

ALL INFORMATION CONTAINED HEREIN IS UNCLASSIFIED DATE 11/19/83 BY 1984

3040 SSA SB 227 - SB 257 8672

2. Climatological Data

The second priority was given to the collection, analysis, and application of weather data. No natural phenomenon has more impact on agriculture than daily, seasonal, and annual weather conditions. Agriculture is now being practiced in areas with insufficient weather data to make daily forecasts or long-range planning decisions. In addition, agriculture is expanding into new areas where little or no weather data have ever been collected. These data are urgently needed to assure that proper decisions are made on crop species and variety selections, seeding and harvesting dates, wind and water erosion control measures, storage, transport, marketing considerations, and the myriad of other daily choices that must be weighed in light of the weather in all agricultural endeavors. Wind and water erosion control are the prime considerations, however.

Environmental hazards (such as floods, severe storms, and site-specific hazards) need identification in each potential agricultural area. Even short-term research (3-4 years) is of prime importance for the establishment of conservation practices. This activity has been developed and installations have been made for both the Delta Junction and Nenana areas. It is important that these efforts be continued there and expanded elsewhere when agriculture potentials are investigated.

3. Agricultural and Legal Relationships

The third priority specifies two research needs of agriculture which are bound by legal restraints. The first of these involves testing and clearance for use in Alaska of chemical pesticides and drugs by the Environmental Protection Agency (EPA) or the Food and Drug Administration. (Many chemicals and drugs cleared for use on specific crops and animals in the Lower 48 or other countries are not cleared for use in Alaska.) Chemicals cleared for use in Alaska on crops we do grow are not always effective at approved rates of application because of climate and/or soil conditions that differ from those where effective rates were determined and maximum limits set. EPA clearance of these chemicals on the crops that we grow and at rates of application that are effective under our conditions requires extensive support data and assurance that neither human beings nor the environment would be adversely affected. For example, one drug of primary importance to Alaska is Worbex. This drug is extremely effective in controlling warble fly infestations of reindeer and currently is used in both Scandinavia and the USSR. This drug has not been approved for use on Alaska reindeer.

The second research need now bound by legal restraints is the development of phosphate fertilizer deposits. These valuable deposits are presently within the boundaries of federal land withdrawals or in areas of State or Native land with land access. Phosphate is one of the major limiting minerals in agricultural soils in Alaska. Application of high rates of phosphorus are needed to produce economical crop yields. Methods or procedures are needed to provide access to and utilization of these deposits.

4. Marketing and Processing Beyond the Farm

The fourth research priority is concerned with the complex disposal system of farm products after they leave the farm. Research is needed in all areas of slaughtering, processing, packaging, storage, and shipment of animals as well as the processing, storage, shipment, and utilization of crops. This research should be directed toward developing technologies appropriate to Alaska's conditions and needs, village and remote area consumption, and urban utilization. The unique marketing system found in rural areas needs to be addressed as well as the development of foreign market feasibility. (Some of these kinds of research are related to priority number 10, below.)

5. Animal and Plant Disease and Insect Control

The fifth priority addresses the serious need for research into the control of animal and plant diseases and insects. These pests annually cause large losses of animals, poor growth rates and feeding efficiencies, and reduced quality of finished meat products. Plant diseases and insects likewise reduce plant population, yields, and quality. There is presently neither a plant or animal pathologist or entomologist on the University of Alaska faculty. Both are desperately needed.

6. Erosion Control Practices

The sixth priority of erosion control research is essentially mandated by the Federal Water Pollution Control Act Amendments of 1972 (P.L. 92-50, Sec. 208) and the Clean Water Act of 1977 (P.L. 95-217). These two acts combined require the development of what are called Best Management Practices (BMP's), and the application of these BMP's to agricultural lands to reduce nonpoint source pollution of lakes and streams. Many BMP's are already developed and practiced, and more are being developed to fit special or changing situations. Their suitability under Alaska conditions and development of BMP's specially for our conditions, need to be researched. The urgency of preventing erosion and water pollution before it occurs is recognized by Alaskans. This is the only state which still has this opportunity. Research of this nature is needed now, not later.

7. Extension - The Transfer of Resources

The seventh priority emphasizes the transfer of research results into appropriate technology that is understandable and usable by large and small commercial farmers, subsistence farmers, and rural and urban gardeners or small animal raisers. The traditional role of the Cooperative Extension Service in this effort is recognized. An intensification of research under other priorities listed here will require a concomitant expansion of extension activities to communicate the results to the people. Increased research without communication is futile.

Additionally, the committee recognizes the accumulation of large amounts of research data over seventy-odd years which now rests, unavailable to

the majority of the public, in archives, private libraries, forgotten files, attics, and closets. These data must be gathered together and placed in a repository with public access. Computer storage of these data, similar to that of the Arctic Environment Information and Data Center of the University of Alaska, would provide ready access to a large amount of research already conducted and would avoid duplication with new research.

8. Interrelationship of Agriculture and Natural Systems

The eighth priority responds to a controversy which commands the collective attention of agriculturists and nonagriculturists alike--are agriculture and natural ecosystems compatible, complementary or antagonistic, and if so, to what degree? Just as important is the question--can agriculture be adjusted or manipulated to be compatible with natural systems without jeopardizing man? Sound information on these interrelationships is lacking and often misunderstood. Of special importance to Alaska is the relationship of natural systems during the development of artificial systems. The integration of agriculture with natural systems needs to be studied to enable orderly development to proceed without compromising nature.

9. Range Site Identification and Carrying Capacity

The ninth priority concerns the vast range lands of Alaska, estimated to exceed 100,000,000 acres. The true value of these range lands in terms of human food production, wildlife production, and vegetative resources is unknown. Demand for the utilization of Alaska's range lands is growing. The resource is known to be fragile. Identification and classification of different kinds of range lands, their carrying capacities of domestic stock and wild animals, the necessary management for sustained use, and preservation of their aesthetic values, need to be determined.

10. Feasibility of Regional Agricultural Base

The tenth priority addresses a problem peculiar to Alaska and other northern countries--distance and isolation of populated regions. These regions, including Anchorage and the Cook Inlet area, depend upon outside sources for more than 90 percent of their agricultural products. The unsoundness of this dependency is evident wherever the transportation system is disrupted. Even with the transportation system to Seward, Anchorage, and Southeast intact, redistribution to outlying regions depends on the variables of weather, sea ice, space on available carriers, internal transportation strife, etc. The ability of individual isolated population regions to maintain an integrated and self-sustaining agricultural base would relieve them of total dependency on the outside and avoid crisis situations during transportation or other disruptions. Soils with agricultural potential have already been identified in most of Alaska, and they are well dispersed throughout the state south of the Brooks Range. Information is available on a number of crops adapted to these areas. Research on the feasibility of the concept of regional agricultural bases is now appropriate.

PRIORITIES AND RECOMMENDATIONS:

1. New plant and animal improvement research should be funded with an initial line item appropriation to the University of Alaska Agriculture Experiment Station in the amount of \$200,000. The University of Alaska should be directed to use these funds cooperatively with both federal and state agriculture agencies and to be guided by further recommendations of the Council's committee.
2. New climatological data for agricultural growth through collection, analysis, and dissemination should be funded with an initial first-year line item appropriation to the University of Alaska Arctic Environmental Information and Data Center in the amount of \$40,000.
3. Legal restraints on agriculture should be examined by the University of Alaska, Institute of Agriculture for that purpose. In pursuing this effort, the Institute should work closely with other state agencies and federal agricultural experts.
4. Problems of marketing and processing beyond the farm should be analyzed through an appropriation to the Department of Commerce and Economic Development in the amount of \$80,000. This unique and difficult problem must be examined in light of Alaska's food consumption in relation to its production ability and the marketing structure and legislation needed to tie these together.
5. Two new research positions in the fields of animal and plant disease should be established within the Institute of Agriculture of the University of Alaska by the initial appropriation of \$120,000 for salary and support.
6. The Office of the Governor should appoint a lead agency for the coordination of research related to agriculture-related erosion and direct this accomplishment in agencies through the use of existing funds. The U.S. Soil Conservation Service needs to be closely consulted in this activity.
7. The University of Alaska Arctic Environmental Information and Data Center and Agricultural Extension Service should be directed to cooperatively develop a plan for the compilation and dissemination of appropriate bibliographies, data files, and materials for the transfer of knowledge to the agricultural community through the utilization of existing funds. The University should be directed to keep the agricultural committees of the legislature informed of the progress of this effort.
8. The problem of relationships between agriculture and natural systems should be addressed by a pilot project, perhaps in the Mat-Su Valley, examining these agriculture, natural habitat, and wildlife relationships. This report might be requested by an appropriate legislative committee or funds made available to the Council on Science and Technology for the solicitation of research proposals throughout the Alaska community of interest.

9. The Department of Natural Resources, in cooperation with the U. S. Soil Conservation Service, Bureau of Land Management, Forest Service, and others as needed, should be requested to provide a plan for range site identification and carrying capacity research.
10. The Office of the Governor should be requested to develop a framework research plan and proposal for the feasibility analysis of regional agricultural bases.

In summary, appropriations as follows are suggested relative to specific recommendations:

1. University of Alaska Agriculture Experiment Station	200,000
2. Arctic Environmental Information and Data Center, University of Alaska	40,000
3. University of Alaska, Institute of Agriculture	N/C
4. Department of Commerce and Economic Development	80,000
5. University of Alaska Institute of Agriculture	120,000
6. Office of the Governor and U. S. Soil Conservation Service	N/C
7. University of Alaska Cooperative Extension Service and Arctic Environmental Information and Data Center	N/C
8. Legislature (appropriate committee)	open
9. Department of Natural Resources	N/C
10. Office of the Governor	<u>N/C</u>
	440,000 +

CONTRIBUTORS:

Burton L. Clifford, Chairman
 State Resource Conservationist, USDA - Soil Conservation Service
 Anchorage, Alaska

Alan Epps
Resource Specialist, University of Alaska Cooperative Extension Service
Fairbanks, Alaska

Lynne Hale
Fisheries Development Specialist, NANA Development Corporation
Anchorage, Alaska

Byron Hollembaek
Farmer
Palmer, Alaska

Sigmund Restad
Associate Director, Agriculture Experiment Station, University of Alaska
Palmer, Alaska

James Stroh
Agronomist/Plant Material Specialist, USDA - Soil Conservation Service
Anchorage, Alaska

ABOUT THE COUNCIL:

The Alaska Council on Science and Technology reports annually to the Governor and the Legislature on research activities funded by the state and recommends research and funding priorities. Though the Council itself does not perform research, it is charged with helping to coordinate research activities and to enhance standards of research. Nonpartisan advisory services to assist planning at both state and local levels are provided by the Council; for this and other purposes the Council convenes committees, task forces and conferences as needs arise. Utilizing earmarked funds appropriated to the Council's Scientific and Technological Account, the Council conducts the Northern Technology Grants Program to foster Alaskan innovation. From the Account, the Council can award research grants and contracts for purposes specified when monies are appropriated or otherwise assigned to the Account.



ABOUT THE ALASKA COUNCIL ON SCIENCE AND TECHNOLOGY

Organization

The Alaska Council on Science and Technology (ACST) was established by statute and began operations in 1978.

The Council consists of seven members who are appointed by the Governor upon the recommendations of the State's scientific, engineering and related organizations.

- . two members are selected from different executive departments of state government having significant research activities;
- . two members are selected from the Alaska academic community;
- . two members are selected from the general public who have direct activities or interests in research;
- . one member is selected from the staff of the legislature.

Purpose

The Council fulfills three major purposes:

- . it serves the state as a technological and scientific advisory body and liaison with the scientific community;
- . it guides important research activities and selects priorities which will support state objectives and policies;
- . it is responsible for the efficient transfer of resulting data and information.

Program Activities

The ACST's activities are divided between two major functions -- advisory activities and grants/awards activities.

The advisory activities include:

- . testimony and reports serving both the executive and legislative branches of Alaskan government.
- . convening of scientific meetings
- . communications linkage between the science community, government and the general public.
- . identification of research needs. Expert committees have been established in twelve areas:

Agriculture and Animal Husbandry

Communication and Information Transfer

Community Structure

Cultural/Lifestyle Relationships

Education

Energy

Health and Human Life

Minerals

Natural Hazards

Renewable Resources

Transportation

Basic Sciences

The grants and awards activities include:

- . Northern Technology Grants Program. A two-year exploratory program designed to stimulate innovative do-it-yourself appropriate technology projects in Alaska. During the life of the program 114 project awards were made to Alaskans.
- . Scientific and Technological Research Grants. An ongoing research oriented program designed to fund proposals which address state issues.

Communications/Information Transfer

More and more the Council is helping to bridge the communications gap between the scientific community, the government, and the public. It is responsible for translating scientific terminology into easily understood general language, to assist the legislature, and the governor in policy making; and it helps to coordinate and relay research to state and federal agencies, as well as the general public.

The Council utilizes a number of methods to achieve this:

- . publication of research reports.
- . publication of technical briefs.
- . electronic media programs.
- . press releases. General information stories submitted to the newspapers, radio and television media for their use.
- . meetings. Both scientific and general public meetings have been sponsored for review and input on technological themes.

Examples of meetings the ACST supported or assisted in supporting include:

Seminars and workshops on the development of an Arctic Alaska Science Policy

Fourth International Conference on Permafrost

Women in Science Symposium

The Alaska Symposium on Social, Economic and Cultural Impacts of Natural Resources Development

Seventh Annual Alaska Health Congress

Learn Alaska Video Conference

Conferences on Old Growth Forests in Relation to Fish and Wildlife

Workshop on Moss Flora of Arctic North America
33rd Alaska Science Conference
25th Annual Alaska Science and Engineering Fair
Seminars to develop a National Arctic Health Science Policy
Pacific Northwest Regional Meeting of American Geophysical Union
4th Alaska Alternative Energy Conference
Conference on Glaciation in Alaska
6th International Symposium on Circumpolar Health
American Fisheries Society Meeting/Alaska
Symposium on Alaskan Telecommunications
1st International Muskox Symposium

For Information

The Council offices are located in Suite 511, 326 Fourth Street, in Juneau.
The mailing address is ACST, Pouch CV, Juneau, AK 99811. For further information contact Christopher Noah, Executive Director, or call (907) 465-3510.



