Sea Grant

A Review of the Fisheries Programs and Their Organization at the University of Alaska

Clinton E. Atkinson

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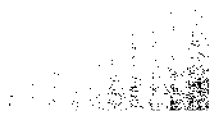

A REVIEW OF THE FISHERIES PROGRAMS AND THEIR ORGANIZATION AT THE UNIVERSITY OF ALASKA

INTRODUCTION

In 1974, the president of the University of Alaska initiated a study of the role of the university in the research and development of Alaskan fisheries. The first part of the study recommended and subsequent action was taken to establish a new curriculum of fisheries study on the Juneau campus of the University of Alaska and to reorient the existing fishery program on the Fairbanks campus toward the hitherto largely neglected studies of recreational and commercial fisheries in the arctic environment. It also recommended, and action was taken to expand the oceanographic curricula to satisfy the requirements of graduate degrees in fisheries oceanography. In addition to the above, the study proposed the establishment of two or three two-year technical training programs in fisheries at the Kodiak Community College (attempted but not successful); expansion of the Marine Advisory Program with a central staff in Anchorage (partially completed);[1] the formation of a joint federal-state-university fishery cooperative unit associated with the fisheries program on the Fairbanks campus (established in 1977/78), and the designation of the University of Alaska as a Sea Grant College (eligible in 1979).

In preparation for the critical 1979 Sea Grant Program site review at the University of Alaska, the director of the university's Sea Grant Program arranged for this independent evaluation of the progress and status of the fishery curricula at Juneau and Fairbanks, the detection of problem areas, and recommendations for revision of organization and curricula, if and where needed.

In addition to the above, the vice-president for academic affairs of the University of Alaska has also expressed concern over certain conflicts in understanding of the organization and scope of the fisheries programs to be offered at the two campuses. It is hoped that the review and recommendations presented in this study will satisfy the needs of both.

Because of the limited time available for this study, the number of personal interviews includes only about 25 contacts representing a broad cross-section of university and fisheries interests. These individuals included the vice-president of academic affairs for the university, the chancellors and senior staff officers of the university at the three campuses, a past and a present member of the board of regents, a representative of the governor's office, the director and/or senior staff members of the National Marine Fisheries Service, the Alaska State Department of Fish and Game and the North Pacific Fishery Management Council,

[1] A separate study of the Marine Advisory Program is scheduled for the fall of this year (1979).

the directors of the Institute of Marine Sciences, the Arctic Environmental Information and Data Center and the Sea Grant Program of the University of Alaska, a state legislator, members of the fishing industry and several others.

In addition to the above, the author wishes to especially acknowledge the assistance given by Drs. Samuel J. Harbo, Willard E. Barber and James B. Reynolds at the University in Fairbanks and Drs. Richard Gard and Anthony J. Gharrett at the University of Juneau. These men provided much of the basic data and detail presented in this report and, of course, could be most affected by the conclusions and recommendations of this study. Their cooperation and assistance is deeply appreciated.

Very briefly, the problems associated with the fisheries programs at the University of Alaska are those one would expect to find in healthy, growing programs. The growth in the number of both undergraduate and graduate students in fisheries at the University of Alaska within the past four years is truly remarkable. On the Fairbanks campus, the enrollment of graduate and undergraduate students in fisheries increased from an average of 15 to 18 before adoption of the new curricula in 1974/75 to 30 at the present time. On the Juneau campus, the enrollment increased from zero to 45 in the four academic years between the fall of 1975 and the spring of 1979.[2] This is a total of 75 students enrolled in fisheries on the two campuses at the present time and as will be seen later, there is every indication that both of the programs will continue to grow.

[2] These figures are based upon the number of students who have declared their major as fisheries. At Fairbanks, the student usually declares the major when entering the University as a freshman, while at Juneau, the major is usually declared at the junior level. Thus, the number of students at Juneau is probably understated in comparison with Fairbanks.

RECENT DEVELOPMENTS IN FISHERIES

The history of the development of the fisheries of Alaska and their importance to the state's economy was reviewed in some detail in the original report. During the past four years, however, several events have occurred which only strengthen the future importance of fisheries to Alaska and the need for increased training and knowledge. Most significant was the enactment of the Fishery Conservation and Management Act of 1976 and the establishment of a North Pacific Fishery Management Council, headquartered in Anchorage and responsible for the management of the fisheries in a zone between three and 200 miles off the coast of Alaska.

The act requires that the fisheries be managed on a scientific basis, providing for the greatest biological yield from the fisheries and the greatest economic and social benefits to the people of Alaska and the nation. Even the extensive studies on halibut and salmon fail to adequately answer questions of economic and social benefits from these fisheries and studies of the other fisheries are fragmentary at best. There has been an almost instantaneous need for knowledge and expertise related to the North Pacific-Bering Sea fisheries. There will also be a continuing need for university graduates trained in fishery sciences and able to understand and predict fluctuations in abundance and availability of various stocks of fish.

Action of the council, under provisions of the act, has restricted foreign fishing within the 200-mile zone and has thus encouraged the development of American fisheries to replace the foreign fishing fleets. This trend is especially noticeable in 1978/79 with 30 or 40 new vessels being ordered and converted for fishing and/or processing bottomfish. Again there will be a growing need for graduates in fisheries or those disciplines closely related to the needs of the fishing industry.

In addition to the above, there are two other areas of study where fishery-trained personnel are more and more in demand. First are those agencies which enforce regulations and define standards relating to protection of the environment and the industry which must prepare various environmental impact statements and develop means to meet the standards established by the various agencies. Second are the Native groups, which have received large amounts of money and land under the Alaska Native Claims Settlement Act (1971), which play an active role in development of the fishing industry in Alaska. A Native group already owns one of the very large fishing companies operating in Alaska and at least two others are in the process of forming, either independently or jointly, their own companies which will eventually employ many of their own people.

Finally, we must recognize the growing importance of recreational fisheries in Alaska. Although detailed statistics are

not available to measure the growth of this industry in the past five years or so, we do know that many tourists come to Alaska for the sport fishing and that the number of tourists have more than doubled since 1972 (180,000 total visitors to Alaska in 1970 compared with 430,000 visitors in 1978 for pleasure only). The first attempt to measure the fishing effort expended annually by the recreational fisheries in Alaska was made in 1978. The records show that in that year (1978), the total fishing days spent by the recreational fishermen in Alaska was 1,197,590, of which 811,127 days, about two-thirds of the total[3], were spent fishing the rivers and lakes. Further, about 15 percent of the freshwater effort was spent by fishermen in the AYK area (i.e., Arctic, Yukon and Kuskokwim drainages). The Tanana River drainage, in the vicinity of Fairbanks, accounts for some 99,919 days of the fishing effort for 1978. The recently established Alaska Cooperative Fishery Unit on the Fairbanks campus has already begun a study of the management of the recreational fisheries on the Chena River, a tributary to the Tanana River.

In 1977, the value of the tourist industry in Alaska was estimated to be in excess of $1 billion, the ex-vessel value of Alaska fishery landings about $350 million, and the estimated value of the recreational fishing industry about $110 million. Very roughly, then, the recreational fisherman in Alaska spends an average of $100 per day for fishing.

These are all valuable, renewable resources and properly developed and managed, will provide an economic base for Alaska for generations to come.

If we take into consideration these new developments in fisheries and fishery related industries in Alaska and the associated demand for university-trained personnel in fisheries, the total enrollment of students in fisheries at Juneau and Fairbanks in the next five years will most likely reach 100 to 150 students, perhaps double or triple the number projected in the original study and report.

[3] Summary of Results of 1978 Sports Fisheries Questionnaire. Alaska Department of Fish and Game, Juneau/Anchorage.

