PART II: CURRICULUM DEVELOPMENT WORKSHOPS

(THURSDAY AND FRIDAY, DECEMBER 11 and 12, 1980)
FISHERIES AND MARINE EDUCATION NEEDS IN ALASKAN
ELEMENTARY AND SECONDARY SCHOOLS

Belle Mickelson,
Education Specialist
Alaska Sea Grant College Program
and
Workshop Participants

Fisheries as a food resource and a renewable resource will be more and more important to Alaskans in the coming years. Students, our future decision makers, need to be aware of the economic, social, biological, political, and cultural impacts of Alaska's vast coastal resources. Decisions made today concerning natural resources in the Interior—in Nulato and Fairbanks, Ft. Yukon and Rampart—affect the whole western coast of Alaska as the Yukon River flows to the sea. Likewise, the affects of coastal decisions, such as those dealing with the oil and gas potential of the Outer Continental Shelf, reach to the Interior.

By learning about the marine and fisheries resources right at their doorsteps, students are motivated to continue in our educational programs. Motivation comes as the students see the importance of mathematics, reading, and writing in fisheries and marine careers; as they learn navigation, read the fishing regulations, figure taxes and keep records; and learn about the complexities of food chains. Many parents and students, particularly in coastal communities, are concerned. They feel the need to understand and appreciate their local marine environment and to be prepared for hometown jobs and the intricacies of coastal decisions.

At this conference, we heard that if the fisheries of Alaska were developed according to their potential, Alaska would rank as the ninth fish producing nation in the world. Alaskan students will have difficulty entering the traditional commercial fisheries due to limited entry and the high cost of gear, so programs are needed to investigate alternative fish-oriented occupations in home towns and villages.

To meet the needs of young Alaskans statewide, we recommend a program of school administrative support, teacher training, curriculum development, funding, and community involvement.

 ADMINISTRATIVE SUPPORT

We recommend that a letter be sent to school superintendents and principals around the state stressing the importance of marine and fisheries education, acquainting them with the outcome of this conference, and thanking those districts who sent teachers to the conference. Short presentations on fisheries and marine education should be made to superintendents and principals at their yearly meetings. State-level support through the Department of
Education will filter down to the school districts and assist local interest in marine and fisheries education.

**TEACHER TRAINING**

More courses and inservices are needed to train teachers in the marine and fisheries education field. The University of Alaska and various community colleges are urged to develop innovative courses and methods of delivery to meet the needs of both rural and urban teachers. Processors and fishermen, government agencies, biologists, and other local resource people can assist with inservice programs for teachers. The Department of Education's Talent Bank can be used to assist in training and information exchanges.

The Northwest Association of Marine Educators can assist with professional teacher development through journal articles and conferences. A conference planned for June 14-17, 1981 in Sitka will include credit classes for teachers. The Alaska Sea Grant College Program has an Alaska Marine Educators Newsletter which keeps teachers in contact with one another and aware of new teaching materials. The Department of Education publishes the Yellow Pad which communicates with all disciplines, plus the Alaska Education News. Tundra Times and other state newspapers can be encouraged to carry articles in the fisheries and marine education field.

Two marine education one-credit courses are planned at the NEA Conference March 5-7, 1981, one for elementary teachers in Seward on the Alaska Sea Week Curriculum Series, and another for secondary teachers in Homer on Project Oceanology materials from Connecticut as applied to Alaska.

**CURRICULUM DEVELOPMENT**

Teachers need curriculum materials, audio-visual supplies, and resources geared to local needs. We hope all schools--private, BIA, and public--will be involved in these marine and fisheries programs. We urge the preparation of a resource directory which includes reference materials for teachers, materials for use with students, names of resource people available to both students and teachers, and an annotated bibliography. The Department of Education has volunteered their computer system to store teaching activities and resources for teacher assistance. The Alaska Native Foundation has already begun to compile annotated bibliographies of available resource material, which can be plugged into the Department of Education system. The Arctic Environmental Information and Data Center has a regional library and other state and local libraries have marine and fisheries materials.

