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causes of the decline came from animals collected in the late 1970s and early 1980s. For example, the report from the April, 1990 U.S.-U.S.S.R workshop on Steller sea lions states: "... some of the most enlightening information on the possible causes of the decline, and how the decline is affecting population structure, came from collections of animals in the 1970s and 1980s by the ADFG. In those studies, changes in physical size of individuals of known age and possible changes in age distribution and pregnancy rates were observed. These types of data are important in considerations of the factors affecting the population and its relative health. Collections may be required in the future if adequate samples cannot be obtained from commercial fisheries observer programs or through other sources." (Anonymous, 1990, p. 9).

Decisions to employ lethal sampling techniques should address the possible impact of sampling on the local population, the deficiencies of any alternative non-lethal collecting techniques, and the significance of the data to be derived from the collection.

43. Develop methods for non-lethal sampling

Whenever possible, non-lethal sampling should be used to monitor health, condition, and vital parameters. In addition to existing methods, efforts should be made to develop or adapt techniques not yet tried on Steller sea lions. It is recognized that some techniques (e.g., chemical immobilization) may pose a risk of mortality. Such incidental mortality must be accepted under the same criteria set forth for lethal sampling: the potential cost of the technique should not exceed the anticipated benefit to the species from knowledge derived from the sampling technique.

A variety of studies require temporary restraint of animals. The large size and vigilance of Steller sea lions may limit the usefulness of some capture and restraint techniques developed for smaller or more approachable pinnipeds. Although few Steller sea lions are currently maintained in captivity, the possibility of research with captive animals should also be considered.

The increasing use of telemetry devices and other techniques to sample free-ranging individuals should be given high priority, because these techniques minimize potentially disturbing interactions with the animals and provide data from animals under the most "natural" conditions possible.

431. Develop and evaluate capture techniques

In recent years, there has been a great deal of work done on techniques for capturing and immobilizing marine mammals. Techniques for chemical immobilization of Steller sea lions and closely related otariids have been investigated (Loughlin and Spraker, 1989; Boyd et al., 1990). However, some mortality does occur even with the best methods currently available, so efforts to improve techniques should be continued. Emphasis on improving techniques should not be taken to imply that special studies need to be conducted for that specific purpose. It should be possible to do most development and evaluation of new techniques during research conducted for other purposes (e.g., Section 613).

432. Develop indices of condition

Various measurements may be used singly and in combination to evaluate the physical condition of individual sea lions. Methods currently in use include body weight (compared to age or length), length/girth ratios, and directly measured blubber thickness (Calkins and Goodwin, 1988). In addition, there are recently developed techniques for assessing condition that may be more suitable for some situations or that can provide measures particularly sensitive to certain aspects of condition not reflected by body size and subcutaneous fat stores (e.g., Huntley et al., 1987). These include, but are not limited to, isotopic tracer techniques for assessing body composition and metabolism, ultrasound and electrical conductivity measures of body fat, measures of lactation energy exchange, and a variety of blood chemistry measures associated with specific aspects of condition (e.g., anemia, immune response, ketone bodies, humoral enzyme levels). Expert advice on this field should be solicited and a complete plan for condition assessment should be developed based on multiple indices of condition. Data on condition indices will most likely be collected at intensive study sites described in Section 44. Samples from dead animals will be obtained by activities described in Section 41.

44. Conduct studies on rookeries

Observational studies of sea lions on land can yield a wealth of data that can be used to evaluate status and condition. Data should be collected as part of a complete program at selected intensive study sites. The program at intensive study sites should include population monitoring efforts (Sections 441 and 442), monitoring of mortality specified in Section 51, sampling from dead animals described in Section 41, and collections of stomach contents and scats described in Section 611. In addition, observations of certain behaviors on the rookery can also serve as indices of health, condition, and vital parameters. For example, copulations over the course of the breeding season can indicate the relative proportion of nulliparous females being recruited into the local breeding population because these females tend to copulate early in the breeding season (Gisiner, 1985). Average tenures of territorial males may be reduced in comparison to other years or other areas if males are in poor condition, since males rely on stored fat reserves while on a territory. Other observational data which are relatively easy and inexpensive to obtain might serve as an index of individual or population condition values that are difficult to measure directly because they require lethal collection or handling of large numbers of animals.

Intensive studies should be undertaken each year for the next 5 years at sites in Oregon (Rogue Reef), southeast Alaska (Forrester Island), the Gulf of Alaska (Marmot Island and Chirikof Island), and the eastern Aleutians (Ugamak Island). Because of the expense and logistic difficulties of transporting and maintaining camps in the central and western Aleutians, intensive studies for this area should be conducted every 3 years (perhaps 1992 and 1995). Suggested study sites in the central and western Aleutians should include at least two of the following: Seguam Island, Kiska Island, Buldir Island, and Agattu Island. Choice of specific sites will depend on a number of variables, including, but not limited to, access to adequate numbers of animals, year-to-year stability of the site, potential for disturbance to animals or disruption of other research activities, and requirements of data comparability between sites or between years. Selection of specific sites should therefore be done by qualified persons who are familiar with the sites and other relevant factors.