PARTICIPATION IN OTHER FISHERIES PROGRAMS

One of the most gratifying accomplishments of the fisheries program has been the call for faculty of the university to organize and/or actively participate in various meetings, conferences, committees, etc. on fishery matters at the state, national and international levels. At the time of the original study, very few of the people interviewed knew of the fisheries program at the University of Alaska and those who did, associated fisheries with activities of the Marine Advisory Program. The original report stated that "All too frequently, opportunities for combined research and assistance have been lost, or more serious, antagonism and confusion have been created, simply through lack of communication and understanding." Initially, an Alaskan Interagency Fishery Coordinating Committee was formed simply to meet from time to time and exchange information on events, programs and problems of the respective agencies and interests.[4] The committee served the university well in gaining recognition among the various fishery groups in Alaska.

The greatest credit for developing recognition of the fisheries program at the university, however, is due the director and staff of the Sea Grant Program. This group, frequently through their own personal efforts, have encouraged faculty and graduate students to become involved in a number of multi-agency programs, meetings, and other fishery-related activities. For example, the director of the Sea Grant Program was instrumental in gaining membership for the university on the important Scientific and Statistical Committee of the North Pacific Fishery Management Council; for the establishment of a voluntary (but highly successful) fishermen's logbook program for salmon trollers in Southeastern Alaska; for the initiation of a program to develop the teaching of marine science oriented toward Alaska in the elementary and high schools; for sponsoring United States participation in the first four-nation symposium on salmon (South Sakhalin, USSR); and for the university to host the second meeting in Alaska in 1980. Very recently, the director of the Sea Grant Program was named to a three-member group from the United States to develop a multi-nation Pacific International Council for the Exploration of the Sea (PICES). The significant point is that within a period of about four years, the fisheries program of the University of Alaska has advanced from an almost completely unknown program to one of broad recognition by other universities, by state, federal and international fisheries agencies and by the industry.

[4] The Alaska Interagency Fishery Coordinating Committee was composed of the following five members: President of the University of Alaska, Commissioner of the Alaska Department of Fish and Game, Regional Director of the National Marine Fisheries Service, the Governor's Office of Domestic Fisheries and the Chairman of the Senate Resources Committee on Natural Resources.

THE FISHERIES PROGRAM

The 1974 report, recommending "A Program of Training and Education" in fisheries for the University of Alaska, gives the following objectives of the program:

"The objectives of the university's fisheries program are three-fold: (1) to improve the skills of the fishermen, the employees of the fishing companies, and fisheries scientists in order to provide a greater efficiency within the industry and a higher professional competence within research and management agencies; (2) to create a greater interest among Alaskan students to enter fisheries as a skill and a profession; and (3) to contribute to the development of fishery expertise in the United States as a whole by demanding a full curricula in mathematics, the basic sciences and the special subject courses, and by adhering to the highest standards of training. To do this, it is proposed to strengthen the role of the University of Alaska in fisheries training and research by expanding the technical training program..., by establishing fisheries academic curricula for marine and freshwater fisheries, by increasing the monitoring of the ocean environment and relating the environmental conditions to the abundance and movements of fish, and by placing qualified marine advisors in the more important fishing communities...[5]"

The Technical Training Program

Although every attempt was made to establish a two-year technical program in fisheries at the Kodiak Community College with the construction and equipping of two special buildings for fisheries technical training and the employment of qualified faculty, and the encouragement and cooperation from the fishing industry itself, the program failed and has been abandoned. Probably the greatest single factor in the failure of the program was the lack of student housing that would enable the program to be truly statewide in scope.

There were other contributing factors. In 1976/77, when it became apparent that a statewide technical program, as originally envisaged, would not succeed, two courses of action were proposed. First, the community colleges, the local high schools and other adult education programs would be encouraged to offer training in marine and fisheries technology on a local basis, wherever there was a sufficient student demand for such programs. The Marine Technology Program now being offered at the Juneau/Douglas Community College is a good example. The Juneau program offers course work in both boat building and engine fundamentals and repair. In

[5] The role of the University in the Research and Development of Alaskan Fisheries. Part I. A Program of Training and Education. University of Alaska, Office of the President, November 1974: page 8.

addition, the students are required to take courses in seamanship, industrial science and small business management. Certificates are given for proficiency in both marine carpentry or marine engine repair.

The community college at Juneau now plans to expand the marine training programs to include fishing technology with the employment of two fishing specialists. Thus, although the proposed technical training program for Kodiak failed, a very similar program has been developed by the community college in Juneau.

In 1976/77, steps were also taken to reorient the technical training program into a series of short, highly specialized "workshops" that could be offered anywhere in Alaska where there was sufficient demand and interest. These programs are organized by the University of Alaska's Marine Advisory Program with funds from the university's Sea Grant Program. A total of 73 institutes, lectures, seminars, short courses and workshops were given in 1978/79, 63 in Alaska and 10 outside by invitation. (See Table 1.)

The university's Cooperative Extension Service/Marine Advisory Program has also been instrumental in helping to arrange other short courses through the local high schools and other groups. In Petersberg, for example, where courses in electronics and in refrigeration were offered last winter, the several fishermen interviewed were enthusiastic about the courses. One fisherman said that he would gladly take the same course over again should it be offered--there was still much to learn from the course; another fisherman said that what he had learned in the course could easily save him thousands of dollars in repairs at sea and in lost fishing time.

Although this review was not directed toward an evaluation of the technical training program in fisheries by the university, it became very obvious during the numerous interviews with fishermen and others closely associated with the industry, that the present series of short courses offered in the various communities throughout Alaska were especially effective and the program should be continued and expanded wherever there is an adequate demand and interest and, or course, supporting funds.

The Academic Program at Juneau

The 1974 report, recommending "A Program of Training and Education" at the University of Alaska, gave particular attention to the location of the fisheries programs. The report states:

> "Probably because of the remoteness from salt water and the important marine and anadromous fisheries, the curriculum offered for over twenty years at Fairbanks has attracted few students in marine fisheries. Accordingly, a new location should be found."

"...the Auke Bay campus of the University of Alaska in Juneau is almost ideally located for an academic program in marine and anadromous fisheries. It is situated between Auke Lake, Auke Creek and Auke Bay convenient 'natural' laboratories for class use. The campus is adjacent to a major fisheries research laboratory with a large professional staff and an extensive library, and about 10 miles from the main offices of the state and federal fishery agencies. Although Juneau is not a major fishing port, the variety of fish and shell fish from adjacent waters and the processing of seafood products at a local plant are adequate for study."[6]

The fishery program at the University of Alaska in Juneau was initiated in the summer and fall of 1975. Dr. Richard Gard was appointed professor of fisheries in the summer of 1975 and later became coordinator of the fisheries program on the Juneau campus. Dr. Anthony J. Gharrett was appointed to the faculty in 1976 and Dr. William W. Smoker in 1978 as assistant professors of fisheries and Dr. Michael S. Stekoll in 1978 as assistant professor of chemistry. The recent session of the Alaska State Legislature added a position for an assistant or associate professor of fisheries to the university budget for an expert in trawling and/or bottomfish. In addition to the regular faculty in fisheries at the University of Alaska at Juneau, the program calls upon part-time faculty, from the neighboring biological laboratory of the National Marine Fisheries Service to teach three or four of the courses each year. Because of the availability of this source of expertise, the fisheries curricula can offer a variety of highly specialized courses in fisheries, if there is a sufficient demand.

The program was hampered during the first three years by the lack of suitable laboratory and class room space. However, in the fall of 1978, the new fisheries building was completed with three laboratories (viz., biology, chemistry and physics), a large classroom, a library/seminar room, desk space for graduate students, faculty offices, etc. A salt water system is being installed in the research laboratories this summer, in cooperation with the biological laboratory of the National Marine Fisheries Service.

The original plan for phase one of the building called for a three-story structure (i.e., one story partially below ground and two stories above ground). However, because of delays in obtaining property and other factors and the associated increase in construction costs, the present building is only two stories in height, although structurally designed to support the third floor. Phase

[6] Ibid. pp. 18 and 19.

two of the building plan calls for the construction of an L- or semi-L-shaped addition to the present building when the increase in student enrollment and/or research needs justify such an expenditure. The present building lacks space for any significant amount of biological research in fisheries and the chemistry laboratory, which is now located in the basement, should eventually be located on the proposed third floor where there would be better ventilation, making it easier to dispose of noxious fumes. Long-range plans for the development of the Juneau campus call for an addition to the fisheries building within the next five years and would most likely satisfy the above deficiencies and needs.

