of this alleged problem and no widely agreed upon understanding of the impact of oil on Alaska's economy, it is not surprising that the proposed solutions to Alaska's oil dependence cover the political landscape.

By focusing on the state's economic base and understanding the role of oil as part of this base, a common understanding of the impact of oil industry and revenues on the Alaskan economy is possible. This common understanding rests both on recalling the difference between the economic base and local market economy and on distinguishing between three income flows attributed to the petroleum industry—the direct and support jobs in the oil industry itself, the economic rents paid by the oil industry to the state to support state government, and the oil income paid to the Permanent Fund which passes directly to Alaskan citizens.

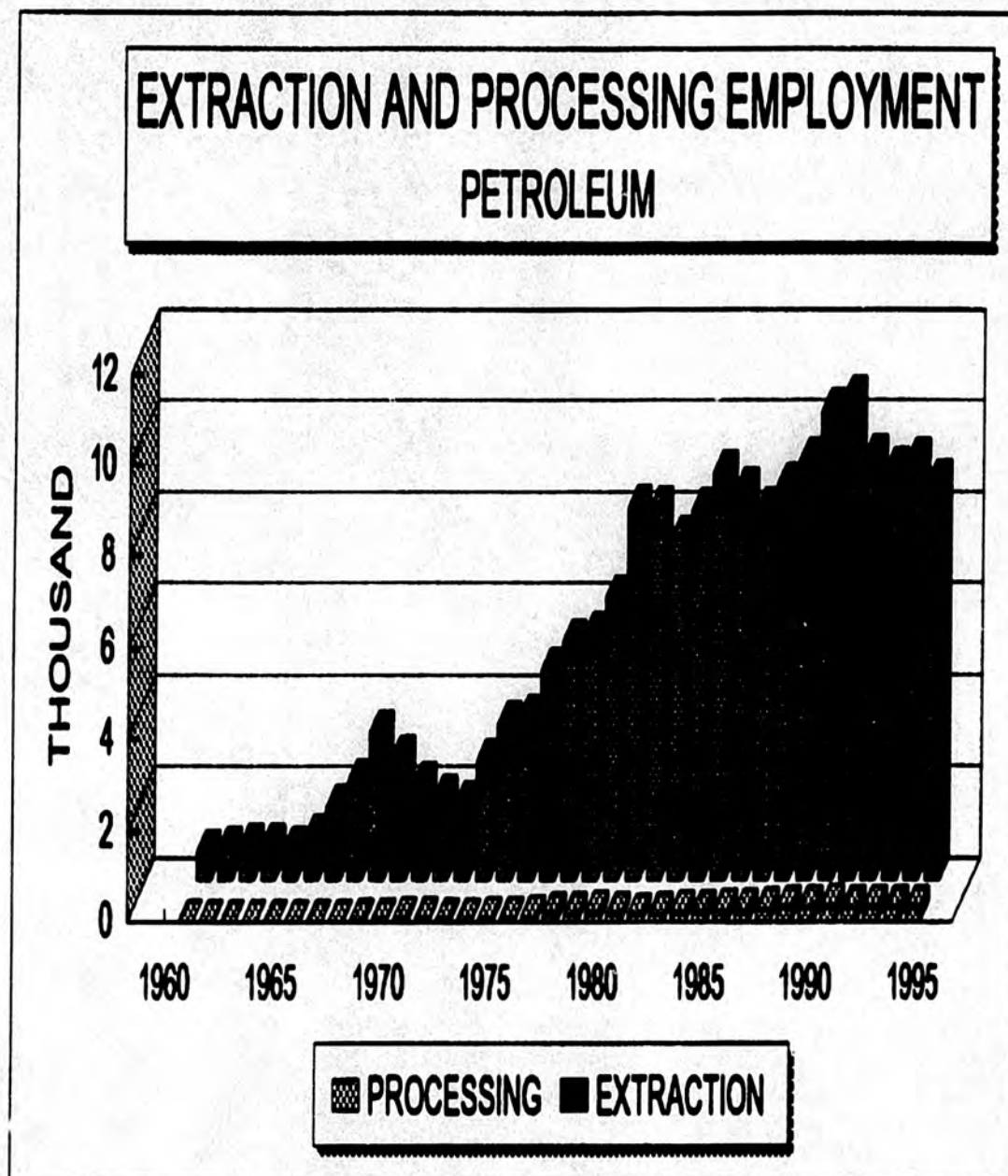
The number of direct and support jobs in the oil industry is easy to track. Employment in the oil industry and the firms which directly support the industry peaked in 1976 at the height of pipeline construction providing then 23.6% of the income in the state's economic base. (Again, this is NOT to say that in 1976 every fourth Alaskan worked for the oil industry or a firm directly supplying the oil industry. Rather the direct and multiplier effect of income from outside the state flowing to Alaska to support jobs in the oil and oil supply industry was to employ every fourth person in the state.)

Chapter I— Alaska's Economy

Since 1976 the number of direct and support jobs in petroleum has declined so now only 12% of the economic base (again, not 12% of all jobs) are in the oil industry or a firm which supplies the industry. In effect, without this direct and support employment of the oil industry, the Alaskan economy would be nearly one-eighth smaller. Compared to the pipeline boom year of 1976, the overall Alaskan economy today is half as dependent on the direct and support jobs of the oil industry.

	CORE JOBS	TOTAL JOBS	RATIO	SHARE OF ALL JOBS
61	0.73	1.20	1.6	1.3%
62	0.83	1.39	1.7	1.4%
63	0.90	1.44	1.6	1.4%
64	0.92	1.49	1.6	1.4%
65	0.81	1.35	1.7	1.2%
66	1.15	1.96	1.7	1.7%
67	1.96	3.45	1.8	2.9%
68	2.65	4.80	1.8	4.0%
69	4.03	7.43	1.8	5.8%
70	3.32	6.52	2.0	4.9%
71	2.72	5.20	1.9	3.8%
72	2.31	4.43	1.9	3.1%
73	2.14	3.84	1.8	2.6%
74	7.28	15.87	2.2	9.6%
75	20.70	47.36	2.3	23.7%
76	24.40	58.20	2.4	27.7%
77	15.35	37.04	2.4	18.2%
78	10.23	23.01	2.2	11.3%
79	9.34	21.41	2.3	10.3%
80	10.59	24.18	2.3	11.5%
81	14.59	32.40	2.2	14.3%
82	15.38	33.89	2.2	14.0%
83	15.66	36.44	2.3	14.2%
84	15.21	36.47	2.4	13.6%
85	15.34	34.98	2.3	12.7%
86	14.42	31.84	2.2	12.1%
87	12.90	27.15	2.1	10.7%
88	12.96	27.23	2.1	10.5%
89	14.22	29.69	2.1	10.9%
90	15.53	33.04	2.1	11.7%
91	16.21	34.62	2.1	11.9%
92	14.57	31.65	2.2	10.7%
93	14.26	31.10	2.2	10.3%
94	15.04	33.50	2.2	11.0%
95	14.41	33.13	2.3	10.8%

Source—Institute of Social & Economic Research, University of Alaska Anchorage



Source—Institute of Social & Economic Research, University of Alaska Anchorage

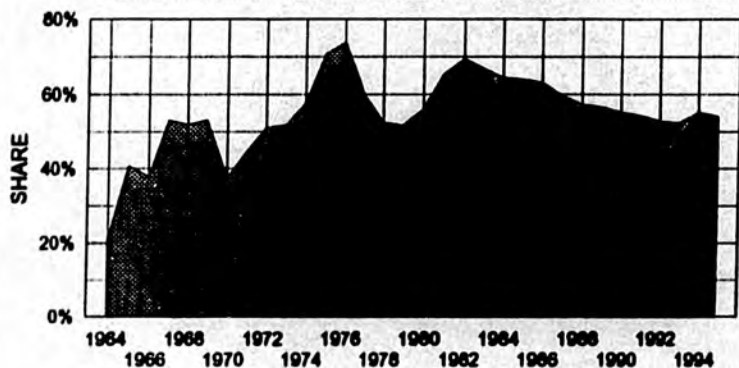
However, since 1976 the Alaskan economy has grown far more dependent on a second source of oil revenue—the taxes or economic rents charged the industry and collected by state government. This oil revenue is paid by oil companies to the state of Alaska but it is, in effect, a pass through tax paid by out-of-state consumers to state government. State government then pays the wages of state employees and purchases local goods, and the income from these sources circulates through the local market economy. These economic rents from oil and gas accounted for less than 10% of Alaska's economic base before 1965, peaked at 29% in 1985, and have declined somewhat to 25% in 1991, the latest year figures are available.

	CORE JOBS	TOTAL JOBS	RATIO	SHARE OF ALL JOBS
61	1.54	2.34	1.5	2.5%
62	1.77	2.71	1.5	2.8%
63	5.02	7.52	1.5	7.5%
64	5.38	8.15	1.5	7.9%
65	7.51	11.32	1.5	10.3%
66	7.67	11.68	1.5	10.3%
67	9.36	14.75	1.6	12.5%
68	9.29	14.93	1.6	12.3%
69	9.70	15.94	1.6	12.5%
70	8.49	14.86	1.7	11.1%
71	11.52	20.16	1.7	14.7%
72	14.54	25.50	1.8	18.0%
73	16.88	29.06	1.7	19.8%
74	16.94	30.08	1.8	18.3%
75	18.42	31.99	1.7	16.0%
76	18.50	31.56	1.7	15.0%
77	17.56	33.63	1.9	16.5%
78	19.70	39.78	2.0	19.6%
79	21.27	42.50	2.0	20.5%
80	22.66	45.74	2.0	21.8%
81	30.69	59.08	1.9	26.0%
82	33.20	62.74	1.9	25.9%
83	36.64	72.22	2.0	28.2%
84	37.35	75.94	2.0	28.4%
85	40.10	80.14	2.0	29.2%
86	38.75	74.07	1.9	28.0%
87	35.20	65.82	1.9	25.9%
88	34.32	63.62	1.9	24.6%
89	37.01	68.50	1.9	25.1%
90	36.39	67.71	1.9	23.9%
91	36.15	68.62	1.9	23.6%
92	37.91	71.83	1.9	24.3%
93	38.39	74.42	1.9	24.6%
94	39.13	77.93	2.0	25.7%
95	37.77	76.64	2.0	25.1%

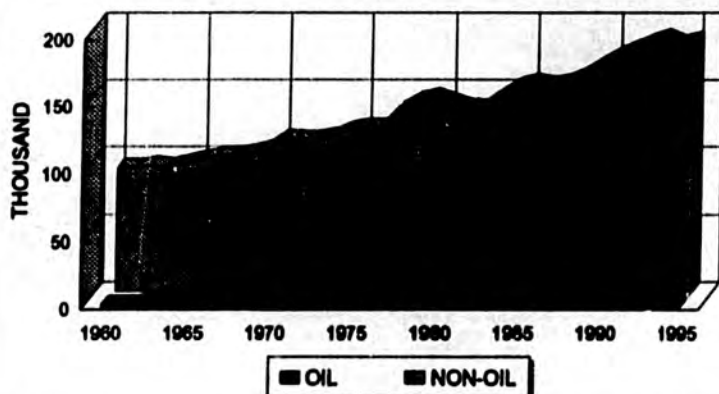
Source—Institute of Social & Economic Research, University of Alaska Anchorage

Adding together the jobs from oil production and the jobs from economic rents on oil shows that at its peak in 1984 over 40% of Alaska's economy was dependent on the oil industry, a figure which declined slightly

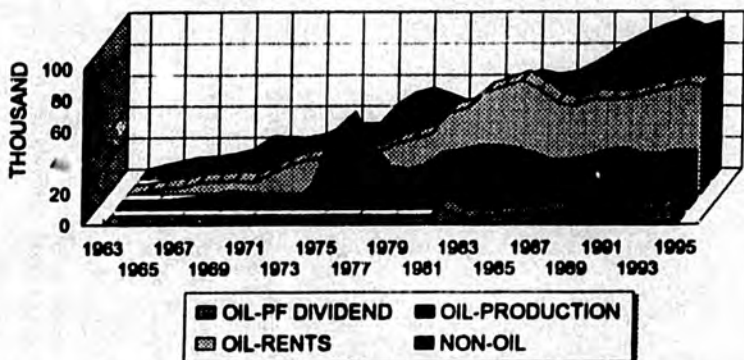
ALASKA JOB GROWTH SINCE 1963
WHAT SHARE IS DUE TO OIL?



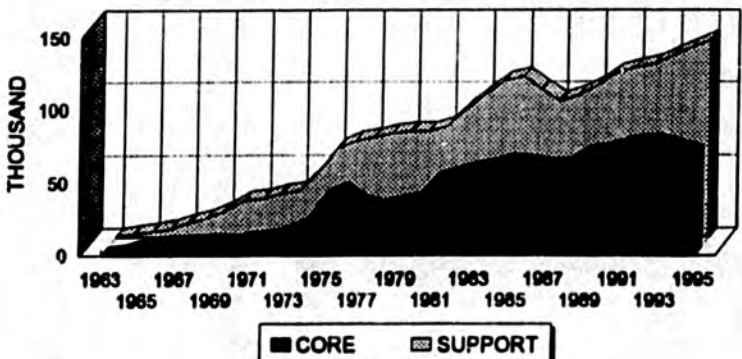
OIL & NON-OIL BASED ALASKA JOBS



ALASKA JOB GROWTH SINCE 1963
HOW MUCH IS DUE TO OIL?



ALASKA JOB GROWTH SINCE 1963
HOW MUCH IS THE CORE? HOW MUCH IS SUPPORT?



to 36% by 1995. The oil industry employs fewer than 10,000 Alaskans and produces public revenues which directly employ another 40,000 public employees but the full

effect of this industry as its impact is multiplied from base jobs to the local market is to support another 50,000 jobs in Alaska's 280,000 job economy. In effect, without an Alaskan oil and gas industry and the oil revenue annually flowing to the state, every third Alaskan would be out of work

The third, and final, income flow of the oil industry is attributed to the income of the Permanent Fund. The \$780 million paid annually to individuals accounts for 6.1% of the state's total personal income in 1995. This payment, when multiplied through the economy, is a \$2 billion boost to the state economy. Besides the Permanent Fund dividends, Alaskans receive income on such miscellaneous assets as stocks and bonds and federal transfer payments (social security, Medicare, etc.) for another 4% of their total income. In effect, a tenth of the state's economic base is revenue from the Permanent Fund and other miscellaneous assets.

The oil industry has measurably increased Alaskans wealth. As the oil industry matures, the impact of this wealth has shifted from providing direct jobs to providing public revenues to purchasing income-producing assets (primarily non-oil equities and fixed income securities) whose incomes support dividends to individuals and revenue for the state.

There is no better sign of the maturing of the Alaska oil industry and the maturing Alaskan population than the shift in the form by which Alaskans have benefitted from oil. The share of the economic base attributed to direct and support jobs in the oil industry peaked at 28% in 1976, the share attributed to economic rents peaked ten years later in 1985 at 29%, and the share attributed to miscellaneous income (some Fund dividends, some other assets, some transfer payments) continues to rise to 10% in 1995, the latest year figures are available, and is no doubt even higher today.

In effect, as the oil wealth in Alaska has matured, it has lost some of its color and fingerprints. In the mid-1970s, the primary mode an Alaskan benefitted from the oil industry was through the direct employment generated by the industry and its suppliers. In the 1980s and 1990s oil wealth is primarily received by Alaskans as public services or goods (roads, education, etc.) paid by oil revenue or as income from someone paid directly or indirectly by the state. In the near future Alaskans will receive an increasing share of oil wealth as a return on public and private assets financed originally by oil revenue.

Since the early 1980s Alaska's economic base has shown a modest ability to diversify from its dependence on oil. Counting all three sources of income to the state's economic base (the jobs in the oil and oil supplier industry, the economic rents, and the Permanent Fund), the industry's share of the total income in the economic base which was 33% in 1975, peaked at almost 50% in 1982 (the first year of Permanent Fund dividends), and has remained fairly steady around 40% since 1987.

The 40% of the economic base attributed to the oil industry is almost as much as all other sectors of Alaska's base industries combined—federal spending, seafood, forestry, mining, tourism, and agriculture. Excepting the agricultural industry in a handful of sparsely populated Great Plains states, no other state is as dependent as Alaska is on one industry for its economic base. Michigan is less dependent on its auto industry, California is less dependent on its Defense sector, Iowa is less dependent on its farm economy, than Alaska's economy is dependent on its oil industry.

Dependence, or concentration, in one basic industry is not necessarily bad if that sector continues to grow—as the oil industry and revenues have not since the mid-1980s—or if the sector is relatively stable, as federal employment and spending in Alaska have

been since 1960. However, a high concentration of one industry as a state's economic base describes a volatile economy continually in a "boom or bust" cycle.

A diverse economy is more resilient to weather dislocations if it depends on selling a variety of goods, with the demand for each having different ebbs and flows. An economy becomes even more volatile when the chief good produced is an internationally traded commodity like oil or wheat, as opposed to a final product like a car or bread. The residents living with an economy, primarily dependent on an internationally priced commodities can be described as largely captives on a roller coaster with someone else at the controls.

Considered for its economic impact, the oil industry has been a wonderful industry for Alaska. It has been primarily responsible for the doubling of the state's economy. It pays the lion share of the state's public services and infrastructure costs. It has greatly increased the wealth of both the state and the assets of individual Alaskans to the point where a quarter of their income is earned from the assets largely purchased with oil revenue or saved because of forgone taxes paid by oil revenues.

But with the price of North Slope crude oil at \$16 a barrel, North Slope production still declining, and a world surplus of oil for the foreseeable future, it seems likely that without building a broader economic base, Alaska's economy will remain on an economic roller coaster with each peak lower than the previous peak and each trough lower than the previous trough.

Conclusion 3

While Alaska is still highly dependent on the oil industry, this dependence has declined. In addition, the form of this dependence is shifting. In the foreseeable future, Alaska will depend less on the oil industry and oil revenues than on how productively the citizens and government of Alaska has invested its oil wealth.

Stage 3—Alaska's Emerging Economy

A more detailed inspection of Alaska's basic industries shows that Alaska's economy has started on a third stage of development. While this emerging economy is still largely based on oil, it is becoming less dependent on oil and so increasingly diversified. This emerging economy is more controlled by Alaskans because it depends less on harvesting or extracting natural resources and more on the processing and distribution of those resources with more value being captured by Alaskans.

The question for Alaska is whether this emerging economy can grow fast enough to replace the gradual decline of oil revenues.

To answer this question, and to understand better what is happening in key basic sectors of the Alaskan economy, requires comparing the performance of different sectors of the Alaskan economy with their national competitors. This tool—called "shift-share analysis" by economists—can be helpful in explaining the performance of an industry by separating out the influence of the ups and downs of the business cycle from underlying competitive factors. If, for example, an industry in Alaska grew 20% during a period of time when its competitors nationally grew only 10%, then we know that the Alaskan industry has a positive competitive shift. Alaskan firms in that industry must be doing something right to become more productive and increase their

market share or, possibly, those firms benefitted from receiving higher quality inputs from the local economy, such as higher skilled workers, or lower business and regulatory costs. If Alaskan firms grew only 5% while their competitors grew 10%, the Alaskan industry might still be growing, but it is less competitive. On the other hand, if in a recession the national industry shrunk by 20% when the Alaskan industry shrunk by only 10%, the Alaskan industry is becoming more competitive even in a downturn.

This form of analysis is not a perfect tool for two reasons. First, Alaska competes not just nationally but internationally so comparing Alaskan firms and their U.S. counterparts offers meaningful but not perfect comparisons. Second, because the structure of Alaska's economy is different than the national economy (more oil, less manufacturing, etc.), shift share analysis is more useful for understanding how different sectors of the economy perform than explaining the performance of the economy as a whole. The Alaska economy is more driven by the price of oil than whether the national economy is growing or in recession.

Comparing Alaska's economy at its earlier peak of 1985 with its recent peak of 1995, shows an economy which gained 27,122 jobs. However, if in that period Alaska's economy had grown as fast as the nation's economy, the state would have added 45,519 jobs. In effect, Alaska "lost" 18,398 jobs (or negative competitive shift) because the state grew more slowly than the nation. The oil industry cannot be blamed for this relative decline. In that period, the Alaska oil industry lost 102 real jobs but because the oil industry was declining much faster nationally than in Alaska, the oil sector had a positive competitive shift of almost 4,000 jobs.

There are important signs of the state's economic future in comparing how Alaska has recovered from the last two business cycles (1978 trough to 1985 peak versus 1987 trough to 1995 peak). While Alaska's had a 43,072 positive competitive shift in the 1980s recovery compared to a positive shift of 17,496 jobs in the recent 1990s expansion, the composition of the recent recovery is more healthy and diverse. The 1980s expansion was driven by big increases in construction and government; in effect by oil revenue. The recent expansion has been manufacturing and mining (including oil) with smaller increase in retail and services. While Alaska's public sector remains a much larger part of the state's economy than the nation, this sector is growing more slowly here than outside.

The star performer of Alaska's base economy has been seafood and, secondarily, mining and other manufacturing. The seafood processing industry does not include seafood harvesters (fishers), most of whom are self-employed. Whether measured from trough to peak (1987 to 1995) or peak to peak (1985 to 1995), Alaska's manufacturing sector led by seafood, but also including durable and nondurable goods, is growing both absolutely in real numbers and relatively compared to national competitors.

On the other hand, the forestry sector of the economy is becoming a smaller part of our state's base and is going in the opposite direction from value-added manufacturing. Since 1985 the state has added 708 jobs in logging while this sector declined modestly nationally. At the same time the state has been losing jobs in producing pulp and wood products from timber. While the dispute over timber availability has dominated concerns about this sector, this factor does not explain why Alaskan firms producing products from timber have been losing market share.

If the seafood sector is an example of what happens when a sector becomes more competitive, the "value-losing" forestry sector shows what results from becoming less competitive.

Engineering and management services have been growing in Alaska compared to the national sector since this sector started being counted separately in 1987. The "contracting out" of engineering design and management functions from, for example, an oil company to a service firm is a trend that is happening here even faster than nationally. This sector is becoming a significant success story in Alaska. While counted as a service sector, in effect the competitiveness of this sector is a part of the state's base both because its customers are often in the base and because these firms are increasingly selling their services outside Alaska.

Business services, primarily temporary help, is one service sector which did not grow at all in Alaska in the latest recovery as the sector lost 710 real jobs and had a negative competitive shift of 7,381 "lost jobs" because this sector was simultaneously booming nationally. This sector counts temporary employment both high skilled—information technology, accounting, software—and lower skilled office and production work. It is not clear if this decline is due to the state's weak business infrastructure or a relatively small critical mass of firms to support with these services. In either case, this weak business service sector is a cause for some concern.

Recent competitive shifts in Alaska's economic base and their ripple effects have made Alaska's economy resemble less a frontier economy and look more like the national economy. There has been growth in Alaska's small manufacturing sector and less dependence on Alaska's large oil and oil-financed state and local government sector and the oil-driven construction sector. Alaska's service sector, including retail, is growing here faster than nationally.

Peak-to-Peak (1985-1995) Comparisons			
Industry	State Growth Rate	National Growth Rate	State Component
All Industries	11.8	19.7	-18,398
Seafood	71.6	10.5	3,757
General Merch & Apparel	71.7	8.1	3,399
Oil & Gas Field Services	29.8	-51.0	3,333
Eng & Management Services *	5.5	-21.0	1,589
Water Transportation	45.5	-13.6	815
Logging	67.7	-3.4	744
Hotels, Motels	37.0	22.1	699
Other Mining	74.9	-23.6	635
Oil & Gas Extraction	-28.0	-41.0	618
Federal	0.7	-1.9	459
Wholesale Nondurables	25.8	14.2	399
Utilities	15.4	-1.1	333
Health Services	51.0	47.3	329
Pipelines, Exc. Natural Gas	22.7	-11.8	321
Auto Dealers & Service Stations	24.2	17.2	267
Other Durables	16.1	-8.5	212
Other Nondurables	21.0	-1.8	211
Membership Organizations	40.6	35.8	190
Railroads	432.3	-33.6	48
Trucking & Warehousing	37.7	38.0	-8
Local Pass Transport	57.6	61.5	-43
Pulp Mills	-15.9	-8.1	-49
Miscellaneous Retail	19.1	20.4	-68
Food Stores	19.6	21.0	-88
Repair Services	23.4	30.4	-170
Transportation Services	38.2	54.1	-175
Other Wood	-35.4	7.9	-273
State Education	17.7	24.1	-305
Personal Services	-0.9	19.7	-398
Printing & Publishing	-17.2	9.1	-487
Communications	-9.7	3.0	-523
Legal Services	-4.7	34.5	-706
Bldg Materials & Furniture	-2.2	26.7	-945
Insurance	-25.2	21.9	-1,111
Air Transportation	27.4	46.7	-1,116
Social Services	41.2	71.5	-1,346
Banks, Credit Unions & S&Ls	-20.9	3.6	-1,392
Wholesale Durables	-19.3	7.8	-1,438
Local Gov't Education	14.4	24.2	-1,629
Rest of Services	-25.5	-6.0	-1,664
General Construction	-32.7	-0.9	-1,698
Heavy Construction	-39.6	-3.0	-1,819
Brokers, RE, Holding Company	-9.6	30.8	-1,908
Eating & Drinking Places	12.4	26.8	-1,925
State Noneducation	-1.7	17.4	-2,991
Local Noneducation	-2.7	20.2	-3,138
Special Trades Construction	-24.1	23.1	-3,915
Business Services	-8.6	80.5	-7,381
*1987-1995			
Source—Alaska Department of Labor, Research & Analysis			

Comparing Two Recoveries

		1978-1985 (Trough1 to Peak1)				1987-1995 (Trough2 to Peak2)				
		Component			Total Change	Component			Total Change	
Industry	SIC	State	National Growth	Nat. Industry Differential		State	National Growth	Nat. Industry Differential		
Total Nonagricultural		43,072	20,586	0	63,657	17,498	30,185	0	47,683	
Mining		10-14	3,505	680	-187	3,998	2,788	1,283	-2,884	1,108
Oil & Gas		13	1,897	633	1,202	3,732	2,423	1,169	-2,878	704
Oil & Gas Extraction		131,132	N/A	N/A	N/A	N/A	164	641	-1,847	-1,043
Oil & Gas Field Services		138	N/A	N/A	N/A	N/A	2,398	518	-1,170	1,747
Other Mining		10,12,14	335	47	-116	266	523	104	-225	402
Construction		15-17	5,065	1,513	-239	6,338	2,221	1,449	-863	2,807
General Construction		15	1,683	443	-376	1,760	817	424	-698	643
Heavy Construction		16	1,909	406	-660	1,667	145	409	-395	167
Special Trades Construct		17	1,746	662	523	2,931	1,472	616	-80	2,008
Manufacturing		20-39	881	1,473	-2,208	148	4,393	1,855	-2,269	3,888
Seafood		2081,2092	599	774	-1,498	-125	3,667	958	-736	3,890
Logging		241	-41	135	-140	-46	154	241	-317	77
Other Wood		Rof24	-90	97	-164	-167	-97	72	-66	-91
Pulp Mills		261	-242	130	-309	-422	-210	127	-268	-351
Printing & Publishing		27	788	110	65	962	-116	229	-172	-58
Other Nondurables			31	122	-221	-67	211	132	-145	198
Other Durables			58	106	-161	3	361	97	-134	325
Transport, Commun. & Util		40-42,44-49	1,307	2,016	-988	2,336	2,684	2,524	201	5,390
Local Pass Transport		41	225	100	-41	285	-110	174	457	521
Trucking & Warehousing		42	-250	295	-187	-142	15	345	334	695
Water Transportation		44	345	144	-275	214	1,056	148	-224	980
Air Transportation		45	-49	560	709	1,221	616	761	667	2,044
Air Trans Scheduled		451	N/A	N/A	N/A	N/A	1,374	406	143	1,923
Air Trans. Nonscheduled		452	N/A	N/A	N/A	N/A	-2,862	272	2,574	-16
Airport, Flying Field, Svcs		458	120	42	121	283	-152	84	205	137
Pipelines, Exc		46	-366	167	-230	-428	336	132	-244	224
Natural Gas										
Transportation Services		47	377	55	223	656	7	151	312	470
Communications		48	-176	499	-241	82	-122	522	-306	95
Utilities		49	380	171	75	626	396	283	-323	357
Railroads		40	-114	23	-85	-176	17	7	-18	5
Wholesale Trade		50-51	2,151	708	148	3,004	683	1,065	-452	1,186
Wholesale Durables		50	1,021	453	168	1,631	-46	582	-309	228
Wholesale Nondurables		51	1,117	254	2	1,373	619	482	-143	859
Retail Trade		52-59	9,377	2,870	1,642	13,789	7,442	4,845	-420	11,667
Bldg Materials/Furniture		52,57	945	242	117	1,304	711	304	69	1,084
General Merch & Apparel		53,56	927	521	-330	1,118	4,143	703	-564	4,281
Food Stores		54	1,783	415	464	2,663	672	840	-53	1,369
Auto Dealers & Svc Statn		55	1,279	306	-269	1,317	1,021	481	-127	1,376
Eating & Drinking Places		58	3,243	944	1,600	5,787	349	1,788	537	2,674
Miscellaneous Retail		59	865	442	295	1,602	434	730	-69	1,095
Finance, Insurance & R.E.		60-67	1,171	1,135	1,251	3,557	-1,619	1,628	-907	-797
Banks, Credit Un/S&Ls		60,61	442	511	586	1,539	-403	726	-879	-666
Insurance		63,64	327	217	58	601	-434	285	-73	-222
Brokers, RE, Holding Co.		62,65-67	135	406	874	1,417	-664	616	18	-19
Services & Misc.		07,70-99,99	6,660	3,487	6,387	16,533	1,675	6,101	9,193	16,869
Hotels, Motels		70	564	377	686	1,627	1,283	666	-167	1,791
Personal Services		72	604	141	39	784	-55	254	-50	148
Business Services		73	-389	634	2,900	3,146	-3,736	1,047	2,978	289
Repair Services		75,76	777	156	216	1,149	355	307	177	840
Health Services		80	1,540	677	1,043	3,261	895	1,298	1,992	4,186
Hospitals		806	787	318	148	1,263	639	543	287	1,448
Other Health Services		R of 80	661	359	988	2,008	145	755	1,837	2,738
Legal Services		81	-143	148	596	601	-517	276	35	-206
Social Services		83	151	396	686	1,233	-976	667	1,945	1,636
Membership Organizations		86	807	387	-354	840	27	626	581	1,234
Engineering & Mgmt Svcs		87	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Rest of Services		07,99,R70-99	2,222	670	1,100	3,893	605	960	-1,900	-335
Government			11,452	6,708	-4,204	13,953	-3,608	9,458	-682	5,268
Federal			-2,636	2,388	-1,628	-1,778	581	2,670	-3,312	-190
State			4,610	1,773	-291	6,092	-672	2,692	307	2,326
State Education		82	1,406	373	9	1,788	239	648	274	1,161
State Noneducation			3,308	1,400	-401	4,304	-890	2,044	-189	1,165
Local			9,113	2,648	-2,021	9,840	-1,942	4,194	877	3,129
Local Govt Education			3,884	1,491	-851	4,626	78	2,295	664	3,037
Local Noneducation		82	5,170	1,057	-1,111	5,115	-406	1,700	186	1,479

Subtotals may not add to totals due to rounding.

Based on nonagricultural wage and salary employment; 1992 data subject to revision.

- National Growth Component = Change in number of jobs if Alaskan industry had grown at the same rate as all U.S. nonagricultural employment.
- National Industry Differential Component = Change in number of jobs if Alaskan industry had grown (or declined) at the same rate as its national counterpart minus change in number of jobs attributable to growth of all U.S. nonagricultural employment (National Growth Component).
- State Component = Actual change in number of jobs minus change in number of jobs if Alaskan industry had grown (or declined) at the same rate as its national counterpart.

Sources—Alaska Department of Labor, Research and Analysis Section; and U.S. Department of Labor, Bureau of Labor Statistics

Shift-Share Components—Between Cycles

Industry	SIC	1978-1987 (Trough to Trough)				1985-1995 (Peak to Peak)			
		Component			Total Change	Component			Total Change
		State	National Growth	Nat. Industry Differential		State	National Growth	Nat. Industry Differential	
Total Nonagricultural		13,708	29,388	0	43,096	-18,398	45,519	0	27,122
Mining	10-14	4,141	971	-1,839	3,273	3,952	1,878	-5,449	381
Oil & Gas	13	3,259	904	-1,237	2,927	3,959	1,751	-5,811	-102
Oil & Gas Extraction	131,132	N/A	N/A	N/A	N/A	618	937	-2,886	-1,331
Oil & Gas Field Services	138	N/A	N/A	N/A	N/A	3,333	813	-2,917	1,229
Other Mining	10,12,14	441	67	-162	346	635	127	-279	483
Construction	15-17	-4,300	2,159	-45	-2,185	-8,020	3,672	-1,369	-5,716
General Construction	15	-901	632	-371	-640	-1,698	1,054	-1,103	-1,748
Heavy Construction	16	-111	583	-939	-467	-1,819	981	-1,129	-1,967
Special Trades Construct	17	-2,878	944	855	-1,078	-3,915	1,638	277	-2,001
Manufacturing	20-39	1,840	2,103	-2,980	963	5,333	2,387	-2,918	4,803
Seafood	2091,2092	728	1,104	-1,443	389	3,757	1,214	-566	4,404
Logging	241	577	192	-184	584	744	206	-242	708
Other Wood	Rof24	-271	139	-158	-290	-273	125	-75	-224
Pulp Mills	261	-74	185	-281	-170	-49	124	-175	-100
Printing & Publishing	27	471	157	75	702	-487	365	-197	-318
Other Nondurables		32	175	-277	-71	211	183	-199	195
Other Durables		-102	151	-232	-182	212	170	-243	139
Transport, Commun. & Util	40-42,44-49	-242	2,878	-1,420	1,216	838	3,688	-257	4,270
Local Pass Transport	41	283	143	-30	396	-43	217	459	633
Trucking & Warehousing	42	-288	421	-123	11	-8	444	412	848
Water Transportation	44	62	206	-406	-138	815	273	-460	628
Air Transportation	45	-1,420	800	1,373	753	-1,116	1,138	1,555	1,577
Air Trans Scheduled	451	N/A	N/A	N/A	N/A	100	668	593	1,361
Air Trans. Nonscheduled	452	N/A	N/A	N/A	N/A	-3,294	347	3,065	119
Airport, Flying Field, Svcs	458	-18	60	201	243	-394	123	368	96
Pipelines, Exc Natural Gas	46	-386	239	-294	-441	321	184	-293	211
Transportation Services	47	277	79	250	608	-175	218	378	421
Communications	48	-550	713	-576	-414	-523	815	-693	-401
Utilities	49	319	244	17	580	333	398	-420	310
Railroads	40	-57	13	-112	-137	48	2	-6	45
Wholesale Trade	50-51	690	1,008	-17	1,681	-1,047	1,723	-813	-137
Wholesale Durables	50	-273	646	8	382	-1,438	1,047	-630	-1,022
Wholesale Nondurables	51	958	362	-21	1,300	399	677	-190	886
Retail Trade	52-59	4,254	4,098	2,085	10,437	968	7,317	230	8,514
Bldg Materials/Furniture	52,57	-390	346	192	148	-945	645	227	-72
General Merch & Apparel	53,56	250	744	-328	666	3,399	1,054	-823	3,830
Food Stores	54	1,320	592	570	2,482	-88	1,190	77	1,179
Auto Dealers & Svc Staln	55	673	437	-250	860	267	750	-98	919
Eating & Drinking Places	58	1,547	1,348	1,889	4,784	-1,925	2,653	943	1,672
Miscellaneous Retail	59	477	631	387	1,496	-68	1,024	33	989
Finance, Insurance & R.E.	60-67	-1,408	1,621	1,905	2,118	-4,384	2,520	-371	-2,236
Banks, Credit Unfs/S&Ls	60,61	-548	730	724	908	-1,392	1,122	-919	-1,189
Insurance	63,64	-251	309	171	229	-1,111	465	52	-594
Brokers, RE, Holding Co.	62,65-67	-939	582	1,340	983	-1,908	932	523	-453
Services & Misc.	07,70-89,99	504	4,977	8,695	14,176	-7,701	8,815	13,387	14,511
Hotels, Motels	70	95	539	936	1,570	699	925	109	1,734
Personal Services	72	341	202	76	619	-398	381	0	-17
Business Services	73	-2,800	905	4,041	2,147	-7,381	1,636	5,036	-710
Repair Services	75,76	397	223	263	873	-170	477	258	584
Health Services	80	1,247	967	1,329	3,543	329	1,728	2,412	4,468
Hospitals	806	583	454	160	1,197	345	757	291	1,392
Other Health Services	R of 80	539	512	1,295	2,346	-143	971	2,249	3,076
Legal Services	81	-329	211	839	721	-706	355	265	-85
Social Services	83	-70	565	936	1,430	-1,346	877	2,302	1,833
Membership Organizations	86	986	552	-318	1,220	190	785	640	1,615
Engineering & Mgmt Svcs	87	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Rest of Services	07,99,R70-89	-210	814	1,449	2,053	-1,664	1,681	-2,192	-2,176
Government		6,779	9,573	-4,934	11,418	-9,292	13,489	-1,467	2,730
Federal		-2,794	3,405	-2,070	-1,459	459	3,468	-3,797	129
State		2,315	2,530	-490	4,358	-3,523	4,040	73	590
State Education	82	997	532	-48	1,482	-305	950	209	854
State Noneducation		1,398	1,998	-522	2,874	-2,991	3,090	-364	-264
Local		7,091	3,637	-2,207	8,522	-4,771	5,631	801	2,011
Local Govt Education		2,629	2,129	-883	3,875	-1,629	3,280	736	2,387
Local Noneducation	82	3,003	1,509	-1,252	3,260	-3,138	2,702	60	-376

Subtotals may not add to totals due to rounding.

Based on nonagricultural wage and salary employment; 1992 data subject to revision.

- National Growth Component = Change in number of jobs if Alaskan industry had grown at the same rate as all U.S. nonagricultural employment.
- National Industry Differential Component = Change in number of jobs if Alaskan industry had grown (or declined) at the same rate as its national counterpart minus change in number of jobs attributable to growth of all U.S. nonagricultural employment (National Growth Component).
- State Component = Actual change in number of jobs minus change in number of jobs if Alaskan industry had grown (or declined) at the same rate as its national counterpart.

Sources—Alaska Department of Labor, Research and Analysis Section; and U.S. Department of Labor, Bureau of Labor Statistics

Conclusion 4

Alaska is developing a healthier, more diversified economic base. The new Alaska economy is less driven by oil and oil-financed government jobs and more driven by the private sector—services, retail, transportation, communication, and—most importantly—seafood processing and other forms of value-added manufacturing.

Conclusion

While the good news is that Alaska's emerging economy is increasingly diversified, the disturbing news is that it is not yet clear whether this transition is happening fast enough to replace oil-dependent jobs. As shown from economic history, it makes a big difference whether a community or state has the good fortune to grow an economic base by expanding from a stable base or whether it first suffers from the job losses and social dislocations of a collapsing base before a new base can be established.

So the question of whether Alaska's economy keeps growing is not answerable because it depends in part on a mixture of the largely unknown—what the world markets in the future will pay for oil—with the largely known—the changing structure of the Alaskan economy and how competitive that economy is. While the wealth deriving from Alaska's oil resources hinges on decisions made almost entirely out of the state, Alaskans have more influence over the other sectors of their economy. While Alaskans have negligible influence over the price of oil and the business cycle, Alaskans can influence how competitive its industries are. A closer look at two of Alaska's important basic industries shows one already playing a larger role and one whose importance is increasingly threatened.

While still relatively small at 11,000 jobs, the seafood processing industry in Alaska is the only industry in Alaska to employ a large fraction of the U.S. workers in that industry. Better yet, the fraction of the industry in Alaska is growing. While Alaska had less than 10% of the industry in 1975, by 1992 the industry was more than 20% Alaskan. This growth occurred less because the national industry was declining than because the Alaskan industry was growing. While there has been significant turmoil in specific fisheries and a large expansion of the bottomfish industry, as a whole the industry has grown fairly steadily since 1975.

The much smaller timber industry has not grown as fast as the seafood industry. With the closing of the Sitka and Ketchikan mills and continued disputes over timber sales from the Tongass National Forest, the forestry industry may no longer be a growing part of Alaska's economic base. But these recent events only highlight long-term trends.