441. Determine sex and age classes of animals on shore

Daily or weekly counts broken down into age/sex classes should be made by experienced observers at selected index sites during the summer breeding season (approximately mid-May to mid-August). If field camps are maintained outside the breeding season, counts should continue to be made to provide information on seasonal variation in use of sites. Frequent counts by experienced observers approach the accuracy of aerial photographs. Such counts have been used to verify aerial counts and as a source of data if aerial counts are not feasible. The age/sex composition of groups on the study site provide site-to-site and between-year comparative data on male:female ratios, female:pup ratios, and female:juvenile ratios. These data serve as indicators of possible changes in individual condition, sex-related differences in survival, fecundity, and other life history parameters. More intensive follow-up studies can then be focused on potential problems revealed by the dynamics of age/sex classes at intensive study sites.

Observations of mother-pup attendance patterns should also be conducted. Female attendance patterns in closely related otariids have been shown to be correlated with female condition and food availability. For example, during the 1983 El Niño climatic disturbances, female attendance patterns and pup condition in California sea lions and Galapagos fur seals were altered by climatically induced food shortages (Trillmich et al., 1986; Ono et al., 1987). Data on attendance patterns may also be obtained from telemetry packages placed on breeding females (see Section 613).

Data on mother-pup attendance patterns should be combined with lactation energetics data (Section 445) to provide a more complete picture of the foraging ecology of reproductive females. These data are important for data compilations and models of foraging ecology in Sections 612, 614, and 62.

442. Determine rates of pup production and mortality

Currently, counts made by researchers walking through rookeries and displacing the adults are probably the best measure of pup production. Such counts are usually very accurate and may yield numbers of pups 30% or more higher than counts made with adults present. The activity results in some disturbance and potential pup mortality, and for that reason this type of pup count is done infrequently at a limited number of sample sites. Some counts may be conducted in conjunction with pup tagging or marking efforts that may also temporarily displace adults.

Section 322 describes a coordinated program of alternate-year pup counts at selected sites in Alaska. The sites listed for regular, biennial pup counts include the intensive study sites; activities at the intensive study sites should therefore be coordinated with the needs of Section 322. Additionally, at intensive study sites, repeated counts of pups should be conducted without disturbing the animals, as part of the daily or weekly counts described in Section 441. Such counts, made over the duration of the breeding season, may approach the accuracy of single counts with adults removed, although it might be desirable in the early years of this plan to perform comparison of the two counting methods at some intensive study sites.

Pup mortality (see Section 512) also can be most accurately and easily monitored by a

shore-based observer who examines the rookery daily or weekly throughout the season.

443. Tag and brand pups and adult females

Section 21 also recommends tagging/marking efforts to determine dispersal and seasonal movement patterns of animals from different management units. This should not be taken to imply that there should be two separate, mutually exclusive tagging/marking programs; Sections 21 and 443 simply emphasize different data aspects of a single tagging/marking program. Any tagging/marking proposal should be considered in light of its ability to be coordinated with other activities (e.g., pup counts and field physiology studies requiring animal capture and restraint); its probability of being followed by studies that can make use of the potential data yielded by animals marked to reveal age, sex, place of birth, and individual identity (the types of activities proposed in Sections 2 and 4 of this plan); and the potential impacts of disturbance resulting from tagging/marking activities.

Pups may be tagged in conjunction with counts (see Sections 322, 33, and 342). Females immobilized for attachment of telemetry equipment or other experimental procedures should also be tagged (Sections 445 and 613). There are limitations to the benefits derived from tagging. It is usually difficult, if not impossible, to re-tag animals older than pups. Tag loss and abrasion of identification numbers over time can therefore seriously reduce the effective number of individually identifiable animals. In addition, most tags are difficult to read under normal field conditions, even if they are still in place and possess legible markings. Nevertheless, tags are inexpensive and easy to put on. Color-coded tags can provide data on the rookery of origin of animals sighted at various locations even after the tag markings are worn off. The accumulated tag sighting data can provide information on the extent of dispersion from various sites, the seasonal movements of individuals from a given site, and the relative amount of immigration from one site to other intensive study sites. Such information should be useful in determining stock identity (Section 2) and seasonal use patterns (Section 12).

Branding is more expensive, the equipment is more cumbersome, and marking does not proceed as quickly or easily as tagging. Nevertheless, branding or some other means of producing long-lasting, easily read individual identification should be considered as a means of providing much needed life table data on recruitment and age-specific reproductive rates. Branding pups to indicate rookery and year of birth has produced valuable information even though the branded animals were not individually identified (Calkins and Pitcher, 1982). Pups were branded with individual identification marks in 1987 and 1988 on two beaches at Marmot Island, but one of the beaches was later abandoned by the sea lions as the population declined (Anonymous, 1990) and the marked animals apparently dispersed (although surviving animals may still return to the branding site or other monitored sites as they come of breeding age).

444. Monitor status of tagged animals

Long-term studies of tagged, branded, or naturally marked animals can be used to estimate such vital parameters as age of first reproduction, age specific pup production, site fidelity, ontogeny of male territory acquisition, cohort survivorship, non-breeding range of individuals, and others. It should be noted, however, that some of these studies may require sample sizes larger than can be practically attained.