The increase in the number of students in the fisheries program at the University of Alaska Juneau, since the initiation of the program in 1975, is remarkable. In the fall and spring 1975/76, there were no undergraduate students in the program and six or seven graduate students (M.Sc. in Fisheries). In 1976/77, the number increased to six undergraduate and 13 or 14 graduate students. In 1977/78, the number increased to 12 to 18 undergraduates and 17 to 24 graduate students. In 1978/79, the enrollment further increased to 22 undergraduate and 25 graduate students (see Figure 1).

The growth in enrollment of undergraduate students has been extremely rapid, and there is no indication in the three academic years of data that the number of students is approaching a maximum. Dr. W. Russell Jones, Dean of Southeastern Senior College, is conservative in estimating the growth in the enrollment of undergraduate students in the Juneau fisheries program, pointing out that he would prefer that the number of students increase at a low and somewhat constant rate to allow for a rational expansion of faculty, space and support programs. Dr. Jones' best estimate of the growth rate of the number of undergraduate students in the fisheries program would be about 10 percent per year, with an ultimate (very long-range) goal of a total of 100 students.

Most of the undergraduate students are from Alaska (19 at the present time) and three are from out-of-state. There have been six transfers into the fisheries program from Sheldon Jackson and in general, these students have a fully acceptable background in the lower division, preparatory course work.

In the spring semester 1979, a total of ten courses were offered in fisheries. The number of students per class ranged from 7 to 21, with an average of about 12 students per class. One class (Algology), scheduled for the spring semester, could not be offered because of a lack of students.

As pointed out earlier, the number of undergraduate students do not include students in the first two years of course work at the community college(s) or at Sheldon Jackson. The undergraduate

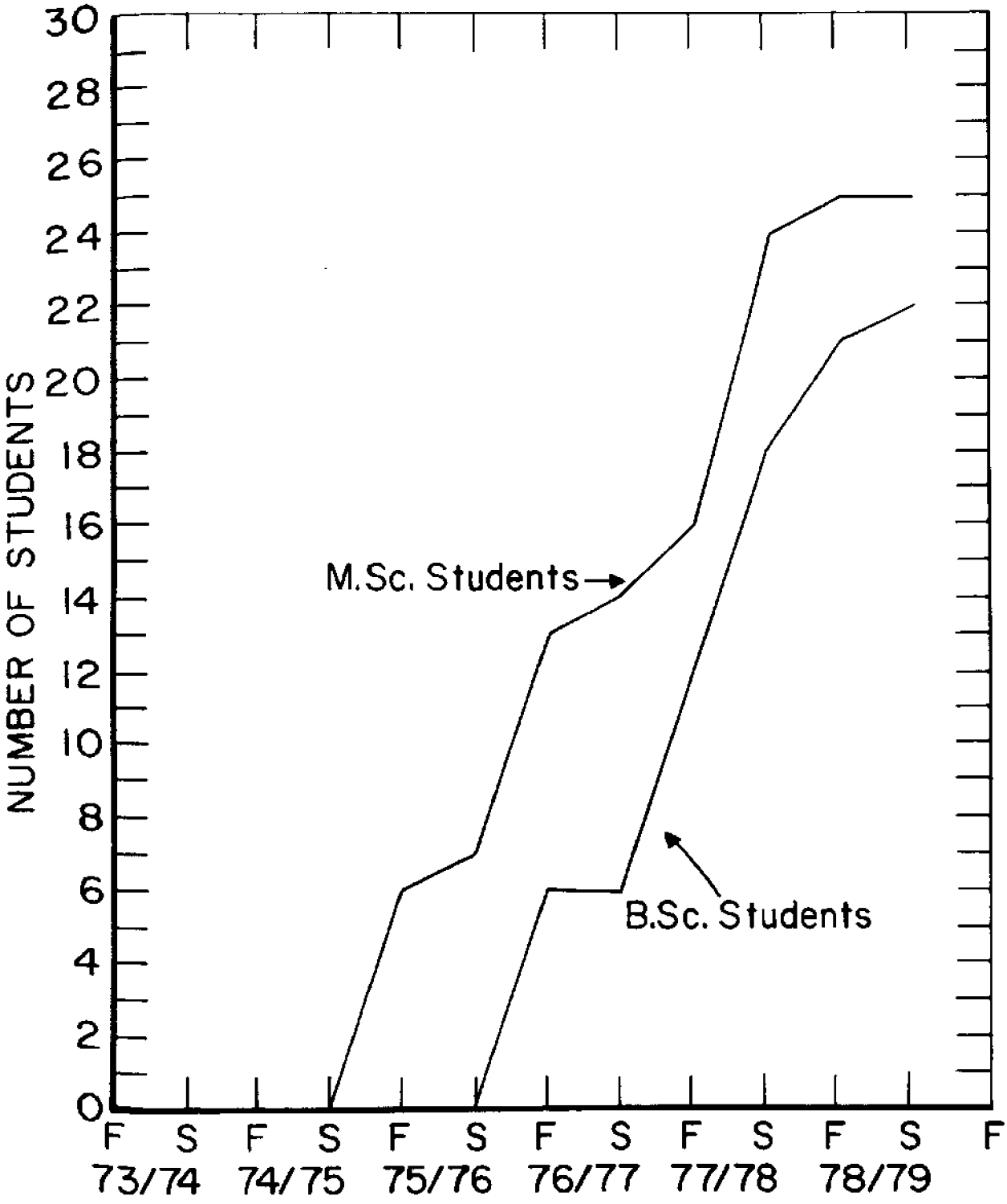

Figure 1. Number of Students in Fisheries Program, University of Alaska

Juneau Campus

students generally enter the senior college in their junior year, at which time they declare their major.

According to Dr. Richard Gard, coordinator of the fisheries program at Juneau, the number of graduate students, in relation to the size of faculty and facilities, has about reached its maximum--perhaps 30 would be the very limit of the number of graduate students that should be accepted in the fisheries program at Juneau.

As noted in the original plan, "Both the Alaska Department of Fish and Game and the Alaska Region of the National Marine Fisheries Service are headquartered in Juneau, making the college readily available to staffs of these agencies for graduate study."[7] Questions arose as to whether or not the graduate program in fisheries might be saturated with graduate students from these two agencies and that the number of students, which would now be dependent upon new recruits or transfers into the Juneau area within these agencies, would decrease quite significantly in the future. This is not the case: of the 24 graduate students accepted into the fisheries program in Juneau, five are from the National Marine Fisheries Service, six are from the Alaska Department of Fish and Game, and most of the remaining 13 are full-time students. Nine of the graduate students are from out-of-state; 15 are in-state. Thus, it is expected that the graduate program in fisheries at Juneau would be maintained at the present, near-maximum, level of enrollment.

Although the fisheries curricula offered at the University of Alaska Juneau appears to be adequate, and would compare favorably with similar curricula required at the other colleges offering degrees in fisheries, there is no basis to judge the quality of the courses and/or the instruction. The real proof lies in the record attained by the individual graduates after they leave the university and time is really too short for this kind of evaluation. However, all of the graduates to date have been employed by the Alaska Department of Fish and Game. According to two senior staff members of the Department, one graduate from the Juneau program is outstanding and the others compare very favorably with graduates in fisheries from the other universities.

The Academic Program at Fairbanks

The 1974 report, which established the fisheries programs at the University of Alaska, gave, in part, the following review and recommendations for the fisheries program at Fairbanks:

> "Since 1954, the College of Biological Sciences and Renewable Resources of the University of Alaska at Fairbanks has offered curricula for Bachelor and Master of Science degrees and an interdisciplinary Ph.D. degree in Fisheries

[7] Ibid, p. 30.