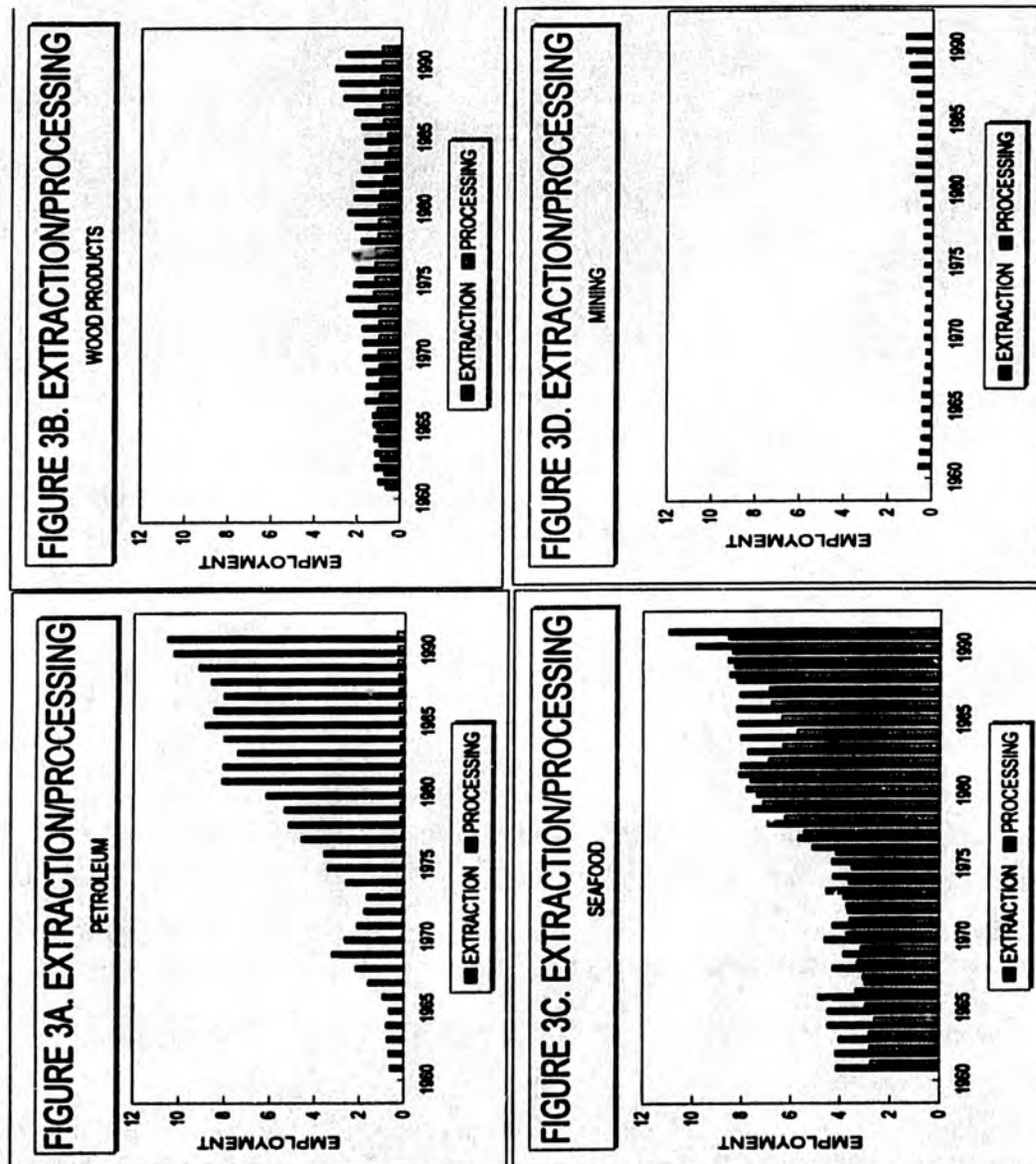
The number of seafood processing jobs first exceeded the number of fishing jobs in 1972, growing from being only a quarter of the industry in the early 1960s to more than half today. On the other hand, the trend in the timber industry has been the other way. Before 1965 there were more jobs processing timber than logging it. Since then the number of logging jobs has grown modestly while the number of jobs processing logs into forest products has held steady at 1500-1700. As a result, the seafood industry, which was twice the size of the timber industry in 1965, by 1990 had grown to be almost four times as large. (See page 9, Proportions of Income Attributable to Basic Sectors.)

Alaska's economy is based on natural resources—oil, fish, timber, and minerals. They can be considered the good cards that history has dealt Alaska. However, with declining oil revenue and prices for natural resources set on world markets, Alaska's economy

increasingly depends on how much value or wealth can be added to those resources. That is, rather than hoping for the luck of continued good deals, Alaska future will depend more on how well it plays its cards.

Conclusion 5

To add more value to Alaska's economic base will require more than the extraction and export of the state's resources. It will require the processing of those resources into products the world wants to buy.



Source—Institute of Social and Economic Research, University of Alaska Anchorage

Our next chapter will outline Alaska's strategic choices; that is, the options Alaska has in playing its cards.

Chapter II

Alaska's Choices

The reader of the previous chapter may consider its conclusions familiar, even obvious. Having distinguished between Alaska's economic base and its local market economy, traced the changing structure of that base, and examined the competitiveness of different sectors of the state's economy, the reader may have expected a more original prescription than Alaska's need to diversify its economic base beyond oil revenues and to add more value to its natural resources. This song has certainly been sung before.

There are at least three reasons to broadcast apparently old news. First, some people may not have heard it. A problem should be defined as clearly and specifically as possible so its reality cannot be denied. Alaska does not want to be like the man who, asked to explain why he walked into a tree, replied, "I saw it, but I did not realize it." Without a common definition of the situation and an agreed upon understanding of what led to where we are, it is hard to agree on next steps.

Second, the news may have been heard, but it may be far less clear what can be done about it. While some may even find it encouraging to know that the signs of Alaska's more diversified and competitive economy are already apparent, many more may feel pessimistic about an Alaska of decreasing oil wealth or react passively believing that Alaskans or their state government can't do much—good or bad—about it. Hopefully, a better understanding of the state's economic base will narrow the focus when considering what to do.

Finally, the news may just appear to be old. As will become apparent, this earlier analysis of the Alaskan economy will suggest a new approach to defining Alaska's future. The clearest way to start to distinguish this new approach from the old is to first examine a few basic myths Alaskans have about their state. The first myth is that Alaska's abundant resources will assure a vibrant economy. The second myth is that Alaska's strategic location puts it in a favored place to take advantage of the emerging world economy. The final myth is that whatever the threats to Alaska's economy, a better government can fix it.

These three myths have been central to how Alaskans have understood themselves, their prospects, and their limits. Myths—like the myth of the frontier—can be powerful ways of understanding the world. Myths are not necessarily completely wrong but as the world changes they need to be reexamined to separate what is still true from what is now false. Unless so reexamined, myths can leave their believers as prisoners of the past, unable to diagnosis their situation correctly and unable to undertake the individual and collective actions necessary to earn a living from the world economy.

As Alaskans consider their choices, it's time to take these three myths head on

Myth I—Alaska's Abundant Resources Create Wealth

The belief that Alaska's prosperity is largely assured because of the state's abundant natural resources is a misreading of Alaska's past economy and, more fundamentally, shows a misunderstanding of how wealth is created.

Natural resources in the ground are not wealth and by themselves are not even the foundation for a healthy, competitive economy. If resources constituted wealth then Zaire,

Russia, Brazil, Indonesia, and Namibia would be among the richest countries in the world today and Japan, Singapore, Germany, and Switzerland would be among the poorest. The position of resource-poor Connecticut, the state with the highest per capita income, would be reversed with coal-rich West Virginia and oil-rich Louisiana, states near the bottom of per capita incomes.

As is apparent from history, even the development and export of natural resources are not a guarantee of wealth. It is the control of those resources, that is the ability to extract, transport, and sell in a final market which creates more wealth than the original ownership and extraction of the resource. So in the nineteenth century European colonial powers could often extract more wealth from Africa than was left behind when the mines were played out or when newly independent African states took control of their resources.

While the processing and sale of resources often creates more jobs and downstream wealth than the mere ownership and extraction of resources, it is even better when a country possess the general ability to process resources into final products the world wants to buy. Japan has negligible natural resources, but even with its recent banking problems it is still a manufacturing powerhouse because it has the industrial technology and trained work force which has produced, distributed and sold its products worldwide. (True, Japanese companies now own coal and mineral resources throughout the Pacific rim but these resources were primarily purchased after Japanese earned its manufacturing and final sale profits. They then had the capital to integrate upstream.)

Oil is the one natural resource which arguably may be the exception which proves the rule that resource ownership does not translate to a prosperous economy. As the world's major fuel and a commodity whose value is increased by little, once refined, petroleum is a unique resource. And those Middle Eastern nations like Saudi Arabia and the Gulf Emirates with few people and abundant oil resources certainly have high per capita incomes with its citizens paying no taxes and having access to free health and education services.

But even oil is a commodity subject to the same forces of supply and demand as other products. High oil prices in the 1970s led to increased conservation measures and the search for replacement fuels. The result is that the marketplace adjusted to higher energy prices by increased investments in making our cars and factories more energy-efficient, by energy costs continuing to be a declining share of product costs, and by increasing the use of coal and natural gas so as to act as almost replacement goods holding down the price of petroleum. Rather than being a monopoly which exercises market control over the price of oil, OPEC is now more a bystander watching both the market share for non-OPEC oil grow and the real price of oil steadily decline. With western technology and capital moving into the Commonwealth of Independent States to increase their oil exports and the continued development of renewable resources and fuel cell technologies, it is unlikely that the oil-rich Gulf states will survive into the next century as wealthy states based solely on their natural resources.

The relative increased value of goods as the resources moves downstream to the market is even greater for renewable resources like seafood and timber than it is for finite resources such as oil and gold which increase less in value before final sale. Prices tend to be more stable, or less elastic, for goods for which there are more immediate substitutes, such as eating more meat when seafood prices climb. When asked what is needed to insure prosperity, sellers of natural resources often hope for a repeat of the rare good year when temporary dislocations elsewhere created short-term windfall profits for Alaskans. So those dependent on the Alaskan oil industry, such as construction workers in the early 1980s building capital projects for the state, fondly remember the effect of the run-up of oil prices following the fall of the Shah of Iran in 1979, gold miners pleasantly recall the panic increase

in the price of gold to \$850 an ounce during temporary hyper-inflation of 1979, and timber sellers recall the good prices which come during housing booms.

But good times rarely last long as high prices decrease the demand for a good, increase the demand for substitute goods, and attract the increased investment which in time brings additional price-lowering supplies to the market.

So individuals who make a living in natural resource industries face a tough choice. They can try to survive by waiting for the rare good year, or they can increase the productivity of their operations so they can make money even at lower prices of normal years. And, if they want to be less dependent on the ups and downs of world commodity prices, Alaskans can have more control of their livelihood and steadier incomes if they can shift from being sellers of the resource into the processing, distribution, and sale of resource-based products.

For Alaska, with already declining oil production, the lesson cannot be postponed that the ownership and sale of natural resources will matter less in the future. Instead the state's wealth will depend more on the ability to add value to the resource and move this value downstream to the market where greater value and profits can be captured.

CONCLUSION 6

Alaska's natural resources should be considered opportunities, not assets. For these opportunities to be realized, Alaskans and Alaskan firms will have to extract, process, distribute and sell resources more efficiently than other competitors. To capture a larger share of the value of its resources, Alaskans will need to retain more ownership and control of how the resource is distributed and sold.

Myth II—Alaska's Strategic Location

The second myth Alaskans have is the belief that Alaska's strategic location will make the state a more important part of the world economy. With Alaska's location on the fast-growing Pacific rim and the opening of Russia, it may appear that, even if nothing else changes, Alaska's location alone should make the state more prosperous. Yet a closer examination of this belief reveals that, like the myth of Alaska's abundant resources insuring prosperity, the state's location is not an asset, only a potential asset. Unless the individuals and firms do the more important work of organizing themselves to produce products which compete globally, the asset of Alaska's location will remain largely uncaptured.

Two trends are making location an increasingly minor factor in the world economy. First, as shown by the approval of NAFTA and GATT, the world's trade barriers continue to fall. As a result, a good's cost and quality becomes an even larger factor in a product's ability to penetrate new markets. Correspondingly, the location of a product's origin is becoming an increasingly smaller factor. As trade barriers keep falling and telecommunications expand, the world is becoming one marketplace. In this global marketplace, it is becoming true that if a resource provider or manufacturer can't sell his product everywhere, they will not be able to sell it anywhere.

Second, declining energy prices and increasing efficiency of the movement of goods have made transportation costs a declining portion of total product costs. As a result (see table, page 9) the proportions of income in Alaska's base attributed to entrepot, the movement of goods and services through the state, has been relatively steady at 1% since statehood.

The expansion of capitalism and the creation of a world marketplace are making the key factors of production more mobile. To consider the three most important ingredients of economic growth—wealth or capital, technology, and labor—at least the first two factors, capital and technology, are increasingly mobile and stateless. Wealth can move between continents as fast as digits on an electronic screen can be sent. Technology—for example, a machine which more efficiently processes a natural resource or bends metal into parts—can be manufactured in the United States yesterday, be put on a plane today, and placed on a factory floor anywhere in the world tomorrow.

The large corporations which by their investments determine where the jobs are created and which communities will grow are increasingly stateless entities deploying their capital and technology wherever they can expect to earn the greatest returns for their shareholders. So rather than asking which locations in the world are strategic in the sense that they are located near important markets, investors are asking about the cost and quality of the local resources, workers, and community and then investing technology and capital at that location. Areas of the world with the right combination to produce competitive products becoming strategic as their products are shipped worldwide; other areas risk become the ignored byways of world commerce.

In the new world economy, even the concept of a strategic location can be questioned. Certainly few people considered Japan a strategic location in 1854 when Commodore Perry opened up that nation to the world. At that time the world's chief economic power was Great Britain. Exporting wealth from its colonies around the world, Britain was a leading manufacturer, shipper, trader, and financier of the world's commerce. Today, Britain is a lesser economic force with a national product and standard of living now below Italy. Was Britain, supposedly a strategic location in the 19th century, an "unstrategic" location in the 20th century?

So Alaskans should look to Russia as an opportunity for business but not a guarantee of opportunity. While it may be more convenient for a business person in Nome or Anchorage to go to Magadan, Magadan is becoming accessible to the world. With improved telecommunications, Magadan will soon be able to communicate with equal ease with whomever else in the world has a phone, a computer and a modem, or a satellite dish. Whatever business Alaska can do with Magadan will depend less on convenient flights and more on the ability of Alaskans to conduct business.

Conclusion 7

Where Alaska is located is less important than its ability to put together the resources, capital, technology, and know-how to produce products which can be sold both locally and globally.

Myth III—The Government Fix

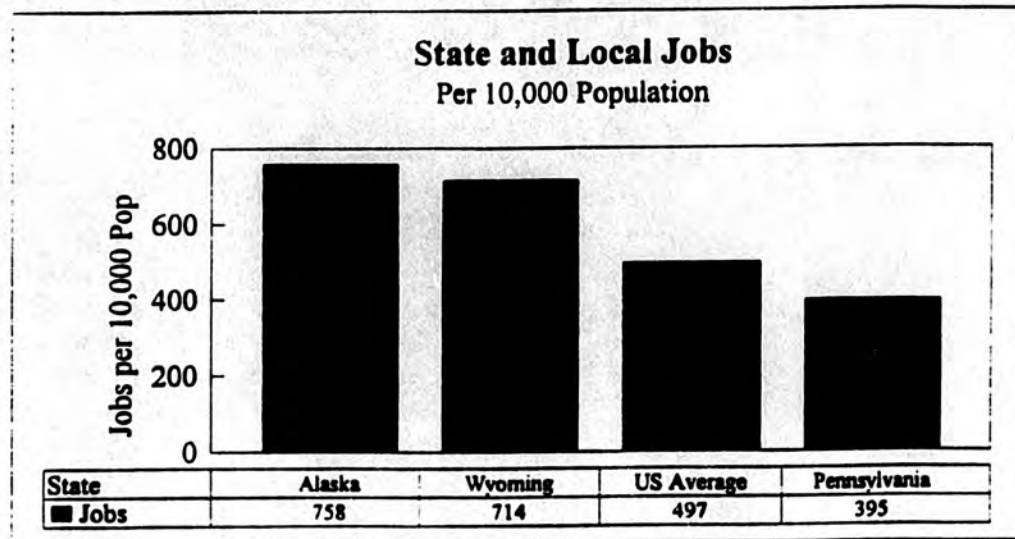
The final myth which has limited Alaskans' ability to come to terms with their economic future is the belief that only the government has to be fixed. Many Alaskans with quite different politics, different definitions of the problem, and quite different views of what the government should do about it, are united in the belief that if only the policies and budget of government were straightened out, Alaska's future would be secure.

Because this myth does not settle the debate about the proper role of government, does not point the way toward more intelligent ways in which government can act, and places the responsibility of fixing the problem solely on government and the politicians, the myth of the government fix is misleading, even dangerous. It becomes dangerous if commitment to this

myth forestalls the more fundamental steps both the public and private sector must take to build a more competitive economy.

The two sides of this myth can be examined; first, that the belief that a larger role for government is the answer and then its more entrancing opposite, the belief that shrinking the public sector will necessarily solve the problem.

More Government?



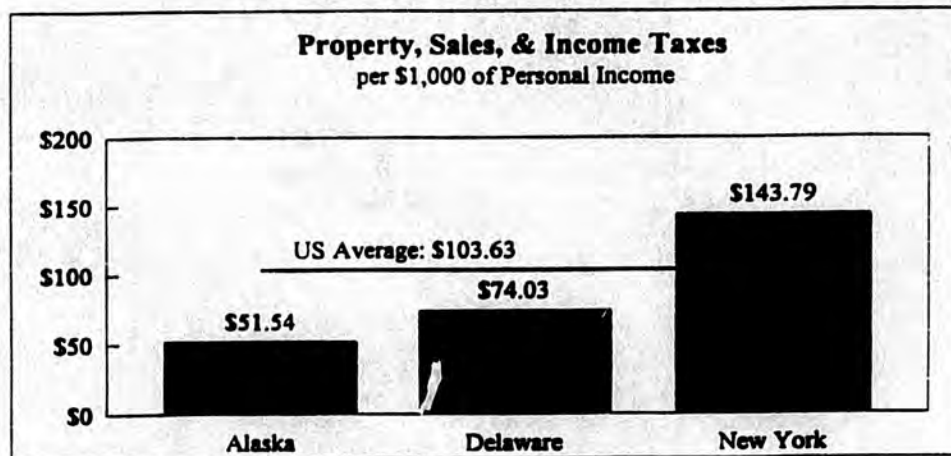
Source—Institute of Social & Economic Research, University of Alaska Anchorage

For most Alaskans, it is probably easier to first dismiss the argument that more government is the answer. Alaska already has the highest proportion of state and local government employees of any state.

Alaska has more than a third more state and local employees per capita than the U.S. average—6% more than Wyoming (the next highest state) and almost 50% more than Pennsylvania (the lowest state).

Alaska is also the only state besides New Hampshire without a statewide income tax, a statewide sales tax, or—not counting the oil revenue tax—a significant statewide corporate profits tax. And, as is well known, through the Permanent Fund, Alaska is the only state which can pay its residents annually a dividend to live there.

As a percentage of personal income, Alaska pays almost a third less in state and local property sales and income taxes than Delaware (the next lowest state) and a half less than the national average.



Source—Institute of Social & Economic Research, University of Alaska Anchorage

In looking at the amount of taxes paid by state residents, it makes sense not to count the state's oil revenues because this is a tax paid by out-of-state consumers and corporations. So setting aside the oil revenues, Alaska has the highest proportion of jobs in the public sector financed by the lowest per capita amount of taxes paid by residents and local businesses. So the argument of any U.S. business person that high business taxes make it hard to compete is less valid for an Alaskan than for a business person from any other state. (True, because of Alaska's location and the colder climate, the costs of goods and services is higher in Alaska than other states, but for now, only the argument that the cost of government makes Alaska uncompetitive is being considered.)

As described in the last chapter, while every fourth job in the U.S. economy is in manufacturing or agriculture, in Alaska only every seventh job is in these sectors devoted to producing goods sold outside the state. With Alaska having the highest proportion of its economy in the public sector, it is hard to believe that growing the public sector even larger will expand and diversify Alaska's economic base. Alaska's private sector economic base is already dangerously narrow.

Even if it is agreed that the declining oil revenue base mandates a stronger role for state and local government in growing the basic sector of seafood, timber, mining, tourism, and agriculture, it is not clear how this would be done. It is one thing to argue that the state and its government have an interest in creating a larger, more diversified economic base. It is another issue entirely to believe that state government itself has the ability to do this.

Even setting aside the quite mixed track record of the state in capitalizing dairy farms, sawmills, and other ventures, what is the economic case for state or borough governments owning or directly capitalizing new private sector businesses? With declining oil revenues, any public capital to finance private sector businesses would have to come from new taxes or more layoffs of public employees. In either case, money would first be withdrawn from the local market economy. Whether the state was just playing the role of investor to lend the public revenue to a "private sector" firm or whether the state directly owned and managed the new enterprise and the jobs were counted as "public sector" jobs, the true test of this strategy is the same. The new business must be able to sell a product at a profit so as to return to the public its investment. If the business purchased most of its goods and services from out of the state, didn't employ existing local workers or attracted workers who returned to Seattle when the business slowed down, and failed to earn sufficient revenue to repay the state, the effect of this failed "private sector" business could be even worse than if the state

had used the money to pay a public employee who provided a local service and spent most of his or her pay in Alaska.

The test of a public investment is not whether its used to purchase public sector good or service or a private sector good and service. Rather, the test is the value of the goods or service received compared to its cost and the return that public-financed purchase has on the Alaskan economy.

With its concern for both process and product, with its need to be both fair and productive, government has shown a limited ability to capitalize and run private sector businesses. In a capitalist economy a business has to be run in the interest of its owners or shareholders. Government has a broader responsibility, a wider and more equal set of stakeholders, and a commitment to fairness and humaneness as well as efficiency. Because government has to be more than a business, it is often unsuited to act in the nimble and practical way a business must be managed.

Governments which have developed extensive programs to try to protect its citizens from every economic change and threat have also imposed costs which have sapped the economy of much of its productivity, incentives, and resilience. As a result, nations as varied as Sweden, the European Economic Community, Japan, Russia, and, arguably, the United States, are now looking for ways to shrink the size of their public sector and to make its private sector more competitive. With its already too narrow private sector and a relatively large public sector, it is hard to argue that Alaska needs a larger role and size for state and local government.

Less Government?

Most Alaskans would consider cutting the size and cost of government to be a more politically attractive option to consider. But the belief that all that Alaska needs to do is shrink its public sector and better manage state finances is, at best, only a partial solution. Whether it is the public or private sector, cutting costs does not by itself make an economy more competitive. A firm, a government, or a local economy is competitive in terms of the value it creates, that is the difference between its costs and its sales whether measured as profits or services.

On the edge of bankruptcy, the Chrysler Corporation turned itself around not only by cutting costs (lower wages and salaries, creating a more flexible work force, and negotiating lower prices from its suppliers) and by the rare event of a government bailout. It did something else that provided far more wealth and economic security for its shareholders and employees—it made a better car.

While it is much harder to evaluate the cost and benefit of government goods and services compared to a firm's product, it is no less important to look at both sides of the coin—both cost and value, both price and quality. Just cutting government costs, as opposed to adding taxes, may make Alaska a cheaper place to live with whatever resulting loss of public services, amenities, and infrastructure. But Alaska's economic base will still be dependent on producing goods and services whose costs and quality must be attractive enough for the world to buy.

With the decline of oil revenues during the 1990s, Alaska's economy is becoming less dependent on state and local government spending as it previously had become less dependent on federal spending. But this forcible downsizing—proponents call it "rightsizing"—of government's large presence in the state's economy does not by itself make the state more competitive. Suppose, for example, that state government decided to cut its employees and services even more drastically and return the savings directly to citizens in

the form of increased dividend checks. It would not be hard to sort out the immediate winners and losers of such a decision. Losers would be the fired public employees and their families, many of whom would leave the state. Also losers would be those citizens most dependent on public services, students in the K-12 schools, the users of local libraries, health services, roads, fish hatcheries, etc. Immediate winners would be those citizens using few public services and receiving little income from the spending of the state or public employees. Communities with a more diversified base like Anchorage and Skagway would be hit less hard than Juneau and Fairbanks.

But would the state be better off? Just shrinking the public sector and increasing the income in the private sector would not by itself bring more income into the state and grow the economic base. Sorting out the immediate winners and losers, it would be hard to know whether the state as a whole would be better off without knowing what would happen with the revenue to the immediate net winners versus what would have happened if no change took place.

If the increased income of those net winners was used to purchase more goods, like cars or clothes, made outside the state than would have been purchased by public employees and their contractors, the local market economy would be worse off. Alaska could even be a loser if the net winners spent more of their income outside the state and the loss of public amenities led fewer tourists to visit the state. Even if net receivers of this transaction saved more of their additional income than the net losers had saved, if the winners found fewer opportunities in the local economy for their investments, the state could be a net loser. Without tracing all the income flows and speculating on what would have happened without the shift in public revenues, it is hard to predict if the state would be better off by redrawing the boundary between the public and private sector.

With Alaska facing declining oil revenues, no one can doubt Alaska has tough choices and tough politics ahead. Fewer public services, more layoffs, the restoration of the income tax, the capping of the Permanent Fund dividend —none of these choices will be without cost or pain. The state needs to balance its budget and manage the state's finances so as to not accentuate the economy's roller coaster responses to changing oil revenues. But with whatever balance of spending cuts and tax increases, no particular solution guarantees a growing economic base and a more competitive economy.

As oil revenues decline, the state government must do as good a job as possible in managing its finances better to insure a "soft landing," that is to modify the mix of service cuts and increased taxes so as to cause the least economic disruption. But unless the public and private sectors take steps now to grow its non-oil base, Alaska's citizens may weather the periodic downsizing of state government in a series of soft landings at destinations where few want to go. Put another way, the operation (managing Alaska's budget) could be a success but the patient (Alaska's economic base) could still relapse and not recover. Like a firm with half its sales and profits in one product which has declining sales and profit margins, Alaska must find new products to sell or increase the production and margins of its existing products.

Conclusion 8

A smaller, more efficient public sector is a necessary but not sufficient condition for a healthier, more diversified economic base. Cutting the size of government will not alone bring prosperity and in the short term may cause even more disruption to the state's economy. Whatever the size and services offered by Alaska's public sector, the economy will only grow and become less oil dependent based on the private and public sector organizing itself to sell more products and services which non-Alaskans want to buy.

Alaska—Smaller, Poorer, or Smarter?

If the remote prospect of higher oil prices doesn't materialize, if cutting the size of state and local government doesn't automatically make Alaska's economy grow, and if events do not make the cards history has dealt the state—Alaska's resources and location—more valuable, what choices do Alaskans have?

Examining the dynamics of the state's economy leaves Alaska with three realistic options—getting smaller, getting poorer, or getting smarter.

The Get Smaller option for the state's economy is the state's likely outcome if the state's emerging diversified economy cannot grow fast enough to replace the state's declining oil revenues. If there are further declines in oil production and prices, and if the state manages the oil contraction by not shrinking the public sector but just lowering the services and raising the costs on Alaska's narrow private sector, there is fair risk that the state's economy could actually shrink. Rather than Alaska looking more and more like the national economy with a quarter of its jobs in the good-producing sector and an efficient service sector with competitive prices, Alaska's economy would revert back to looking like the colonial economy of prepipeline Alaska, an economy based on federal spending and the export of unprocessed natural resources. Always a high wage economy, a postpipeline Alaska would now also be a high cost, slow or no growth colonial economy with resource decisions increasingly in the hands of non-Alaskans. Unless Alaska can somehow expand its non-oil economic base, this do-nothing scenario becomes more likely. Clearly, most Alaskans would find a contracting economy an unattractive option to be avoided if possible.

The Get Poorer option is a variation of the Get Smaller scenario based on a limited view of how to become competitive. This option concentrates on only the cost side of the cost-quality coin. As long as Alaskans are selling undifferentiated natural products to processors who have other sources of supplies, Alaska can only compete by lowering prices and taking what the processors or market makers offer. Unfortunately, there is no natural end to this process of cutting costs. If Russia or other Third World economies have plentiful supplies of timber, salmon, or oil and a lower standard of living and wage structure than Alaska, Japan or any resource buyer can play the Alaskan resource seller against the competition. The predictable result is that Alaska will sell for less or lose the sale.

As long as Alaska is primarily in the business of selling natural resources, only the occasional luck of external events—shortages caused by temporary dislocations elsewhere—will bring higher wages and profits to Alaska. Otherwise, in an increasingly open world market, Alaska as a high wage, high standard of living economy will be in an increasingly brutal competition with areas of the world always willing to pay its workers less and sell its resources cheaper. The Get Poorer Option does not necessarily lead to a state with fewer jobs but it is a poorer Alaska, an Alaska unable to employ its smarter, more educated young people in the high productivity, high wage jobs they were trained for. Clearly, the Get Poorer scenario is an option of last resort.

The Get Smart option recognizes that Alaska must compete in world markets, but it does so by both increasing quality and keeping costs competitive. Rather than depending on the sale of unprocessed resources, Alaskan firms are integrating their operations downstream to capture more value and profits from the processing, sale, and distribution of resource-based products. For example, instead of selling salmon for less than a dollar a pound to Japanese processors, the Alaskan salmon industry has restructured itself so harvesters, processors, and distributors have figured out how they can deliver a high quality, fresh salmon to large urban market in the Lower 48 where consumers understand the difference between pen-

raised European fish and a higher quality, higher priced Alaskan product. Competing both on quality and price, Alaskan products are high quality and customized for different niche markets. Rather than being a low wage, low value-added economy, a Get Smart economy uses capital, training, and the latest proven technology to be a higher wage, higher skilled, higher productivity economy based on both the extraction of resources and their processing into a variety of products. Clearly, if it can be done, a Get Smarter option for Alaska is a preferred option for Alaska's long-term economic future.

The following chapters will sketch out some more specific directions for how key sectors of Alaska's economy can work both harder and smarter in pursuing this higher productivity, higher wage economy. Then key changes in the structure of Alaska's public and private sector will be suggested which could facilitate the ability of every sector in Alaska's economy to compete in the world economy. Rather than depend on decisions in Washington or Saudi Arabia to bring wealth to Alaska, in this emerging integrated economy, Alaskans would have more control of their economic prospects.

For in history, as in cards, smart players seem to create their own luck.

Chapter Notes

Employment for all sectors from the U.S. Commerce Department except farming and fishing. The farming number is from a USDA estimate of 500 proprietors in farming in 1992; 900 were counted as involved in farming during one summer week but many of these jobs, including those counted as proprietors, represent individuals working seasonally and holding other jobs. So 500 probably represents a high number of full-time equivalent employment. The number of individuals in fishing is an as yet unreleased estimate from the McDowell Group which estimated employment based on the number of fishing licenses and average crew sizes for different species. Using similar methodology, the McDowell group estimated employment of less than 13,000 in 1987. Since 1987 estimated harvesting employment has increased by a third, processing employment is up two-thirds. Federal government employment does not include 24,200 active-duty military personnel.

Chapter III

Fisheries

The seafood industry is largest private sector employer and the second largest revenue generating industry in the state. More than 35,000 Alaskans work in the harvesting and processing sectors, accounting for more than one-sixth of Alaska's employment and payroll. Including jobs in support sectors such as transportation, more than one-fifth of Alaska employment is attributable to the seafood industry. The seafood industry is particularly important for coastal communities, where fish harvesting and processing are often the only significant private-sector activities, and fisheries taxes are the primary source of revenues to support local government. This key industry is facing major management and market challenges in the 1990s. As a result, profound and lasting changes are underway in the harvesting, processing, and marketing sectors that will transform the Alaska seafood industry as the next century approaches.

The industry can be classified in three separate categories, salmon, groundfish, and shellfish. The salmon include the five Pacific species, Chinook (King), Sockeye (Reds), Coho (Silvers), Chum (Dogs), Humpys (Pinks). Groundfish species include, Pollock, Halibut, and Sablefish. Shellfish species include King, Tanner, and Dungeness crab, shrimp, as well as mariculture of oysters and other bivalves.

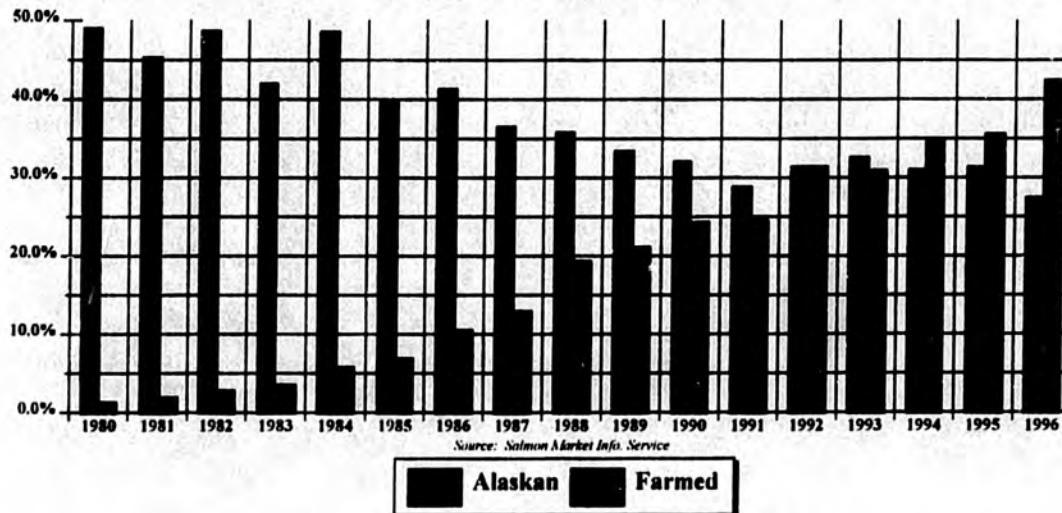
Alaska Salmon

The Alaska salmon industry has seen a dramatic increase in competition in recent years, primarily from farmed fish in Norway, Scotland, Chile, Japan and Canada. The market for Alaskan salmon has changed. What was an active product allocation market, is now a second grade, lower quality commodity, searching for any buyer, at (nearly) any price. The success of farmed salmon (and resultant over-production), ensure that in the future there will be a maximum retail price for Alaskan wild salmon that is lower than it has been in the past. Farmed fish are setting the quality, delivery time and pricing standard for all salmon, and in Alaska, that means the highest prices the market will bear are lower than previous normal levels. In short, the Alaskan salmon industry must change in order to compete in the new global environment in which it operates.

The present condition of the Alaska salmon industry may be best depicted by several graphs, the first one illustrates the decline of Alaska's percentage of world salmon supply from 1980-1996, and the second one which depicts the decline of the harvest value of Alaskan salmon from 1992-1997.

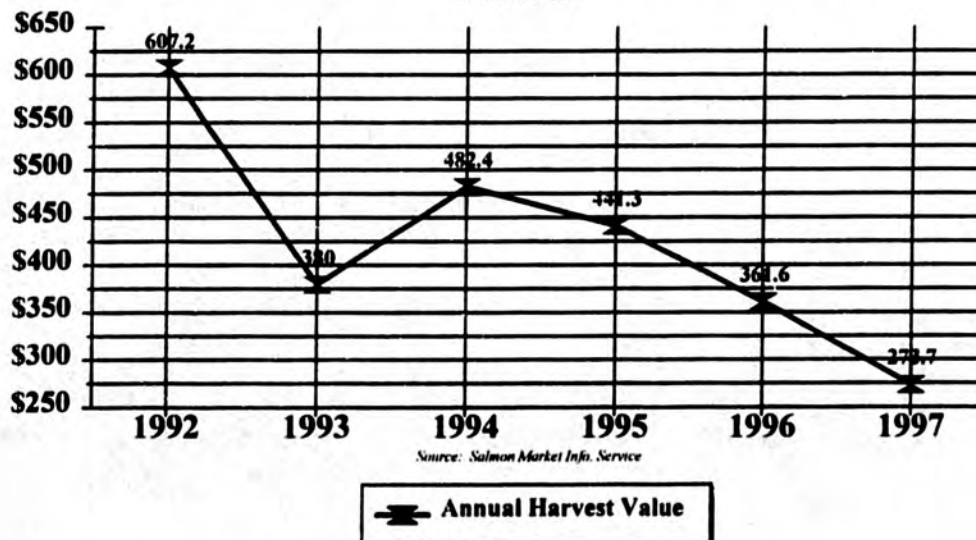
Percentage of World Salmon Supply

(% of estimated round weight)



Alaskan Salmon Harvest Value

In Millions



The question then is how did this once great fishery reach the tenuous position it is in today and how can Alaska regain control of its future.

Modern History of the Alaska Salmon Industry

Initial automation of the Alaskan salmon industry was a direct result of U.S. investment in the territory following the purchase of "Seward's Folly" in 1867. The first salmon canneries came to the state in 1873 as vertically integrated production plants with

control over all aspects of raw material collection, processing and harvesting. The standard operating procedure for raw material harvesting was to place fish traps (stable structures capable of capturing a huge percentage of any given salmon run) in strategic locations, then periodically emptying the traps for production. Additionally, many of the processors maintained a fleet of boats for fishing with nets. Unlike today, internal employees manned both the boats and the traps, eliminating any competition between independent fishermen.

Largely due to the "Iron Chink", a head and gut removing machine invented in 1904, pressure on the fishery to supply adequate raw material for processors was beginning to threaten the resource by the early 1900's. Specifically, salmon was being heavily fished in South and Central Alaska, leading to a series of Congressional Acts targeted to protect the salmon fishery.

In 1912 the Organic Act established a territorial legislature with limited power, but specifically restricted that legislature from any control over fisheries resources. For some years, Alaska was considered to be a model of the superior conservation management possible with federal regulation versus local control. This was in fact merely lip service, with the reality being that the federal system of control was rife with corruption and mismanagement. The last twenty years of federal control damaged the industry so badly that the fishery in 1960 (when control was handed back to the state) was the lowest it had been since the heyday of commercial pillaging prior to enactment of the Organic Act. In fact, the condition of the fishery had significant impact on the Alaskan push for statehood.

With statehood, Alaskan legislators regained control of a depleted resource with a concurrent threat to jobs, lifestyles and tax revenues. Also, at this time a few major companies not only controlled the majority of the cannery pack (at that time the primary form for product sold), but owned most of the fishing boats as well. These large companies controlled supply with fish traps set in strategic areas, effectively barring independent fishermen from access to the resource. In other words, competition was limited and a significant amount of fishery income was moving out of state with these companies. At this time, with strong attitudes of "local hire", the state outlawed the fish trap which was central to the corporate control structure. Subsequently, the number of independent fishermen increased, creating the base for the industry structure we see today.

During the same time period, Japan was expanding its high-seas fisheries, becoming a major player in the harvesting of Alaska's salmon resources. Through 1976, Japan was supplying the majority of its huge seafood market with domestic boats fishing both domestically and internationally, with a significant portion of the Japanese international fishing occurring in the Bering Sea, off the coast of Alaska. The passage of the Magnuson Act in 1976 established a U.S. domestic fishing zone to 200 miles from shore, effectively cutting Japanese fishermen out of the Alaskan salmon fishing industry. This led to a rapid expansion of the export market to Japan which, through 1988, created an allocation market for Alaska salmon. That allocation market does not exist today.

Industry Analysis

Salmon farming is an industry whose international growth over the past 17 years has been astronomical. From 1980 when farmed fish were responsible for only one percent of the total global production (with Alaska at 41 percent) the industry has grown internationally to the point where in 1996 farmed fish comprised over 42 percent of

global production and Alaska's share had shrunk to less than 27 percent. In gross figures, between 1980 and 1996, global farmed fish production went from 7,149 metric tons to 631,574 metric tons. Estimates of future growth of salmon farming indicate a continuation of the this trend in the near term.

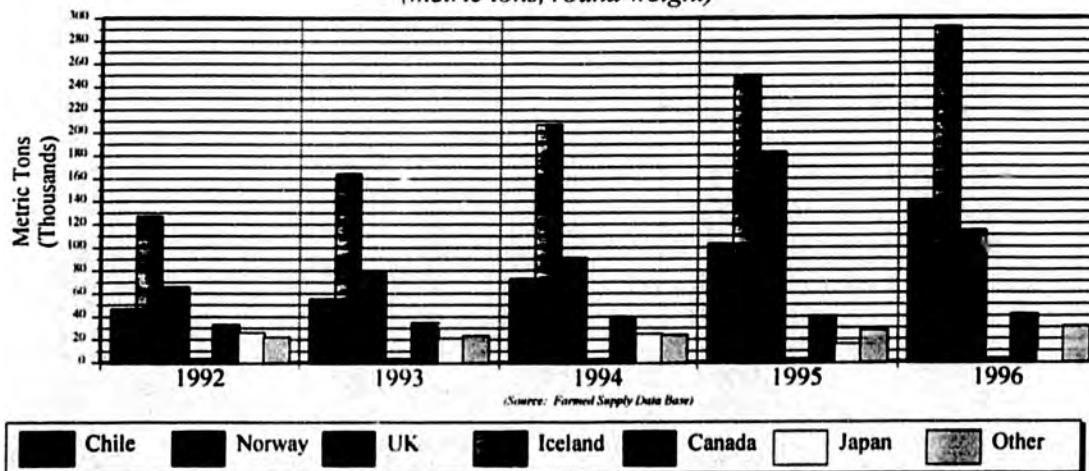
Of primary interest in the following chart are the rapid growth of Chile and Scotland who, along with Norway, can be directly tied to Alaska's loss of market share in Japan, Europe and the U.S. domestic market over the past few years.

The rapidly increasing production demonstrated here has made a tremendous impact on world-wide salmon markets. Rapid growth of global production has surpassed market demand (leading to the slight decline in production noted in 1993). This has resulted in stockpiles of inventory in large consumer countries like Japan and producing countries like Norway. Consequently, farmed fish sales are expanding to include frozen fish sales and both Norway and Chile have adopted the practice of setting minimum sale prices to decrease the effect of oversupply on revenues.

Over the past five years, Chilean farmed salmon has experienced astronomical growth over and above the industry's growth. This increase is a direct result of advanced technological improvements to farming processes and vertical integration with

World Farmed Salmon Production

(metric tons, round weight)



Japanese businesses who have control over the product from development through retail sales. This is a direct threat to Alaska's percent of market share in Japan. Even for those countries with less rapid growth in the industry, farmed fish product has a competitive edge over wild salmon in quality and timeliness.

It is unreasonable to expect that Alaskan wild or ranched salmon can compete with farmed fish products in the fresh market on a year round basis due to the seasonal nature of the Alaskan industry. Many have suggested that the successful marketing of Alaska salmon should focus on product differentiation between "wild" Alaska product and farmed fish. While this approach has been successful on a small scale, where independent fisherman have sold their product directly to restaurants or other small buyers, it is not a feasible solution industry-wide. Should a fisherman in this market become successful and expand to any significant production level, the direct sales structure is incapable of handling the supply. As soon as the fisherman enters into the forty foot container (37,500 pound) size, or multiples of same, he or she enters the

world market and must compete with the dominant pricing structure. This is a direct result of the seasonality of the Alaskan supply and an inability to store inventory.