THE COUNCIL ON SCIENCE AND TECHNOLOGY

LIVING RESOURCES AND HABITAT PROTECTION

Research Priorities and Recommendations

A Special Report

Based Upon the Results of the

Alaska Council on Science and Technology

Living Resources and Habitat Protection Committee's

Joint Discussions and Individual Contributions

September 1981

ALASKA COUNCIL ON SCIENCE AND TECHNOLOGY

Living Resources and Habitat Protection: Research Priorities and Recommendations

* * * * *

CONTENTS

EXECUTIVE SUMMARY. 1
BACKGROUND AND STATUS OF CURRENT RESEARCH. 1
MAJOR ISSUES 2
ANALYSIS AND DISCUSSION. 5
PRIORITIES AND RECOMMENDATIONS 6
CONTRIBUTORS 8
ABOUT THE COUNCIL. 9

* * * * *

EXECUTIVE SUMMARY

Alaska's long-term economic stability rests largely with the maintenance and controlled exploitation of her living resources. Leading the list of living resource industries are fisheries and timber. The fisheries industry is the largest employer in the resource sector within the State. Maintenance of these resource industries is inextricably linked to maintenance of habitat. Habitat loss due to community, agricultural and industrial development leads inevitably to the loss, degradation, or malfunction of intricate natural systems that produce fish, timber, wildlife, and aesthetic experience for humankind. Alaska is faced with balancing the demands of groups using these resources and the demands for industrial growth and development wrought by oil wealth--all against a backdrop of state, national, and international politics and law.

The committee recognized immediately that because of the breadth of scope embodied in "Living Resources and Habitat Protection" not every topic worthy of discussion could be included herein. A significant outcome of this recognition is the establishment of a separate committee on "Water Resources".

BACKGROUND AND STATUS OF CURRENT RESEARCH

Many governmental organizations are involved in research in the area of living resources and habitat protection. State agencies include the Department of Fish and Game (ADF&G), Department of Environmental Conservation, Department of Natural Resources, and the University of Alaska. Federal agencies include Fish and Wildlife Service, National Marine Fisheries Service Park Service, Bureau of Land Management, and Forest Service.

The spectrum of studies being conducted is broad, and programmatically, is comprised of the following:

- Outer Continental Shelf Environmental Assessment Program
- Hydropower Development
- Commercial Fisheries Stock Assessment and Forecasts
- Effects of Logging on Fish and Wildlife
- Marine Ecosystem Interactions and Analysis
- Wildlife Biology - Population Dynamics and Predator Prey Relationships
- Marine Mammals - Population Studies and Harvest Allocations
- Aquaculture - Husbandry and Evaluation
- Water Monitoring and Supply Assessment
- Statewide Sport Creel Census
- Fish and Wildlife Habitat Relationships and Requirements
- Fish and Wildlife Surveys and Inventories
- Silvicultural Practices

These areas cover resource management and development, and habitat protection.

At this time in Alaska's history, the need to focus research on specific resource management problems is particularly acute. The Nation and the world look to Alaska to provide minerals and hydrocarbons to drive an industrial economy, to supply a source of fish products, and to offer a place of sustained infinite beauty where one can, by choice, adopt a life-style with varying amounts of harness to economic drivers and motivations.

Obviously, such a potpourri of human intentions will produce substantial conflicts among competing users and uses of the resources. For example, rapidly changing land-use patterns in the State are having, and will continue to have, a profound impact on Alaska's valuable living resources. Because of these changes, fish and wildlife resource managers are facing an extraordinary demand for increased exploitation of nonrenewable resources and the orderly disposal of lands while attempting to maintain the capabilities of the State's natural habitats to produce and support fish and wildlife.

MAJOR ISSUES:

1. Economic worth of the fish and wildlife resources.

The value of Alaska's commercial fisheries reverberates through Alaskan society far beyond prices paid directly to fisherman. What is the reach of this multiplier effect? To what extent does it impact regional and local employment? Income? What is the economic value of the sport fisheries? Is a sport caught king salmon or coho salmon worth more than a commercially caught king salmon or coho salmon? What is the economic value of subsistence hunting and fishing? There are also important non-economic and intangible values to be considered. For example, what are the costs and benefits of maintaining or improving the viability of coastal communities and expanding the opportunities for individuals to develop alternative lifestyles? What are the aesthetic values of our fish and wildlife resources. Are these aesthetic values tangible or intangible?

Recent dedication of additional Alaska lands to national parks, monuments, and wilderness reservations closed many parts of Alaska to sport hunting. What is the nature and extent of the economic impacts, positive or negative, that resulted from these closures? Without a monetary evaluation of the worth of the fish and wildlife resources and their habitats, informed decisions cannot be made with regard to the trade-offs imminent when competing uses of the resource and land/habitat are proposed. Furthermore, both Federal and State legislation and policy require that management plans and regulations serve a range of biological, economic, social, and environmental objectives. Data and analyses are required to identify and measure these objectives and the effects that alternative management strategies will have upon them.

2. Effects of logging on fish and wildlife.

Researchers have long been studying timber harvesting and its associated activities and their resultant impacts on anadromous fish and their habitat. Much has been learned about physical disturbances (e.g. sedimentation, increased stream temperature, and altered stream discharge) created by logging activities; but an understanding of how these disturbances impact fish and fish habitat and the functioning of the aquatic ecosystem is not well understood in Alaska. The problem is complex. The impacts are difficult to assess because of the high variability in natural populations, and this variability is confounded by commercial fishery exploitation. At this time, the most critical issue and data gap is the role of stream bank or waterside vegetation in maintaining and protecting the integrity of fisheries habitat. At the heart of this issue is the use of "buffer or leave strips" in forest management. More and more information is being collected that documents the importance of the wetland and estuarine areas as critical nursery grounds for many commercially valuable fish and invertebrates. However, little is currently known about the impacts of upland logging on these downstream estuarine areas.

Logging impacts wildlife populations. For example, recently it has been determined that old growth, uneven-aged timber stands are necessary for the well-being of Sitka black-tailed deer. Clearcutting produces even-aged stands of timber with much less value as habitat for the deer and possibly for other wildlife. However, further attention and research are needed in this area to provide an understanding of habitat requirements for other wildlife so that deleterious effects of logging may be minimized or eliminated. Timber harvesting in the interior of Alaska is also increasing, and even less is known of its impact on fish and wildlife. In the interior, mature spruce is harvested for saw timber and house logs, plus cants for export and; birch, spruce, and aspen are cut for fuel. Logging is done by clearcutting, the shelter-wood technique, and certain forms of selective cutting.

All timber harvesting causes major changes in vegetation and, therefore, in wildlife habitats. Fish habitats may be affected by secondary changes in runoff, erosion, etc. There is a need to understand how removing timber influences fish and wildlife in interior Alaska. Logging operations must be designed to protect fisheries and wildlife.

3. Evaluation of performance of hatchery released salmonids.
Alaska has embarked on an ambitious program of salmon enhancement and rehabilitation. Successful enhancement and rehabilitation efforts will ensure the perpetuation of a healthy salmon fishery. Determination of the number of adult fish which are actually contributed to the various commercial, sport, and subsistence fisheries from hatchery production is critical to evaluation of the program. Further, it is likely that salmon produced from yet-to-be-built hatcheries in Southeast Alaska may be looked upon to balance the salmon interception problem that Alaska has with Canada. This could only come to pass as part of a workable solution by determining, at some future time, how many of the hatchery released salmonids are captured as adults and by whom. Hatcheries must be objectively and analytically evaluated on the basis of performance of hatchery released fish so that intelligent, unbiased decisions can be made regarding the future of Alaska's enhancement program. Some hatcheries will be highly successful; others may fail. In the future, we should be able to tell the two apart.

4. Hydroelectric development and instream flow requirements.

The development and construction of hydroelectric power stations necessitate an analysis of the changes that will accrue in the river system that has been dammed. Incremental changes in streamflow and stream channel alterations resulting from proposed hydroelectric development will effect the instream uses and aquatic habitat of fish and wildlife. Changes in streamflow will influence water quality, freshwater recruitment to estuaries, water requirements for riparian vegetation and the amount and timing of streamflow required to maintain the desirable aquatic habitat values of the river itself, i.e. thermal regimes, sediment load, width/depth ratios, channel gradient, stream velocity, and riffle/pool ratios. Reservoir construction may result in inundation of key wildlife habitat or restrict natural movements of some wildlife species. The specific focus and degree of analysis involved in instream flow assessment will depend upon existing or proposed river uses and the concerns of local citizens, public interest groups, and government agencies.

5. Ecosystem analysis (Bering Sea).

The Bering Sea is uniquely productive, and its stocks of fish and shellfish are harvested annually by fishermen from the United States, Japan, Soviet Union, Korea, Taiwan, West Germany, and Poland. In 1972, the commercial catch of fish from the eastern Bering Sea amounted to 5% of the total world catch. In the future, the United States will harvest an ever-increasing proportion of the total catch now allocated to foreign nations.

Because of its high productivity, the Bering Sea is also one of the major congregating areas in the world for marine birds and mammals. These marine animals form the foundation of culture and economy for Aleuts and Eskimos on the Alaskan shore of the Bering Sea and are a major, increasingly valuable asset to the Alaskan economy. Marine mammals also are major users of the commercial and forage fish and invertebrates of this region. For example, it is estimated that marine mammals annually consume more than twice the annual commercial catch of fish. Marine birds consume somewhat less than the annual commercial harvest. The continental shelf of the Bering Sea contains geological structures suitable to oil and gas accumulation. If found in commercial quantities and economic and technological conditions permit the structures will undoubtedly be exploited. The Federal Government is accelerating leasing of parts of the Bering Sea (such as the St. George Basin and the Aleutian Shelf) for petroleum exploration and possible development.

This development and its related activities will impact living resources of this region and the people and animals that use the resources. Understanding the Bering Sea ecosystem and its dynamics is the key to developing rational decisions for competing resource users of this and other regions adjacent to the Alaskan coast.

Federal funding for the necessary fish and wildlife ecosystem research is declining amidst the clamor for increased exploitation of both the living and nonrenewable resources of the Bering Sea. To protect Alaska's vital interests in this resource-rich area, the State will be moved to contribute a greater portion of those research dollars allocated to fish and wildlife ecosystem analysis. Research should be oriented towards the dynamics of relationships among fish, marine mammals, and marine bird populations; the distribution and productivity of their basic forage species; and the impact of petroleum development on the dynamics of these species.

Information is required to assess which ecosystem components and processes are fragile and which are resilient, which are unique and which are redundant, and which must be protected and which can be exploited.

ANALYSIS AND DISCUSSION:

The environmental problems that confront Alaska are multiple and varied. Many needed research projects are currently underway and will continue into the future. Others have not yet been funded, and some are in jeopardy of losing financial support.

Members of the Living Resources and Habitat Protection Committee have identified specific areas of research (discussed below) that have high priority because of their relevance to the major issues discussed above. These should be addressed by the State at this time. For some state and federal agencies, funds are already devoted to conducting the research required; however, the funds are insufficient for problem resolution. We recommend the commitment of additional state funds. Where state funds have already been requested by the normal budgetary process, we support this request. Some

areas of research require more detailed descriptions of what is required and how results will aid in problem resolution. Before funding levels can be recommended in these cases, State funds are sought to accomplish this task. Some problem areas addressed by the proposed research require long term investigations, and the year and level of funding recommended do not imply complete resolution of the problem in the specified time.

The research priorities discussed below in no way constitute a complete listing of the research needs under the broad umbrella that we have titled "Living Resources and Habitat Protection". Absent are such problem areas as atmospheric pollution, groundwater supplies and hydrology, stock dynamics of mixed stock fisheries, fish disease, fish genetics, and placer mining, just to name a few. Nevertheless, the committee does feel that sufficient information is at hand to at least point out several areas of vital importance to the state where no or insufficient research is presently conducted.

PRIORITIES AND RECOMMENDATIONS:

1. Economic Worth of the Fish and Wildlife Resources

Presently, Alaska is making no attempt to assess the value of its fish and wildlife resources. This must change. We recommend that 1.5 million dollars be appropriated over the next 3 years to the Commissioner, Alaska Department of Fish and Game, for this analysis. Such an undertaking will be extremely complex and difficult because values, both tangible and intangible, of the fish and wildlife resources reach into many facets of Alaskan economy and lifestyle.

2. Effects of Logging on Fish and Wildlife

To resolve the conflicts between the timber and fishing industries in southeastern Alaska, the creation of an Interagency Fish and Wildlife Habitat Research Council has been proposed consisting of four agencies (Alaska Department of Fish and Game, Sport Fish and Commercial Fish Divisions; National Marine Fisheries Service, Auke Bay Laboratory; U.S. Forest Service, Forestry Science Laboratory; and the U. S. Fish and Wildlife Service). This council would coordinate and prioritize the research efforts of the four agencies in southeastern Alaska. Together, these agencies are currently spending about \$900,000 annually to investigate and monitor the effects of logging on the fisheries resources. This expenditure is indicative of the concern by these agencies but inadequate to resolve the problem in a timely manner. Consequently, we recommend that the State appropriate \$900,000 annually, as matching monies, over the next 5 years to the Commissioner of the Alaska Department of Fish and Game for use by the proposed Interagency Fish and Wildlife Habitat Research Council. Disbursal of funds within the Council should be based upon each agency's contribution toward the program.

To continue research on the effects of clearcutting on Sitka black-tailed deer, bears, goats, and furbearers, we recommend that \$230,000 be appropriated yearly to the Division of Game, Alaska Department of

Fish and Game for the next 3 years.

We also recommend an initial appropriation of \$450,000 to the University of Alaska for a 3-year study on the effects of logging on the fish and wildlife resources of interior Alaska.

3. Evaluation of Performance of Hatchery Released Salmonids.

Enhancement programs are now demonstrating that large-scale salmon production is resulting in millions of additional adult salmon. Hatchery-supplemented returns now comprise a significant portion of localized runs and will soon constitute a substantial part of the State's total salmon production. A coordinated statewide tag-recovery program will help evaluate each hatchery's production of adult salmon. The program will also provide information on harvest rates, time and routes of migration, and separation of stocks. The Fisheries Rehabilitation, Enhancement, and Development Division of the Alaska Department of Fish and Game has requested 1.2 million dollars for mark, tag, and recovery efforts statewide. We support this effort and recommend that it be funded.

4. Hydroelectric Development and Instream Flow Requirement.

Because of the many potential hydroelectric facility sites in Alaska and the several advantages of hydroelectric power production, many dams are under reconnaissance, design, or construction. Project funds usually permit site-specific fish and wildlife studies once a potential project has been identified and up to the beginning of the construction phase. However, funding is rarely adequate for: (a) studies of whole watersheds identified for possible development before identification of a specific project; (b) post-construction studies of ecological changes up- and downstream of the dam(s); and (c) construction and validation of hydrologic models used to predict instream flow requirements of affected flora and fauna. Such studies would increase the ability of the State to predict effects of future projects, identifying optimum mitigation projects, and prescribe project operation changes that will benefit fish and wildlife resources.

We recommend that \$375,000 be appropriated to the University of Alaska's Arctic Environmental Information and Data Center to further research the application of the incremental flow model as a predictive instrument for measurement of impact and impact mitigation of the major reservoir projects presently contemplated by the Alaska Power Administration. This effort will identify information gaps to be filled by the resource agencies and will ensure that the data collected are compatible with the needs of the model.