Biology. The university offers the student a variety of courses and faculty assistance, and has many other academic advantages that cannot be met at the other campuses. The undergraduate course work in fisheries is designed to provide the student with a broad education in the basic sciences as well as some specialization in fishery biology during the third and fourth years. The University of Alaska Fairbanks is the only school in Alaska where a student may obtain a Ph.D. in fisheries.[8]

"Although remote from the saltwater environment and the important marine fisheries, the main campus at Fairbanks is located in an area well-known for its recreational fisheries, very substantial personal use fisheries, and a considerable potential for the development of important commercial fisheries for sheefish, whitefish and other freshwater species.

...Taking the above into consideration, a fisheries program should be retained on the main campus at Fairbanks, but reoriented toward research and the management of freshwater fisheries."[9]

The fisheries program at Fairbanks was established in 1960 following the recommendations of a task force appointed in 1959 by Dr. Ernest N. Patty, president of the University of Alaska. Dr. James E. Morrow was appointed to the faculty in 1960 in the field of taxonomy and fishery biology. Dr. Morrow remained with the university's fisheries program until retiring in 1975. In 1967/68, Dr. Jack M. Van Hyning was appointed to the faculty as a specialist in population dynamics and remained with the university for about two years. Subsequently, Dr. R. T. Cooney and other regular members of the university's faculty have taught various courses in fisheries and fishery-related subjects.

After adoption of the new fisheries program in 1974/75, an attempt was made to initiate the freshwater fisheries program in the fall of 1975. The position vacancy was announced in the spring of 1975, but no suitable applications were received. To fill the vacancy, Dr. James Andreason of Oregon State University served as a guest professor in fisheries during the fall semester, 1975. The position was re-announced early in 1976, and Dr. Willard E. Barber was selected to fill the vacancy as assistant professor in

[8] This statement was not quite correct. The first fisheries courses were offered at the University of Alaska in 1954, but the various degrees in fisheries were not given until 1960.

[9] The Role of the University in the Research and Development of Alaskan Fisheries. Part I. A Program of Training and Education. University of Alaska, Office of the President, November 1974, pp. 37 and 38.

fisheries. In 1977, Dr. Mark W. Oswood was appointed assistant professor in aquatic biology to fill the vacancy left by the retirement of Dr. James Morrow but the position was transferred from fisheries to the biological sciences program, representing some loss to the fisheries program.

The 1974 report also recommended the establishment of an Alaska Cooperative Fishery Unit, as follows:

> "The university should initiate action as soon as possible to establish an Alaska Cooperative Fishery Unit on the Fairbanks campus with funds to support graduate student research. Cooperative units have been established at a number of the major universities in the United States and have played an important role in the development of graduate students interested in recreation fisheries and in the application of academic study to field problems."[10] (Note: Cooperators are the Bureau of Sport Fisheries and Wildlife (U.S. Department of Interior), Alaska Department of Fish and Game, and the University of Alaska.)

After a great deal of effort by the university and the various agencies, a cooperative agreement was signed in January 1978 which established the Alaska Cooperative Fishery Unit on the Fairbanks campus. The unit leader, Dr. James B. Reynolds, is well qualified in freshwater fisheries. He received his Ph.D. from Iowa State University--a leading university in education and research in freshwater fishery ecology and management. The assistant unit leader is Stephen L. Tack, who has an M.S. from the University of Alaska and research interest in ecology and management of stream fish in interior Alaska. These men have exactly the type of background and interest envisaged in the recommendations given in the 1974 report.

The cooperative unit will receive a second assistant leader in 1979 and is further strengthened by two cooperators, Drs. Barber and Oswood, from the university and a secretary.

The unit has four major objectives: Fisheries research, graduate study, technical assistance to other agencies and extension service to the public in general. It should be noted that objectives of the Cooperative Fishery Unit are almost identical to those of the Sea Grant Program, although much smaller in scale. The unit brings to the Fairbanks fisheries program an additional three faculty members and $25,000 in research funds for graduate students. In addition, the unit has been given $10,000 for use in establishing a permanent office on the Fairbanks campus and is negotiating several research contracts for work in freshwater fisheries, some in excess of $100,000.

[10] Ibid, p. 43.

Since adoption of the fisheries program in 1975, the University of Alaska Fairbanks has been unable to find appropriate and adequate space for the faculty, for classrooms and laboratories and for research in fisheries. The offices, in general, are located in laboratories. This is not only inefficient for offices but a waste of valuable laboratory space. There is an obvious lack of storage space; field gear, equipment and other materials were seen in the offices and the laboratories, exposed and under questionable control. Some laboratories are reported to be shared by both faculty and students. Most serious, however, is the scattering of the fisheries program in several buildings on campus, offices separated from classrooms and laboratories, and little semblance of a coordinated, unified program. There have been numerous requests for space by faculty in the fisheries program. The most recent request, (Harbo, 1979)[11] for a block of rooms in the Arctic Health Research Center, would provide an almost ideal space arrangement for the fisheries program and would eliminate most, if not all, of the deficiencies and problems noted above.

The number of students in the fisheries program at the University of Alaska at Fairbanks averaged between 18 and 22 prior to the adoption of the new fisheries curricula. In 1975/76, the number of students, graduate and undergraduate, totaled 25 for both fall and spring semesters; in 1976/77 the number of students increased to 31 and 32, in 1977/78 decreased to 27 and 30, and in 1978/79 increased again to 34 and 32.

The growth in the number of undergraduate students was greatest between 1975/76 and 1976/77--from 19 and 20 to 24 and 25, and has continued to increase (20 to 26) from 1976/77 to 1978/79.

The number of graduate students in fisheries increased from three or four prior to initiation of the fisheries program in 1974/75 to a total of eight in 1978/79. It is most significant to note, however, that 11 or 12 graduate students will be accepted in the fall of 1979, a direct result of the establishment of the Alaska Cooperative Fishery Unit on the Fairbanks campus. In addition to the above, the cooperative unit has received an additional 11 letters from prospective graduate students in the arctic/freshwater fisheries program at Fairbanks.

Some thought has been given to indications of future growth based on data available on student enrollment over the past several years. The trend shown in Figure 2 indicates an increase of about two undergraduate students every three years, or an average growth rate of about 3 percent per year. This, or even a higher rate of growth, would be expected to continue in the future due to the general development of Alaska, the increased recognition of the

[11] Memorandum from S. J. Harbo, Chairman, Wildlife and Fisheries Program to John Bligh, Director, Division of Life Sciences, University of Alaska (Fairbanks), May 3, 1979: three pages plus attachments.