In other words, the farmed fish industry has established a standard of 50 pound minimum orders in the "white tabletop" market where differentiation in taste and the mystique of "wild" salmon are most apt to be successful. In Alaska, with a seasonal harvest, the minimum order standard is an LD3 or 2,800 pounds. Also, farmed fish is delivered fresh within 24 hours of being pulled from the sea while Alaska salmon has been dead a minimum of three days prior to delivery. If Alaska chooses to challenge this high end, year round industry, the only way for Alaska to directly compete in this market is to establish a home-grown farmed fish industry.

It must be understood that the development of the farmed fish market was a direct result of Norwegian subsidies for industry development. During the development of the farmed fish industry, Norway subsidized approximately 65% of the development of the industry and every aspect of the system: from development of the farms, advertising, marketing, packaging, transportation and research and development. This investment was financed through excess proceeds from North Sea oil and continued for many years prior to the collapse of oil prices. By this time the stage had been set, the market had been developed, and Alaskan markets had been lost. Unless Alaska can compete with an Alaskan farmed product and meet the competition in terms of quality and shipping standards, the industry is not operating competitively in this market. There is simply no direct comparison that can be effectively made between Alaskan wild and ranched salmon and that produced by farms.

Fish farms produce large volumes of product on a year round basis with little damage to the fish in the harvesting process. To date, the intrinsic quality of raw salmon product (or those quality/taste factors inherent in the product before any harvesting effort) has been of little value in market differentiation between Alaska wild and competitive wild or farmed fish. In other words, while some argue that wild salmon tastes better than farmed, this has not proven a strong enough selling point to retain market share. Additionally, fish farms have successfully differentiated their products from Alaska seafood in extrinsic quality measures.

Extrinsic quality is a direct result of the handling a fish receives in the harvesting process. Where wild salmon are often bruised in the harvesting process, remain stored in the holds of fishing vessels for many hours prior to processing and are at varying stages of transition from salt water to fresh water adaptation, this is not true of farmed fish. Farmed fish are penned near to processing facilities and can be processed faster, with virtually no other harvesting damage issues to contend with. Additionally, fish farmers have higher quality guidelines than processors of wild fish resulting in a consistency of product the consumer can rely on. With the market acceptance of farmed salmon, the definition of a quality fish has been refined. The Alaskan industry has recognized the need to improve product quality over the past several years and have implemented better methods of handling fish from the time they are harvested to finished product as part of the effort. These steps have included paying a premium for chilled product, faster deliveries by tender vessels, and providing further training to fishermen and process workers to improve fish handling. Hatcheries and processors have also invested in developing new methodologies for improving quality such as stunning and bleeding fish early in their processing to reduce bruising of the meat. Other industry changes currently underway, that effect quality, are the HACCP training currently required for all Alaskan seafood processors, and the development of quality standards by industry organizations such as the Alaska Seafood Marketing Institute.

One of the most significant quality advantages fish farmers have over wild harvesters is an ability to grow their product to satisfy particular markets. For example, fish allocated for smoking are reared with a higher fat content. On the other hand, there are 5 species of Alaskan salmon, with many grading standards for simple dressed and frozen products. Each of these species varies in size, delicacy, oil content and optimal use. The only option for competing with the consistent product of the Norwegians or Chileans is the development of better quality fish and new value-added products that cater to the consumer's needs for convenience and ease of preparation. The effort is underway, however to be successful at this strategy will require the industry to redefine itself as a food producer rather than a fishing business and learn how to navigate new market channels than have been traditional for the industry.

While the general public has the perception that the decline in revenues in the salmon industry is tied to poor fishing or a lack of fish, harvest figures indicate that since 1986, total salmon harvest trends have in fact increased through 1995 when statewide harvest peaked at 993.7 million pounds. The last two years harvest results have been less each year with results of 887.9 million pounds in 1996, and 623.6 million pounds in 1997.

Despite these recent harvest fluctuations, the key problem does not lie in a lack of salmon resource or in harvesting effort. The critical issue for Alaska then is what to do with huge annual harvests of wild and ocean ranched stocks, much of which is millions of pounds of second and third grade quality product. This quality determination mostly has to do with levels of maturation and skin color, certainly fit for human consumption but nowhere near the quality they compete with for the white table cloth restaurant market place.

The result of Alaska's inability to compete in quality, combined with the rapid growth of farmed fish competition and additional competition from expanding production of low cost Russian and Chinese wild and ranched salmon has been a dramatic decrease in wholesale value for Alaska's product. Due to the nature of the industry, Alaska's fishermen and processors are not capable of generating profits at these lower price levels.

Unlike fish farmers, harvesters of wild and ranched salmon must bring in raw product when it is available. Only a few days or weeks of work must support a years worth of overhead. Additionally, extremely limited production periods mean that fishermen and processors must amortize the cost of capital investments for their business on a very short period of income generation. These capital investments are currently very high, too high in fact, for the level of income being generated by the industry.

For fishermen, over-capitalization has been due in part to sporadically high fish prices combined with restrictions on the fishery, leading to fast and heavy investment as fishermen looked to capitalize on a trend that did not play out and maximize their harvesting capacity. This investment has been supported by the Capital Construction Fund, a program implemented by the IRS where, during good years, fishermen could place their tax liability in trust for development and enhancement of their equipment. As a result of this program, many fishermen have over-extended (as much as \$1 million for a single purpose vessel less than 60 feet long) their financial resources. Heavy capitalization can be traced back not only to capital investments of equipment during the boom years, but to the limited entry permit system established in 1975 as well.

The purpose of the limited entry system was to restrict the number of salmon harvesters in a specific fishing area. Understanding the distribution of limited income periods to overhead, it is easy to see that any fisherman on the seas will increase their

effort to meet financial obligations. In short, limiting the number of boats could limit the overall catch on a salmon run. These permits have become a commodity unto themselves, ranging in price from \$80,000 to \$300,000 adding to the overhead burden of fishermen. Unfortunately, the fact that the limited entry permits are in large part transferable has resulted in an outflow of this resource to fishermen based outside of the state, as well as significant financial losses to permit holders whose permits have decreased in value over the past ten years.

Alaskans hold 77 percent of the available fishing permits in 1995, down 5 percent in two years, and 57 percent of which are held by rural residents whose fishing income is often the single significant source of cash in rural communities. Many of these fishermen are currently in financial trouble. The Internal Revenue Service has a large number of fishermen (an estimated 1,200, or 9 percent of permit holders) that owe money for back taxes, indicating that these people are not earning enough to stay current with their financial responsibilities. An act passed in 1994 by the State legislature concerning the commercial fishing revolving loan fund makes it possible for permit holders (or potential purchasers) to finance payment of back taxes and costs of permits and equipment. While this may help fishermen in the short term, the end result of this type of financing will continue to be over-capitalization of the industry.

Over-capitalization occurred for different reasons in the processor side of the industry. From the early 80's on, it was evident that there was a higher and better use for the product than simply placing it in a can. Considerable investment into automated dressing equipment and blast freezing equipment was the order of the day. At the same time, due to excessive inventory carrying charges (twice the norm at 17 percent) and 2 deaths due to botulism the crash of the canned salmon market gave additional incentive to capitalization.

Unfortunately, what developed were larger facilities producing the same product, both in the traditional canned and the relatively new frozen market. Sadly, bigger was not necessarily better. As mentioned earlier, the term of the season was changing dramatically. For example, in 1980 processors in the Prince William Sound had as much as 10.5 processing months over which they could spread their risk, utilizing various fisheries. By 1990, that had changed to no more than 6 months of production. In some cases, production of an entire season occurred in just a few short weeks. Deciding to make the most of what was available and expanding facilities to produce as much as possible during shorter and shorter seasons, processors were caught in a trap. Combined with dwindling margins, the financial burden of carrying heavy capitalization costs over short periods of time has stretched processors to the limits of financial stability.

Summary of Industry Concerns

Competition

Farmed salmon is here, at a reasonable price, with excellent delivery and quality. Additionally, farmed salmon embody product features that are beyond the ability of our current harvesting, processing, and distributing infrastructure in Alaska. Finally, Russia and China, with labor forces receiving extremely low wages, are increasingly willing to sell salmon at very competitive rates in the world markets and their production has increased in recent years.

The changing nature of salmon competition and resultant over-production has influenced the variability of selling price. Always a fluctuating commodity, in recent

years price fluctuations appear to have been more dramatic and harder to predict. Due to the short harvesting season, the inability to store inventory for long periods and the over-capitalization discussed above, these fluctuations are particularly difficult for the Alaskan harvester and processor to work with. Specifically, under the current system, the processor must guess at the price they will sell this year's fish, then commit to the price they will pay for fish prior to the selling season, hoping to sell at the target price. This leaves little room for error in planning if a processor is to succeed. Fish farmers on the other hand can simply wait out the fluctuation before harvesting and target their sales for higher returns.

The global supply of salmon has grown faster than the global consumption of salmon mostly as a result of the rapid growth of the farmed salmon industry during the past two decades. This basic fact has established a cap on the price paid for salmon in the wholesale markets around the world whether it be farmed or wild. In this kind of economic environment, the supplier that can reduce and control the costs of production has a key advantage over the competition. The salmon farming industry has used this fundamental advantage to increase its market share, and now farmed salmon production costs largely establishes the base for pricing. As the salmon farming industry grows, the per unit costs of production has been reduced, and this trend is likely to continue as the industry grows and new cost saving techniques and technologies are developed and adopted by the industry. In contrast to the salmon farming industry, the Alaskan wild salmon industry does not have the same capacity to control production costs without undertaking major structural and regulatory changes. This advantage and the ability to manipulate supply, gives the farm industry a key competitive advantage over the Alaskan Industry that will be difficult to overcome in the future.

Markets

In response to the limits on international fishing in Alaskan waters discussed above, and having a well established market for the salmon they had previously fished in Alaska, Japan became the largest importer of Alaskan salmon. Reaching a sales peak of nearly \$790.6 million dollars in 1988, this single market represented 85 percent of Alaska's total salmon export sales. Since 1988, with increased competition from farmed fish, the United States share of the Japanese import market has dropped from 85 to 21 percent in 1997. For Alaska, this drop in market share, in conjunction with reduced prices, resulted in a total revenue from this market of \$260 million dollars in 1997, or a difference of \$530.6 million within 10 years.. The shift of supply sources for salmon away from Alaskan sources by Japanese markets continues as shown by the increased market share of Chilean farmed salmon. In 1997, Chilean farmed salmon and trout increased its market share to 23 percent of the market. This marks the first time that Chile provided more salmon than did Alaska to this important market. With current Japanese investment in Chilean salmon farms, there does not appear to be much hope for Alaska salmon to regain market position in Japan.

Domestically, Americans are consuming more salmon (up to 2.5 pounds per year from 0.5), but that demand is being filled by farmed fish mostly from Canada and Norway. Canned salmon, the traditional value added product Alaska produces for the domestic market, is experiencing a decline that is not expected to recover. The market demographic for this product defines the average consumer as a single woman 50 -55 years of age with limited income. Clearly, this is not a high growth market. Alaska has lost the domestic "white tablecloth" market to the higher quality farmed salmon and, with the exception of the ability of a few individual fishermen to market directly to restaurants, this is not expected to change. As prices have declined and market share

For traditional salmon products have declined, there has been increased interest in new value-added products that cater to new trends for easy conveniently prepared meals by industry members. These value-added items include a broad range of products from smoked salmon snacks, salmon burgers, hot dogs, seafood pockets, flaked salmon in retort pouches, to individually packaged microwavable boneless fillets in a sauce. In addition to finished products, the processing industry has also developed a new intermediate product, frozen blocks, that are a useful base manufacturing new seafood products by food reprocessors. Many of the Alaskan processors have already redefined their businesses from fishing to food businesses, a key change for the Alaskan industry for future success. These companies are learning how to compete and succeed in this new world. This includes such topics as developing the capacity for new product development, learning about new channels for selling the new products, and the new realities of competing in this new market realm. The cost of developing new products and their high failure rates in the market place, along with high marketing costs such as paying retailers for shelf space are challenging hurdles to be overcome by those involved. Although it is too early to know what the total impact of value-added will be, it has great promise to move significant volumes of salmon and improve margins for the Alaskan industry. In the case of turkey, per capita consumption was doubled in a ten year term largely by introducing new and value-added products. If this could be replicated in the salmon industry, it would mean the consumption of over 630 million pounds, edible weight. This would equate to approximately 1.6 billion pounds of round weight of salmon by the year 2004 based on 1994 estimated domestic salmon consumption. In addition to learning the market side of value-added, the industry has also recognized the need to improve production efficiency to reduce costs and improve quality as an important aspect of succeeding in these areas. Pin bone removal, bleeding prior to processing, And new methods for producing new products are examples of work undertaken to enhance production efficiencies in the industry.

Quality

Processors have not always utilized universal high quality guidelines to assure consistent high quality product in the market however this is changing in Alaska prompted by the increased global competition for salmon markets. With the market acceptance of the farmed salmon, the definition of a #1 fish has changed upward and Alaskan processors have lost market share as they have been slow to recognize the need to change fish handling and improve quality. Alaskan processors have not kept in step with the change of quality standards occurring with the increase in farmed fish production. It is a major challenge for the Alaskan industry to change the way wild salmon is harvested in order for it to favorably compete with the harvesting procedures farmed salmon. While programs developed by the Alaska Seafood Marketing Institute are available for setting quality standards, the costs inherent in this type of plan are steep. To overhaul the industry to high-grade wild salmon is a challenging task and may be cost prohibitive in today's industry.

Seasonality

The nature of the Alaska salmon industry is one of seasonality. While fish farmers can afford to hold off on harvesting their product, this is not an option for Alaska. In short, while there is less overhead associated with harvesting raw product for wild or ranched salmon (if not over-capitalized), there is less control over how, when and where to sell Wild salmon runs fluctuate from year to year, even where the wild stocks have been enhanced with hatchery raised and ocean ranched, and the seasonal short window of availability increases risk (will there be any fish to catch?), and the cost of doing

business at every level. for this industry, placing it at a distinct disadvantage in the marketplace. This facet also reduces the ability to control cost of production and limits options for matching product supply to market demand in order to support price levels.

Cooperation

Alaskan fishermen are an independent group and form a strong lobby. In 1988, this group successfully promoted the rejection of fish farm legislation. In the past they have been politically active in all issues that effect their business and they are expected to remain so in the future. This influence has slowed efforts in Alaska to make fundamental changes needed to stay competitive on the world market with "high quality" fresh salmon products.

While the canneries have long provided funds for industry infrastructure, the relationships between fishermen and processors have traditionally been non-cooperative. This attitude has carried over to regulatory agencies as well. The relationship between federal and state agencies has been soured through historical mismanagement of the fisheries by federal agencies, which fisheries were then passed on to the state. The independent fisherman has been treated badly by the canneries in that they were effectively restricted from the industry for years and, finally, the canneries have been affected by regulations removing fish traps and limiting competition among suppliers, affecting their margins and acquisition structure. In short, we have created a working environment of moderate mistrust between the key players; fishermen, processors and government. This makes coming to consensus, creating a plan, and taking action more difficult than it might otherwise be.

Industry Structure

Currently the processor has little control of either the raw material they receive from the fisherman, or the markets where their products are sold. With virtually no vertical integration in the industry, the seafood processor is caught in the middle of significant price pressures. As the market reduces the prices paid for salmon, the processor sector is under pressure to reduce the price paid to the fishermen in order to protect their margins. This squeeze exacerbates the financial difficulties occurring at the harvester level of the Alaskan industry with no easy solutions in sight. This squeeze has reached the point that the weaker participants viability to continue in business is in doubt and some failures of processors and harvesters are likely in 1998. These failures will in turn have an adverse effect on the performance of industry lenders and their willingness to make new loans in the current environment.

In order for the industry to compete in new market conditions, significant investments must be made in the development of processing technology and quality standards. Unfortunately, these major investment requirements are not supported by sound risk/reward evaluations. Each step of the salmon harvesting/ processing process is risky and, while in the past this risk was off-set by the potential for high profits the margin potential is not there today. The processing sector of the industry has reluctantly recognized the need to make changes and new investments are underway that address the needs for new processes, new techniques & methods to improve product quality, develop new products, and learn and understand the new consumers wants and needs and the market channels to access them. The outcome of these efforts is not known since they are ongoing, however, relationships between the processors and the harvesters will require adjustments that will be painful for both sectors.

Conclusions

The Alaskan salmon industry is undergoing major change in response to the greatly expanded global supply of salmon and the farmed salmon industry's aggressive takeover of market share in most of the world's markets. Farmed salmon producers have been able to accomplish this takeover in just two decades by being more responsive to consumer desire for better quality seafood products at competitive prices. As the farmed industry grew it gained economies of scale, and developed new techniques and technology that improved efficiencies and reduced production costs without sacrificing product quality. The structure of the farmed industry has allowed for the ability to control costs and cater to market demands for specific products and time of delivery especially with the vertical integration of production with market channels that has developed in many farm operations, especially in Chile and Norway. Although these changes have been ongoing for years, the Alaskan industry has been slow to take the challenge seriously, and make the needed changes to respond to the challenge and protect market share and profit margins. Unfortunately, the pain has become severe enough in the processing and harvesting sectors of the industry, that denial has been overcome with a general recognition that business as usual is not a viable option. All sectors of the industry are feeling enough pain that there is a willingness to at least discuss their version of what changes are necessary?

The major themes for change include improved quality of salmon products, improved efficiencies of harvesting and processing, new product developments to cater to consumer wants and needs, and new innovative methods of accessing new and existing markets for seafood products. The regulatory and management changes that address these themes will effect many different areas of the industry and will require participation and cooperation by all facets of the industry to decide on specific changes and how implementation should take place. The changes supporting these themes that take place within individual companies are underway to varying degrees and will require encouragement and financial support to facilitate implementation as rapidly as is feasible. All major economic changes brings distress to some caught up in its tides, and this is present today in the Alaskan industry at all levels in some degree. Although most certainly there is more distress and upset to come before the Alaskan salmon industry has adapted, a new course has been set by redefining the industry's business to one of food supplier meeting the wants and needs of dynamic markets from a fishing business focused on producing traditional products. The challenge is to help the changeover happen quickly and mitigate the pain and distress in the process.

Alaska Science and Technology Foundation (ASTF) has been an important source of support and funding for the innovative changes taking place in the industry. Since its start in late 1989 through October 1997, ASTF has funded more than 63 projects for a total of \$6.65 million, almost 23% of the total amount expended for projects by the Foundation. In addition to committing its own funds, ASTF has also acted as a catalyst to focus on specific problems, assemble an appropriate team, and attract other funds to support the identified projects. Organizations with which ASTF has formed working relationships for these purposes include: Alaska Fisheries Development Foundation (AFDF), the University of Alaska Fisheries Industrial Technology Center (FITC), and the National Marine Fisheries Service (NMFS). These projects have included new products development such as the chunked, flaked pink salmon in a retort pouch and salmon hams and microwavable salmon pockets. Projects aimed at improving the processing of salmon have included stunning and bleeding salmon, pin bone removal and total bone removal of salmon, and salmon block development. Other funded projects have addressed improving resource recovery during processing to developing innovative organizational structure for marketing value-added salmon products in domestic markets. The need for ASTF participation will continue to be important for this industry in the immediate future when the industry continues to evolve and change to its new environment and industry funding sources are stretched for business survival. Other sources of funds may be necessary to help fund the business changes, new equipment and

infrastructure development that will be needed by the industry. These funding sources could include tax credits, as well as direct sources of funds available to the industry in the form of loans and perhaps buybacks of permits and vessels if that is a strategy adopted as a response.

Alaska Groundfish

The sole constant in an analysis of the Alaska groundfish industry is that there are no constants. This is, quite simply, an industry in flux. For Alaska this is a young industry attempting to fill a void where older, more traditional fisheries have failed. Primary factors in Alaska's ability to find its niche in this market are international competition, industry structure and the regulatory climate.

Modern History of Alaska Groundfish

Development of the modern groundfish (pollock, halibut, cod etc.) industry in Alaska is relatively new, dating back to 1976, when the federal government passed the Magnuson Act restricting access to the fish resources within 200 miles of the nation's shores. As the industry converted from foreign to domestic ownership, growth was propelled by the crash of the crab fishery in the early 1980's; as crab populations declined, crab fishermen switched gear to pursue groundfish. Additionally, declining worldwide cod resources have increased demand for Alaska's groundfish.

The collapse of the traditional cod fishing grounds of the Northeastern U.S. and Canada has boosted demand for Alaskan cod and alternative products. The Alaskan cod fishery is, in fact, unable to supply the demand for whitefish fillets. This has created an opportunity for pollock which is now being utilized as an alternative to cod in many applications. Of particular importance to this fishery is the production of surimi which utilizes as much as two thirds of the Alaska pollock catch; unlike more traditional Alaskan fisheries, primary processed (headed and gutted) pollock and cod are typically low in value per pound; profits are made through volume conversion to secondary processed product.

Given the structure of industry profits, boat owners and processors in the industry (often with assistance from foreign joint ventures and investments) have built larger boats to maximize the return on harvests. As a result, the fleet has seen astronomical growth. In 1980 there were no domestic factory trawlers and virtually no pollock harvest, whereas today there are over 60 U.S. factory trawlers today with an annual domestic catch of approximately 4.5 billion pounds. Presently, Alaska produces 20% of the world's processed groundfish with pollock representing over 70 percent of this production. In 1992, pollock contributed 2.9 billion pounds to the total groundfish catch with an ex-vessel value of 324 million dollars. In short, over the past ten years the pollock industry in Alaska has become a significant factor in the overall picture of Alaska's seafood industry.

Although it doesn't compete in volume, the halibut fishery in Alaska generated over 68.7 million dollars in ex-vessel value in 1995 making it a significant contributor to the state economy. Also, unlike the pollock industry, the halibut industry is primarily shore-based, directly impacting Alaskan employment. Over the last few years increased fishing effort on the quota has forced this industry to operate under derby fishing conditions, with scheduled twenty-four hour openings during which fishermen have no quantity limits on their catch. This system was changed in 1995 with the implementation of an Individual Fishing Quota system (see below).

The existing system has been an incentive for fishermen to catch fish as fast as possible, postponing cleaning and icing of the product until the fishery is closed, lowering the quality and value of the fish delivered to the dock. Unlike pollock, most halibut is frozen and sold to markets as primary processed frozen product and diminished quality has a direct effect on ex-vessel value of the product. In this industry, the bulk of production goes to domestic markets with small amounts being shipped to Japan although very little of the product exported is direct from Alaska. The majority of halibut exports then are indirect, indicating that Seattle shippers and cold storage facilities are processing this Alaskan product.

Industry Analysis

As prices rose for pollock and cod in the early 1990's, a variety of nations rushed to fill the market demand for inexpensive raw material sources for the production of surimi and other secondary processed products. Internationally then, New Zealand, Thailand, China, Poland and the Newly Independent States (NIS) have increased production levels of competitive products. While many of these countries cannot compete directly with pollock and cod, they have found a niche in lower cost, lower quality alternative raw material products like hoki from New Zealand and threadfin bream from Thailand. The heavily capitalized Alaskan fishery is having difficulty competing in this aggressive market.

Expansion of the factory trawler fleet has impacted the Alaskan pollock fishery to such a great extent the catch limit is now being reached in 70 days or less instead of the 300 days of fishing financial planners based their assumptions on. With an average capital investment of approximately 40 million dollars, servicing debt over such a short working period is extremely difficult. Some financial experts estimate that over half the factory trawler fleet is in danger of bankruptcy and, in fact, it may be true that until the fleet is reduced by half this fishery will not be profitable for any of these floating processors. This year noted the first foreclosure on one of these massive fishing vessels, perhaps only an indication of a coming trend in the industry. Presumably, shore based processors are in a stronger position to withstand this competition with a lower level of over-capitalization and a 35 percent allocation of the 1.3 million ton pollock quota.

The North Pacific Fisheries Management Council (NPFMC) is responsible for managing the groundfish resource in Alaska. In 1992 the Council introduced Community Development Quota's (CDQ'S) in an effort to use the pollock fishery as a tool in support of rural communities in Alaska. The CDQ program allocates 7.5% of the total allowable catch of pollock harvested in the Aleutian Island/ Bering Sea District to 55 communities organized into six regional corporations. Each of the regional corporations is utilizing the income from this allocation in the implementation of a targeted Community Development Plan (CDP).

Since the implementation of the CDQ program in 1992, it has generated total revenues exceeding \$108 million for the six CDQ Organizations to fund economic development in western Alaska. The program has created over 5,425 jobs and enrolled over 2800 people in various training programs. Some of the regional corporations have also reached agreements with established processors to purchase their quota of groundfish in programs that support more traditional industry development for their region. All of the corporations have developed working partnerships with catcher/processors in the industry and are investing in capital improvements for their respective communities. For example the Aleutian Pribilof Island Community Development Association (APICDA, one of the six CDQ corporations) has completed construction of improvements to the Zapadni Bay Harbor on St George Island, designed and built a dock and gear storage building in Nelson Lagoon, and extended sewer and water service for the City of False Pass dock. In short, Each CDQ Organization has undertaken implementing an approved development plan for their member communities that are designed to increase local employment while adding and improving the

local economic infrastructure of western Alaska. The CDQ program is too new to reach any definitive conclusions, however, it can be stated that it has been successful in establishing a funding mechanism and a focus on improving the economic status of large rural areas of western Alaska that did not exist before 1992. For this reason, as well as the results from the first four years provides cause for cautious optimism for the future.

The NPMFC has also recently initiated an allocation program for the halibut and Sablefish fisheries. In response to increasing numbers of fishermen utilizing these resources, 1995 was the first year when Individual Fishing Quotas (IF's) were used to allocate access to the resources. Boat owners with a provable history in each of the fisheries were allotted a permanent claim against all future total allowable catches in the halibut and Sablefish fisheries. What was a 24 hour derby fishery, with every boat landing as many fish as possible in a short period of time, will now be a fishery open only to IF permit holders on a longer seasonal basis. The incentive to postpone cleaning and icing the fish will be removed, resulting in a higher quality catch and, as fishermen will no longer be forced to fish in dangerous weather conditions, industry safety will be improved and resource market value enhanced.

Based on a similar Canadian model implemented several years earlier, the IFQ program has significantly improved the halibut and Sablefish industries. While there are several advantages for the industry in an individual quota system, the bottom line is that this type of program results in a safer industry producing consistent, high quality product. The market will bear a higher price for a premium product both fresh and frozen and the net result is the dollar value of the fishery will increase without having to increase the catch size. Additionally, the opportunity for secondary processing is increased, because the supply of fresh product will be more consistent, allowing processors to plan and manage production over a longer production cycle. These positive changes have come at cost to those industry participants that did not receive IFQs and no longer have access to these fisheries. Many residents of remote Alaskan fishing communities had historically fished for these species to supplement their salmon fishing efforts when results were poor. The lack of access has eliminated this strategy and narrowed their opportunities unless they have access to capital to purchase IFQs. In short, the long-term effects of both the CDQ's and IF's are expected to result in increased shore-based employment in the Alaskan fishing industry.

Summary of Industry Concerns

Markets

Of primary concern to the groundfish industry is the fact that there is only a single major market for all of the world's production of surimi; that market is Japan. The Japanese consume over 15 pounds of surimi products per capita, down from 18 pounds a few years ago. This decline in per capita consumption is not expected to reverse itself any time in the near future, posing a threat to the health of this industry. Recently, markets for blocks and fillets made from pollock and other groundfish been developed in Europe and the U.S. providing an alternative to the Japanese market. These different products and markets for Alaskan groundfish need to be expanded allow healthy growth for the industry.

Regulatory Environment

The regulatory environment in the groundfish industry is changing at such a rapid pace (attempting to catch up to the industry itself) that it is hard to quantify with any clarity. Indications are that the regulatory body responsible for the fishery is working very hard to

help stabilize the industry, but flexibility will be key as the industry goes through those fluctuations common to an emerging market.

The Community Development Quota program has been extended two times, with a current term through 2000 and beyond since the CDQ program was included in the renewal of the Magnuson-Stevens Fishery Conservation and Management Act in 1997. This legislation, that governs the Bering Sea fisheries, also expanded the CDQ organizations fish quotas to include a percentage of the allowed catch of other groundfish species and opilio crab. These new quotas are to be implemented over the next three years, beginning with 3 percent of the opilio crab allocation starting in 1998 and eventually totaling 7.5 percent of each species allowable catch beginning in the year 2000. These regulatory changes have provided the CDQ organizations greater permanence and an expanded economic base that should make them bigger engines for economic development for their communities.

Industry Structure

The industry is over-capitalized, with production capability far out-distancing groundfish quota allowances. This is expected to result in the failure of many of the factory trawlers in use today, presenting an uncertain future for the industry as unprofitable operators are shaken out of the system. This huge fleet is primarily based in Seattle, with most of the factory trawler crews coming from outside Alaska. The majority of production from these ships will either be off-loaded at sea or shipped to Seattle for storage and reshipment to the next customer in the distribution chain. In contrast, shore-based operators tend to hire Alaskan employees to staff their facilities contributing more to the state economy than the offshore operators. It is unknown whether the shore-based processors will be able to remain competitive as the industry goes through expected changes.

Resource Availability

One result of the trawler fleet expansion is the increased pressure this huge production capacity places on the resource. It is undecided if the resource can survive at its current level of health with the added pressure from the expanded factory trawl fleet. The exact impact of the fishing effort on the biomass is a point of contention among various interest groups. The fishermen need to expand production to support their debts; the government needs the resource to continue generating tax revenue; and environmental groups are of the opinion we are harvesting more than the resource can sustain. Proposed legislation was introduced in 1997 in the U.S. Senate that is intended to "Americanize" the ownership and management of the Bering Sea trawl fleet. If it passes in its current form, it will reduce the number of vessels qualified to participate in the fisheries. This will reduce the fleet's production capacity for the near term and easing the pressure on the resource.

Competition

Those fishing countries that successfully introduced alternative raw materials for surimi production when pollock was selling very high have shown no inclination to cease production as pollock prices have leveled off. The industry is changing with processors looking at new more efficient methods for surimi production that will reduce costs resulting in improved economics for the manufacturers, however, the continued dependence on the troubled Japanese markets will destabilize this fishery as the consumption of surimi based products continues to level off or decrease. The industry is developing alternative products and markets for surimi that will eventually address this over reliance on one market, but this will take time to achieve this diversification.

The other major species of groundfish harvested in Alaskan waters include halibut, sablefish, and Pacific cod. The stocks of each of these species remain healthy and the catch quotas have been increased in recent years. The increase harvests allowed may serve to reduce harvest values for these species, however this moderation of value will not eliminate impact of larger harvests for those fishing for these species. Some halibut fisheries that are located near areas frequented by visitors, are facing very vocal competition from sport fishermen desiring a larger share of the harvest quotas. As Alaska's tourism industry grows in strength this is expected to become an even more controversial issue.

Summary of Industry Concerns

The harvesting and processing capacity in the Alaskan groundfish industry is capable of handling three times the total allowable catch. The industry is also young, with resource sustainability and bycatch issues that are currently being addressed largely by the North Pacific Fisheries Management Council. The excessive production capacity and concerns over maintaining a sustainable resources combined with a large global supply and flat or diminishing traditional markets for groundfish products result in an industry with an uncertain future.

Conclusions

The groundfish industry has grown in importance in recent years with Pollock now being the highest valued fishery in Alaskan waters. The major issues for the sector are safekeeping valuable resources from over harvesting and developing new products and markets for groundfish products especially pollock surimi, and attracting more Alaskan based harvesting and processing of groundfish. The North Pacific Management Council is currently working on establishing sustainable levels of harvesting and addressing bycatch issues which also impacts the health of the resource, and new Federal legislation has been introduced which will address the excess production capacity. These activities adequately address the safekeeping of the resource. Over 80% of Alaskan surimi production continues to be sold to Japanese markets even as its market value softens. The Alaskan producers have started taking steps to develop alternative markets for pollock surimi as well as develop different products from pollock such as blocks from fillets for food manufacturers use a base ingredient for various products. These efforts need to be increased, since the Japanese market for surimi is expected to continue to soften as other protein sources such as poultry, pork and beef gain market share and the weak economy continues. Markets for halibut, sablefish, and Pacific cod from Alaskan waters appear solid, especially with the extended seasons established with the implementation of Individual Fishing Quotas for halibut and sablefish. The last major concern regarding attracting more Alaskan based processing is also being addressed by the North Pacific Fisheries Management Council in their review of the allocation of the pollock harvest quota between the floating processors and onshore based plants. Currently, this quota is split on a 65-35 percentage with the majority being allocated to the trawl fleet. This allocation is under review at this time and a determination is expected at the June meeting. It is anticipated that any change in allocation would be in favor of the shore based processors which is anticipated to generate additional economic activity for the State's fisheries communities.

Although the dominant issues for the groundfish fishery are regulatory and management in nature, ASTF has become involved in the area by funding several projects under the guidance of AFDF and NMFS aimed at solving problems that have hindered the commercialization of Arrowtooth flounder. This species is a major component of the biomass residing in the Gulf of Alaska. Arrowtooth has not been commercially exploited until recently due to its flesh becoming an unappetizing mush during processing caused by an

endogenous protease. Work performed in ASTF funded projects was able to overcome this characteristic and open new possibilities for new products made from Arrowtooth flounder. These solutions presents the opportunity for a new commercial fishery one day to be based on targeting this specie once bycatch concerns are addressed. work on commercializing Arrowtooth is Ongoing that builds on the earlier ASTF supported projects that should create a new fishery for the Gulf of Alaska in the future.

Another example of ASTF involvement in the groundfish sector was a recently completed project organized by a NMFS scientist to demonstrate the advantages of using highly sophisticated decanters to produce surimi rather than the traditional screw presses. The results of this Kodiak project were sufficiently impressive that several major surimi manufacturers chose to install decanter technology to upgrade their production plants to capture systems the improved resource utilization, lower operating costs, use of less plant space while producing the same or better quality product. This project results has most likely changed the production methodology used to manufacture surimi in Alaska and perhaps worldwide.

Alaska Shellfish

A once hearty fishery, the Alaska shellfish industry has passed through its peak and has stabilized at reduced levels of production. Through the history of this industry, Alaska has sold shellfish in only three forms; fresh, frozen, and canned. Virtually no value added work has been successful with these products and, realistically, it does not appear as though additional value added research will change this fact. In combination with increasing competition from low cost producers, indications are that the industry has leveled off and can expect little in the way of significant future growth.

Modern History of the Alaska Shellfish Industry

Alaska utilizes several varieties of shellfish with shrimp, oysters and crab currently generating significant commercial activity. This section of our report will focus primarily on the crab industry. Clams, mussels, scallops, abalone, sea urchin, and snail all have small commercial interests directly impacting rural communities. While these new and developing industries are of interest, their present economic impact is isolated and is not specifically addressed in this report.

The shrimp industry reached its peak in 1976 with 125 million pounds harvested. Due to a combination of foreign competition and over-fishing the industry crashed. For the past several years an average of only two million pounds of shrimp has been harvested annually and there is no indication that any significant growth in the industry will occur. The harvest for 1995 was 4.9 million pounds and Alaskan shrimp harvesters have not had any major difficulty marketing their product. This industry is currently at a stable level and this Southeast based fishery is being closed to new entrants by the State's Commercial Fisheries Entry Commission to maintain this equilibrium. Unless and until there is some major change in the raw material resource, the industry is not expected to undergo any dramatic changes.

Oysters are a farmed commodity and are raised primarily on the southeast coast of the state. There are 56 permitted farms in Alaska and 99 percent of their production is oyster, generating \$306,000 in sales in 1995. This represents fewer farms in operation and a slight increase in sales from 1993. This is an industry in its infancy with obstacles differing significantly from the traditional harvesting industries addressed in this report. However, the

farming of oysters, mussels, and clams in Alaska has the potential to grow into a major part of the Alaskan industry due to the State's pristine and nutrient rich coastal waters. The construction of a mariculture hatchery and technical center in Seward that is scheduled to begin operation in the spring of 1998, and a shellfish nursery facility currently being field tested in Kachemak Bay will provide the needed infrastructure for growth and improved performance from this sector. Also, the regulatory environment for shellfish mariculture has been changed providing longer term leases of farm sites that makes the farm business more attractive for further capital investments. These developments provide the base for this sector to grow and reach its considerable potential to generate revenues and employment for rural areas of the state.

The three primary crab species harvested in Alaska are King, Tanner (bairdi and opilio) and Dungeness. Of these, King crab has traditionally been the premium product, with the strongest market demand and the highest sale price of any shellfish species harvested in the state. The year 1948 marked the first large scale U.S. effort to catch and process crab and, with consistently high demand the industry boomed through 1980.

From a peak harvest of 185 million pounds in 1980, the King crab harvest crashed, declining steadily through 1985 when only 15 million pounds were harvested. The collapse in the crab industry had a ripple effect on the groundfish industry. Boats that were previously geared for crab refitted their boats to pursue groundfish, contributing dramatically to the rapid expansion of that industry. Subsequent to the crash, fishermen also worked to develop expanded markets for Dungeness and Tanner crab and began marketing a fourth species, Korean Hair crab. The Korean Hair crab industry is now in the early stages of development with these shellfish being sold as premium products live to Japan..

Industry Analysis

Although the development of fisheries based on these other species have not completely made up for revenues lost with the crash of the Alaskan King crab fishery, the industry has rebounded somewhat since the crash. In 1992, harvest of the three primary species of crab generated 375 million pounds of product for market, generating \$310 million in ex-vessel revenues. In 1996 the fishery produced only 16.11 million pounds with an ex-vessel value of \$52.48 million. Of the three primary crab species fished, Tanner crab now provides the largest harvest. In 1996, the harvest for Tanner was 69.76 million pounds, with King crab at 16.11 million and Dungeness harvests totaling only 6.01 million pounds. The reduced harvest levels during the 1990s graphically demonstrates the on-going fluctuations in the Alaskan shellfish resource which has caused major purchasers to develop other sources of supply.

Summary of Industry Concerns

Competition

Competition in this industry comes principally from the Newly Independent States (the NIS) that were parts of the former Soviet Union. With the crash of the Alaska King crab industry in 1981, the NIS became the world's largest supplier of King crab. In 1992 almost two thirds of the king crab consumed in U.S. markets came from NIS waters, but it was sold with a 'Product of U.S.A.' label. As many Alaskan crabbers have looked to develop joint venture relationships with NIS fishermen, they can fish in NIS waters and legally label their product as a U.S. commodity.

Raw Material Availability

As noted above, this fishery is particularly vulnerable to seasonal harvest fluctuations. As it is impossible to develop stable working relationships with customers if one cannot accurately predict product availability, sales of available product are difficult to rely on. Additionally, as there is no conclusive evidence detailing the cause of the resource collapse in 1980, it is difficult to predict when and if the resource population will crash again. The final consequence of this uncertainty is that investment in the crab fisheries is fraught with high risk that does not attract new funds until the resource availability is more predictable.

Conclusion

The shellfish fisheries future are tied to the health of the stocks and their availability for harvest. The health of both the crab and shrimp fisheries are tied to maintaining robust populations and establishing harvest levels that can be sustained over time. Both industries have global competition that set market prices for product made from these species. New management plans have been implemented, or are in the process of being implemented which are designed to protect and enhance stocks of these species. If these steps prove effective, Alaska may become a reliable source of crab and shrimp once again. Until then, the crab product from the Russian Far East will continue to take market share.

The mariculture of oysters and other bivalves such as little neck clams, mussels, and geoducks is a promising area for the industry. The needed infrastructure for shellfish mariculture to grow and reach its considerable potential are underway in the form of the hatchery facility under construction in Seward and the nursery being field tested in Kachemak Bay. Once these facilities are in production mode, the farms will have access to a reliable in-state source of dynamic spat(seed) that can be profitably grown to a marketable size out in the individual farms located around the State. This infrastructure development and the improved State's regulatory environment for existing farms as well as new ones sets the stage for new investments and growth in this sector. This growth trend will be encouraged by the continuing degradation of the environment for healthy mariculture in the lower 48 states. ASTF has supported this sector by providing funding for several projects including the shellfish nursery construction and testing and by funding research for farming geoducks and depuration of shellfish for PSP. An important industry partner for ASTF has been the Marine Advisory Program based in the University's School of Fisheries and Ocean Sciences. This area has great promise for the future and should be supported as appropriate opportunities are identified.

Summary

Clearly, Alaska's seafood industry is experiencing major challenges that need to be addressed if the industry is continue to play a key role in the State's economy. Of the three major categories discussed in this report, the salmon industry presents the most acute need for analysis and change since it employs the most persons for harvesting and processing and is the backbone of the economy in most of the rural coastal communities. Growing supplies of farmed salmon and other factors have depressed prices of Alaska's wild and ocean ranched salmon. Foreign-produced farmed salmon and wild-run salmon is being substituted for our salmon in Alaska's domestic and export markets. Unanticipated low run returns in some of Alaska's major salmon fisheries for several years in a row has further depressed income to both processors and harvesters further exacerbating already strained finances. An ongoing recession in Japan and more recently economic turmoil in other Asian markets important as buyers of Alaskan salmon and other seafood, has further contributed to drops in prices paid for salmon exports and other species. Finally, ongoing class action price fixing

litigation between harvesters and major Japanese buyers in the bell weather Bristol Bay has strained loyalties and relationships between Alaska fishers and their primary export market. This at time when global competition for salmon markets is increasing.

Recovery in the Alaska salmon industry will require a recognition that continuing to do "business as usual" is no longer a viable option. The industry will depend on the development of new products, increased emphasis on quality, and renewed efforts to expand domestic and new export markets, as well as a careful and thoughtful review of the structure of the industry with a willingness to make bold and innovative changes to "the system." This proposed review should include all aspects of the structure such as, the management plans, the limited entry system, and regulations governing vessel size and gear usage. All members of the industry should participate in this review for it to be effective and the State government is the logical choice to take a leadership role if this review and strategic change is to take place. The new course has been established by industry leaders and now a general consensus must be achieved to agree on and make the necessary changes to adapt to the new economic environment.