5. Ecosystem Analysis (Bering Sea)

To ensure perpetuation and continued long-term exploitation of the various living resources of the Bering Sea, the data base for this region must be improved in specific areas where informational

gaps exist. In addition, research must be continued to improve and verify ecosystem models that could forecast interactions in multispecies fisheries and interactions between fossil-fuel extraction and fisheries and wildlife. Information needs should be listed for each research category, e.g. interactions between fish and birds, mammals and fish, different species of fish, as well as interactions between petroleum development and fish and wildlife.

The extent to which these research needs are being addressed by State, Federal, and University groups should be determined before research priorities can be established and funding requested. To accomplish this task, we recommend that \$80,000 be appropriated to the ACST to convene a series of workshops involving scientists from State, Federal, and University groups involved in ecosystem-related research in Alaskan waters.

In addition to producing a priority listing of information needs and funding levels in each research category, the workshop would be used to establish an interagency task force of highly qualified scientists to formulate and guide future ecosystem-related research that will best serve the interests of the State.

CONTRIBUTORS

Robert D. Burkett, Ph.D.	ACST Vice Chairman and Committee Cochairman, Juneau
Charles D. Evans	Associate Biologist, Arctic Environmental Information and Data Center University of Alaska, Anchorage
William R. Heard	Program Manager, Salmon Aquaculture U.S. Department of Commerce National Oceanic and Atmospheric Admin. National Marine Fisheries Service, Juneau
K. Koski, Ph.D.	Supervisor, Watershed and Estuarine Ecosystem Project U.S. Department of Commerce National Oceanic and Atmospheric Admin. National Marine Fisheries Service, Juneau
Richard E. Logan, Ph.D.	Director, Division of Habitat Protection Alaska Department of Fish and Game, Juneau
Donald E. McKnight, Ph.D.	Chief of Research, Game Division Alaska Department of Fish and Game, Juneau

William Meehan, Ph.D.,	Project Leader, Forestry Sciences Laboratory U.S. Department of Agriculture Forest Service, Juneau
Steven Pennoyer	Director, Commercial Fisheries Division Alaska Department of Fish and Game Juneau
George W. Rogers, Ph.D.	Adjunct Professor of Economics University of Alaska, Juneau
Donald M. Schmeige, Ph.D.	Program Leader, Forestry Sciences Laboratory U.S. Department of Agriculture Forest Service, Juneau
Richard R. Straty, Ph.D.	ACST and Committee Cochairman, Juneau
Robert B. Weeden, Ph.D.	Professor of Resource Management University of Alaska, Fairbanks
William J. Wilson	Supervisor, Resource and Science Services, Arctic Environmental Information and Data Center University of Alaska, Anchorage

ABOUT THE COUNCIL:

The Alaska Council on Science and Technology reports annually to the Governor and the Legislature on research activities funded by the state and recommends research and funding priorities. Although the Council does not perform research, it is charged with helping to coordinate research activities and to enhance standards of research. Non-partisan advisory services to assist planning at both state and local levels are provided by the Council; for this and other purposes the Council convenes committees, task forces and conferences as the need arises. Utilizing funds appropriated to the Council's Alaska Account for Scientific and Technologic Research, the Council conducts the Northern Technology Grants Program to foster Alaskan innovation. From this account the Council also administers the Research Grants Program, supporting Alaskan Research identified in reports such as this and other areas of investigations identified by the Council.



THE ALASKA COUNCIL ON SCIENCE AND TECHNOLOGY

ALASKA MINERALS

Research Priorities and Recommendations

A Special Report

Based Upon the Results of the
Alaska Council on Science and Technology
Minerals Committee Workshop
Held February 1980 in Anchorage, Alaska

April 1980

ALASKA COUNCIL ON SCIENCE AND TECHNOLOGY SPECIAL REPORT

ALASKA MINERALS: Research Priorities and Recommendations

* * * * *

CONTENTS

EXECUTIVE SUMMARY.....1
BACKGROUND AND STATUS OF CURRENT ACTIVITIES IN
ALASKA MINERAL RESEARCH.....2
MAJOR ISSUES.....3
ANALYSIS AND DISCUSSION.....4
PRIORITIES AND RECOMMENDATIONS.....6
CONTRIBUTORS.....10
ABOUT THE COUNCIL.....11

* * * * *

EXECUTIVE SUMMARY:

Mineral development in Alaska holds considerable promise but greater attention to state policies and accelerated investigations, mapping and research are essential to progress which can be both economically productive and environmentally safe. Expected placer mining activity is a particularly acute problem for the state and should be dealt with aggressively on all fronts: policy, education, and regulation.

BACKGROUND AND STATUS OF CURRENT ACTIVITIES IN ALASKA MINERAL RESEARCH:

Geologic Mapping

The U.S. Geological Survey has an ongoing program to map and otherwise compile Alaska's geologic features on a broad-scale, regional basis. This mapping provides basic geologic information but does not provide the detailed information necessary for in-depth understanding of mineral districts. The scale of 1:63,360 (1" = 1 mile) is generally taken as the dividing line between reconnaissance and detailed mapping. To date, less than five percent of Alaska has been covered at 1" = 1 mile, and much of this mapping does not address hard minerals.

The Alaska Division of Geological and Geophysical Surveys (DGGS) has indicated that it considers detailed mapping an appropriate activity for itself. The DGGS has proposed programs for more detailed mapping for five areas: McGrath/Lime Hills, north flank of the Chugach Range, Brooks Range,

Lake Clark area, and southeast Susitna Basin. To date, however, only the program for the Brooks Range has been funded.

Placer Mining

Despite the fact that almost all of the mining in Alaska is placer mining, only limited research has been conducted on the effects of placer mining on the environment and the best methods to minimize these effects. The Mineral Industry Research Laboratory (MIRL) at the University of Alaska, Fairbanks, has recently completed a limited study on the effects of placer mining in the Fairbanks and Interior mining districts. In addition, the Alaska Miners Association conducted a study on the effects of placer mining on wildlife habitat in the Nyac area. However, the scope of both of these studies has been limited.

The effects of placer mining on water quality have been studied by the Department of Environmental Conservation (DEC) and by the Water Laboratory of the University of Alaska. DEC has stated that more research is necessary in order to develop the best management practices to reduce water pollution from placer mining.

The MIRL is presently updating the Bureau of Mines' publication on Placer Mining Methods of Alaska. However, when this project is completed more research will be needed to develop better mining methods to maximize mineral recovery and to minimize environmental degradation.

Coal

Only limited research has been undertaken on the development of Alaska's coal resources, in addition to general field-related studies conducted by Don McGee of DGGS and the USGS Conservation Division on coal-bearing areas. The only state research underway at present is a contract by the Division of Policy Development and Planning (DPDP) for a study of export marketing for coal. No thorough research has been conducted on the state's coal royalty and leasing policies. Present state coal royalty-leasing policies appear to be moving toward those appropriate for oil and gas only, when in fact, there are many substantive differences upon which to base separate policy approaches.

The National Academy of Sciences is currently conducting a study on the unique characteristics of the Alaska environment which may require or suggest modification of the federal Surface Mining Control and Reclamation Act of 1977.

Locatable Minerals

Several studies have been completed on the policies and procedures for the disposal of hardrock minerals by the Congressional Office of Technology Assessment, the General Accounting Office, and the Joint Federal-State Land Use Planning Commission. One of the studies by the Office of Technology Assessment dealt specifically with Alaska and is still reasonably current.

MAJOR ISSUES:

The basic issue in hardrock mineral development and research is the need to establish underlying state policy for the development of these minerals. The development of such a policy statement is most desirable. Based on federal experience, however, where much effort was put forth in the drafting of a national policy (the Mining and Minerals Policy Act of 1970), it would appear most productive to divide the policy development question into discrete parts rather than to try to achieve a holistic approach. The Council urges policy resolution in a step-by-step manner, along the following lines:

- 1) Mineral development management—subdivided mainly into coal, placer, and major hardrock;
- 2) Productivity of an Alaskan mining industry—attention should be given to both commodity production and secondary benefits;
- 3) Geologic mapping—policies should prioritize the extent and type of such mapping most beneficial to Alaska;
- 4) Land status—the ownership of land clouds mineral development; the policy issue here is for the state to assert rules for mineral development on its land, including the assertion of state ownership, particularly river and stream beds, and to prescribe policy relationships to lands held by the federal government and private interests;
- 5) Water ownership and management—Alaska has a good body of water law, nevertheless the allocation of water for mineral as well as other development will be a basic issue for the next decade. The state needs to examine its water policies pertinent to mineral development in the light of the prioritization of beneficiary uses under law and the economic and environmental considerations of such potential developments;
- 6) Mineral leasing and royalty policy—the rules for the leasing of state lands for mineral development need to be overhauled from balanced economic and environmental viewpoints consonant with other state land management approaches;
- 7) Transportation and access to mineral holdings—policies need specific articulation in order to provide set rules for state lands and their relationships with and between federal and private interests; and
- 8) Education—policies for the education of miners on mining methods and the conduct of mining operations and for the public as to mining problems and potentials, need to be set forth and carried through at the program level.

ANALYSIS AND DISCUSSION:

Various opinions exist on the economic viability of Alaska's coal and hard minerals. Nevertheless, it is clear that extensive mineral resources exist within the state, and that potentially, their development can have a major impact on the state. Currently, mining and exploration for hard minerals in Alaska is about a \$100,000,000 industry. Industry projections exist for a \$1,000,000,000 industry by 1990, exclusive of coal, which in itself has potential for hundreds of millions of dollars annually by the same date.

At present, though hard mineral development lags behind fisheries and petroleum, it may be very important for operations in the state. It is estimated that there are about 300 small mining operations in the state. The exact number and potential worth of these operations, particularly in local economic and environmental terms, requires research and assessment.

Current research efforts do not adequately address the diverse geologic nature of the state in any detailed fashion, nor are relationships with developmental management programs, particularly those involving water and downstream effects, being adequately analyzed.

The following discussion focuses on particular priority concerns:

1. Geologic Mapping

Detailed geologic mapping (at scale of 1" = 1 mile or less) has benefits in both hard and soft minerals, both at the site of the geologic map and, for fuel minerals, in adjacent nonexposed lowlands. The U.S. Congress and many state legislatures have, in general, opted for purported resource evaluation programs with more immediate glamour than geologic mapping per se. One state, Kentucky, was, however, mapped geologically at 1" = 2000' by a massive USGS/Kentucky cooperative program; the direct and indirect benefits of the state from this program are sufficient to provide the value of such mapping if carried out here in Alaska.

The needs of the state for both reconnaissance mapping, as done by the USGS, and more detailed mapping by the DGGs, are so great that both types of programs need to be expanded or worked on cooperatively so that a more realistic view of Alaska's geologic base will be apparent within the next few decades. From a cost/benefit point of view, geologic mapping is of positive value. Direct and in-depth legislative hearings on this subject are recommended strongly.

2. Placer Mining (Mineral Management and Environmental Research)

The immediate placer mining season is perceived to be one in which management of mining will be strained by a influx of new miners, and one in which there may be unnecessary local environmental damage which, in turn, could lead to legislative and regulatory actions going well beyond the actual scope of the problem.

An immediate need is evident for researching new miners to give preliminary information on permits required, the necessity of evaluating a prospect prior to starting to mine, good mining practices, and pollution and reclamation plans.

Placer mining has been ongoing in some of the same areas of Alaska for several generations, establishing a history of water use, soil disturbance, and growth cycles. No comprehensive study has ever been conducted on the effects of mining activities upon Alaska's particular environments. Because of complex effects on mining on waters, vegetation, and animal life, historical study plays an important role in identifying factors which are difficult to quantify experimentally.

3. Placer Mining (Education)

Essentially no information center is available for miners to learn mining and recovery methods, or to learn about legal requirements for mining in Alaska. Water pollution control, waste disposal, and reclamation information and assistance must be made available to miners at all stages of mining. Safety permits, property evaluation, and more efficient recovery methods are also areas of need for miners.

Furthermore, an antipathy between miners and bureaucrats has been heightened in recent years by new laws and land withdrawals. An impossible gap between the regulatory bureaucracy and the small miner is being established, and demonstrates a need for an informational and assistance program outside of a regulatory agency. The framework and legislative mandate for such work is contained in the MIREL of the University of Alaska, Fairbanks.

4. Water Rights and Management

Critical issues, which will affect the future development of a minerals industry in Alaska, concern water rights and management. There has been little case law on water rights in Alaska, although litigation will increase as conflicts arise regarding federal, state, Native, and private water rights. Water rights litigation involving the Native village of Pauyvik will set some additional rules for water appropriation in Alaska and the relationship of the Alaska Native Claims Settlement Act and the state water appropriate code. The Department of Law is undertaking some research into federal/state conflicts with respect to water. Also, the federal government is in the process of quantifying federal reserve water, both reserve water required for federal purposes and water required in connection with its trust responsibilities toward Native peoples.

The unresolved nature of most water management issues, suggests the necessity of monitoring the complex development of water law in Alaska as it particularly affects mineral development.

PRIORITIES AND RECOMMENDATIONS:

1. Expand the State's Geological Mapping Program

The single most valuable research and land planning tool would be detailed geological mapping at a scale of 1" = 1 mile. Such mapping would provide basic geologic information necessary for state land classification and would stimulate private exploration and development.

Specific Recommendations:

The proposed programs of the DGGs for detailed geological mapping of the following areas should be approved:

1. McGrath/Lime Hills
2. North flank of the Chugach Range
3. Brooks Range
4. Lake Clark area
5. Southeast Sisitna Basin

In addition, the DGGs should initiate an even more detailed mapping program in cooperation with the U.S. Geological Survey, similar to the ten-year cooperative program for mapping in Kentucky, at a scale of 1" = 2000'. Appropriation of funds by the Alaska legislature for such a program could well demonstrate to the federal government a positive attitude on the question of resource research expenditure. The Council highly recommends hearings on this subject.

2. Detailed Mapping of the Fairbanks Mining District

There is an immediate need in the Fairbanks area for highly specific mineral information for land purposes. This area has 1:24,000 base topographic map (1" = 2000'). Detailed geologic mapping at the same scale would provide the necessary input to study the feasibility of an ore-processing plant in the Interior.

Specific Recommendations:

The Committee believes that the budget proposal of the Fairbanks North Star Borough's Program for Progress relative to ore processing should be evaluated. Either under this program or under a similar one, the DGGs should be given the funding for a detailed mapping program in the Fairbanks mining district.

3. Map Coal Resources Available for Village Use

A coal mapping program in and near villages would provide the necessary information to evaluate coal as an alternative energy source for local needs.

Specific Recommendations:

An additional appropriation of \$200,000 should be made to the DCGS for field investigations and mapping of Alaskan coals surrounding villages. The DCGS should also be asked for priority recommendations pertaining to pilot development efforts.