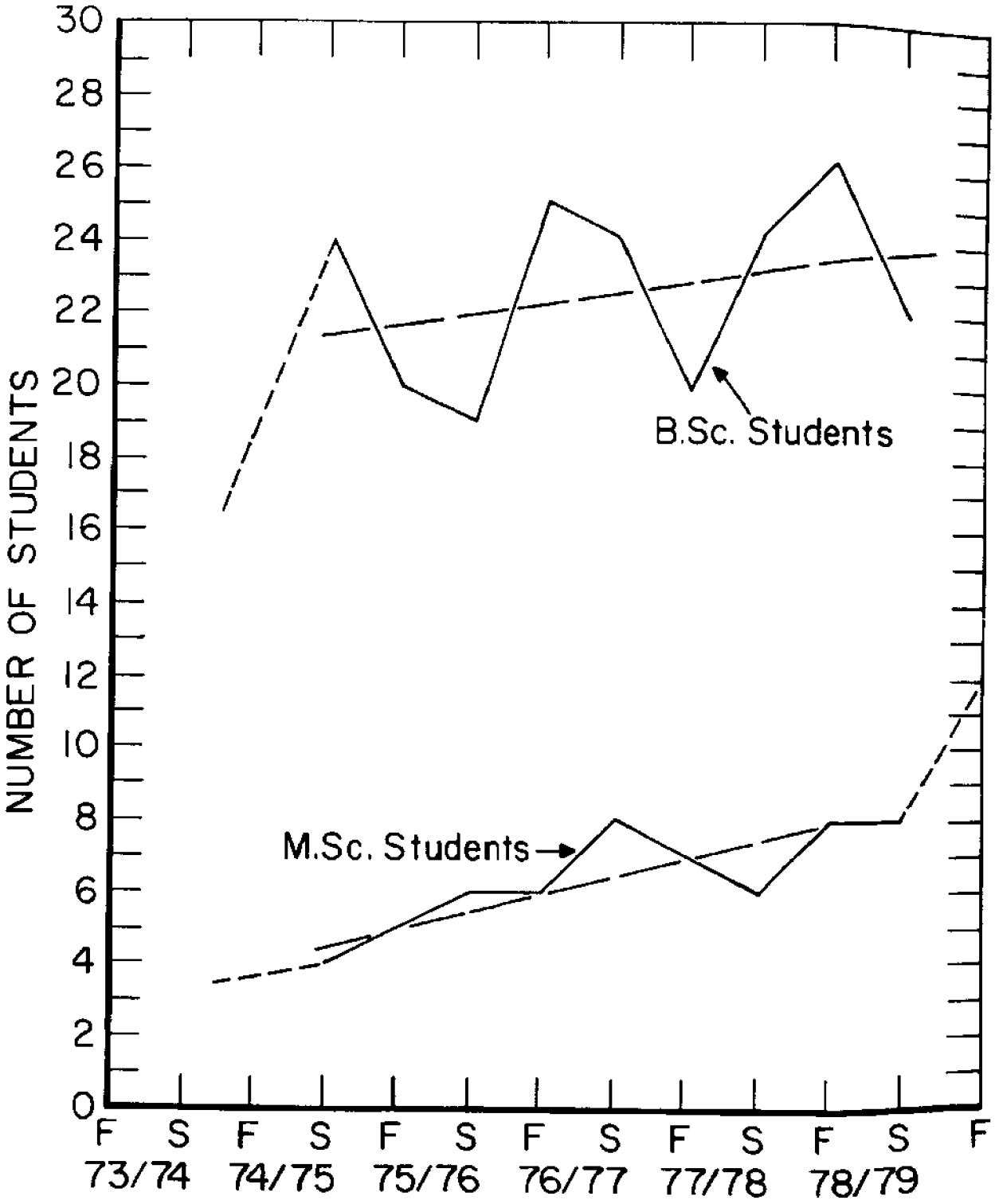

Figure 2. Number of Students in Fisheries Programs, University of Alaska

Fairbanks Campus

University of Alaska's fisheries program in arctic and recreational fisheries, the increasing importance of these fisheries to the economic wealth of Alaska and the necessity of good management practices to maintain the resource.

The expected increase in the number of graduate students in the fisheries program at Fairbanks is much clearer. As pointed out above, the establishment of the Alaska Cooperative Fishery Unit at Fairbanks is already attracting graduate students, and it is expected that the increase in the number of students will continue to be rapid over the next five years until a maximum of 25 to 30 graduate students in fisheries is reached.

Most of the undergraduate students are from Alaska, although statistical data are not immediately available. In contrast, two of the eight graduate students accepted into the fisheries program at the University of Alaska Fairbanks are from Alaska.

In the spring semester of 1979, a total of four courses were offered in fisheries, or an average of about nine students per class.

Again, it is too early to properly evaluate the quality of the students receiving B.S. and M.S. degrees in fisheries from the University of Alaska Fairbanks. They all have found ready employment in a variety of agencies and occupations. The three graduates with B.S. degrees found employment with the Alaska Department of Fish and Game, the U.S. Forest Service and as a commercial fisherman. The four graduates with M.S. degrees in fisheries have been employed by the Alaska State Department of Fish and Game, the Bureau of Land Management and/or the U.S. Forest Service, a consulting firm, and as a candidate for a Ph.D. degree at Scripps Oceanographic Institution (University of California). Evaluation by employers (in this case only one person interviewed from the Alaska Department of Fish and Game) concluded "that the employees appeared to be well-trained and comparable to graduates from other universities."

The Academic Program in Fisheries Oceanography

The 1974 report reviewed the growing need for a program at the University of Alaska in fisheries oceanography and recommended that such a unit be established on the Fairbanks campus. Excerpts from the report are given below:

> "As noted in the review of the marine academic program at the University of Alaska by Alexander and Cooney (1974), the Institute of Marine Science was established by legislative action of 1960 based on the recommendations by University President Patty and four consultants, and for the purpose of training graduate students and conducting research in the marine sciences. Since the state and federal agencies were charged with the responsibilities of fisheries, ...

were better staffed and equipped to carry on fishery investigations, it was felt from the very start that the Institute could better serve the state by turning its attention to the oceanography of Alaskan waters--a very large and complex expanse of water, important to the future development of industry and with only few sporadic observations available at the time. The work of the Institute has been very successful, both in the training of graduate students and in the completion of millions of dollars of contractual research...

Nevertheless, this emphasis on 'pure' oceanography is contrary to the recommendations of the Patty Committee of consultants, which stated that '...the program of the Institute should work in physical, chemical and biological oceanography on a fairly broad base rather than restricting it to a fisheries program, although fisheries research and education should be an important element.

Only in recent years have we begun to realize how critical the ocean environment is to the success or failure of our fisheries... Both the Japanese and the Russian coastal and high seas fisheries make extensive use of certain oceanographic features to locate the best fishing grounds... Unfortunately, the United States lacks both the extensive series of oceanographic data available to the Japanese and Russian fleets and the expertise to apply this information to its fisheries. To better understand this relation between ocean environment and the biology and behavior of marine and anadromous fish, we propose to establish a Fisheries Oceanographic Unit as a part of the new fisheries training program.

Information on fisheries (i.e., movements, areas of abundance and scarcity, expected runs, etc.) can usually be defined quite easily while the oceanographic factors or combination of factors that govern the functioning and movements of the fish are complex and for the most part, unknown. Thus, the fisheries oceanographer should be stationed on the campus of Fairbanks where he will be close to expertise in a variety of oceanographic disciplines and where he will have easy access to oceanographic data collected over the years by the University of Alaska and other institutions...

The fisheries oceanography unit will require a full-time professor and some staff assistance... So far as known, there is no such expertise in the United States and quite probably, qualified individuals may only be

found in one of the important fishing nations--preferably a fisheries oceanographer from Japan or Russia with actual experience in the fisheries of the North Pacific."[12]

In 1975, the Institute of Marine Science arranged for Dr. Tsuneo Nishiyama, professor of the University of Hokkaido (Japan), to come to the University of Alaska for one year as a visiting professor of fisheries oceanography. Dr. Nishiyama has remained with the Institute of Marine Science, doing research on the relation of the ocean environment to the early development of Alaska pollock in the Bering Sea and more recently, on the relation between ocean temperature and the food, growth and age at return (maturity) of salmon in the eastern North Pacific and Bering Sea. In the short time that Dr. Nishiyama has been in this country, he has won the recognition of scientists in Alaska and along the Pacific Coast for his research expertise in fisheries oceanography.

In 1979/80, the academic course in fisheries oceanography (OCN 640) will be offered for the first time under Dr. Nishiyama.

At the present time, two graduate students are working with Dr. Nishiyama in the fisheries oceanography program at the University of Alaska Fairbanks. The program is just developing and it is too early to try to predict the number of students that will eventually be interested in either the course in fisheries oceanography or in the graduate degree program.

The Marine Advisory Program

As noted earlier, no review or evaluation of the Marine Advisory Program has been made in this study. Instead, a separate study is scheduled for July or August of this year (1979).

[12] Ibid, pp. 45 to 48.

THE SEA GRANT PROGRAM

On August 4, 1965, Senator Pell of Rhode Island introduced legislation to establish a National Sea Grant Program. In part, the bill, as originally conceived, provided for:

(1) the establishment of Sea Grant Colleges, particularly where the economy of a region is closely tied to the sea, to play a key role in the development of our ocean resources, develop local centers of excellence in the marine sciences, stimulate the regional economy to reap the harvest from the sea, and provide graduates in the marine sciences that would take a lead in the potential economic boom in oceanography;

(2) the creation of a source of funds for the express purpose of supporting research that will lead to results of a direct and practical nature in the marine sciences. This applied science program is needed in many cases to translate the findings of basic research scientists into results that can be used by the marine industries;

(3) the establishment of a system of extension services designed to bring the latest developments in the marine sciences to the attention of workers in the field, the industries and the interested public, and satisfied by programs originating at a local level; and

(4) the setting aside of such portions of the sea beds and associated resources for those interested in developing aquaculture and other marine activities.