The management changes for the groundfish fisheries are underway with the implementation of different resource management systems. Individual fishing quotas (IFQs) for halibut and Sablefish was initiated in 1995 and has led to longer, safer seasons for a smaller fleet. This has led to generally higher quality products that have garnered higher ex-vessel values in the marketplace. However, this privatization of these two fish resources has also had the negative effects of reducing the number of Alaskans participating in the fisheries due to non-qualifying for the initial IFQs distribution and due to the reduced crew positions available because of the fishery consolidation.

The inclusion of the Community Development Quotas Program into law in 1997 has solidified this management vehicle since it was introduced in 1992. This program has also been expanded to include all fisheries species harvested in the Bering Sea. The North Pacific Fisheries Management Council that oversees most groundfish and crab fisheries in Alaskan waters is in the process of making other management changes such as the harvest allocation of pollock between the trawl fleet and the onshore processors, limiting access to crab and other species to address overcapitalization issues, as well as such issues as resource protection and utilization. With regard to the issues concerning the over reliance on Japanese markets for pollock surimi and other groundfish, steps are being taken to develop other markets and new products that cater to alternative markets at the this time. These steps will help diversify markets for surimi, although the Japanese seafood consumption is so great that this market will play a major role for the foreseeable future. New technology has recently been developed that will reduce production cost of surimi which will improve the economics as the new technology is implemented.

Crab stocks including Dungeness continue to fluctuate from year to year and need additional protection to restock until a sustainable population may be established. New management plans have either been implemented or are in the planning process which are designed to enhance the stocks by both the North Pacific Management Council for King and Tanner crab and by the Alaska Commercial Fisheries Entry Commission with regard to Dungeness crab. If these steps prove effective, Alaska may become a stable supplier of these species once again. Until then, the foreign suppliers will continue to take market share and establish market prices.

While this report has identified many issues and challenges facing the Alaska seafood industry, the flip side of these are many exciting opportunities that are present for savvy industry participants in the future that may far surpass what the industry has accomplished in its past. It is an exciting time to be involved in the seafood industry, especially with the ability to assist in making the changes underway.

Chapter IV

Mining

1997, the centennial year of the Klondike Gold Rush, is an appropriate time to examine what the mining industry has meant to Alaska's past, the current status of the industry, and what it might contribute to Alaska's future. The history of Alaska's settlement since 1850 is, in many ways, a history of Alaska's mining industry. In the late 1800s and early in this century, the AJ and Treadwell gold mines in Juneau and Douglas were impressive operations, producing over six million ounces of gold over the mine lives. The Klondike Rush extended focus through Southeast Alaska to the interior regions of Canada. From the Klondike, prospectors traveled the Yukon River, establishing mining camps at Fairbanks, Circle and near interior rivers. The Nome mining district opened soon thereafter. In the Copper River basin, the Kennecott copper mine and active coal and oil prospecting brought roads and railroads to Southcentral Alaska. Copper, zinc, silver, platinum, lead, and other strategic metals have been and continue to be important in the economic and political chronicle of the State. Development and sustenance of many towns, roads, airfields, communication systems and even the Alaska Railroad continues to be attributable to the presence of the mining industry.

Opportunities for successful mining in Alaska continue, as the recent openings of several new mines and announcement of major discoveries attest. The challenges facing the industry are many. Subsequent to locating mineral resources, mining companies, as investors and developers, must weigh probability of success against a global portfolio of competing properties. Intrinsic to this investigation is evaluation of time and expenditure required from inception through capitalization to development, wherein factors such as the status, stability, and stipulations of the regulatory environment weigh as heavily as operating plans and equipment procurement.

A. Structure of the Metals Mining Industry Today

Precious and base metal mines are developed in stages from exploration, assessment, mine planning and development, permitting, and construction, and finally, production and marketing. Frequently, mineral discoveries are identified and subsequently claimed by individuals or small companies, then leased to "juniors"—small capitalization mining companies. The juniors will evaluate the prospect, and, based on their findings seek further exploration or development capital through alignment with one or more "major" (large capitalization, often multinational) mining companies. In Alaska, the complex land and mineral-estate title often introduces another participant in mine development. Through the Alaska Native Claims Settlement Act, (1971) Native Corporations have selected large land areas with high mineral potential, with the intent of pursuing development with the assistance of a "major." Recently, singular and collaborative exploration and development capitalization processes such as these have led to the opening of several world-class mines, notably, Red Dog, Fort Knox, Illinois Creek, Greens Creek and Nixon Fork Mines.

Advanced exploration or feasibility stage lode gold deposits, such as True North, located northeast of Fairbanks, Pogo, located east of Delta Junction, Donlin Creek, located in the central Kuskokwim, and Kensington, located near Juneau, are being vigorously explored and appear to be of size and tenure requisite for commercial development. Outstanding base

metal prospects and new reserves at existing mines are also being delineated. When coupled with current exploration expenditures and industrial minerals activity, it is possible that Alaska could have a new mine go into production every two years for the next eight to ten years. It must be noted, however, that, as with any commodity-driven primary industry, price sensitivity exposure is present. The following table shows recent price behavior for commodities important to Alaska.

Table 1. Spot Commodity Prices (Wholesale - US Dollars)		
Commodity	01May96	01May97
Antimony, American per lb.	\$2.45	\$1.60
Copper, Cathode full plate	\$1.28	\$1.17
Gold, troy oz. Handy & Harman	\$392.40	\$339.25
Silver, troy oz. Handy & Harman	\$5.34	\$4.73
Lead, lb.	\$0.48	\$0.48
Platinum NY Merc spot per troy oz.	\$407.80	\$374.10
Mercury, 76 lb flask NY	\$265.00	\$230.00
Zinc, lb.	\$0.50	\$0.62

Protracted gold price depression continues to cause concern in gold mining camps. As the decline extends, metal hedging and forward sales strategies may contribute less to operating margin while simultaneously becoming riskier. If the decline continues, future gold mine openings may be delayed. As gold price received approaches individual capital threshold, operating mines will extract higher tenure portions of their resource reserve, and consequently shorten mine life. Mines may also choose to delay scheduled development, equipment modernization, or forgo other capital intensive activities to maintain production profitability. Mergers and acquisitions, such as the recently announced Kinross Gold Corp./Amax Gold, Inc. merger, sustain economic viability by taking advantage of synergistic capital and operating capability.

B. Status of the Mining Industry in Alaska

Foreign Competition

Alaska competes with the rest of the world when attracting mining and development capital. Alaska offers a commercially competitive environment with a large land base open for exploration (approximately 300,000 square miles or 50% of the state), permissive geology, excellent infrastructure or marine accessibility, and sanctity and tenure of title through a stable political environment. To maintain competitive advantage over geologically prospective countries, when viewed from the prospective of multinational mining companies, Alaska must continue the "Open For Business" atmosphere promulgated during recent administrations. Even with the noted competitive advantages, more exploration money is spent in South America than any other continent, largely due to aggressive regulatory reforms adopted by Chile, Peru, Bolivia, and Argentina combined with recent discoveries of sizeable ore deposits. Interestingly, these reforms consist mainly of a systematic reduction in the bottlenecks and unnecessary delays in permitting exploration, development, and production activities, not in reduction of safety or environmental standards.

Table 2. Location of Corporate Headquarters for Selected Mining Companies Active in Alaska		
Company	Parent Company	Headquarters Location
Kennecott Exploration	RTZ	London
Cominco Alaska	Cominco Ltd.	Vancouver, B. C.
American Copper & Nickel	INCO Limited	Toronto, ON
Placer Dome US, Inc.	Placer Dome Inc.	Vancouver, B. C.
BHP Minerals	Broken Hill Proprietary Company	Melbourne, Australia
Alaska Gold Company	Mueller Industries Inc.	Wichita, Kansas
Fairbanks Gold Mining, Inc.	Amax Gold Inc.	Golden, Colorado
Nevada Goldfields Inc.	Consolidated Nevada Goldfields	Denver, Colorado
Hecla Mining Company	n/a	Coeur d' Alene, Idaho
Coeur Alaska	Coeur D' Alene Mining Company	Coeur d' Alene, Idaho

Value To State

In 1997 the total expenditures for exploration (\$58 million), development (\$153 million) and production topped \$1 billion for the second year running. The following chart shows the mining industry's value to Alaska since 1982.

Table 3. Total value of the mineral industry in Alaska by year. (in millions of dollars)				
Year	Exploration (expenditure)	Development (expenditure)	Production (value)	Total
1983	\$34.10	\$27.80	\$232.40	\$294.30
1984	\$22.80	\$53.60	\$199.40	\$275.80
1985	\$9.20	\$34.10	\$226.60	\$269.90
1986	\$8.90	\$24.30	\$198.50	\$231.70
1987	\$15.70	\$100.30	\$202.40	\$318.40
1988	\$45.50	\$275.00	\$232.20	\$552.70
1989	\$47.80	\$134.30	\$277.00	\$459.10
1990	\$63.30	\$14.30	\$533.00	\$610.60
1991	\$39.90	\$25.60	\$546.50	\$612.00
1992	\$30.20	\$30.00	\$560.80	\$621.00
1993	\$30.30	\$27.70	\$448.70	\$506.70
1994	\$31.10	\$44.90	\$507.50	\$583.50
1995	\$34.30	\$148.60	\$537.20	\$720.10
1996	\$44.60	\$394.00	\$590.40	\$1,029.00
1997	\$57.30	\$167.40	\$901.60	\$1,126.30
Total	\$515.00	\$1,601.90	\$6,194.20	\$8,211.10

From—Swainbank, Bundtzen, Clough, Henning, "Alaska's Mineral Industry, 1996)*
1997 estimates from Alaska Dept. of Commerce, DTD.

If exploration expenditures continue to successfully lead to new property developments such as noted above (POGO, Kensington, True North, Donlin Creek and others), there will be a

steady increase in the mining industry's contribution to the economy of the State. At present, initial higher grades, prudent marketing strategies, and price sensitivity elasticity have allowed the larger operating gold mines in Alaska to continue operations through the current depressed gold market conditions.

A further enhancement to the State economy could be realized with in-state processing of mine concentrates in smelters and refineries. For example, vertical integration accomplished through down-stream, value-added production is not uncommon in the U.S. Southwest, where copper ore is processed near the mines, and ore processing and refining jobs benefit the local economy. Finding alternatives to offshore ore treatment may be especially beneficial to the State, as the mining industry is growing when oil production, and revenues, are declining.

Tax Payments

As the mineral industry increases its presence in Alaska, there will be increases in the mining industry's contribution to the economy of the State. Last year, the State realized revenues from corporate income taxes paid by mining companies, plus approximately \$400,000 in mining license fees. Payments at the borough/municipality level are in (excess of \$5,000,000—finish this number) for property tax, plus other benefits, including lease payments to land trusts and Native Corporations and an electrical rate reduction in Fairbanks North Star Borough. Corporate contributions to charitable causes are a significant and reliable portion of non-profit funding. Taxation of mineral wealth is evolving, with debate focussed on two issues: (1) property tax valuations based on replacement cost or income produced, and, (2) State corporate tax derived from a percentage of metal concentrate produced, or taxation of net revenues. On both issues, one alternative allows the State or municipality to realize gains correlative to metal prices and mine performance, while the opposing alternative allows the taxing entity an income stream based on quantity of metal extracted. Clarification of these issues will assist mineral industry analysis and quantification of development costs in Alaska.

Jobs

In August 1996 there were 283,000 people employed in nonagricultural jobs in Alaska.² That year, the mining industry provided an estimated 3,760 full-time equivalent jobs in Alaska, up 10% from the previous year and representing 1.33% of the total nonagricultural jobs. The wages of the average miner were \$5,158 per month, second only to the oil industry. In addition to direct jobs, the economic multiplier effect of the mining industry expenditures is significant. For example, the Fort Knox gold mine near Fairbanks will spend about \$76 million on payroll, purchases, and taxes in Alaska in 1997. The current housing construction boom in Fairbanks is due mainly to the economic impact of the new mine, but construction work at the Healy Clean Coal Project, and Alyeska Pipeline operations cannot be discounted. Exploration also brings a lot of new money (\$58 million in 1997) and jobs into the State. This largely seasonal expenditure is spread more evenly throughout the State as local air charter operators, suppliers and labor benefit from geographically diverse operations. In contrast, large mining operations can create job site concentration in remote areas where employment opportunities were previously rare to nonexistent. The Red Dog, Nixon Fork and Greens Creek mines all offer rural residents jobs and the opportunity to develop and use marketable skills while earning a better living than otherwise possible. Secondly, training coupled with quality incomes allows small community entrepreneurship not realizable under pre-mine economic conditions.

At both Red Dog and Greens Creek, approximately 80% of mine employees are local residents, at Red Dog, approximately 50% of the mine employees are NANA Regional Corporation shareholders. These percentages are comparable to other large mines in the state. Greens Creek contributes approximately \$21 million in local payroll and purchased \$15 million in materials and supplies from Southeast Alaskan distributors during 1997. Mining companies in general have found that hiring locally is mutually beneficial; employees and their communities have a stake in the performance and profitability of the mine and the mine has an opportunity to exercise good citizenship within its community.

Land Availability—Access to Land for Mineral Development

Alaska has approximately 300,000 square miles (192 million acres) of land available for mineral entry, comprised of 53.3 million acres of Federal land and 95.4 million acres of State land open for claim location, and 44 million acres of Native Corporation land, available by negotiation. As can be noted from Table 4., below, almost half the land in Alaska is closed to mineral entry. Federal closures include National Parks and Preserves, National Monuments, Wild and Scenic Rivers, National Recreation and Conservation Areas, National Wildlife Refuges, Petroleum Reserves, etc. Large areas of National Forests, while not withdrawn from mineral entry, are restrictive. Notwithstanding the "No More" clause in the Alaska National Interest Lands Conservation Act (ANILCA), the Department of the Interior continues to advocate further major land withdrawals. Proposed and *de facto* "buffer zones" surrounding conservation units further enlarge the areas where development is prohibited.

Table 4. Land Status in Alaska				
CATEGORY		Total Acres (million acres)	Open to Mining (million acres)	Closed to Mineral Entry (million acres)
Federal Lands				
	National Park Service	52.0	0.0	52.0
	Fish and Wildlife Service	77.1	0.0	77.1
	US Forest Service	22.2	16.4	5.8
	Bureau of Land Management			
	National Petroleum Reserve	23.0	0.0	23.0
	Other lands	39.0	36.9	2.4
	Department of Defense	2.1	0.0	2.1
	Subtotal	215.4	53.3	162.4
State Lands				
	Division of Lands	80.8	75.7	5.1
	Div. of Parks...	3.0	0.0	3.0
	Division of Forestry	2.0	2.0	0.0
	Dept. of Fish & Game	1.8	0.0	1.8
	Not TA'd Selected/Conveyed	17.7	17.7	0.0
	Subtotal	105.3	95.4	9.9
Private Lands				
	Native Corporations	44.0	44.0	0.0
	Other Private	0.5	0.5	0.0
	Subtotal	44.5	44.5	0.0
	Total	365.2	193.2	172.3

Withdrawals of lands from mineral entry have an adverse impact on the economy of the state since closure prohibits discovery of valuable oil, gas and mineral deposits and corresponding revenues from development. Three of the most exciting mineral deposits in southeast Alaska (Quartz Hill, Greens Creek, and the Brady Glacier Copper-Nickel deposit) are in or are

surrounded by land with restrictive land classification that hinders or denies exploration and/or development.

The Permitting Process

In 1994, Governor Knowles named the Alaska Department of Natural Resources (DNR) as the lead agency for mine permitting. This is captured in AS 27.050.010(b), the Statute granting this authority. In part it reads:

"The department is the lead agency for all matters relating to the exploration, development, and management of mining, and, in its capacity as lead agency, shall coordinate all regulatory matters concerning mineral resource exploration, development, mining, and associated activities. Before a state agency takes action that may directly or indirectly affect the exploration, development, or management of mineral resources, the agency shall consult with and draw upon the mining expertise of the department."

Large hard-rock mines are multifaceted industrial complexes, and as such, the process for identifying and obtaining the variety of permits required to develop and then operate a mine is extraordinary. As the lead agency, DNR has developed a six-step process to coordinate the permitting of projects and mitigate conflicting requirements of the various permitting agencies. DNR does not supercede the responsibilities of any agency, but is responsible to the public process. Applicants are charged a fee for DNR coordination.

John Shively, head of the NANA Development Corporation during commissioning of the Red Dog Mine, is currently Commissioner of the DNR. In a talk to the Resource Development Council on September 18, 1997, he briefly described attempts by his Department to clarify and streamline the permitting process for project development. He noted that while as many as 84 permits may be considered for development of projects, not limited to mines, 56 are currently considered. By designating 'lead agency' status with DNR, both permit acquisition time and process complexity have been reduced. Further time reductions are anticipated as DNR encourages other agencies (DEC, DFG, etc.) to enter the permitting process at initiation. It is reported that Fort Knox, which is partly on federal land, invested over \$350 million in development during an eight-year period and required and obtained 41 permits. Echo Bay Mines, seeking to reopen the A-J mine near Juneau, spent eight years and \$10 million in permitting costs before the project was suspended. Since the DNR designation, the Illinois Creek mine, located on State land, completed the permitting process in 15 months, and the Kensington project is progressing through permitting more rapidly than would have been previously expected. Illinois Creek and Fort Knox, both on State land, required the following state permits:

Table 5. Type and Source for State Permits for Large Hard Rock Mines

From DNR	From DEC	From DF&G
Mining Lease	Consolidated Waste Disposal Permit	Fish Habitat Permits
Mill Site Permit	Air Quality Permit	Permit to Alter Stream Flow
Water Rights		
Reclamation Plan		
Plan of Operations		
Dam Safety		
Road Right-of-way		

In addition, wetland permits may be required from the Army of Corps of Engineers. On Federal lands, Environmental Protection Agency, US Dept of Transportation, US Forest Service, and US Coast Guard permits may be required as well. Permits for placer mines are varied and are significantly different than for hard rock mines.

C. Industry Snapshot

Red Dog

The Red Dog zinc-lead-silver mine, located in northwest Alaska, commenced production in 1989, and clearly illustrates the accomplishment achieved by a Native Corporation/multinational mining company/State agency (AIDA) partnership. At Red Dog, land selection and acquisition by NANA Regional Corporation, evaluation and development through production by Cominco Alaska, and port and road financing assistance by Alaska Industrial Development Authority, coupled with continued successful exploration has led to 10% of the world's zinc being exported from Northern Alaska. The Red Dog mine was the world's largest zinc mine in 1995, 1996 and 1997. The open-pit mine and ancillary port facility employ about 470 people. Currently another 300 employees are involved in upgrade and expansion projects; water treatment facilities, accommodation, concentrate storage, load out and dock facility, and tank construction are near or at completion. Permanent employment following expansion is expected to increase by 100 people and mine output will increase by about 35% from current levels of 373,000 tons of zinc in concentrate and 70,000 tons of lead in concentrate. The mine has a projected fifty year life.

Fort Knox

The Fort Knox open cast gold mine is located about 25 miles northeast of Fairbanks and reached via the Steese Highway and a short mine road. Amax Gold Inc. expended just short of \$400 million developing the mine for production. Ore grade averages 0.026 ounces of gold per ton of ore, and, by design, economy of scale is necessary for profitability. Design capacity of the mine is 36,500 tons of ore mined and processed each day, producing about 1,000 ounces of gold per day. During 1997, the first full year of production, Fort Knox produced 45,701 ounces prior to commercial production and an additional 320,233 ounces

of gold when fully commissioned. The mine has current reported reserves of 4.1 million ounces of gold, indicating an eleven year mine life. There are 246 permanent, Fairbanks based mine employees commuting by road to the mine. Because of the large electrical consumption by the mine, the Fairbanks electric utility subscribers experienced a 7% rate reduction, a singular but highly visible benefit from the mine. The recently announced merger agreement entered into between Amax Gold Inc. and Kinross Gold Corporation reduces debt currently carried by Fort Knox, presumably increasing tolerance to depressed gold prices.

Greens Creek

The Greens Creek Mine on northern Admiralty Island is within the U.S. Forest Service managed lands of the Admiralty Island National Monument. The underground silver-lead-zinc mine is owned by Hecla Mining Company (29%), and Kennecott Greens Creek Mining Company (71%), an RTZ subsidiary. After a several year closure, the mine resumed full production in 1996 following mill, concentrate storage and handling facility expansion and upgrade, and redesign of water treatment and underground facilities. According to plan, 1,320 tons of ore are trucked to surface and pass through the mill per day. Annual production will be about 62,000 ounces of gold, 11 million ounces of silver (20% of U.S. silver production), 79 million pounds of zinc, and 40 million pounds of lead. At present production and reported reserves, mine life will be about 17 years.

Nixon Fork

The Nixon Fork underground gold mine became the first hard rock gold mine to go into production in Alaska since World War II when it commenced production on October 6, 1995. Daily production of 150 tons of ore averages about 2.5 ounces of gold per ton plus copper. In 1997, the underground mine produced 40,000 ounces of gold and also shipped copper concentrate. The mine employs 65 people, with 40 workers on site and 25 out on rotation during normal shifting. The mine, located about 30 miles northeast of McGrath, is owned by Consolidated Nevada Goldfields Corporation.

Placer Gold Mining

Based on permit applications, about 140 placer gold mines reported production of about 90,000 ounces of gold worth approximately \$30 million in Alaska in 1997. These mines, concentrated in drainages and on alluvial terraces throughout the State, employed a total of about 850 people during the 1997 mining season.

Coal Mining

Briefly, Alaska has 60% of the U.S. coal reserves. Large deposits of low sulfur coal are known, including a world class deposit on the northern slope of the Brooks Range. Infrastructure requisite for North Slope coal exploitation has been proposed but remains primitive to non-existent, precluding large scale development of the resource. Coal fields along the Gulf of Alaska, Cook Inlet and in the Susitna Valley have yet to meet economic hurdles. Usibelli Coal Mine, near Healy, is the only operating coal mine in Alaska.

Usibelli Coal

In 1997 Usibelli Coal Mine produced approximately 1.5 million short tons of ultra-low sulfur, high ash product using state-of-the-art mining and reclamation methods. Usibelli is a family owned business which has supplied coal to meet Alaska energy needs for over 50 years. The mine employs about 120 people, some of whom are second and third generation employees. Mine-mouth electrical generation produces power for the Fairbanks market and a second plant is under construction. The new plant, called the Healy Clean Coal Project, will be a 50MW power generation plant using a new coal combustion technology. Commercial operation is expected in 1999.

Low Rank Coal Water Fuel

The Alaska Science and Technology Foundation recently joined with University of Alaska, US Department of Energy and Usibelli Coal Mine in demonstrating feasibility of power production in converted boilers and diesel engines using low rank coal-water fuel slurries (LRCWF). There is increasing interest in development of the Beluga Coal Fields on the west side of Cook Inlet as export coal, or as a source for LRCWF.

Prospective Geology

The geology of Alaska is complicated and diverse, containing Pacific Rim and continental geologic suites of marine to terrigenous rocks ranging in age from lower Paleozoic or preCambrian to recent, from flat lying to complexly folded and intruded, of varied metamorphic grade, and barren to highly mineralized or carbon bearing. As global exploration sophistication and mineral extraction technology advances, Alaskan mineral resources become better understood and more competently located and developed.

Deposits of the size and tenor requisite for attracting the attention of major mining companies are in production (Red Dog) or are currently being evaluated for development (Donlin Creek, Pogo, Ambler Copper belt) in Alaska. Other prospective mineral occurrences await infrastructure maturation or regulatory change. For instance, at the Red Dog mine, production is derived from lead-zinc mineralization hosted in a distinctive group of rocks known as the Lizburne Suite. This belt of rocks can be traced to the northeast and east for hundreds of miles, along which there are numerous areas of lead-zinc mineralization similar to Red Dog. Unfortunately, most of the Lizburne is in National Petroleum Reserve-Alaska and is withdrawn from mineral entry. Other similar lead-zinc deposits are known in the southern part of the Arctic National Wildlife Refuge. North of the upper Kobuk valley, numerous copper-zinc deposits are hosted in a belt of marine volcanogenic rocks. Requisite infrastructure development commensurate to mine development currently makes these deposits uneconomic. In all of Alaska, over 6,200 mineral deposits are known. With new exploration techniques and mineral deposit models, many more deposits will be found. However, as noted earlier, even with land closures and areas of prohibitively expensive infrastructure development, mineral properties continue to be located and evaluated for development at an exhilarating speed.

D. Does Alaska Want a Mining Industry?

In certain areas of the state, such as Nome and Fairbanks, mining has always been a mainstay of the local economy and a significant part of the local culture. Local support for the Fort Knox mine accelerated the permitting process as people seeking mine employment

encouraged process completion. Contrarily, intense stakeholder involvement can negatively impact the permitting process, and unquantified testimony often appears to have more influence than mining company or scientific documentation. For instance, as noted above, Echo Bay Mines, Ltd. spent in excess of \$100 million and 10 years while attempting to acquire permits to reopen the AJ mine, and, in the face of continued opposition from local residents, relinquished the property prior to permit process completion. In Alaska, the largest industrial sectors capitalize on natural resources, such as commercial fishing, oil and gas, mining, recreation and tourism. Diversification of Alaska's industries is a common prescription given to guarantee a stable and healthy economy, and diversification as well as vertical integration, and in-State sourcing of material and supplies have become increasingly important revenue as oil receipts decline. A positive consequence of a healthy economy is stable real estate price appreciation. As on the global horizon, stable economics engender increased political stability; in Alaska's case, increased regulatory stability and, optimistically, efficiency.

As noted above, control of the resource base is integral to resource development. Alaskan Native Corporations received 44 million acres of land when Congress enacted the Alaska Native Claims Settlement Act of 1971. The selection process allowed Native Corporations to select lands based upon individually defined merits, such as subsistence value, real estate value, coal, oil and gas, and mineral resources, etc. Since much of the land was selected for mineral potential, increase of mining revenues from Native lands is probable. From the mining industry perspective, joint venture or lease agreements with Native Corporations have advantages over claim staking on Federal or State lands, notably, political support for development and accessibility. One of the many positive repercussions of the Red Dog Mine is that it has demonstrated the positive economic role that mining can play, and that mining can coexist with other traditional uses of Native resources.

E. Characteristics of a Viable Alaskan Mining Industry

A viable mining industry must consist of risk-averse companies with economically efficient production. Members of the industry must strive to meet or exceed environmental standards, and employ the latest and best technology to improve product quality, quantity and cost, safety and viability of workforce and the environment, and investor and stakeholder relations

Responsible Mining Companies

Mining gives rise to environmental change with variable impact. Either above or underground, rock is moved, crushed, processed, and stored. In the not too distant past, extractive technology was rudimentary, understanding of mining impacts was minimal; and acid mine drainage and acid rain were problematic during mining and smelting ventures. Economic, strategic and military survival forced initiation and continuation of many practices that are now deemed primitive. Mining companies are the first to acknowledge that the times have changed. Mining company survival now depends on recognition, utilization or development of technologies that minimize impact. During the intense scrutiny that constitutes the State and Federal permitting process, regulators focus on all impacts of the proposed activities. The final mine plan becomes a collaborative effort, ensuring that best practices are achieved in every aspect of the proposed activity, from discovery to reclamation. Equally with the industrial impacts, extraneous impacts, such as the character and population change in the mining community, educational benefits, and closure issues are entertained and addressed. Continued compliance to permitted activities and stipulations is monitored by permitting agencies, and not infrequently by stakeholders unassociated with the mine through agency or employment. Many contingencies are in the regulations, and the penalties for infractions can be severe.

Workplace safety is crucial to efficient operations, community relations and mine survival. Alaska is proud to acknowledge the safety record maintained at hard-rock mines within the State. For example, during 1997, Greens Creek Mine was proposed for the prestigious Sentinels of Safety award, given in recognition of lost-time accident free operation. Red Dog reported and a rate of two accidents per 200,000 hours worked. Mine working conditions, workplace equipment and appropriate skill-levels are continuously monitored. Job and skill levels are enhanced through training and experience; qualified safety, mine rescue and medical personnel rigorously reviewed, and sophisticated air, water and rock monitoring systems consistently employed. Safe operations are not an accident—they require planning, initiation and commitment from all employees.

Today's mine employees enjoy benefit packages that reflect the positive economics of retaining and rewarding employees and reducing "turn-over". Wages are among the highest in the State, reflecting the skill levels required. In addition, mining companies routinely support education programs with cash or equipment donations, matching funds, scholarships, research grants, *etc.* to increase the talent pool from which to draw employees.

The Economic Feasibility of Medium and Large Scale Mines

Alaskan mine ownership and operation ranges in scale from "mom and pop" to those run by Fortune-500 classed companies. Thirty years ago, gold mining was characterized by family-owned and operated placer gold mines scattered around the State. The mine owner was, by necessity, accountant, surveyor, equipment operator, and marketing manager. Occasionally, value-added products were derived by making jewelry or other retail items from a portion of the summer's production. Today, the family mine is rapidly becoming a thing of the past. Increased equipment, operation, and compliance costs have forced consolidation and reduced the number of operations throughout the state. Partnerships and small corporations are more typical now. Placer mines tend to have lower capitalization costs than lode mines. The Valdez Creek Mine, operated by Cambior, was the largest placer mine in North America and had production levels (80,000 oz./year) comparable to a lode mine before exhausting reserves in 1995.

Alaska is now in the era of mines operated by medium-sized and large corporations. Capital requirements to commence production are high, mining technology must be state-of-the-art, ore tenure together with economies of scale drive the bottom line, and global competitive position must be considered. The Red Dog and Fort Knox Mines typify this new era. In 1995 and 1996, the Red Dog Mine produced more zinc than any other mine in the world despite an Arctic climate, a three month shipping season, and at a cost that allowed a profit to be made in spite of marginal prices for zinc, lead, and silver.

Commodity prices are determined by global market conditions; Alaskan mines must be globally competitive because these are the markets they produce for. The mine revenue or margin, or the return received by investors is the portion of revenues in excess of the value of recovered gold less cost of location, physical extraction, processing, taxation, debt service, and waste disposal and reclamation. High-risk projects, such as Fort Knox, survive margin analysis during feasibility studies by demonstrating that survival through commodity price fluctuations is probable. The average grade of the ore at Fort Knox is 0.026 ounces of gold per ton, with a gold-in-ore value of \$7.80 per ton (at \$300/ounce). All costs and processes plus an investor return must be less than \$7.80 for each ton of rock moved, thus illustrating that economy of scale is imperative. Risk abatement practices, such as forward selling and conservative reserve analysis coupled with margin normalizing and debt restructuring flexibility can increase the probability for maintaining economic viability during depressed metal markets. The inescapable fact is that the tenure of the resource ultimately drives the

economics of the mine, and the even best management and development schemes cannot overcome feasibility models that do not allow for sustained profitability.

The management systems, equipment, and technology used by Alaska's larger mining operations rival the competition around the world. As with comparable industrial processes, equipment is selected to optimize profitability while maintaining safe and environmentally acceptable operating conditions. The entire operation is continually scrutinized to decrease in overall costs. A modern mine is like a Swiss watch—every piece is working precisely with every other piece.

State-of-the-Art Technology

New technology has brought about lucrative opportunities in mining, creating opportunities to mine ores that were previously uneconomic. For example, industry utilizes recent technical advances to achieve profitability with previously uneconomic lower grade or metallurgically complex ores. "Technology" encompasses many disciplines. Process technology, process control technology, component monitoring, remote sensing and remote control mining, combined with state of the art environmental technology and materials handling procedures economize operations and enable environmental compatibility. Computer assisted applications are integrated into every aspect of mining, including maintenance scheduling, modeling optimum mining sequence of the ore deposit, monitoring processes in the mill, GPS tracking of vehicles, and just-in-time materials procurement. Larger scale heavy equipment has also enabled unprecedented economy of scale in some operations, but the days of "bigger is better" have been replaced by "smarter is better."

Educated and Capable Workforce

New process technology has placed new demands on the Alaskan workforce and opened opportunities in existing sectors. For years, the University of Alaska graduated mining engineers who faced limited degree-specific job opportunities in Alaska. The development and commissioning of new mines has changed this. Technology assisted operations take varying degrees of training, and mining-related preparation is receiving increasing demand at the University of Alaska. Heavy equipment operation and maintenance, though integral, is not as specific to mining, and displaced forest industry workers are having success in mining jobs. Construction of the Trans-Alaska Pipeline and the very high standards required for pipeline welders has also contributed to the Alaskan workforce skill base. Skilled and industry-ready accountants, analysts, personnel, safety and public relations staff are available in Alaska. Skilled underground miners are internationally sought after, and consequently, frequently amongst the highest paid mine employees.

F. Obstacles To Overcome

A decision to proceed is made at each step of the exploration, evaluation, feasibility and operation assessment of a potential ore-body. The outcome of each decision is dictated by risk determination and financing availability. A negative determination results in mineral property sale or title relinquishment. Each positive advancement decision results in increasingly in-depth and precise cost determination for each stage of development, coupled with exponentially increasing evaluation or development costs. Initially this process moves a mineral location to the property acquisition (claim or lease) stage. Quantitative processes, such as remote sensing and drilling follow acquisition of title. If merited, feasibility and permitting is initiated. Infrastructure and mine design are evaluated, and acquisition of requisite permission from regulatory agencies is undertaken. Interestingly, the two factors

with the most unpredictable outcomes occur independently at the beginning and near end of the process. Prospecting has long been characterized as a profession for the speculative. Likewise, from a time and dollar investment perspective, the large-mine permitting process is difficult to quantify.

Baseline Knowledge—Maps & Geophysical Data

Although Alaska has significant mineral potential, publicly funded mapping of the state, particularly with respect to geologic features is incomplete. It is estimated that only 5% of Alaska has been explored using modern techniques.

A State-funded airborne geophysical mapping effort was begun in 1992 to encourage mineral location and development within the State. The Alaska Business Monthly (1/98) reports that, to date, 2.3 million acres of State lands have been surveyed, at a cost of \$2.6 million. The DGGs, as program manager, has targeted areas with known mineral potential and industry has followed, expending millions of dollars in the recently surveyed areas. The survey employs airborne sensors to measure variations in the earth's magnetic field, and identify areas with anomalous electrical conductors in the subsurface. Survey data can be purchased unfiltered, or as color-contoured maps that show the magnetic and conductive properties of the area. To date, airborne geophysical surveys have been flown in thirteen target areas: Circle, Fairbanks, Nome, Nyc, Valdez Creek, Richardson, Rampart-Manley, Chulitna, Petersburg, Stikine, Ruby, Iron Creek and Koyukuk.

Satellite and remote sensing data are becoming increasingly available. The University of Alaska Fairbanks' Geophysical Institute is establishing a facility to gather SAR (Synthetic Aperture Radar) data for creation of a digital elevation and surface mapping database. Initial study areas will evaluate sites that demonstrate high mineral potential, have transportation access, and are already covered by a DGGs airborne survey. Maps derived from combined data will give new insight into the mineral potential of large areas.

Publicly funded mapping of Alaskan bedrock geology remains largely uncompleted, even though it can be an important management tool for identifying extractable construction resources such as gravel and rock, or geologic hazards, such as fault or landslide zones. In comparison, much of Alaska is yet to be mapped at a scale of 1:250,000 while most of the lower 48 has been mapped at 1:63,360 or 1:25,000. Geologic mapping initiated by the private sector is more complete, targeted toward locatable minerals, privately held, and largely unavailable because of industry competitiveness and the high cost of origination.

Permitting Issues

Among the most enigmatic of the multiple permitting issues required for industrial development in Alaska are air and water quality permits. Alaska's large climactic range, variable topography and preponderance of streams and drainages make it difficult to gather and have available the reliable and consistent water quality data needed to effectively develop a new mining property. Frequently, data depicting background levels of metals and metal-speciation in streams is not available, let alone effects of seasonal stream flow variation. Methodical mineral development schemes include collection of background data prior to invasive mineral activity so that water discharge or other impacts can be measured against background rather than artificial standards.

To sanctify this process, an initiative has been undertaken by the Alaska Producers Council with the cooperation of the Alaska Department of Environmental Conservation. The Initiative proposes a State and privately funded program to establish baseline water quality data for

high priority drainages in Alaska so that background quality can be agreed upon prior to disturbance.

House Bill No. 128, introduced in the 20th (1997) Session of the State Legislature is "An Act...directing the Department of Environmental Conservation to conduct water quality research" and "establishing the Water Science Oversight Board". The intent of this Act is to direct the DEC to develop a water quality information base that can be used to develop valid water quality standards. The Water quality oversight Board will participate in the DEC's water quality research, and formulation of ensuing regulations. The bill is currently in committee (1998 Session) and, if passed, could provide outcome-based water quality standards.

History—Permitting Quartz Hill & Alaska-Juneau

In 1974 U.S. Borax discovered the Quartz Hill molybdenum deposit about 40 miles east of Ketchikan. A large scale exploration program was initiated, and as the massive size of the deposit became apparent, hopes were high for a mine to be in production by 1988. The reserve estimate of 1.5 billion tons of ore averaging 0.136 percent molybdenum indicates that Quartz Hill contains at least 10% of the western world's molybdenum.

In December 1978 the Department of the Interior established the Misty Fjords National Monument, which surrounded the prospect. In 1980, ANILCA was passed, which excluded 100,000 acres of the deposit from the National Monument. Nevertheless, permitting became difficult as U.S. Borax, the Forest Service and the Environmental Protection Agency tried to work out an agreement for the disposal of the mine tailings. Submarine disposal of the tailings, an environmentally sound procedure used at Island Copper on Vancouver Island, was the disposal method preferred by U. S. Borax. A strong environmental and fishing industry lobbying effort disputed the viability of this method.

After spending over \$100 million, 25% of which was for permitting, U. S. Borax terminated all work on the development of the mine and eventually sold the property for a rumored amount that was less than 10% of the amount they had spent. The proposed mine would have employed at least 7-800 people over a mine life estimated at seventy years.

The Alaska-Juneau mine was a large gold mine active from the turn of the century until World War II, and the mining town of Juneau became the capital of Territorial Alaska because of it's presence. Echo Bay Mines began a systematic evaluation and exploration program of the Alaska-Juneau mine in 1985, and over the next twelve years spent \$110 million on exploration, rehabilitation and permitting. During the permitting process the proposed mine reopening drew the attention of, and strong opposition from, a local citizens group. As part of the operation permitting process, Echo Bay Mines' initial Environmental Impact Statement (EIS) proposed submarine disposal of mine tailings, but were instructed by EPA that this method was not permissible. After considerable time and expense, Echo Bay produced a supplemental EIS with a redesigned mine plan. They were then denied on-shore disposal and instructed to reconsider underwater disposal. Echo Bay terminated all efforts to develop the mine in early 1997 before a final ruling on submarine disposal was made.

The AJ and Quartz Hill examples illustrate differing Federal, State and Municipal involvement in the permitting process, and difficulties present when attempting to get large mines into production. The negative impacts of the timely review of operating and discharge permits, change in land status, and a process that allowed non-financial participants to control the permitting process are often cited by companies who are considering involvement in minerals exploration and development in the State. Legislative oversight is beginning to change agency mandate, and defining agency roll in the permitting process. Early involvement

between public and private sectors increases the potential for a predictable and workable regulatory process. Recognition of non-industry stakeholders early in the permitting process often brings issues to the attention of industry within a timeframe reasonable for resolution.

Factors Unique to Alaska

Location

Alaska is the "air cross roads of the world"; Anchorage International Airport ranks number one in the nation in handling cargo tonnage. From a mining perspective, Alaska is a long distance from the smelters and finished-metal markets for metal concentrates. In the past, the exploration effort often targeted gold proximal to historical mining camps and their access routes, both because of reduced shipping costs associated with shipping a high value to weight product, and because of the probability of locating lode gold following placer location. Other metals, notably lead, zinc and silver are becoming increasingly important as both primary and bi-product metals, however, concentrate shipping costs and smelter obligations do add an extra tier of expense to mine economics. Accepting smelter services are located throughout the Pacific Rim; concentrate shipments from Alaska have become common.

Climate

Although a significant portion of Alaska experiences a seasonal exploration window, there are no parts of Alaska that have climate prohibitive to mineral development. In fact, parts of Alaska have temperate climate (SE and SW) or dry to arid climates (interior). Further, industrialization of northern climes is a global phenomenon, and a great deal of research and technical innovation has been accomplished to overcome obstacles. University of Alaska engineering disciplines distinguish themselves as "cold weather experts" with expertise in engineering problems facing developers in arctic regions.

Poor Infrastructure

Alaska competes poorly with developed nations for instate transportation infrastructure. Although the current infrastructure portfolio is not substantially lower than lesser-developed countries, it is more expensive to build roads, airports, and railways in Alaska. However, sophisticated communications systems, state of the art medical services, energy supply, education and research facilities plus a thriving business climate enhance Alaska's global competitive position.

The State of Alaska continues to support development through State budget discipline and agency partnership. The Alaska Industrial Development and Export Authority (AIDEA) was employed to relieve certain infrastructure costs by providing project-specific bridge or construction loans. This approach to infrastructure development is beneficial because it can remove a significant capital component from the overall cost of developing a mine. AIDEA financed and built the Red Dog road and port site and is currently expanding those facilities. Cominco Alaska Inc., the operator of the Red Dog Mine, maintains the road and pays a monthly use fee, which is presumed to refund the investment plus provides additional capital for other AIDEA projects.

G. Strategy For Growth and Development

The Alaskan mining industry is still in its infancy. The global mining industry generally views Alaska as a favorable place to invest exploration dollars, which means it is a good place in which to have producing mines. It is a fact, however, that for a deposit to be economic to mine in Alaska, it must be higher grade than anywhere else in the U.S., or of significantly large size to recover exploration and development costs.

Alaska needs a healthy and viable mining industry. Sustained growth and progress for the industry requires initiative by the private sector in conjunction with strong cooperative efforts on the part of the state government. The following are components of an overall strategy to meet those goals with identified key participants.