Prolonged follow-up studies are required to develop life table data for long-lived species with low fecundity such as the Steller sea lion. In addition, public reporting of sightings of marked animals should be encouraged through public education and informational programs (see Section 75).

445. Obtain measurements and samples using non-lethal techniques

Techniques developed and evaluated in Section 43 should be applied at the intensive study sites, in coordination with other activities. Programs that have potential for disturbance may need to be conducted away from sites being monitored for regular counts or being used for ongoing behavioral studies. Measurements and samples required by other programs should be collected in conjunction with the activities planned in this Section in order to reduce the number of capture efforts required to fulfill all research and monitoring goals (e.g., tissue sampling for Section 22 studies, tagging and branding for Section 21 and 443 studies, attachment of radio-tags for Section 613 studies, and food habits sampling in Section 611 could all be performed during captures for condition assessment and energetics studies under this Section).

45. Compile a catalog of all tissues and other samples

Previous research has resulted in the collection of a considerable number of tissues and other samples from Steller sea lions. Most of this material is currently held by ADFG or NMML. Some, but not all, of this material has been analyzed. All of the existing material should be centrally cataloged so that it may be available for completion of ongoing analyses or for additional analyses that are required later. The catalog should include the location of samples, their condition, and whether or not any analysis has been conducted on them. Documentation should indicate the protocols used in making collections. To this catalog will be added the samples generated by efforts described in Sections 22, 41, 445, 511, 611, and 612. Steps should be taken to ensure that samples are being properly archived.

46. Conduct laboratory analyses of samples for diseases and parasites, contaminant levels, and nutritional status

Arrangements should be made with appropriate laboratories that can provide reliable, timely, and cost-effective analyses of samples. In many cases, the data collection procedure, sampling, and analysis may be carried out by a single agency or contractor. Criteria should be established for prioritizing samples for analysis. The types of analyses to be performed will be determined by the needs of programs instituted under Sections 41, 42, 445, 51, and 61.

47. Compile and analyze data

Data collected in current and future research should be analyzed and reported in a timely manner. Reports should be thoroughly referenced and follow standards of organization to facilitate comparison with existing reports. As much as possible, data should be presented in peer-reviewed periodicals and other open publications to ensure that research programs benefit from regular peer commentary.

To the maximum extent possible, current and future research efforts should collect data

in such a way that they can be compared with historical data. Studies may need to be conducted to calibrate results from newly developed techniques with those obtained by previous methods. Data analyses should examine trends over time and attempt to correlate observed changes with physical, biological, or human induced changes in the environment.

Analyses of data should also emphasize correlations between regional differences in sea lion population trends with regional differences in other factors, such as physical oceanography, food resources, human activities (fishing, tourist activities, etc.). Factors that are correlated with declining regional populations can help identify the causes of declines, which in turn will lead to more effective management efforts.

5. Assess and minimize causes of mortality

Regardless of the causal factors of the current decline, the goal of population recovery requires a major effort to decrease mortality wherever possible. Furthermore, the decline in Steller sea lion numbers must eventually be traced to specific sources of mortality and/or reductions in productivity; this can only be done by quantitative assessments of the causes of mortality.

51. Determine causes of mortality and their relative contributions to total mortality

511. Implement/expand stranding networks

Marine mammal stranding networks have provided valuable data on mortality for several marine mammal and bird species. Examples include episodic outbreaks of leptospirosis and San Miguel sea lion virus in California sea lions and gillnet mortality of seabirds and harbor porpoises in central California. As illustrated by these examples, stranding networks may be valuable for determining causes of illness, injury, or death within an area as well as year-to-year changes in the number or location of affected animals. Data from stranding networks are usually not used to determine the relative contribution of a specific agent of mortality to total population mortality because some agents may be more likely than others to produce strandings and subsequent recovery of animals by stranding networks. Also, because of the large size and relative inaccessibility of much of the Steller sea lion range, and the relative rarity of Steller sea lion strandings, information derived from stranding networks may not be very extensive for this species.

Existing organizations and individuals should be informed that Steller sea lion strandings are of particular significance. Data that are obtained should be cataloged and maintained by a central agency, and should be kept up to date through annual or semi-annual mailings to stranding networks, state fish and game agencies, etc. A possible approach would be to request that stranding networks notify a designated office (e.g., the regional stranding program coordinator), and a trained group of people who might respond to strandings.

Personnel examining stranded animals should endeavor to determine the cause of death or injury, and look especially for evidence of interactions with humans (e.g., bullet wounds or net marks). Besides indicating the presence of potential agents of mortality, the opportunity to examine sick or injured animals may lead to better field diagnosis of sick or injured animals that

are not stranded. Maintaining stranded individuals in captivity for further study or treatment may be practical only for younger, smaller individuals. Rehabilitation and release may be of value in the recovery of very small populations, but it is not likely that such an effort would make a significant contribution considering the current numbers of Steller sea lions.

Dead animals, even those that are decomposed, can be valuable sources of data. High priority should be attached to the reporting of stranded sea lions regardless of condition. A priority list for observations, measurements, and specimens to be collected should be made available to state fish and game agencies, Federal research and management teams, and other appropriate groups and individuals within the Steller sea lion range.