The National Sea Grant Colleges and Program Act of 1966 was signed into law on October 15, 1966.

Probably because of its long history of association with research, universities and grants, the Sea Grant Program was first placed under the administration of the National Science Foundation. Then, in answer to growing pressures to create a single agency for marine conservation and similar activities, legislation was passed in 1970 establishing the National Oceanic and Atmospheric Administration in the Department of Commerce and transferring a number of marine agencies and activities, including the National Sea Grant Program, to this new unit.

The University of Alaska Sea Grant Program has passed through three recognizable periods of financial support. The first period was during the administration of the program by the National Science Foundation, 1966 to 1970. Only one grant for $33,600 was received during this period. The second period, between May, 1970 and October, 1974, was characterized by an increase in funds to some $750,000 in 1971/72 and subsequent decrease to $415,100 in 1973/74.

The third period, coinciding with the adoption of the new fisheries program and reorganization of the Sea Grant Program within the University, shows a continuing rise in funding from the National Sea Grant Program. In addition to the Sea Grant funds, there are matching funds for facilities and other expenses provided by the University of Alaska, a direct appropriation of state funds to the program, and occasional support from other marine-related programs.

Summary of funding for the program is given below:

Period	Sea Grant Funds	Matching Funds
(1968)	$ 33,800	$ n/a
(1969)		
May 70 - Apr. 71	309,200	172,095
May 71 - Oct. 72	750,000	1,418,912
Nov. 72 - Oct. 73	550,000	769,100
Nov. 73 - Oct. 74	415,100	812,336
Nov. 74 - Oct. 75	575,000	916,200
Nov. 75 - Oct. 76	559,100	523,100*
Nov. 76 - Oct. 77	740,000	680,000
Nov. 77 - Oct. 78	910,000	849,700
Nov. 78 - Oct. 79	1,050,000	829,300

* Matching funds were reduced to include only those funds directly appropriated to the Sea Grant Program and the Marine Advisory Program in order to reduce administrative costs: It does not represent a decrease in the program.

Information is not available on the request and administration of the first Sea Grant funds received in 1968. Between 1970 and 1974, David M. Hickok served as director of the Sea Grant Program administered jointly with the Arctic Environmental Information and Data Center (Anchorage). In 1974, an independent Sea Grant Program office was established on the Fairbanks campus. Donald H. Rosenberg served as coordinator of Marine Programs and later as director of the university's Sea Grant Program office. The work is divided into two major divisions - research, and education, publications and the Marine Advisory Program. Each division is headed by a project coordinator.

The present staff of the Sea Grant Program office totals 15 and includes secretarial, clerical and editorial positions (in addition to the director and assistant director). The Sea Grant Program employs a marine economist to fill a void in the marine expertise available at the University of Alaska. Dr. Abby Gorham, who was chosen to fill the position, has already made a number of important contributions to the economics of Alaskan fisheries.

As pointed out earlier, the Sea Grant Program office has played a major role in developing many aspects of the fisheries

programs. Probably the majority of the fisheries research now being done by the University of Alaska is financed by Sea Grant funds. The Marine Advisory Program is directly oriented toward assistance to the fishermen and the fishing industry.

In order to make the unit more effective, the Marine Advisory Program was combined with the Cooperative Extension Service in 1974. A central staff was located on the Anchorage campus of the university and marine advisory agents were placed in the key fishing communities. At first, because of dual administrative responsibilities of the Sea Grant Program and the Cooperative Extension Service, some question developed in direction of the Marine Advisory Program (which must meet certain objectives and criteria, and is under the continuing review of the National Sea Grant Program). An agreement was reached, however, between the two units, establishing responsibilities and now, so far as known, the administration of the combined units is operating well and with no perceptible difficulty.

The objectives and recommendations relating to the Sea Grant Program at the University of Alaska were reviewed in Part II of the report on "The Role of the University of Alaska in the Research and Development of Alaskan Fisheries," submitted in draft form in June 1975. The report states:

> "Because of the importance of the marine environment and resources to the State of Alaska, the intent of the National Sea Grant Colleges and Program Act to establish centers of expertise in the marine sciences and to stimulate the development of the ocean resources, and the dominant role the Sea Grant Program has played in the support of marine-oriented research at the university, every effort should be made by the university to attain a higher status within the National Sea Grant Program--first as an institution and later, as a fully qualified Sea Grant College."[13]

The University of Alaska was made an institution in 1976 and is eligible this year (1979) to be considered for Sea Grant College status.

There are many advantages to being designated a Sea Grant College. First, and probably most important, is the professional recognition that the University of Alaska meets high standards of education and research in the marine sciences and marine-related activities being done in the United States. It is quite comparable to being named a fellow in a professional organization or being awarded a Ph.D. by a university. Second, a Sea Grant College is given priority in receiving Sea Grant funds at a relatively high and stable level. Third, the university will be a member of the

[13] The Role of the University of Alaska in the Research and Development of Alaskan Fisheries. Part II Organization of Research. University of Alaska, Office of the President, June 1975. p. 14. (In draft only).

"club" and as such, will have a stronger voice in determining national policies relating to the teaching and research in the the marine sciences. Fourth, the University will no longer be subject to the rather demanding annual "site reviews" by the national Sea Grant office, which are both costly and time consuming. Finally, the university will be considered for special kinds of research and assignments for other agencies (e.g., the U.S. AID Program, etc.).

ORGANIZATION

The 1974 report recognized that "the most difficult and certainly the most controversial aspect of the study concerns the overall organization of the fisheries program of the university and the selection of various sites."[14] After considering the history of the previous attempts to develop a fisheries curricula at the University of Alaska and other factors, the study recommended the following:

> "...Because of the extent of Alaskan waters, the distances involved, the differences in the environment, and the variety of problems in its fisheries, it is felt that the state would best be served by dividing the fisheries program of the university into several units and by locating each unit in an area most favorable for the conduct of a specific function.
>
> To prevent misunderstanding, the fisheries training program should not be considered as five independent curricula.
>
> It is still a single program but located on the different campuses and offering five different 'majors', with standardized courses and a continuing exchange of faculty and students between campuses. In charge of the program will be a coordinator of fisheries programs, attached to the president's office and with duties to include various problems of coordination, approval of fisheries curricula, evaluation of levels of instruction, and the periodic convening of meetings of faculty from all units of the fisheries program to discuss the program and recommend change. The academic administration of the local program will be the direct responsibility of the provost of each region."[15]

It should be noted that the organization of the fisheries programs recommended in the 1974 report were based upon the then existing centralized structure of the university as a whole.

Decentralization of the University's Organizational Structure

On May 16, 1975, President R. W. Hiatt announced a major restructuring of the principal administrative offices of the University of Alaska. The purpose of the reorganization was to strengthen the administration of the academic and related programs at the urban campuses at Fairbanks, Anchorage and Juneau and to better serve the

14 The Role of the University in the Research and Development of Alaskan Fisheries. Part I. A Program of Training and Education. University of Alaska, Office of the President, November 1974: p. 12.

15 Ibid., pp. 12 and 13.

rapidly expanding post high school education programs in the rural Alaskan communities. Changes involved the elimination of two vice-president positions, the creation of a new position of vice-president for rural education, and the designation of chancellors to head the three urban campuses.

The new organizational structure for the Fairbanks campus became effective on June 10, 1975. The six former university research institutes and six colleges at Fairbanks were combined into three colleges, and all education and research responsibilities brought together into single units. For example, the new College of Environmental Sciences included the academic curricula for oceanography, wildlife and fisheries, as well as the Institute of Marine Sciences and the university's Sea Grant Program office.[16]

Later, similar reorganizations took place on the Anchorage and Juneau campuses.

