ALASKA LEGISLATURE COMMITTEE FILES 1983-1984

3039 SSA SB 227 8672

YUKON-KUSKOKWIM COASTAL COMMUNITY HARVEST DISRUPTION STUDY

Principal Investigator: Ann Fienup-Riordan
325 East Manor Street
Anchorage, Alaska 99501

Amount Funded: $79,888.

The study will provide socioeconomic and sociocultural parameters that can be used to evaluate the nature and extent of potential resource conflicts on coastal Alaskan communities, should uplands or offshore oil and gas activities create an environmental disturbance.

Research will include the identification and assessment of the economic, social and cultural ramifications of possible renewable resource harvest disruption on residents of Scammon Bay, adjacent communities, and the region as a whole. Disruptions could include effects of offshore structures, tanker movements, noise, human disturbances, potential oil spills and other occurrences.

SIXTY SECONDS OF SCIENCE

A SERIES OF STATEWIDE MONTHLY RADIO PROGRAMS

Principal Investigator: Nan E. Elliott
Arctic Environmental Information and Data Center
University of Alaska
Anchorage, Alaska 99501

Amount Funded: $62,006

"Sixty Seconds of Science", a statewide monthly radio program, was developed by the Arctic Environmental Information and Data Center in 1980 through a grant from the National Science Foundation.

The goal of the project is to reach the nonscientific audience and inform it of science activity in Alaska. Ten 60-second programs will be produced each month. The programs are aired by 85 percent of the commercial and public radio stations in the state. In 1981, in its first year, "Sixty Seconds of Science" won a first-place award from the Alaska Press Club.

UNDER-ICE NAVIGATION BY SEALS

Principal Investigator: Robert Elsner
Institute of Marine Science
University of Alaska
Fairbanks, Alaska 99701

Amount Funded: $35,631

The objective of this study is an experimental examination of the under-ice orientation and navigation capabilities of the Bering Sea spotted seal. It will investigate the possible sensory disturbances arising from ambient noise levels and environmental disturbances which are anticipated to take place in connection with petroleum exploration in Alaskan waters seasonally covered with sea ice.

A series of experiments will be performed with captive spotted seals. The study will take place in a large, flooded industrial gravel pit during the winter to simulate under-ice low visibility conditions while maintaining control over the environment.

REMOVAL PROCESSES OF AIR POLLUTION PARTICLES BY ICE FOG CRYSTALS

Principal Investigator: Takeshi Ohtake
Geophysical Institute
University of Alaska
Fairbanks, Alaska 99701

Amount Funded: $118,816

Air pollution in Fairbanks during the winter months manifests itself primarily as ice fog. Researchers have cautioned that the city might experience dangerously high levels of air pollution with increasing population and industrial development.

However, a high possibility of removal of air pollution particulates by sedimentating ice fog crystals has been demonstrated. Chemical analyses of ice fog precipitation collected in the Fairbanks area suggest that the pollution particulates are scavanged by the ice fog crystals. If removal of air pollution by ice fog is verified, more ice fog might be preferable because the ice fog may be less harmful than air pollution.

This possible cleansing effect of air pollution particles will be studied in Fairbanks. The mechanism of the scavenging effect of ice fog crystals will be examined by use of electron microscope techniques. The research objectives of this study will be: to obtain current size and number distributions of ice fog crystals and aerosols in Fairbanks and its vicinity; to evaluate the degree of the cleansing effect by ice fog crystals in a subarctic polluted urban atmosphere; and to examine the mechanism of artificially enhancing such a possible scavenging effect by small ice fog crystals.

STUDY OF IMPLEMENTING ALASKA'S BILINGUAL EDUCATION POLICY

Principal Investigator: Ramona N. Suetopka-Duerre
University of Alaska
Arctic Environmental Information and Data Center
Anchorage, Alaska

Amount Funded: $23,710

The study will analyze the implementation of Alaska's bilingual education policy in the Lower Kuskokwim School District. The intent of the research will be to pinpoint problems, suggest reasons for the problems and offer suggestions for improvement in the district's bilingual education programs. The research will include examination of documents pertinent to the programs under study, observation, and interviews. It will also examine the reasons for the increased difficulty in determining the impact of education policies from one program to another and why a single policy produces varying results in various program locations.

ARCTIC RESEARCH SHIP DESIGN (Phase III)

Principal Investigator: Robert Eisner
Institute of Marine Science
Fairbanks, Alaska

Amount Funded: $161,933

Earlier design work for an arctic research ship established the requirements for national polar research vessel operations in terms of geographic regions, environmental conditions and scientific capabilities. The design envisages a ship having characteristics of 225' water line length, 2900 tons displacement, twin rudder and diesel propulsion.

This proposal is to continue the design effort to solve technical problems which remain and which require resolution before further development work can begin. These problems concern sea ice resistance and propulsion and include design improvements such as: modification of hull lines; diesel, reduction gear, nozzled, variable pitch propeller propulsion, and reduction of frictional resistance in ice by air-water lubrication.

A model will be constructed suitable for the installation of self-propulsion equipment and testing. Model tests in ice will be performed at various ice thicknesses to determine the resistance of the ship and to observe the flow of ice around the hull. Modification of hull lines and lubrication techniques will be studied for effectiveness in reducing ice compression, resistance, and ice flow under the hull.

Legislature of the State of Alaska

Testimony of
Dr. Edward Wenk, Jr.

It is quite a privilege to testify on new legislation regarding the Alaska Council of Science and Technology. In my view, this proposition may be one of the most crucial to come before this session. By updating an important aid to state decision making, continuity of the ACST would represent a small investment today that should pay off handsomely tomorrow --- providing sharp and objective information on Alaska's opportunities and problems so as to foster development with the least disappointments or unwitting economic and social costs. I hope that these brief remarks may be helpful in your deliberations.

By way of introduction, a word or two about your witness. Over the last 24 years, I have been a participant in or analyst of advisory apparatus related to the making of technology-intensive policy. Although trained as an engineer and engaged as a practitioner for 18 years, I became the first science advisor to the U.S. Congress in 1959, then served on the science policy staffs of Presidents Kennedy, Johnson and Nixon. In 1970, I was appointed to the faculty at the University of Washington, where I have taught, conducted research, and continued in advisory capacities, especially to the Congress.

Over this last decade, I have periodically visited Alaska where I learned firsthand about its people, its economy, its challenges and its dilemmas. I soon understood why Alaska's future is a special case so that whatever steps are taken in science and technology policy must be carefully matched with the unique characteristics of geography, economy, history, hopes and dreams of its citizens.

As legislators, you have a powerful vantage point on Alaska's agenda so much of which depends on science and technology. These issues and corresponding initiatives, to name just a few, would:

- Increase efficiency, economy and productivity in state government by strengthening information resources, communication linkages and use of technological aids;

- Foster development of Alaska's natural resources, by understanding their distribution, richness and accessibility, by enhancing techniques of management in the public interest to assure a competitive position in world markets;

- Evaluate the future supply and demand of energy, state and global, considering indigenous sources of hydroelectricity and natural gas, their transportation and distribution;

- Provide new opportunities for employment through technological innovation, linking university R and D with industrial and state requirements, attracting diversified industry, facilitating capital formation, promoting long term investments and stimulating economic vitality in rural areas;

- Consider new rail networks that would improve interior transport, considering geology, climate and state of the art of hardware;

- Evaluate the impact of new technologies unfolding in the lower 48 to map dependencies and constraints that may influence the future of the state;

- Expand knowledge of high latitude phenomena, for example of electromagnetic effects that may impair pipelines, disrupt electrical power or radio transmissions, and of frozen soil that must be considered in construction or maintenance of highways, large buildings, railroads, and underground utilities;

- Strengthen meteorological reporting and forecasting as it affects agricultural development, stream flow, and hydroelectric capacity, glacial behavior, outdoor recreation, aviation and maritime safety, etc.;

- Extend capabilities for health maintenance and disease prevention so as to prolong and improve quality of life and to contain rising costs of medical care;

- Meet needs of a growing population for highways, water supply, sewerage, fire and police protection;

- Help manage state funding of research and development, which is a greater proportion of the total conducted in Alaska than in any other, to assure its focus on interests of the state, promote high standards in its conduct, and the effective utilization of products.

Although these examples cover a wide range of topics, they reveal significant common features:

- All these key decisions, consistent with Alaska's Constitution, are matters of public policy,

- Options depend critically on research results from natural and social sciences and engineering, and on alert inquiry as to future technological and social developments,

- Substantial public investments are involved,

- Issues are both technically and institutionally complex and require heightened initiative for public understanding and acceptance,

- Consequences of error are likely to be costly, politically difficult to correct, ecologically irreversible, or marked by shortfall in goal achievement,

- Implementation requires balanced partnership between public and private sectors,

- Public responsibilities for implementation, monitoring , or regulation cross agency boundaries so as to require an unusual degree of coordination,

- The past no longer provides a guide for the future, thus requiring new levels of foresight and impact analysis.

Put another way, these technology-laden issues involve high stakes for Alaska. Moreover, their satisfactory resolution depends on a base of sound information and analysis, and on keen public management. Because of Alaska's special situation, research conducted elsewhere may not suffice.

All of which adds up to the need for Alaska to equip itself with technical advisory apparatus that can provide essential facts and objective interpretations, focused on policy questions, prompt, free of advocacy, future oriented, drawing on a wide range of expertise, clearly and concisely presented. For only after the crucial data base is developed can options be examined and rational choices made that reflect economic, social, legal and political considerations that must be blended in democratic process.

In short, we find that both policies and policymaking that depend on science and technology are substantially different from others. So what do we do?

It is here that such steps may be easiest visualized with a nautical metaphor. Science advisory apparatus is like having a

navigator on a ship's bridge. It's function is an adjunct to that of the captain; it does not replace the crew in the engine room tasked with smooth operations. Navigation involves defining a course to reach a distant and future destination, with a careful watch for obstacles and hazards--early warning of storms, other vessels, reefs--utilizing all available charts, radio, radar and electronic location devices. Otherwise, if these functions are carried out by the ship operator, they are in competition for time and attention, may be terribly distracting -like running from wheel to radar scope- or they may be entirely neglected, with increased risk of collision, damage, delay or failure to achieve goals.

To strengthen the policy making capacity of the state, various instruments are available:

- Modify and strengthen the role for ACST,
- Expand roles of other governmental apparatus,
- reinforce functions in existing staff agencies,
- create a small specialized staff,
- appoint ad hoc advisory committes,
- use private consultants,
- develop systematic citizen consultation.

In considering relative merits of alternatives, and in recognizing that effective functioning may involve several in concert and not just one the following criteria should be considered. The unit should:

- facilitate role of governor as Chief Executive,
- demonstrate credibility and freedom from advocacy,
- assure access to diversity of expertise and of data banks,
- display low cost and structural simplicity,
- impart long range perspective and foresight capacity,
- respond with fast reaction time when needed,
- provide balanced representation of various disciplines and professions,
- demonstrate familiarity with policy process,
- foster interagency coordination and articulate with bodies

at other governmental levels,

- communicate effectively in and outside of government,

- be backed by legislative mandate.

As an aside, while the federal experience is not directly applicable, it may be instructive because exactly the same types of policy predicaments had to be met. Beginning in 1957, the incumbent President and his successors created and utilized four interrelated instruments:

- an advisory committee of outsiders,

- an advisory committee of insiders,

- a science advisor directly on the White House Staff,

- and a small specialized staff office.

With different administrations, these units have undergone major changes to strengthen or to divest tasks, depending upon wishes of the Chief Executive; but except for a 1973-76 hiatus, core functions have continued now for 25 years.

Congress, too, has acted. In 1958, it created a post of science advisor in the Legislative Reference Service, Later, they expanded it to a diversified staff of experts; then in 1972 created an entirely separate Office of Technology Assessment by legislation. Also about 1977, it authorized a science policy unit in the GAO.

States have also established analogous advisory apparatus. They are highly varied; they change in structure and style with new administrations; they range widely in mission and effectiveness. Most have a role in economic development, and these are being reexamined and revitalized as most states respond to the seduction of the hi-tech frontier. The National Governors Association has completed three studies in this area, treating prospects and comparative mechanisms.

To return to Alaska, as was said before, whatever is established here should be custom designed for the State's special needs and situation. As a first step, I strongly support new legislation in relation to the Alaska Council on Science and Technology.

Such a measure should focus more on a policy advisory role and less on managing grants; its mission should reflect:

- the need for acquiring and interpreting technical information in SandT policymaking,

- the potential of scientific and technological research in Alaska's future,

- the obligation to spend public research funds prudently and without unnecessary duplication,

- the benefit of effective information transfer,

- the requirement for central integration of research results,

- the capacity to look ahead and build a future orientation into the advisory function.

I also believe it essential to clarify the organizational arrangements by establishing the ACST in the Office of the Governor. This erases existing ambiguity as to structure, and best assures effective utilization and communication of this resource by linkage between advisor and advisee. Additionally, roles and missions of ACST should be spelled out to meet general criteria for functioning that I listed previously. And finally, the bill should contain an action-forcing provision through a requirement for a biannual report, dealing with the state of SandT, issues deserving research, recommendations for additional research and a summary of significant accomplishments.

In summary, this proposal is derived from what I perceive as needs of the state; it meets a test of soundness, using the criteria for such advisory apparatus. Finally, it would be built on an existing body that, while having a different scope and direction, has a track record of accomplishment that should reduce uncertainties as to performance if it were an entirely new entity. For the ACST has earned recognition and praise in a national scientific journal, almost unprecedented in activities of this kind.

What is important to your deliberations is that this proposal has a high prospect of success. It does mean that the members of the ACST will have a very demanding challenge ahead. But in my discussions with them, they appeared to share objectives and possible changes in legislative mandate that I have repeated here. This step might also correct what seemed to be substantial underutilization by the preceeding administration.

I do not believe that this is the last word on what the state may ultimately decide is necessary to fulfill its opportunities involving science and technology. But in my judgment, it is the best possible first step.

March 22, 1983

Testimony of Mr. David Hickok, Chairman, Alaska Council on Science and Technology before the joint Senate and House State Affairs Committee-Alaska State Legislature

Mr. Chairman, my name is David Hickok, the current chairman of ACST. With me is Chris Noah, Executive Director to the Council and Dr. Edward Wenk.

For four years we have been involved with an experiment unique to Alaska government experience. An experiment which has involved an extremely high level of volunteer participation and committment from individuals within the Alaskan engineering and science community. This volunteer effort has been made primarily to make available Alaskan expertise in the sciences and engineering to the legislature and the executive branch as they considered policies and programs requiring such advisory input. Additionally, the Council has prepared research needs reports on subjects applicable to state interests, disseminated science and engineering information on a variety of subjects and in a variety of media and administered grant funds for the support of technology and research grant programs established by the legislature and given to the Council for administration.

Like many experiments our experience has been only partly successful. But we have learned something of both the strengths and weaknesses of a science organization in and for Alaska. I, and the members of the Council welcome this hearing and a candid discussion of the Council's record together with an evaluation of its responsibilities and duties. Since inception we have been engaged in our own self analysis but particularly over the past 1-1/2 years have sought better approaches or ways to alleviate the deficiencies in the ACST structure which we have observed. We brought three distinguished men of science in Alaskan and ocean affairs--Drs. George Rogers, Joseph Fitzgerald and Edward Wenk in to assist us in this evaluation. Dr. Wenk is here today to offer some observations from his lengthy experience in federal science and other state organizations.

With that introduction aside I'd like to briefly summarize some salient points of our own self-analyses. Where we are weak, where we are strong and why.

1. The Councils' authorizing legislation provided for an organizational relationship to both the governor and the legislature. This dichotomy of responsibility to both branches is perhaps the reason why neither has used the broad expertise available through the Council - extant in hundreds of Alaskan scientists and engineers available to assist government in appropriate ways -- to the extent possible.

   Even so the legislature and the governor have called upon the Council for advice on numerous and various matters. The legislature has used the Council much more than the past executive branch with particular contacts involving several legislative committees: agriculture, telecommunications, natural resources and state affairs. As you will recall it was the Council who first furnished the legislature through this committee information on the impacts of federal budgetary cutbacks.

   The authorizing legislation for the Council called for its placement within the Office of the Governor. However, we were never really welcomed there in the past administration and were transferred first to DEC and later to Administration by executive order.

2. Patterned after the federal experience in science organizations the 1979 draft legislation originally called for three separate entities: an advisory body to the executive branch on policy matters involving science and technology; the chartering of an independent private sector organization - e.g. Alaska Academy of Engineering and Sciences;

and, a third organization to grant funds for the support of scientific and technological research applicable to solving state needs and problems.

During the legislative process all three of these above functions were combined in the ACST. Experience has shown that this was a mistake. A small (seven person) volunteer Council simply cannot perform in both the policy advisory function and the granting of support funds for science and technology.

3. Experience has shown that the membership (7) is too small to effectively represent the expertise necessary to consider the range of scientific and engineering issues brought before the Council. Even though we have a rapid response system at hand to involve hundreds of diverse experts we are hindered in the deliberative and voting process. At least two more members from the private sector would make for a more effective operation.