512. Survey selected areas for dead animals

During studies at selected index sites (see Section 44), personnel should have the materials and training to: (1) determine approximate age/sex and location of all dead animals observed; (2) perform field necropsies to determine causes of pup mortality on the rookeries and collect tissue samples needed for other studies (Sections 22 and 41); and (3) properly store and transport collected materials for laboratory analysis (Section 46). Under some circumstances it is recognized that the cost of recovery may exceed the value of potential data from the dead animal; for example, dead pups should be counted and sampled during pup counts when pups have been separated from adults, but rookeries should not be disturbed solely to recover dead pups (see Section 442 for discussion of methods for determining pup mortality).

Efforts should also be made to identify sites where there is an high probability of being able to locate and sample dead animals. This effort will need to be coordinated with activities of stranding networks (Section 511), aerial survey crews (Sections 32, 33, and 34), field enforcement (Section 76), and other field activities. If identified sites are not visited regularly as part of the activities listed above, it may be desirable to conduct special field efforts to examine and sample dead animals.

513. Monitor incidental take in commercial fisheries

The mechanisms for reporting incidental takes and ensuring compliance are provided in the MMPA and NMFS regulations. Additional effort should be devoted to emphasizing the significance of these data for Steller sea lions. Specific methods for assuring maximum compliance in reporting, and for proper sampling of animals and storage of specimens should be developed. To increase their cooperation and compliance fishermen should be encouraged to take an interactive role in developing strategies for reporting takes. Educational programs aimed at fishing organizations and communities (see Section 75) would be a particularly useful forum for developing workable monitoring procedures.

514. Investigate entanglement in debris

Current observations of sea lions at sea and on land indicate that entanglement in debris is infrequent. There should be a continued effort to estimate the relative number of entangled animals in stranding data, by observers aboard vessels at sea, and during field research activities such as pup counts (Sections 322, 33, and 342) and observations at intensive study sites (Section 44). When possible, the entangling material should be identified as this may provide

clues about the circumstances under which sea lions become entangled. Literature surveys should be conducted regularly to update information on related marine mammal and bird entanglement incidents, and surveys of occurrence of entangling materials (packing bands, net fragments, etc.) at sea. Data should be used to support efforts to mitigate mortality (see Section 523).

515. Determine and monitor level of subsistence take in Alaska

Available data on subsistence take of sea lions in Alaska has recently been summarized (Haynes and Mishler, 1991). A statewide subsistence harvest survey should be conducted to provide more current and accurate estimates of regional and total harvest levels. Subsequently, annual monitoring should be done at locations where substantial numbers of sea lions are being taken. Observers should determine the numbers and age/sex of animals taken, numbers killed or injured but not recovered, methods used to take, etc. In addition to monitoring activities, personnel interacting with subsistence hunters should seek cooperation in obtaining measurements and samples required by Sections 22, 41, and 611.

516. Evaluate causes and extent of other deliberate killing

Enforcement programs (Section 76) and educational programs (Section 75) should yield information about specific instances of deliberate killing not associated with subsistence hunting. Follow-up on reports of deliberate killing are needed to determine the causes of such mortality (see Section 41) and how prevalent such incidents are. Once sources of deliberate killing are identified, programs should be developed to eliminate this source of mortality.

517. Evaluate mortality caused by non-human predators

Known marine predators of Steller sea lions include killer whales and sharks. Observations of predation have been sporadic and opportunistic. Rookeries do not appear to be regularly patrolled by killer whales. It would therefore be difficult to develop a reliable estimate of predation for a specific location or rookery. Even at sites where marine predators (white sharks and killer whales) are easily sighted from shore, such as the Farallon Islands in California, it has not been possible to develop quantitative assessments of the extent of predation or its possible impact on pinniped populations (D. Ainley, personal communication).

Potential terrestrial predators include brown and black bears, and to a lesser degree foxes, bald eagles, ravens, and gulls (the latter four probably prey only on injured or abandoned pups that would likely die anyway). There is no record of bears contributing regularly or substantially to sea lion mortality.

During the current population decline reports of predation have not increased, and it is therefore unlikely that predation has contributed substantially to the problem. Nonetheless, opportunistic observations of predation can and should be made in conjunction with intensive study programs (Section 44) and other field activities.

52. Minimize injury and mortality

It is clear that human activities have caused injury to and mortality of many thousands of Steller sea lions (e.g., Perez and Loughlin, 1990). Steps should be taken to improve the data base in this area, and at the same time reduce all human-related mortality and trauma to the maximum extent possible.

At present, the causes and extent of natural mortality are not known. As research outlined in this plan progresses, data may reveal agents of natural mortality (e.g., disease) that could be controlled to facilitate population recovery. Currently, however, no programs for attempting to reduce natural mortality are identified.

521. Develop and implement methods to reduce incidental take

Gear modification programs should be considered for fisheries where the incidental take of sea lions can be identified with specific gear types. Current data, however, tend to indicate that sea lion mortality in fishing gear is more a function of area and feeding activity than it is of the gear itself. For example, incidental take is higher when fishing is conducted at night (Loughlin and Nelson, 1986).

Particular attention should be paid to the timing and location of fisheries where sea lion mortality is known to occur. Fishery management regulations may be able to shift the location or timing of those fisheries to reduce the incidental take of sea lions, with little or no impact on the overall commercial catches of fish. Changes in regulations to alter the time and area where fish may be taken may, however, impact current and traditional fishing patterns and could affect the economic return from the fisheries.