Integration of the Academic and Research Programs

One of the major objectives of the reorganization of the university was to integrate more closely the academic and research programs on each campus., This was stated as follows:

> "3. Structured in this manner, a more effective balance between teaching and research will be inevitable, because of the closer contact between hitherto separate research units and teaching departments. A single, over-all administrator can thus utilize faculty, staff and other resources to achieve the most effective balance for teaching, research and public service."[17]

The relation of this policy to the fisheries program was outlined in the 1975 report on the "Organization of Research":

> "Major objectives of a university in research in fisheries and the other marine sciences should be (1) to train students in the conduct and evaluation of research, (2) to provide the opportunity for faculty members, normally engaged in teaching but highly trained in a variety of specialized subjects and aware of the most recent advances in science and technology, to apply this knowledge to the greatest benefit of all, (3) to maintain the highest standards of research as a model for students and worthy of the scientific discipline of the university, (4) to create an environment for study, sensitive to the needs of the people but relatively free from the exigencies of political pressures, (5) to offer research services to individuals and organizations not normally available through

[6] Memorandum. Structural Organization for the Campus. From President R. W. Hiatt to Faculty and Staff, University of Alaska, Fairbanks. June 10, 1975.

[7] Ibid., p. 1.

governmental or private agencies, and (6) to work in concert with all scientists in order to expedite the advance of knowledge, minimize needless waste of effort, and direct the wise use of funds granted for research programs.

Research at the University of Alaska is conducted either by private arrangement with an individual student or faculty member or, more usually, through one of the twenty-one research institutes, laboratories or offices located on the Fairbanks, campus. All have provided an opportunity for research and fifteen of the twenty-one have some relation to the marine sciences."[18, 19]

Both the 1974 and 1975 studies recommended that there be a close relation between the academic and research programs in fisheries at the University of Alaska, that academicians undertake research as their teaching load permits, and that research scientists, technicians, staff of the Marine Advisory Program, etc. teach college or university level courses from time to time as their work loads permit. The integration of the two disciplines is stimulating to the individual and valuable to the student. This policy should be continued.

The intent of the directive becomes important when we examine the organizational structure of the university as a whole and the fisheries program in particular. Simply stated, the higher the level of separation between teaching and research, the greater the gap between the two disciplines. Thus, to be most effective, the academic and research programs should be administered at the division or college level, not in the chancellor or president's offices, unless the duties avoid actual administration of the programs and are restricted to one of over-all coordination.

Thus, the initial recommendation made in the 1974 report, proposing that "...In charge of the program will be a Coordinator of Fishery Programs, attached to the President's Office,...", is no longer applicable. Instead, to be more effective, the fisheries program on the Fairbanks campus should be made a major component of a division within the College of Environmental Sciences.

Reorganization of the Fisheries Program at Fairbanks

In order to make the fisheries program on the Fairbanks campus fully competitive with its counterpart on the Juneau campus, it must be given a prominent role within one of the divisions of the

18 The Role of the University of Alaska in the Research and Development of Alaskan Fisheries. Part II. Organization of Research. University of Alaska, Office of the President, June 1975: pp. 13 and 14.

19 Note that the figures quoted are for the year 1973/74 and there have been subsequent changes. The number of laboratories and institutes on the Fairbanks campus at the present time total 17, with 15 related to the marine sciences.

College of Environmental Science. In making this review of the fisheries programs at the University of Alaska, the strength of the fisheries program in the organizational structure of the University of Alaska Senior College on the Juneau campus becomes immediately apparent. The fisheries program at Juneau occupies divisional status and is one of the two major programs of the senior college as a whole. Accordingly, the program receives prime attention from the administration for its needs for funds and faculty.

On the Fairbanks campus, the fisheries program is submerged among perhaps fifty or more competing programs and activities and its needs for funds, facility, space, etc. are soon lost among the requests of the larger, more prestigious and longer established programs.

One proposal would be to form a new division within the College of Environmental Sciences--a Division of Wildlife and Fisheries, consisting of separate curricula and degree programs for wildlife and fisheries, the Cooperative Wildlife Research Unit and the Cooperative Fishery Research Unit. Following this organizational structure, the College of Environmental Sciences would have four divisions: Life Sciences (six programs), Geosciences (five programs), Wildlife and Fisheries (four programs) and Marine Sciences (three programs). This form of organization would follow the common organization within the state and previous federal agencies (i.e., the Alaska Department of Fish and Game, the Washington Department of Fisheries and the Washington Department of Game (including sports fish), the former U.S. Bureau of Commercial Fisheries and the U.S. Bureau of Sports Fisheries and Wildlife, etc.) and only indicates the close relationship between the management and interests of wildlife and the sports fisheries. A combination of these two programs was proposed in the 1974 study.

An alternative organizational structure would be to include fisheries within the Division of Marine Sciences, thus avoiding the very indistinct separation between limnology and oceanography and between the freshwater, marine, anadromous and eurohyaline fishes. The theory and methodology of the marine and freshwater sciences are basically identical. The marine programs (i.e., the Institute of Marine Sciences, the Sea Grant Program, etc.) are well-established on the Fairbanks campus and well-funded. There would be no real conflict between the Fairbanks and Juneau fisheries programs if the programs are properly defined as "undergraduate and graduate degree programs in fisheries with emphasis on marine or anadromous fishes" or "undergraduate and graduate degree programs in fisheries with emphasis on arctic, freshwater or recreational fishes." (See pages 44 to 46 for further discussion of the scope of the fishery programs on the two campuses.)

The present Division of Marine Sciences, renamed the Division of Aquatic Sciences (or similar title), would probably afford the

best environment for the fisheries program at Fairbanks to develop and grow. However, if this transfer was made, a very close liaison should be established with the wildlife program, or the wildlife program should also be transferred into an expanded Marine Sciences Division.

Scope of the Programs at Fairbanks and Juneau

From the very beginning of the fisheries program at the University of Alaska in 1974/75, questions have arisen regarding the scope of the two programs proposed for the Juneau and Fairbanks campuses, that is the division between the marine and anadromous fish program proposed for Juneau and the arctic freshwater fishery program proposed for Fairbanks. It was recognized and agreed during the first year of the new program that the fisheries curricula to be taught on both campuses should include both freshwater and the marine and anadromous fisheries. However, it was further decided that the subject matter should emphasize problems of fisheries in one or the other fields but not restricted to such examples. This decision is correctly defined in the Juneau catalogue: "The Division of Natural Sciences presently offers undergraduate and graduate degree programs in fisheries. Emphasis is on marine and anadromous fishes..."[20]

From the review of the fisheries programs at Juneau and Fairbanks, it is obvious that there is a sufficient student interest to continue the fisheries programs on both campuses. The enrollment in both programs is increasing and the numbers of students per class exceed the critical mass established by the university. The elimination of one of the programs would not mean that the students would automatically enroll in (or be absorbed into) the program on the other campus. There are many other factors that contribute to a student's decision to attend one or another university or college. Therefore, we are not looking at a competition for students per se between the two campuses but only, to some degree, a competition for funds for equipment, facilities and the costs of general administration.

No change is proposed in the offering of the fisheries programs on both campuses, as long as the programs meet the criteria of critical student mass for the necessary classes or curricula.

Similarly, although emphasis on the marine and anadromous fisheries program at Juneau and the arctic, freshwater and recreational fisheries program at Fairbanks should be retained because of location and demonstrated success, any restrictions on offering any course in fisheries and oceanography at any campus should be completely removed. The decision to offer a course should be made by the chancellor of a campus and based upon the apparent student demand, the availability of qualified faculty, facilities and supporting funds, and, of course, meet the over-all standards and criteria established by the university.