4. Particularly difficult and time consuming for the Council has been the granting of funds for Northern Technology and Applied Research. In part the criteria for these grants have been vague in the legislation, but more importantly it is extremely difficult for a deliberative body, representing different scientific or engineering disciplines and interests to vote on the propriety of a broad spectrum of research proposals -- even though well screened by reviewing experts prior to Council vote. Incidentally, this review process itself has been most effective scientifically and financially and has been applauded nationally in SCIENCE magazine.

5. Despite some of these difficuties we have produced, in our view, with only volunteer help--a rather impressive record of research needs reports, support of meetings and conferences, and dissemination of information in a variety of media: publications, radio and T.V.

6. On the subject of research needs reports and their prioritization we have only made priorities within each subject or function. We have not felt it appropriate to prioritize between research needs in health vs agriculture or natural resources vs transportation, etc. Instead we have held that this prioritization between functions was a matter for elected representatives. Even so if asked our opinion we would have responded.

7. Similarly we have been criticized for not coordinating all science in Alaska. In response to this we have pointed out that the legislative history for the ACST specifically said not to do so, and in any event it would be a mistake to put the Council in a "big brother" role for all Alaska science. Instead, we have pursued the goal of improved coordination in research through indirect means of workshops, conferences and information exchange. In this way--ie communications and involvement--coordination of state interests on many subjects has been achieved.

8. Finally, I would like to point out that we believe it has been in the policy area that the Council has been particularly effective and in an important sense. We have sought the development of research partnerships between the federal government, the state government, universities and private industry. To this end we wrote the report

U.S. Arctic Science Policy, assisted Senator Murkowski in the drafting of his legislation, the Arctic Research and Policy Act, formulated the state's position on this legislation and influenced the national scientific community to support its enactment in the U.S. Congress.

At this point in time the future of this legislation is our greatest concern and highest priority. We feel most strongly that if state and national goals in resource development, human health, environmental protection and national defense are to be achieved in the U.S. Arctic--Alaska and adjacent waters, then the combined forces of science and engineering expertise from government, from academia and private industry must work cooperatively in the greatest partnership possible.

What you decide to be the fate of the ACST or a similar science body in Alaska will have a direct effect on this effort. Unless Alaska continues an interest in science policy and research planning the United States Congress is unlikely to do so.

Thank you for this opportunity to appear before you I'd be pleased to answer any questions.

A NEWSLETTER PUBLISHED BY THE ASSOCIATION OF CANADIAN UNIVERSITIES FOR NORTHERN STUDIES

see p. 4

NORTHLINE

VOLUME 3, NUMBER 1, FEBRUARY 1983

The Changing Face of the N.W.T.

The changing face of political life in the Northwest Territories is reflected to some extent in the re-orientation of the Territories' Ottawa office. Once the bureaucratic source of administrative decisions emanating from Ottawa, the office has undergone a major transformation over the last 20 years similar to that which has taken the N.W.T. itself essentially from protectorate status to responsible government.

Gone is the bureaucratic office first operated quietly under the wing of first the Department of the Interior, then the Department of Northern Affairs and Natural Resources, and finally the Department of Indian Affairs and Northern Development. In its place is an independent, politically oriented office — an advance observation post for the elected officials of the N.W.T. government in Yellowknife.

The Territories' current champion in Ottawa is Claire Barnabe, who brings an astute knowledge to the job of both the major political issues affecting the North and the leading personalities of the Ottawa political scene. She has the insider's grasp of the political manoeuvring now going on between Ottawa and the N.W.T. over such important questions as the settlement of native land claims and the control of the potentially valuable resource base.

Claire Barnabe knows her territory. Born in Vanier, Ontario in 1940, she has lived in the North since 1965, working as a teacher, a hotel manager, a settlement manager and a policy analyst for the Drury Commission from 1978 to 1980. As Senior Advisor in Ottawa to the Government of the N.W.T., she is responsible in part for establishing contact with federal ministers and their parliamentary and political staffs, and recommending lobbying strategies and plans to the elected Executive Committee of the N.W.T. She reports to the Minister responsible for Intergovernmental Affairs, George Braden, who has been the leader of the Executive Committee since 1979. Braden previously worked as a policy analyst with Claire Barnabe on the Drury Commission.

According to Claire Barnabe, George Braden was the chief architect of the changes

Claire Barnabe

that have taken place in the Ottawa office. "After being elected in the fall of 1979," she says, "George Braden decided that the role of the Ottawa office had to change. He wanted more of a political liaison office. We looked at what the provinces were doing, especially Alberta and B.C." There was a feeling at the time, she adds, that the office should not only be independent of the federal government in fact, but should also be seen to be independent.

This desire led to a decision by the Executive Committee in the spring of 1982 to close the bureaucratic office that still operated within the Department of Indian Affairs and Northern Development. "We wanted to get out of DIAND because of the confusion it was causing," she says, "and to get out of government buildings so we could be independent of the federal government." The bureaucratic office was finally closed in September 1982, leaving only the independent Intergovernmental Affairs office, modelled on provincial offices in Ottawa.

If the move towards responsible government and the right to be represented in negotiations affecting one's future has been accomplished without much opposition, indeed, in many cases, with the encouragement of the federal government, such has not been the case with other goals. The goal of provincial status, for example, embraced by many northerners, is no closer than it has ever been. The people of the eastern Arctic, Claire Barnabe says, who voted strongly in favour of division of the Territories in the recent plebiscite, "seem to believe that within 15 years they will have provincial status and control of resources."

"I don't think the Northwest Territories is ever going to have provincial status," she declares bluntly. The uncertainty in the field of energy and the absence of an adequate industrial base, she explains, make it impractical

Page 4, Changing

New SSHRC President

On October 28, 1982, the Prime Minister announced the appointment of William E. Taylor, Jr. as President of the Social Sciences and Humanities Research Council of Canada (SSHRC). Dr. Taylor succeeds André Isorier, who has retired from the Public Service.

One of Canada's specialists in Arctic archaeology, and the architect of the National Museum of Man's extensive national research and outreach programs, Dr. Taylor is well known for his many research publications and addresses in the fields of archaeology, museology and Inuit art and culture. Dr. Taylor has been the recipient of numerous awards including the Queen's Jubilee Medal, the Bicentennial Medal of the Society of Antiquaries of Scotland, and the Royal Society of Canada Centenary Medal.

Dr. Taylor has been the Director of the National Museum of Man (including the Canadian War Museum) since 1967. He assumed his new position with the SSHRC on a full time basis on February 15, 1983. □

Trust Announces First Awards

In association with the sponsoring body, the Association of Canadian Universities for Northern Studies, the Canadian Northern Studies Trust has begun a program to give northern Canada a stronger and more national place in education and training by announcing the first winners of Northern Studentships and Special Awards to be held at Canadian universities.

The Trust, which was recently established by the Council of the Association of Canadian Universities for Northern Studies, has this year offered Northern Studentships valued at $10,000 each to three outstanding young Canadians in support of their studies leading to careers involving Canada's North. An additional studentship is also being considered at the present time.

In making the announcement Dr. J. G. Nelson, President of ACUNS, and Dr. J. K. Stager, chairman of the Trust Management Committee, said: "We are very pleased to make the first awards to support students clearly committed to northern studies. There is little doubt that northern Canada faces change with the interest in resource potential, the concern for environmental quality and the human condition, and political evolution at several levels of government. We are convinced that it is important to begin now with scholarships to prepare, through education and training at our universities, some of the young people who will be needed to shape a northern future. What was very heartening to the Committee was the excellent response from really quite outstanding students. We had nearly seventy applications of superior quality in most respects, and to select three Studentship winners and three for Special Awards was very difficult. It has demonstrated to us that we need to expand our program with contributions to the Trust fund."

The Special Award winners are from the North. Carol Geddes, a member of the Teslin Band, will work towards a Master's degree in Communications at McGill. Robin Johnson leaves nursing in northern Alberta to gain a Master's degree in Nursing at the University of Calgary before returning north. Jonleah Hopkins from Whitehorse will study the development of northern health care delivery systems for a Master's program at the University of Waterloo. One of the Northern Studentships will go to Margaret Johnston studying at Trent University, who will prepare her Bachelor's thesis on the relationship of highways, tourism and wilderness, using the case of the Dempster Highway. Alain Bissonnette won his award to support a Ph.D. program in anthropology, investigating the territorial rights of an indigenous northern people. He will do fieldwork among the Montagnais and present his thesis to the Université de Montréal. Nancy Weeks will begin study for a Master of Environmental Studies degree at York University, focusing on the theoretical and practical basis for cooperation on multifaceted interests in research on renewable resources. All of the successful candidates have previous northern experience and have demonstrated a commitment to the North which will extend beyond the study period.

The awards from the Canadian Northern Studies Trust are possible because of a grant from the Donner Canadian Foundation. The Trust is seeking funds to match the Donner grant and establish a basis for a five-year program of scholarships and other support for northern study.□

ACUNS Board Meeting

The first meeting this year of the Association's Board was held in Toronto on Thursday, January 27, 1983: "back to back" with the Management Committee of the Canadian Northern Studies Trust which took place the day after on the 28th.

These two events in tandem enabled us to hold a reception during the evening of the 27th so that members of both the Association and Trust could meet each other and discuss plans and ideas with local Council members. We also invited representatives from the corporate funding sector.

Five elements of the Board's agenda are worth reviewing here for general information:

1. The Association is updating the List of Northern Specialists. By the time this edition goes to press the questionnaires will have been sent out across the country.

2. The Association is going to draw up and probably publish a compendium of all federal assistance which is available for northern research and northern training.

3. The work of three Association Committees is now underway. The Education Committee, chaired by Jim Carefoot, is doing a survey of literature of distance education. Dr. John Theberge's Land Use Committee is writing a paper on progress on educational and research land use in the North with special reference to the IBP areas. Finally, Dr. Garry Clarke's Committee on Research and Field Facilities is undertaking a preliminary analysis of the licensing and permit requirements now needed for research in the North.

4. One session of the Annual Conference in Regina in April will be given over to a plenary discussion on the whole range of funding and support available for northern scholarship, including the Northern Scientific Training Grants Program of Indian and Northern Affairs.

5. The Association is considering the advisability of holding a symposium during 1984. Are there any suggestions or ideas on subject matter, time and place?□

ACUNS Annual Conference

A preliminary agenda has been prepared for the ACUNS 1983 Annual Conference, which will be held April 21-23, 1983 at the University of Regina. On the 21st there will be a day-long discussion of the topic "Communicating Northern Values", which will feature papers by Mrs. Minnie Freeman (Edmonton), Professor Joan Townsend (University of Manitoba), Professor Pierrette Désy (Université du Québec à Montreal), Ms. Julie Cruikshank (Yukon Territory), and Ms. Ruth McCleary (Winnipeg). In addition, there will be a review of funding for northern training and research, and a discussion of northern scholarly research being carried out at the University of Regina. The ACUNS Annual General Meeting will be held on the 23rd.

A number of social events have also been arranged including a reception and banquet on the 22nd at Government House — home of the former Lieutenant Governor of the North West Territories.□

NORTHLINE

Northline is a publication of the Association of Canadian Universities for Northern Studies, and is issued four times during the academic year. Contents may be used without permission, but with attribution. Contributions and comments are welcome. Subscriptions may be obtained by writing to ACUNS:

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Dr. Gordon Nelson, *President*
David A.W. Judd, *Executive Director*
Eileen van Heyst, *Administrative Officer*

Northern Scientific Training Grants: Program Update

The Northern Scientific Training Grants Program, which was started in 1961, is managed by the Department of Indian Affairs and Northern Development. Its primary purpose is to support Canadian universities in providing training that gives advanced students professional experience in the North and encourages them to develop a commitment to northern work. The program objective is to increase the number of graduate and other advanced students in Canadian universities who have specialized in some aspect of northern studies and who have northern research experience.

The Program budget for 1983/84 is $725,000, with annual increases of $100,000 approved until 1985/86, to a total of $925,000. With the establishment of Committees for Northern Studies at Simon Fraser University, Ryerson Polytechnical Institute, and the University of New Brunswick, there are now 26 universities participating in this Program.

The evaluation study of the Grants Program undertaken by Kubiski & Associates, has just been completed. Copies will be distributed to universities participating in the Grants Program, for their information and comment, as well as to the Association of Canadian Universities for Northern Studies. Several of the recommendations have already been adopted by the Program, in particular those relating to the guidelines and applications.

It should be noted that throughout the evaluation process, there has been direct input from representatives of other federal departments, ACUNS, and the academic community. Follow-up on the evaluation and program issues will also be achieved through visits to universities by Program managers, and discussions at the specific session on the Northern Scientific Training Grants at the ACUNS Annual Meeting. This process facilitates annual Program refinements in response to changing needs and circumstances.□

The Canadian-Scandinavian Foundation

The post World War II euphoria of international co-operation saw the creation, in 1951, of the Canadian-Scandinavian Foundation (CSF) in Montreal. Although similarities between the two countries as geopolitical entities may be somewhat tenuous, the tenacity of the CSF in the field of scholarships and grants is impressive. Over thirty years (and some 200 scholarships and grants) have gone by since the Federation was founded, and it is still very much alive and active.

The CSF operates with two basic advantages. The first is that the outstanding achievements of Scandinavia in countries in various fields, including industry, high technology, architecture, planning and public policies constitute a strong appeal to high-quality Canadian grant applicants. The second is that Canadian students have shown themselves to be interested in the possibilities of learning something new from the Scandinavian experience, and of applying Scandinavian solutions in the Canadian milieu. Although the relationship between the foundation's small budget and the large results it achieves is disproportionate, this is, perhaps, an indicator of efficiency in itself.

The present grant program can be divided into three distinct types of grant. The first group of grants is funded by the CSF itself, through annual membership payments and donations. These grants usually amount to approximately $500 per grant, and are intended to be used as travel support to assist a student in his or her study visit to Scandinavia. These CSF-funded grants are not tied to any specific destination in Scandinavia, and thus allow the recipient as much freedom to move around as the total finance will permit.

A second type of grant is funded by national organizations in Scandinavia, with the review and selection of applicants left up to the CSF. For example, two scholarships of this type are awarded by the Swedish Institute and (indirectly) the Swedish-America Foundation. Both are full-year academic grants, which can be sought by academic and non-academic applicants alike. However, the recipient of one of these grants must conduct his study and research in Sweden.

The final type of grant is exemplified by the Brucebo Fine Arts Scholarship, named for the Hamilton-born artist, William Blair Bruce, and the Sylvia Weldon Scholarship, set up in 1982 to commemorate the late Mrs. Weldon, a Canadian-Norwegian who lived in Montreal. The Brucebo Fine Arts Scholarship, which is funded by the artist's estate, takes the recipient to the historically interesting island of Gotland, where William Blair Bruce once had a summer residence. The Sylvia Weldon Scholarship, the result of a generous bequest to the CSF, is to be used to pursue research and studies, preferably in Norway. The 1982-83 winner was Dr. A. Trak, a geologist at the University of Ottawa.

In spite of generous individual and corporate donations from both Canada and Scandinavia, the CSF, as does any voluntary organization, has its financial problems. Over the years, interest in the grant program has grown at a much faster rate than the foundation's resources.

The Management of the CSF consists of a member-elected board of directors, a president, and a secretary-treasurer. Currently, Dr. George Jacobsen, president of Tower Arctic Inc., Montreal, is serving as the foundation's president.

The CSF would like to extend an invitation to new members who are interested in supporting the work of the organization. For further information regarding memberships, write: Dr. J. Lundgren, CSF Secretary, Dept. of Geography, McGill University, 805 Sherbrooke St. W., Montreal, Quebec, H3A 2K6.

Northern Science and Research

As a result of a recent re-organization of the Northern Affairs Program (NAP) of the Department of Indian and Northern Affairs, the Northern Policy and Coordination Branch has been realigned to provide greater direction to matters relating to northern science and research. As part of this re-organization, the Northern Social Research Division has become the Office of the Northern Research and Science Advisor reporting directly to the Director General of the Branch. The mandate of this new office is to advise the NAP, government departments, industry and universities on northern scientific matters; ensure a coordinated approach within the NAP to funding and implementation of NAP scientific activities in the North; promote northern science development; and manage research and analysis between Canada and other circumpolar countries.

Mr. Donat Savoie acts as the Northern Research and Science Advisor; Walter Slipchenko is responsible for Circumpolar Affairs with specific responsibilities for USSR, Alaska, Greenland and Scandinavian countries; while Mr. Harold Finkler is in charge of social research and university affairs which include the administration of the Northern Scientific Training Grants Program. In order to support the Advisor's broadened mandate, Mr. Raymond Bergeron of the James Bay Development Corporation has joined the Research and Science Advisor's Office on Executive Interchange as coordinator of Northern Science.□

Development of Science in the N.W.T.

by J. M. Harrison

Few people now resident in the Northwest Territories have been trained in science. In an age dominated by science and engineering, this is a serious shortcoming, and as one step in improving the situation the Science Advisory Board (SAB) was established by the Legislative Assembly of the N.W.T. The SAB was charged with encouraging scientific activities that will benefit Northerners and with helping to develop the capacity of Northerners to undertake scientific activities themselves.