Available data should be reviewed annually to determine where the likelihood of incidental take is greatest, and to identify alternative areas or times where those fisheries could operate. If necessary, new regulations or modifications to existing regulations should be developed and implemented. Educational programs (Section 75) should include active involvement of fishermen in development of techniques to reduce and eliminate incidental takes.

522. Develop non-harmful deterrents for use by commercial fishermen

Existing regulations prohibit fishermen from shooting at or near sea lions to keep them away from their gear or catch. Alternative methods for displacing pinnipeds, such as seal bombs, killer whale sounds, and taste aversion, have been tried, but they have generally not been very successful (e.g., see Mate and Harvey, 1987). Fishermen are therefore left with the very real problem of sea lions damaging their gear and catch, and little or nothing they can legally do. Some additional effort should therefore be devoted to finding new non-harmful means of keeping sea lions away from fishing operations, perhaps with support provided by the fishing industry. For example, Sasakawa (1989) reportedly was able to keep Steller sea lions away from submerged setnets by using explosive sounds. However, Sasakawa did not describe the possible physical effects of the explosions on sea lions, and that is a factor that must be considered before such techniques can be used.

Part of the current problem is that some fisheries, for example the pollock roe fishery,

produce large amounts of readily available fish (target species, bycatch, and waste) that provide an easy food source attractive to sea lions. Aversive techniques intended to deter sea lions from coming near boats and gear must therefore overcome the positive reinforcement supplied by the readily available fish. Continued attention should be given to procedures that will reduce this attractant.

It should also be recognized that one of the possible causes of the current decline of Steller sea lion numbers is poor individual condition leading to increased mortality and reduced pup production. It may therefore impede recovery of the population if sea lions are kept away from food resources because those resources are also being harvested by a commercial fishery. It may be more appropriate to consider other management techniques (e.g., Section 521) to mitigate incidental takes and gear damage rather than using methods that drive sea lions away from food sources.

523. Improve and continue programs to minimize marine debris

While entanglement in debris has not been shown to be a major factor in sea lion mortality, some animals do become entangled in net fragments and packing bands. The educational program within the fishing industry, including all support units, to totally eliminate the at-sea discard of materials that may cause marine mammal entanglement should be continued. Entanglement of fur seals in net fragments is decreasing (Fowler and Ragen, 1990), but efforts to further reduce or eliminate this problem should be continued. Foreign fishing and support vessels may be major sources of packing bands and scraps of netting. Efforts should be made to have input at the international level through the International Convention for the Prevention of Pollution from Ships (MARPOL) and related organizations, through the NMFS Marine Entanglement Research Program. Educational programs (Section 75) should stress the harmful effects of marine debris.

524. Develop methods to reduce loss rate in subsistence harvests

Not all sea lions killed or injured in subsistence hunts are recovered. Changes in capture methods, areas, or timing may reduce the loss rate (and disturbance to rookeries and haulouts that may result from hunting). A program to work with one or more of the major subsistence communities should be developed to explore solutions.

53. Review and revise recommendations for maximum allowable levels of lethal take

Maximum allowable levels of lethal take should take into consideration subsistence, commercial fisheries, research, and other human-related sources of killing. Current information indicates that commercial fisheries and subsistence hunters take the vast majority of animals. Allowable levels of take should be established based on abundance and trend (determined and monitored as described in Section 3) in appropriate management units (identified in Section 2). If necessary, mechanisms should be developed to allocate portions of the total allowable take among various general categories (e.g., incidental take, subsistence, research).

The maximum legal incidental take of Steller sea lions under the MMPA as amended in 1988 was set at 1,350 animals annually. The Emergency Interim Rule listing sea lions as threatened reduced the allowable incidental take to 675 in the area west of 141° west longitude.

No specific rationale was given for either number. Although percentage of the index count apparently was not the basis for setting and modifying incidental take limits, the allowable level amounted to about 2.2%-2.7%. NMFS is currently working on an overall plan for setting allowable levels of incidental take for marine mammals that will apply to all species including Steller sea lions, and a draft regime has been proposed (NMFS, 1991). This proposal will be revised and submitted to Congress for their consideration during MMPA reauthorization in 1993. If necessary, takes in fisheries should be divided by region, season, and gear type to prevent high takes in one fishery or region from overburdening or closing other fisheries.

The ESA allows the continued subsistence harvest of threatened or endangered species by Alaska Natives, but such taking may be regulated if it negatively affects the species. Levels of subsistence harvests (documented in Section 515) should be evaluated in relation to the current condition of the stock (Sections 2 and 3). If regulation of the harvest is deemed necessary, the communities taking Steller sea lions should be included in the process of setting the overall harvest limits and the distribution among villages (as is done with bowhead whales by NMFS and the Alaska Eskimo Whaling Commission). Animals killed and lost should be included in any limit set on subsistence take.