Establish Background Data Bases

- ◆ Develop new or unique mapping techniques in collaboration with the UAF Geophysical Institute incorporating SAR data into conventional mapping (ASTF, UAF, and Industry).
- ◆ Continue/expand the geophysical data collection for additional mining districts (DNR, Industry, and Legislature).
- ◆ Conduct joint field research to establish background metal concentration levels in important watersheds (DNR, DEC, ASTF, Industry, Legislature).

Standards and Permitting

- ◆ Develop a jointly supported water chemistry project to conduct the scientific research to define the appropriate water quality standards affecting coal, placer, and hard rock mines (DEC, ASTF, Industry, Legislature).

Research

- ◆ Define and conduct R&D on innovative exploration, processing, or refining techniques specifically aimed at development of Alaskan ore bodies (UA, ASTF, Industry, BLM, US DOE, etc.).
- ◆ Continue/enhance work on alternate products from low rank coals (UA, ASTF, US DOE, Industry)

Infrastructure

- ◆ Infrastructure development should be continued cooperatively by industry and the State using the Red Dog Mine as an example (AIDEA, Industry).
- ◆ Define and address institutional and/or technical issues which impede Alaska mining companies and support industries to enhance Alaska's international competitiveness. (ACED, DNR, AIDEA, Industry)

- ◆ Continue the review of legislation affecting the industry, support proactive legislation. (State agencies, Legislature, Industry)

Education

- ◆ Ensure that mineral resource curricula (mining engineering, geology, petroleum engineering, etc.) remain viable at the University of Alaska (UAF, Industry, Legislature)
- ◆ Develop and include a balance and scientifically based natural resource curricula within the state's school system (Department of Education, Industry, Legislature, UAA, and UAF).

Several organizations are assuming issue specific leadership roles in the Alaskan mining community. As the industry continues to mature, significant progress in key technical and regulatory areas will enable the industry to grow steadily, thereby making an increasingly substantial contribution to the economy of the state and the well-being of its residents. To balance the investment, the industry needs a measure of certainty in content of regulatory requirements and increased predictability of mine development and permitting to assure that the risks are known before mining projects are undertaken. Alaska is "Open For Business" and, in the words of Governor Knowles, Alaska welcomes industry that hires Alaskans, uses Alaskan businesses and develops resources while protecting air, water and wildlife habitat.

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Chapter V

Non-Oil Energy

Overview

Why is the State of Alaska in the energy business? How does the state actively and positively stimulate growth and development of Alaska's energy sector, and how does the state exit from components of the energy business that are better served by energy producers and resellers?

In the past, the state has attempted to marshal available resources from the public and private sectors in strategic plans where programs and resources are identified. However, these strategic plans did not enable any entity to coordinate the resources available to carry out the goals of the strategic plans. As a result, the strategic plans of the state have tended to be little more than self-serving defenses of existing programs and projects.

This Energy Sector Analysis is intended to present a historical reference for considering the existing and future energy needs of Alaska, a brief review of energy programs that have been in place in Alaska over the years, and a set of considerations to address these issues. As such, this analysis is intended to provide information for further discussion by vertically integrated user/provider councils representing the strategic energy interests of the people of Alaska. This analysis is divided into a discussion of Alaska's energy resources and infrastructure, and Alaska's electric utility industry.

Alaska's Energy Resources and Infrastructure

Alaska contains several of North America's most significant energy resources. Yet, these resources remain undeveloped due to the costs of producing the resource (exploration and transportation), access difficulties, lack of identified markets, or other legal impediments to resource development.

Coal Energy

The coal resources of the state have faced many of the same limiting forces as Alaska's other natural resources. Location is not a strategic advantage for Alaska's coal resources. Neither is price or supply. Alaska has more than 5 trillion tons of coal reserves, representing more than 50 percent of the total reserves of the United States. Of Alaska's coal reserves, nearly half are high-grade bituminous coals located in the Arctic. The other half are low-grade (sub-bituminous) coals located close to Cook Inlet or in interior Alaska, locations easily accessible to ice-free ports. How much of these reserves can be extracted and developed, due to the engineering and economic challenges, remains to be determined.

Alaska's sub-bituminous coal will be sought by world markets only when it can be delivered to those world markets in a form competitive with world oil supplies at competitive prices with firm delivery commitments. This requires that the sub-bituminous coal resources of Alaska be demonstrated to be competitive substitutes for oil products, and that supply can be guaranteed in order to secure long-term purchase contracts.

To demonstrate that Alaska's sub-bituminous coal is a competitive substitute for oil products means that the per dollar energy output of Alaskan coal is equivalent or better than the per dollar energy output of other available oil products or coal resources. However, the low-sulfur (low-rank) content of Alaska's coal is an important advantage in a world that is increasingly concerned about the environment. Alaska's low-rank sub-bituminous coal will be strategically competitive in markets where long-term purchase commitments can be secured which allow the capital investments in technologies necessary to operate energy generating facilities on Alaskan coals, and which are forced to switch from their use of high-sulfur coals due to environmental requirements or lack of firm suppliers.

The bituminous coal reserves of the Arctic are six miles east of tidewater (the Chukchi Sea), and existing exploration plans call for underground mining operations. However, the tidewater is not ice-free, and year-round operations would require that coal produced during the winter be stockpiled during the winter for transport during the summer. The advantage bituminous coals have over sub-bituminous coals is that market demand is well established.

The enormous costs of developing Alaska's coal resources and the limited size of Alaska's energy markets have both contributed to decisions by coal deposit owners to look outside of Alaska for markets for their coal. This is not a strategy imposed from outside interests, as both Alaskans and interests located outside the state own the coal in Alaska.

Alternative Energy Technologies

Alternative energy technologies have received considerable attention in Alaska. These have included geothermal, wind, solar, batteries, bioenergy, hydro, and hybrids which combine systems to take advantage of intermittent opportunities for energy production from renewable resources. In the past, the question of financing the long-term capital costs of alternative energy technology development was posed in terms of the state looking to its own best interests over the long-term. It may be that the best approach is for the state to share funding of the development risk, namely financing technology development, leaving the market and management risk to firms operating in the private sector. The advantages of this approach are that local users can choose from an array of available technologies; the state participates only in the technology development; there will likely be markets for the technology outside of Alaska (resulting in export income to the state's economy); and by appropriate incentives, production can be done in Alaska, further expanding the economic base of the state.

The principal aim of alternative energy technologies is to displace diesel fuel as an energy source. Diesel fired generators have several principal disadvantages:

- 1) the cost of energy is tied to world oil prices and is typically a substantial component of the cost of power in small communities;
- 2) storing diesel fuels in remote Alaskan communities has resulted in environmental contamination which will be expensive to cleanup, and will require significant repair costs to bring the storage tank facilities up to regulatory requirements;
- 3) diesels are relatively inefficient and have a short economic life, typically 10 to 15 years; and
- 4) diesel fuel can only be brought into many Alaska villages once or twice a year, thus necessitating large capacity on-site fuel storage facilities. It should be noted that diesel fired generators offer advantages as well:
 - a. they are relatively simple to operate and maintain when compared to most other commercially available small generator options;
 - b. they have a proven track record in rural Alaska;

- c. diesel is a nonvolatile fuel which is relatively safe to handle; and
- d. the initial installed capital cost is low in comparison to existing alternatives.

Gas Energy Resources

Alaska's natural gas resources are suspected to be plentiful and dispersed around the state. Proven reserves include the North Slope and Cook Inlet. The Anchorage area enjoys low-cost natural gas provided from the Beluga and Cook Inlet fields. The North Slope of Alaska contains significant undeveloped gas reserves, and interest in building a Trans-Alaska Gas (TAGS) System has been increasing in recent years. However, to date, oil producers on the North Slope have been content to re-inject the gas to bolster declining oil production through gas lift.

Natural gas reserves are also thought to exist throughout the state in small quantities that might prove to be economical for regional energy production.

Alaska's Electric Energy Industry

It is ironic that Alaska possesses the largest energy reserves of North America, and yet faces a near-term energy and fuel storage crisis in many of its communities. Electric energy construction and consumption has been heavily subsidized in most of Alaska's communities (urban and rural). It is now foreseeable that those subsidies will be reduced or eliminated due to declining oil revenues, with a substantial impact on the economic health of those communities.

The Need for Electric Energy in Alaska & the Role of Government

Electric energy is essential to Alaska's people and economy. Nearly every community in Alaska is served by a centralized power system, providing power to residential, commercial and institutional customers. Public services such as water, sewer, and telecommunications rely on electric energy, as do public facilities and institutions such as schools, churches, clinics, city halls, community centers, airports and docks. Businesses such as stores, restaurants, hotels, processing plants, sawmills and mines need electric energy to operate.

The economic viability of a community is dependent on the availability of reliable and affordable electric energy. To avert disaster, or when disaster strikes, the state has stepped forward with money and personnel. It is for these two reasons: economic development and disaster prevention and response, that the state is in the energy business.

In some parts of rural Alaska, residents face conditions usually seen only in third-world countries. Basic utility services are often nonexistent. The only exception has been the provision of reliable and affordable electric energy to all Alaskans. What is the commitment of the state? Does Alaska want to remain in the energy business by: providing operating or capital subsidies; providing assistance to small utilities that cannot achieve economies of scale; or providing the technical and professional resources to operate effectively and efficiently?

If state government is going to stay in the energy business, then one of the first questions that must be answered concerns the level of participation by the state in energy production and development, and whether the long-term commitment of the state to supply energy needs can be guaranteed. If the state continues to provide resources to replace aging or

destroyed diesel powerhouses, should it also collect revenues from those communities to cover the cost of replacement and replenish sinking funds intended to provide replacement of capital assets?

If government is going to get out of the energy business, then the planning and implementation of that goal needs to begin now in order to meet the long-lead times traditionally associated with the electric energy industry. The changing role of government in Alaska should also be addressed as the future of energy supply begins to change due to the introduction of independent power producers (IPP's) who are able to supply electric energy on relatively short notice (eighteen months).

A Brief History of Electrification in Alaska

Federal Investment

The federal government recognized the importance of electricity to economic development, and realized that the initial capital cost of electrification was too high to be borne at the outset by the individual consumer. Therefore, the costs and benefits of electrification were borne by all members of society through the use of government funding of infrastructure.

By the time Alaska was ready for a substantial share of its electric energy infrastructure development, most of the federal funding for energy projects had disappeared. The exceptions in the state of Alaska are the Eklutna and Snettisham hydroelectric projects and low interest loan programs under the Rural Electrification Administration (REA). One of the principal mechanisms for reducing the cost of electric energy: building transmission systems to create large, efficient, interconnected systems, will only work in limited regions of Alaska, such as the railbelt region or where villages are tightly clustered together. For most of Alaska, communities are too far apart or are separated by terrain that is not well suited for the construction of transmission lines.

Legislation recently passed by Congress (the Rural Electrification Loan Restructuring Act of 1993) will increase the cost of financing for most of Alaska's nonprofit electric cooperatives, but it will also provide better access to that financing for electric system improvements in rural areas. Now, federal funds can be used to improve electric service in rural areas of Alaska that had previously been considered ineligible for the REA program simply because they already had some form of central service.

State Investment

The state of Alaska has invested heavily in its electric energy infrastructure. By some estimates, the total is between \$1.4 billion and \$2.0 billion over the past twenty years. Of this, according to the recently released Alaska Energy Strategy (April 1994), the state invested over \$370 million in rural area projects and programs (approximately 30%), and over \$730 million in large-scale transmission and hydro projects in the railbelt and around the state (approximately 70%). These infrastructure investments continue to provide returns to Alaska, but the operation and maintenance of electric energy systems requires a cash flow which is difficult for small isolated electric utilities to sustain in communities where a substantial portion of the economy is based upon a subsistence economy.

Through 1994, nearly \$217 million has been spent on Power Cost Equalization (PCE) and its predecessor programs. PCE paid a share of the cost of electricity, rather than investing

to provide electric energy at lower cost. Today, many of the tiny independent village systems (approximately 80 utilities) that serve less than 200 customers still:

- ◆ do not employ trained and qualified utility managers and plant operators;
- ◆ do not have a sinking fund for equipment renewals and replacements;
- ◆ do not purchase insurance on utility facilities;
- ◆ do not have an effective preventative maintenance program; and
- ◆ do not pay the true cost of environmental cleanup due to fuel spills.

State-funded schools are often the largest customer for small utilities, and so it becomes profitable to move rates to their highest levels and thereby maximize revenue collection from the school (the state), and from the PCE program (the state). Small utility systems in Alaska have had few incentives to cover all of their costs through revenue generation because the state has stepped forward to pay for:

- ◆ training for plant operators;
- ◆ technical and maintenance assistance;
- ◆ system renewals, replacements and upgrades; and
- ◆ emergency and disaster response.

It should be made clear, however, that there are several utilities (who serve the majority of Alaska's population) that are of viable size and are not wards of the state. For example, Alaska village Electric cooperative (AVEC) serves 50 communities, is self-sufficient, and other than PCE, is not dependent on the state for anything. AVEC's capital structure is \$29 million in debt from REA and \$22 million in equity. PCE comprises about one third of AVEC's operating revenue.

PCE is critically important to all the utilities serving villages. Even with PCE, the cost of power in the villages is double the cost in urban areas. Without PCE these very low income communities cannot afford electricity nor the things that electricity makes possible, such as water and sewer service, and telecommunications.

The Alaska Power Authority was created in the late 1970's with a broad mandate to identify and construct large scale energy projects in the state. As the need and economic viability of large-scale projects became questionable, the Power Authority changed its name and sought to redefine its role in Alaska's energy industry. Finally, in 1994, the agency became the Division of Energy and has focused on providing services.

As originally created, the Alaska Power Authority was governed by a five-member Board of Directors, with four members selected from the private sector, and one public employee. Day-to-day operations were managed by an Executive Director. However, as the stakes grew higher, the Board was altered to include three Commissioners, and two private sector members. Though such an arrangement provides an Administration the opportunity to have more oversight of agency decisions, it also tends to overemphasize the political side of decision making, at the expense of decisions based upon technical or financial merit.

Alaska's Electric Utility Industry

Alaska has nearly 120 independent utilities that serve a population of less than 600,000. The states of Washington, Montana, Idaho and Oregon combined have a fewer number of independent utilities. The large number of independent utilities can be attributed to equal parts geography and the quest for self-determination. In fact, approximately 80 of these independent utilities serve populations of less than 200 people.

Every utility in Alaska, including the small utilities, is responsible for the following: its own management and administrative services, such as billing and accounting, collections, PCE program filings, insurance coverage, financial and power supply planning, legal matters, and office facilities. Each utility is also responsible for providing technical and professional services such as engineering; operation and maintenance of generation, distribution, and fuel delivery and storage systems; renewal and replacement of those systems; and system upgrades and expansions. Small utilities are generally unable to achieve economies of scale.

Due to the lack of an implemented strategic plan, state technical and financial assistance has not been consistently applied to encourage the development of regional and locally owned and operated utilities.

Electric utility managers and policy planners have struggled to develop a plan which will incorporate small rural utilities into larger utility systems. One of the principal concerns has been: whether the capital costs of bringing existing village systems up to REA standards will be borne by the state, the users of the small systems, or the members of the larger electric cooperatives. Until these smaller systems are brought together into professionally managed organizations with access to sufficient pools of capital to allow the financing of upgrades or equipment replacement, the state will continue to serve as the insurer for these systems, called upon when disaster strikes.

Diesel Generation

Perhaps one fact that is often overlooked is that living in rural Alaska is expensive. Transportation costs and the lack of economies of scale both contribute to the higher prices faced by rural residents. Cast within this discussion is the awareness that diesel-fired generators may be the simplest and one of the safest sources of electric energy in rural Alaska. This affords us the opportunity to ask if improvements in diesel generation can be implemented which reduce fuel consumption or which otherwise reduce the cost of electric service to rural consumers.

This differs slightly from the discussion of alternative energy technologies in that the aim is not displacement of diesels, but using diesel-fired generators more wisely. Tactics to be employed may include: a) battery storage systems to take advantage of the light loading at night; b) higher efficiency diesels; c) waste heat recovery systems; and d) conservation systems.

Electric Energy Consumption Subsidies

The state has provided subsidies to both rural and urban consumers of electric energy. In fact, the state has provided nearly twice as many dollars to urban areas as to rural areas. The difference is largely that subsidies to urban areas have funded the design and construction of capital facilities, while the subsidies to rural areas have funded operating expenses, of which one of the principal components is fuel cost. In many cases, portions of the capital subsidies provided by the state will be repaid through the revenues from bond proceeds or wheeling charges (electric energy transmission revenues). However, the operating subsidies will never be repaid.

During the development of major state-owned energy projects, as a mechanism for achieving energy cost parity, electric rate subsidies were established that afforded rural residents the right to purchase electric energy at a rate approximately equal to that available in communities along the railbelt (Anchorage, Fairbanks, Palmer, Wasilla, Kenai Peninsula).

Recent legislation, which was tied to the dismantling of the Alaska Energy Authority and the establishment of the Division of Energy, called for 20 years of electric energy subsidies through the PCE program, yet provided funding for less than six years of the program. At present, there is funding for only five more years of the PCE program.

Where does the PCE money go? It is worth considering data from the following two communities, Chauthbaluk and Atmautluak, to illustrate the electric energy industry in rural Alaska. Chauthbaluk is located within the service area of the Middle Kuskokwim Electric Cooperative, approximately 110 miles northeast of Bethel on the Kuskokwim river. Atmautluak is located approximately 25 miles southwest of Bethel, and requires overland transport to reach the community.

1992 (Most Recent Data)	Chauthbaluk	Atmautluak
Population	97	254
Residential Customers	30	52
Commercial & Industrial	4	5
Residential Subsidy (kWh/month)	180 kWh/month	335 kWh/month
Average Annual Subsidy	\$863/customer	\$747/customer
Cost Per kWh (\$/kWh)	\$0.583/kWh	\$0.468/kWh
Total Kwh Sold	165,000 kWh	373,000 kWh
kWh Eligible for PCE	111,000 kWh	242,000 kWh
PCE Subsidy (\$/kWh)	\$0.288/kWh	\$0.147/kWh
Diesel Fuel Consumed	23,500 gallons	44,000 gallons
Diesel Cost Per Gallons	\$1.38/gallon	\$1.46/gallon
Total cost of Diesel	\$32,500	\$64,200
PCE Paid to Community	\$31,900	\$42,600
Generator Efficiency	7 kWh/gallon	8.5 kWh/gallon

When reviewing these annual subsidy totals for the two communities, keep in mind that the average annual household income for residents of rural Alaska is \$14,300. The cost of heating alone (not counting electrical energy) using fuel oil for a household can consume as much as 20% of the family's income (for a family of 5, annual heating fuel consumption of 400 gallons per capita, at \$1.46 per gallon).

The PCE subsidy pays for most or all of the cost of diesel fuel used by the community to generate electric energy. When PCE subsidies are reduced or eliminated, these communities can be expected to react by reducing consumption. Reduced consumption will ultimately mean smaller annual bulk fuel purchases, and subsequently increased per unit fuel costs as economies of scale are lost in those bulk fuel purchases.

A possible solution to recapturing economies of scale is to encourage the formation of bulk fuel cooperatives which represent several utilities or which have available bulk fuel storage facilities which can handle the fuel requirements of member villages. Another possible solution is to encourage independent utilities such as Atmautluak to join electric cooperatives, or for MKEC (the electric cooperative serving Chauthbaluk) to expand its service to other independent utilities or to merge with a larger regional electric utility, thus taking advantage of the cooperative's buying power.

Note that there is an additional reaction to subsidies. Subsidies shift consumption patterns away from traditional and locally available fuels toward fuels that must be imported.

Utility Consolidation Efforts

Utility consolidation refers to either or both of two concepts: the incorporation of independent electric utilities into large electric utilities (either nonprofit cooperatives or privately held entities), and the joint operation or ownership of infrastructure utilities such as electric energy, sewer, water, and possibly telecommunications by one entity in a given community.

The arguments for consolidation go something like this: Consolidation will increase economies of scale, allowing the consolidated utility to spread fixed costs over a larger customer base and ensuring a financially viable operation. Thus, rather than maintaining separate utility management offices, a single centralized office will reduce administrative costs. And with consolidation, fewer administrative employees are needed to manage the member utilities and to serve the customer base.

Consolidated utilities are expected to have greater leverage in dealing with suppliers, and to be able to obtain umbrella insurance coverage on facilities at an affordable cost, whereas a stand-alone utility might not be able to get insurance at all. Additionally, consolidated utilities can afford full-time positions, are better positioned to deal with regulatory authorities, may qualify for low-interest loans, and are better positioned to effectively implement energy conservation and load management programs to increase end-use efficiencies.

However, small utilities are often reluctant to surrender control or autonomy. Also, sewer and water utilities may have similar technical and management considerations, but they are very different from the electric utility business or the telecommunications business.

Another substantial problem with consolidation is how assets will be transferred from one entity to another. Even though the assets may serve the same small community, the management systems may be different, and in the case of telecommunication utilities, private ownership interests may not favor consolidation, either because divestiture of their assets is not in their best interests, or because they do not have an interest in moving outside the business of providing telecommunications services.

Utility consolidations have taken place in recent years, with nonprofit cooperatives such as Alaska Village Electric Cooperative (AVEC) incorporating two to three new communities into their system each year. A critical component of the process is upgrading substandard systems to REA standards prior to their acceptance by the larger REA cooperative. As an example of how deals can be structured, in the community of Brevig Mission, on the Seward peninsula, the community owned assets were turned over to AVEC, which then received approximately \$500,000 in funding from both the Alaska Energy Authority and the Rural Electrification Administration and invested that money in rebuilding the powerhouse and the community's distribution system in order to bring the system up to REA standards. AVEC now owns and operates the system.

Energy Sector Analysis Considerations

Evaluate programs and program changes on the basis of their impact on the long-term strategic needs of the state. Apply resources based upon a strategic plan, rather than the requirements of existing programs.

Develop coordinated policies that encourage further oil and gas exploration and production efforts. Demonstrate that the state is "open for business". Possible options include tax and/or royalty incentives for local production, the promise of stability, one-stop shopping for permits, and the use of technology to enhance recovery.

Get in, or get out. Agree on a clear and consistent policy regarding the continued involvement by the state in the energy systems business, including generator replacement, providing subsidized energy consumption, providing system maintenance, operator training support, and development efforts toward applications of new technology.

Determine how the inevitable reduction in subsidies (PCE and capital expenditures) will be distributed among rural utilities. Design and implement an effective energy strategy to allow all of Alaska's communities to maintain the integrity of their electric energy systems.

Determine strategic goals and methods for utility consolidation, weighing desire for independent utility operation with the reduced administrative costs gained through consolidation. Independent utilities must evaluate this decision within the context of providing least-cost and long-term reliable energy to their consumers.

If the state is going to stay in the energy business, create a mechanism to collect revenues for services provided.

Create an advisory board or board of directors empowered to oversee development and implementation of a comprehensive energy strategy for the state, and provide this board with the resources to implement the plan. Include in the strategic plan an exit strategy for the state. Put representatives from independent and cooperative electric utilities, local and state officials and elected representatives, and technical experts on the board.

Include development opportunities for the formation of bulk fuel cooperatives that can reduce the cost of diesel fuel to rural communities. Pass the savings on to consumers. (There is at least one bulk fuel cooperative functioning at present.)

Alternative technology opportunities and conservation program opportunities exist which deserve further exploration and commercial development, principally technologies aimed at displacing the use of diesel fuels in rural Alaska communities.

Coal resources exist in Alaska that have so far proved difficult to develop for in-state electric energy production. Direct continued efforts toward small-scale clean coal projects that are economical alternatives to diesel-fired generation.

Continue technology development of clean coal energy production facilities that can utilize Alaska's sub-bituminous coals.

Identify the organizational structures in place in Alaska (i.e.: cities, village governments, cooperatives, schools, privately held firms, village and regional corporations, etc.) and allow and encourage these entities to interact and implement utility consolidation where least-cost operations can be achieved.

Chapter VI

Alaskan Coal Industry—Sector Analysis

Abstract

For all practical purposes the coal resources of Alaska are sufficient for centuries of production under any conceivable use scenarios, whereas those for oil are not. As we are becoming painfully aware, production of North Slope oil has begun to decrease steadily and, without new discoveries, will tail off dramatically early in the next century. However, an expanded coal industry can provide long term stable employment and serve as a partial buffer to the boom and bust cycles associated with oil. For example Usibelli Coal Mine, Inc. (UCM) has been in operation for over 50 years and today provides employment for around 120 people at the mine and another two dozen who are associated with transportation at the Alaska Railroad (ARR) and the Suneel Alaska Coal Terminal. Alaskans must realize that, regardless of how successful the coal industry in Alaska becomes, it will never provide the state with the revenues that the oil industry has.

There is an opportunity for significantly more Alaskan coal to be sold on the international steam coal market. But the mere abundance of Alaskan coals, their low sulfur (S) content and proximity to the major steam coal importers are not enough to guarantee Alaska's participation into this rapidly expanding market. Most of the Alaskan coal that is near year-round open tidewater is low-rank coal (LRC) which most Pacific Rim coal importers consider inferior to traditional high-rank (bituminous) coal. Potential consumers will require thousands of tonnes (t) of the new fuel for testing in their facilities before they will commit to long-term purchase agreements. Therefore, potential Alaskan coal suppliers will have to provide test coal at prices below those in the prevailing market and which may be substantially below production costs. This will require investments of millions of dollars just to begin to develop market acceptance for the new coals.

The window of opportunity in the steam-coal market has occurred because the tremendous growth in Pacific Rim energy requirements has finally caused demand for steam coal to exceed production capacity for the first time in about a decade. Despite the apparent elasticity in coal supplies, the high capital requirements and length of time required to bring new mines into production, a sellers market should continue well into the next century. Obviously the first mines that are brought on-stream will have the best opportunity to ensure sales for their coal.

Costs for a new open pit coal mine in the Beluga field and a new port near the mine are estimated to be upwards of a \$100,000,000 (MM) and \$40 MM, respectively. These costs when coupled with generally low steam coal prices and requirements of investing millions of dollars just to attempt to get market acceptance so far have proven to be a major obstacle for investors. If the state and coal industry are unable to adopt a unified coal policy that clearly demonstrates to investors support for growth in the coal industry about the best that could be hoped for would be a doubling of the amount of coal currently mined.

International Coal Market

Growth

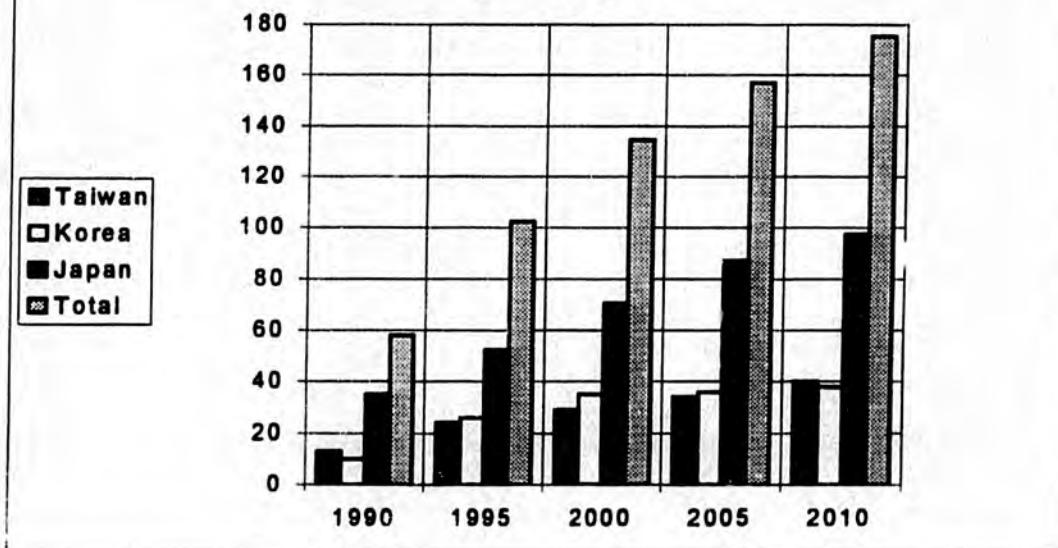
In the early 1950s, a world glut of cheap oil displaced coal as the primary source of energy.

The oil crises of the 1970s precipitated by OPEC had dramatic impacts on power generating practices and on the international steam coal market. In 1973 the seaborne trade in coal amounted to about 106MM tonnes and steam or thermal coal accounted for only 19 MM tonnes with the balance being coking or metallurgical coal. Due to lower, less volatile prices and secure supplies offered by a number of coal exporting nations, coal rapidly began to replace oil as the primary fuel for new power generation and older units originally designed for coal that had been converted to oil switched back to coal. During the next 22 years the amount of coking coal traded doubled, but the amount of seaborne steam coal traded grew by over an order of magnitude to 276 MM and is now the predominate coal traded internationally.

Coal has had a poor image in many industrial nations and has been regarded as a dirty fuel, one that is used only in remote locations or as a last resort. This image arose from mining practices that made little effort to reclaim mined land and little or no emission controls when burning coal. However, a new public awareness of the need to protect the environment has led to strict reclamation, water and air quality laws. Industries in developed nations, aided by governmental support have responded and the 1980s and 1990s may well be known as the clean coal era due to the development of numerous clean coal technologies that have demonstrated that coal could be mined and used in an environmentally responsible manner to generate low-cost power. These efforts have begun to change the image of coal as a dirty fuel and have contributed to the re-emergence of coal as the preferred utility fuel.

While the oil crises caused economic shocks in all nations, they had the most impact on those that had few indigenous energy resources like, Japan, Korea and Taiwan. After the first oil embargo most Pacific Rim nations began a crash program to reduce their dependence on imported oil and seek the price and supply security that coal offered. As shown in Fig. 1, the switch to coal by the leading Pacific Rim importers is projected to continue growing well into the next century. Steam coal imports for 1995 for Japan, Korea and Taiwan alone were over 100 MM t and are projected to grow by as much as 50% in the next decade to over 150 MM tonnes per year (tpy).

**Fig.1 Current & Projected Steam Coal Imports
(MM tpy)**



In addition to switching from oil to coal, wherever possible, Japan has re-emphasized long range energy policy plans and expanded coal research and technology development. They have also committed to a significant backward integration for their energy and feedstocks supply and have begun acquiring equity positions in coal mines in a number of countries principally, Australia and Indonesia. Today Japanese companies own about 26% and 18% of the coal mined in New South Wales and Queensland, Australia, respectively.

Generating Practice Changes and Expanded Use of Low-Rank Coals

Beginning in the 1950s demand for power grew rapidly in industrialized nations and utilities were driven by economies of scale, i.e., the larger the plant, the cheaper the power. This led to the construction of numerous large generating plants, 1000 mega watts (MWs) and larger. In many cases, especially in the U.S., large generating plants were built at the site of the coal mine (mine mouth) and electricity was exported over high voltage transmission lines to population centers hundreds of miles from the mines. With the advent of the mega-sized mine mouth generating plants and improved high voltage transmission lines, the sale of "coal by wire" opened the way for low-rank coal mine development in Western U.S. and Southeastern Australia. Low-rank coals (LRCs), lignite and subbituminous coal, are young coals that have a much higher inherent moisture (25-40%) and lower energy content than their high-rank bituminous counterparts. As operating experience was gained and less conservative designs adopted, LRC-fired plants have become the cheapest source of thermal power in the U.S. and Australia. Despite these successes, Pacific Rim steam coal importers that have little or no experience with LRCs remain skeptical about their value.

LRC use in the U.S. also was boosted by the environmental movement as the New Source Performance Standards for air quality significantly reduced the amount of allowable sulfur emissions. The lower S in many LRCs makes them attractive fuels for achieving the required new air quality standards. Many eastern U.S. utilities examined a number of options to reduce sulfur oxide (SO_x) emissions including, blending or switching to low S coals, adding wet or dry scrubbers and/or buying emission credits from other utilities. In actual practice the majority chose to blend or switch. Blending and switching options could choose from a

variety of coals, both bituminous and subbituminous. The extremely low production costs of Wyoming and Montana Powder River Basin (PRB) subbituminous coal and better than expected handling and combustion characteristics has enabled LRCs to compete very successfully in central and eastern U.S. markets. Wyoming has displaced Kentucky as the leading coal producer in the U.S. at over 180 MM tpy and growing. Large test shipments from the PRB have also been evaluated in Europe and Japan and PRB coal may begin to penetrate foreign markets. However, their long distances from ports cause high overland transportation costs.

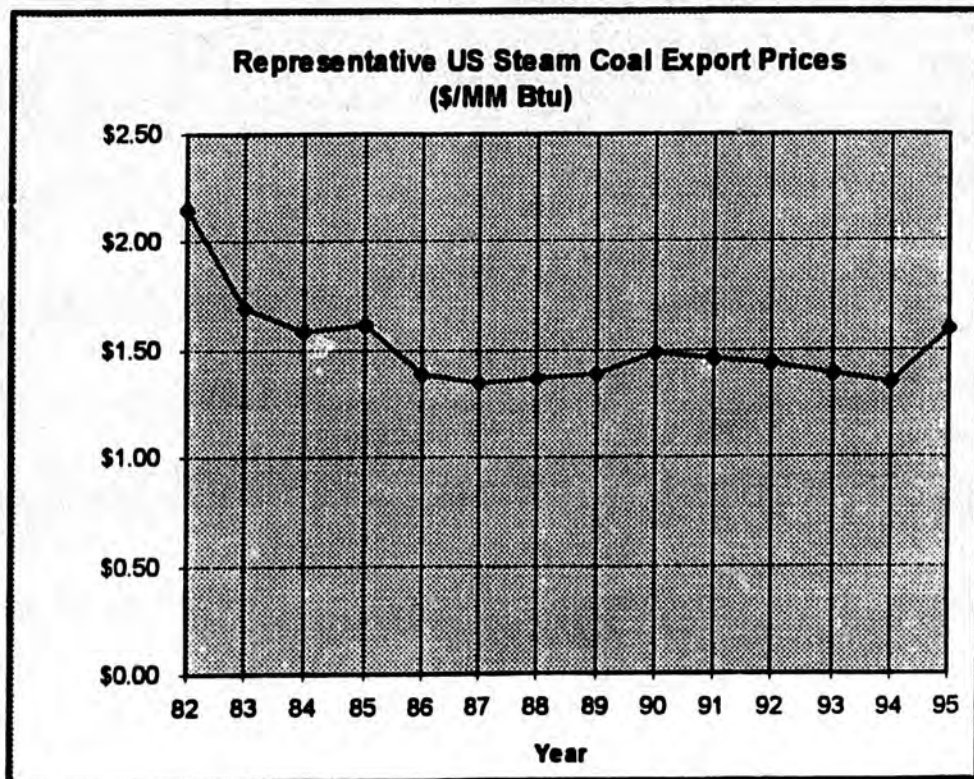
Until very recently, all seaborne steam coal was high rank, bituminous coal. Low-rank coals, subbituminous, lignitic and brown coals are younger coals existing in thicker seams with less overburden than higher rank, bituminous coals, making them amenable to low-cost-open cast (strip) mining. Due to the high moisture content of LRC, low production costs associated are often outweighed by increased transportation costs to distant markets. However, from a utilization aspect, LRCs contain more volatile matter, have no tendency to agglomerate (stick together) when heated and have a higher surface area than bituminous coals. These characteristics lead to rapid ignition and nearly complete carbon burnout making them excellent fuels for most modern combustion applications. The perception of poor quality associated with LRC unnecessarily limits options for the coal importing nations since low-rank coal could be used to replace more costly bituminous coals, either as a blending component with high rank coal in existing boilers, or in new boilers designed with the flexibility to use low-rank coal. However, it wasn't until 1983 that LRCs entered the international steam coal market. The precedent setting contract between UCM, Suneel Alaska and KEPCo in 1983, marked the first long-term export contract for LRC in the world.

Steam Coal Prices

Today, most steam coal is recovered by open cast (strip) mining techniques that have been highly mechanized. Similar advances have occurred in the bulk coal transportation sector and have greatly increased productivity while reducing coal costs. As more operating experience was gained on a variety of coals and dependable coal quality data became available, coal buyers began buying allotments of similar quality coal from the lowest cost producer. The goal of reducing dependence on a single supplier has intensified competition between the various coal producers and helped keep thermal coal prices depressed.

Japan's aggressive effort to reduce dependence on imported oil and diversify energy supply has led to them becoming the world's largest steam coal importing nation at 52 MM tpy in 1995 and projections of over 87 MM tpy in ten years, Fig.1. Australia with enormous reserves of bituminous steam coal is the leading steam coal exporter with sales topping 63 MM tpy last year. Every year a Japanese utility is selected to negotiate with Australian coal suppliers to establish bench-mark steam coal prices. These prices apply to contract or term sales that account for between 70-80% of Pacific Rim utilities' coal purchases, and become the basis upon which all contracts between other suppliers and utilities are negotiated. Recently, KEPCo has become the largest single steam coal buyer and has had some success in negotiating contract prices marginally below the Japanese benchmark.

Since the early 1980s, except for short upward cycles associated with supply problems or unusually heavy demand, steam coal prices have trended downward while surplus capacity existed. However, prolonged periods of low steam coal prices slowed investment in expansion and new mines. By the end of 1994 the growth in power demand, especially in developing nations, finally began to cut coal surpluses and depressed coal prices began to rebound. As shown in Fig. 2, U.S. steam coal export contract prices have risen from lows of around \$1.35 per MM British thermal units (Btus) to over \$1.60 per MM Btus for coal freight on board (FOB) at a U.S. port.



It remains to be seen how long the current supply/demand imbalance will last and if it can sustain the current rate of growth in coal prices. Some believe prices may even approach the high values seen in the early 1980s of over \$2 per MM Btus. Most energy forecasters contend that the current price escalation is not just another example of cyclic price swings common in the energy industry, but reflects a real gap of about 15 MM t between supply and demand that is unlikely to go away quickly. They expect the rate of increase to begin tapering off, followed by a more gradual increase into the next century.

The rate of price increases will primarily be determined by how rapidly additional coal capacity can be added by the major exporters, Australia, Republic of South Africa (RSA), Indonesia, Columbia, Canada, and the U.S. China may well develop some nearby export markets; i.e., Hong Kong, Singapore, and the Philippines. However, their insatiable internal demand for power as they become a modern industrial nation will make severe demands on their coal industry and it's questionable just how much coal will be available for export. Indonesia, which has rapidly become a major coal exporter, has decided to maximize its use of coal for internal power generation at the expense of coal exports in order to increase its export of oil. Others like RSA and Indonesia may also be limited by the availability of capital to add new transportation infra-structure to meet increased export demands.

Alaskan Coal Resources and Potential

History

Alaskan coal has been instrumental in the state's industrial development and, with proper development, could begin to lessen the impact of jobs and income lost as oil production declines.

Alaskan coal's role in state development has included:

1. First mined in 1855, it powered early ocean and river steam ships;
2. Fueled large mining operations and the Alaska railroad;
3. Provided the driving force for the RR's expansion to the Mat-Su and Nenana coal fields;
4. Supplied power for all the military bases until natural gas displaced coal at the bases in Anchorage in 1968;
5. With the UCM nominal 800,000 tpy contract with KEPCo, became the first LRC traded internationally;
6. Provides low-cost power at military bases, utility and university cogeneration plants in the Interior;
7. Will power the 55 MWe \$227 MM Healy Clean Coal Technology Demonstration Project that is expected to be one of the cleanest coal-fired power plants in the world.

Current Industry

The harsh climate and distance from major steel and machine fabricators add considerably to mine development and equipment costs. Operating costs are also more expensive in Alaska than the lower 48, due to higher personnel and insurance costs.

UCM which pioneered the development of self sufficient remote site open cast mining and mined land reclamation in the Sub-Arctic has been in operation for over 50 years. UCM is currently Alaska's only commercial coal mine producing approximately 1.5 million tons of ultra low-sulfur subbituminous coal per year from the Nenana Coal Field near Healy, AK. About half of the UCM coal is consumed for low-cost power generation and heating in military, municipal and university cogeneration plants in the Interior.

The other half is shipped on the state owned Alaska Railroad (ARR) 360 miles to the modern Suneel Alaska coal terminal in the Port of Seward, AK. In Seward coal is loaded into Korean vessels and shipped to the KEPCo generating plant at Honam, Korea.

The entire Alaskan coal supply chain, UCM, ARR and Suneel have shown that they could reduce costs and provide coal to KEPCo at competitive prices, even when the international steam coal market was depressed. This was critical to begin to establish the international credibility of Alaskan coal. It is estimated that the amount of UCM coal exported to Korea could roughly be doubled with only modest capital investments required at the mine, railroad and port.