Although its budget is only about $200,000 per year, SAB has made a modest beginning to achieving its objectives in its six years of existence. It has, for example, sponsored studies on the animal resources of the N.W.T. to provide a base to help calculate the rate at which they may be harvested; a study on population trends; renewable sources of energy; small-scale hydro; and has supported promising students to work with field parties in the North. However, if there are to be indigenous scientists, there must first be a northern scientific presence — an "institute" to investigate problems of concern to northerners who must also take part in its management.

Several years ago a group of people from university, industry and government was convened by the Minister of Indian and Northern Affairs to consider a proposal that the science labs operated by the department should form the basis for a "Northern Research Institute". All agreed, but so far no action has been taken by DINA, except for an inventory of its three facilities at Frobisher, Igloolik and Inuvik and of other facilities that might be included, or added later, and which were under non-departmental management.

It should be emphasized that the term "Institute" is used to describe a concept rather than a physical establishment. The three centres, with others that may be added, would need to have their programs coordinated to the best advantage of the North. In the beginning the "Institute" would probably be made up of a program director and secretary in Yellowknife, responsible to a Board of Governors. To a considerable degree it would be a stimulant rather than an operation, although we expect that it would be responsible for contracting scientific work to appropriate individuals or institutes.

The Institute should be established under authority of the N.W.T. The Board of Governors should draw at least half its members from the North, and should be responsible for determining the major directions of research, and should report to the Legislative Assembly of the N.W.T. It is essential that the Institute represent the N.W.T. and not a department of the federal government, which it would be seen to do if it reports to any federal agency.

The SAB estimates that the yearly cost of up-grading the existing centres, and maintaining and staffing them, would be in the order of $1 million per year. A reasonable scientific program would cost, say, one and a half to two million dollars per year. The SAB believes that a good part of this sum could be obtained from outside sources, but if DINA is serious about northern research, it should provide at least $2 million per year as long as it claims any responsibility for the research.

For the first several years of its existence, the Institute would have few people who would be full-time residents of the North, simply because there are so few scientists who live in the region. However, with laboratories reasonably well-equipped for research, it is expected that researchers from the south would be prepared to spend a couple of years based in the North before returning to their home institutions for final prepatation of results and discussions with their colleagues. If the three centres of DINA form the nucleus of the labs, it might be possible to add other stations, such as that of the University of Saskatchewan at Rankin Inlet, or the McGill station on Axel Heiberg Island. Thus, there would be centres through the North where there would be a continuous presence of scientists.

Technician training could be provided for young people interested in the work that goes on, and eventually young Northerners would obtain university degrees in science and in engineering. The Polar Continental Shelf Program is considering the establishment of a year-round centre in the North and such a center would greatly help in making scientific activities visible throughout the year, rather than being regarded as "tourist" efforts. The Arctic Research Establishment at Pond Inlet, which is based on private funding, clearly has a strong effect on the local people. In its ten years of operation the local community has become much more aware of science in relation to its world.

Assuming the Government is serious about the devolution of responsibilities to the Legislative Assembly of the N.W.T. (and to that of the Yukon) the Science Advisory Board is convinced that one important step is the creation of a Northern Research Institute. It would be relatively inexpensive — DINA already spends nearly as much on its science service centres as it should make available to such an Institute — and its long-term effect would build on the short term studies it could undertake or sponsor. These could include such projects as the effects of hydro-electric sites, more detailed studies of marine and land animals to determine the natural fluctuations in populations, effects on the health of native people who eat the meat of sea mammals that are relatively high in mercury, and other such topics as may be identified by the governing board. Such an institute could be the first step in developing a "University of the North", which may also develop first as a concept.

In any case, the concept of a Northern Research Institute is supported by the interagency group convened by the Minister of DINA some years ago, by the interdepartmental committee on Arctic Science and Technology, by the Legislative Assembly of the N.W.T. and by the Science Advisory Board. There is no evident reason for further delay in implementing the concept.□

J. M. Harrison is the Chairman of the Science Advisory Board.

Changing, from page 1

for the Territories to assume provincial responsibilities. Even if resource prices were stabilized, she claims, it is unrealistic to believe that the Territories would be given sufficient control of the resource base. "If Manitoba, Saskatchewan and Alberta were entering Confederation today," she says, "they would never be given the control they have over resources."

Nevertheless, she admits that there is a strong movement in the N.W.T. for greater governing control. In this, however, the Territories face a dilemma. While the federal government seems ready to devolve certain responsibilities, she explains, they have not come forward with any substantial changes in the financial arrangements between the two levels of government. "There are certain responsibilities the Northwest Territories doesn't want," she says, "unless there is guaranteed funding. For example, John Munro wanted to devolve forest fire control to the Territories, but he expected it to pay the $12 or $14 million that it would cost, so the Northwest Territories refused.

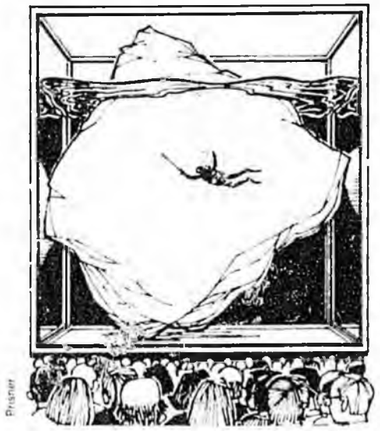
"Right now we're looking at a new system called 'formula financing'. In a nutshell, formula financing would allow for a direct transfer of money from the federal government to the Territories." Support for the system in the N.W.T. is based in part on the belief that it would allow the territorial government to formulate plans that are based on a predictable expenditure ceiling. The federal government has, in fact, promised to move quickly to introduce formula financing in the N.W.T.

The territorial government, however, is interested in a financial arrangement that would be more politically accountable, she explains. "Our government is very strong on resource revenue sharing. The Northwest Territories is still getting money through DIAND. We are not a branch of DIAND, so why should we be treated as a branch of DIAND?" □

Iceberg Management Seminar

A three-day *Seminar on Iceberg Management in Offshore Exploration, Production and Transportation* was held in November 1982 at Memorial University in St. John's, Newfoundland. The seminar, which was co-sponsored by the university's Continuing Engineering Education service, petroleum industry sponsors and various professional groups, provided an opportunity for an in-depth study of the iceberg hazard to offshore operations.

Some of the topics discussed included: a review of the iceberg climatology; measurement and estimation of iceberg size; detection and surveillance; drift forecasting; collision avoidance; iceberg scours; and concepts for protecting production systems. The seminars resource team was composed of representatives of the industry, consulting companies, government organizations and research and academic institutions.



Proceedings of the *Seminar on Iceberg Management* will be available later in 1985, at a cost of $65. For information, write: Dr. Hira Ahuja, Continuing Engineering Education Centre, Memorial University, St. John's, Newfoundland, A1C 5S7.

Arctic Videotapes

The year-old Inuit Broadcasting Corporation has recently concluded a cross-country tour to introduce to southern Canada a video-tape series produced in the Arctic. The Kaminuriak caribou series is concerned with a major herd of caribou in the Keewatin Region of the Arctic and the recent crisis which developed around it, between Inuit hunters and leaders on the one hand, and government biologists and game managers on the other. The 33-tape series also describes (and actually is) a process involving communications techniques and technologies used to bring about greater understanding and co-operation among groups which have been bitterly opposed over the matter of the caribou herd.

Reception of the tapes in the various centres in which the series was shown was most enthusiastic. Although the tapes were initially made for intensive community screenings in the Keewatin District, it is now apparent that they present broader opportunities for use in broadcasting, public meetings, education, special interest groups, and so on. The tapes are designed so that they may be used individually, in various groupings, or in their entirety. All tapes are in English and in Inuktitut, and besides depicting the present, are a source of rich cultural and archival material.

For descriptive material pertaining to the Kaminuriak caribou series and price lists for leasing or purchasing, write: IBC, Suite 300-294 Albert Street, Ottawa, K1P 6E6 (613) 235-1892. □

Caribou Symposium Comes to Canada

The Fourth International Reindeer/Caribou Symposium will be held August 22-25, 1985 in Whitehorse, Yukon. It is expected that 150 delegates from across Canada, the United States and Europe will attend the conference. Following the pattern established at the last symposium, held in Saariselka, Finland, in 1982, the 1985 symposium has been scheduled to follow the Fourth International Theriological Congress, which will be held the week previous, August 13-20, 1985 in Edmonton.

At the present time, planning is still in the preliminary stage. Further details may be obtained, however, by contacting: Dr. A. W. F. Banfield, Chairman, Canadian Committee for the Fourth International Reindeer/Caribou Symposium, Institute of Urban and Environmental Studies, Brock University, St. Catharines, Ontario L2S 3A1, (416) 688-5550. □

Project ASTIC

A two-year project to research and compile a "Bibliography of Algonquian Syllabic Texts Held in Canadian Repositories" is being carried out by John Murdoch of Rupert House, James Bay, Quebec, with funding from the Social Sciences and Humanities Research Council of Canada. The project, known as Project ASTIC (Algonquian Syllabic Texts in Canada), is an extension of Mr. Murdoch's recent work on the use of syllabics in native education.

The system of syllabics was devised by James Evans, a nineteenth century Wesleyan Methodist missionary who, in the winter of 1841-1842, introduced it to the Crees who traded at Norway House, where he was stationed. The use of a syllabary evidently suited the language needs of the Cree, as well as other Algonquian speakers, for within a decade thousands of people from the Rocky Mountains to the Atlantic with no literate tradition were able to read. One of the chief advantages of the system was that it could be readily learned in a matter of a few days and passed on to friends and members of the family.

The extensive collection of syllabic texts located in archives, libraries and resource centres throughout Canada provides the modern researcher with a rich store of information on Indian culture and history. Unfortunately, few archivists or custodians can read these texts, so much of this information remains unorganized or incorrectly identified.

Project ASTIC covers the period from 1841-1981. It is expected that the bibliography will be complete by the end of the first year (now underway) of the two-year project. During the second year, identification keys, transliteration charts and indexes will be developed. In addition, Inuit and Dene texts will be added to the original bibliography.

Information or enquiries on any aspect of Project ASTIC should be directed to: John Murdoch, Rupert House, James Bay, Quebec, J0M 1R0. □

Away From It All

The government of the Northwest Territories has proposed turning Grise Fiord, N.W.T., into a tourist resort. The residents of the small village, located at the southern end of Ellesmere Island, pursue the traditional Inuit activities of hunting, fishing and trapping. It is felt that the village and its way of life may be of interest to Canadians living in southern Canada. □

CALENDAR

April 12-15, 1983 • *Banff Conference on Natural Resources Law* on the theme of "Public Disposition of Natural Resources"; sponsored by the Canadian Institute of Resources Law; Banff, Alberta. Enquiries:
Conference Co-ordinator
Canadian Institute of Resources Law
Room 430, Bio Sciences Bldg.
Faculty of Law
University of Calgary
Calgary, Alberta
T2N 1N4

April 21-23, 1983 • *ACUNS Annual Conference*; University of Regina; Regina, Saskatchewan. Enquiries:
ACUNS
130 Albert Street
Suite 1915
Ottawa, Ontario
K1P 5G4
(613) 238-3525

May 18-20, 1983 • *Cold Regions Environmental Engineering Conference*; sponsored jointly by the University of Alaska and the University of Alberta; Fairbanks, Alaska. Enquiries:
Dr. D. W. Smith
Department of Civil Engineering
University of Alberta
Edmonton, Alberta
T6G 2G7
(402)

June 21-25, 1983 • *36th Annual Conference of the Canadian Water Resources Association* on the theme "Industrial Development and Water Resources"; Saskatoon, Saskatchewan. Enquiries:
Jon A. Gillies
C.W.R.A. Conference Chairman
P.F.R.A.
Box 908
Saskatoon, Saskatchewan
S7K 3M4

July 18-22, 1983 • *Fourth International Conference on Permafrost*; University of Alaska; Fairbanks, Alaska. Enquiries:
Louis DeGoes
Executive Secretary
Polar Research Board
National Academy of Sciences
2101 Constitution Avenue N.W.
Washington, D.C.
20148

July 23-30, 1983 • *Northern Yukon and Mackenzie Delta Field Excursion*; organized jointly by the International Geographical Union Commission on the Significance of Periglacial Phenomena, and the Fourth International Conference on Permafrost (see previous entry). Enquiries:
Dr. Hugh French
IGU Chairman
Department of Geography
University of Ottawa
Ottawa
K1N 6N5
(613) 231-6829

September 28-October 1, 1983 • *34th Alaska Science Conference*; sponsored by the Arctic Division of the American Association for the Advancement of Science. Theme of the conference is "Alaska/Canada North: Neighbours in Science." Whitehorse, Yukon. Enquiries:
Art Pearson
Conference Chairman
Box 4580
Whitehorse, Yukon
Y1A 2R8
(403) 667-4288

ACUNS University Representatives

For general information we are publishing in this issue university representatives for 1982-83.

University of Alberta
Mr. R. S. Jamieson, Director
Boreal Institute for Northern Studies

Athabasca University
Dr. Dwight Thomas
Director of Applied Studies

University of British Columbia
Dr. J. K. Stager
Associate Dean Faculty of Arts

University of Calgary
Dr. F. Schleicrmann
Arctic Institute of North America

Carleton University
Prof. V. F. Valentine
Department of Sociology and Anthropology

Concordia University
Dr. R. J. Diubaldo
Department of History

Dalhousie University
Dr. P. B. Waite
Department of History

Ecole Polytechnique
Dr. B. Ladanyi, Directeur
Centre d'Ingenierie Nordique

University of Guelph
Dr. J. B. Sprague
Department of Zoology

Lakehead University
Dr. B. A. M. Phillips
Department of Geography

Laurentian University
Dr. F. J. Turner
Vice-President (Academic)

Universite Laval
Dr. S. Payette
Directeur, Centre d'Etudes Nordiques

University of Manitoba
Dr. R. R. Riewe
Department of Zoology

McGill University
Dr. J. M. Cain
Director, Centre for Northern Studies and Research

McMaster University
Dr. Wayne R. Rouse
Department of Geography

Memorial University
Mr. H. A. Williamson
Executive Director
Labrador Institute of Northern Studies

Universite de Montreal
Dr. J. T. Gray
Departement de Geographie

University of New Brunswick
Dr. R. W. Wein
Department of Biology

University of Ottawa
Dr. James Fenwick
Department of Biology

Universite du Quebec a Chicoutimi
M. Guy Archambault
Directeur, Centre de Recherche du Moyen-Nord

Universite du Quebec a Montreal
Prof. J. Mousset
Departement de Geographie

Universite du Quebec a Trois Rivieres
Dr. Paul Laurin
Doyen des etudes superieures

Queen's University
Dr. F. Cooke
Department of Biology

University of Regina
Mr. J. B. Catchpole
Assistant Dean, University Extension

Ryerson Polytechnical Institute
Prof. Frank Dueriden
Geography Department

University of Saskatchewan
Dr. N. O. Nielsen
Western College of Veterinary Medicine

Simon Fraser University
Dr. Colin Crampton
Department of Geography

University of Toronto
Prof. W. R. Cummins
Department of Botany

Trent University
Dr. B. W. Hodgins
Department of History

University of Waterloo
Dr. J. G. Nelson
Dean, Faculty of Environmental Studies

University of Western Ontario
Dr. R. H. King
Department of Geography

University of Windsor
Dr. J. D. Jacobs
Department of Geography

York University
Dr. M. C. Lewis
Department of Biology

Vic's copy

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3-1-83

TO: Sen. Victor Fischer
FROM: Brian Rogers
RE: Alaska Council on Science and Technology draft

Enclosed is a draft proposal on ACST for your consideration. The main features of this draft are:

(1) continues council through 1987;

(2) moves council to Office of the Governor [OMB is implicit, but was not made explicit due to legislative/executive disputes over OMB];

(3) removes power of grant-making from council;

(4) eliminates laundry-list of purposes, powers and duties of council [streamlining functions];

(5) repeals northern technology small grants program;

(6) gives council a role in development and implementation of federal Arctic Science Policy;

(7) increases membership to 9 members; removes designated seats on council;

(8) requires all agencies to submit notification of commencement of reserch activities and copy of final research reports to Office of Governor and council;

(9) establishes post of Alaska Science Advisor.

OMB

I believe this draft meets most of the needs of the Alaska scientific community, the legislature, the governor's office, and the council. It should assist Senator Murkowski in promoting the Arctic Research and Policy Act; it repeals the grants process now in disfavor among House Republicans; it meets the governor's need for scientific advice within OMB. A possibly controversial section is the creation of the Alaska Science Advisor. One item I considered, but did not put in, is enforcement of existing statutes requiring agency researchers (and consultants) to provide copies of research results to the state library and other sources so the research is not lost. You might wish to consider making it a class C misdemeanor not to file the reports required by law to spur compliance. [Such a section would certainly bring attention to the bill; you could argue that a person who deprives the public of the results of state-funded research is guilty of theft.]