4. Education of New Miners

Since this coming spring, summer, and fall will see an influx of new miners, many of them inexperienced in mining, an educational program directed at informing miners of regulatory requirements and good mining practices is of immediate importance.

Specific Recommendations

A simple, attractive brochure should be devised to be distributed at various statewide check-in places where miners may be expected to inquire. The brochure should depict the problems encountered in starting to placer mine, possible solutions, permits needed, evaluation needs, mining methods, and pollution and reclamation practices. Because this medium must be as simple as possible in order to attract the attention of many interested in mining, it will only touch the surface of a longer educational process. The brochure should list places where further information may be collected and various bibliographic sources of reference.

It is suggested that \$15,000 might be appropriated through the Alaska Council on Science and Technology to contract for professional production of this brochure.

5. Promotion of Good Mining Operations

A tremendous amount of expertise is held by long-time successful miners in Alaska. Distribution of such expertise should be a priority for the state in order to 1) educate the public on the individual ingenuity and ability essential to develop successful mine properties, and 2) share such expertise with less knowledgeable miners. This expertise will also enable miners to maximize mineral recovery.

Specific Recommendations:

It is suggested that funds in the amount of \$50,000 should be appropriated through the Alaska Council on Science and Technology to contract for the production of a videotape focusing on how successful Alaskan miners have solved specific problems in evaluation, mining and recovery methods, and waste control.

Because of the variation in conditions faced by miners, such as frozen and thawed ground, negligible to thick overburden, and terrain types, the film should focus on representative geographic examples.

The film would have a two-fold purpose: educational for other miners, and information for the general public. The videotape approach will suit wide-scale distribution.

6. Mining Extension Service

A mining extension program, starting with a mining engineer, should be considered a high priority on a long-term basis for offering qualified assistance to miners in complying with environmental regulations—leading to better mining practices in the areas of water pollution control, waste control, and reclamation. The program would furnish information on mine safety, permits, property evaluation, and more efficient recovery. The extension agent would travel extensively to mine sites, and would also be in regular communication with the Division of Minerals and Energy Management (DTEM), the Alaska Department of Fish and Game (ADF&G), and DEC. Although the immediate concern is with placer mining, the extension program could also apply to hardrock and coal mining, especially by small operators in future years.

Specific Recommendations:

The mining extension program at the MIREL of the University of Alaska, Fairbanks, should be expanded. Initially, a mining engineer should be added to the MIREL staff to serve as an extension agent.

Initial Funds of:

Salary and Benefits	\$ 50,000
Travel	25,000
Program	<u>50,000</u>
TOTAL	\$125,000

are recommended for MIREL to initiate the first year's program.

7. Research on Effects of Placer Mining

Due to the complex effects of mining on waters, vegetation, and animal life, research in the area of mining-environmental relationships should receive high priority. Compilation of all data currently available, supplemented by further study in areas lacking information, and highlighted by case study of an area such as the Fairbanks region, with its mining history, would be valuable working tool for future mining plans.

Specific Recommendations:

As data are still available on the Fairbanks area to quantitatively determine the changes effected by mining, it is suggested that the Fairbanks area could be used as the type example for a placer research program which would evaluate:

1. post-mining land uses, capability, and land value;

- 2- on-site and downstream effects of silt removal and redeposition; and
3. specific effects of mining on fish, birds, and mammals at and downstream from the mine site.

Funding of \$100,000 should be allocated to DNR or to a University consortium and ADF&G working together for a one-year period to cover research and compilation by 1) aquatic and terrestrial biologists, 2) a hydrologist-soils scientist, and 3) a mining engineer. The work should be correlated with other site-specific studies.

8. Research Directed at Placer Mining Activities

Four areas of need have been identified as priorities in the area of active placer mining evaluation and research. These are:

1. techniques of evaluation of placer ground;
2. mining methods;
3. recovery methods;
4. reclamation and pollution problems and opportunities.

Applied research is needed on traditional methods of ore evaluation such as shaft sinking, as well as on the possibilities of the use of neutron activation analysis and large-scale rapid drill sampling using either in situ or through extractive methods to obtain samples.

Mining methods are essentially unchanged since the 1930's. In deep ground, drifting--not used extensively since the early 1900's--may have modern application. Older mining techniques, such as bucket line dredging, may be modified to make the discharge "better" in terms of both dredge pond retention and capability for revegetation and land reclamation.

Several improved recovery systems are available, but there is need to analyze the benefits of when to concentrate on higher recovery of fines or of by-product minerals. Research should focus on pragmatic systems which will allow increased recovery, but possibly use less water or permit discharge of cleaner water.

Pollution and reclamation problems and opportunities both need to be extensively researched. In some deposits, it appears that an attempt to return placers to alluvial valleys to original contour would have adverse consequences in regard to recolonization by fish, plants, and animals. Work is needed on physical and chemical means to economically reduce silt discharges.

Specific Recommendations:

It is recommended that the House and Senate Resource Committees consider appropriations of \$100,000 for each of the four projects to be completed

within one year. Proposals would be requested for each area and contracted to the program best suited to carry out the intent of the priorities of the proposal. The Council could assist both the legislature and the administration, if requested, in the evaluation of these proposals.

CONTRIBUTORS:

Chuck Hawley, Committee Chairman
Hawley and Associates
Anchorage, Alaska

Wyatt Gilbert
Alaska Division of Geological and Geophysical Surveys
Department of Natural Resources
College, Alaska

Dan Hawkins
Geology/Geophysics Program
University of Alaska
Fairbanks, Alaska

C. F. Herdartz
B. F. Alaska Exploration
Anchorage, Alaska

John Katz
Governor's Office
Anchorage, Alaska

Paul Metz
Minerals Industry Laboratory
University of Alaska
Fairbanks, Alaska

Tom Miller
U.S. Geological Survey
Anchorage, Alaska

Jane Perla
Anchorage, Alaska

Robert Sanders
Department of Natural Resources
Division of Minerals and Energy Management
Anchorage, Alaska

John Proffett
Anaconda Company
Anchorage, Alaska

ABOUT THE COUNCIL:

The Alaska Council on Science and Technology reports annually to the Governor and the Legislature on research activities funded by the state and recommends research and funding priorities. Though the Council itself does not perform research, it is charged with helping to coordinate research activities and to enhance standards of research. Nonpartisan advisory services to assist planning at both state and local levels are provided by the Council; for this and other purposes the Council convenes committees, task forces and conferences as needs arise. Utilizing earmarked funds appropriated to the Council's Scientific and Technological Account, the Council conducts the Northern Technology Grants Program to foster Alaskan innovation. From the Account, the Council can award research grants and contracts for purposes specified when monies are appropriated or otherwise assigned to the Account.



THE ALASKA COUNCIL ON SCIENCE AND TECHNOLOGY

ALASKAN ENERGY

Research Priorities and Recommendations

A Special Report

Based Upon the Results of the
Alaska Council on Science and Technology
Energy Committee Workshop
Held February 1980 in Anchorage, Alaska

March 1980

ALASKA COUNCIL ON SCIENCE AND TECHNOLOGY SPECIAL REPORT

ALASKAN ENERGY: Research Priorities and Recommendations

* * * * *

CONTENTS

EXECUTIVE SUMMARY.....1
BACKGROUND AND STATUS OF CURRENT ACTIVITIES
 IN ALASKAN ENERGY RESEARCH.....1
MAJOR ISSUES IN ALASKAN ENERGY RESEARCH.....2
ANALYSIS AND DISCUSSION.....3
PRIORITIES AND RECOMMENDATIONS.....3
CONTRIBUTORS.....7
ABOUT THE COUNCIL.....8

* * * * *

EXECUTIVE SUMMARY:

For the world as a whole, energy has suddenly become recognized as a key requirement for maintaining the economic welfare of nations and the quality of life of all people. For Alaskans, energy seems even more significant because the energy industry is the state's greatest source of income and it provides growing numbers of jobs for Alaska's work force. Furthermore, it is increasingly apparent that individual, community and regional lifestyles are seriously threatened unless Alaska can bolster energy self-reliance at the community and regional level. Although a great deal of general energy research is underway, thus far it has been of shotgun character. The state should target in on specific opportunities.

BACKGROUND AND STATUS OF CURRENT ACTIVITIES IN ALASKAN ENERGY RESEARCH:

Current energy research in Alaska is primarily devoted to assessment of energy sources, toward developing solutions to problems associated with the extraction of non-renewable resources, and toward Alaska-specific problems in utilizing renewable energy resources. These research activities, most of which are primarily funded by federal agencies, involve petroleum, coal, hydroelectric, geothermal, wind power and solar energy resources. The largest scientific program currently active in Alaska--the Outer Continental Shelf Environmental Assessment Program--deals specifically with the extraction of petroleum resources, chiefly from the offshore regions of the State. Other similar long-term environmental assessment programs are underway and, by necessity, will take some years to complete.

In addition to these research efforts, there are a number of active projects that involve research but which emphasize technological development and demonstration, public education, conservation and economic or societal aspects of Alaskan energy production and usage. Among such projects funded by the State are geothermal demonstrations at Pilgrim Hot Springs and Unalaska Island, and wind energy demonstrations at Nelson Lagoon, Kotzebue, Council, and Newhalen. Other projects funded include energy alternatives and conservation potential in the marine industries, the energy demand within Alaska, energy-intensive industrial development, solar energy resources and utilization potential, and wind power applications. Energy conservation projects include those involving waste heat and waste oil.

Worthy of note is the high interest among individual Alaskans in small-scale private development of, and even research into, energy alternatives. Support of these activities currently comes from both federal (Department of Energy) and state (the Northern Technology Grants Program administered by the Alaska Council on Science and Technology) sources.

Bearing upon Alaskan progress in energy resource development is the aggressive Canadian approach to development of energy in the Mackenzie Delta and arctic island regions, particularly the Canadian emphasis on maritime technologies that may affect the extent to which pipelines are used in the future, (i.e., ice-stressed oil and gas transport ships).

MAJOR ISSUES IN ALASKAN ENERGY RESEARCH:

- Alaska has a variety of potentially viable energy resources. A major issue surrounds the identification of these energy sources, how to gather the environmental and physical baseline data, and policy alternatives relevant to their development. Although an excellent data base has existed for years (i.e., hydro opportunity) and a great deal of work is generally underway, more attention needs to be directed to two areas of major potential: coal and large-scale geothermal energy sources.
- Serious economic problems exist for remote communities of Alaska needing energy to supply basic community needs. There is need for innovative pilot projects that will lead to feasible small-scale energy usage in communities remote from population centers or transportation corridors. Emphasis must be placed on economic justification and community acceptance and there must be adequate consideration of operating and maintenance burdens under conditions that exist in rural Alaska.
- Transmission of electrical power over long distances is costly in both energy and economic resources. Alaska can benefit from the development of improved power transmission systems that would provide a more reliable energy supply and more efficiently utilize available energy. In a northern environment particularly, the development of these technologies is worthy of high state priority.

A major problem that is particularly severe at high latitudes where there is large seasonal variability in energy supply and demand is how to store energy. There is need for the development of improved energy storage capability to utilize off-peak supply in small-scale systems as well as for better long-term storage technology applicable to northern use.

ANALYSIS AND DISCUSSION:

With its production and export of oil from the North Slope and Cook Inlet, Alaska has, in the last few years, become a major contributor to the energy needs of the nation. This role is likely to continue for several decades, with export of natural gas and development of other oil and gas fields.

A consequence of Alaskan petroleum production is the availability of petroleum products along the major transportation corridors at prices comparable to or lower than other West Coast locations. Nevertheless, the general increase in the cost of petroleum product, even where the supplies are plentiful, creates a favorable economic climate for the development of major alternative energy sources such as coal and hydro. Rapidly rising transportation and supply costs are creating economic hardships for families and communities in remote areas of Alaska; the disparity in energy costs between urban and rural locations continues to grow and require attention.

The needs of both urban and rural areas provide the incentive to conserve energy and to develop, especially in remote areas, alternative energy sources -- coal, hydro, geothermal, wind power, etc. Secondly, there is strong reason to improve power transmission technology so that rural systems might be linked to larger systems to take advantage of demand average.

Since Alaska is now a major energy contributor to the nation and will likely increase that contribution in the coming years, we also have the opportunity to participate in the scientific and technical research related to energy production and delivery. We can enhance this opportunity by providing college training for technologists in energy fields, particularly in oil and gas technology. This training could likely be initiated with a cooperative program with the oil industry.

PRIORITIES AND RECOMMENDATIONS:

General Recommendations:

1. Coal: Alaska's major coal reserves and the distribution of these reserves over the state provide the opportunity for both large-scale and small-scale research and development. The Council believes great opportunity for research pay-off exists in coal development interests. Priorities in coal research are:

- a. Assessment of available coal resources; particularly the assessment of deposits most valuable for local or regional consumption need to be examined in relationship to environmental and technological constraints;
- b. Research on burning technology, pollution control, ash disposal, and coal quality with emphasis on small-scale usage application;
- c. Existing programs for the orderly accumulation of environmental and physical data about prospective source sites need to be continued but on a long-range and maintained basis;
- d. The establishment of a new, innovative and full-scale pilot project for the examination of coal extraction technologies, particularly those applicable to permafrost ground;
- e. Research into the use of Alaskan coal to produce synthetic fuels such as syncrude; into gasification of coal and its use in producing hydrogen as an energy source; as well as related research into storage methods for these fuels.

Specific Recommendations:

- f. It is recommended that in response to the need for expanded coal research in Alaska, there be established in Alaska a coal research laboratory under federal Public Law 95-87, which provides for the creation of thirteen such laboratories in the nation;
 - g. It is recommended that Alaska establish several pilot projects to advance the capability to utilize coal in small-scale applications, the projects to be selected in the areas of small-scale use technology, mining techniques in permafrost, assessment and environmental aspects of deposits for local consumption. Projects selected should include economic appraisal of reducing rural power costs. Initial funding required to select, plan and initiate pilot projects: \$50,000 - \$100,000.
2. Oil and Gas: As an owner of extensive oil and gas deposits and real property, Alaska has high motivation for giving priority to:
- a. Research on secondary and tertiary recovery methods applicable to Alaskan oil fields; a cadre of research personnel on secondary and tertiary recovery methods is needed in Alaska and might be best achieved through a joint University-industry program;
 - b. Research on permafrost problems associated with the transport and delivery of petroleum and gas raw materials and products (i.e., particularly cold gas pipeline investigations);

3. Water: Alaska should give priority to research needed to develop small-scale hydro-electric projects. Applications of this kind are particularly desired since this renewable resource is available at many locations in the state and there already is a vast collection of necessary baseline data. Specific needs are for:
 - a. The Alaska Power Authority to provide a listing of potential hydro-electric projects of potentially satisfactory cost effective ratio and where work over the past 30 years has already developed a data base for environmental assessment. This will provide a basis for accelerated project decisions.
 - b. The identification and development of usages and technologies for low-head, high-volume (run of the river) sources, including under-ice technologies.
 - c. An acceleration of analysis pertaining to economic hydropower projects, including studies of economies of scale and the optimization of small-scale systems and seasonal flow variations.
4. Geothermal Energy: As a follow-up to the currently active program to assess the low and moderate temperature geothermal energy resources of Alaska (hot springs), priority should go to site-specific geological and geophysical investigations that will define the extent of the selected reservoirs. There is also a need to further develop and test geothermal exploration techniques uniquely suited to the arctic and subarctic environment. However, the main promise of geothermal energy is in applications that take advantage of Alaska's high-grade level of tectonic activity to extract large amounts of highgrade energy from active volcanoes and buried plutons (igneous rock bodies derived from cooling magmas).