Alaska Coal Resources and New Mine Potential

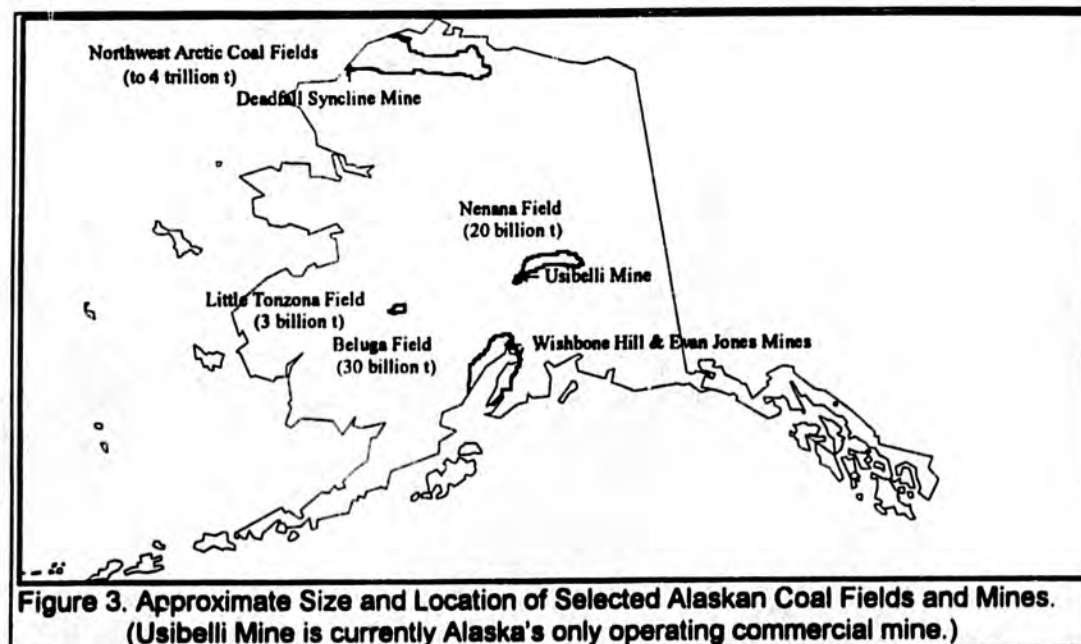
Coal is widely distributed in Alaska and the hypothetical coal resources have been estimated at over 5 trillion tonnes with over 2 billion tonnes of measured reserves, Fig. 3. Most of the coal that is near year-round open water or the ARR is low-rank, subbituminous or lignitic coal.

The largest resources of both bituminous and subbituminous coal are located in the Arctic on the North Slope of the Brooks Range and thus are amenable to conventional marine transportation only during the hundred or so odd days when the ice is out. The Arctic Slope Regional Corp. (ASRC) is assessing mining and transportation options for bituminous coal located on their property at the Deadfall Syncline. Their property is the most inhospitable location considered for mine development in Alaska. Nevertheless, ASRC believes that underground mining may provide the most efficient means of recovering Arctic coals by enabling year-round mining with a higher recovery factor with less surface disturbance than surface mining. ASRC has determined that a 2.7 MM tpy under-ground mine is probably the

optimum size to achieve economy of scale for their Deadfall Syncline coal. Since transportation is the most critical issue, they are evaluating the use of ice strengthened bulk carriers to extend the typical three-month, ice-free season to 8 months.

The Beluga Coal Field which probably contains the largest source of ultra-low sulfur coal near tidewater in the world has been well explored. Two organizations, The Beluga Coal Co. (a joint venture between Placer Dome U.S. Inc. and CIRI) and the Chuitna Group (former affiliates of Diamond Shamrock) each hold measured reserves of nearly a billion tonnes. Based on assessment of geological data, infra-structure needs, environmental requirements and economies of scale, they estimate that an investment of around \$100 MM would be required to develop a 1 MM tpy open pit mine in the Beluga field and about another \$40 MM would be needed for a new port near the mine. It would require about 4 years for a permitted project to construct the mine and make test shipments to end-users or about 7 years to bring a non-permitted Beluga mine into production. Both organizations are seeking investors and/or coal contracts to provide funding to develop the mine and infra-structure in the Beluga field.

There are two modest reserves of bituminous coal near Anchorage that supported mining earlier, the former Evan-Jones mine now held by Nerox Corporation and the Wishbone Hill property now held by Cook Inlet Region, Inc. (CIRI). The Evan Jones mine was closed in 1968 when the Anchorage military bases switched from coal to gas. On an adjacent property, a major Japanese energy company, Idemitsu Kosan, Ltd. was on the verge of opening the Wishbone Hill mine when delays arising from the Mental Health Trust Lands Act (MHTL) disputes contributed to a decision to suspend operations and sell their leases. Both new owners are seeking joint venture partners and contracts that would allow them to start production.



In addition, a number of native corporation villages have looked at developing small mines on native lands to provide fuel for the villages. Since there would be no economy of scale and no existing infrastructure, production cost estimates could be many times that for larger mines in South Central Alaska. However, a local mine would create jobs, retain money spent on fuel in the community and end pollution from rural bulk fuel storage systems.

Value-added Coal Products

The economic base for the state would be enhanced if, instead of shipping raw coal, the coal was upgraded to higher valued products. In addition to the mining and transportation jobs, additional jobs would be created to upgrade the coal.

Research on upgrading Alaskan LRCs has focused mainly on drying technologies that would permanently reduce the moisture content of LRCs. If an economical permanent moisture reduction technique could be developed, Alaskan LRC would be upgraded to bituminous coal energy content and could compete on an equal footing with bituminous coals in the international steam coal market. To date, no drying techniques have been developed that can produce a stable dried LRC at a low enough cost to compete in the steam coal market. With the depressed coal prices that prevailed until late 1994, there was very little room to do any significant upgrading before pricing the upgraded product out of the market. However, today's rising coal prices could provide an opportunity to reassess drying technologies that were ruled out when coal prices were low.

The concerns over oil prices and supply security have caused many oil importing nations to seek alternatives. The most promising alternative to heavy oil is coal-water fuel (CWF) which originally was made by mixing finely ground bituminous coal with costly proprietary additives to control viscosity and settling in water. This quasi-liquid fuel enjoys all the benefits of liquid handling and storage, is non-hazardous if spilled and is independent of OPEC pricing. Led by Japan, China, Italy and Russia, CWF is a growing industry that could see over 14 MM t of CWF traded by the turn of the century. An attractive, but often overlooked feature of CWF is that it enables coal to compete in the oil market which is significantly higher valued than the steam coal market on a dollar per million Btu basis.

The high inherent moisture levels in LRC precluded their entry into conventional bituminous CWF market. However, hydrothermal treatment can permanently reduce the inherent moisture content to levels that permit formulation of CWFs from LRCs without the use of costly additives. The technical feasibility of producing a premium low-rank coal-water fuel from Beluga and Usibelli subbituminous coals was demonstrated at the pilot-scale in a project jointly sponsored by the Alaska Science and Technology Foundation (ASTF) and the U.S. Dept. of Energy (DOE) in 1991. Preliminary cost estimates for production of 1 MM tpy LRCWF near the Beluga mine site, pipeline transportation to a mono-buoy in Cook inlet, and ocean transport to Japan, indicate that Alaskan LRCWF would be competitive with heavy oil and imported Chinese bituminous CWF in Japan.

The next step in commercialization is to demonstrate the technology at a large enough scale to provide potential LRCWF users with sufficient data to develop their own economic analysis and adequate quantities of LRCWF for testing in their own facilities. A commercial demonstration project has been proposed at the University of Alaska Fairbanks (UAF) Power Plant.

A unique opportunity has arisen to secure the required DOE funding from Clean Coal Technology (CCT) funds that have already been appropriated. One of the projects selected in the fifth and final round of the DOE CCT Program was one developed by AD Little, Inc. and Cooper-Bessemer, Inc. to demonstrate a coal-water fuel (CWF) fired diesel system. The \$38.2 MM project was to produce 14 MWe of power from two 20 cylinder diesel engines powered by CWF at a utility in Easton, MD. Recently, the utility host decided to withdraw from the project and the developers were forced to look for alternate sites. The CWF diesel developers were aware of the likely superiority of LRCWF over bituminous CWF and are enthusiastic about integrating the projects and bringing the existing DOE funding of over \$19 MM to Alaska. The combined project would provide two distinct marketable products, LRCWF and its technology, and CWF-fired diesel engines which should enhance the chances for success.

A commercial LRCWF plant in the Beluga field would require opening of a nominal 1 MM tpy open cast mine, a pipeline and mono-buoy tanker loading terminal and all attendant facilities. Capital construction costs would approach 250 million dollars and the combined facilities would require over 200 primary employees.

Institutional Developmental Barriers

Low-Rank Coal (LRC) Image

With the exception of the Wishbone and Evan Jones properties in the Mat-Su valley, the remainder the coal near the railroad or year-round open ports is low-rank. The belief that Alaskan LRCs will be sought by world markets when they can be delivered at competitive prices, because of Alaska's "strategic" location and/or the abundance of these coals should really be considered as another myth surrounding economic development in Alaska. Despite the successes in the U.S. and Australia where, for about the last decade, the lowest cost thermal electric plants have been fired by LRC the perception in the Pacific Rim is that LRCs are inferior to more costly bituminous steam coals. Recent announcements that some of the new coal-fired generating plants to be built in Japan, Korea, and Taiwan will be designed to work with LRC and LRS—bituminous blends indicate that this perception is beginning to change.

In order to qualify a new fuel for purchase considerations, large test quantities of Alaskan LRCs at prices below prevailing market rates for testing in potential user's boilers. Since the coal will be obtained from areas without operating mines, under conditions well below the optimum production level to benefit from economies of scale, money from the sale of test coal will be substantially less than the cost of production. Thus, millions of dollars will have to be spent just to begin to get market acceptance before any contracts will be consummated. Only when extensive testing in potential end user's facilities has demonstrated that Alaskan LRCs have excellent combustion characteristics, do not lead to excessive boiler fouling, can be stored without generating excessive dust or catching fire in the stockpiles, will a market exist for Alaskan LRCs.

Environmental Issues

Environmental permitting in Alaska is perceived by many to be a major hurdle to new mine development. This is because Alaska has "green reputation" and in many instances, "pristine" conditions are invoked to inhibit development. This perception has been exploited by local and national "environmental" experts.

For example, the well publicized challenges to the Healy Clean Coal Project air quality permits by the National Park Service nearly doomed a project that is assured to be one of the cleanest coal-fired generating plants in the world. In another case, President Clinton has and maintains he will continue to use veto power to prevent opening a tiny portion of the Arctic National Wilderness Refuge (ANWR) to limited oil drilling and potential production. This action is contrary to the wishes of a majority of the state residents, including the native Americans who would be most impacted.

The Alaska Department of Environmental Conservation (ADEC) tends to act independently from industry concerns in promulgating new legislation. Currently, ADEC has proposed regulations in at least 5 areas of the state's air quality control act that are more stringent than those in the Federal Clean Air Act enforced by EPA. If these stricter regulations are not reduced to EPA levels by ADEC or challenged by the Legislature, thermal power production costs in Alaska, especially from coal-fired generators will needlessly increase. These

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confrontations between state agencies and Alaskan industry could largely be avoided if industry were involved during the formulation of new regulations.

State and Federal Governmental Issues

As mentioned earlier, disputes and litigation over Alaska Mental Health Trust Lands (MHTL) contributed to a major Japanese company, Idemitsu Kosan, Ltd.'s decision to divest the Wishbone Hill coal mine project.

The 1920 Jones Act requires that all goods shipped between U.S. ports move only on U.S. built, owned and crewed ships. Since the U.S. does not have any Panamax or Cape size coal haulers, and has the highest marine operating costs, U.S. coal shipping costs are far higher than rates of competitors. The noncompetitive U.S. shipping rates cost Alaskan coal an opportunity to compete for a 15-year coal contract for about 1.2 MM tpy at a new 140 MW_e coal-fired generating plant that was installed near Honolulu, Hawaii. Instead, the contract was awarded to an Indonesian coal supplier.

Conclusions & Recommendations

Given the high cost of project development, labor and transportation in Alaska and the developmental barriers, both real and perceptual, it is little wonder that Alaska is regarded as a difficult place to do business. Potential investors also have reason to be concerned about how much time and cost will be required to obtain permits and whether the state's inability to achieve a balanced budget will ultimately lead to higher taxes on industry. In addition, potential coal developers must also contend with the need to provide enough coal for large scale testing at costs below prevailing market rates just to obtain market acceptance which extends the length of time required from investment to any profit. The following recommendations for both industry and the state could help stimulate growth in the Alaskan coal industry. As expected, the list of recommendations dovetails, because if industry and the state do not work together closely the chance for large growth in the coal industry is minimal.

Alaskan Coal Industry

- ◆ Prospective Alaskan coal producers should work closely with one another and the various state and federal agencies on resolving common issues to improve the health of the industry.
- ◆ Industry should strive to enhance working relationships with the following key organizations and entities to support industry growth—Alaska Departments of Commerce and Economic Development (ADCED), Environmental Conservation (ADEC), and Natural Resources (ADNR), the Alaska Industrial Development and Export Authority (AIDEA), the Alaska Coal Association, the Alaska Miners Association, the Resource Development Council and, of course, state and federal legislators.
- ◆ Industry assistance could come in many forms including, DOE-sponsored research directed at problems or opportunities for recovering, transporting and utilizing Alaskan coal, streamlined permitting procedures for new mine development, elimination or reduction of severance taxes on test shipments of coal sold for user-acceptance testing.

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- ◆ The coal industry should make use of Alaska's congressional power and seek exemptions from the Jones Act for shipping Alaskan coal and coal products to U.S. markets in Hawaii and the Lower 48.
- ◆ Maintaining a competitive position in the coal industry that is dependent on large volume mining and transportation will require that UCM, ARR and Suneel Alaska to keep abreast of and implement technological advances as early as possible.
- ◆ Producers should develop a network of consultants and R&D organizations familiar with Alaskan coal mining, preparation, transportation and utilization to assist potential new end users.

State Restructuring to Support the Coal Industry

- ◆ State agencies, especially ADEC and ADNRC should work more closely with industry in promulgating regulations that demonstrate the state's willingness to support responsible natural resource and industrial development.
- ◆ The state should make every effort to obtain and retain primacy in permitting issues ranging from surface mining to wetlands.
- ◆ The Department of Community and Regional Affairs (DCRA) should refocus on a directive that is part of the Power Cost Equalization legislation and the Raven Commission's Report, to develop and demonstrate reliable, low-cost alternatives to diesel fuel for power generation using indigenous energy resources in rural Alaska. If a coal-fired alternative to diesel generation is to succeed, it must be commercial technology, not advanced DOE Clean Coal Technology, make economic sense and have the enthusiastic support of one or more of the villages where it will be demonstrated.
- ◆ State agencies should work closely with potential coal producers and help market coal in Japan, Korea and Taiwan. This will require trade specialists located in these key countries who will work closely with their ADCEI counterparts in Alaska to mount a concerted effort to locate and obtain commitments from potential clients to participate in the coal testing program and invest in new coal ventures.
- ◆ The state should ensure that the University of Alaska continues to provide a quality education in Environmental, Geological and Mining Engineering, and in technical training opportunities for careers in the Alaskan coal industries.

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Chapter VIII

Agriculture in Alaska

SUBMITTED BY:

ALASKA RESOURCE METHODS
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Introduction

Alaska will mark the 100th anniversary of the agricultural experimentation stations in 1998. This continuing government commitment has provided a fundamental foundation for the growth and sustainability of agriculture in the North. As the Russians learned in the early 1800's, agriculture in Alaska is marginal geographically. It is remote from large sustaining commercial markets and distant from the biologically richer mid-latitude biomes¹.

Government research and new technologies have provided the basis for a continually modernizing agricultural industry. Alternatively, governmental policies have fluctuated dramatically from highly overoptimistic plans and projections to somber, negative, assessments. Through all this, a baseline of support has continued as part of long-term federal and state supported agricultural research, instruction, outreach/extension education, and essential agricultural service programs such as inspection, marketing, and loan program assistance.

Where, then, does agriculture stand in Alaska today? Is it a viable industry and is continued government support justified? This report addresses these issues.

Admittedly, federal and state programs to stimulate agriculture in Alaska have been supported by projections and promises that agriculture would become a major Alaskan industry. In short, there has been a mythology that accompanied the policies. More recently, there is the myth that agriculture in Alaska is a dead industry, having "failed" in the Delta and Pt. MacKenzie projects of the 1970s and early 1980s². In fact, agriculture has expanded in

the 1990s, albeit not in the manner envisioned by planners of the two projects. Nevertheless, the net result is a very modest agricultural industry.

Today, Alaskan agriculture supplies approximately 10% of the state's food needs. That number might reasonably be expanded. The small population base, approximately 600,000, limits the in-state market. Without an appropriate infrastructure, Alaskan producers and processors cannot enter the unprocessed product export stream. Without this opportunity, agriculture is not likely to become a major industrial factor in the near future. In 1995, all traditional agricultural products constituted less than one percent of the state's revenues from resource industries.

Despite impediments, Alaska's agricultural producers continue to look to the future. Much of Alaska's agriculture has nothing to do with production of food and fiber for traditional markets. Entrepreneurs derive income from agricultural tourism, raising and stabling horses for pleasure and show, dog racing, revegetation, seed production, and subsistence agriculture. In turn, these enterprises generate a demand for supplies and infrastructure to support their endeavors, supplementing demand from traditional producers.

State and federal baseline support for research, instruction, extension education/outreach and basic services will ensure that agriculture will remain a sustaining Alaskan industry. Injections of significant capital from either the state or federal government will not result in massive expansion despite efforts of planners. State government support has shown itself historically ephemeral toward agriculture. Federal policy no longer emphasizes expansion. State support will assure sustaining growth of the industry if political leaders begin to understand the definition of agriculture in Alaska and assume a leadership role in shaping policy to provide fiscal baseline support.

Historical Background

A brief historical discussion will provide background for what has happened to Alaska's agricultural industry from the beginning of this treatise: statehood. Agriculture has never been considered a basic industry in Alaska. Thus, large, sustained investments have not been part of its institutional history.

During the first half of this century, the stimulus for agricultural development was the lack of adequate transportation facilities and the need to provide food for local settlers. At the turn of the century, agricultural research stations were established, (the first in Sitka in 1898), to provide information on farming in Alaska and support advancement of the frontier. During the gold booms in interior Alaska in the earlier 1900s, farmers supplied food to the miners. In the 1920s, farms supplied food to workers building the Alaska Railroad. In the 1930s the Matanuska Colony, a federal agricultural project, was established to provide relief for depression farmers from the north-central United States.

The stimulus for agricultural development in Alaska changed rapidly after World War II. The War brought infrastructural improvements. Shipping costs were reduced as a result of construction of the Alaska Highway during the 1940s. In the 1950s, refrigeration made it possible to bring perishable goods into the territory. Despite this, federal homesteading was revived in Alaska in the 1950s, and a state homesteading program was put in place in the late 1960s. Both intended to expand land in production and encourage food production. Improved harbors, airports, and less expensive fuels, a result of new oil refineries in southcentral and interior Alaska, came with oil development in the 1970s and 1980s. With the onset of oil revenues, the state of Alaska promoted agricultural projects in Delta in interior Alaska and Pt. MacKenzie in southcentral Alaska (Figure 1)¹. Agricultural resources were seen as alternative income for the future as oil resources declined.

The timing of these latter agricultural development efforts was ironic. The infrastructure that had reduced costs of shipping value-added food and fiber products into Alaska was not designed to move raw products within and outside the state. The Delta and Pt. MacKenzie agricultural projects came to fruition during the U.S. farm crises in the mid 1980s. This occurred simultaneously as oil revenues were declining in Alaska, the U.S. held excess grain surpluses, and world grain prices were falling. These situations and events had adverse affects on state government's attitude toward agricultural expansion. State aid promised for the infrastructure to support the Delta and Pt. MacKenzie projects was not sustained or sufficient to change the configuration of the infrastructure. Recovery of grain prices came too late to rejuvenate the state's interest in supporting the production of commodity crops.

Although the cash value of Alaska's traditional agricultural products dropped in the early 1990s, by 1996 value had risen to near the highs of the mid 1980s. The mix of products produced in Alaska changed. The shift was toward in-state demand. The result has been expanding interest by producers in products that can add value or be sold in niche markets.

Definition and Scope of Agriculture in Alaska

The traditional definition of agriculture is "the production of food and fiber."³ This restrictive definition has broadened as agriculture has evolved and more emphasis placed on diversification, niche markets, and value-added processing. Webster's Third New International Dictionary defines agriculture as "the science or art of the production of plants and animals useful to man and in varying degrees the preparation of these products for man's use and their disposal (as by marketing)."

Much of Alaska's agriculture has nothing to do with production of food and fiber. While some Alaska farmers may produce traditional products such as vegetables and potatoes, barley, small grains and hay, beef cattle, and swine, others may gain a significant source of income from production of such non-traditional products as grass seed for revegetation in oil fields, gold mines, and along roadsides. Entrepreneurs may also derive income from agricultural tourism or raising and stabling horses and dogs for recreational purposes. A greenhouse operator may grow tomatoes, cucumbers, and other vegetables for the fresh market, a part of traditional agriculture, but a far greater source of income may be from bedding plants, flower baskets, cut flowers, compost, potting soil, and landscape materials.

Alaska's agricultural industry has unique advantages. The state's isolation from other agricultural areas and its severe winters reduce the hazard of insect and disease infestation in crops. The state is a regime ideal for the propagation of disease free seed stock for export. Alaska has also been designated as disease-free for hog production. These same reasons contribute to limited use of agricultural pesticides; a pristine environment ideal for production of 'safe' food. Another advantage of the Alaskan climate is the effect of cool temperatures and long daylength on increasing the sugar content of vegetables and enhancing the color intensity of flowers. Alaska's farmers also take advantage of the climate to supply products that enhance the environment. Soils disturbed by road construction, military operations, oil field development, and mining must, by federal and state law, be revegetated with plant species adapted to the area. Plant seeds and propagation materials must be grown in the environment in which they will be used. Finally, production of agricultural products offers an efficient solution for the disposal of waste products. Shell and finfish wastes are used as protein supplements in animal feeds. Municipal sewage and shell and fin fish waste are used as soil amendments in agricultural operations; a desirable alternative to ocean dumping, incineration, or shipping wastes out of Alaska.

Alaska's Agriculture as a Part of U.S. Agriculture

Agriculture is the largest industry in the United States. The value of U.S. agricultural products sold in 1992 was \$162 billion. Fiscal 1995 agricultural exports set a record at \$54.7 billion exceeding 1994 by \$10.7 billion. The mix of unprocessed to manufactured products exported by the United States is changing. In 1995, approximately half of U.S. agricultural exports were manufactured. Historically, the United States has held the world's largest surplus supply of feed grains. This began to change in the early 1990s as South American countries accelerated production and displaced U.S. products in export markets. The United States, however, continues to be a leader in the world's food supply chain. There were slightly over 2 million farms in 1995 with 4.5 million people residing on them. Each U.S. farmer supplied food and fiber for 129 people.

Alaska's agricultural industry is minuscule when compared to that of the United States. Alaska farm product value of \$25.7 million in 1992 represented less than 0.02% of the U.S. total. Its approximately 500 farms have supplied less than 10% of the food and fiber for its residents over the past decade. The industry exports few products and these, such as honey, syrups, jellies and jams, herb vinegars, and specialty potatoes, into niche markets.

This does not mean that Alaska's agricultural industry is unimportant to Alaskans and the circumpolar north. While Alaska's contribution to U.S. agriculture is not significant, its contribution to agriculture in the circumpolar north can be. In addition to its isolation and climate, Alaska has access to the technologically advanced research base of the United States. Its researchers and educators have taken advantage of this base and have added their knowledge of production of food and fiber in the north where Alaska is recognized as a leader. The industry has the opportunity to contribute to the diversity of the economic base of the state and to the knowledge base of the circumpolar north.

Statistical Overview

Land surveys in Alaska during 1897-1898 were initiated by the federal government in part to determine the territory's agricultural potential. There have been several estimates of potential agricultural lands in Alaska since that time. A 1951 survey by Kellogg and Nygard⁴ using existing economic conditions, concluded that the total area available for cropping was under 1 million acres. A 1973 survey by the U.S. Soil Conservation Service suggested that 15 million acres of land, not considering accessibility, were capable of growing crops. State analysis of lands in the 1970s estimated that 5 million acres could be used to produce cultivated crops, but that only 500,000 were close to existing transportation corridors. For the most part, those lands included the Tanana Valley (Fairbanks and Delta), the Matanuska Valley (Palmer and Anchorage), and Point MacKenzie.

In 1960 (statehood was granted in 1959), total agricultural cash value were slightly above \$3.5 million. In 1996 cash value totaled \$29.3 million, near the 1988 peak of \$30.1 million (Figure 2). Milk cash value dominated Alaska's agricultural industry in the 1960s and early 1970s (Table 1). By the 1980s, the cash receipt share of potatoes and hay approximated that of milk. This mix has remained relatively constant to 1996^{5,6}.

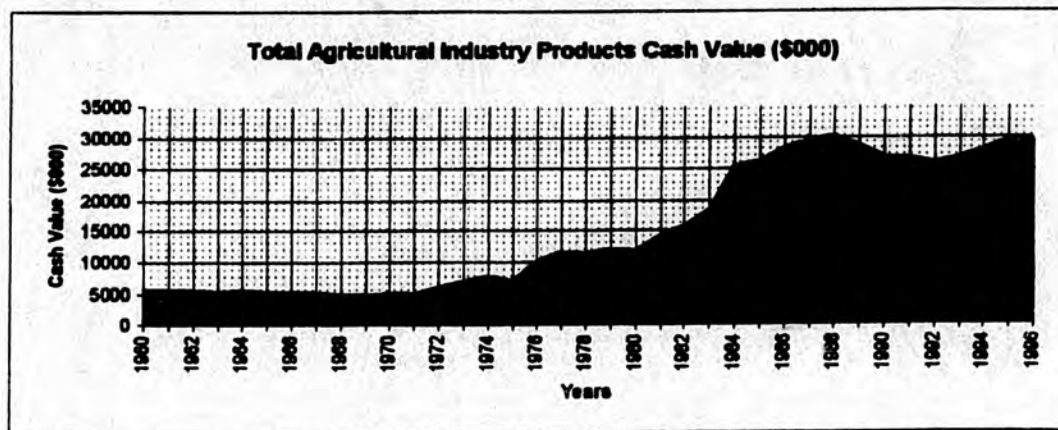


Figure 1. The cash value of all products produced in Alaska from statehood to the present time.

There were 2 million acres in farms and ranches in 1960⁷. This dropped to half by 1996. The total crop acres harvested peaked in 1985. Increases coincided with activity in the Delta and Pt. MacKenzie agricultural projects. The total number of farms and ranches rose from 420 in 1960 to a peak of 670 in 1986 settling in the mid 500s in the 1990s.

Table 1. Alaska's agricultural industry profile (as a percent of total cash value of major products excluding greenhouses and nurseries. (each year totals 100%.)².

YEAR	RED MEAT	BARLEY	MILK	POTATOES	VEGETABLES	HAY
1960	4.6	4.3	53.4	16.1	4.4	17.2
1970	13.2	2.0	47.1	16.0	5.8	16.0
1980	12.3	11.8	26.1	18.2	7.2	24.4
1990	13.5	3.8	28.9	23.1	7.4	23.2
1996	17.1	7.4	22.3	20.0	11.1	22.0

The greenhouse and nursery sector is an often overlooked segment of the agricultural industry in Alaska. Although the Alaska Agricultural Statistics Service began tracking the industry in 1977, detailed statistics were reported only in 1987 and 1991. Reporting for this sector includes cut flowers, nursery stock, greenhouses, retail florists, landscape firms, local garden centers, and floral/garden supply departments in national chains⁸. Rising economic indicators and perhaps increased activity in other agricultural sectors contributed to the rapid increases in cash value from 1981 to 1985 (Figure 3). Rising economic indicators particularly affect sales of flowers and bedding plants. From 1986 to 1990, cash value in the horticulture sector responded to a rising economy with increases in cut flowers (98%), potted flowers (45%), and bedding plants (10%). By 1996, cash value in the greenhouse and nursery sector had risen to \$18.0 million.

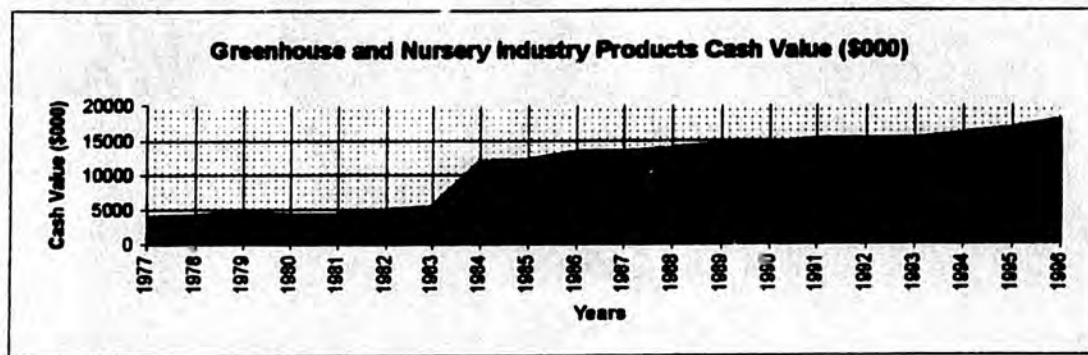


Figure 2. Cash value of all products produced in the greenhouse and nursery sector of Alaska's agricultural industry from 1977 to the present time.

The agricultural industry provides both year-round and seasonal jobs. Job availability in the industry has been relatively flat since statehood. In 1962, 1,200 people were employed, 775 were family laborers. In 1995, the last year statistics were reported, 1,000 people were employed excluding those by greenhouses and nurseries; 600 were family members now defined as unpaid farm labor. Except in the dairy sector, most labor is seasonal. Average wage rates for seasonal and full-time workers rose from approximately \$2.00 per hour in 1960 to \$7.40 in 1996. Labor statistics for the greenhouse and nursery sector indicate there were 1,575 workers in 1986, and 1,825 in 1990, the only years labor statistics were reported.

The Alaska Agricultural Statistics Service has supplied comprehensive data on traditional crops and livestock since 1953 and the greenhouse and nursery industry since 1977. This information is invaluable to planners and industry watchers. There is, however, a paucity of data on nontraditional products.

Cash value of non-traditional agricultural products and services in Alaska can only be estimated. This information is not reported by the Alaska Agricultural Statistics Service. Subsistence agriculture is very important in Alaska. Gardens and livestock in rural areas both on and off the road system have a value of approximately \$700 to a family⁹. Oil company estimates indicate revegetation research has resulted in savings of \$20 million per year. Local farmers supply seeds to this industry but there is no public record of sales volume. Seed producers in Delta have been selling grass seed to Japan since the mid 1980s. Estimates indicate sales have reached \$500,000 to \$1,000,000 annually. Unfortunately, farmers are not always willing to provide sales information because they consider it proprietary in an area of specialty where there are few producers. There have been substantial savings to meat producers and dairy farmers from the use of fish waste in feed rations. There has been no consistent tracking of the savings or the amount of fish meal used in Alaska for this purpose. There is definitely a need for more detailed information to show the extent and impact of non-traditional agricultural products and services.

Role of Government

As the agricultural industry in Alaska matures, it does so in a world of sophisticated technology. Transportation systems bring a wide variety of fresh and processed products to markets far from points of production. In Alaska and the circumpolar north where agricultural industries are small when compared to major agricultural production areas, there is not a major interest in expansion as long as there is no break in the food supply chain in either quantity or quality. This reflects an economy that is stable and dependent on income from

other sources; in Alaska, oil. If there is an interest in agricultural expansion, it is to diversify the economy.

Federal government support is a major reason why U.S. agriculture has led the world in supply of commodity¹⁰ crops. Federal support for construction of transportation systems, homestead programs, and water access during frontier development were instrumental in U.S. agricultural development. Farm policy in 1933 provided price supports to farmers for commodity crop production. These supports were continued and expanded in 1949 farm legislation, the basis for all farm bills to date.

Beginning in 1985, the federal farm bills shifted support from program crops¹¹ to manufactured products and new export crops. Federal support for new transportation infrastructure is no longer available and the need for food production in areas physically remote from existing core land transportation networks is not deemed necessary to meet national goals. This change of policy is significant for Alaska where federal support for agricultural infrastructure historically has been quite limited and the agricultural economy has been weakly developed. This begs the question "What is the proper role of state government in supporting agriculture in Alaska?"¹²

The Models

Previous work¹³ analyzed the response of agriculture to various levels of government involvement since statehood to answer the question about state support for agriculture. Three models developed in 1986 describe the degree of investment in agriculture by federal, state, and private interests. The models were based on amount and source of capitalization of infrastructure and farms. They assumed baseline support for research, instruction, outreach/extension education and basic services such as inspection, land sales, loan services, and marketing assistance were in place. They did not take into account the influences of farmer/owner abilities to operate highly mechanized and sophisticated enterprises, problems with land ownership, or changes in political directions. The models included only the traditional crops and livestock: barley, red meat (beef cattle and hogs), milk, vegetables, potatoes, and hay. Data for these products can be tracked in detail from statehood. All identified positive directions and significant pitfalls.

The **hands-on model**¹⁴ (in this report: "**high support**") depicts an industry segment dependent on state support for land sales, loans, and appropriations to support an infrastructure including transportation, processing, and transfer facilities at port and inland. This infrastructure was to enhance a virtually non-existent grain and red-meat sector. The **moderate-support model**¹⁵ (in this report also, "**moderate support**") describes an industry dependent on funding from a mix of primarily state, and federal loans, in a few cases loans from private sources. The model focused on a single industry, dairying, and increasing production of raw milk and sales of milk products in Alaska. The **hands-off model** (in this report, "**baseline support**") describes farms supported by a mix of private funds and private, state and federal loans. In this market-based model, there was never a plan to increase number of farms, land in farms, product production or sales to meet a specific goal. Production on farms simply continued to supply demand in state markets.

The major pitfall of the high support and moderate support models is the ephemeral nature of state government support. As administrations have changed, so has the attitude toward agriculture. Agriculture does not contribute substantially to the state's coffers. Thus, when income from more lucrative resource development begins to decrease, capital formerly targeted for aggressive agricultural development is diverted elsewhere. Alaska's economy has typically been single-resource dependent, leaving it the victim of supply and demand for that resource. Federal policy is no longer emphasizing expansion in production of program crops. The baseline support model is seen as that most likely to sustain growth in Alaska's

agricultural industry because it depends on a mix of private, federal and state funding, thus not as directly on state income.

On the positive side, state intervention with capital and positive policy and regulations did make a difference in Alaska's agricultural industry. The surge in barley, livestock, and milk production generated by this intervention was short but it had an impact. Some of the suppliers who began or expanded their businesses to meet the demands of the early and mid 1980s stayed in place. Growth in the baseline support model has been steady as long as product quality has been competitive with or better than imported products, and consumers have been willing to pay slightly higher prices. Farms in the high support model have continued to develop though not as planners thought they would. Dairy farms that reverted to the state are being sold. The short-term intervention piqued interest in agriculture. Agriculture was in the public eye in Alaska, albeit at times negatively, and further development of the industry remains a topic of discussion today.

Support for Agriculture

In all three models, research, instruction, technology transfer and outreach/extension education and general service functions such as, inspection land sales, loan services, and marketing support programs were considered essential. There was a very important reason for this consideration. Climatic conditions in Alaska differ greatly from other agricultural areas of North America. Therefore, direct transfer of technology is usually not practical. Since Alaskan agriculture is a relatively small and developing industry, there is a continuous influx of newcomers, both producers and regulators. Many of these newcomers not only lack the knowledge and skills to succeed in the North, but they must also be convinced that techniques learned "back home" don't necessarily work in Alaska. The Alaskan climate is unforgiving; the growing season is short, the temperatures are extreme, and agricultural operations must be performed correctly and in a timely manner or they fail.

The private sector has never played an important role in providing financial support for agricultural research, technology transfer, or marketing in Alaska. The agricultural industry is not large enough to attract private sector investments. Thus, financial support has come from federal and state governments.

Federal Government

The United States Department of Agriculture (USDA) was established in 1862 to acquire and disseminate information pertinent to national agriculture issues. The Agricultural Research Service (ARS), a branch of USDA, was instrumental in establishing agricultural experiment stations in Alaska during the early 1900s. The purpose of ARS is to conduct agricultural research of national interest while the experiment stations address problems at the local level. Funding for the ARS was withdrawn from Alaska in 1993. However, USDA is still represented by the Natural Resources Conservation Service and the Farm Service Agency. These agencies oversee soil and water conservation programs, government support programs, and farm loans. Although these federal agencies provide some technological assistance to the farm community, their primary functions are to enforce federal policies and to service federal loan and incentive programs.

Federal support is provided to the University of Alaska, the state's land grant university, through federal formula funds. The formulas include such variables as state population, number of acres in agriculture, and farm gate receipts. Federal formula funds received in Alaska are from the Hatch Act (1887) for agricultural research, the McIntyre-Stennis Act (1962) for forestry research, and the Smith-Lever Act (1914) for cooperative extension

services. To receive these funds, states are required to provide matching money to their agricultural experiment stations, forestry research programs and cooperative extension services.

State Government

State government support for agriculture in Alaska has two components. The most direct support is to the Department of Natural Resources, Division of Agriculture. Less direct state funding is to the University of Alaska. Part of the state funding to the university is a required match to receive federal formula funds.

The Alaska Department of Natural Resources, Division of Agriculture

The Division of Agriculture is both an advocacy and a regulatory agency in state government. It advocates agricultural development and provides crop inspection services and marketing assistance to farmers, and maintains seed and plant material collections. The Division was instrumental in establishing the "Alaska Grown" program to promote high quality Alaskan agricultural products. The Division facilitates and conducts sales of state lands for agricultural purposes and administers land contracts. It also manages the Agricultural Revolving Loan Fund (ARLF) established in the 1950s as a 'bank of last resort' for farmers. The Plant Materials Center (PMC) maintains foundation seed blocks to ensure purity of released varieties and to ensure that plant propagation materials are available to meet needs within the state. The state seed laboratory is a part of the PMC. The laboratory determines concentrations of noxious weeds, seed germination, and performs other tests essential for seed certification. Funding for the Division of Agriculture has historically come from state general funds, but for the past two years, approximately \$600,000 for partial operation of the PMC and the Division has been taken from the ARLF; in FY98 that number is closer to \$1 million.

University of Alaska

As a land grant university, the University of Alaska is responsible for providing agricultural research, instruction, technology transfer and outreach/education extension services to the citizens of Alaska. The School of Agriculture and Land Resources Management (SALRM) provides instructional services, the Agricultural and Forestry Experiment Station (AFES) research, and the Alaska Cooperative Extension (ACE) outreach/extension education. All are a part of the University of Alaska Fairbanks (UAF).

SALRM's instruction program offers B.S. and M.S. degrees in Natural Resources Management (NRM). Approximately 1/3 of the students are interested in nontraditional agriculture such as revegetation of minelands and other disturbed soils or bioremediation of oil contaminated soils and superfund sites. Others are interested in horticulture and greenhouse management; and a few are interested in animal science, mainly as a prerequisite for a veterinary medicine degree. Approximately 70 percent of the AFES research budget is for agriculture. This research, with the exception of economics, marketing, and management is carried out predominantly by faculty in the Department of Plant, Animal & Soil Sciences. An estimated 1/3 of the total budget in ACE is spent on agricultural activities. The ACE technology transfer and outreach/extension education programs are delivered in both rural and urban Alaska. The staff of extension agents and program directors provide publications, workshops, and one on one consultation for their clientele.

The three UAF units have non-agricultural as well as agricultural responsibilities. For example, in addition to agriculture, SALRM and AFES faculty conduct research and teach in such areas as forestry, geographic information systems, general resource economics, fisheries economics, natural resources management, recreation management, environmental and wilderness education and management, environmental law, wildlife policy, and resource planning and conflict resolution. Approximately 2/3 of ACE's activities involve social programs and address community, youth and family needs.

Private Sector

The Alaska Farm Bureau is the focus of agricultural promotion and cooperation within the private sector. Its functions are promotion and outreach among rural communities and lobbying at the state and federal level for the agricultural industry. The Alaska Seed Growers Association is also an active farm organization. It promotes certified seed production in Alaska. The Association writes and adopts the seed standards that are enforced by the Division of Agriculture in the seed certification process. The Alaska Horticultural Producers Association advocates for the industry and includes greenhouse and nursery producers as well as others interested in this aspect of agriculture. Garden clubs in urban areas around the state provide beautification but are also strong lobbyists for agriculture. There are numerous groups and associations in Alaska that are specific to animals and products such as sheep, wool, goats, and poultry. Some are affiliated with national organizations. These associations provide specific information to their members and also serve as affective supporters of agriculture in Alaska. Farmers' markets are also an important segment of the private sector. The Tanana Valley Farmers' Market in Fairbanks is the oldest and the only market with a permanent structure. All of these groups operate with minimal funds, in most cases only sufficient to provide operating expenses. There is not a producer tax by farmer organizations in Alaska as there is in other states where agricultural is dominating in the economy.

Implications of State and Federal Investments in Agricultural Services

Of the total \$11.7 million federal and state FY98 budget for the Division of Agriculture, SALRM, AFES, and ACE, 54% (\$6.4 million) is spent for agriculture, and 46% (\$5.3 million) is spent for other human and natural resource related activities (Table 2). The state will contribute \$4.45 million of the 54% and the federal government \$1.91 million to agriculture. The state portion has decreased during the past five years as income was allocated elsewhere. Unrealistically projecting no increase in agricultural cash receipts in 1997-1998, for every dollar in cash value generated by agricultural products (\$26.7 million traditional and \$27.2 million non-traditional¹⁶), the state will spend 8.3 cents and the federal government (including grants and contracts) 3.5 cents; a weighted average of 6.9 cents.

Table 2. FY98 budgets and distribution for state entities involved in agriculture (\$000).						
	University of Alaska Fairbanks		Division of Agriculture			TOTAL
	SALRM	ACE	Division*	ARLF	PMC	
FUNDING SOURCE						
USDA formula funds	1,325	1,000				3,325
Other federal			98		352	449
State general fund	322	2,500				2,822
Interagency receipts†			98		66	164
ARLF			381	538	509	1,428
ASTF	2,650					2,650
Grants & Contracts	1,170					1,170
Program receipts‡			218		14	232
Sales*	450					450
TOTAL	5,897	3,500	795	538	941	11,671
FUNDING DISTRIBUTION						
Agricultural						
Research	2,003					2,003
Instruction	183					183
Outreach/Extension Education	671	1,225			941	2,827
General Services			795			795
Loans				538		538
Total Agricultural	2,851	1,225	795	538	941	6,356
Non-Agricultural						
Research	2,003					2,003
Instruction	367					367
Outreach/Extension Education	671	2,275				2,946
Total Non-Agricultural	3,041	2,275				5,316
TOTAL	5,897	3,500	795	538	941	11,671

- The Division includes the director, inspection programs, land program, contract management, and Natural Resources Conservation (soil and water subdistricts). Federal funding is for inspection programs.
- † Funds received for work completed for other state agencies.
- ‡ Interest for land loans.
- * 1/3 of sales are milk, if milk sales end reduce to \$300,000; remainder are animals, rentals, and miscellaneous.