OMB

I will call you this afternoon to discuss this bill.

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IN THE SENATE OF THE STATE OF ALASKA

THIRTEENTH LEGISLATURE - FIRST SESSION

A BILL

For an Act entitled: "An Act relating to the Alaska Council on Science and Technology, and providing for an effective date."

BE IT ENACTED BY THE LEGISLATURE OF THE STATE OF ALASKA:

*Section 1. LEGISLATIVE FINDINGS. The legislature finds that

(1) there exist in this state scientific and technological research capabilities which have the potential to contribute significantly to the processes of state government, to industry, and to the public welfare;

(2) the scientific and technological capabilities and knowledge of the state should be available to assist in issue analysis and fact-finding necessary for governmental policy-making activities;

(3) policies for expenditures by the state on science and technology research and development need to be designed or redesigned to achieve the highest and best use of research dollars;

(4) state agencies need to improve ~~initiatives~~ to ascertain the extent of existing knowledge on subjects, problems, or issues of concern prior to the initiation of new research;

(5) existing organizations concerned with production, transfer, and dissemination of scientific and technological knowledge in Alaska need to be more effective in the execution of their missions; and

(6) state agencies and consultants need to comply with

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existing law to produce, and properly file, research and other investigative and analytical reports on the completion of research, investigative, or analytical projects.

*Sec. 2. AS 44.19 is amended by adding a new section to read:

ARTICLE 3B. ALASKA COUNCIL ON SCIENCE AND TECHNOLOGY

Sec. 44.19.241. COUNCIL ESTABLISHED. (a) There is established in the Office of the Governor the Alaska Council on Science and Technology. The council consists of one member representing the Office of the Governor and eight members who are appointed by the governor upon the recomendations of the state's scientific, engineering, and related communities and organizations. Members have overlapping three-year terms. The council shall elect one of its members as chair. A chair may be reelected chair for successive terms as chairman ~~and~~ serves until a successor is designated. Five members constitute a quorum.

(b) There is established in the office of the governor the position of Alaska science advisor. The science advisor is in the exempt service and serves at the pleasure of the governor. The governor shall appoint the science advisor after consultation with the council. The science advisor shall act as executive secretary to the council. Administrative costs for the council shall be borne by the office of the governor.

(c) Council members receive no compensation but are entitled to the travel and per diem provided by law for members of boards or commissions.

Sec. 44.19.242. PURPOSES. The council shall consider problems and developments involving the fields of science, engin-

eering, and technology and related activities affecting more than one state agency and shall recommend policies and other measures designed to:

(1) provide access to existing scientific and technological information and expertise necessary to the ascertainment and articulation of public policies or programs for the advancement of state needs or objectives;

(2) identify research or investigative needs, including areas requiring additional emphasis, in order to provide adequate bases of knowledge relevant to the development of public policies or programs for state economic or societal strategies;

(3) achieve more effective utilization of the scientific, engineering, and technological resources and facilities of state agencies, including the University of Alaska;

(4) further cooperation in science, engineering, and technology through policy, program and facility agreements between the State of Alaska and local governments, the academic community, the private industrial and business sector, the agencies of the federal government, and the governments of Canada;

(5) foster development and implementation of a national Arctic science and research policy; and

(6) perform such other duties as the governor or the legislature may assign.

Sec. 44.19.243. POWERS AND DUTIES. (a) The council may

(1) convene committees, task forces, conferences, public hearings, and other meetings necessary to carry out the public's purposes;

(2) request and receive from any agency of the state

government the assistance and data needed to carry out the requirements of this section; and

(3) assist, ~~the~~ Arctic Science Policy Council ~~and the~~ Arctic Research Commission, in identifying policy and program needs in national Arctic science and research policy.

national bodies, such as the National Academy of Sciences, and

(b) The council shall

(1) biannually submit to the governor and the legislature the findings of the council, including a listing, description, ranking, and justification of research needs, and a commentary on significant research activities of the preceding two years funded by the state and including the relationship of that research to the state's needs and priorities;

(2) promote and enhance high standards for research activities conducted by the state;

(3) at the request of either the governor or the legislature, advise in a timely fashion on inquiries concerning scientific investigation or comment;

(4) recommend one or more persons to the governor for appointment as the Alaska Science Advisor; and

(5) assist the governor in making nominations for presidential appointments to the Arctic Science Policy Council.

Sec. 44.19.244. REPORTS. (a) Biannually, within 10 days of the convening of each legislature, the council shall sumbit to the governor and the legislature a comprehensive report on the state of science and technology in Alaska, the issues surrounding scientific and technological research in Alaska, recommendations on additional research needs of the state, and a summary of

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significant state research activities conducted during the preceding two years.

(b) Each state agency which conducts significant research activities shall, upon commencement of each research project, notify the [office of the governor] [and] [the council] of the project description, cost and source of funding. Upon completion of each research project, each state agency shall notify the council and shall forward the results of the project.

Sec. 44.19.245. DEFINITIONS. In AS 44.19.241-44.19.246, "council" means the Alaska Council on Science and Technology established in AS 44.19.241.

Sec. 44.19.246. SHORT TITLE. AS 44.19.241-44.19.255 may be cited as the Science and Technology Act.

*Section 3. AS 44.66.010(a)(6) is amended to read:

(6) Alaska Council on Science and Technology (AS 44.19.241) -- June 30, 1987 [1983].

*Section 4. AS 44.21.241-44.21.255 (Alaska Council on Science and Technology) are repealed.

*Section 5. AS 44.46.080 (d) (Northern Technology Grants) is repealed.

*Section 6. The unexpired terms of members of the Alaska Council on Science and Technology on the effective date of this Act ~~shall~~ continue until their original termination. New appointments made by the governor to fulfill vacancies on the council ~~shall be~~ are made for terms which will result in three members terms expiring in 1984, three in 1985, and three in 1986.

*Section 7. This Act takes effect July 1, 1983.

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April 6, 1983

The Honorable Mitchell E. Abood, Jr.
House of Representatives
State Capitol
Pouch V
Juneau, Alaska 99811

Dear Representative Abood:

As you requested at the Alaska Council on Science and Technology "Sunset Review" hearing on March 22, enclosed is a status of Northern Technology Grants projects.

Before looking over the status I would recommend you take into account the following:

1. The Council has had no staff or administrative funds to monitor this program for almost a year. Therefore, many of the projects which are listed as underway could be completed;

2. Many of the projects that are indeed underway are completed. However, the grantees were reluctant to call their projects complete without a period of testing and monitoring to see that they actually work well enough to recommend use by others;

3. The fact that a project was listed as unsuccessful does not necessarily mean it was a "failure" or a 'bad" project. For example, in two cases the grantees considered their projects unsuccessful because of institutional barriers rather than monetary or technological setbacks.

   Also, as I have stated many times, knowing a project cannot or will not work is just as important as knowing it does. Testing technologies on a small scale can eliminate large mistakes when the same technology is used on a larger scale.

After you have had time to look over the enclosed status report I would be pleased to answer any questions you may have.

Sincerely,

Christopher Noah
Executive Director

Enclosure
cc: Senator Vic Fischer

April 1, 1983

STATUS OF NORTHERN TECHNOLOGY GRANT PROJECTS

1979 - 1982

PROJECT	COMPLETED SUCCESSFUL	COMPLETED UNSUCCESSFUL	UNDERWAY	FUNDS RETURNED	OTHER
11-79 Regenerative Freezer		X			
27-79 Ambulance Splint				X	
29-79 Waste-Heat Claiming Greenhouse	X				
65-79 Solar Heater		X			
74-79 Solar Greenhouse			X		
83-79 Bee-Overwintering Building	X				
89-79 Solar Hot Water Heater			X		
98-79 Electric Car			X		
106-79 Waste Oil Heater			X		
107-79 Juice Bottling Plant		X			
129-79 Hydroelectric Generator	X				

PROJECT	COMPLETED SUCCESSFUL	COMPLETED UNSUCCESSFUL	UNDERWAY	FUNDS RETURNED	OTHER
136-79 Wood Furnace				X	
139-79 Solar Greenhouse			X		
144-79 Insulated Shutters	X				
145-79 Oil Fired Clothes Dryer	X				
146-79 Hydraulic Powered Auto		X			
155-79 Hydroelectric Generator			X		
162-79 Tidal/Current Hydraulic Suction Dredge			X		
165-79 Methyl Fuel Plant			X		
180-79 Experimental Greenhouse	X				

April 1, 1983

STATUS OF NORTHERN TECHNOLOGY GRANT PROJECTS

1978 - 1982

PROJECT	COMPLETED SUCCESSFUL	COMPLETED UNSUCCESSFUL	UNDERWAY	FUNDS RETURNED	OTHER
20-80 Technique for Shallow Subsurface Exploration	X				
36-80 Window Insulation	X				
44-80 Solar Thawing of Permafrost			X		
45-80 Digester	X				
55-80 Greenhouse	X				
64-80 Solar Energy Heating System	X				
68-80 Furnace Conversion	X				
72-80 Solar Heat House	X				
81-80 Trailer Steering Device					Default Judgement Obtained. Grant Funds being re-paid.

PROJECT	COMPLETED SUCCESSFUL	COMPLETED UNSUCCESSFUL	UNDERWAY	FUNDS RETURNED	OTHER
85-80 Recycling Aluminum Scrap	X				
98-80 Wind Generator	X				
116-80 Solar Wood Drying Kiln	X				
118-80 Home Energy System			X		
130-80 Subterranean Outbuildings	X				
139-80 Effective U-Valve Measurements			X		
145-80 Fish Drying Process		X			
155-80 Boiler System			X		
159-80 Passive Solar Home Plans			X		
165-80 Waterproofing For Earth Shelter Home	X				
166-80 1 Watt Translator				X	
177-80 Water Heating	X				
205-80 Data Recording Instrument	X				

PROJECT	COMPLETED SUCCESSFUL	COMPLETED UNSUCCESSFUL	UNDERWAY	FUNDS RETURNED	OTHER
226-80 Solar Space Heater	X				
232-80 Permafrost Excavation	X				
234-80 Home Energy Conservation System				X	
248-80 Solar Wood Drying Kiln			X		
262-80 Steam Plant for Small Boat			X		
281-80 Hybrid Electric Car			X		
290-80 Plant Hydro Feed System	X				
298-80 Tree Cultivation			X		
309-80 Automated Thermal Shutters			X		
312-80 Treatment Unit	X				
327-80 Shutters for Greenhouse			X		
328-80 Solar Greenhouse			X		

PROJECT	COMPLETED SUCCESSFUL	COMPLETED UNSUCCESSFUL	UNDERWAY	FUNDS RETURNED	OTHER
332-80 Generator					Project cancelled prior to transmitting funds.
358-80 Alternative Powered Washing Machine			X		
362-80 Methane Generator		X			
374-80 Improved Willow Rake	X				
505-80D Arctic Home Construction	X				
506-80D Induction Generator			X		
508-80D Fuel Cell Made From Scrap Metal				X	
515-80D Greenhouse			X		
538-80D Generating System		X			
540-80D Wind Generator				X	

STATUS OF NORTHERN TECHNOLOGY GRANT PROJECTS

1979 - 1982

PROJECT	COMPLETED SUCCESSFUL	COMPLETED UNSUCCESSFUL	UNDERWAY	FUNDS RETURNED	OTHER
3-81 Wind Powered Heat Pump and Lighting System			X		
4-81 Using Solar Power to Operate Boat Equipment	X				
5-81 Mariculture of Subtidal Red Seaweeds	X				
6-81 Record Abundance and Distribution of Seaweeds	X				
13-81 To Recycle Aluminum Cans		X			
20-81 Construct a Dual Layer Greenhouse	X				
21-81 River Powered Electrical Generator			X		
22-81 To Refine Indoor Hydroponic System			X		
26-81 To Develop a Method of Producing Ethanol Alcohol			X		

PROJECT	COMPLETED SUCCESSFUL	UNSUCCESSFUL	UNDERWAY	FUNDS RETURNED	OTHER
28-81 High Temperature Surface Combustion Techniques			X		
31-81 To Construct a Chicken House and Solar Pit Greenhouse			X		
33-81 Composting Techniques Experimentation	X				
38-81 To Reuse Waste Heat from Laundromat	X				
52-81 To Construct a Solar Semi Subterranean Root Cellar	X				
56-81 Improved Hydraulic Ram for Use on Streams in Interior Alaska			X		
57-81 Construction of Electric Hybrid Car			X		
59-81 Wood Fueled Electric Generator	X				
61-81 Development of a Cam Operated Arctic Door Design			X		
63-81 Development of Clam Harvesting Technique	X				

PROJECT	COMPLETED SUCCESSFUL	COMPLETED UNSUCCESSFUL	UNDERWAY	FUNDS RETURNED	OTHER
66-81 To Install a High Pressure Jet Modification to A Clam Harvester	X				
68-81 Device to Test Soil Strength	X				
69-81 To Develop A Submersible Investigating Drone			X		
70-81 To Study the Feasibility of Migratory Bee Honey Operation Sympathetic to Delta Barley Project		X			
77-81 To Develop a Micro High Head Hydroelectric Site			X		
79-81 To Reuse Waste Computer Paper	X				
110-81 To convert a VW Car to a Hybrid Electric Vehicle			X		
115-81 To Grow Fruit Trees in the Yukon-Tanana Uplands			X		
117-81 To Use Spill-Over Energy from A Hydraulic Windmill			X		

PROJECT	COMPLETED SUCCESSFUL	COMPLETED UNSUCCESSFUL	UNDERWAY	FUNDS RETURNED	OTHER
118-81 Heat Pump For Foundation Stabilization			X		
130-81 Installation of Self Timer Silencers on Smoke Detectors	X				
131-8 Equipment For Sensitivity and Cold Temperature Testing of Smoke Detectors	X				

STATUS OF NORTHERN TECHNOLOGY GRANT PROJECTS

1979 - 1982

PROJECT	COMPLETED SUCCESSFUL	COMPLETED UNSUCCESSFUL	UNDERWAY	FUNDS RETURNED	OTHER
1-82 Wood Utilization Survey in The Fairbanks North Star Borough			X		
2-82 Development of An Automatic and Manual Floor Register			X		
14-82 Frozen Food Processing Plant			X		
23-82 Documentation of Off-Peak Heating System and Usage	X				
26-82 Design, Development and Test Manual and Automatic Controls for Thermal Shutters			X		
38-82 Hydrogen Gas Generation By and For Boats			X		
44-82 Design and Construct Waste Oil Furnace	X				
49-82 To Develop A Microprocessor Controller to Optimize Hot Water Heater Usage			X		

PROJECT	COMPLETED SUCCESSFUL	COMPLETED UNSUCCESSFUL	UNDERWAY	FUNDS RETURNED	OTHER
51-82 Bandsaw Power Alternative For Bush Areas			X		
72-82 Cross Transmission of Coccidiosis Between Wild and Domestic Sheep	X				
77-82 Studio Sized Hydraulically Powered Impact Mill			X		
80-82 Monitoring of Interior Window Insulations			X		
87-82 Soil Heated Food Production with Seep Irrigation			X		
103-82 Winter Storage For Root Crops	X				
107-82 Development of a Low Cost Solar Snow Melter For Remote Site Use					
108-82 Instrumentation For A Small Hydro Power Project			X		
109-82 To Develop A Hydro Power Generation System			X		
119-82 Fish Meal and Oil Producing Raft			X		

ACST
THE ALASKA COUNCIL ON SCIENCE AND TECHNOLOGY

April 22, 1983

APR 25 1983

Senator Vic Fischer
Alaska State Senate
State Capitol
Pouch V
Juneau, Alaska 99811

Dear Senator Fischer:

Enclosed for your information is a recently published special report entitled "Trends in Alaska Research". Sponsored by the Alaska Council on Science and Technology this paper provides a brief overview of who pays for research in Alaska; who conducts research in Alaska; where research is conducted (by region) and what is being studied.

If you or your staff have any questions regarding this report I would be happy to answer them.

Sincerely,

Christopher Noah
Executive Director

Enclosure

Christopher Noah, Executive Director - Pouch CV, Juneau, Alaska 99811 - (907) 465-3510

Report

SPECIAL REPORT:

TRENDS IN ALASKA RESEARCH

March, 1983

Christopher Noah, Executive Director, Alaska Council on Science and Technology,
Pouch CV, Juneau, Alaska 99811

TRENDS IN ALASKA RESEARCH

Introduction

This report analyzes the Current Research Profile for Alaska (CRP) maintained by the University of Alaska Arctic Environmental Information and Data Center in order to identify recent gaps, trends, and changes occurring in how research is supported and conducted in Alaska.

Research and development (R&D) is big business in Alaska. The latest year of record (1981) indicates a direct economic investment of $235 million in nearly 2,000 research projects.

The growth of science in Alaska has not been entirely orderly and smooth. There has been no federal, state, or other overall policy to guide research in Alaska. Thus, the selection of research topics has often been governed more by the interests of individual scientists, institutional biases, or the relief of national crises rather than by any long-range plan related to societal or economic needs.