Because there is no sustainable yield from a depleted, declining population, there is no biologically defensible basis for estimating maximum allowable removals for regions where sea lions are declining. Since sea lions are declining in the area from the central Gulf of Alaska through the Aleutian Islands, efforts should be made to minimize all sources of mortality in this region until such time as population recovery begins. Efforts should also be made to see that, whenever possible, any allowed lethal takes provide information that will aid in recovery of the population. In areas where sea lion numbers are stable or increasing, allowable removals can be calculated based on biological factors such as abundance and productivity.

6. Investigate feeding ecology and factors affecting energetic status

Although the sea lion diet as a whole is diverse, in particular areas a single species may comprise as much as 50% of their food for certain periods. Such species are usually locally concentrated or form schools or aggregations in particular areas at certain times. Examples include herring, walleye pollock, hake, and rockfish.

Many of the prey eaten by Steller sea lions are species that also are taken in commercial fisheries. It is unclear at present whether and how particular fisheries may affect the ability of sea lions to obtain an adequate supply of food. Fluctuations in abundance of fish and shellfish stocks in Alaska have been well documented in recent years (e.g., Naumenko et. al., 1990; Megrey and Wespestad, 1990). However, the influences of predators, commercial harvests, and environmental factors on fish stock abundance are poorly understood. Sea lions may be able to alter the mix of prey in their diet in response to changes in prey abundance, but the degree to which they can switch, and the possible costs of such switching, are unknown.

Correlations of sea lion population changes with gross estimates of fish catches have not provided much insight into sea lion-fishery interactions (Loughlin and Merrick, 1989). Comparisons of the condition of sea lions collected in the Gulf of Alaska in the mid-1970s and the mid-1980s suggested that animals collected in the latter period were nutritionally stressed

(Calkins and Goodwin, 1988), but the data do not allow the identification of specific problems. Nonetheless, it is obvious that rapid recovery of the sea lion population will require that animals have optimal feeding conditions.

It may be necessary to implement management actions to ensure that food supplies, especially in critical areas and times, are adequate to stop the decline and then support a growing sea lion population. In many cases, additional information will be needed to design properly focused and effective management measures. The actions that must be taken to obtain the necessary information and to implement appropriate measures are described below.

61. Investigate sea lion feeding ecology

One of the principal reasons for investigating sea lion feeding ecology is to understand the interaction between food availability and the status and trend of the sea lion population. Additional information is needed on the sea lions' nutritional requirements, and on how much prey is available seasonally and spatially to meet those requirements. Correlation of changes in feeding habits with population changes in specific areas can be informative, but will require long-term studies. Comparisons of feeding habits among areas where sea lion populations are showing different trends may be particularly valuable.

The existing data on sea lion feeding ecology are largely restricted to a description of the diet. This description has resulted mostly from the examination of stomach contents of animals collected for scientific purposes, and from stranded animals. Considering the current status of the sea lion population, it is unlikely that large scientific collections can be justified in most areas at this time. Therefore, it is essential that alternative methods of describing and monitoring changes in the sea lion diet be developed.

Understanding the interactions between sea lions and their food resources requires additional information beyond a description of characteristics of prey being eaten. Recently developed techniques that allow the investigation of energetics and nutritional physiology of free ranging animals should be applied to sea lions where possible. Telemetry and other devices should be used to describe diving behavior and characteristics of feeding cycles, and to identify feeding areas. Models need to be developed to integrate information on sea lion feeding and energetics with factors that may influence prey populations. Such models can be used to identify areas of significant interaction and to evaluate the possible effectiveness of potential management actions.

611. Describe foods eaten by sea lions

To provide direction for ecological and process studies, it is necessary to know what foods are being consumed by sea lions. In addition to the specific identity of prey, the size (or age) classes that are being eaten must be determined. Ideally, such data should be obtained for all age/sex classes of sea lions in all areas and seasons. The data should be used to compare prey utilization among different regions and to monitor changes from year to year in a particular area. To evaluate differences between age classes, areas, seasons, or years, sampling and analysis must allow statistical testing.

6111. Collect and analyze stomach contents

Stomach contents should be collected from dead sea lions whenever possible (see Section 41). Potential sources of material include beachcast carcasses, animals incidentally taken in commercial fisheries, and animals taken by Alaska Natives. Animals taken in commercial fisheries are of particular interest, since it is likely that their stomachs will contain fresh food remains, and the location where they were feeding will be known. However, sea lions caught by fisheries may be more likely to have been feeding on the target species, and this bias must be taken into account during analysis of results.

The entire stomach contents should be collected from every animal incidentally taken in commercial fisheries as part of observer programs. Intestinal contents should also be collected and examined for prey remains. Samples collected from these sources may not reflect the exact diversity or relative proportions of prey species eaten by the sea lion population, and small sample sizes may preclude statistical treatment of the data. They may nonetheless be useful for comparisons among areas and over time. While other methods (e.g., Section 6112) may produce larger sample sizes, analysis of stomach contents will give data that are the most comparable with data collected in previous years.

Obtaining samples of stomach contents from live sea lions by gastric lavage (putting fluid into the stomach and pumping it out) would require animals to be anaesthetized. The technique could be tested on sea lions that are anaesthetized for other purposes (Sections 445 and 613). However, the drug levels currently used when animals are handled for attaching telemetry equipment are too low to allow them to be lavaged. Higher drug levels result in an increased chance of death, which may preclude use of lavage techniques unless alternative immobilization methods are developed (see Section 431).