The Alaska Sea Grant College Program is working on a suggested list of books for library purchase. Schools are urged to buy or build saltwater aquariums and binocular microscopes so that marine organisms can be studied more thoroughly.

We encourage the development of more Alaska slide shows and films on fisheries resources. Pieces of film already exist in agency files that could be coordinated into films or videotapes to address current Alaskan issues such as subsistence, oil development, marine animals, fisheries regulation, and coastal zone management. We hope the state telecommunications systems will
immediately begin broadcasting existing fisheries- and marine-oriented programs, and that they will develop new programming, including teacher guides.

At the elementary school level, the Alaska Sea Grant College Program has the Alaska Sea Week Curriculum Series which was developed in Juneau at the urging of parents there. Alaska Sea Week is being revised for statewide use and is available to local districts to test and evaluate. The Southeast Regional Resource Center is available to assist schools in their region with Sea Week.

Alaska Sea Week is a chance for students to integrate the sea into their regular classes for a week each spring or fall. The seven curriculum guides are Discovery, Sea Animals, Shells, Legends and Traditions of the Sea, Birds and Estuaries, Fish, and Man's Influence on the Sea. Several school districts are already piloting the Sea Week Program.

The Education and Resources Group, Inc. is assisting with a program for kindergarten through twelfth grade in Akiok teaching basic science, introductory economics, and decision-making skills through a scallop culturing project involving the school and the entire community. Topics important to cover in elementary schools, through focusing on local, observable species, are food chains, biology of fishes including their life cycles and the various species, exploitation of fisheries, ecosystem interrelationships, and interdependence of life cycles.

At the statewide level, no secondary curriculum materials exist, although Ketchikan, Kodiak, and Sand Point all have vocational programs covering marine fisheries, biology, aquaculture, and seamanship. The Lower Kuskokwim School District has contracted with the Alaska Native Foundation to research source materials. The Kodiak Area Native Association is working with Kodiak Schools on secondary materials implementation. Kodiak Community College is developing navigation and fisheries law enforcement modules with plans for more modules in the future. Many schools have marine biology programs, including those in Wrangell, Kenai, Seldovia, Cordova, Craig, and Anchorage. Cordova, in fact, is planning a secondary Sea Week Program this spring.

But statewide materials are needed. We recommend a summer workshop for teachers to write curriculum with the assistance of resource people from the fishing industry, university, and native corporations. Many curriculum materials from other states can be used to assist in this effort. Topics should be integrated into English, math, science, and social studies classes as students study oceanography and marine biology, general fisheries, and aquatic ecology in their science classes; seafood preparation, cooking, and quality assurance in home economics; and subsistence food preparation and nutrition and safety. Social studies classes can tackle coastal issues. Math classes can cover the rudiments of navigation and utilize problems in figuring nautical miles and seafaring distances. All students should know about boat safety and handling, swimming, radio use, and other survival skills. The Department of Education and school districts already involved in fisheries and marine education should be consulted in developing course outlines. There are communities working as de facto pilot communities. There is a need for many more.
Vocational topics in secondary schools should include marine electronics, hydraulics, fuel systems, refrigeration, diesel mechanics, welding, fishing gear technology, marine power systems, and propulsion systems. Many of these topics are greatly facilitated by having access to boats. In Ketchikan their boat, the Sea-Ed, is used for not only vocational classes, but by many other classes involved in marine studies. Districts need to pick up insurance so that students can actually experience the ocean, and complement their studies by real life experience. A vocational marine technical center would greatly assist rural schools. The Kuskokwim School District is anxious to begin a facility in Aniak. Perhaps the Seward Skill Center can also assist in this program. Anchorage and Fairbanks have career centers which can possibly assist in training. Western area schools particularly need courses in outboard marine engine repair, net technology, boat repair (both fiberglass and aluminum), fish quality control, fisheries economics, fisheries law and politics, fishing boat safety, and seamanship.

Kuskokwin Community College is working on short, intensive courses in boat-building, navigation, welding, small engine repair, net mending, net handling, first aid, survival skills, purchasing, and record keeping. Elementary schools should contain some exposure to marine careers. Students should be trained as cooks, scuba divers, mechanics, and net menders as entry level positions in the fishing industry. Quality control is important to emphasize as students learn about and experience fish processing.