In the last few years, four factors may have long-term but contradictory impacts on Alaska research. The Reagan administration has reduced the amount of money available for research nation-wide. This trend has been intensified by an overall increase in the decline of the U.S. economy, affecting scientific research in both the governmental and private sectors by further reducing the amount of money available for research investment. On the other hand, the responsibilities of federal land managing agencies in Alaska have increased significantly, increasing their need for additional information analysis and research. Finally, the State of Alaska, experiencing an expanding economy,

has expended increased funds for technological development assessment and related applied science investigations.

Research Topics

Figure 1 shows the number of projects conducted in each of the major scientific disciplines, "Physical," "Biological," and "Social." Growth, in terms of the number of projects, has changed in each of these disciplines in recent years. The number of projects increased by 11 percent in the Physical Sciences in 1980, but decreased by 5 percent in 1981. In the Biological Sciences the number of projects has increased by 4 percent in each of these years. Growth has been most pronounced in the Social Sciences, increasing by 28% in 1980 and 12% in 1981.

Among the categories of Physical Science, Geology had the largest number of projects in 1981 (137 projects), followed by Minerals and Fossil Fuels projects (87) and Atmosphere and Space (81 projects). Fisheries studies dominated in the Biological Sciences with 225 projects, followed by Terrestrial Mammals (112 projects) and Vegetation studies (92) projects). Only minor changes in the rankings of these categories have occurred in recent years (since 1979). Similar comparison of categories in the Social Studies is not possible due to the years of accumulated record and presentation format.

Figure 2 compares the number of projects conducted in Alaska during each of the last several years. In general, the trend has been gradually upward, with the exception of 1979. The slight decrease noted that year was seen equally in each of the three major disciplines. Similarly the increases noted in other years have been shared among the major disciplines, with the

FIG. 1: WHAT IS BEING STUDIED IN ALASKA?

NUMBER OF PROJECTS STUDIED-1981

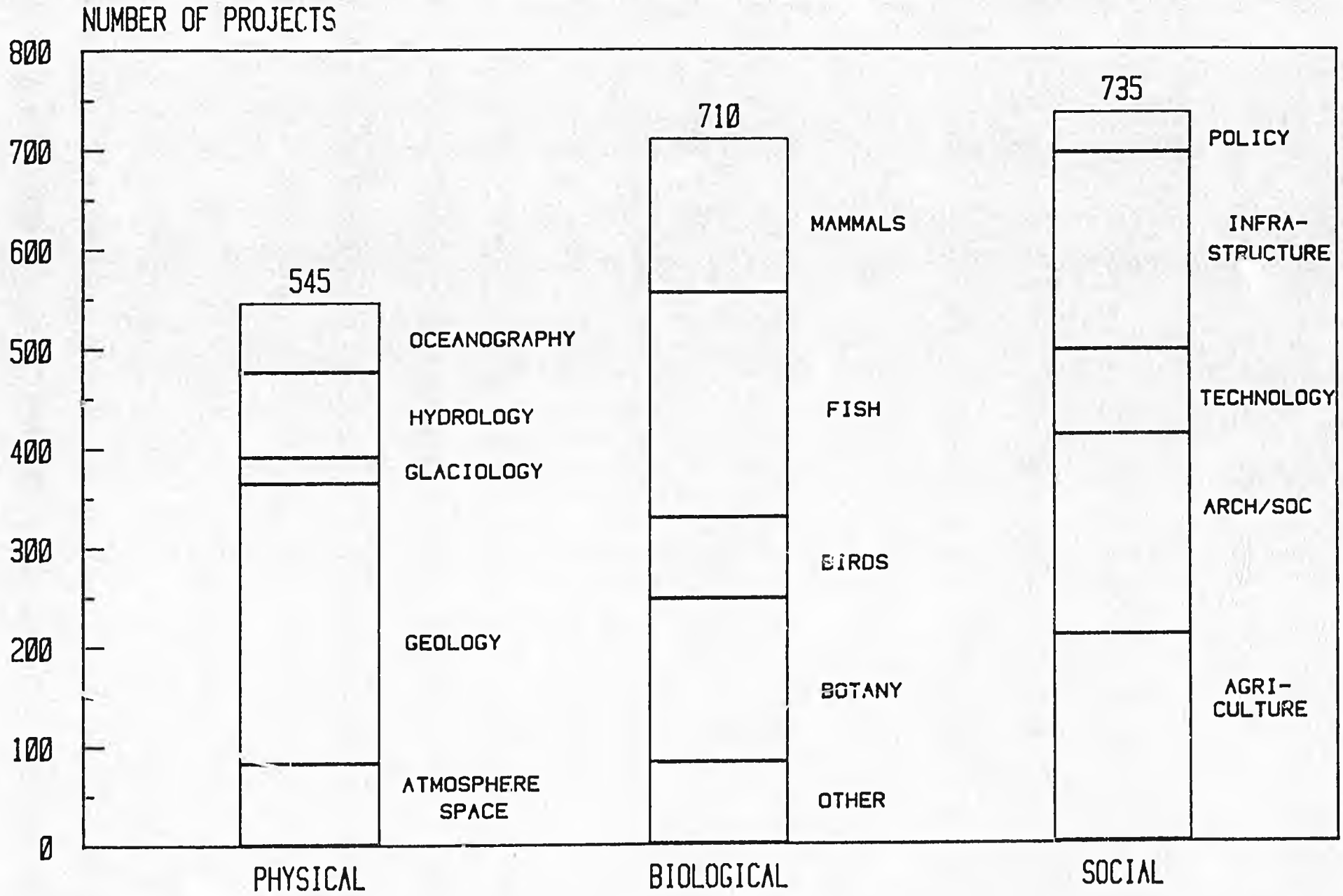
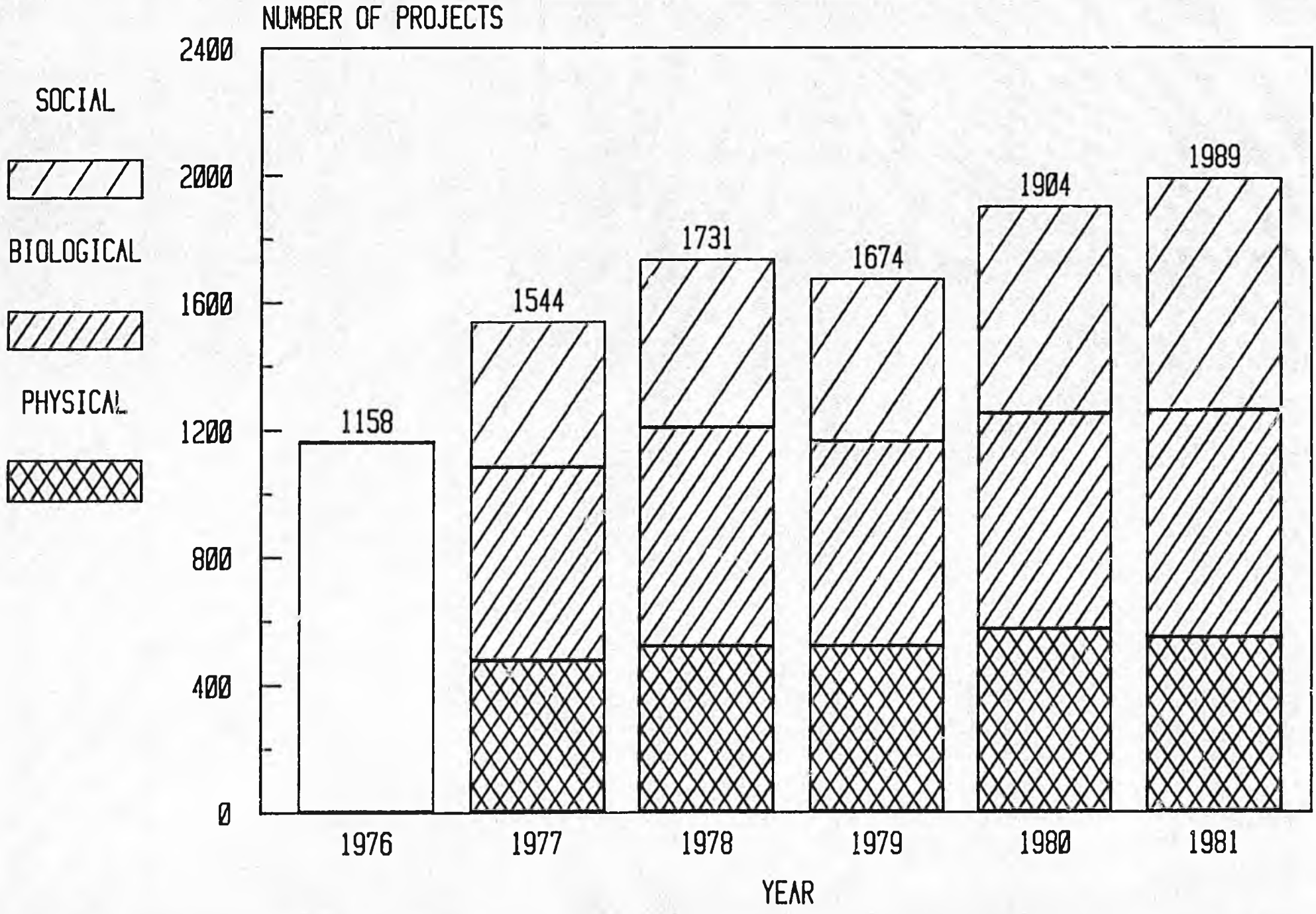


FIG. 2: HOW HAS ALASKA RESEARCH CHANGED?

NUMBER OF PROJECTS CONDUCTED PER YEAR



exception of 1981 when the number of projects conducted increased for Biological and Social Sciences but decreased for the Physical Sciences. The rate of increase was less in 1981 compared to other recent years, except for 1979.

Location of Research

Figure 3 compares the number of projects conducted in each of the six major regions of the state for 1979, 1980, and 1981. Projects conducted in more than three of the state's regions were listed in the statewide category. In all three years 20 percent of all projects fell into this category. More projects were conducted in the Southcentral than in other regions, followed by Interior and Southeast. Fewest projects were conducted in the Northwest region. The number of projects conducted has increased in all regions since 1979, although only a very small increase is noted in the Northwest regions in 1981. The rate of increase has been less each year in the Arctic since 1979, so that in 1981 more projects are conducted in Southeastern than in the Arctic. This trend maybe reflected by the recent closure of the Naval Arctic Research Laboratory at Pt. Barrow.

Agencies Conducting Research in Alaska

Figure 4 compares the agencies conducting research in Alaska. Combining elements in the Figure indicates some possibly significant generalizations. Less than one-third of the projects were conducted by various universities. Thus over 2/3 of research in Alaska is conducted outside of academia. By combining University of Alaska with Alaska government scientific activities, the record indicates that state employees are directly involved with nearly half of all projects conducted in the state. Just over half of all projects

FIG. 3: WHERE IS SCIENCE DONE IN ALASKA?

NUMBER OF PROJECTS PER REGION

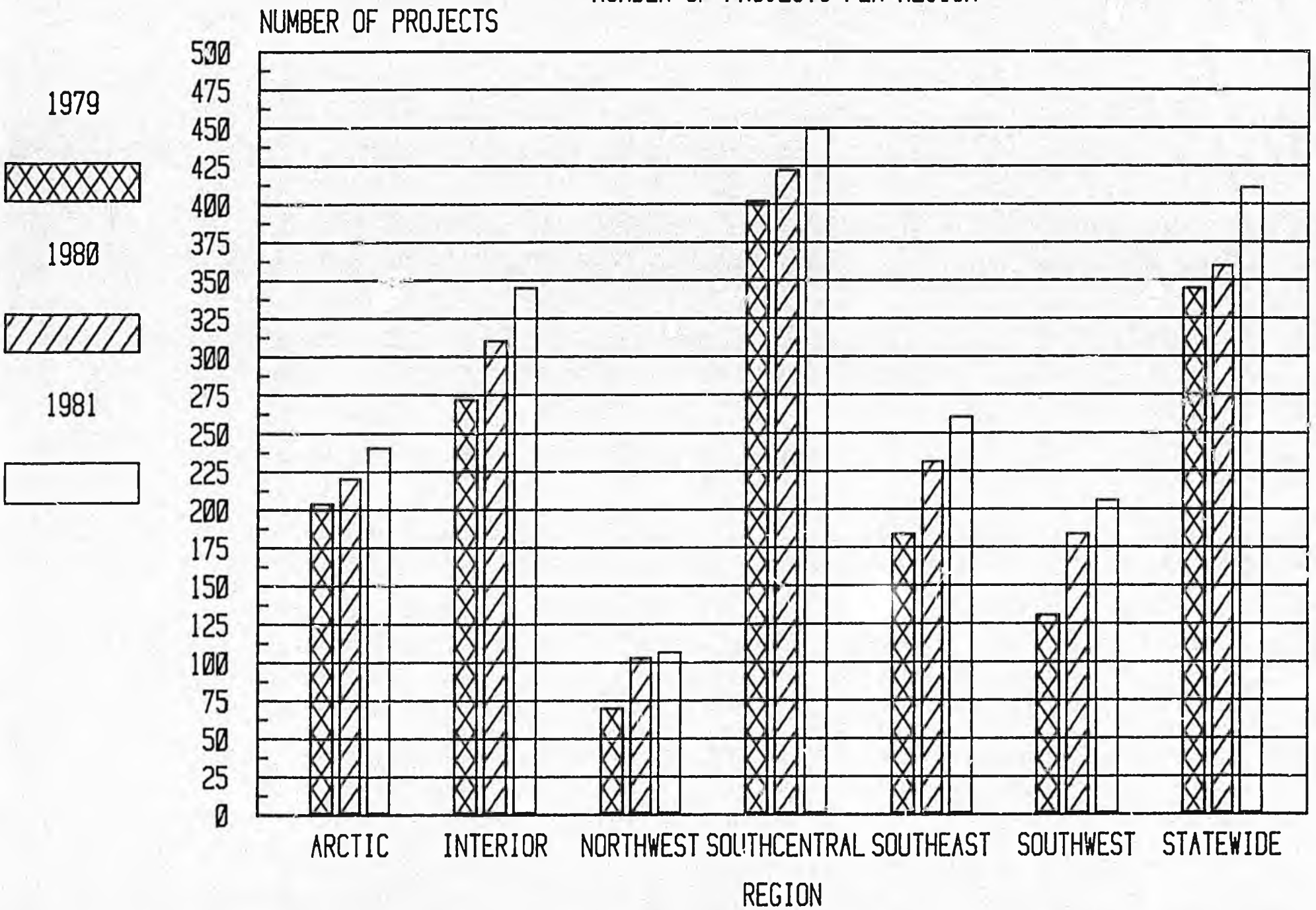
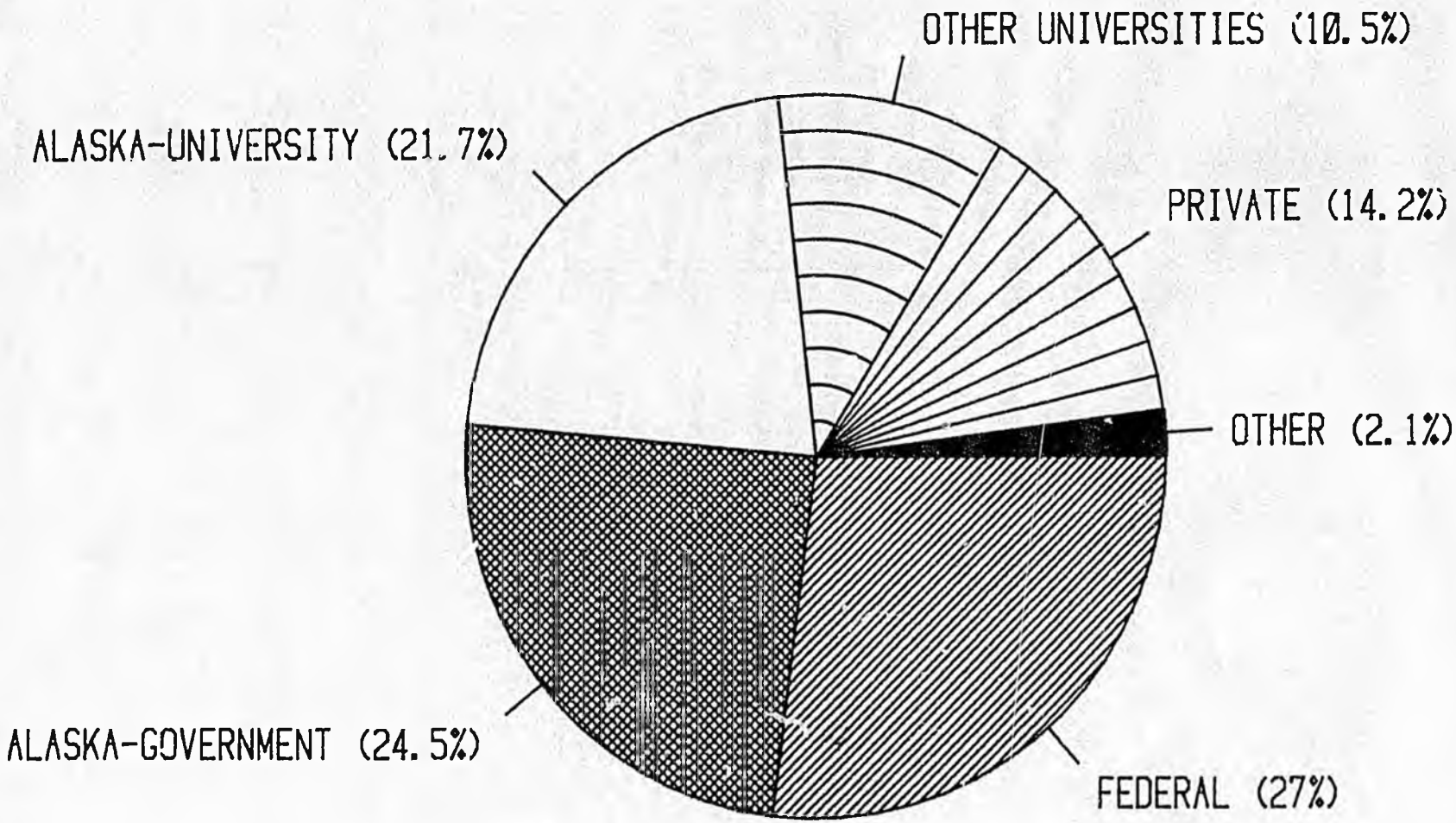


FIG. 4: WHAT AGENCIES CONDUCT RESEARCH?