Specific Recommendations

- a. It is recommended that several pilot projects be funded by Alaska to investigate in detail and develop selected low-grade geothermal energy resources. These projects should utilize the capabilities of the Alaska Geological and Geophysical Surveys, the Alaska Division of Energy and Power Development, the University of Alaska, and other groups in cooperative activities. The activities should be directed to:
 - development and testing of geological and geophysical techniques.

- application of the resource to heating, gardening, and other local uses.
 - development of usage technologies.
 - economic appraisal and community acceptance.
- b. It is recommended that Alaska initiate an active program in the technological frontier area of extraction of large amounts of energy from volcanic and deep hydrothermal sources. The first step should be to develop a scientific and logistic plan for a major initiative of several million dollars annually. For initial assessment and definition an appropriation of about \$300,000 is desirable.
5. Windpower: Priority needs in developing windpower usage in Alaska do not require research per se:
- a. Rather the task is to evaluate the application of on-shelf wind generators and systems for individual usages and to improve or develop wind energy systems with promise for community use. These applications can best be evaluated in pilot or test projects. Of additional concern beyond those of applicable technology are questions of social acceptance and attitudes which require examination and understanding.
 - b. Wind data for equipment and systems design and location is non-existent for many Alaskan communities. These data must be gathered if wind generation design and application is to proceed apace with technology. The most practical expansion of the state's wind data base is through the expansion of the number of meteorological observatory sites for rural airports and the people gathering this data. In addition, in communities without airports, (e.g. Western Alaska) or in areas where wind resources appear marginal, observation systems might utilize community buildings or schools.
6. Solar Energy: Solar energy is increasingly attractive for small-scale applications, e.g., residential, greenhouse, and powering of remotely situated instruments. This application of existing and new technology to the use of solar energy is satisfactorily fostered by existing state and federal small grants and similar programs. While maintaining those programs, priority should go to research that develops better energy storage technologies and into obtaining baseline data on solar radiation received at Alaskan sites.
7. Energy Distribution: Alaska's size and location at a high latitude present special problems to long-distance power transmission systems. Priority should be given to research on the use of

ground return and ground electrodes in the Alaskan environment where cold and frozen soils create extremely low conductivity in the earth medium. Similarly, priority should be given to research into ways to protect large-scale distribution systems from outages or damage created by the large magnetic disturbances inherent to Alaska's location at high geomagnetic latitude.

Another priority need is to improve long-distance power transmission through use of direct current or low-frequency alternating current technologies, including the technologies of DC to AC conversions, maintenance of phase stability, frequency conversions in multiterminal systems, and the evening out of supply and demand variations.

8. Energy Storage Systems: Alaska's climate and latitude combine to create an out-of-phase seasonal relationship between energy demand and several forms of energy supply. Hence, there is a special need in Alaska for research into Alaska-specific methods for long-term energy storage, the emphasis to be on small-scale systems since large-scale systems likely are not practical.

9. Energy Conservation and Other Research Needs: Since conservation is an extremely effective means to minimize energy costs and reliance upon distant energy sources, priority should be given to research and development activities that conserve energy. Examples are:
 - Utilization of biomass wastes for energy production.
 - Utilization of waste heat and waste fossil fuel products.
 - Energy-efficient residential and other building designs.
 - Production of methane from sewage and other wastes.

10. Advanced Training in Energy Technology: It is recommended that the University of Alaska give serious consideration to increasing programs that provide training for technologists in energy fields, particularly in oil and gas recovery technology. Industry involvement should be investigated.

CONTRIBUTORS:

Max Beazley, Committee Chairman
Mobil Oil Corporation
Anchorage, Alaska

O.K. Gilbreth
Alaska Oil and Gas Association
Anchorage, Alaska

Don Markle
Alaska Division of Energy and Power Development
Anchorage, Alaska

Don McGee
Alaska Geological and Geophysical Surveys
Anchorage, Alaska

Clarissa Quinlan
Division of Energy and Power Development
Anchorage, Alaska

R. W. Retherford
Anchorage, Alaska

Ross Schaff
Alaska Geological and Geophysical Surveys
Anchorage, Alaska

James Wise
Arctic Environmental Information and Data Center
University of Alaska
Anchorage, Alaska

Eric Yould
Alaska Power Authority
Anchorage, Alaska

ABOUT THE COUNCIL:

The Alaska Council on Science and Technology reports annually to the Governor and the Legislature on research activities funded by the state and recommends research and funding priorities. Though the Council itself does not perform research, it is charged with helping to coordinate research activities and to enhance standards of research. Nonpartisan advisory services to assist planning at both state and local levels are provided by the Council; for this and other purposes the Council convenes committees, task forces and conferences as needs arise. Utilizing earmarked funds appropriated to the Council's Scientific and Technological Account, the Council conducts the Northern Technology Grants Program to foster Alaskan innovation. From the Account, the Council can award research grants and contracts for purposes specified when monies are appropriated or otherwise assigned to the Account.



THE ALASKA COUNCIL ON SCIENCE AND TECHNOLOGY

ALASKAN SEISMOLOGY:
Research Priorities and Recommendations

A Summary Report
Based Upon the Results of the
ACST WORKSHOP ON ALASKAN SEISMOLOGY
Held September 1979 at Fairbanks, Alaska

February 1980

ALASKAN SEISMOLOGY: Research Priorities and Recommendations

* * * * *

CONTENTS

EXECUTIVE SUMMARY 1
BACKGROUND AND STATUS OF CURRENT ACTIVITIES IN SEISMOLOGY 1
MAJOR ISSUES IN SEISMOLOGICAL RESEARCH 2
ANALYSIS AND DISCUSSION 3
PRIORITIES AND RECOMMENDATIONS 4
CONTRIBUTORS 6
ABOUT THE COUNCIL 6

* * * * *

EXECUTIVE SUMMARY:

Geophysical hazards, particularly earthquakes and volcanoes, are a fact of Alaskan life. The effects can be minimized through better knowledge of the physical processes involved in producing these hazards, by learning how to predict their occurrences and developing planning and response policies.

The Working Group on Alaskan Seismology was convened in 1979 by the Alaska Council on Science and Technology. The membership is composed of persons actively involved in collecting data or performing research on Alaskan earthquakes and volcanoes and who have volunteered their time to the workshop effort. Recommendations from the workshop are directed to state and federal governments and to the scientific community.

BACKGROUND AND STATUS OF CURRENT ACTIVITIES IN SEISMOLOGY:

Despite Alaska being the most seismically active state in the nation, little research and collection of data was conducted in the state prior to the 1964 Good Friday earthquake. That earthquake and the development of the petroleum industry caused recognition of the need for extensive seismic investigation to evaluate the hazards of Alaskan earthquakes and to develop zoning and other hazard reduction activities.

Currently, approximately 200 seismic stations are operated in Alaska by approximately ten different federal agencies, universities and private organizations (USGS, NOAA, USAF, U of Alaska, U of Colorado, Columbia U., U of Texas, Alyeska, Exxon, Shell Oil). The existing stations are primarily located in coastal regions, particularly along the Gulf of Alaska. Recognizing a lack of coordination among these groups, the Alaska Council on Science and Technology, in 1979, assisted in organizing a "Working Group on Alaskan Seismology" composed of scientists actively pursuing seismic investigation in the state.

To date, there is no systematic reduction and archiving of the data being collected by the various organizations. One step in this direction--the compilation of a quarterly bulletin listing all earthquakes located by the several networks operated by the University of Alaska and incorporating data from other networks--was successfully conducted for one and one-half years and then abandoned in early 1979 because of lack of funds.

Despite such weaknesses in the overall program, significant advances are being made in identifying the levels of seismicity and the degree of seismic hazard in the Gulf of Alaska region in consequence of the strong effort being supported by NOAA through the Outer Continental Shelf Environmental Assessment Program (OCSEAP). But, at the same time, there is almost a total lack of effort in such critically important areas as the route of the proposed gas pipeline were it runs along the Alaska Highway between Delta and the Canadian Border. Nor is there yet any detailed seismic monitoring being done in the area of the proposed Susitna dams.

MAJOR ISSUES IN SEISMOLOGICAL RESEARCH:

- o The primary determinant of seismic activity in the southern half of Alaska and the Aleutians is the northeasterly motion of the North Pacific tectonic plate at the rate of about 2-3 inches per year. Rubbing past the fixed coastal region of Southeast Alaska, the plate accumulates strain in the rocks there and generates very large strike-slip earthquakes such as those near Yakutat in 1899 and at Lituya Bay in 1958. The plate subducts beneath southern Alaska and the Aleutians and in the process creates large thrust earthquakes like the 1964 Good Friday earthquake and those along the Aleutians that have struck this region frequently, often causing large tsunamis that have devastated coastal areas of Hawaii. A major issue in Alaskan seismology is to gain a better understanding of this large earthquake system and the hazard it creates for economic development and the people in southern Alaska.
- o Another major issue is to gain a better understanding of the immediate cause and cycling of activity of the many Alaskan volcanoes that also are generated by the subducting North Pacific plate and which contribute a major geophysical hazard, the predictability of which may be partly related to earthquake activity. Current methods of short-term prediction do rely upon seismic monitoring of the volcanoes.
- o There is need to learn the source mechanisms, expected sizes and recurrence rates of earthquakes in the active seismic zone which extends northward from Cook Inlet up along the railbelt and population axis of Alaska to the Fairbanks area.
- o Yet another major need is to learn the cause and the characteristics of the surprisingly active seismic areas in the vicinity of the Seward Peninsula, to identify the active faults that create this activity and the hazard they create for petroleum and other development in this region.

- o There is need to develop better models of the propagation velocities of seismic waves throughout Alaska and the attenuation of these waves as they traverse the various parts of the state.
- o Since local soil conditions are a major influence upon the hazards of earthquakes (as Anchorage discovered in 1964), there is need to perform extensive mapping of near-surface materials and to better learn their response to seismic waves, especially in regions of discontinuous permafrost.
- o There is need to develop an effective distribution and operation of seismic stations throughout Alaska to meet economically the current and future needs of the state and to develop standardized methods of data processing and standardized catalogs of earthquake data.

ANALYSIS AND DISCUSSION:

Seismology is an important area of science for Alaska because of the major influence of tectonic activity upon the structure of the state and the geophysical hazard earthquakes created for Alaska's people and future development. Unfortunately, continuous monitoring over periods of many years is required to evaluate earthquake risk and to gain the fundamental knowledge needed to understand the underlying causes of Alaskan earthquakes.

The major NOAA/OCSEAP program in earthquake hazard evaluation is helping to build the data base around the margins of Alaska as are other significant monitoring programs conducted in southern Alaska by USGS and NOAA. These programs are a foundation upon which Alaska can assemble a cost-effective program to meet its needs in seismic safety, earth science and resource development activities.

The time is ripe for Alaska to establish a state policy in earthquake hazard reduction. That policy might well borrow from current federal efforts to frontally attack earthquake hazards by: *

1. Developing feasible design and construction methods for areas of seismic risk, in order to make new and existing structures earthquake-resistant, giving priority to nuclear power generating plants, dams, hospitals, schools, public utilities, public safety structures, high occupancy buildings, and similar other occupancies.
2. Implementing systems for predicting damaging earthquakes in all areas of moderate or high seismic risk.
3. Developing model safety codes in conjunction with state and local officials, and professional organizations.

4. Improving understanding of earthquakes, and of capability with respect to earthquake safety, disseminating earthquake warnings, organizing emergency services, and planning for reconstruction and redevelopment following earthquakes.
5. Educating the public, including state and local officials, on the significance of earthquakes and related seismic and geologic events.
6. Encouraging research on:
 - a. Ways to increase the use of existing scientific and engineering knowledge.
 - b. The social, economic, legal, and political consequences of earthquake prediction.
 - c. Ways to improve the availability of earthquake insurance or some functional substitute.

* Items 1 to 6 constitute a direct quote of a statement of purpose of the Earthquake Hazard Reduction Act of 1977, PL 95-124 as given by Stanley Scott, Policies for seismic safety: elements of a state governmental program, Inst. of Governmental Studies, U of California, Berkeley, 1979.

PRIORITIES AND RECOMMENDATIONS:

1. Alaska State Policy For Seismic Risk: As the nation's most seismically active state, Alaska should give high priority to establishing a comprehensive state policy for seismic safety. The policy should involve codes and standards for the design and construction of buildings; means of dealing with critical facilities such as dams, hospitals and schools; planning, development and land-use control; emergency preparedness and post-disaster recovery; and seismic research needs.

Specific Recommendation: Funds in the amount of \$50,000 should be appropriated to the Research Fund of the Alaska Council on Science and Technology with the instruction that these funds be utilized to bring together representatives of state and federal agencies, and others from academic organizations, industry and public interest groups to evaluate Alaska's current stance toward seismic risk and what might be done to improve it, the results to be made available in a report prior to the next session of the Legislature.

2. Establishment of Statewide Seismic System: State and Federal priority should be given to establishing an integrated statewide system to collect, process and archive seismic data and which has the capability to provide a variety of data products to users in a timely manner. This system should be operated and financed jointly by the federal and state governments and should be developed around existing capabilities. Modern telecommunications and computers permit the conduct of data collection and analysis activities at separated locations, and this possibility should be considered.

Specific Recommendation: The Alaska Council on Science and Technology should take leadership in seeking to develop a state-federal partnership agreement to undertake jointly the establishment of a statewide seismic data collection and analysis system that utilizes modern seismic instruments, communications and computer techniques. The Council should seek to convene representatives of the federal Office of Science and Technology, USGS, NOAA, the ACST Working Group on Alaskan Seismology, the Alaska Division of Policy Development and Planning, the Alaska Division of Emergency Services, the Alaska Division of Geological and Geophysical Surveys, the Alaska Department of Transportation and Public Facilities, the University of Alaska and other organizations deemed necessary. As part of its effort, the Council should seek a statement of interest from the State of Alaska regarding its willingness to provide appropriate fiscal participation. An initial commitment by the State of \$125,000 likely would create the statewide system.