20 University of Alaska Juneau: Academic Catalogue, 1978-80. University of Alaska, Juneau, January 1, 1979: p. 52.

Recently, a similar problem arose in offering a course in marine biology at Fairbanks. Marine biology is not fisheries biology, nor does a marine biologist normally have the necessary training to be a fisheries biologist. The same differences are true between marine biology, biological oceanography and fisheries oceanography. These are separate disciplines and should not be confused. Again, the recommendation is the same as given above: "The decision to offer a course should be made by the chancellor and based upon curricula need and student demand..."[21]

And the same rationale would apply to the kinds of research that might be done on the respective campuses: If there is a demand for a certain kind of research, be it freshwater, marine, arctic or whatever, and if there is expertise and interest by a faculty member or a graduate student to do that kind of research, then they should be allowed to do the work and should not be restricted by the definition of the fisheries program at one or the other campuses. For example, this means that Dr. Gard, who has considerable expertise in whales, should be allowed to work on whales without reservation, and the same would be true for Dr. Cooney, who has done considerable work on salmon fingerlings in estuaries, or Dr. Barber, who is interested in studying the movement of salmon through estuaries, or Dr. Nishiyama, who has done considerable research on the relation of ocean temperature to growth, food, age at maturity and mortality of salmon in the marine environment. The choice would depend upon the individual's professional ability to design and carry out the research in the most conclusive and efficient way. To not follow this policy would be a waste of professional talent.

Administration of the Central Programs and Institutes

The administration of the central programs and institutes should remain (as proposed by memorandum of June 10, 1975) under the chancellor of the campus (or region) where headquartered. The inter-campus scope of these programs, however, should be recognized by all chancellors. They would encourage participation of their faculty and students in the programs and activities, and they would offer facilities and other assistance to the participants in the central programs and institutes. Conflicts, should they arise, would normally be resolved on a chancellor-to-chancellor basis and only rarely be taken to the president's office for decision.

Normally, as indicated by both Dr. Cutler and Dr. Paradise, coordination and operational detail would be delegated to members of the faculty and students participating in the programs and carried out in an informal way. Wherever necessary or appropriate, arrangements involving the use of facilities or equipment, or payment of certain expenses, etc., would be documented by an exchange of correspondence between the participants, but simple and informal, and with a minimum of paper work.

[21] See page 25, third paragraph.

Consolidation of the Fisheries Programs

Since the initiation of the new fisheries program in 1974/75, there has been considerable agitation to move the undergraduate fisheries program from Juneau to Fairbanks and to make the Juneau program one for graduate students only. The arguments favoring such a move centered around the availability of faculty and facilities that would provide the undergraduate students with a more adequate training in the basic sciences, mathematics, etc. These sources predicted that the Juneau program could not support an adequate critical mass of students in the undergraduate program.

This prediction simply has not proven true. The Juneau program has been able to provide all of the basic courses needed for fisheries and at class levels above the critical mass set by the university. Further, the Juneau program is receiving upper division students from the neighboring Sheldon Jackson College in Sitka to supplement their enrollment.

A similar proposal, in reverse, was offered during the recent interviews. It was that all marine programs on the Fairbanks campus (i.e., the Institute of Marine Science, the Sea Grant Program, the curricula in oceanography, etc.) should be moved to Juneau to establish, in effect, a "Little Woods Hole" or a "Little Scripps." This proposal has interesting possibilities, but the implications and complications of such a move are extremely complex and go far beyond the scope of this study. The proposal has not been seriously considered here.

In summary, no consolidation of fisheries programs is recommended at this time. Both programs appear healthy and are attracting a growing student interest and enrollment.

CONCLUSIONS AND RECOMMENDATIONS

This study has been made at the request of the director of the Alaska Sea Grant Program in order to provide guidance for the administration of the Sea Grant Program within the university and to recommend changes, where appropriate, in the new fisheries program established by the study of 1974/75 and now, after a period of four years, in need of some revision.

The growth in the fisheries programs at Juneau and Fairbanks has been remarkable. The number of students in fisheries at Juneau has increased from zero in 1974/75 to a total of 47 in 1978/79 (22 undergraduate and 25 graduate students). The fisheries program at Fairbanks was established in 1960, and the number of students enrolled in fisheries at Fairbanks increased from a total of 18 to 22 before the establishment of the new program in 1974/75 to about 32 to 34 in 1978/79 and an expected enrollment of about 42 in 1979/80.

Although the technical training program proposed for Kodiak was not successful, a similar program is developing at the community college in Juneau. Certificate programs are now offered in marine carpentry and marine engine repair, along with a two-year curricula in marine technology.

In addition to the above, failure of the Kodiak program prompted the establishment of a series of short-term courses sponsored by the Marine Advisory Program under the Sea Grant Program. In 1978/79, a total of 73 "workshops" were conducted throughout Alaska and by invitation, in several outside locations.

There are also a number of training courses offered in fisheries related subjects through the local high schools and other educational programs.

The Fisheries Oceanography Program proposed for Fairbanks is just getting started. Dr. Tsuneo Nishiyama, a former professor at the University of Hokkaido (Hakodate), is heading the program. Dr. Nishiyama now has two graduate students working with him and will offer the first formal course in fisheries oceanography (OCN 640) in 1980/81.

The Marine Advisory Program has increased from a staff of five to eight, plus secretarial assistance, or the addition of about one staff member per year. The Marine Advisory Program is scheduled for an independent review in July or August of this year and has not been studied in any detail at this time.

The Sea Grant Program has provided valuable support to the fisheries curricula and research programs on the various campuses, plus the Marine Advisory Program and the several educational and training programs, the publication of "Alaska Seas and Coasts" and "Alaska Tidelines," the provision of grants and fellowships to undergraduate and graduate students, and other marine-related

activities. One of the objectives of the 1974 study was to attain Sea Grant College status for the University of Alaska. The Sea Grant Program was given Institutional status in 1976 and is eligible this year (1979) for designation as a Sea Grant College.

The organization of the fisheries programs within the present university structure has been examined in some detail and the following recommendations offered:

1. The fisheries programs should no longer try to function as a central program but should be administered independently by the chancellors of the respective campuses.

2. In order to effectively merge the academic and research programs of the University, the programs (i.e., the institutes and similar organizations and the academic programs) should be administered at the division or college level, not in the chancellor's or president's office, unless the duties avoid actual administration of the programs and are restricted to one of overall coordination. Thus, the initial recommendation made in the 1974 report that a coordinator of fisheries programs attached to the president's office is no longer applicable and instead, the fisheries program on the Fairbanks campus should be a major component of a division within the College of Environmental Sciences. The fisheries program at Juneau is already a major component of the Division of Fisheries and Natural Sciences in the senior college.

3. The fisheries program on the Fairbanks campus is buried among a number of academic programs both within the University of Alaska Fairbanks and within the College of Environmental Sciences. It is proposed that either a new Division of Wildlife and Fisheries be formed within the College of Environmental Sciences or that the fisheries program and the associated Alaska Cooperative Fisheries Research Unit be placed within the existing but expanded Division of Marine Sciences. However, if this transfer is made, a very close liaison must be maintained with the wildlife program, or the wildlife program should also be transferred into an expanded Marine Sciences Division.

4. There is a sufficient student interest to continue the fishery programs on both campuses, and they should be continued as long as the programs meet the criteria of critical student mass for the necessary classes or curricula.

5. Although emphasis on the marine and anadromous fisheries program at Juneau and the arctic, freshwater and recreational fisheries program at Fairbanks should be

retained, any restrictions on offering courses in fisheries and oceanography at any campus should be completely removed. The decision to offer a course should be made by the chancellor of a campus and based upon the apparent curricula need and student demand, the availability of qualified faculty, facilities and supporting funds, and, of course, meet the overall standards and criteria established by the university. The same rationale would apply to the kinds of research that might be done by the faculty or graduate students on a campus.

6. Administration of the central programs and institutes should remain under the chancellor of the campus (or region) where headquartered, but the operational detail should be worked out informally between the faculty or students participating in the program with a minimum of paper work.

7. Numerous suggestions have been made to consolidate the undergraduate fisheries programs at Fairbanks in order to provide the students with better undergraduate training. From an examination of the records, the Juneau fisheries program is flourishing, the undergraduate students are receiving the necessary basic courses, and there is no real reason to consider a transfer of programs at this time.

There has also been a suggestion that all marine programs be transferred to Juneau to form, in effect, a marine center at Juneau. This proposal has interesting possibilities, but the implications and complications are extremely complex and go far beyond the scope of this report.