IN ALASKA-1981



were conducted by some agency of the federal or state government.

The University of Alaska conducted more projects than any other single agency. Most research at the University was conducted by its various research institutes. The Geophysical Institute conducted more projects than the others, followed by the Agricultural Experimental Station, the Institute of Marine Science, the Institute of Arctic Biology, the Arctic Environmental Information and Data Center, the Institute of Water Resources and the Institute of Social and Economic Research, in that order. Overall the University experienced an 8% increase in the number of projects conducted in 1981 compared to 1979, but increases were noted only in the Geophysical Institute, and the Agricultural Experimental Station. The other four leading institutes experienced modest to significant decreases in the number of projects conducted.

The Alaska Department of Fish and Game (ADF&G) was involved with nearly half of the projects conducted by agencies of the state government, followed by the Department of Natural Resources and the Department of Environmental Conservation, and several miscellaneous agencies. Overall the state executed a 67 percent increase in the number of projects conducted in 1981 compared to 1979, most occurring in ADF&G and miscellaneous agencies.

The federal government conducted only 8 percent more projects in 1981 compared to 1979. The U.S. Geological Survey led all others, followed by the U.S. Forest Service, the U.S. Fish & Wildlife Service, the U.S. Army, the National Marine Fisheries Service and the National Park Service (NPS). The NPS and the U.S. Army conducted fewer projects in 1981 than in 1979, while all of the other agencies listed, particularly the U.S. Geological Survey and the U.S. Forest Service, experience modest to significant increases.

Sponsorship of Research

Sponsorship of research is viewed both in terms of the number of projects supported and the amount of money provided. Figure 5 indicates that nearly 60 percent of the projects conducted in the state in 1981 were sponsored by federal agencies. The federal government supported nearly equal numbers of Physical and Biological projects (390 physical science projects and 360 biological science projects), followed by a much smaller number of Social Studies projects (231). Various state agencies supported the next largest number of projects. Interestingly, the state sponsored relatively few Physical Science projects (67), a much higher number of Biological Projects (215), and still more Social Studies projects (329) In fact, 45 percent of all Social Studies were state sponsored, more than were federally funded

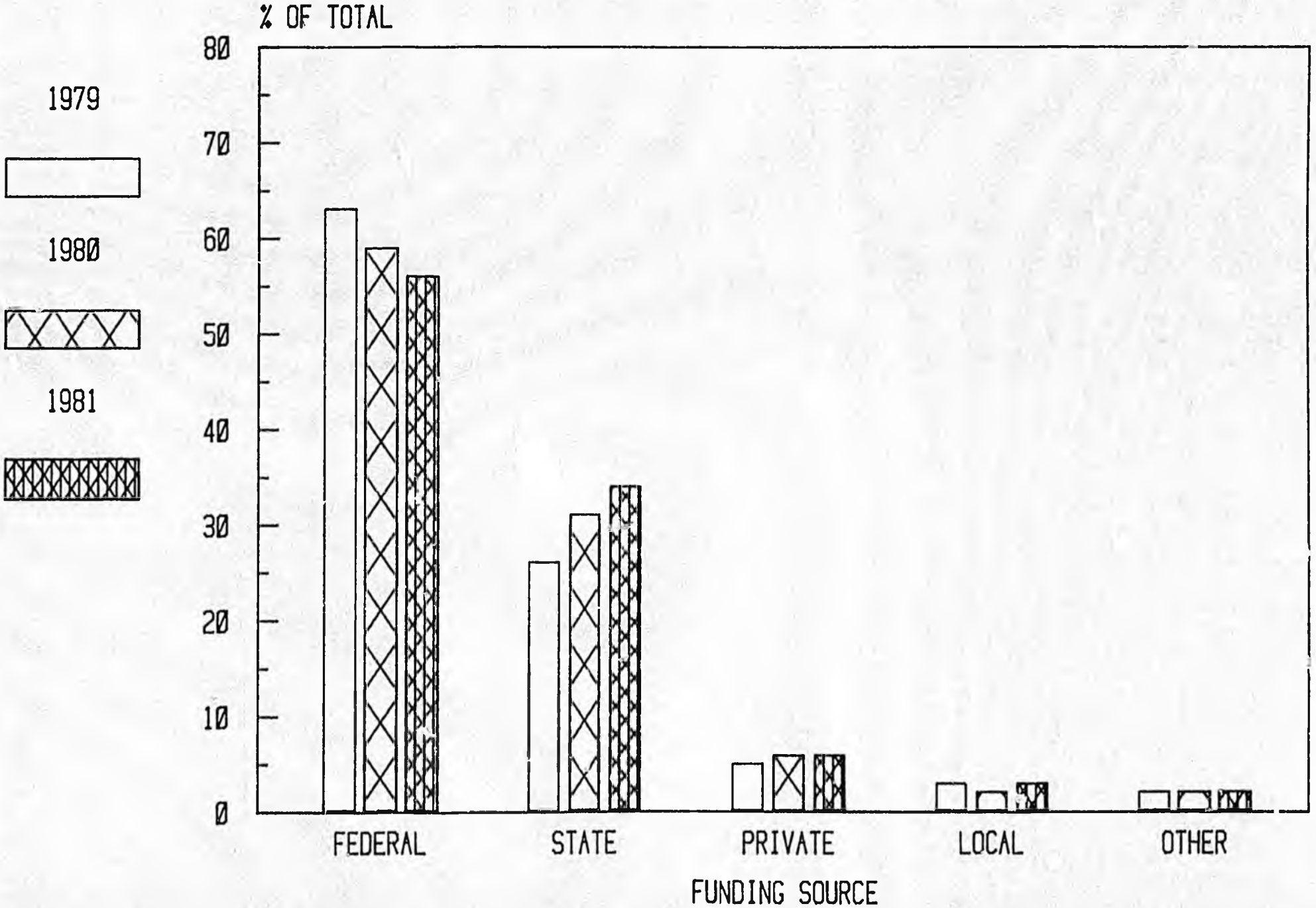
Although the number of projects sponsored by federal and state agencies has increased since 1979, changes have occurred in the proportions of projects supported by these two groups of governmental agencies. Since 1979 the proportion of federally funded projects has decreased 7 percent, matched by a similar increase in state funded projects.

An estimate of the total amount of money spent on scientific research in Alaska during 1981 was calculated from CRP data. Approximately 40 percent of the projects reported their funding. Some of those had to be adjusted to indicate only monies expended during 1981 rather than over the life of a multi-year project. From those data an average expenditure per project was calculated and aggregated by discipline for all those reporting their funding.

Nearly $235 million was spent on research in Alaska in 1981. (Miscellaneous projects not included in the CRP would probably raise the total to about $250

FIG. 5: WHO SUPPORTS SCIENCE IN ALASKA

% OF PROJECTS BY FUNDING SOURCE



million.) Nearly $63.5 million was spent for Physical Science Projects, $74.5 million for Biological Science Projects, and $97 million for Social Science Projects. The federal government provided nearly $142.5 million for scientific research in Alaska, while the state provided nearly another $82 million. Roughly $10 million came from other sources. The average amount of money spent per project was approximately $118,000.

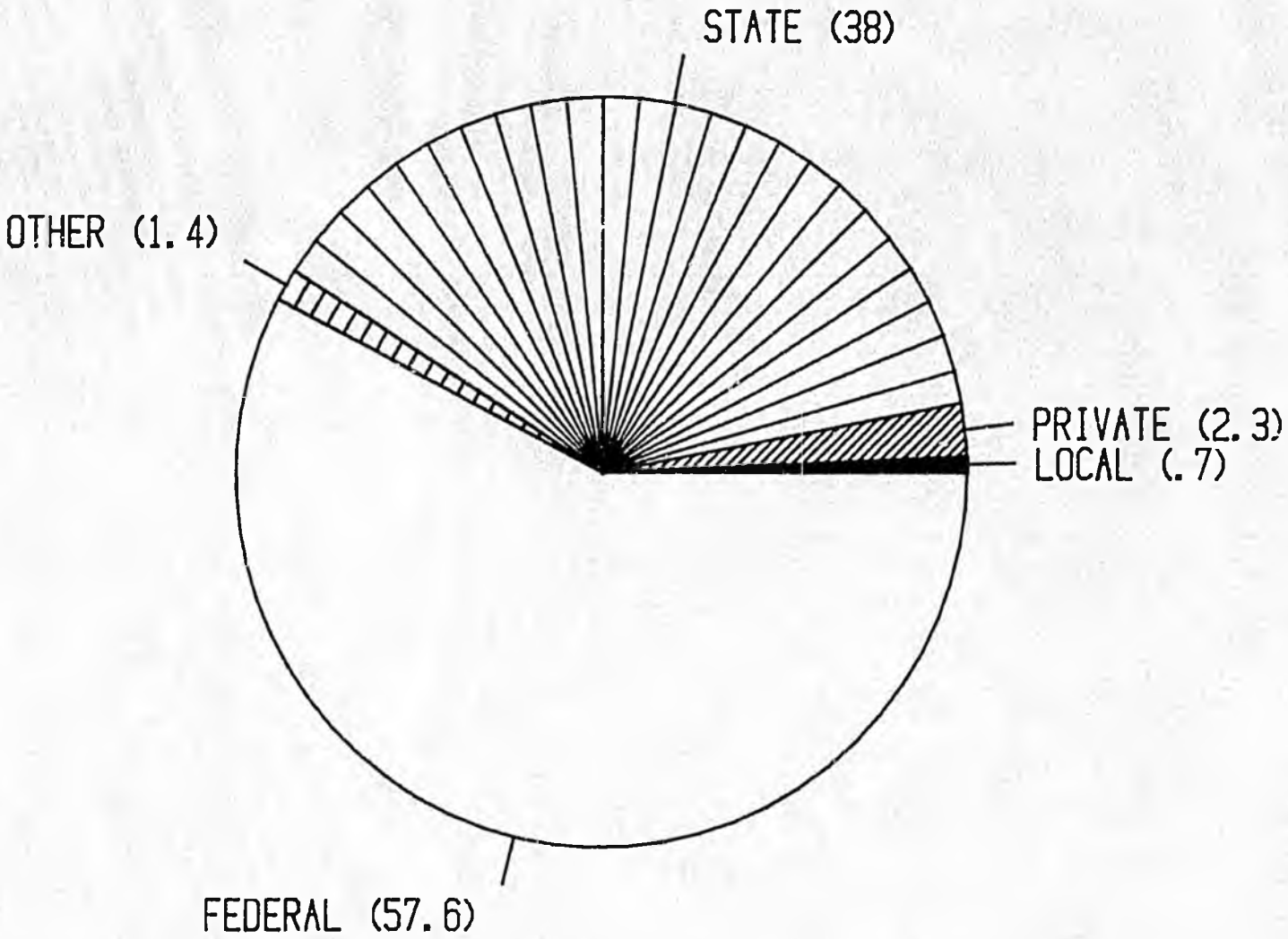
The amount of money provided by the federal government decreased nearly $4 million between 1979 and 1981, while state dollars increased from $30 million to over $80 million. Figure 6 shows the proportion of projects supported by various sources for 1981. The federal government provided less than 60 percent of Alaska's research dollars in 1981--down from over 80 percent in 1979. The proportion of state dollars increased during the same time period from 16 percent to nearly 40 percent. Most of the state dollars paid for Fisheries research and Social Science Projects

Summary

The record indicates that research in Alaska has continued to grow in recent years, from just under 1,700 projects in 1979 to nearly 2,000 in 1981; from approximately $200 million in 1979 to approximately $250 million in 1981. However, there have been significant changes in the sponsorship of Alaska research support and which disciplinary emphasis. Generally, cutbacks in federal support have been compensated for by increases in state sponsorship. Increases have occurred mainly in geology, fisheries, and several of the social science categories. Other categories, especially in the physical sciences, have experienced either very modest increases or significant

FIG. 6: WHO FUNDS SCIENCE IN ALASKA?

PERCENT OF TOTAL-1981



decreases, both in the number of projects supported and amount of funds provided.

The trend towards a decrease in Physical Science support is particularly alarming in view of the dependency of technological and resource development upon basic knowledge in this field.

THE ALASKA COUNCIL ON SCIENCE AND TECHNOLOGY

RURAL PRIMARY AND SECONDARY EDUCATION IN ALASKA

Research Priorities and Recommendations

A Summary Report

Based Upon the Results of the

ALASKA COUNCIL ON SCIENCE AND TECHNOLOGY

EDUCATION WORKSHOPS

Conducted by the University of Alaska

and the Alaska Native Education Association

Spring, 1980 in Fairbanks and Anchorage, Alaska

January 1981

Christopher Noah, Executive Director - Pouch CV, Juneau, Alaska 99811 - (907) 465-3510

ALASKA COUNCIL ON SCIENCE AND TECHNOLOGY SPECIAL REPORT

EDUCATION IN ALASKA: Research Priorities and Recommendations

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CONTENTS

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EXECUTIVE SUMMARY:

Alaska devotes 39% of its state budget ($591 million) to the support of education. Yet, little state money is allocated to educational research to identify strategies for improving this important enterprise and making it more cost-effective. Alaska has a set of critical educational problems which are not common to other areas of the United States. The central issue is how to deliver effective and relevant education to culturally different population groups. Most groups are scattered in small, remote communities while others comprise large subgroups in Anchorage and other urban areas. Since these problems differ from national educational issues, research funds are not available from non-state sources.

This report proposes four research projects which could substantially improve the quality of Alaskan education and thereby the competencies of a future generation of Alaskan adults.

1. Defining and Assessing "effective Schooling" in Alaska's Cross-Cultural Context — Estimated Cost $50,000

2. Effects of Community Participation in Educational Affairs on School Functioning — Estimated Cost $100,000

3. Providing Educators with Skills Necessary to Work Effectively in Alaska's Cross-Cultural Situation — Estimated Cost $75,000

4. Developing Educational Approaches for Village High Schools — Estimated Cost $110,000

BACKGROUND AND STATUS OF ACTIVITIES IN EDUCATION RESEARCH

Alaska devotes approximately 27% of its state budget to the support of education at the school district level and another 12% to education at the university level. Yet, little research has been carried out on the complicated educational problems presented by Alaska's culturally and linguistically diverse populations and by the scattering of these groups in small, isolated communities.

At the state level, the Department of Education includes a "Planning and Research" section in the Office of the Commissioner. This section performs analyses of current educational issues, conducts a statewide testing program for fourth and eighth graders, and houses special educational efforts, such as the telecommunications project. The Planning and Research section with the assistance of the Northwest Regional Educational Laboratory also carries out some applied research relevant to the development of new educational systems. Those regional resource centers still in existence in Alaska conduct some development activities as well. Primarily, these centers provide training, curriculum, and other forms of practical assistance to school districts in their regions.

At the university level, the School of Education of the University of Alaska's Fairbanks campus contains a Center for Cross-Cultural Studies. The Center is the major agency for cross-cultural education research in Alaska. However, little money is available to support research projects concerned with Alaskan issues.

The major source of research funds in education is the National Institute of Education (NIE). However, NIE's primary interest is in supporting educational research that will apply to national educational problems. These problems center around Black and Hispanic children, not Indian and Eskimo children, and around congested urban ghettos, not small remote villages.

The National Institute of Education is currently supporting several educational studies in Alaska. These include:

1. The Social Basis of Mathematics Learning and Teaching

   Dates: 7/01/80-6/30/81 Institution: UA Funding: $14,505

   Purpose: To examine the nature of mathematics teaching and learning across cultures and identify educational and social processes best suited to increasing the integration of math thinking into the social and cultural circumstances of the learner.