3. Tectonic Study Corridors: Several panels of the National Academy of Sciences have recommended that certain corridors cutting across continental boundaries receive the focus of tectonic investigation. For the Alaskan continental margins three transects are recommended. First priority - the Fairweather corridor in the eastern Gulf of Alaska; Second priority - the Kodiak corridor in the western Gulf of Alaska; and Third priority - the Shumagin corridor in the eastern Aleutian island arc.
4. National Seismic Network: In the proposed National Digital Seismographic Network it is recommended that the following Alaskan sites be included: Shemya, Adak, Kodiak, Palmer, College and Sitka/Juneau.
5. Data Preservation: It is recommended that the National Geophysical and Solar-Terrestrial Data Center include Sitka in its project to microfilm all records from certain stations and also that the threshold for copying all available records be lowered to magnitude 5.5 for Alaska.
6. Catalog of Existing Alaskan Data: It is recommended that data for selected past earthquakes be processed to produce a uniform catalog of Alaskan earthquakes and that continuing funding be made available to develop and continue the catalog. The State of Alaska should consider an initial investment of \$75,000, per year through the Research Fund of the Alaska Council on Science and Technology.

CONTRIBUTORS:

This special report is based upon the Report of the Workshop on Alaskan Seismology, September 1979, by John Davies, Co-chairman of the Working Group on Alaskan Seismology. Contributing members:

Selena Billington	C.I.R.E.S., University of Colorado, Boulder
Niren Biswas	Geophysical Institute, University of Alaska
John Davies	Lamont-Doherty Geological Observatory, Columbia University
Neil Davis	Geophysical Institute, University of Alaska
Steve Estes	Geophysical Institute, University of Alaska
Larry Gedney	Geophysical Institute, University of Alaska
Klaus Jacob	Lamont-Doherty Geological Observatory, Columbia University
Dale Kenney	Bureau of Land Management, OCS Program
Juergen Kienle	Geophysical Institute, University of Alaska
Joseph Kravitz	NOAA/OCSEAP, Boulder
John Lahr	U. S. Geological Survey - Menlo Park
Ashok Patwardhan	Woodward-Clyde Consultants, San Francisco
Bob Peterson	Science Applications, Inc., Boulder
Hans Pulpan	Geophysical Institute, University of Alaska
W. U. Savage	Woodward-Clyde Consultants, San Francisco
John Sindorf	NOAA Alaska Tsunami Warning Center, Palmer
Christopher Stephens	U. S. Geological Survey - Menlo Park
Paul Thenhaus	U. S. Geological Survey - Denver
Glenn Thrasher	U. S. Geological Survey - Anchorage
Jack Townshend	U.S.G.S. College Observatory
John Whitney	U. S. Geological Survey - Anchorage
Chris Noah, ex officio	Alaska Council on Science and Technology

ABOUT THE COUNCIL:

The Alaska Council on Science and Technology reports annually to the Governor and the Legislature on research activities funded by the state and it recommends research and funding priorities. Though the Council itself does not perform research, it is charged with helping to coordinate research activities and to enhance standards of research. Nonpartisan advisory services to assist planning at both state and local levels are provided by the Council; for this and other purposes the Council convenes committees, task forces and conferences as need arises. Utilizing earmarked funds appropriated to the Council's Alaska Fund for Scientific and Technologic Research, the Council conducts the Northern Technology Grants program to foster Alaskan innovation. From the Fund, the Council can award research grants and contracts for purposes specified when monies are appropriated or otherwise assigned to the Fund.



THE ALASKA COUNCIL ON SCIENCE AND TECHNOLOGY

GRANTS FOR SCIENTIFIC RESEARCH
IN ALASKA

INFORMATION AND GUIDELINES FOR APPLICANTS

September 1981 - June 1982

THE ALASKA COUNCIL ON SCIENCE AND TECHNOLOGY

ABOUT THE ALASKA COUNCIL ON SCIENCE AND TECHNOLOGY (ACST)

The Alaska Council on Science and Technology reports annually to the Governor and the Legislature on research activities funded by the state and recommends research and funding priorities. Though the Council itself does not perform research, it is charged with helping to coordinate research activities and to enhance standards of research. Nonpartisan advisory services to assist planning at both state and local levels are provided by the Council; for this and other purposes the Council convenes committees, task forces and conferences as needs arise. Utilizing earmarked funds appropriated to the Council's Scientific and Technological Account, the Council conducts the Northern Technology Grants Program to foster Alaskan innovation. Also from the Account, the Council can award research grants and contracts for purposes specified when monies are appropriated or otherwise assigned to the Account.

Christopher Noah
Executive Director
Alaska Council on Science and Technology
Pouch CV
Juneau, Alaska 99811
(907) 465-3510

TYPES OF RESEARCH SUPPORTED

The ACST considers proposals for support of research in any field of science relevant to Alaska. However, funding available to date is limited so the chances of funding are best when an applicant proposes research in an area of science specified by the Council in its research needs reports (see attachment for research needs categories).

WHO MAY SUBMIT

Proposals normally are initiated by individual scientists or engineers interested in performing specific research or investigations. In most instances the proposal is submitted on the individual's behalf by an employing organization. Prior to formal submission, the proposal may be discussed with the Council or its staff, either by letter, telephone or in person.

Proposals may be submitted by colleges and universities, by non-profit, non-academic research institutions, by private profit organizations, by state or federal agencies, and by unaffiliated scientists.

Proposals should be submitted to the Alaska Council on Science and Technology, Pouch CV, Juneau, Alaska, 99811 (Telephone: 907-465-3510).

THE PROPOSAL

When proposals are submitted in response to funding opportunities announced by the Council, fifteen copies of each proposal should be submitted with at least one copy bearing the signature of the principal investigator and authorized representative(s) of the organization, if applicable.

An abstract of approximately 200 words describing the proposed research and suitable for publication is required. This should appear at the front of the proposal.

There is no set format for proposals, but each should provide a statement describing:

- (1) the objectives and significance to the people of Alaska - indicating the magnitude of the problem and a statement of need;
- (2) the methods to be employed and their suitability to the project;
- (3) a plan of work;
- (4) a statement indicating the guiding hypothesis and the potential result to be attained;
- (5) the qualifications of the investigator and the grantee institution; (if consultants are to be used, they must be listed by name and a summary of their qualifications must be presented);
- (6) a detailed budget which separately identifies salary costs, staff benefits, overhead, equipment, travel, materials and supplies, other direct costs (a budget sheet is attached to these guidelines is to be used when submitting a proposal); and
- (7) desired effective date of grant and time period for which support is requested.

PROCESSING OF PROPOSALS

The Council has available as of August 24, 1981, the sum of \$2,075,000. for research grants in appropriate fields of science and technology.

The process of proposal review and decision for this current period (September 1981 - June 1982) is as follows:

- (1) The Council will maintain an open program of grant awards throughout the period, or until available funds are exhausted;
- (2) All proposals in the Council offices as of the 15th of each month, commencing on September 15, 1981, will be assigned to panels or individuals for peer review;

- (3) Within 30 days following such assignment, reviews will be completed and the advice of reviewees and staff recommending appropriation action on individual proposals forwarded to the Council for final award decision. These decisions will be made at regular Council meetings.

In the evaluation of each proposal, the Council normally will seek the assistance of scientists or engineers knowledgeable in the subject matter of the proposal. Depending upon circumstances, the Council may submit proposals to individuals for review or it may convene panels for the purpose of evaluating proposals. In special circumstances, other methods of evaluation may be utilized.

If a proposal results in a grant from the Council, the proposal becomes part of the record of the transaction and may be made available to the public upon request. If a proposer desires his or her unfunded proposal to be returned, a letter of request should accompany the proposal. To the fullest extent possible, confidentiality of the proposals will be maintained.

GRANT AWARDS

Notification of a grant award is by letter signed by the Council's Executive Director. The grant letter is addressed to the individual or the institution to which the grant is made.

The grant period begins on the date of the grant letter unless otherwise specified, and runs until the expiration date indicated in the grant letter. Expenditures incurred prior to the effective date of the grant may not be charged against the grant. Expenditures after the scheduled expiration date of the grant may be made only to honor commitments made prior to the expiration date. At the discretion of the Council, no-cost extensions will be granted.

Payment normally will be made in response to quarterly billings from the grantee. Ten percent of grant monies may be withheld pending the receipt of the final report.

GRANT REPORTING

The grantee is required to submit two final reports describing: (1) the results of the activities and expenditure of funds within 60 days of the expiration of the grant period; and (2) within six months of project completion a comprehensive final report delineating the findings, usefulness of the final product, and the knowledge gained for science and the state of Alaska. Formats

for this final substantive report will be made available to grantees at the time of the award. If the grant period exceeds six months, semi-annual reports not longer than a page and one-half will be required. On grants over \$75,000, the ACST may require quarterly progress reports. Investigators must submit one reproducible copy of the final research report to ACST. ACST encourages publication of research results when appropriate. Presentation at the AAAS, annual Alaska Science Conference is also encouraged. Any publication or presentation based upon research activity supported by the Council should acknowledge that support. The Council welcomes suggestions from the proposer on the most appropriate means to make research results available to other researchers, policy makers and the public. All reports will be made available to the public on request. Renewal proposals to the extent they constitute a report of progress on an earlier grant likewise will be released. However, in recognition of the investigator's interest in being the first to publish the results of the research, the ACST may allow a reasonable period of time to permit publication, if specifically requested to do so, prior to public release. The ACST encourages the publication of research results in open scientific literature whenever appropriate and worthy. The ACST reserves the right to publish grantee research in a series of Council research publications.

The ACST would appreciate being informed of any results of unusual interest as soon as they are obtained.

Grants for support of data banks or the creation of computer software of wide usefulness are subject to conditions reserving to the ACST and to the general public certain rights of access to the data.

The right to use published materials resulting from the performance of work under the grant is retained by the State of Alaska for governmental purposes, unless otherwise agreed. Commercial publication or distribution of papers, monographs, proceedings, films or other works produced under ACST grants must be approved in advance by the ACST.

ADHERENCE TO ORIGINAL RESEARCH OBJECTIVES AND ORIGINAL BUDGET ESTIMATES

The principal investigator, operating within the established policies of the grantee institution, if any, should feel free to pursue interesting and important leads which may arise during the conduct of the research. The principal investigator may discontinue or modify unpromising lines of inquiry, without jeopardizing continuation of support for the remainder of the grant period. When it appears from a scientific standpoint that the inquiry as originally envisaged will no longer be fruitful or that a related line of inquiry will be more promising, the research may be modified. However, prior approval by the ACST must be obtained when such modification would result in a major deviation from original research objectives, or when research activities are to be undertaken which were specifically excluded from support at the time the award was negotiated. Without

prior approval from the Council, the principal investigator is free to reallocate funds from one budget category to another up to a limit of 15%, except to the salary or permanent equipment categories. Specific, written, prior approval by the ACST must be obtained prior to other reallocation of funds.

CHANGES IN PERSONNEL

The ACST should be informed of any changes in senior personnel where the period involved is 3 months or less. However, written ACST approval is required for any permanent change or for any temporary change in excess of 3 months; such as an investigator taking sabbatical leave. Further, when it appears the principal investigator(s) or other senior personnel will devote substantially less effort to the work than anticipated in the approved proposal, the ACST must be informed.

TRANSFER OF PRINCIPAL INVESTIGATOR

The ACST does not transfer grants from one institution to another. In the event that a principal investigator changes his or her organizational affiliation, a new proposal through the new institution may be initiated. The original grantee institution may terminate the grant, or when appropriate propose a substitute principal investigator to continue the research. The principal investigator and the appropriate representatives of the grantee institution or the new institution are encouraged to consult with the ACST if unusual problems are expected in providing for an orderly termination or continuation of the research.

EQUIPMENT

Title to equipment purchased or fabricated with grant funds will be vested in the grantee institution. In special situations, the ACST may reserve the right to require the grantee institution to transfer title to items of equipment costing \$1,000 or more to a third party named by the ACST. The right may be exercised anytime prior to 4 months after the ACST has received a final fiscal report from the grantee institution following completion or termination of the project.

ALASKA COUNCIL ON SCIENCE AND TECHNOLOGY

Dr. Robert D. Burkett
Vice-Chairman, Alaska Council on
Science and Technology
F.R.E.D. Division
Department of Fish and Game

Dr. Mim Dixon
Private Anthropological Consultant

Jay Hogan
Director, Division of Legislative
Finance
Alaska State Legislature

Dr. T. Neil Davis
Geophysical Institute
University of Alaska

David M. Hickok
Chairman, Alaska Council on
Science and Technology
Director, Arctic Environmental
Information and Data Center
University of Alaska

Dr. Richard R. Straty
Director, Marine Investigations
Auke Bay Laboratory
U.S. Department of Commerce/NOAA

DETAILED BUDGET BREAKDOWN

A. Proposal Title:

B. Estimated Time of Project Personnel:

Cost

1. Salaries and Wages

2. Staff Benefits

C. Travel:

In-state:

Out-of-state:

Per-diem:

D. Materials and Supplies:

E. Equipment:

F. Other Direct Costs:

G. Indirect Costs (overhead, fees):

TOTAL:

Attachment A

August 31, 1981

ALASKA COUNCIL ON SCIENCE AND TECHNOLOGY

Completed Research Needs Reports

Agriculture and Animal Husbandry

Rural Primary and Secondary Education

Alaskan Energy

Health and Human Life

Alaskan Minerals

Alaskan Natural Hazards (Including Alaskan Seismology)

Alaskan Transportation

Living Resources

Reports Underway

Basic Sciences

Communication and Information Transfer

Community Structure

Cultural/Lifestyle Relationships



THE ALASKA COUNCIL ON SCIENCE AND TECHNOLOGY

ALASKAN COMMUNICATIONS AND INFORMATION TRANSFER
Research Priorities and Recommendations

A Report

Based Upon the Results of the
ACST Communications and Information Transfer
Committee Workshop
Held February 1980 in Anchorage, Alaska

Revised January, 1982

ALASKA COUNCIL ON SCIENCE AND TECHNOLOGY SPECIAL REPORT

ALASKAN COMMUNICATIONS AND INFORMATION TRANSFER: Research Priorities
and Recommendations

CONTENTS

EXECUTIVE SUMMARY 1
BACKGROUND AND STATUS OF RESEARCH 1
MAJOR ISSUES IN COMMUNICATION AND INFORMATION TRANSFER RESEARCH 2
ANALYSIS AND DISCUSSION 3
PRIORITIES AND RECOMMENDATIONS 5
CONTRIBUTORS 7
ABOUT THE COUNCIL 7

EXECUTIVE SUMMARY

Alaska has the need and the opportunity to develop a statewide telecommunication network serving both rural and urban areas of the state, one that can evolve as technology and demand change. Such a network interfaced with data processing systems, informational storage systems and instructional capabilities located around the state can create for Alaska vastly improved services that are more cost-effective than those in use today.