Alaskan Agriculture—1960 to 1996

Alaskan agriculture from the beginning of statehood to the present is best understood in the context of the three models. Each describes predominant sectors in the agricultural industry in Alaska. Farmers in the baseline support model tend to produce the horticultural crops, hay and potatoes. The high support model depicts the small grain and red meat sectors, the moderate support model the dairy industry (Table 4).

As state financial support decreased substantially in the late 1980s and 1990s, the high support model began to blend with the baseline support model. Farmers began using their

own capital and private and federal loans in addition to state support. In the future, this may also be the case with the moderate support model since land title questions have been resolved. The state continues to release lands for agricultural production. It also continues to provide baseline support services. The ARLF remains the major source of loans for capital investments and operating expenses for farmers in Alaska.

Although the models did not take farm management into consideration, it is significant in influencing successful development in the agricultural industry. Farmers, of course, must remain at the cutting edge of technology to produce crops in the circumpolar north. However, if they cannot manage their farms and their capital investment, technological ability is immaterial. As production becomes more capital and less labor intensive, the management factor will become more important.

Table 4. Percentage of Cash Value by Model and Units in Production

Years	HIGH SUPPORT				MODERATE SUPPORT		BASELINE SUPPORT			
	% of Cash Value	Beef Cattle Nos.	Hog Nos.	Acres in Barley	% of Cash Value	Dairy Cattle Nos.	% of Cash Value	Acres in Hay	Acres in Potatoes	Acres in Vegetables
1960	8.9				53.4		37.9			
1970	15.2				47.1		37.8			
1980	24.1				26.1		49.8			
1990	17.3	2,600	700	5,400	28.9	1,400	53.7	15,100	590	264
1996	24.5	3,100	2,000	6,900	22.3	800	53.1	20,200	630	332
Average	18.0				35.6		46.5			

The High Support Model

Increases in small grain prices contributed to the optimistic outlook in the early 1970s for growth in barley and red meat production. There were substantial state funds from oil development and a desire to diversify the economy to provide some economic support from industries other than oil. The Delta Agricultural Project was conceived to utilize some of this income to expand agriculture in Alaska².

Barley and red meat production began to increase and peaked in 1984 at \$3.6 million (Figure 3). With falling grain prices during the agricultural crises in the mid 1980s and declining state

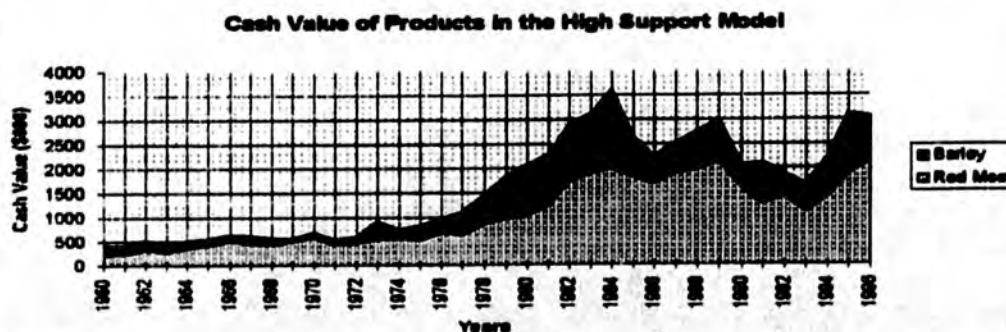


Figure 3. The cash value of barley and red meat from statehood to the present time.

revenues from petroleum, government support for the Delta Agricultural Project collapsed. Funding for infrastructure necessary to move grain efficiently in state and into markets

outside the state was stopped by a state administrative directive in 1984¹⁷. As a result, grain could only move by costly truck transport thus minimizing possibilities for sustained exports.

From 1984 to 1986, the amount of barley produced and its value dropped approximately 68% as farmers left the industry. Some remained, producing for in-state markets. Red meat value only fell 15% and quantity dropped 23% during this period. Falling international prices made it cost effective to import feed grains keeping animal numbers up somewhat. A factor in the drop in red meat was bankruptcy of the Palmer slaughter plant in 1985. It was taken over by the state in 1986 to supply institutional markets. It now supplies some selective markets in the private sector.

There has been relatively steady production of barley since 1976, the year Delta Agricultural Project planning began. Yields per acre have increased as farmers adopted varieties and production practices recommended by researchers. Red meat quality has also improved and feeds now incorporate fishmeal and oilseeds produced in Alaska using diets developed by Alaska's researchers. Beef cattle numbers have increased paralleling increases in barley production. The state has begun to sell and lease lands it owns in the Delta Project. The new farmers have more experience and are better capitalized. Most have adopted the best management practices recommended by researchers for grain production in the circumpolar north. Farmers have also diversified into grass for seed, oilseed crops, and hay, and there are several feedlots for beef cattle. The grain market is still limited to consumption in the state because of limitations in the infrastructure. Because of the potential for expansion in marketing local red meat in the state, a new, private slaughter plant is under construction in Delta.

The positive direction of the model was to bring large blocks of land into production rapidly (over a three- to five-year period), give farmers access to export grain markets, and increase the in-state grain and red meat supply. A major pitfall was the dependence on state administrative policy and legislative action.

The Moderate Support Model

The focus of this model was the dairy industry. Prior to the onset of the Point MacKenzie Agricultural Project², most milk was produced near Palmer and processed by Matanuska Maid in Anchorage. The exception was one private producer/processor near Delta who left the industry in 1978, and one private producer/processor, Northern Lights, in Delta who began operations in 1979. This creamery is now supported by five herds.

State support for the Point MacKenzie Project was in the form of state land sales, capital and operating loans for new farms, and purchase of Matanuska Maid to maintain its operating status¹⁵. As new dairy farms were brought into production at Point MacKenzie, milk production increased. At the peak of production in 1986, Matanuska Maid was still importing milk to meet capacity, however. Northern Lights was operating near capacity with local milk from herds in Delta.

Between 1985 and 1990, milk production far exceeded that in the early 1960s (Figure 5). From 1984 to 1986, the value of milk increased 114%. In 1986, local milk held about 38% of the road and railbelt market. By 1994, this had dropped to 20%, the historic low for the milk industry in Alaska. The cash value of dairy products in 1992-1996 was approximately equal to that in 1960-1965. While state support resulted in a brief spurt of increased milk production, questionable land title resulted in new dairy farmers leaving the industry with the concomitant fall in production of raw milk.

The positive direction of the moderate support model was to bring agricultural lands into production. Capital was also provided to the Anchorage creamery to keep it operating. The

pitfall was questionable land title causing problems for farmers with lending agencies including the state.



Figure 4. The cash value of milk from statehood to the present time.

The Baseline Support Model

This model is represented by the vegetable, potato, and hay segments of Alaska's agricultural industry. There has been little state or federal capital invested in infrastructure with the exception of loans to private entrepreneurs for small scale, specialized operations. State and federal loan programs in combination with private sector financing and personal capital have been used by farmers.

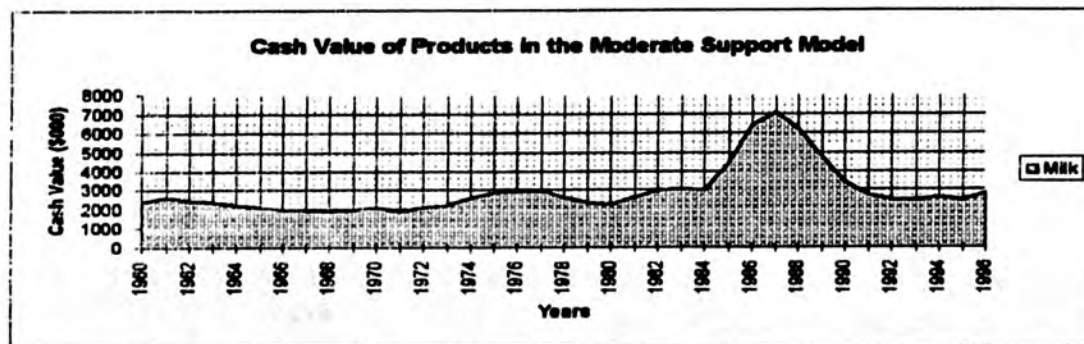


Figure 5. The cash value of hay, vegetables and potatoes from statehood to the present time.

Vegetables

Almost all Alaskan vegetables and potatoes are marketed fresh. The Alaska market is limited by population. There is a lack of infrastructure to export bulk or even container quantities of fresh products although there have been exports of premium priced products in limited quantity into niche markets. In early years, producers tended to react to higher prices and insufficient supply of imported vegetables in the previous year. This resulted in over production and decreased quality. Processing was not feasible in the highly competitive, manufactured food products arena¹⁸. The state Division of Agriculture put substantial effort into the "Alaska Grown" program in the 1980s. This marketing strategy and advertising campaign to promote high quality Alaska agricultural products has had continuing success¹⁹. Increases in cash value continue to follow increases in demand for Alaska vegetables (Figure

6). Improved quality is reflected in increasing prices. Additionally, consumers are willing to pay 10 to 15% more for high quality "Alaska Grown" vegetables²⁰ now available in supermarket chains, specialty stores, and farmers' markets.

Potatoes

Research results have contributed to continuing increases in quality and the varieties of potatoes that can be grown in Alaska. These factors contributed to an overall increase in their appeal to consumers and were a factor in the price paid to producers. After 1986, sharp rises and falls in the potato crop cash value reflect producers entering and leaving the industry. The increasing demand and prices paid for Alaska potatoes were enticing to some farmers looking for new crops and seeking to diversify. In recent years, table potatoes and potato seed have been exported. Those who could not meet the exacting grade standards and continuing consumer demands for a high quality product discontinued production. This trend appears to be reversing (Figure 6) as markets become more stable and producers take more advantage of new varieties and research and extension education efforts.

There is an increasing desire by some farmers to enter the processing arena to realize value-added benefits. At the present time, there is room for expansion in the fresh market particularly in the restaurant and industrial segments. If the restaurant market is to be entered, owners and chefs will have to learn how to use the Alaska potato with its relatively high sugar content. The successful production of a russet adapted to Alaska may also aid market entry. There is a wide array of well-established processed potato products imported into Alaska's retail outlets. To enter this market, Alaskan products would have to command premium prices to cover processing costs unless quantities increase substantially. Aggressive marketing is essential. Premium prices can be obtained, however, in specialty markets where products are differentiated²¹.

Hay

Hay production occupies the largest percentage of land devoted to agricultural crops in Alaska. The average historical yield since statehood is slightly under 1 ton per acre. This compares to an average for dryland production in the northern plains states of 3 - 5 tons per acre depending on variety. Yields in Alaska vary widely by year and are very weather dependent. Dry springs and wet falls contribute to the high risk associated with hay production. The 1996 year provides an example of the dependence of hay on weather. A dry spring and wet fall affected hay harvests. Average hay yields in that year were 0.71 tons per acre. Brome and timothy are the prevalent hay grasses produced in the state. Research is continuing to bring a legume such as alfalfa into the commercial market.

Hay is grown statewide for a variety of markets. It is not an export crop at the present time nor in the near future. On-farm uses include dry hay for animal feed and bedding, and haylage for dairy cattle. Horse owners provide a major off-farm market for Alaskan hay. This market is increasing as quality (consistency in moisture, color, and protein content) improves. The Alaska Agricultural Statistics Service does not report hay sales by market segment nor does it report the number of horses in the state. Estimates available indicate there are more than 10,000 horses. Horse owners import hay. Alfalfa, the hay preferred, is not grown commercially in Alaska and some horse owners portend the quality of Alaska hay is not equal to that produced outside Alaska. Owners of sheep, goats, poultry, and the exotics such as llamas, elk, and buffalo use hay for feed and bedding. Alaska's dog mushers use hay for bedding. Hay and exotic grasses are gaining favor with crafters and weavers.

Hay has made an important contribution to cash value in the baseline support model. From 1960 to the early 1970s, cash value was approximately equal to potatoes (Figure 5). During

the "expansion years" from the mid-1970s through the late 1980s, when red meat production and dairy were promoted, hay cash value exceeded those of potatoes.

Summary and Conclusions

Alaska's agricultural industry has overcome the twin myths that it is alternatively a dead industry and a potential major industry in the state. It is an industry that is sustaining and enjoying modest growth.

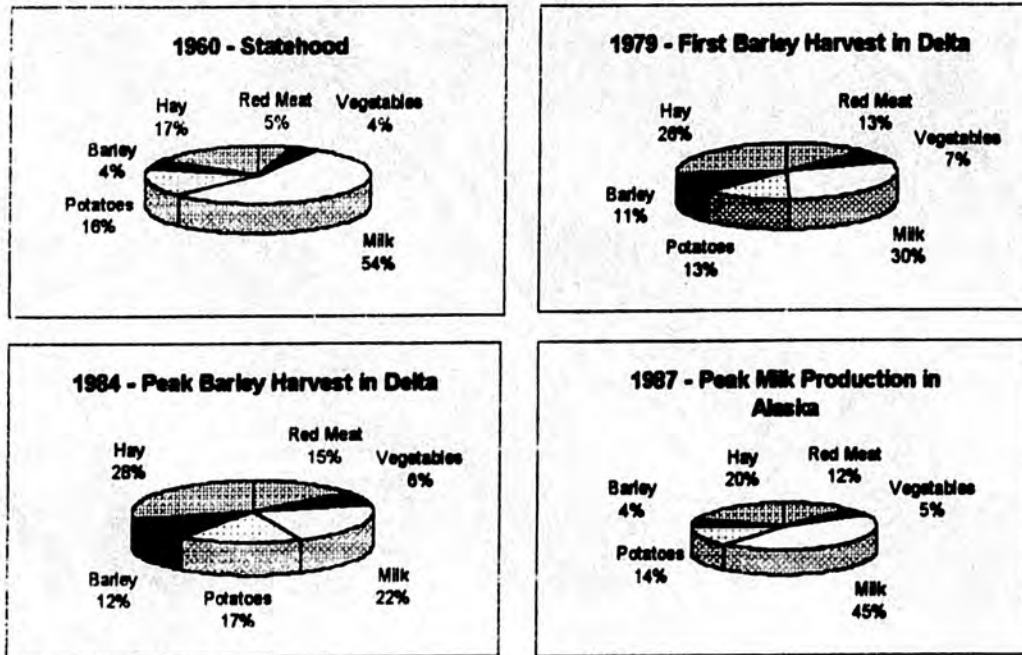
Summary

Alaska's agricultural industry is maturing despite the infrastructural impediment restricting it to regional (Alaska) markets. Farmers and other entrepreneurs have taken advantage of its unique isolation and climate to produce a wide range of products. It has moved from an industry dominated by milk production, typical of circumpolar, isolated regions to one that exhibits diversity in its product mix (Figure 7). This diversity is beyond the traditional perception of agriculture.

Much of Alaska's agricultural industry has nothing to do with production of food and fiber. Alaskan farmers do produce traditional farm products, but they are also involved in seed production, tourism, and raising horses and dogs for work and pleasure. Agriculture in Alaska is also helping improve the environment with research, demonstration, and technology transfer to aid in revegetation and use of waste products.

The high support model drew major attention to agriculture in Alaska. It provided a catalyst for private investment in farms and symbiotic suppliers and processors. It also provided the impetus, voiced by citizens of Alaska, for the state to release more land for agricultural production. Additionally, it made opportunities available for private entrepreneurs that had not existed in the red meat and small grain segments. At the moderate support level, the state was able to keep Matanuska Maid in operation and resolve land title problems. Consequently, the infrastructure is now in place for future expansion in the dairy industry. Given the kick start of the high and moderate support models, the baseline support model now dominates Alaska's agricultural industry.

Federal and state governments provide support to agricultural producers and processors in Alaska. Farmers are eligible for federal support programs and federal loan guarantees. The state of Alaska, Department of Natural Resources, Division of Agriculture provides substantial support in marketing, inspection services, loan programs and outreach and demonstration activities. Farmers still depend heavily on the ARLF for capitalization and operating expenses.



The federal government and the state support the near century old experiment stations in Alaska. They have benefitted Alaska's farmers and provided them with information about the best management practices in traditional and non-traditional agriculture in the circumpolar north. The extension programs in Alaska continue to support this effort. Producers have used the flow of information from the experiment stations to improve production, management and marketing since 1898. Individual farmers do not have the time or the impetus to design or test new technology. There is presently no private infrastructure to provide this support.

Conclusions

The three models, while they do not provide a 'road map' do indicate a trend in the development of Alaska's agricultural industry. They provide a direction for the most effective support. Baseline support for Alaska's agricultural industry is necessary for it to maintain moderate growth that will contribute to the economy of the state and provide a higher percentage of food and fiber for Alaskans.

Figure 6. Alaska's maturing agricultural industry is evident in a changing product mix.

There is no agricultural industry on the planet that is supported totally by private capital. Additionally, because Alaska is a part of the highly industrialized and increasingly service oriented industry of the United States, there is no reason to expect increasing support from the federal government for the expansion of agriculture in the state. Therefore, it is left to the state of Alaska to provide support for its sustaining and moderately expanding agricultural industry.

Role of State Government

There are services that the federal government and the private sector cannot and should not provide. These must be provided by the state of Alaska to Alaska's agricultural industry if it is to sustain moderate growth. The baseline support model is the best example of their effectiveness.

Support for a Sustaining, Moderate Growth Industry

- ◆ If Alaska's industry is to survive, **inspection and aggressive marketing** will be a key factor. The Division of Agriculture must continue to provide marketing assistance and inspection services and continue to work with the Alaska Department of Environmental Conservation to make certain Alaska's food products are safe for consumers and that regulations imposed by the Department of Environmental Conservation allow farmers to continue to operate and market their products in a cost effective and appropriate manner.
- ◆ The Alaska Division of Lands and the Alaska Division of Agriculture have accelerated their **agricultural land sales and lease** program. This must continue. Interest in agriculture is beginning to increase. There is a core of farmers now on the land. Numbers of farms and acreage in farms have to increase to support the necessary infrastructure (transportation, distribution, and manufacturing) to move products efficiently in Alaska and out of Alaska and allow farmers to add value to their products.
- ◆ The **Agricultural Revolving Loan Fund is necessary** and its administration by the Alaska Division of Agriculture insures that the nuances of farm loans are understood. The industry in Alaska is not yet without risk although Alaskan farmers and processors are becoming more sophisticated in their farm, business, and capital management skills. Guarantees of private loans by the U.S. federal farm credit system will provide some risk assurance. Unfortunately, the private banking industry in Alaska does not yet understand the agricultural industry.
- ◆ The **Plant Materials Center is essential** to the industry and must be continued. The PMC in the Alaska Division of Agriculture provides demonstrations and increases and propagates plant materials appropriate for the environment of Alaska and the circumpolar north.
- ◆ The **Agricultural Statistics Service in Alaska should be expanded** to provide more detail about the greenhouse and nursery industry and non-traditional segments of the agricultural industry including subsistence agriculture.
- ◆ **Research, education, technology transfer, and outreach/extension education services must be continued and should be expanded** to include all components of the agricultural industry. The University of Alaska is the states' land grant university. SALRM, AFES and ACE carry out the land grant mission. Both receive formula funds from the U.S. government that are matched by the state government to provide information to the agricultural community of Alaska. Therefore, state support must continue. The information provided by the three UAF units is critical for the agricultural industry and cannot be transferred from the more temperate states.

The services listed above are necessary to sustain a moderate level of expansion in the agricultural industry in Alaska. They are not sufficient to accelerate expansion, however. Should the state of Alaska again become more aggressive in pursuing the expansion of agriculture in Alaska, there is a role it can play. This role is not necessarily as major as that attempted in the high support or moderate support models. It is, interestingly, one the state has not pursued during the time period spanned by the three models.

Support for an Accelerated Growth Industry

- ◆ Provide **preferential rail rates** on the Alaska Railroad for the movement of agricultural products.
- ◆ Provide **preferential highway tax rates** on the Alaska road system for the movement of agricultural products.
- ◆ Expand the Division of Agriculture and formally support **"Alaska Grown"** as a **'state brand'** in Alaska and in a nationwide marketing campaign.
- ◆ **Expand the role of the Agricultural Revolving Loan Fund** by increasing capitalization of the fund, increasing loan limits, and expanding the definition of agriculture to allow processors and non-traditional producers to take advantage of state loans.
- ◆ Encourage communities in the state to provide a **user-friendly environment for agricultural processors**. This could include tax and zoning incentives.

ADDENDUM

Federal and State Support for Alaska's Agricultural Industry

To the uninformed, the phrase "Alaska agriculture" may seem to be an oxymoron. Certainly the Russian colonial agricultural experience in Alaska was not highly successful. On the other hand, a century ago, the U.S. government, continuing a tradition of support for agriculture in the westward expansion of the country, began establishing agricultural experiment stations in Alaska. The first such station was started in Sitka in 1898.

Without question, agricultural expansion in the Territory was fraught with difficulties and the industry witnessed only modest growth. The year following statehood, 1960, saw an industry that recorded only \$3.5 million in cash value of all agricultural products. By 1996, while accounting for less than one percent of the state's revenue resources, agriculture, nevertheless, accounted for \$53.9 million in cash value including reported tradition products and estimated non-traditional products. During that time, the focus of the industry also changed. Whereas milk dominated in the 1960's, today a variety of crops and livestock and non-traditional products (e.g., seed production and revegetation) characterize a market-oriented, diverse industry.

The federal government, later joined by the state government, provided fundamental baseline support for agriculture continuing a 100 year tradition in Alaska. This baseline support includes research, instruction, extension education/outreach and a range of services from inspection to marketing to land sales. Funding for support is primarily to the Alaska Division of Agriculture in the Department of Natural Resources and the University of Alaska Fairbanks. All activities in the Division are related to agriculture. The University carries out other human and resources related activities (47 percent of these funds) pursuant to its land grant mission, as well as agricultural activities (53 percent of these funds).

Has the government investment been justified? One positive indicator is the significant growth of the industry since statehood. Today agriculture is a small, but sustaining, industry providing additional economic diversification to Alaska's economy.

TOTAL FY98 STATE AND FEDERAL BUDGET FOR UAF AND THE DIVISION OF AGRICULTURE*

	UAF**		Division of Agriculture***			TOTAL
	SALRM	ACE	Division	ARLF	PMC	
USDA formula funds	1,325	1,000				2,325
Other federal			98		352	449
State general fund	322	2,500				2,822
Interagency receipts ¹			98		66	164
ARLF			381	538	509	1,428
ASTF	2,650					2,650
Grants & Contracts	1,170					1,170
Program receipts ²			218		14	232
Sales ³	450					450
Total	5,897	3,500	795	538	941	11,671

AGRICULTURAL PORTION OF THE FY98 STATE AND FEDERAL BUDGET

	UAF		Division of Agriculture			TOTAL
	SALRM	ACE	Division*	ARLF	PMC	
Research	2,140					2,003
Instruction	183					183
Outreach/Extension	780	1,225			941	2,827
General Services			795			795
Loans				538		538
Total Agricultural	3,303	1,225	795	538	941	6,356

- * Amounts are in \$,000
- ** School of Agriculture and Land Resource Management (SALRM), Agricultural and Forestry Experiment Station (AFES), and Alaska Cooperative Extension (ACE).
- *** Division Activities, Agricultural Revolving Loan Fund (ARLF), and Plant Materials Center (PMC)

The total state (\$4.45 million) and federal (\$1.91 million) contributions in FY98 are counterbalanced by \$53.9 million in cash value of agricultural products (\$26.7 million in traditional and \$27.2 in nontraditional) assuming, unrealistically no increase in agricultural cash value from 1996. Stated differently, for every dollar of agricultural value generated, the state spends 8.3 cents and the federal government 3.5 cents, a weighted average of 6.9 cents. To wit: less than a dime of government investment yields a dollar cash value in Alaska's agricultural industry.

NOTES

- 1 Gibson, J.R. 1976. *Imperial Russia in Frontier America*. New York, Oxford University Press.
- 2 Planning for the Delta Project began in 1976 (Faris, J.E., and R.J. Hildreth. 1977. Considerations for development - Alaska's agricultural potential. Federal-State Land Use Planning Commission for Alaska, Anchorage. Report 14; Thomas. W.C. 1977. An assessment of Alaska agricultural development. Federal-State Land Use Planning Commission for Alaska, Anchorage. Report 13; and Thomas W.C., C.E. Lewis, F.J. Wooding, D.L. Carney, A.E. Epps, and E.D. Kern. 1977. Potential barley production in the Delta-Clearwater area of interior Alaska. Report to the Legislature, Office of the Governor, State of Alaska.). The first land sale took place in 1978. Parcels ranged in size from 1,800 acres to 3,200 acres, deemed efficient for dry-land grain production by planners. The project was targeted at expanding the red meat and grain industry in the state. The initial 50,000 acres sold was sufficient to export grain and increase the red-meat supply in Alaska to 40% of the total railbelt market.

Planning for Point MacKenzie was completed in 1980 (Lewis, C.E., J.M. Harker, E.L. Arobio, and W.C. Thomas. 1980. Potential milk production in the Point MacKenzie area of southcentral Alaska. Agricultural Experiment Station, University of Alaska, Fairbanks. Bulletin 59). Nineteen parcels targeted for dairy farms were sold in 1983. The idea behind the project was to bolster milk production in south-central Alaska that was decreasing because of the sale of dairy farms at an expanding urban fringe. The objective was to add 3,000 milking cows to the industry supplying up to 60% of the demand of the Matanuska Maid creamery in Anchorage.
- 3 Alaska Rural Development Council. 1974. *Alaska's Agricultural Potential*. University of Alaska Fairbanks, Publication No. 1.
- 4 Kellogg, C.E., and I.J. Nygard. 1951. Exploratory study of the principal soil groups in Alaska. Agricultural Research Administration, USDA, Agriculture Monograph No. 8.
- 5 Statistical information is from the Alaska Agricultural Statistics Service. Agricultural statistics for Alaska have been compiled since 1953 by the Service, a part of the USDA, located in Palmer, Alaska, and funded in part by the Alaska Division of Agriculture, the Alaska Cooperative Extension, and the Agricultural and Forestry Experiment Station.
- 6 The major crops in Alaska's agricultural industry are red-meat (beef and pork), barley, milk, potatoes, vegetables, and hay, and those crops associated with the greenhouse and nursery industry. Minor crops, some listed but most grouped under miscellaneous by the Alaska Statistical Reporting Service include sheep and lamb, poultry and eggs, wool, oats, aquiculture, equine, goats, honey, musk ox, reindeer, other livestock (such as buffalo and elk), forest products, berries, grass seed and other field crops (such as oilseeds). Greenhouse and nursery crops totaled \$18.0 million in 1996. This industry segment has made up approximately 50% of Alaskan agricultural cash value at least since 1977, the first year they were included as a separate item in the agricultural statistics. Miscellaneous products totaled \$2.7 million in 1996. The major products excluding greenhouses and nurseries totaled \$8.9 million in 1996.
- 7 The agricultural statistics do not differentiate between farms and ranches. The two million acres includes a number of large grazing holdings on the Kenai Peninsula

and Kodiak not all of which are used extensively for grazing but rather are used for 'gentlemanly recreation'. From 1955 to 1974, farms and ranches were defined as 10 or more acres and \$50 or more in sales, or \$250 or more in sales. From 1975 to the present, farms and ranches were redefined as those with annual sales of \$1,000 or more to duplicate the definition used by the USDA.

- 8 Brown, D.M., P.S. Holloway, and C.A. Kirts. 1986. A survey of the Alaska greenhouse industry and related enterprises: results and analysis. Agricultural and Forestry Experiment Station, School of Agriculture and Land Resources Management, University of Alaska Fairbanks, Circular 57.
- 9 Information obtained from the Alaska Cooperative Extension, survey 1996.
- 10 The 1933 farm bill defined only wheat as a commodity crop. This list was expanded in 1949 to include feed grains, corn, and sorghum. Commodity crops are defined in each farm bill which began to be considered every 5 years in the late 1950s.
- 11 Program crops are defined by the U.S. farm bills and are those for which farmers receive support and deficiency payments.
- 12 There has not been a nationwide, in-depth assessment of policy in states where the cash value of agricultural products is decreasing and/or the industry has never been an important part of the economy.
- 13 Lewis, C.E., and R.W. Pearson. 1990. Three development models for Alaska's agricultural industry. *Association of Pacific Coast Geographers Yearbook* 52; Pearson, R.W., and C.E. Lewis. 1989. Alaskan Agribusiness: A Post-Statehood Review. *Agribusiness: An International Journal*, 5(4):367-384; Pearson, R.W. and C.E. Lewis. 1990. Transportation and infrastructure: key to successful agricultural development in Alaska. Proceedings of the Western Soil Science Association Conference, Fairbanks, Alaska.
- 14 Lewis, C.E., and W.C. Thomas. 1982. Expanding subarctic agriculture: social, political and economic aspects in Alaska. *Interdisciplinary Science Review*, 7(3):178-187; Thomas W.C. and C.E. Lewis, 1986. Alaska's delta agricultural project: A review and analysis, *Agricultural Administration*, 8, 357; Lewis, C.E., and F.J. Wooding. 1978. Barley production in the Delta-Clearwater area of interior Alaska. Agricultural Experiment Station, University of Alaska. Bulletin 49. Harker, J.M. 1981. *Economic interrelationships within Alaska's developing agricultural industry*. Fairbanks, University of Alaska, Cooperative Extension Service, Report P-42.
- 15 Lewis, C.E., J.M. Harker, E.L. Arobio, and W.C. Thomas. 1980. Potential milk production in the Point MacKenzie area of southcentral Alaska. Agricultural Experiment Station, University of Alaska, Fairbanks. Bulletin 59; Fugelstadt, P., W. Thomas, B. Buxton, and O. Schock. 1985. An economic analysis of fluid milk processing in Alaska. Agricultural and Forestry Experiment Station, University of Alaska, Fairbanks. Bulletin 65.
- 16 The Alaska Agricultural Statistics Service does not report the value for all non-traditional agricultural products. Using only available information on cash values estimated and not reported in the agricultural statistics (conservatively \$20 million for revegetation, \$1 million for the seed industry, and \$700 for 1000 subsistence operations), the total cash value of nontraditional agricultural products in Alaska in 1996 was \$24.6 million.

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- 17 Engelbrecht C.R. and W.C. Thomas, 1987. Agricultural policy implementation in Alaska, *Agricultural Administration and Extension* (26): 75 (1986).
- 18 Little Goldstream Associates. 1981. Vegetable Industry Report, City of Nenana. Contract No. AG - 103; Hayden, A.J. 1983. Accessing the potential for northern latitude vegetable processing. in *Proceedings of the Alaska Agricultural Symposium*, Alaska Division of Agriculture and Cooperative Extension Service, University of Alaska Fairbanks.
- 19 Arobio, E.L. 1989. Alaska grown program. Paper presented at *Buy Alaska* seminar, sponsored by Alaska Department of Commerce and Economic Development, Fairbanks, April 1989; Swanson, R.B., C.E. Lewis, and F.G. Mielke. 1992. Alaska grown: implementation of a positive agricultural policy. *Agroborealis*, 23(1): 54-55.
- 20 Swanson, R.B., C.E. Lewis, and F.G. Mielke. 1992. Alaska grown: implementation of a positive agricultural policy. *Agroborealis*, 23(1): 54-55.
- 21 Swanson, R.B. and C.E. Lewis. 1991. Food acquisition, availability, and allocation in Urban Alaska. *Home Economics Research Journal*, 19 (4): 303-314.

Chapter VIII

Tourism

Tourism has grown in Alaska's economy over the past two decades. As the largest component of foreign exchange in the world (surpassing petroleum) and the largest growing nonessential service sector in the United States, tourism has the potential to add additional wealth to the Alaskan economy in the future.

Visitor expenditures on the way to, from and within Alaska total over 1.6 billion dollars annually. An estimated 72% of direct visitor expenditures in-state and vendor payments in support of prepaid cruise and tour activity enters and circulates within the state. In addition, an unknown percent of profits, capital, taxes and fees circulate in the state.

What Alaskans Want from a Visitor Industry

Alaska residents hold diverse views about the preferred future of the state, and this includes how they feel about the kind of tourism the state should encourage. Some see an opportunity to develop part of the vast lands in Alaska as a mass tourism destination, with several resort communities, and intensive use of some areas for large scale tour products. Others see Alaska as an opportunity to develop small scale, back country adventure tourism, but want to avoid larger scale tourism.

The dynamics of the industry suggests that both types of tourism contribute substantially to the state and that visitors are attracted to both types of experiences. In fact, a hybrid of the two approaches is developing.

Alaskans want to make intelligent decisions in areas where they can guide the direction of tourism growth and benefit from its wealth. This requires us to become smarter about the visitor industry; how it works, how to participate. Unlike many vertical industries, tourism activities are distributed throughout our communities—where we work and where we play. Much information is missing as to the economic, social and environmental impacts of tourism, and the pieces that are available are often fragmented. Individuals who see the entrepreneurial successes in tourism need mentors to show them the way.

How should the State think about the visitor industry? At a minimum, any tourism activity should provide a net benefit to the state or its residents whether that be in income, profit, taxes or social benefits. Economic measures like multiplier effects and leakage are not available in Alaska, but the multiplier for tourism expenditures is likely in the range of 1.2 to 1.7 times. In other states, visitor taxes generated from state-funded promotions return as much as 10-20 times the tax money spent—including only visitors motivated by the promotions.

Visitor spending arrives in the state directly from visitor in-state spending and indirectly from industry payments in support of in-state operations. We need to measure the economic impact of different visitor types accurately. Owner-employee income generated by tourism businesses is not known, but is likely to be significant given the small business structure of the visitor industry.

In a growth mode, the influx of capital may exceed profits that leave the state. Better information is needed before strategic decisions can be made as to where the best return on investment can be made with the state's resources.

Visitor Industry Benefits and Costs

Tourism, like other industries within Alaska, brings a variety of benefits and costs to the State. The most measurable of these is its economic benefits. Tourism contributes to the wealth of Alaska in several ways:

- ♦ through the importation of outside capital in the building of infrastructure (i.e., hotels, lodges, boats, railcars, retail shops, restaurants, visitor attractions, etc.);
- ♦ through the creation of jobs and employee income;
- ♦ through the creation of in-state company profits;
- ♦ through the creation of small businesses which provides owner income, including businesses serving visitors directly and vendors supplying other companies (owner income is not reported to the Department of Labor as wages); and,
- ♦ through the generation of state and local taxes and fees.

Other benefits are less measurable, yet important. Diversified opportunities throughout every region of the state, including rural communities, a clean industry with relatively low environmental pollution, new amenities available to Alaska residents, enhanced transportation networks, and advocacy for environmental protection are important benefits.

Costs associated with the industry include increased maintenance and operating costs of public facilities and utilities. Tourism may also compete with other industries for use of public lands. Social costs include overcrowding, and competition for certain recreational areas. Fortunately, the industry has one of the lowest percentages of nonresident employment in the basic sector—an important factor for many Alaska residents.

How the Alaska Tourism Product is Promoted

Benefits by Visitor Type. The amount of benefit the State enjoys comes from both direct and indirect in-state expenditures made on behalf of each visitor type. Unfortunately, data exists only for direct visitor expenditures by visitor type. For example, the cruise-only visitor has one of the lowest in-state expenditures, while the cruise-tour visitor has one of the highest. Both types are the target of the same campaigns. Many Southeast and Southcentral retail and day-tour businesses are dependent upon the cruise-only visitor, and the tens of millions of direct labor and contractual dollars spent by the cruise ships in support of cruise-only visitors must be counted.

Overall, package tourists account for 57% of all vacationers and contribute 50% of in-state visitor expenditures. How much of package tourist's prepaid expenses enter the state in the form of payments is substantial, but not known. These two figures would have to be added together to see the entire picture.

Independent visitors who buy an in-state tour contribute the highest in-state expenditures. They arrive by air, ferry or highway and cruise ship. Each visitor type has unique spending patterns impacting different locations and each are important to a variety of businesses. Independent visitors who buy tours are 15% of all vacationers but spend 28% of all in-state spending. Pure independent vacationers spend about equal to their numbers, 28% and 24% respectively.

Dependence on Promotion. As a long-haul destination, removed from its major markets, Alaska needs promotion to create and maintain market demand. Without promotion, visitor arrivals would decline significantly, and at a relatively faster and greater rate than say, Washington or Oregon, which are located closer to their primary markets. The private sector invests the majority of promotional dollars in the North American marketplace, which constitutes 93% of Alaska's visitor business. Taking into account only the top two cruise lines and the State ad budgets, the state contributes about one-third of the promotional dollars. Add in the remaining private sector advertising, and the state's share would drop to less than half that amount.

Alaska then, is dependent upon private sector marketing for attracting the majority of its visitors, and the bulk of this spending currently comes from outside cruise lines doing business in the state. Because most companies emphasize the destination rather than their product, their ads convert a substantial number of visitors who buy products other than their own. By way of contrast, the state's campaign is designed to attract all types of visitors equally, as a matter of fairness to taxpayers, and to retain the interest of its diverse, private sector marketing partners.

Future Promotion. It is unlikely that cruise promotions will go away anytime soon. Average annual growth in North American cruise berth capacity has been 7.6% since 1981. Growth outlook for contracted (with shipyards) and planned berths through 1999 is 7.0%. It is likely some existing ships will be replaced by these new ships, but there will still be an increase in capacity. Princess Cruises plans to add a 1,950 berth ship in 1997 and a 2,600 berth ship in 1998. Holland America plans to add a 1,266 berth ship in 1996 and a 1,318 berth ship in 1997. Both lines will maintain their current share of berths in the North American marketplace with these additions.

Season Expansion. Like many other destinations with dramatic seasonal changes, Alaska's visitor industry is seasonal in nature. The distinctions between Summer and non-Summer visitor volumes is a clear one. Likewise, there are differences between the industry "delivery system" that accommodates visitors.

The industry in the summer is geared to handle large numbers of visitors which are delivered primarily by air or cruise ship. Tour companies have large investments in equipment and personnel. Summer products are well-developed and fine-tuned. Products and services of various companies are coordinated into one or more packages available to the visitor. Managers and employees are experienced in providing summer product. Large firms have the capacity to handle volume tourism. A large number of small business products and services depend on the delivery of visitors by large tour companies. Demand often exceeds supply. The visitor experience is often visual, passive and place oriented, and the market is familiar with the product offered.

The traditional summer season is expanding. Through the combined efforts of the cruise lines, who advanced their summer schedules, and the shoreside tour operators who opened early, May has become a significant contributor to the year's visitor count. The best opportunity for expansion of the summer visitor season is to extend the season further into the early part of May, and later into September and early October. Through extended use of basic facilities and personnel, greater revenue will justify the addition of facilities which can be used in the peak of summer.

Contrasting summer, the "off-season" months receive far fewer tourists. The lumping of the fall and spring with winter clouds important distinctions among them. Many Fall and Spring visitors can be attributed to the same motivators as Summer visitors. Fall and Spring offer the opportunity for Summer-type vacations, with some modifications. Winter-oriented tourism is different in kind, and may be available in the more northern latitudes as early as September

and as late as May. Winter tourism will depend on how quickly industry coordination starts providing consistent and reliable product.

Winter tourism can be described as geared to handle independent travelers and small tour groups by air, such as the Japanese Aurora-watchers. Capacity is greater than demand, although attraction and activity products and services are infrequent, new, and often unreliable. Products of individual companies are marketed separately, and not coordinated into a full experience. Managers and staff are inexperienced in providing cold-weather activities on a scheduled basis because of low volume. Innovation and product development will occur through trial and error and growth will depend upon risk-taking. Marketing is more difficult due to the independent nature of the visitor, and the smaller potential market. Importantly, the winter visitor experience is more active and activity-oriented. Alaska's unique winter features offer the greatest opportunity to compete with more developed winter destinations closer to market.

How the Alaska Tourism Product is Sold

The tourism product is sold a variety of ways; prior to arrival by out-of-state firms or by Alaska-based firms, in-state by out-of-state firms, and in-state by Alaska-based firms.

The two highest direct expenditure visitor types include one tour package type—Cruise/Tour visitors, and one independent type—Independents who buy a tour in-state. These two types alone contribute half of all visitor dollars and have the highest per-person per-trip average spending of any travel type in Alaska. Marketing strategies directed toward these visitors should generate additional wealth. These two groups seem to be merging, as cruise passengers are beginning to stay longer in Alaska and buy tours on their own, before going home.

Trends. Visitors are spending more of their trip dollars directly, in-state than ever before, about 42%. A substantial portion is spent on transportation to the State and package visitors buy components before arriving. Visitors are also spending more per trip, even after inflation is taken into account. The largest in-state spending increase is in day and overnight tours. This is encouraging new business development in the tour field.

Competitive cruise and air fares have made it cheaper to get to Alaska. This competitive trend is likely to continue and should benefit the volume of all visitor types.

A high percentage of Alaska promotion is taken up by the private sector's large outside firms, and there is significant conversion of independent visitors by these promotions. It would be difficult to replace these substantial promotional dollars from within the smaller tourism businesses within the state.

Native corporations are developing an increased interest in entering the visitor industry. They are an important potential resource for the expansion of tourism development in Alaska. Native corporations possess major land-holdings throughout the state and have the potential for making additional land selections or trades which could have characteristics which meet the criteria for tourism development. Many of these lands are adjacent to National and State Parks and Preserves. Use of these lands would provide investment opportunities both for the corporations themselves, and to co-venturing developers and operators.

A Need for Access to Public Lands

Two key issues affecting the visitor industry in Alaska are the lack of sufficient mobility within the state, and lack of commercial access to public lands.