2. The Social Organization of Participation in Four Alaska Cross-Cultural Classrooms

   Dates: 9/1/80-8/31/81 Institution: UA Funding: $14,865

   Purpose: To examine teaching style and effectiveness in cross-cultural classrooms involving Native teachers.

3. The Organizational Control of Communicative Differences in a Public University

Dates: 9/30/80-12/31/81 Institution: UA Funding: $20,315

Purpose: To conduct an ethnographic study of the University of Alaska's Fairbanks campus which centers on the experience of Native university students.

4. Decentralized Education in Rural Alaska

Dates: 8/1/80-12/31/82 Institution: UA Funding: $198,142

Purpose: To examine the concept of decentralization and its application in rural Alaska where a diverse student population - Indian, Eskimo, Caucasian - is educated.

5. Youth Organizations as a Third Educational Environment, Particularly for Culturally Different Youth

Dates: 10/1/79-9/30/81 Institution: UA Funding: $120,000

Purpose: To examine the type of learning that occurs in non-formal situations, such as Boy Scouts, Girl Scouts, and 4-H, in order to identify potential educational benefits of such activities in rural Alaska.

While the projects listed above may appear to apply directly to Alaskan issues, in many cases the research is actually directed toward national issues which the Alaskan experience is expected to illuminate. As a national institute, NIE is not interested in supporting research on the serious educational problems specific to Alaska. Thus, Alaskan educators have virtually no source of funding to examine research issues which are uniquely important in Alaska.

MAJOR ISSUES:

Given the high costs of conducting educational research in Alaska and the smaller number of Alaskan researchers, it makes more sense to review and use research conducted elsewhere than to launch a special research program on educational issues relevant to majority white communities. Alaska's unique educational problems concern first how to deliver educational programs to small, remote communities in ways which respond to cultural differences. The issue is not only "how" to accomplish this goal but exactly "what" constitutes quality education in these settings and "whether" the goal can be accomplished with reasonable levels of cost. Second, Anchorage and other urban areas have large populations of Native and other minority students who typically have low rates of achievement, high levels of drop-out, and related problems.

Issue 1: Are there cultural differences in what constitutes "effective schooling"?

Recent educational research suggests that it is possible to identify and measure characteristics of schools that lead to greater educational effectiveness, such as higher student achievement and lower student dropout. These include such characteristics as time devoted to instruction, principal's leadership, and and school ethos. It is not clear, however, whether these findings apply to Alaska's cross-cultural situation. "Effectiveness" in this context may be strongly linked as well to such variables as the type of interpersonal relationships which develop in schools between teachers and students from different cultural backgrounds. In view of the emphasis begin placed on "effective schooling" in the Governor's Office, it is important to determine the applicability of national findings to Alaska's cross-cultural settings and to identify factors important to effective schooling.

Issue 2: Should opportunities for community participation in educational affairs and decision-making be increased and if so, how?

One of the key premises in educational discussion is that increasing community participation will lead to greater satisfaction with schooling and decrease such problems as absenteeism and vandalism. This assumption needs to be tested. It also may be that certain types of community participation are educationally helpful while other types create conflict with improving education. Research on this issue can be applied in such areas as school board training and the design of educational programs and facilities which promote certain types of community involvement.

Issue 3: How can teachers and administrators be better prepared to work in the Alaskan environment?

Teachers and administrators require special knowledge and abilities to operate in a culturally and geographically unfamiliar and isolated area. Identifying these teacher skills is important to improving both campus-based teacher training programs and alternative field-based delivery programs. Such information will also be useful in developing evaluation and certification programs which enable educational systems to retain teachers and administrators who remain competent and effective.

Issue 4: How does the size of a school and school system affect the delivery of eduational services?

In the 1970's, Alaska established a system of small village high schools so that rural students would not have to leave home to obtain a secondary school education. Serious controversy is occuring about the academic and social effects of these schools.

According to one viewpoint, village high schools have been highly successful in developing students with strong cultural identities and this goal has been accomplished without declines in achievement. According to the opposite view, village high schools offer a limited curriculum and staff and thereby result in low student achievement. Research needs to be done which examines the effects of school size and location on such factors as achievement, attendance, drop-out, social-emotional problems, and cultural identity. This study can help identify the resources necessary to support educational success in small schools and to capitalize on the advantages of these institutions. It can also suggest educational strategies, curriculum models, and media technology which can provide students in small schools with equal educational opportunity.

Issue 5: Are educational benefits equally distributed across all segments of Alaska's population?

Certain groups of Alaskans may not be receiving equitable educational services. These include school age youth who are not attending formal educational institutions, residents of remote villages, and young children and older adults, who are not traditional clients of educational institutions. Identifying these groups, assessing their educational needs, and developing service strategies are important educational problems.

ANALYSIS AND DISCUSSION:

The issues discussed in this report are central to providing high quality, cost-effective education in Alaska. Yet, these issues are not eligible for funding from conventional sources precisely because they are narrowly relevant to Alaska. Without special funding from the legislature, these key issues will not be addressed in a systematic, careful way. These issues are fundamentally state, not federal, responsibilites.

PRIORITIES AND RECOMMENDATIONS:

Of these issues, the first priority is examining cultural differences in what constitutes "effective schooling". The Department of Education and the Governor's Office are establishing a Task Force of Effective Schooling in 1981. This Task Force is to identify the responsibilities of the school as opposed to other agencies, identify educational practices effective in Alaska, and send recommendations to the Governor concerning teacher training and school reporting systems. This important project is being based on national findings regarding effective schooling which may or may not apply to culturally different regions of Alaska. The Legislature needs to support a research project which examines effective schooling in Alaska before firm conclusions are drawn and statewide standards are developed. Determining what dimensions of schooling relate to educational effectiveness for Eskimo and Indian children

will have important applications in many areas, such as program planning, curriculum development, and teacher training.

Our second priority is examining the the effects of community participation in educational affairs on school quality. Vast amounts of time, effort, and funds are expended to develop channels for citizen participation in education; for example, community school committees, regional school boards, the hiring of Native and or local school staff, and the formation of special committees. Indeed community participation is widely regarded as a "panacea" for educational problems. Yet, we have no information on the effects of these participation strategies and the most appropriate channels for community/school cooperation.

Our third priority is developing information on the skills needed to work effectively in Alaska's cross-cultural situation. This project is related to the "effective schooling" issue but it focuses on improving the skills of educators rather than improving the characteristics of school programs. Systematic information needs to be developed on the problems of teaching in rural Alaska and productive ways of working with children, staff, and communities in remote villages. Only anecdotal material is currently available on these critical matters.

Our fourth priority is developing educational approaches suited for new village high schools. Some initial work in this area has already been carried out by the Center for Cross-Cultural Studies at the University of Alaska. A study of issues in village secondary school education has been completed and some curriculum packages have been produced. This effort, however, is proceeding slowly because of the lack of reliable, sustained funding.

In sum, we recommend that the Legislature provide funding to conduct the following educational research projects:

1. Defining and Assessing "Effective Schooling" in Alaska's Cross-Cultural Context — Estimated Cost: $50,000

   The purpose of this study is to analyze the issue of effective education in Alaskan cross-cultural settings. This project would a) examine the applicability of research on effective schooling outside of Alaska to Alaska's cross-cultural context, b) identify the diverse roles of the school in rural and urban settings and potential changes in these roles, and c) develop a research plan for creating a body of knowledge on the educational dimensions related to effective schooling in Alaska. This initial project is fundamentally a small-scale analytic effort which can be followed by a large data-gathering effort. It addresses a critical issue with important political and practical ramifications.

2. Effects of Community Participation in Educational Affairs on School Functioning — Estimated Cost: $100,000

   A key premise which underlies educational discussion and program planning in Alaska is that a high level of community involvement in

educational activities increases educational quality and relevance and community and student satisfaction with schooling. This assumption, however, has not been tested. Nor is it clear what ways (local school communities, teachers drawn from the community, school staff working informally with local leaders) community involvement may be related to educational success. This project would a) survey school districts and examine levels of and alternative channels for community involvement, b) examine the relationship between various types of community involvement and indicators of educational success, and c) suggest ways in which community involvement most effectively occurs.

3. Providing Educators with Skills Necessary to work Effectively in Alaska's Cross-Cultural Situation Estimated Cost: $75,000

Teachers and administrators require special knowledge and skills and supportive networks to work effectively in what are for many culturally unfamiliar, isolated communities. This research would a) identify and describe the knowledge and skills needed by Alaskan educators, b) compare the cost and adequacy of alternative methods (such as pre-service training, summer workshops, inservice support groups) of providing this training, and c) propose institutional arrangements for carrying out training activities.

4. Developing Educational Approaches for Village High Schools Estimated Cost: $110,000

The formation of small village high schools in rural Alaska has alleviated one set of educational problems, the dislocation experienced by village students away from home, but has created another set of problems, how to provide high quality education in small schools. The purpose of this project is to examine the effects of village high schools in such areas as drop-out, attendance, achievement, college success, and preparation for economic and leadership roles in the village and elsewhere. This information will be used to develop innovative educational stragegies, alternative curriculum models, and media technology which build upon the strengths of the village high school and mitigate weaknesses.

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ACST
THE ALASKA COUNCIL ON SCIENCE AND TECHNOLOGY

ALASKAN TRANSPORTATION

Research Priorities and Recommendations

A Special Report

Based upon the Results

of the

ALASKA COUNCIL ON SCIENCE AND TECHNOLOGY

Alaskan Transportation Committee Workshop

Held February, 1980 in Anchorage, Alaska

and the

Subcommittee Meeting on Transportation Research

Held October 3, 1980 in Anchorage, Alaska

January, 1981

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ALASKA COUNCIL ON SCIENCE AND TECHNOLOGY SPECIAL REPORT

ALASKAN TRANSPORTATION: Research Priorities and Recommendations

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EXECUTIVE SUMMARY

This report incorporates knowledge of past research and development into its recommendations on how to improve and restructure traditional areas of transportation research. It deals with new and neglected areas of research needed to solve Alaska's transportation problems. As a result, recommendations include all transportation modes, as well as the economic and social implications of transportation in Alaska. Both urban and rural transportation problems are considered. Since the role of transportation is to link the two, the report views the system holistically as it serves the diverse needs of a single, small population of 415,000, with annual recruitments of itinerant workers and tourists numbering about 300,000.

It was recognized that the state must find long-term energy sources and alternatives for its transportation systems. The committee did not develop research priorities in this area, but believes that the magnitude of the problem and the complex related technological questions stipulate a major state research and development effort in the near future.

Because of the scope and complexity of this issue, the report has been divided into three components: 1) Aircraft, Automobiles and Freight Vessels; 2) Foundations and Soils; and 3) Technological Scale and Market Structure.

BACKGROUND AND STATUS OF CURRENT ACTIVITIES IN ALASKAN TRANSPORTATION RESEARCH

In addition to the ACST Transportation Committee, two other groups exist for coordinating transportation efforts in the state - the Federal/State Transportation Planning organization and the Transportation Advisory Council of the Alaska Department of Transportation and Public Facilities.

Aircraft, Automobiles and Freight Vessels

Aviation development in Alaska has traditionally been linked to federal funding patterns which tend to concentrate on airport surface improvements, field lighting, natigational aids and air traffic control. Little has been done on total system evaluation. Response to an increased aviation need has been to lengthen the runway. If this cannot be accomplished, service is usually continued with obsolescent aircraft that can fit the field size.

Advanced aircraft applications have been left to the military and to private industry. Most of the short takeoff and landing aircraft available today are offshoots of military programs. However, aircraft that fit a specific regional need are not forthcoming from the present development stimuli.

The civil aviation system in Alaska has developed around the Boeing 737 and 727. These were the only commercial aircraft available to the larger Alaskan carriers in the late sixties and early seventies. This equipment is not ideally suited to Alaskan conditions. Thus, adapting this aircraft to the larger, passenger-supported markets and to the rural, freight-passenger market has created high fleet utilization costs and capacity problems.

No technological breakthroughs in airfoil design or power plants are in sight that would improve cost or performance of aircraft suitable for Alaska's bush routes. The present financial configuration of the industry in Alaska does not permit maximum application of existing aircraft technology. The main problem is cost rather than inadequate technology.

As with aircraft, motor vehicles that fit a specific regional need in Alaska are not forthcoming. Even automobiles with specific adaptations for operation in severe cold are not a feasible possibility within the market structure of the U.S. automobile industry. However, studies show that small attachments and changes to help alleviate the problem appear to have reasonable research promise.

Deterioration of air quality through carbon monoxide produced mainly from cold starting of light-duty vehicles is one manifestation of the expanding motor vehicle transportation network in Alaska. Present research falls far behind what is needed to develop the knowledge necessary to incorporate carbon monoxide control strategies into the planning and designing of new highway and street systems.

Another major vehicle-related problem in Alaska is ice fog. This is not a public health problem but rather one involving safety and economic factors. Past efforts on ice fog research have suffered from spotty interest by federal funding sources.

Increased demand for freight service, other than air, in western Alaska, requires a study of the relationship of the barge system serving that area to the container-ship service presently serving major ports. Very little research has been conducted on new types of vessels and vehicles that have proven their worth in other parts of the world - amphibious air cushion vehicles, hydrofoils, shallow-draft ACV's and surface-effect vehicles, to name a few.

Foundations and Soils

High transportation costs in Alaska have historically been due to the cost of system maintenance, whether the system component is a highway, airport, dock, or other facility. Construction of the trans-Alaska pipeline created a great surge in applied technology in several of these areas, which is still being absorbed into general applications throughout the state. Much of this new technology was possible because of basic research programs that had been ongoing since World War II at the University of Alaska and in federal and state agencies.

Because of the importance of oil and gas development in the future of Alaska, special attention has been given to pipelines. There is ongoing research on metal stresses in cold temperatures, particularly for high pressure gaslines and hose pipelines subject to extraordinary stresses due to foundation movements such as frost heaving, solifluction and the problems presented by permafrost.

Permafrost and frost heave conditions have also had a major effect on roadway and railway construction and maintenance costs in Alaska. Current studies indicate expected performance from selected design features under certain climatic and soil conditions.

For the past ten years the Department of Transportation and Public Facilities has conducted a small-scale research focusing on roadway design and construction techniques to control permafrost and frost heaving and detection of permafrost and ground ice through surface remote sensing methods. Research shows promise of future benefits but major research efforts are needed in the area of design, prediction techniques and permafrost detection.

Technological Scale and Market Structure

Alaska's transport market is such that there is a relatively large number of small economic activity centers separated by considerable distance and rugged topography. This has caused transport system development to follow regional and subregional patterns rather than integrating at the state level. This condition has been aggravated by the high number of carriers, even in remote areas, who compete for the limited markets.

Traditionally, the technologies used to serve this market have been those which have been adapted from systems developed for large national or international markets and those in which Alaska has acted as a laboratory for initial development. Currently, it is almost impossible to find transport systems specially designed for the conditions prevalent in the state.

The concept of the shipping container is the classic example of the "pilot program". The system saw its initial, commercial development and implementation in Alaska during the fifties. It quickly matured into an operational system which achieved its maximum return when applied to larger markets outside Alaska. As a result, the rate of technology development far outpaces increases in Alaska's market size, the state's carriers have found it increasingly difficult to justify the high capital costs of replacing their equipment with modern units for use in small-scale local markets. The pioneer marine carrier in this field dropped from the market in the midsixties. Current operators are finding utilization of current high technology only marginally economical in the Alaskan situation.

MAJOR ISSUES IN ALASKAN TRANSPORTATION

Aircraft, Automobiles and Freight Vessels

- Aircraft tailored to meet Alaska's needs can be produced by private industries. However, production will be primarily tailored to the national needs of the producing country unless some effort is made to influence design to meet Alaskan needs. Operators such as Wien and Alaska Airlines are large enough to have some effect, but they have concentrated their efforts on large jet aircraft. The operators that need specialized aircraft are not large enough to generate orders of any size by themselves.

- The present financial configuration of the aircraft industry in Alaska does not permit maximum application of existing aircraft technology or taking advantage of marginal upgrading that could occur through fleet replacements. The main problem is cost (capital and operating) rather than inadequate technology.

- Motor vehicles that fit Alaskan needs are not forthcoming. However, current studies indicate that increased research pertaining to the development of adaption changes and attachments could help alleviate some of the problems.

- Present research in deterioration of air quality through carbon monoxide falls far behind what is needed to develop the knowledge necessary to incorporate carbon monoxide control strategies into the planning and designing of new highway and street systems.

- Ice fog in Alaska is a problem involving safety and economic factors. Research has bogged down due to spotty interest by federal funding sources. Alleviating or diminishing the ice fog problem can only be accomplished by finding avenues for continuous, uninterrupted research in this area.

- In western Alaska, the demand for freight service, rather than air, will continue to increase. This requires a study of the relationship of the barge system and container-ship services. Additionally, extensive research is needed on the suitability of new types of vessels and vehicles that have proven their worth in the area of freight service outside Alaska.

Foundations and Soils

- Present practice in structural earth embankments requires that they be constructed of free-draining, coarse-grained material (sand and gravel) which is extremely expensive where it is not readily aviable. Lower cost substitute methods and materials should be found that could still provide structural reliability.