Sample analysis should determine the identity of prey and their relative importance in the sample (by number, weight, and/or volume). Diagnostic hard parts should be used for identification of contents where necessary. Original sizes of prey consumed should be determined by measuring intact organisms and appropriate hard parts such as otoliths.

6112. Collect and analyze scats

Hard parts of prey may pass through the gastrointestinal tract and appear in scats. Although there are biases associated with differential digestion and passage and it is usually not possible to determine which individual produced a particular scat, valuable information on diet composition can be obtained from scat analysis (e.g., Olesiuk et al., 1990). Physical characteristics of the substrate may preclude scat collection in some locations, but some specific areas may be suitable for sampling. Relatively large sample sizes can be obtained and used to monitor changes or trends in prey utilization. Scat collecting should generally be done in conjunction with other activities (e.g., Sections 322, 33, 342, and 443) in order to minimize potential disturbance.

Scat analysis requires careful separation of the hard parts of prey from non-diagnostic material in the feces (Bigg and Olesiuk, 1990). Once separated, hard parts should be identified and measured in the same manner as those obtained from stomach contents.

612. Determine food and energy requirements

For the Steller sea lion population to recover, the proper amounts and types of food must be available to individuals during critical periods. A large combined biomass of assorted prey species does not necessarily indicate an adequate food supply, since some of the species may be nutritionally poor at times or energetically costly to catch. To ensure a food supply of adequate quantity and composition, it is necessary to know the sea lions' nutritional requirements and their costs of obtaining prey. Isotopic studies and other techniques should be used to measure the food intake and energy expenditure of free-ranging animals (see Section 432). Such studies may be conducted in conjunction with intensive on-site study programs (Section 44). Studies of captive animals may be useful to develop and validate techniques, as well as to provide a more detailed picture of nutritional requirements for some age/sex classes. Results from captive studies must be used with caution since they may overestimate nutritional requirements (Innes et al., 1987).

Foraging costs will vary with location (due to transit times and prey dispersion) and with the type of prey (due to differences in difficulty of capture). Therefore, whenever possible, energetics studies should be done in conjunction with programs at intensive study sites (Section 44), studies on feeding areas and diving behavior (Section 613), diet composition (Section 611), and prey availability (Section 6141). Animals that have been injected with isotopes can be studied with satellite telemetry to measure the costs of foraging under different circumstances. This information on the dietary needs and energetics of the sea lions should then be compared to the abundance, nutritional characteristics, and distributions of various prey species throughout the year (Section 614).

It would be desirable to collect baseline data on food and energy requirements for all age and sex classes at a variety of locations throughout the year. Initial emphasis should be put on juveniles (especially pups after weaning) and adult females. If other age/sex classes are determined to be experiencing nutritional stress, then foraging studies should emphasize those groups. Studies should be designed to detect changes in foraging effort over time, as well as to allow comparisons of areas with different population status (Section 3) and patterns of prey availability (Section 6141).

613. Determine feeding areas and feeding strategies

Determining the locations, time of day, and depths at which sea lions feed will enhance efforts to assess and monitor the abundance and composition of their prey resources. When coupled with simultaneous studies of prey distribution and abundance (Section 6141), it will also help determine the degree and type of competition between sea lions and commercial fisheries and to identify which areas and depths constitute critical foraging habitat (see Sections 112 and 15). Continued monitoring will reveal how variable these feeding areas are and may provide an indication of the species' ability to change location or depth in response to changing prey availability.

6131. Identify feeding areas

It will be difficult to identify the areas used by Steller sea lions for feeding. Observations of sea lions feeding at sea can pinpoint feeding locations and, when made from

boats, sampling of the prey is also possible. However, such data have an inherent bias associated with the activities of the observation platform (e.g., salmon fishing boats are very likely to encounter sea lions feeding on salmon). Aerial or shipboard surveys of standardized tracks avoid this bias but may have a much lower probability of encountering sea lions. Another approach that has been used with pinnipeds is to track individuals by using satellite, radio, or sonic tags. While these methods are expensive, labor intensive, and cause some disturbance to the animals, they provide the most accurate and detailed information about feeding areas and transit routes.

For wide-ranging species such as Steller sea lions, satellite telemetry is the most appropriate technique currently available for identifying feeding areas. Satellite tags should be applied to an adequate sample of animals at selected locations throughout their range. Because of the limited duration of tag function, it will be necessary to apply them at different times of year in order to obtain coverage for all seasons. Satellite tags will also provide data that will be useful for studies described in Sections 1 and 2.

6132. Investigate diving behavior and feeding cycles

Sea lions alternate feeding trips at sea with stays on land. The timing and duration of these cycles can vary with age, reproductive status, time of year, and food availability. Observations of changes in feeding cycle characteristics among sea lions of a given age or reproductive status may therefore provide an indication of changes in food availability.

Characteristics of dives can be determined by using devices that record time and depth. In situations where animals may easily be captured and handled, relatively inexpensive time-depth recorders can be deployed and recovered. However, considering the problems with handling Steller sea lions, incorporation of time-depth measurements in satellite packages appears to be the most appropriate method currently available.