The community colleges, school districts, the regional resource centers, private consultants, processors, and fishermen can all contribute to the development of a comprehensive vocational curriculum through another conference, after the presently proposed curriculum is developed and piloted.

**FUNDING**

We urge legislative support through the Bottomfish Coordinator's Office and the new fisheries and marine education supervisor at the Department of Education level. Various grants, processors, fishermen, the university, school districts, and native corporations are all sources of potential funding. The Department of Education needs to search out funding possibilities.

**COMMUNITY INVOLVEMENT**

Community involvement is particularly important for program success. Students can make community presentations about their learning experiences. Parents can be involved in assisting with field trips and inservices and being on advisory boards. Advisory boards representing various sectors of the community will insure that fisheries and marine programs meet local needs. Community fairs and festivals can encourage fishing related skills such as the survival suit races in Kodiak's Crab Festival and net mending contests at Ketchikan's Festival of the Sea. Community swimming pools can contribute to swimming and scuba diving competency.

**SUMMARY**

By developing a statewide comprehensive fisheries and marine education program, students will be better prepared for the complexities of coastal
decisions whose results will affect all of us for many years to come. The fisheries and marine program will require efforts by all of us--fishermen, processors, teachers, administrators, parents, native corporations, government agencies, students--as we train teachers and administrators and develop curriculum, funding sources, and community support. But the result will be Alaskans ready for the future: ready for aquaculture; commercial, sport, and subsistence fisheries; recreation; and, perhaps most important, resource management so that generations to come will enjoy the bounty of the sea.

Addendum

Dick Clark,
Curriculum Director
Lower Kuskokwim School District

If you view the December 1980 fisheries conference as a starting point for the development of a concerted effort to introduce a program of awareness at the elementary level, academic and vocational preparation at the secondary level, and professional preparation at the university level, much has been accomplished by bringing people from diverse fields together to support each other in a common effort.

Three groups worked separately on the program from the perspectives of kindergarten through twelfth grade development, vocational and technical concerns, and university programs. This process involved introducing position papers about their individual concerns and reporting to the total group. Time and format did not permit a work-study group made up of representatives of the three groups.

It appears that the next step in the process is to bring the groups together to write a skeletal outline identifying the specific components that would represent an exemplary program that individual school districts could use as a base for the development of programs unique to their own areas.

The sequence of events in the marine and fisheries education program development process should be as follows:

1) Identify need--accomplished at December conference.
2) Literature search.
3) Writing conference--rough draft on program development.
4) Disseminate for comments (possible public hearing).
5) Incorporate comments into position paper (program).
6) Develop resource directory.
7) Implement fisheries and marine education plan.
PLANNING FOR VOCATIONAL AND TECHNICAL EDUCATION

Outline Submitted by
Hank Pennington,
Marine Advisory Program
University of Alaska
and
Terry A. Whitbeck,
Fisheries Education Supervisor
Alaska Department of Education

Who needs vocational and technical training?

1) Secondary students--those entering the industry.
2) Entry level--those out of school, age 16-80, with no skills.
3) Industry--those who are employed and need:
   a) basic skills,
   b) update of existing skills, and
   c) retraining in a new technique or occupation.

CURRICULUM AREAS

Five needed curriculum areas were identified: fishery resource management, harvesting, seafood production, business and marketing, and aquaculture and mariculture.

Fishery Resource Management Skills

Orientation to Resource Management
Communications--oral and written
Management and Conservation
Laws and Regulations
Economic, Social, and Political
Implications of Management Decisions
Applied Fisheries Oceanology

Harvesting Skills

Seamanship
Safety and Survival
Marine Engineering
Fishing Gear
Maintenance and Repair
Cooking
Communications
Navigation
Ergonomics
Quality Assurance
Marketing
Laws and Regulations
Sanitation
Waste Disposal
Business and Recordkeeping
Seafood Production Skills

This section focuses on the operation of the seafood plant by technical specialists.