BACKGROUND AND STATUS OF RESEARCH

The Alaska-Siberia Telegraph project, and by virtue of it, Alaska's early role in international communications was terminated in 1866 by successful completion of the Atlantic telegraph cable. Not until Alaska's emergence as a strategic military location during World War II did communications again become a major issue in this region. Then recognition came of the special complications auroras and related geomagnetic disturbance phenomena presented for arctic and sub-arctic communications.

In response, Congress passed a bill in 1946 to establish the Geophysical Institute at the University of Alaska to research communications and related problems. Since then, steady progress has been made toward solving the technical problems of long-distance communication in Alaska, although the use of new radio frequencies and new space-age techniques have required ongoing fundamental research in the propagation of electromagnetic waves and in transmission technology. Much of current research involves the effect of the variable geophysical environment upon the ability of radio signals at different frequencies to carry information over satellite-ground station links.

Alaska's high-latitude location has made it impossible to use the ionospheric reflection of high-frequency radio waves for reliable long-distance communications, as was common at lower latitudes prior to the satellite era. Partly for that reason, and partly because Alaska's great geographic extent created special demands on communication capabilities, Alaska was quick to move into the application of satellite technology to the state's needs. In fact, the state has taken a leadership role, both politically and technically, in the innovative application of new technology to the needs of Alaskans throughout the state. Probably more so than in any other state, Alaska's elected officials and others in government have maintained awareness of and appreciation for the benefits of modern communications technology.

Compared to that of research and development in the technologic areas, the status in the non-technologic areas is far from satisfactory. In such areas, the definition of what the problems are can be as difficult as finding the best solutions. Research in these areas often must deal with combinations of economic, social, legal and psychological questions in situations where the technological and social climates are changing rapidly.

MAJOR ISSUES IN COMMUNICATION AND INFORMATION TRANSFER RESEARCH

- ° A leading issue in Alaska is how best to provide for the orderly development of the state's telecommunications network. It is certain that the demand for telecommunications capability will continue to grow. The desires for two-way voice and one- or two-way video communication capabilities are strong, and there is increasing demand for transmission of data, fueled in part by the wide assortment of telecommunications and data-processing devices available on the market.
- ° An important issue affecting all aspects of Alaskan communications and information transfer involves the unique physical and social environment surrounding all activities in this general field. Alaska is unique among the states in its combination of great size, its location in the disturbance-prone auroral region, its low population density, its cultural and social diversity, its current economic wealth, and its strategic economic and military location on the North Pacific Rim. At issue is the appropriate degree of federal responsibility for arriving at solutions to the Alaskan communications problems and the extent to which federal regulations should flex or otherwise accommodate solutions appropriate only for Alaska.
- ° A large proportion of Alaskan scientists, technologists and governmental decision-makers, regardless of their individual fields of speciality, recognize the need for more effective technology and information transfer as a major issue deserving greater attention. The problem is perceived as having many facets ranging from strictly technological aspects to how to better provide information to those who need it for making informed decisions.

- A never-ending but important issue is how to build and manage Alaskan data bases in a cost-effective manner that yet provides for useful integrations of data sets, eliminated duplication of effort, and allows easy access to users.
- As the Alaskan telecommunications capability rises, we become more able to utilize it for teleconferencing and instructional purposes. An issue of importance is how to foster through research and development the most effective ways to use this capability. An issue also is the psychological or social impact of increased telecommunication use, especially on rural areas.

ANALYSIS AND DISCUSSION

The issue of how Alaska can best develop its telecommunications network is complicated by national developments over which Alaska has little or no control. Telecommunications economics is a particularly troublesome area. Economic problems have manifested themselves most visibly in increased intrastate telephone rates that already are limiting innovative uses of telecommunications in Alaska. Some change in the economic structure of telecommunications is inevitable, and it is clear that new arrangements will be needed to assure the economic viability of Alaskan telephone service. In particular, we need to examine economic problems peculiar to village telecommunications.

Telecommunications technology has undergone great advances during the past decade. Many of the new developments are applicable nearly everywhere over the globe and, therefore, usable in Alaska, yet there remain some specifically Alaskan needs. These needs largely center around dealing with environmental constraints created by Alaska's far-north location and provision of low-cost technology for village use. Research and development to meet these needs likely will require funding from state sources.

The problem of identifying and setting priorities on research needs in the area of technology and information transfer is particularly thorny because of the diversity in the user audience. Technologies and informational products suited to technical workers may be unsatisfactory for non-technical persons. A further complication in the assessment of the utility, feasibility, and consequences of adopting a particular technology or informational procedure often must involve many considerations. These can include user availability, user needs, user perceptions, identification and definition of the technology, delivery and maintenance support for the technology, cost-effectiveness, and analysis of the economic, social and environmental impacts.

Since Alaska is the subject of much research, there is considerable information available about a variety of topics. However, much of this information is available only to the individual or agency collecting the data and making the analysis. Printed materials produced by state agencies are required by statute to be deposited in the State Library, but even there large gaps exist, especially in consultant studies and surveys. Some information collection and dissemination is presently accomplished through such activities as the Current Research Profile for Alaska, an annual listing issued by the Arctic Environmental Information and Data Center; participation in the Washington Library Network computer bibliographic center by several major Alaskan libraries; and data management activities by various agencies such as the Alaska Department of Natural Resources and the U. S. Bureau of Land Management.

Historically, the initial step in solving information problems has been to collect data on a piecemeal basis without thought to multiple uses, external access, or delivery to others in forms or formats different from those used by the collecting agency. As an information need occurs in a specific area, a system is established to handle it but with little regard for other applications of the same data. This results in desparate and virtually unlinked sets of information resources that are underutilized for decision-making and planning purposes. Steps that can be taken to improve the situation include:

- Development and use of compatible formats for data prior to integration;
- Development and use of machine-readable presentations;
- Use of accessing terms (e.g., those used in the Washington Library Network authority files) that foster logical growth and multidisciplinary use; and
- Adoption of geographical location entries with sufficient accuracy to computer draw maps of many different scales.

During the 1970's the hopes of Alaska's educators for instructional telecommunications capability were raised exponentially by a series of experiments that showed conclusively that technology was no longer a barrier to the delivery of a wide range of educational services. The time has come when these hopes must be realized by operational systems which are an integral component of the educational delivery system and not an exotic add-on. In effect, we must now bring into one network at the local, state, national and international levels the whole range of audio/visual materials that are in common use in the classroom. Through such networks the abilities of each individual teacher or student working independently can be expanded to whatever level is necessary to achieve the desired education goal.

PRIORITIES AND RECOMMENDATIONS

1. Research on Development of a Statewide Telecommunications Network: Alaska should give top priority to research oriented toward the orderly development of a statewide telecommunications network. Research and assessment efforts needed to permit this development include:
 - Formulation of a full range of technological and organizational options for the network;
 - Estimation of economic benefit associated with various telecommunications capabilities; and
 - Evaluation of the probable effects of regulation, competition and subsidy upon the development and economic viability of a statewide network.

2. Telecommunications Technology: Specific research and development needs in Alaskan telecommunications technology are:
 - Development of satellite technology that employs high effective radiated power and, therefore, requires only small, low-cost ground facilities;
 - Development of low-cost, application oriented ground equipment for use by telecommunications consumers;
 - Development of a small, low-cost telephone office suitable for use in a village, or development of an alternative to a central office for providing service to a number of telephones in a village;
 - Research to determine the best way to bury telephone cable in permafrost locations;
 - Research to determine the effect of rain attenuation on satellite earth stations operating in Alaska that use the 14/12 and 30/20 GHz up/down links;
 - Investigation and demonstration of packet broadcasting in Alaska;
 - Demonstration and evaluation of reliability and economic feasibility of meteor burst communications;
 - Development of a "source book" for Alaska telecommunications; and
 - Development of design handbook for television earth stations that only receive.

3. Information and Technology Transfer: There needs to be a reasonable on-going level of research directed toward monitoring and evaluation of available technologies and of the information and technological needs and desires of Alaskans, both rural and urban.

One aim is to provide insight into the educational, social and cultural impacts of the growing availability of new technologies and informational services, the help guide decisions on future developments.

4. Data Management: Rapidly improving computer and related technologies are permitting the accumulation of large amounts of data on Alaska -- especially on its natural and human resources. Ongoing research is needed on the best means to build, maintain and access data banks. First priority should go to an evaluation of existing data collections, the evaluation to include user identification and need, physical location and format of data, accessing and processing methods, and attendant costs.

5. Educational Applications of Telecommunications and Computers: In Alaska, we now have networks for instructional video, computer-assisted instruction, and teleconferencing. Plans are under way for the expansion of those networks to a statewide capability in which each educational administrative unit in the state will be able to take part and in which each unit will have systems that are integral to its own local needs. To proceed beyond the present level of planning, research is needed into the best ways to use the available networks in such areas as cross-cultural education and Arctic and Alaska-related science disciplines. Second in priority is research into how best to incorporate into Alaskan use the wide body of general instructional material available to others elsewhere.

CONTRIBUTORS

This report is based on the deliberations of the ACST Committee on Alaskan Communications and Information Transfer held in February 1980 in Anchorage, Alaska chaired by Alex Hills. Contributing members represent academic institutions as well as federal and state agencies possessing appropriate expertise.

Jay Barton (Advisory)	President, University of Alaska
Duke Combs	Computer Network, University of Alaska
Linda Perry Dwight	Arctic Environmental Information and Data Center University of Alaska Libraries and Museums
Richard Engen	Department of Education
Alex Hills	Alaska Public Utilities Commission
Richard Jablonowski	Technical Services, Division of Data Processing Department of Administration
Doug Mutter	Department of Natural Resources
Walt Parker	Parker Associates
George Shaginaw	Alascom, Inc.
Peter Sokolov	Alaska Public Utilities Commission
Jennifer Wilke	Department of Education

ABOUT THE COUNCIL

The Alaska Council on Science and Technology reports annually to the Governor and the Legislature on research activities funded by the state and recommends research and funding priorities. Although the Council does not perform research, it is charged with helping to coordinate research activities and to enhance standards of research. Non-partisan advisory services to assist planning at both state and local levels are provided by the Council; for this and other purposes the Council convenes committees, task forces and conferences as the need arises. Utilizing funds appropriated to the Council's Account for Scientific and Technologic Research, the Council administers the Northern Technology Grants Program to foster Alaskan innovation. From the account it also administers a research program to fund projects based in part on reports such as this which are produced periodically. The Council also awards research grants and contracts for purposes specified by legislation and appropriating or assigning monies to the account.

February 14, 1983

TO: Sen. Vic Fischer, Chairman
Senate State Affairs Committee

FROM: Brian Rogers *BR*

RE: Alaska Council on Science and Technology

You requested that I look at the current situation of the Alaska Council on Science and Technology and provide you with a brief memo outlining possible courses of action. During the past few weeks I have discussed the role and future of ACST with Chris Noah (executive director), David Hickok (chairman), and T. Neil Davis (former chairman) of the Council and Pat O'Rourke, Chancellor of the University of Alaska-Fairbanks. I am also aware of discussions between ACST members, the University, and the Governor's Office of Strategic Planning in the Office of Management and Budget.

The ACST was created by the legislature in 1978 to advise the legislature and governor on Alaska science policy. It was attached to the Office of the Governor. Unfortunately Gov. Hammond made little use of the Council's expertise. In 1979, the northern technology small grants program was given to the Council by the legislature. By 1980, the Hammond administration decided by executive order to transfer the Council to the Dept. of Environmental Conservation. The legislature objected, and the Council was moved once again by executive order to the Department of Administration, for administrative purposes only. The FY 1982 capital budget contained \$5 million (reduced by line item veto) to fund special research projects by the Council; in FY 83 another \$500,000 was appropriated for such projects. The Council established a peer review process for these research projects which has won national acclaim; the legislative auditor has reportedly criticized the Council for funding too many research projects at the University of Alaska (audit report pending at this time). In the FY 84 operating budget, Gov. Sheffield deleted all funding for ACST and, until recently, did not respond to requests for a meeting with Council members. The Alaska scientific community has been concerned about the possible termination of ACST at the same time that legislation is pending in Congress to establish an Arctic Science Policy.

Indications are now that the Sheffield administration did not intend to abolish the Council with the cut in funding. A recent meeting in Juneau between Council members, Governor's staff (Allen Blume and Ben Harding) and Gordon Harrison (head of the Office of Strategic Planning within the Office of Management and Budget) helped alleviate some of the ACST concerns. The governor's people indicated that Governor Sheffield does intend to make use of the Council and is considering a move of the Council to OSP/OMB. Ironically, this would put the Council back where the legislature intended: assisting the Governor and legislature in planning policy. Still up in the air are questions of whether the Council will have its own staff (probably not as an independent office, but perhaps staff designated within OSP); the level of funding, if any, for the research grants program, and the relationship between the Council and the legislature (given the current relations between OMB and the legislature). Also not settled is whether a transfer would be accomplished by executive order or by legislation.

The Council is scheduled for sunset review this year. Given the fact that legislation will be necessary to continue the Council's existence, the State Affairs Committee may wish to explore possible statutory changes with the Governor for inclusion in the continuing legislation. Questions which could be addressed include:

- placement of ACST in the Office of Strategic Planning, or movement to the University of Alaska
- increasing the size of the Council (now 7 members; many recommend an expansion to 9 adding two non-state members)
- establishing a "task force" approach to scientific problems identified by the Council
- giving statutory authorization and guidance for operation of the research grants program (mini-NSF?)
- requiring the executive director be a scientist who can him/herself be the governor's science advisor when the entire Council is not available
- establishing a mechanism for increased use of University research/academic faculty to meet state research needs identified by the Council
- methods for addressing legislative needs for scientific and technological advice during sessions and through the interim
- staff needs of the Council
- the Council's role in development and execution of a national Arctic Science Policy

I would be glad to provide you with analysis of any of these or other questions as needed by the committee.

NOTE REGARDING THE FOLLOWING FRAME(S) ON MICROFILM:
COMPLETE DOCUMENT IS AVAILABLE IN ORIGINAL FILES.
TITLE PAGE ONLY HAS BEEN FILMED.