- Alaska's road and railway systems directly affects more people than any other transportation system in the state. There are major annual roadway and railbed maintenance expenditures. Permafrost, frost heave, snow and ice add tremendously to construction costs. Major efforts in research are needed for methods of predicting the long-term performance

of roadways and railways. Some factors to be considered include: design features, cost information, frost heave prediction techniques and the development of remote sensing methods to detect permafrost and ground ice, snow avalanche prediction and ice removal.

- The future of Alaska depends, in great part, on oil and gas development. Cost efficiencies in pipeline construction will pay special dividends because of their magnitude. There are special research needs that require ongoing examination such as continued research on metal stresses in cold temperatures and continous research on the problems of burying hot or cold pipelines in frozen and thawed soils.

Technological Scale and Market Structure

- It is unusual to find transport systems in use in Alaska that are specifically designed for the prevalent conditions. Civil aviation is an example of the existing problems. This situation represents only one of the more obvious problems relating to Alaska's transport requirements and the scale of economic activity. There is a definite need for research directed toward the types of conflicts engendered by Alaska's current transport systems.

- Relatively little is known about the intricacies of market structure in Alaska. It is closely related to the concept of scale effects on technological efficiency. This involves the identification of the casual elements transport demand and the manner in which the transport market can have a profound influence on the scale and applicability of technology types. A good deal of research is called for. Much of this work is in disciplines which emphasize economics or management, rather than science or engineering.

ANALYSIS AND DISCUSSION

Because of Alaska's low rural population and greater distances from national transportation systems, the overall economic relationships and associated research needs of the system must be examined in light of operational scale and market structure.

As Alaska's population continues to grow, an increase in service and efficiency in mandated. Because the federal government, through it various agencies, has had a strong research presence in Alaska and because that presence is fast disappearing, close cooperation between the state and federal government is essential to efforts of improving Alaska's transportation system.

The transportation system incorporates modal splits within its functional areas. Vehicles include aircraft, automobiles, ships, boats and surface-effect vehicles. Foundations include highways, airports, coastal structures and offshore facilities.

Aircraft, Automobiles and Freight Vessels

Aviation will continue to be the dominant transport mode for more than 70 percent of the state's communities during the next 25 years. The percentage

of aviation use will probably increase due to greater energy efficiencies for long-distance travel.

Little has been done on a total system evaluation of aviation in Alaska. Production of larger aircraft is primarily tailored to the national needs of the producing country. Efforts must be made to influence design to meet Alaskan needs.

There are no inherent technical constraints in meeting design criteria for small aircraft suitable for Alaska's low-density routes. The aircraft design and selection issue is essentially one of trading off purchase and operating costs against weight and capacity of limits.

Alaska's expanding population means an increase in the number of motor vehicles on the road. As a result, carbon monoxide is fast becoming a major problem in Anchorage and Fairbanks. Needed are carbon monoxide control strategies that would stress cold-start emission. There is need for research, development and maintenance of a relevant air dispersion computer model for the major centers of Alaska.

A comprehensive ice fog research effort is also needed. It should include open-water control, vehicular-produced control, study of aviation-related ice fog, study of large stationary sources such as power plants and basic research directed toward a better understanding of the formation and nucleation of ice fog.

Increased demand for freight service in western Alaska requires an examination of the relationship of the barge system serving that area to the containership service presently serving major ports. Access into western Alaska systems can be either by the Alaska Railroad or highway to the river port of Nenana, through a potential new river port at Yukon Crossing, or to Circle. New type vehicles/vessels should be systematically analyzed for use under the economic and climatic constraints of Alaska operation.

Foundations and Soils

There are popular misconceptions as to the amount of basic research being conducted in permafrost and frozen ground problems as they affect Alaska. The enormous industrial research effort that went into the oil pipeline is privately held. Federal funding of permafrost research is at a low level and funding by the Federal Highway Administration that financed research on the pipeline and haul road has not been renewed. In essence, the present state and federal research programs are funded at low levels and fragmented.

Permafrost and frozen ground have been problems that have beset Alaska for many years. Permafrost and frost heave conditions have a major effect on roadway and railway construction and maintenance costs in Alaska. Extensive research efforts are needed in methods of predicting the long-term performance of roadways and railways based upon known soil and climatic factors; benefits of difference design features for performance on permafrost; benefit and cost information on winter versus summer construction scheduling; frost heave prediction techniques and effects of frost action on pavement system layers and the development of reliable methods of detecting permafrost and ground ice by remote sensing methods.

One of the most pressing needs in ice-related transportation is for short-range prediction of ice distribution and motion to predict areas of open water and thin ice on a real-time basis for periods of several days. Development of this system would make possible better prediction of the trajectory of oil spills, siting of marine structures, prediction and possible routes of marine mammals and other applications.

Another severe problem in Alaska, especially to the fishing fleet, has been the icing of ship superstructures. Already identified by the Marine Board of the National Research Council, it is of special interest to plans for the northward expansion of the fishing fleet.

Technological Scale and Market Structure

Market demand and potential demand dictate the level of technology which can be utilized by the transportation system. For example, the limited demand of communities on the Bering Sea coast has made it unattractive to construct even minimal deep-sea port facilities in the region. Likewise, the channelization of railbelt demand through the Port of Anchorage has managed to meet the minimum throughout requirements for employment of midlevel container technology.

Imaginative use of the demand generated over broad geographic and economic sectors may allow more efficient utilization of transport technologies. Perhaps the most interesting examples of this type of concept has been White Pass and Yukon Railroad's use of a variety of container types for haulage of all commodities, including bulk items. This permits a single technology type to serve a wide variety of demands much more efficiently than would normally be the case for so small a market. Similarly, the backhaul of seafoods between Kodiak and Seattle fills, to some extent, the otherwise empty tonnage moving south from the railbelt.

Changes in the structure of markets can profoundly alter the technology required to service a market. The outstanding example of this phenomena is in the petroleum distribution system used in the state. The location of Tesoro's refinery in Nikiski provided a sufficient concentration of product movement to justify the construction of a pipeline from that point to Anchorage. This reduced the demand for tanker and barge transport as well as converting an overcrowded petroleum terminal at the Port of Anchorage into one which sees a tanker only briefly once a month. It also caused a reorientation of the Alaska coastal distribution system away from West Coast tanker traffic to one based on local barges.

Transport market structure is an area over which the public sector, through a variety of investment and regulatory mechanisms, can exert considerable influences. Thus, public bodies have the power to grant carriers or classes of equipment (e.g., subsidized construction shipping, aircraft sizings, truck weight limits) entry to a market or forced exit from that market. Public policy may also provide a variety of subsidizations which influence technological viability in a market. Likewise, public investment in facilities can cause or dissipate economics of market concentration.

These situations represent the more obvious problems relating to Alaska's transport requirements and the scale of economic activity. They do, however, illustrate the need for research directed toward the types of conflict engen-

dered by these difficulties. Specifically, the following areas would appear to be appropriate targets for research.

1. Identify the cost structures of available technologies as they relate to market size and composition.

2. Determine minimum volumes of various traffic classes necessary to support the operation of technology types.

3. Identify and develop arctic variations of traditional technologies and determine their efficient cost levels and intermodal compatibility with existing systems.

4. Develop low-capital, efficient alternatives to present transport systems.

5. Develop methodologies for exploring capital-labor tradeoffs in technology design.

6. Investigate questions of benefit and equity in expenditure of public funds to support various service levels to remote, high-cost rural areas.

7. Investigate the effects of both intermodal and intramodal competition on small market rate structures and the effects of regulartory policy on these areas.

8. Identify, catalog, and adapt work done in other polar nations (particularly Canada) which addresses these issues.

PRIORITIES AND RECOMMENDATIONS

1. To implement a long-term examination of the market structure problems of the Alaska transportation system: This area has been almost totally ignored, yet it would make possible immediate returns in efficiency, cost, and safety, if addressed by competent researchers. The aim of the examination would be to establish a relationship between the capital programs funded by the state, the currently available technology that is not in use due to inadequate financing being available and the market structure of Alaska.

   Specific Recommendation: The committee recommends that the Alaska Council on Science and Technology provide $25,000 to develop a proposal for submission to the legislature for funding this examination.

2.* Establishment of a program to investigate the problems of permafrost and frost action in soils: There is no strong state presence at this time in this area. Present funding is inadequate to deal with the wide range of permafrost and soil freezing problems encountered in highway, airport, building, port and dock facilities, and oil and gas pipeline construction.

Specific Recommendation: A program is recommended for FY 1982 funding in the amount of $200,000 to investigate the problem of heat and mass transport in freezing and frozen ground and especially the frost heave problem. This program would be especially timely in view of the present gas pipeline planning and pre-construction efforts.

3. Establishment of a program to further efforts on instrumenting roadbeds and other structures to obtain long-term performance data on permafrost and frozen soils: Permafrost, frost heave, snow and ice add tremendously to maintenance and construction costs of roadbeds, railbeds and other structures.

Specific Recommendation: A program of permafrost research funded at $250,000 annually over five years for applied research on permafrost properties and processes and on permafrost and ground ice detection is recommended. It is further recommended to create a continuing position for permafrost research, preferably at the Geophysical Institute, to organize and conduct a long-term permafrost research program. These problems are complex and will require continuing, long-term funding to develop solutions. Total costs over the next five years would be approximately $2,000,000.

4. A major conference on transportation research and technological development be held in Alaska in August 1981: There is a crucial need at this time to bring together experts in arctic transportation to help coordinate research efforts and facilitate communication within the scientific community.

Specific Recommendation: That the council request funding in the amount of $150,000 to sponsor a three to five day conference, bring together experts in arctic transportation with experts in movement of massive resource flows, small scale passenger and freight movements, operations in difficult terrain and a host of other factors.

* The committee further recommends that the only state agency which has a broad range of experience and expertise in dealing with problems of permafrost and frost action is the research section of the Alaska Department of Transportation and Public Facilities. This organization has worked since statehood, in design and construction problems involving permafrost and frost action in soils: therefore, this state agency should be designated the lead agency for allocation of these funds.

5. State of Alaska loan programs for aircraft operators: Design requirements should be developed suitable for Alaska's low-density routes with would include: relatively low initial prices, low operating and maintenance expenses, ease of maintenance, repair and crew training, reliability and durability, independence from ground support equipment and facilities, short field takeoff and land capacity and load configuration versatility.

   Specific Recommendation: The State of Alaska should examine its loan programs to insure that they are meeting the needs of aircraft operators to replace their fleets as needed. The state should work with Alaskan operators to replace their fleets as needed and to specifically define which aircraft characterists are most needed in Alaska. The state should communicate such information to the aircraft manufacturers as a vital component of an overall air transportation plan.

6. Coordination of transportation efforts in the state of Alaska: In addition to the Transportation Committee sponsored by the Alaska Council on Science and Technology, two other groups exist for coordinating transportation efforts in the state - the Federal/State Transportation Planning Organization and the Transportation Advisory Council of the Alaska Department of Transportation and Public Facilities. More coordination of information and communication is needed.

   Specific Recommendation: A forum is needed to bring together private transportation interests with public planners, in addition to the continuation of the above organizations. The above groups could possibly fill this role either through subcommittees or expansion of the parent body.

7. Develop carbon monoxide control strategies: The deterioration of air quality is one manifestation of an expanding motor vehicle transportation network in the urban areas of Alaska. Carbon monoxide, produced mainly from cold-starting of light-duty motor vehicles in now becoming a major problem.

   Specific Recommendation: The state should establish a research program to incorporate carbon monoxide control strategies into the planning and design of new highway and street systems.

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THE ALASKA COUNCIL ON SCIENCE AND TECHNOLOGY

AGRICULTURE AND ANIMAL HUSBANDRY

Research Priorities and Recommendations

A Special Report

Based Upon the Results of the

Alaska Council on Science and Technology

Agriculture and Animal Husbandry Committee Workshop

Held February 1980 in Anchorage, Alaska

March 1980

Christopher Noah, Executive Director - Pouch CV, Juneau, Alaska 99811 - (907) 465-3510

ALASKA COUNCIL ON SCIENCE AND TECHNOLOGY SPECIAL REPORT

AGRICULTURE AND ANIMAL HUSBANDRY: Research Priorities and Recommendations

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EXECUTIVE SUMMARY:

This report cites certain background and priority needs for activities in agriculture and animal husbandry research in Alaska. The working committee was selected to represent a broad background and diversity relative to Alaska agriculture. The committee identified more than 30 critical concerns in agriculture and animal husbandry. Each concern was evaluated and the top 10 selected and set in order of their priority for this report.

The Council itself, in consultation with the committee's chairman, has added recommended fiscal actions for consideration this year.

BACKGROUND AND STATUS OF CURRENT ACTIVITIES IN AGRICULTURE AND ANIMAL HUSBANDRY:

Over the past six years the State of Alaska has launched a dynamic agricultural development program. Agricultural rights to land are already being sold, approximately 75,000 acres since 1977. An estimated 30,000 to 40,000 acres were already in private holdings, bringing the present potential agricultural base in private ownership to more than 100,000 acres. Present proposed legislation could add another 75,000 acres by 1983. The State has identified a goal of 500,000 acres for agricultural development by 1990. The people of Alaska, as identified in "Alaska Destination Tomorrow" released by the Office of the Governor, placed high priority on development. Through several planning efforts, both commercial and subsistence, agriculture has been consistently emphasized by the Alaskan citizen. (Subsistence in this case refers to farms, usually small, that produce food and fiber for family use and income to generally supplement other income sources.)

Alaska can produce many agricultural products consumed by the in-state population, especially on a subsistence level. Further, as transportation and other costs of imported food continue to rise, this potential becomes more significant. At present, most food needs for Alaska are met through the Seattle marketing structure. If this supply were cut, food shortages would start immediately, and critical shortages would develop within a matter of weeks. This has become an expressed concern and is an important factor behind present agricultural development interest.

The red meat industry is developing rapidly, especially the reindeer industry. Alaska produces less than 2 percent (estimate) of its annual red meat consumption. This can be increased, especially in view of Alaska's rapidly developing grain base. Small grains produced in Alaska could be first made available to meet local needs such as feed requirements for dairy, swine, and cattle feeding. Most of the small grain produced in Alaska over the next five years could be utilized within the state if the proper infrastructure were developed, but the lack of such a system is very evident and a source of concern. It should also be noted that Alaska's developing hydrocarbon industry manufactures urea (nitrogen) fertilizer in Alaska, providing a low-cost source of this most important fertilizer element. (The Kenai plant is presently the largest in the world.)

ANALYSIS AND DISCUSSION:

The present trend favoring agricultural development has been motivated by individual Alaskans. The Soil Conservation Service, through a public participation effort with local subdistricts, noted a strong public concern about the loss of present crop land and potential acreages. Citizens throughout the railbelt area expressed a concern that agricultural lands were being diverted to other uses (especially urban) or were being tied up by special interests.

The Delta Land Management Planning Study, conducted by the Division of Lands, also emerged with strong local public participation. Agriculture development and preservation have become the first identified objectives of this plan, resulting in the Delta Agricultural Development Project.

Several considerations relating to agricultural development and preservation have been developed by local citizens over the past four years.

1. Project Approach

   There is a need to clearly define each development boundary, and how the proposed project will proceed. All resources must be considered in each project. Where it is possible and practical, conflicts must be resolved or minimized.

2. Conservation Ethics

   Precautions must be taken to allow for minimum impacts on the environment during and after development. Erosion control practices, water-quality concerns, and potential pesticide hazards must be

identified. An attitude of prevention of the environmental hazards before they occur rather than correction after they have developed prevails among the public.

3. State Leadership

The need for strong state leadership has been expressed by local people. This includes: a) the necessary legislative authorities to support and maintain the agricultural industry, b) the financial resources necessary to participate, c) identification of the marketing structure, and d) technical support in both research and development.

As an overview of the above, it has been noted by soils experts that Alaska has the soils and climate to produce a variety of adapted, quality crops for both in-state consumption and export purposes.

MAJOR ISSUES

The following are the 10 most urgent concerns for agriculture and animal husbandry. These were selected from approximately 30 areas identified as major research deficiencies in Alaska. The list is presented and explained in order of priority as determined by the committee.

1. Plant and Animal Improvement Research

Top priority was given to this basic area of research. Broad as it is, it is fundamental to establishing a stable agricultural base. The committee includes in this priority the recognition of the need for research in small amimal, subsistence farming, village and urban gardening, and large-scale commercial farming. Research emphasis should be placed on:

a. The introduction of new crop species and new animal species for evaluation under Alakan conditions.

b. Improvement of plants and animals through breeding programs designed to utilize both domestic and introduced genetic material.

c. The management of plants and animals to best utilize the natural resources unique to Alaska, i.e., long summer days, and to increase the efficiency of production.

d. The nutritional requirements of plants (fertilizer) and animals (feed) and especially how the former affects the latter.

As this is a broad display of research, it is recommended that this committee further define the specific research needs on a priority basis when funding is considered for plan and animal improvement research. This report of the committee will be forwarded by the Council to the University for their guidance.