Production Overview
Quality Control
Refrigeration
Machinist—To include plant maintenance, electrical, power units, generator sets, portable engine, retort steam, water and waste, rolling stock, and hydraulics.
Personnel Management
Personnel Safety

Seafood Production Management Skills

This section focuses on the management of the seafood plant by management/technical specialists.

Seafood Technology and Production Management
Food Processing and Preservation
Marketing Strategies
Laws and Regulations
Water and Waste Management
Accounting
Operation and Maintenance of Processing Equipment
Quality Control and Quality Assurance
Sanitation Policies and Procedures

Business and Marketing Skills

Marketing
Distribution
Promoting
Clerical and Office Skills
Permits
Consumer Education
Retailer Education
Finance
Taxes
Insurance
Bookkeeping: payroll, profit and loss, budgeting
Recordkeeping: fish catch records, engine logs, depreciation, and record retention.
Laws, Regulations, Political Process
Quality Control and Quality Assurance
Domestic and International Economic Overview
Planning and Scheduling: decision-making and research skills
Aquaculture and Mariculture Skills

Orientation to Mariculture and Aquaculture
Fish Husbandry (Rearing Technology)
Species Life Cycles
Species Pathology
Water Quality Testing
Water Systems
Site Location
Holding, Harvesting, and Marketing
Data, Statistics, and Records
Sanitation and Waste Control
Mechanics, Electricity, and Electronics
Stock Assessment
Experimental Design and Research: Systems and Gear
Permits, Laws, Regulations, and Politics

RECOMMENDATIONS

Recommendations for Local Consideration

Local needs should be demonstrated.

Local programs and delivery systems should be designed to meet those needs.

Should consider local programs, resources, materials, and planning done in other areas of Alaska. Cooperation and coordination between other programs and industry should occur.

The instructor is the key to successful fisheries and marine education. Care should be taken to select instructors with work experience in the curriculum area.

Coordination and cooperation must occur among educational institutions so that comprehensive planning can take place to ensure that the duplication of equipment, facilities, and resources does not occur in fisheries education.

It is imperative that Alaska native groups be actively involved in fisheries and marine education planning and implementation.

Packaged programs need to be developed for delivery to rural areas which consider the local needs of the students.

Local programs need to promote, to a maximum extent, contacts with industry for supplying faculty, facilities, or both.

Both hands-on experience and on-the-job training need to be an integral part of a vocational and technical program in fisheries and marine education.

Interface with industry should be a top priority of vocational and technical fisheries and marine education at the local level.
Recommendations to State Entities

The state should develop a resource bank of facilities, materials, and personnel which includes industry resources.

A fisheries and marine advisory committee made up of industry, educators, and Alaska native representatives needs to be established to oversee the development of fisheries and marine education in the State of Alaska.

A directory of state and federal agencies, organizations, and educational institutions and groups that may be able to provide services and information to fisheries and marine education programs needs to be developed and disseminated.

It is imperative that Alaska native groups be actively involved in fisheries and marine education planning and implementation.

Packaged programs need to be developed for delivery to rural areas which consider the local needs of the students.

Promote to a maximum extent, contracts with industry for supplying faculty and facilities.
UNIVERSITY LEVEL PROGRAMS

SURVEY OF EDUCATIONAL NEEDS OF FISHERIES BIOLOGISTS

John Clark, Chief of Research
and
Ben Van Alen, Fisheries Biologist
Commercial Fisheries Division
Alaska Department of Fish and Game

An education survey was conducted in the Commercial Fisheries Division of the Alaska Department of Fish and Game (ADF&G) during November and December 1980 and January 1981. The survey was aimed at determining the academic backgrounds of Commercial Fisheries Division personnel and what their interest is in continued education. The survey was completed by all permanent personnel in the division. The material presented here summarizes the results of the survey.