The limited highway network, limited capacity of the ferry system, and reliance on air travel represent a constraint on the full enjoyment of Alaska's tourism resources. A reliable transportation network is crucial to successful tourism development of Alaska's 367.7 million acres of land area, 105.2 million are managed by the state, 43.7 million by native interests, and 216.5 divided by federal agencies.

A perception is held that with vast areas of land managed by agencies in the interest of state or national residents, the very public is restrained from the enjoyment these public lands represent.

Each of the land agencies has a different mandate for managing the resources entrusted to it. Federal agencies are slow to open up the state's recreation resources for commercial use. On the other hand, these agencies are successful in funding projects that state government could not address. While some agencies have a mandate to provide for recreational pursuits, others limit them in order to protect aspects of the natural environment. Considering the extent of the land area each of these agencies manage in Alaska, it is inconceivable that the same management principles must apply to all of their lands, and that certain areas could not be opened up for commercial tourism use under certain conditions.

Some of the state's recreational resources are already crowded and could expand their capacities only at considerable cost. Industry and government will have to invest more for each new activity-hour added to the state's present capacity.

At peak season, tourism already strains some ports-of-call, transportation systems, and visitor-serving facilities. Future expansion of visitation will require continued expansion of the season, a parallel expansion of the state's infrastructure, and the development of new visitor destinations and attractions. This added demand for private investment to facilitate steady growth in tourism suggests exploration of visitor markets that would be less capital intensive. Such as the more labor-intensive travel markets with emphasis on soft-adventure and ecoadventures. It might also require the further consolidation of visitors and more intensive use of certain resources.

Wherever tourism requires the expenditure of public funds resistance can be remedied by planning for public improvements that serve both visitors and the resident community.

Criteria for Successful Tourism

All successful visitor destinations have some basic qualities. If Alaska is to expand its tourism, it must meet some basic criteria and criteria that are particular to its own position in the market place, its resources and its life style. In charting a path for the industry, the following criteria will have to be kept in mind.

- ◆ Vacation experiences in Alaska must be responsive to the expectations of the market. For example, independent travelers who buy in-state tours appear to be of highest value. However they comprise only 15% of the current market. This market segment has growth potential and should be expanded. The cruise tour market is almost of the same value on a per trip basis. It too should be expanded. A portion of the cruise-only segment is beginning to add on in-state tours. This trend should be encouraged.

- ◆ The industry must remain competitive in both the experience and in price. It is essentially up to the industry to ensure a quality product, and remain price competitive with alternative destinations, however certain public infrastructure such as roads, airports, and other public services must be upgraded and maintained to handle the traffic.
- ◆ There must be an effective collaboration of public and private interests. Both marketing and product development will require cooperation. The state cannot take on the private sector's ability to promote the destination, but it can provide the structure for cooperative ventures, and some products will require reasonable access to state lands.
- ◆ Tourism must provide significant net benefits to the state's economy and it must complement the state's other industries.
- ◆ Growth in the industry will require that public agencies develop the ability to provide, maintain, and manage facilities, services and systems that tourism needs for success.
- ◆ Alaska will have to offer both the security and comforts of pre-planned (supervised) vacations, and the freedom and flexibility associated with independent travel.
- ◆ Alaska will have to adopt hospitality as a potential livelihood for many of its residents. Hospitality is an attitude that starts with education at several levels. Native corporations might find it beneficial to work with shareholders in developing small business opportunities, loans, or training for local and rural tourism developments. Schools should include a knowledge of the industry and its opportunities in its curricula.
- ◆ Residents must learn to think about tourists as guests, and to think of themselves as their hosts.
- ◆ Local and state agencies must learn to welcome and accommodate visitors as important contributors to Alaska's economy.
- ◆ Federal agencies must learn to identify with the state's interests while carrying out their national responsibilities in Alaska.

Competitive Product Opportunities

Alaska is a relatively remote destination. It is far from major population concentrations, and it takes some planning and means to spend a vacation in the 49th state. But Alaska also has some qualities that provide it with a competitive edge. The state has a rich native heritage, it has an abundance of unique wildlife, it includes vast virgin territories, and it offers true wildland experiences. Increasing worldwide interest in learning about native cultures and the natural environment, and the fascination with wildland experiences, can be the basis for additional wealth.

Wildlife Viewing. It is evident that the visitor industry has a primary interest in preserving and expanding opportunities for wildlife viewing in Alaska. The Provinces of British Columbia and Alberta are way ahead of the 49th state in this regard, and Alaska must make an effort to catch up with its neighbor competitors for the wildlife viewing visitor dollar. The industry

can do something about this in three specific ways: by working with public agencies in making wildlife viewing more accessible; through added funding of the Watchable Wildlife Program in Alaska, and by helping protect wildlife and their habitats.

Wildland Touring. Often called natural history tourism, adventure travel, soft adventure, ecotourism, or specialty travel, wildland tours are of growing interest among an increasingly urbanized U.S., European, and Asian population. The visitor industry will benefit economically it expands and improves the commercial potential of wildland touring. The characteristics of wildland touring make it especially appealing as an option for Alaska.

- ◆ It is labor intensive, requiring higher ratios of employees to clients than do urban and mid-country tours.
- ◆ Revenues are high relative to the volume of visitors accommodated.
- ◆ It effects extensive rather than intensive use of the environment, consisting of small groups in response to environmental and aesthetic concerns.
- ◆ Start up costs are relatively low and allow for many small, entrepreneurial businesses, which are conducive to rural resident lifestyle and temperament.
- ◆ Economies of scale in marketing will require coordination among several specialty tour firms in creating a full vacation experience.
- ◆ It fosters coordination with larger companies who can efficiently deliver clients and who stand to gain from the addition of experiences they are not prepared to operate.

Increasing Alaska's capacity for added outdoor recreation through "ecotourism" will require more coordination and collaboration between public agencies and the visitor-serving business community. To serve its clients, these businesses will require extensive use of public lands which may encroach upon the recreational lands of residents. More land will be needed to keep small groups from imposing upon each others wilderness experiences.

Another opportunity is to appeal to those visitors wish to explore Alaska's treasure of native culture and art. This is generally an urban based activity, and its success will depend on organizing the vast wealth of artifacts, art, and history and in developing the quality of the presentation in a manner in which the visitor can absorb it.

Modern History of the Alaska Visitor Industry

The Early Years. The tourism industry is not a new industry in Alaska. Sightseers have been coming to Alaska for over 100 years. Travelers discovered Alaska soon after it became a United States possession. Explorer/naturalist John Muir, and missionary/government agent Sheldon Jackson promoted the region in their written accounts, inspiring visitors northward. The Gold Rush of 1889 and the Harriman Expedition of 1899 provided a big break for Alaska tourism. With completion of the White Pass & Yukon Route, tourists could travel more comfortably into the North Country.

The Turn of the Century. The early 1900s brought competition among steamship companies and itineraries began to feature Southcentral Alaska and Nome. Completion of the Richardson Highway and the Alaska Railroad brought new tour options for the traveler.

Few independent travelers were among these early travelers. Leaving the tour risked losing a berth on a Seattle-bound steamship.

The Great Depression/ WWII. The Great depression resulted in a sharp downturn tourism to Alaska however by 1933 the industry recovered and began making strong gains. Interest was rekindled in steamer travel to Nome and the Bering Sea during these years, and the introduction of air travel proved popular for flightseeing. The highway to Alaska originally proposed by tourism boosters in the late 1920s was built to meet a military need.

The Post War Years. In 1945 the Alaska Development Board was created. Governor Gruening announced, "The tourism industry will be bigger than the \$50 million salmon industry. Our job is to prepare for tourists, and not turn them away with the excuse that we have no accommodations. If necessary, we must take visitors into our home and make them feel welcome..."

Entrepreneurs were instrumental in restarting the tourism industry after the war, building the basis for large package tour operators in Alaska today. A shortage of lodging facilities prompted the development of new hotels.

Attitudes towards tourism were mixed in these early post-war years. Many old-timers didn't see the value in the tourism industry and really didn't care. In 1950 the Alaska Visitors Association was established to act as an industry trade association and create positive public awareness of the value of the visitor industry.

The Alaska Highway replaced the Yukon River as a means to reach interior Alaska. Air travel increased, and tour packages began including air transportation to and from Alaska. In 1957 the first ship since the early part of the century to cater exclusively to tourists sailed the inside passage and the modern cruise industry was born.

Alaska Statehood. Independent travelers began to show up in ever-increasing numbers. The formation of the Alaska Marine Highway System in 1963 did much to attract the independent traveler. The Division of Tourism was formed in 1959. By 1972, Westours had become the largest vertically-integrated tour operator in Alaska. Princess Cruises and the television show "Love Boat" popularized cruising and helped launch the growth of the cruise industry worldwide. In 1975 the Alaska Visitors Association and the Division of Tourism formed the cooperative marketing program.

The 1980s Boom. By the 1980s Alaska had become a premier vacation destination, competing with Europe and Hawaii for visitors. The 1980s saw strong growth, fueled by television advertising on a national scale and increases in cruise ship and hotel capacity. Niche markets brought about the introduction of small cruise ship travel, which visited more remote locations. Restructuring of the airline industry resulted in Alaska being well-served by four major domestic carriers and a few domestic charter operators. Several international carriers used Anchorage as a refueling stop, but available seats to Alaska limited the growth of the international market. Independent travelers had more choices and saw improved opportunities, including the paving of the Alaska Highway.

Tourism Today. Today, the tourism industry is marked by diversity. Travel choices range from completely independent itineraries arranged by the traveler to highly structured package tours. Product offerings include everything from the luxury of a cruise to adventure travel such as kayaking, sport fishing, and wildlife safaris. Salmon bakes, flightseeing, riverboat cruises, train rides, canoe trips, river rafting, horse trekking and much more tempt the visitor. The industry remains seasonal, with over two-thirds of all visitors arriving in the state during the peak season months of May through September.

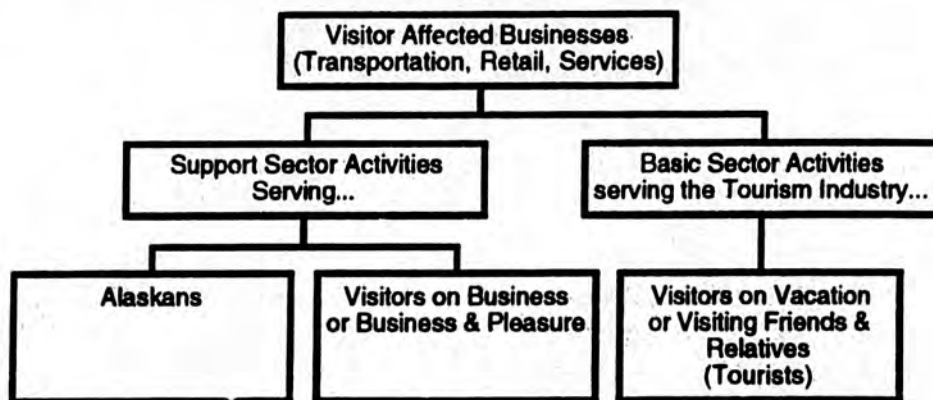
Tourism as a Part of the Basic Sector

Alaska's economy is a composite of government and industry activities which generate income for the state's residents and others. Tourism is one component of the basic sector of the economy that includes the production of seafood, oil and gas, minerals and timber, military activity and management of federal interests in Alaska.

A basic industry is one that sells goods and services to markets outside the local area (Alaska), drawing income from outside the community. The oil industry is an example of a basic industry. A support industry is one that meets local needs, such as the health care industry.

Not all the visitor industry is basic industry, but the tourism industry is. Tourism in Alaska is a basic industry because it sells a commodity, Alaska's scenery, wildlife, and heritage, to a nonresident market. This distinction is important because although the visitor industry is larger than the tourism industry, only the tourism industry can be compared with other basic industries, such as seafood, oil, and federal government.

Tourism's Role In The Visitor Industry and Alaska's Economy



The tourism industry is that part of the visitor industry which serves nonresident pleasure visitors, more commonly known as tourists. Not all visitors are tourists—the visitor industry serves all kinds of visitors, including those traveling on business. Basic industries like seafood, oil, and government are responsible for most of the business travel to Alaska. For business visitors, the visitor industry is fulfilling a support sector function, not a basic industry function. The tourism industry serves only those traveling for pleasure—primarily vacationers and those visiting friends and relatives. The tourism industry is a basic industry because it exports both a product (the Alaska mystique) and a service (the means to experience Alaska) to the outside world.

Tourism's Place in the Alaskan Economy

Tourism is often unrecognized as a basic industry because it is largely composed of support sector businesses: providers of transportation services, retail businesses, hotels and restaurants, and others. These businesses serve residents and visitors alike, so employment in the transportation sector for example cannot all be attributed to tourism. No government agency measures employment or payroll in the tourism industry, only in its component parts.

It is the interindustry relationship that prevents inclusion of the visitor industry in most economic analysis of Alaska. What is not collected is how much of the employment is due to tourists. A 1991 Alaska Visitor Industry Business made it possible to estimate how much of their employment is due to nonresident visitors and more specifically, due to tourists.

Tourists account for about three quarters of the nonresident sales in the transportation sector, about two-thirds in the retail sector and eighty-five percent in the service sector.

Alaska's Visitor Industry and Tourism Related Employment and Payroll By Economic Sector (1990)				
Economic Sector	Visitor Industry Employment	Tourism Employment	Visitor Industry Payroll (\$millions)	Tourism Payroll (\$millions)
Transportation	3,518	2,667	\$103	\$78
Retail	4,993	3,341	69	46
Services	5,011	4,280	72	62
Total	13,522	10,288	\$244	\$186

Jobs, Income, and Taxes

Number of Jobs. The annual equivalent of 13,500 workers were employed in 1991 in Alaska's visitor industry earning an estimated \$244 million in annual payroll. These totals do not include the approximately 10,000 cruise ship or employment generated by traveling Alaskans. Employment as a result of intra-state travel was estimated in 1991 as approximately 8,200 jobs statewide. Tourism generated an estimated annual equivalent of 10,300 jobs for a 1991 annual payroll of \$186 million.

Based on employment, tourism is Alaska's second largest basic industry in the private sector, after the seafood industry. Among all basic industries in Alaska tourism is the third largest following the seafood industry and the military.

Nonresident Component. In Alaska's private sector over one quarter of all workers are nonresident (27%). The nonresident component in the visitor industry, is less than 20%. Visitor-related industries are responsible for proportionately less economic leakage than Alaska's other basic industries.

The tourism industry is indirectly responsible for economic activity—employment and income in Alaska's infrastructure and support sectors. The Alaska economy as a whole has to date not been modeled accurately enough to make estimates of indirect impacts for any basic industry in Alaska.

Taxes, Fees and Other Revenues

Tax revenues from tourists are lower than they otherwise might be since tax bases are fewer, and tax rates are lower in Alaska than U. S. norms. Alaska collects no personal income or statewide sales tax. Some municipalities collect sales taxes, but Anchorage and Fairbanks, two of the most visited communities in Alaska, do not.

In 1994-1995 visitors directly and indirectly generated approximately \$124 million in state and local government revenues. On average, every visitor to Alaska generated \$110 in taxes,

fees and other revenues, including \$62 in state revenues and \$48 in local government revenue. Tourists comprised 75% of the total, generating \$93 million in government revenues.

Visitors account for a wide variety of tax and user fee revenues. At the state level, these revenues include:

- ◆ corporate income taxes paid by visitor industry businesses
- ◆ Alaska Marine Highway revenues
- ◆ gas and aviation fuel taxes
- ◆ a variety of fees including business license fees, museum admission fees, hunting and fishing permit fees and others.

Local government revenues from visitor spending include:

- ◆ sales taxes on visitor spending
- ◆ property tax revenues
- ◆ bed tax revenues
- ◆ cruise ship moorage fees

Alaska State Taxes, Fees & Other Revenues Generated by the Visitor Industry 1992 vs 1995			
Revenue Item	1992 Estimate	1995 Estimate	Percent Change
Fees	8,288,000	13,461,800	62%
Taxes	6,727,000	13,401,200	99%
Other Revenues	36,954,000	39,230,600	6%
Total	51,969,000	66,093,600	27%

Alaska State Taxes, Fees & Other Revenues Per Visitor 1992 vs 1995		
	1992 Per Visitor Total	1995 Per Visitor Total
Fees	\$8.64	\$11.91
Taxes	7.01	11.85
Other Revenues	38.54	34.71
Total	\$54.19	\$58.47

Visitor revenues to the state are growing faster than visitor arrivals. Comparing the same revenue sources, visitor arrivals have increased 18%, fees have increased 62%, taxes have increased 99% and other revenues have increased 6% over the three year period.

The Competitive Environment

Alaska's Ranking Among Top Visitor Destinations. An important indicator of any destination's tourism potential is its ranking by consumers as a desirable place to visit. On a variety of scales, Alaska performs well against its major competitors—Europe, Hawaii, Australia, and the Caribbean. The *Travel Industry Association of America's* survey shows Alaska in the top ten preferred summer destinations on a consistent basis. A *New York Times* poll recently ranked Alaska fifth in all destinations for a fantasy vacation. And a

Longwoods Travel USA survey in 1994 showed Top-of-Mind awareness of Alaska at 21% among America's 150 million traveling households. This is compared with other destinations like Florida at 27%, Hawaii at 25%, the Caribbean at 28%, Europe at 37% and Asia Pacific destinations at 23%.

Alaska's biggest challenge is to convert that awareness into visits. Consumer intentions to visit within two years falls dramatically short of the 21% awareness levels to 7% who intend to visit in two years. This drop is more severe than for Alaska's most important competitors, even those further away from the U.S. market. The state must focus its efforts on closing the sales with these predisposed travelers. Presently, it does so through cooperation with the private sector who have product to sell. The generation of names for industry direct-marketing has been very successful, but mostly with the larger firms that use direct mail successfully. A way must be found for the small operator to efficiently reach these predisposed travelers.

Promotional Expenditures. Alaska's competing destinations take tourism seriously, if investing in promotion is any indication. Aside from the millions of dollars spent by the private sector, European government agencies spend over \$770 million annually attracting visitors. Twenty-three Caribbean nations spend over \$165 million annually, and remote but exotic Australia spends \$100 million in the United States annually attracting about one-third the number of tourists Alaska receives. Closer to home, Hawaii spends over \$25 million, and Canada's combined national and provincial spending is close to \$100 million. Alaska spends \$3.9 million through ATMC and \$2.9 million through the Division of Tourism for a total of almost \$7 million.

Alaska's Division of Tourism. The Division of Tourism within DCED is the state agency primarily responsible for tourism development. DOT promotes in international markets (approximately six percent of total tourists), fulfills more than 170,000 requests for information annually, and represents Alaska at consumer and trade shows in the U.S. and overseas. The Division also compiles visitor research, provides assistance to tourism businesses, and markets Alaska as a film production location. The DOT places emphasis on the development of rural tourism and travel by the Alaska Highway.

Alaska Tourism Marketing Council. The Alaska Tourism Marketing Council is a public corporation created through a cooperative agreement between the State and the private sector and governed by a 21-member Board of Directors. ATMC's primary goal is to attract visitors from the U.S. and Canada through a targeted national advertising and public relations program. Alaska is promoted in its entirety. Concentrating promotion on a single message helps penetrate the clutter of advertising messages that bombard people daily. This focus is important as Alaska strives to keep pace with competing destinations. A key element of success in executing Alaska's 20 year-old cooperative marketing program is ATMC's focus on creating opportunities for specific regions of the state, market segments, and private businesses to participate in the program, financially, editorially, and with proprietary advertising that reaches millions of viewers, and hundreds of thousands of high potential visitors.

Other Tourism Agencies. In addition to the DOT and ATMC, other public and private agencies focus on developing the tourism industry. The Alaska Visitors Association is a statewide nonprofit trade association with a broad spectrum of industry members. AVA provides a unifying voice for the industry on policy issues, lobbying, and cooperative marketing. AVA is a partner in the formation of the ATMC and raises the private sector cooperative marketing funds. AVA's four goals are to attract visitors, educate the industry and public on tourism, encourage business development, and support its members.

There are several Destination Marketing Organizations that focus on a specific region of Alaska or market segment. They include Tourism North, Alaska's Southwest, Kenai Peninsula Tourism Marketing Council, Alaska Native Tourism Council, Prince William Sound Tourism Coalition, Southeast Alaska Tourism Council and the Alaska Wilderness Recreation and Tourism Association. They are typically funded through membership dues, government grants and cooperative marketing ventures.

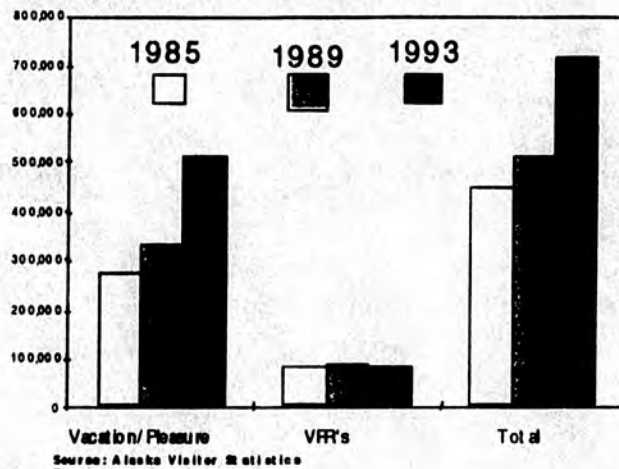
There are also local visitor organizations which focus on a single location in Alaska. They promote, operate visitor centers, and attract meetings and conventions. They usually take the form of a Chamber of Commerce or Convention and Visitors Bureau and are typically funded through accommodation taxes or other local sales taxes. A 1990 survey by DOT found that 17 convention and visitor bureaus employed 95 workers, and had annual budgets totaling \$7.4 million.

Alaska's Visitor Profile

Mode of Travel. Cruise ship visitor volumes have increase most dramatically since 1989, as a result of increased vessel capacity and new cruise line entries into the market. Domestic air visitors had the second largest overall increase. International air visitor arrivals have decreased steadily since 1990, and Marine Highway traffic has remained stable due to a consistent fleet capacity. Highway traffic has been somewhat volatile, but posted a 5.3% annual increase since 1989.

Full-year Visitor Arrivals Summary By Economic Sector & Trip Purpose (sampled arrivals only) Summer 1993 and Fall/Winter 1993-1994		
Trip Purpose	Full Year 1993-94	Full Year % Change 1989-90 to 1993-94*
Basic Sector (Tourists)		
Vacation/Pleasure	622,400	+73.4%
Visiting Friends & Relatives	129,600	-6.9
Support Sector (Other Visitors)		
Business & Pleasure	74,800	+1.9
Business Only	175,800	+27.1
Seasonal Worker	17,800	-52.5
*Full-year sample for 1989-90 was June 1989 to May 1990. The full-year sample for 1993-1994 was May 1993 to April 1994. Source—Alaska Visitor Statistics Program FWS Arrivals 1993-94.		

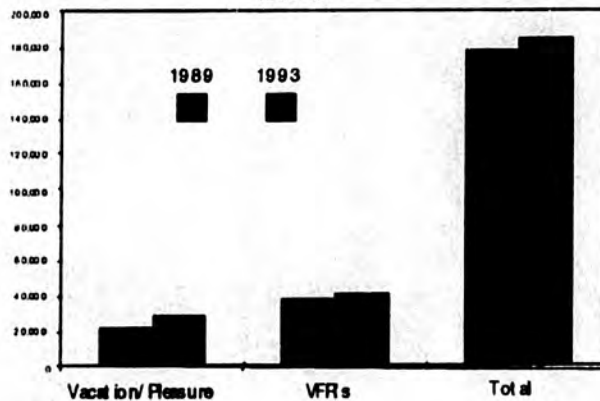
Summer Tourist and Total Visitor Growth 1985 to



Trip Purpose. In Summer (June-September) 1995, 82% of visitors were tourists, that is, vacationing or visiting friends and relatives. The vacation market increased about 66% since 1989, an average of 9% per year. Visiting friends and relatives increased only 2.1% since 1989.

In the Fall, Winter, and Spring season, only 38% of visitors were tourists, with 15% being vacationers, and 23% visiting friends and relatives. The vacation market increased 31% since 1989-90, an average of 5.6% annually. Visiting friends and relatives grew by 15% or about 3% annually.

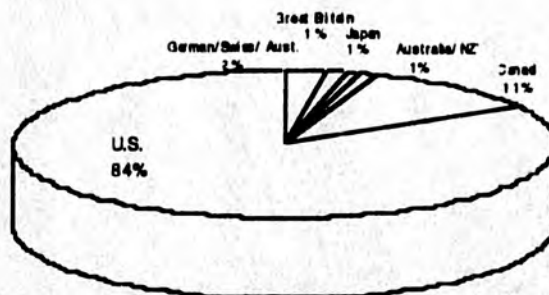
Fall-Winter-Spring Tourist and Total Visitor 1989 to



Visitor Expenditures.

Vacationers represented 71% of all Summer visitors and account for 78% of all spending in Summer, 1993. They account for just 13% of spending in the Fall, Winter and Spring season. Visiting friends & relatives account for 12% of visitor arrivals in Summer and contributed 8% of all spending. VFR's contribute 9% of spending in FWS. Combined, tourists accounted for 83% of visitors and 86% of visitor spending in summer and just 22% of spending in Fall, Winter and Spring. Vacationers are the driving force behind the volume and growth of the tourist market.

Basic Sector "Tourist" Volume by Origin Full Year 1993-94



Source: Alaska Visitor Statistics Program

Visitor Origins. Eight out of ten visitors to Alaska came from the United States in 1993—unchanged since 1989. The international market share is unchanged at six percent. In spite of direct efforts by the Division of Tourism, the overseas markets have not increased their share. Industry has less interest in overseas markets because of the larger expense in promoting to them, and the instability of direct air lift into Alaska from Asia and Europe.

National Travel Trends

There are specific national market trends and visitor motivators— fundamentals that drive the U.S. pleasure travel market now and in the near future.

Some trends will benefit travel to Alaska:

- ◆ Travelers want "life-enriching vacations"—educational, historical, outdoor or natural. Ecological vacations are the fastest growing travel segment.
- ◆ America is getting older. The over 50 population account for 80% of all leisure travel. Grandparent travel with children is up.
- ◆ Travelers today are more stressed out. Almost 50% just want to sleep.
- ◆ In-bound International travel is booming.
- ◆ Overnight trips are increasing as a percent of market share.
- ◆ Travelers are going where they expect their values to be met.
- ◆ Travelers are trying to slow down their exposure to change.

Other trends present a challenge to Alaska travel:

- ◆ More frequent, short vacations, closer to home will be popular to save time and money.
- ◆ More Americans travel by car—80% of domestic travel is by car.
- ◆ Several trends present opportunities to Alaska depending on our actions:
- ◆ By the year 2012, 70% of all Americans may be self-employed.
- ◆ Total air travel will double by the year 2005 if it continues at the current rate.
- ◆ Interactive home shopping is expected to become a major source of travel bookings before the end of the century according to the travel trade.
- ◆ The fax and Internet are now effective marketing tools.
- ◆ Loyalty programs work harder than ever.
- ◆ Travel is the largest and fastest growing nonsurvival retail industry in the U.S.
- ◆ Visits with family and friends are increasing share of market.
- ◆ Family travel is increasing share of market.
- ◆ Families are looking for "bonded leisure."
- ◆ Travelers are looking for good value for their money.

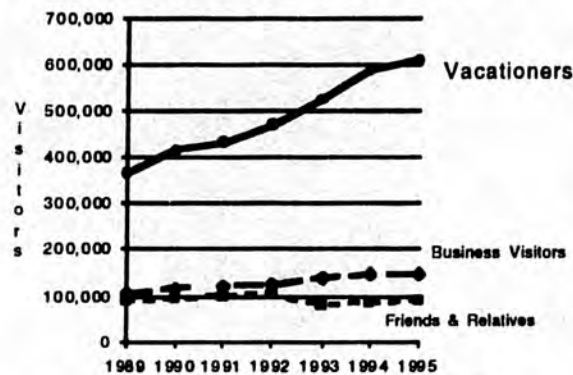
Alaska's Visitor Trends

Clearly, the vacationer contributes the bulk of growth to the tourism industry with a growth rate of 66% since 1989. Friends and relatives grew by 2.1% during the same period. There was a 26% increase in per-person per-trip expenditures and a 73% increase in total expenditures from Summer 1989 to Summer 1993.

Alaska visitor trip planning time lines are stable.

Length of stay for vacationers is stable but friend-and-relative stays are getting shorter.

Summer Visitor Arrivals by Type 1989-95



Source: Alaska Visitor Statistics Program - Summer is June through September

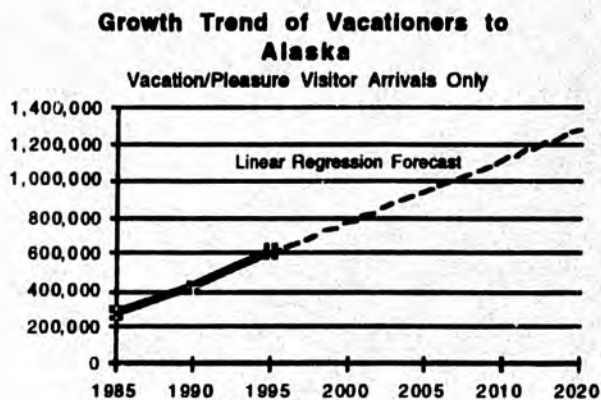
As the industry grows, each region of Alaska captures a similar share of the market with the exception of the Interior/Far North, which is losing share in spite of steady growth.

Visitor satisfaction and value for the money ratings are very high, although they recently declined slightly. Evidence points to the more critical scoring by baby-boomers whose expectations are different from their parents who dominate the visitor population. To address these different expectations product changes are being undertaken by the industry.

Growth Projections—Population & Visitors to 2000

Vacationers to 2000. Assuming the trends shown in the chart below continue, a sizable future increase in the number of U.S. vacationing households can be projected throughout the turn of the century.

Number of U.S. Vacationing Householders (for all households and selected types, in thousands)			
	Number of HHs in 1993	Number of HHs in 2000	% Change 1993-2000
All U.S. Householders	96,391.00	110,143.00	13.60
-Domestic Vacationers	33,777.00	38,845.00	15.00
- 5+ nights away	13,484.00	15,596.00	15.70
- Travel by car	23,963.00	27,391.00	14.30
- Travel by air	11,842.00	13,920.00	17.20
-Foreign Vacationers	11,882.00	13,920.00	17.20
Source—Data by Mediarmark Research Inc.; projections by American Demographics— from ATMC Marketing Plan 1995-2000, October 14, 1994.			



Visitor Arrival Growth Projections.

While total visitor arrivals have already passed the 1.1 million mark, the dynamic component of the tourism industry—vacationers, has yet to reach 700,000. If growth of these visitors continues, we can expect to break one million in the year 2006. Visitor expenditures are likely to grow faster based on recent trends explained above.

Conclusion

Alaskans have available to them a growing visitor industry that can provide jobs and careers while maintaining a pleasant lifestyle, but much of the knowledge and training that can make it happen is missing or hard to find. The entrepreneurial nature of the business tends to reward the self-taught and self-motivated.

Visitors of several types come to Alaska and contribute to the economy in different ways and in different sectors of the industry. Cruise/tour visitors and Independents who buy tours instate are among the most valuable and should be cultivated. The state depends heavily on private sector promotions to bring visitors to Alaska yet provides a vital role in structuring cooperative promotions.

The future of tourism as a contributor to the basic sector of Alaska's economy will depend on additional access to public land resources. Expansion of tourism will require both intensive and extensive use of public lands.

Tourism growth will require substantial capital, both from outside, and in-state, principally from the diversification of native-held investments. In many cases, public infrastructure development in the form of roads, ports, and other public amenities will need to find funding.

Talented practitioners are a critical element to the success of tourism in Alaska. Corporate skills will be needed to craft resort developments that cater to the cruise/tour market. Entrepreneurial talent will be especially in demand to develop new in-state tours for the independent market.

Recommendations

A number of first steps should be taken at once.

6. The state should measure the economic impact of different visitor types to Alaska, including direct visitor spending, industry spending in support of visitors, owner-employee income generated by tourism businesses, the investment of outside capital, and the retention of profits within the state. [The state needs to find out which travelers are contributing the most to Alaska, and devise strategies to increase their numbers.]
7. The state should maintain a business environment that encourages strong private sector marketing of the Alaska product and keeps the state government's

contribution to marketing proportionately low. The state should facilitate public private cooperative marketing which creates efficiencies for the marketing partners. [The state should make sure the large players stay in the game or it will have to make up the difference in overall destination marketing to insure a growing visitor count.]

8. The visitor industry must work harder to extend the summer season an additional four to six weeks, and create a measurable increase in the winter niche market in order to justify investment in new facilities needed for the summer.
9. The state should establish an assistance program for winter tourism business development.
10. Native corporations should aggressively enter the tourism business by making strategic alliances with existing tour operators and by opening up their land holdings for new tourism infrastructure.
11. The state should review their capital investment and operating budgets with a view toward including infrastructure construction and maintenance strategically needed to facilitate the movement of visitors throughout the state.
12. Education in the state should inform students about the jobs and career opportunities that are available in the visitor industry. Technical and academic courses should lead toward entry level management positions in the industry and inspire entrepreneurship.
13. The industry should preserve and expand wildlife viewing opportunities by working with public agencies to make wildlife view more accessible, by funding of watchable wildlife programs, and by protecting wildlife and their habitats.
14. The state should inventory and zone tourism areas on state lands which will be made available for both extensive use by small group tourism and intensive use by large group tourism.

Source Notes

"Modern History of Alaska Tourism," "Tourism as a Part of the Basic Sector," "Tourism's Place in the Alaskan Economy," "Number of Jobs" and "Nonresident Component" sections are adapted from "Alaska's Visitor Industry—An Economic Profile," prepared for the Alaska State Division of Tourism by McDowell Group, July 1991.

"Taxes, Fees and Other Revenues" section adapted from "Taxes and Fees Paid by Alaska's Visitor Industry." Prepared for the Alaska Visitors Association by McDowell Group, March, 1996

"Competition and Promotion" section adapted from OATMC Marketing Plan 1995-2000 prepared by the Alaska Tourism Marketing Council, October 1994.

"Alaska's Visitor Markets," "Visitor Expenditures," and "Visitor Origins" section statistics are drawn from the Alaska Visitor Statistics Program reports, prepared annually since 1985 by The McDowell Group for the Alaska State Division of Tourism.

"National Travel Trends" section is adapted from: Travel Industry Association of America Presentation, October 18, 1995, by Jane Mass, Chairman Emeritus, Earle Palmer Brown

Advertising and, "Directions" Travel Intelligence System Database, D.K. Shifflet & Associates, Ltd.

"Alaska's Visitor Trends" section statistics are drawn from the Alaska Visitor Statistics Program reports, prepared annually since 1985 by The McDowell Group for the Alaska State Division of Tourism.

"Vacationers to 2000" section is adapted from "ATMC Marketing Plan 1995-2000" prepared by the Alaska Tourism Marketing Council, October 1994.

"Access to Land Resources," "Seasonality" and "Recommendations" sections are adapted from "Destination: Alaska—Strategies for the Visitor Industry" prepared by International Tourism and Resort Advisors for the Alaska Visitors Association, 1993.

Competitive Market Awareness figures are from a 1995 Market Study by Longwoods International for Princess Cruises & Tours.



Fund properties to help promote Alaska

Goods, services to be sold Outside

By PATRICIA JONES
Staff Writer

Most people see only rental income and possible market appreciation when they look at financial benefits provided by the 90 real estate properties owned by the Alaska Permanent Fund Corp.

But managers of Alaska's oil-backed savings account see opportunity for state tourism businesses, for local artists and for organizations that make products out of the state's many natural resources.

Celebrate Alaska, a marketing program for state businesses, was formally approved Wednesday at a luncheon held as part of a permanent fund board meeting held in Fairbanks this week.

The program calls for using any of the Lower 48 apartment buildings, office space and shopping centers owned partially or entirely by the permanent fund as a place to promote Alaska.

"I think it's a wonderful opportunity to sell Alaska's goods and services throughout the world," said Debby Sedwick, commissioner of the Alaska Department of Commerce and Economic Development.

Her staff will work with managers of the permanent fund real estate assets to tailor appropriate marketing strategies for each property.

For example, shopping malls

in both Washington, D.C. and Phoenix are sending representatives to Alaska later this month to look at artwork and performing artists. The artwork and artists will be featured in week-long promotions at the malls later this year.

Each mall management office has committed to a \$20,000 budget they will spend on the Alaska promotion in their mall, Sedwick added.

"This will let people learn about all that Alaska has to offer," she said. "Alaska is still a mystical place, and this will help sell Alaska as open and ready for business."

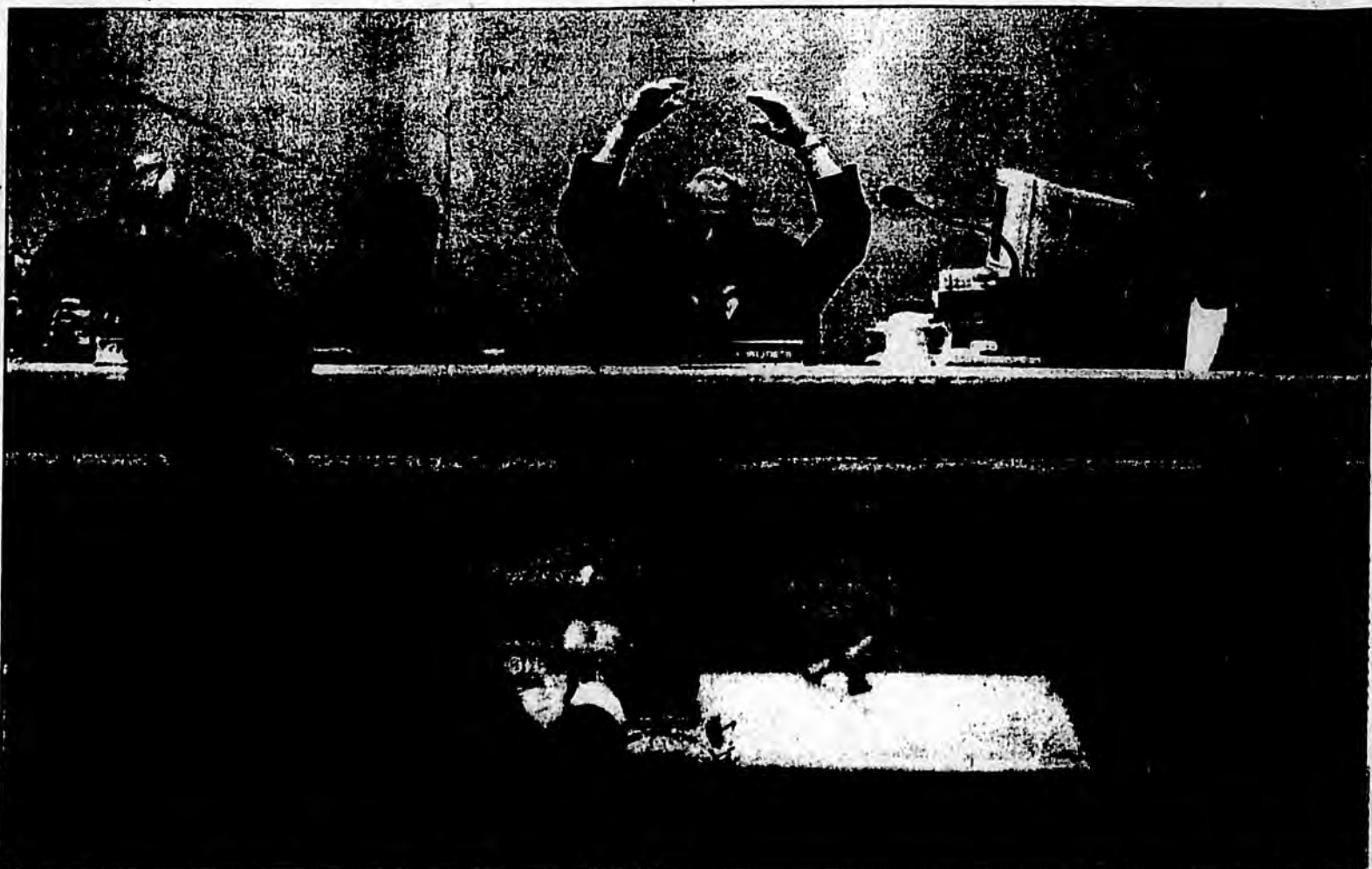
The program involves more networking and making contacts than it does spending money, both Sedwick and permanent fund managers said.

Permanent fund property managers say the program will not cost earnings generated by the savings account's real estate assets, currently worth about \$1.6 billion.

"The intent is to try to leverage the value of the permanent fund for the benefit of Alaskans without compromising its integrity and earnings," said Peter Naoroz, permanent fund real estate investment officer.

The largest portion of real estate investment is in office space, with 17 properties valued at \$432

See FUND, Page A-11



MONEY TALK—Peter Bushre, foreground, chief financial officer for the Alaska Permanent Fund, addresses the Permanent Fund Board, including members (from left) Clark Gruening, Chairman Eric Wohlforth and Melphine Evans in the borough assembly chambers Wednesday afternoon. Bushre was updating the board on operations during a regular board meeting held in Fairbanks Tuesday and Wednesday.

Mike Mathers/News-Miner

FUND: Properties

Continued from Page A-1

million. Those office property managers, as well as people overseeing the fund's 37 apartment complexes, will be asked to buy artwork produced by Alaska artists when redecorating common areas and foyers.

"It's a cooperative partnership for the promotions," Naoroz said. "There's not going to be any strong-arming of tenants or property managers."

Welcome baskets placed in

some of the 15,000 apartment units will contain Alaska-made products such as canned or smoked salmon and tourism brochures about the Last Frontier.

"I think this could become a trend nationwide for institutional investments," said Jim Kelly, permanent fund spokesman. "The mall in Phoenix has 55,000 people pass through it every day, so it has very big benefits."