Alaska

Science Policy



**Alaska Council on
Science and Technology
September, 1982**

S B

2 3 5

STATE OF ALASKA
FISCAL NOTE

Revision Date , 1983

I. REQUEST

Bill/Resolution No.: SB 235
 Title: An Act Amending PERS
 Sponsor: Moss
 Requestor: _____

II. FISCAL DETAIL

Agency Affected: Administration
 Program Category Affected: Cent. Adm. Svs.
 BRU, Program of Subprogram(s) Affected: Retirement & Benefits

EXPENDITURES/REVENUES: (Thousands of Dollars)

	FY 83	FY 84	FY 85	FY 86	FY 87	FY 88
OPERATING						
100 PERSONAL SERVICES						
200 TRAVEL						
300 CONTRACTUAL						
400 COMMODITIES						
500 EQUIPMENT						
600 LAND & STRUCTURES						
700 GRANTS, CLAIMS, ETC						
TOTAL OPERATING		-0-	-0-	-0-	-0-	-0-
CAPITAL						
REVENUE						

FUNDING: (Thousands of Dollars)

GENERAL FUND						
FEDERAL FUNDS						
OTHER (Specify Source)						

POSITIONS:

FULL-TIME						
PART-TIME						
TEMPORARY						

III. SOURCE OF FUNDS TO OFFSET FISCAL IMPACT OF BILL:

IV. ANALYSIS: Attach a separate page for any Analysis

Prepared By: *J. K. Humphreys* Phone: 465-4460
 Division: Retirement & Benefits Date: 4/13/83

Approved by Commissioner: Lisa Rudd, Commissioner Date: 4/13/83
 Department: Administration

Distribution:

- Original to Legislative Finance
- Copy to Office of Management and Budget (for Legislature introduced bills)
- Copy to Department (for Governor introduced bills)
- Copy to Sponsor
- Copy to Requestor (if different from Sponsor)

3/8/83

State of Alaska

Fiscal Note

SB 235

IV Analysis:

The cost of this bill will be borne entirely by the PERS employers (school districts). The individual employer contribution rates will increase by 1.71% of their PERS payroll.

The total costs to school districts who are participating in PERS is expected to be as follows:

<u>FY 84</u>	<u>FY 85</u>	<u>FY 86</u>	<u>FY 87</u>	<u>FY 88</u>
\$5,465.1	\$5,902.3	\$6,374.4	\$6,884.3	\$7,435.0

If this bill becomes law, the funding ratio in PERS will decrease by .7%.

The total actuarial present value of cost of this bill is \$15.5 million.

S

B

2

5

7

THE LEGISLATURE OF THE STATE OF ALASKA
THIRTEENTH LEGISLATURE

FISCAL NOTE

I. REQUEST

Bill/Resolution No. SB No. 257
 Title An act relating to standards of conduct of legislators and legislative
~~REQUESTED BY~~ employees and establishing a Legislative Ethics Commission
 Requested by: Senate State Affairs Date: April 19, 1983

II. FISCAL DETAIL

Agency Affected Legislative Affairs Agency
 Program Category Affected General Government
 BRU, Program, Or Subprogram(s) Affected Legislative Affairs Agency
 (Note: If more than one budget component is affected, separate line-item
 amounts and funding for each component in the analysis section.)

EXPENDITURES (Thousands of Dollars)

	FY 83	FY 84	FY 85	FY 86	FY 87	FY 88
100 PERSONAL SERVICES		-0-				
200 TRAVEL		44.1				
300 CONTRACTUAL		50.0				
400 COMMODITIES		-0-				
500 EQUIPMENT		-0-				
600 LAND & STRUCTURES		-0-				
700 GRANTS, CLAIMS, ETC.		-0-				
TOTAL		94.1				

FUNDING (Thousands of Dollars)

GENERAL FUND		94.1				
FEDERAL FUNDS		-0-				
OTHER (Specify Source)		-0-				

POSITIONS

None

FULL TIME						
PART TIME						
TEMPORARY						

III. ANALYSIS (See Fiscal Note Preparation Instruction, Section III)

SEE ATTACHMENT

IV. DATE April 20, 1983 PREPARED BY Wally Harrison, Director, Adm'n. Svcs.
 AGENCY Legislative Affairs Agency
 Original: Legislative Finance PHONE 465-2850
 cc: Budget and Management
 Prime Sponsor (First Legislator Named)
 33-001 (Rev. 12/82)

Fiscal Note for Senate Bill No. 257:

III ANALYSIS:

There are no guidelines in the bill for amount or level of staff or for amounts of travel and per diem. It is necessary, therefore, to establish a set of assumptions on which to build a fiscal note.

Using input from various legislators who worked on the bill, I have made the following assumptions:

Assumption 1: There will be no permanent staff at this time. Personal services and professional services will be contracted as needed; therefore, no office space or equipment will be needed. The commission will determine how the central files are to be kept.

Personal Services Contracts	20.0
Professional Services Contracts	20.0
Other Contractual Services	10.0
	<u>50.0</u>

Assumption 2: To establish a good average for travel costs, I have hypothetically assumed that the Commission is to be made up of members living in Nome, Bethel, Fairbanks, Anchorage, Kodiak, Juneau, Ketchikan, and will travel coach fare: 3 roundtrips to Juneau; 4 roundtrips to Anchorage; and 5 roundtrips to Fairbanks for meetings. There will be no more than an average of three days per month of travel and per diem for meetings. There be no more than an average of one meeting per month.

Per Diem -----	\$18,720
Travel -----	\$25,385
TOTAL Trvl/PD	<u>\$44,105</u>

Assumption 3: Additional costs, if any, for reports or copies made by other agencies for the Commission will be absorbed in that agency's operation budget.

Assumption 4: The Legislative Affairs Agency print shop can print the semi-annual summaries of decisions and advisory opinions.

April 28, 1983

M E M O

TO: Members, Senate State Affairs Committee
FROM: Vic Fischer
RE: SB 257: definition of conflict of interest

In the course of our work on this important bill I've come to the conclusion that, with one exception, it will leave our committee as a workable statute, meeting both the public interest and the requirements of legislators and their staffs.

The exception is this bill's definition of conflict of interest. This concept is the keystone of this bill, and can, I think, be tightened up.

The following language is based closely on the concept used in Maryland and North Carolina, where instead of a conflict being vaguely defined as "where the private interests and public interest of a legislator are in conflict" they directly link the concept with the problem that it creates, and say that a conflict of interest exists when a legislator's private interest "tend to impair his or her independence of judgement."

I submit the following proposed language for your consideration.

Deletion of Sec. 24.50.030(b) through (d) which commenced on line 20, page 2 through line 7, page 3, and substitution of a new subsection. The new subsection would read:

(b) A conflict of interest does not exist under this

chapter and there is no duty to disclose a conflict of interest if the benefit or detriment received by a person to whom this chapter applies is not different from that shared by all residents of the state or by all members of a large group or class of residents of the state.

(c) If the benefit or detriment received by a person to whom this chapter applies is not shared or is shared only by a small group or class of residents of the state, then a conflict of interest may exist.

(d) A personal interest of a person to whom this chapter applies conflicts with the public interest if it tends to impair the independence of judgment of the member of the legislature or the person employed by a member of the legislature.

(e) If a person to whom this chapter applies acts on a legislative matter in which a personal interest may exist, the person shall consider whether the personal interest will tend to impair the independence of judgment of the person.

(f) If the member of the legislature determines that an actual conflict of interest exists, or receives an advi-

sory opinion finding that a conflict of interest exists, the member of the legislature shall declare the interest on the floor or in committee, ask to be permitted not to vote, take no further legislative action on the matter and file a written statement on the conflict of interest with the ethics commission within 48 hours of the determination that a conflict of interest exists. If a person employed by a member of the legislature or a permanent or temporary employee of an agency of the legislature determines that an actual conflict of interest exists, the person shall file a written statement with the ethics commission within 48 hours of the determination that a conflict of interest exists and may not participate further in the matter. The person may divest the interest, place the interest in a blind trust or resign the position.

Following line 7, page 3, insert the following:

Sec. 24.60. ____ . PRESUMED CONFLICTS OF INTEREST. (a)

A member of the legislature shall take no further legislative action on the matter and request permission to

abstain from voting, and a person to whom this chapter applies may not undertake other official duties where the person

(1) has an interest that is direct and different from the interest of a member of the public in an activity that would receive a benefit or detriment from proposed legislation or official duties; and

(2) is a participant in a close economic association with an individual or person who the member of the legislature or an employee of the legislature knows

(A) has a direct interest in a business activity that will receive a benefit or detriment directly by the proposed legislation or official duties;

(B) is a lobbyist or has employed a lobbyist;

(3) solicits, accepts, or agrees to accept a gift as defined in AS 24.50.080, loan, or payment in an aggregate amount during a single calendar year of more than \$100 from

an individual or person with an interest in a business activity that would receive a benefit by or share a detriment from proposed legislation or official duties.

(b) Notwithstanding (a) of this section, a member of the legislature may vote on proposed legislation or engage in other official duties prescribed in (a) of this section if the legislator files a sworn statement with the commission. The statement shall describe the circumstances of the apparent conflict and shall state that the apparent conflict will not prevent a fair and objective consideration of the proposed legislation or official duties by the member of the legislature. This statement shall be published in the supplemental journal.

(c) If the member of the legislature files a statement under (b) of this section or if the member of the legislature requests an advisory opinion on an apparent or presumed conflict, the commission may issue an opinion concerning the propriety of the proposed action by the member of the legislature.

(d) A disclosure to the Public Offices Commission under AS 39.50.020 does not constitute compliance with the

requirements of disclosure of a conflict of interest under this section or AS 24.60.300.

(e) The acceptance by a member of the legislature of campaign contributions that are reported under AS 15.13 does not create a conflict of interest.

(f) As used in this section, "close economic association" means, as related to a person to whom this chapter applies, partners, associates, employers and employees in business and professional enterprises, corporations in which the person owns capital stock in excess of \$5,000, and a corporation of which a member of the legislature or a person employed by a member of the legislature is an officer, director, or agent.

ALASKA STATE LEGISLATURE

SENATE STATE AFFAIRS COMMITTEE

SENATOR VIC FISCHER, CHAIRMAN

POUCH V, JUNEAU 99811

(907) 465-4954



April 20, 1983
7:00 pm

Room 504, Capitol

MEMBERS PRESENT:

Senator Vic Fischer, Chair
Senator Sturgulewski
Senator Kelly

ALSO PRESENT:

Senator Faiks
Representative Phillips

TELECONFERENCE:

All LIO Sites Notified and On Line
5-day Rule Waived for This Meeting on April 18

SB 257 Legislative Standards of Conduct

Senator Fischer made opening comments, pointing out that although this bill had been the subject of extensive hearings of the special Joint Committee for Legislative Reform, this was the first opportunity the public had to comment on the bill.

Peggy Muller, Soldotna, representing the League of Women Voters testified that she thought that appointed officials should be included in the bill. She stated that the public didn't have much confidence in politicians.

Representative Phillips stated that legislation would be introduced in the future which would cover non-legislative elected officials and other public officials. He pointed out that Alaska has a part-time, citizen legislature which demanded that legislators be able to earn a living outside of state government.

Scott Sterling, Fairbanks, testified that he liked the bill but thought that it should address campaign financing and PACs. He and Senator Faiks discussed whether the common law could be repealed. He also questioned some of the terms in the bill as ambiguous, disagreed with the nepotism policy, and felt that the commission should be bound by the rules of evidence.

Senator Fischer said that he thought that any contract between the state and a legislator creates a conflict of interest.

Representative Phillips defended the nepotism policy on the grounds

that Juneau was "one company town." Senator Fischer said that nepotism is generally bad, but was frequently used as a tool to keep down women.

Senator Kelly discussed the effect that the Homan case had on the legislature.

Gail Stolz, AKPIRG, read a statement by that organization's director, Maureen Kennedy. The statement was generally critical of the efforts of the joint committee, and that the joint committee had failed to address the issue of budget reform.

John Dirkin, Anchorage, wanted the bill to be more specific in including the "public trust doctrine." He also wanted the bill to cover all state and municipal employees.

Senator Faiks pointed out that 33 other states had taken similar approaches to the one embodied in this bill.

Sheri Jacobus, Anchorage, representing the FREE committee of the Anchorage Woman's club testified that their position was that the legislature should go more slowly toward adopting this type of legislation to allow everyone to digest the contents of the legislation. She commented that the bill was complicating the situation and suggested that the bill was not fair to legislators.

Darlene Holt, Anchorage, testified that she did not think that there would be enough public comment on the bill.

Theda Pitman, APOC, Anchorage, promised to send detailed comments on the bill.

There being no further public comment the meeting was adjourned at 8:20 pm.

by
Fischer
-ide

ALASKA STATE LEGISLATURE

SENATE STATE AFFAIRS COMMITTEE

SENATOR VIC FISCHER, CHAIRMAN

POUCH V, JUNEAU 99811

(907) 465-4954



21
April 14, 1983
3:00 pm

Butrovich Room
Capitol

MEMBERS PRESENT:

Senator Vic Fischer, Chair
Senator Sturgulewski
Senator Kelly

ALSO PRESENT:

Senator Faiks

SB 257 Legislative Standards of Conduct

Senator Fischer made opening remarks.

Peg Kehrer, representing herself, made a number of specific suggestions and comments on the bill, and gave the committee a written list of her suggested changes. She was also concerned about the application of confidential information provisions to former legislators and employees.

Ron Lorensen, Office of the Attorney General, testified that the 30-day limitation on issuing advisory opinions is too restrictive. He said that the AG's office is working on a conflict of interest bill for the executive and judicial branches.

Senator Faiks said that the AG doesn't have a draft of this legislation because early drafting attempts were focused on developing a system for all public officials. She gave a summary of legislative ethics statutes in other states.

Senator Sturgulewski asked if the issue of legislative immunity was addressed in this bill. Senator Fischer said that it was not, and Ron Lorensen gave some legal background on the issue.

Senator Fischer presented a list of topics in the bill which he thought should be addressed by the committee. The topics on the list were covered in order and much general discussion followed.

The meeting adjourned at 4:30 pm. Attached is Senator Fischer's discussion document.

by
Lewis Schwager
Aide

April 21, 1983 in Senate State Affairs Committee

ISSUES TO BE ADDRESSED ON LEGISLATIVE ETHICS BILL SB 257

- P1 L16 APPEARANCES OF IMPROPRIETY
Should they be banned?
Or should we suggest that appearances only should be avoided.
- P2 L 9 WHO SHOULD BE INCLUDED
Is this group too wide, too narrow?
What about the Range 18 cutoff.
- P2 L17 CONFLICTS OF INTEREST
What about this definition?
Is it too ambiguous?
What about the definition that a "conflict of interest" exists when a personal interest conflicts with the public interest to the point where the member's independence of judgement is impaired?
- P3 L8 CONTRACTS
Is the public interest protected by competitive bidding?
What about after the contract is let and performance is being assessed?
Ownership interest: is this formula adequate. Too high?
What about setting a low fixed dollar value and allowing the commission to allow permission for people to have contracts if the person did not or will not improperly exercise influence in obtaining the contract?
Should we require publication in the Journal of the of all state or municipal contracts?
- P3 L29 - LOAN
P5 L14 INTERESTS BETWEEN OFFICIALS
Is "substantial financial matter" satisfactory or should we set a dollar value?
- P6 L16 GIFTS
Do you agree with the amounts and approach of section (3)?
- P6 L25 NEPOTISM
Objection to the provision allowing spouses to work in the other house during session was raised at the hearing last night. Do you support this provision?
- P7 L12 REPRESENTATION
Do you agree that a lawyer-legislator can represent a