The total number of respondents was 192. For analysis of the survey, the respondents were divided into four groups, as follows:

<table>
<thead>
<tr>
<th>Group</th>
<th>Job Type</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Biologists</td>
<td>103</td>
</tr>
<tr>
<td></td>
<td>(Fishery Biologists I, II, &amp; III)</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Supervisors</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td>(Fishery Biologist IV and higher)</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Administrative and clerical staff</td>
<td>50</td>
</tr>
<tr>
<td>4</td>
<td>Scientific support staff</td>
<td>24</td>
</tr>
<tr>
<td></td>
<td>(Biometricians, programmers, pilots, and others)</td>
<td></td>
</tr>
</tbody>
</table>

Of the 150 degrees reported by Commercial Fisheries Division biologists and supervisors, 113 (75 percent) are B.S.'s, 34 (23 percent) are M.S.'s, and 3 (2 percent) are Ph.D.'s. (The American Fisheries Society reported that in 1979 the educational index of ADF&G fisheries biologists ranked 40th among the 50 states [Fisheries, May-June 1980].) Most degrees were received outside of Alaska: 89 percent of the B.S. degrees, and 76 percent of the M.S. degrees; only one of the three Ph.D.'s was awarded by the University of Alaska.

Most of the Commercial Fisheries Division personnel felt that their education prepared them well for ADF&G work. The biologists were satisfied with their ability as resource scientists, but less satisfied with their ability as personnel supervisors or managers or as budget managers. Most of the biologists, supervisors, and scientific support staff felt they did not need
fours of the administrative/clerical and scientific support staff felt they needed additional training to prepare them for promotion or transfer.

Personnel in all job classes felt a broader education and training program would improve their job performance and increase their satisfaction with the State of Alaska as an employer: 76 percent of the biologists, 86 percent of the supervisors, 85 percent of the administrative and clerical staff, and 95 percent of the scientific support staff. Personnel in all job classes also felt that ADF&G does not place adequate emphasis on training and education: 77 percent of the biologists, 86 percent of the supervisors, 82 percent of the administrative and clerical staff, and 100 percent of the scientific support staff.

Eighty percent of the division's personnel would participate in an education and training program if one existed. If a state-supported return-to-college program existed, the following personnel would participate: 51 (50 percent) of the biologists, 3 (20 percent) of the supervisors, 23 (62 percent) of the administrative and clerical staff, and 15 (65 percent) of the scientific support staff. Of the personnel who would participate in a state return-to-college program, over 60 percent of the biologists, supervisors, and scientific support staff, and 30 percent of the administrative and clerical staff wish to apply course work towards an advanced degree.

Approximately 55 percent of the division's personnel would enroll for a short course if ADF&G paid all course costs, 28 percent would enroll if partial support was provided, and 14 percent would enroll if no financial support was given. The conditions for enrolling in a short course were felt to be best left between the employee and his or her supervisor. Most people would not object if they were required to complete the course or reimburse the state for expenses.

The most desirable form of course work for all job classes is part-time, and the least desirable form is correspondence (Table 1). Additional education in mathematics, business, and fisheries sciences is desired by personnel in all job classes (Table 2). Sampling and statistics, population dynamics, resource management, technical writing, and resource economics are the top science courses desired (Table 3).

The results from this survey show that there definitely is a need within ADF&G for a continuing education program. Personnel from all job classes would participate. Most people are interested in part-time and short courses, but not in applying them towards an advanced degree. However, some of the staff are interested in participating in a return-to-college program which would lead towards an advanced degree. The Commercial Fisheries Division should establish a broad education and training program.
Table 1.--Results of Survey Question: "If you want to take a class or classes, what form would this course work ideally take, ignoring job constraints, etc.? (rank numerically, 1 for first choice, etc.)."

<table>
<thead>
<tr>
<th>Options</th>
<th>Biologists</th>
<th>Supervisors</th>
<th>Admin. &amp; Clerical</th>
<th>Scientific Support</th>
</tr>
</thead>
<tbody>
<tr>
<td>Part-time during work hours, if leave provided</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Short courses</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Evening courses</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Full-time on campus</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>Correspondence courses</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
</tr>
</tbody>
</table>

Table 2.--Results of Survey Question: "If you want to take a class or classes, what type of training do you think would benefit you most? Mathematical sciences ____, Fisheries sciences, ____, Business and personnel management ____, Other fields* ____.

<table>
<thead>
<tr>
<th>Options</th>
<th>Biologists</th>
<th>Supervisors</th>
<th>Admin. &amp; Clerical</th>
<th>Scientific Support</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mathematical sciences</td>
<td>65</td>
<td>6</td>
<td>11</td>
<td>13</td>
</tr>
<tr>
<td>Fisheries sciences</td>
<td>51</td>
<td>7</td>
<td>11</td>
<td>6</td>
</tr>
<tr>
<td>Business and personnel management</td>
<td>50</td>
<td>10</td>
<td>37</td>
<td>9</td>
</tr>
</tbody>
</table>

*Under "other fields" 33 respondents listed computer sciences, 8 listed data processing and management, 4 listed report writing, and 4 listed law.
Table 3.--Results of Survey Question: "Within the science category, number by priority the specific type of training you would sign up for if available to you, using 0 for not required and 1 for first preference. Reuse numbers for items of equal rank."

<table>
<thead>
<tr>
<th>Type of Training</th>
<th>Biologists</th>
<th>Supervisors</th>
<th>Admin. &amp; Clerical</th>
<th>Scientific Support</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sampling and statistics</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Population dynamics</td>
<td>2</td>
<td>3</td>
<td>6</td>
<td>2</td>
</tr>
<tr>
<td>Resource management</td>
<td>3</td>
<td>2</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>Technical writing</td>
<td>3</td>
<td>4</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>Resource economics</td>
<td>4</td>
<td>1</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>Marine sciences</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>6</td>
</tr>
<tr>
<td>Ichthyology</td>
<td>6</td>
<td>5</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>Freshwater sciences</td>
<td>6</td>
<td>6</td>
<td>5</td>
<td>7</td>
</tr>
<tr>
<td>Bioclimatology</td>
<td>7</td>
<td>6</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>Hydrology</td>
<td>8</td>
<td>7</td>
<td>7</td>
<td>7</td>
</tr>
<tr>
<td>Genetics</td>
<td>9</td>
<td>6</td>
<td>5</td>
<td>7</td>
</tr>
<tr>
<td>Chemistry and physiology</td>
<td>9</td>
<td>7</td>
<td>5</td>
<td>6</td>
</tr>
</tbody>
</table>
CURRENT PROGRAMS AT THE UNIVERSITY OF ALASKA

Fisheries Education for Alaska--Today and Tomorrow

Hank Pennington, Editor
Alaska Seas and Coasts

For most Americans the era of Jacques Cousteau stirred a romantic awareness of the world's oceans. Many quickly unfurled the banners of preservation and conservation with little understanding of the relationships and distinctions between the concepts.

In the same breath we talk of the rape and plunder of the oceans' resources, and yet say that the oceans are the world's hope for a continuous supply of protein. Today, in the minds of many, the fishermen of the world and the fishing industries embody some fuzzy blend of world saviors and condemned pillagers confused with the romantic notion of "going down to the sea in ships."

Within the industry the concepts of full-scale harvesting of resources at levels that meet world need, but tempered by the concept of sustained yield, are similarly fuzzy. Complicated by rampant inflation and state, national, and international politics, the free life of pulling a fish from the water and selling it has lost its romance. Around the world, huge factory fleets follow the dwindling schools of protein, daily rousing new fears that man can indeed overharvest the "limitless resources of the world ocean."

The State of Alaska views its wealth from oil and gas as a short-term source of essential funds for development of its renewable resources, especially fisheries. Both the fishing industry and the state recognize that if those fisheries, once developed, are truly to be renewable, they will have to be carefully and professionally managed: the harvest of the resources and the production of fisheries products must be efficient and profitable.

If development of the fishing industry to its fullest sustained potential is to be a realistic goal of the state, it follows that the state must place high priority on the understanding and solution of the problems facing that industry and the management agencies.

In all nations, universities have assumed the roles of performing basic and practical research and of training the people needed for problem solving and development. In the United States these activities are focused on the needs of local communities and individuals through the training and information services of an extension program. The University of Alaska has offered these services within the limits of its funding and personnel, but it also recognizes that the present and future needs of the fishing industry, the coastal communities, and the State of Alaska far exceed the university's present capabilities to respond effectively.

*From Alaska Seas and Coasts, Volume 9, Number 1 (February-March 1981).
Over the last six months, the University of Alaska and a panel of experts on fisheries and education have studied the present and future needs of the fishing industry and management agencies. Based on their evaluation, the university and the panel developed a 10-year plan for the improvement and expansion of education, research, and public service programs.

In this issue of Alaska Seas and Coasts a brief description of that plan is presented along with a summary of the University of Alaska's present capabilities and activities. We invite you to review the materials, and based on your experiences with the industry, give us your criticism and comments. If the University of Alaska is to develop and improve its capabilities to work with the industry and the management agencies, its plans must be based on a clear understanding of the problems and needs. Only through the direct cooperation of the people of the industry, the University of Alaska, and the management agencies can we maintain proper emphasis and focus in fisheries education programs.

Vocational and Technical Fisheries Education
and the University of Alaska

John P. Doyle
Marine Advisory Program

A Fishery Industrial Technology Center is proposed as the hub of vocational fisheries education in Alaska. To be located in one of the state's major fishing communities, the Center will be a joint industry-University enterprise. It is the major effort in the University's proposal for extensive improvement and expansion of its technical and vocational fishery programs.

Researchers at the Center will pursue the development of new technology for the fishing and processing industries. Technical assistance will be available through the Center for individuals and businesses in the application of the new advances in technology and in the development of new business ventures. The community college system will provide development of curricula, training, and instruction in fishing and food processing.

The core of the activities of the Center will be fishing technology and seafood processing science and technology. In fishing technology, the programs will include development and training in the use of more energy efficient gear types, gear that is less destructive of other resources, and new fishing methods and fishing operations.

Applied research and development in seafood processing will include improvement of existing techniques and the development of techniques for handling new resources. And as the industry leans ever heavier on technology and new skills, continuing education must be part of anyone's life whose business is fishing. The University of Alaska's plan provides for the active fisherman whose job must be the first priority of business, and for whom course work and study have to be meshed in where and when they will fit. The Marine Advisory Program and the community college network are to be expanded to meet this growing need.
The Marine Advisory Program is designed to deliver information through one-to-one encounters, workshops, seminars, and publications. Presently general agents are located in Kotzebue, Atmaulik, Kodiak, Cordova, and Petersburg. There is a staff of specialists in Anchorage in the fields of seafood science, aquaculture, marine safety, fisheries and marine biology, and business management.

**Formal Degree Programs in Fisheries at the University of Alaska**

Donald H. Rosenberg, Director
Alaska Sea Grant College Program

A university's traditional role is to educate and train people, to do basic and practical research, and to extend information to the public. The University of Alaska has acknowledged that in a state where fisheries are as important as they are here, the state university must provide excellence in fisheries education. The direction and approach for expansion and improvement of fisheries at the University of Alaska are outlined in its 10-year plan. This plan describes in detail the personnel, facilities, and resources which will be necessary to provide what Alaska needs.

This improvement and expansion in fisheries and marine affairs at the University of Alaska will include academic programs for training management personnel and industry and community leaders.

The proposed programs will help Alaska manage and develop its natural and human resources to their fullest potential, while ensuring that "sustained yield" and "profit" are not just the latest jargon from a growing body of scientists, managers, and public servants devoted to the maritime industries.

The University of Alaska now offers a Bachelor of Science degree in Fishery Science; Master of Science degrees in Fishery Science, Fisheries Oceanography, and Marine Biology; and an Associate of Applied Science degree in Marine Technology (fishing option).

The expansion that is planned will add an Associate of Applied Science in Seafood Technology, a Bachelor of Science in Fishing Technology, Master of Science degrees in Fishery Resource Management (non-thesis), Limnology, Seafood Science Food Technology, Fishing Technology, Ocean/Marine Policy and Law, and Marine Affairs. A Doctor of Philosophy degree will be available in Fishery Science.

You can obtain a copy of the Fisheries Education Plan (Sea Grant Report 81-1) from the Alaska Sea Grant College Program, University of Alaska, Fairbanks, Alaska 99701, telephone (907) 479-7806.