Satellite tags allow very precise monitoring of feeding cycles because the likelihood of overlooking animals when they are ashore is minimal. However, they are expensive and potentially can affect the feeding patterns of the animals to which they are applied. Because large sample sizes are usually required to detect changes in feeding cycle patterns, naturally scarred, branded, and flipper tagged animals should be monitored in addition to those with radio or satellite tags (in conjunction with Section 44). Because animals are not always seen when they first come ashore, attendance pattern data from telemetry and direct observations are not entirely comparable (e.g., observational studies tend to give longer at-sea times) but information from both sources can be useful. Because lactating females return to land frequently to nurse their pups, their attendance patterns on the rookeries can be relatively easily monitored, especially if some animals are marked (see Section 443).

Measurement of time on shore and at sea should be compared among areas and years. Because foraging effort may vary in addition to the amount of time at sea, energetics studies (Section 612) should be conducted concurrently with studies of feeding cycle patterns. Changes in feeding cycle patterns should be analyzed for correlations with commercial fisheries catches and with rates of abortion, mortality, and copulation (Section 44).

614. Assess significance of various prey

Determination of the significance of a particular food to sea lions requires more than simply knowing its relative contribution to the diet. Certain prey may occur in particular circumstances in which they can be captured efficiently with little cost. It is likely that the caloric value of prey varies with age, sex, and season of the year. These factors may interact to make the availability of particular prey items of critical importance for sea lion nutrition at certain times and places. Additional data are needed to address the significance of individual prey species.

6141. Characterize geographic and seasonal patterns of prey availability and utilization by sea lions

Sampling programs should be based on the analysis of existing diet information (Section 615) and additional information on seasonal prey use that is obtained from studies described in Section 611. Potential prey availability should be estimated in areas where animals are known to be feeding (Section 6131) by using hydroacoustics, nets, underwater cameras, or other appropriate techniques. Sampling should be designed to give estimates of prey availability in actual feeding areas, as opposed to broad geographic regions. Annual patterns of prey availability should be determined using these data. In addition, measurements of parameters such as density and depth of prey, and distance from the rookery or haulout, are necessary to evaluate foraging costs. Prey sampling in areas adjacent to identified feeding areas would help determine why animals feed in certain locations and not in others.

While some of the information described in this Section may be obtained during standard NMFS resource assessment cruises, adjustments will have to be made to techniques and the distribution of effort to satisfy the data requirements for sea lions.

6142. Determine nutritional value of prey

The nutritional value of a particular type of prey can be viewed as the net energy obtained by its capture and assimilation. An assessment of net nutritional value requires the integration of costs of swimming to and from feeding areas and diving to capture prey (Sections 612 and 613), with information on the amounts and characteristics of prey caught on a feeding trip.

Many marine organisms show large variations in caloric content and essential nutrients, often associated with maturation and production of eggs. For example, adult females just prior to spawning may have a very high caloric value, while spent (post-spawning) individuals contain much less energy. Where not already known, patterns of caloric and nutrient variation should be documented for major sea lion prey species that are identified in Section 611, using specimens obtained in Section 6141.

Digestibility influences assimilation efficiency and can therefore affect the actual nutritional value of prey. Available data indicate that pinnipeds in general have high assimilation efficiencies, and additional investigation of this factor may not be necessary for

Steller sea lions. If further studies are necessary they will probably require the use of captive animals.

615. Compile and analyze data

The information that is generally available on sea lion feeding ecology is contained in a number of published papers and agency reports (e.g., Pitcher, 1981; Calkins and Goodwin, 1988). A considerable amount of information exists that has been only partially analyzed and has not been reported. All available information, including that from Russia and Canada, should be reviewed, analyzed, and presented in a comprehensive report. Results of that report should be used to assess the current state of knowledge about sea lion feeding habits, and to guide the design of future research.

A thorough analysis of existing data is required to identify all the areas that are appropriate for comparisons over time. The review of historical data on sea lion feeding should compare regions of differing population status and trend, where possible. Comparisons of current and historical data will need to allow for ecosystem changes that may have occurred over time.

It is unlikely that the existing data base will allow definitive comparisons to be made. Future collections and analyses should take advantage of the variations in population status and trend throughout the sea lion range in order to gain insight into the interactions between feeding and population parameters. To the maximum extent possible, current and future research efforts should collect data on sea lion feeding in a way that it can be compared with historical data.

62. Investigate interrelationships between prey abundance and sea lion growth and productivity

While the dynamics of the Steller sea lion population may be affected by a variety of factors, growth of individuals and productivity of the population are likely to be limited by food availability at some point. Field studies have demonstrated the role of food in regulating population productivity in many terrestrial ecosystems (e.g., McCullough, 1979; Skogland, 1985). However, marine mammals foraging in complex marine ecosystems pose tremendous problems for such studies. El Niño events have provided some insight into the role of food in limiting pinniped productivity (Ono et al., 1987).

A variety of techniques are available for assessing the abundance of marine fishes and invertebrates. However, these techniques have been developed by fishery managers to assess overall stock sizes, and may not measure prey abundance in the areas and times of importance to sea lions. Existing data sets should be examined for information on local prey abundance. Future data collection efforts and analyses may need to be designed specifically to address questions of relevance to Steller sea lion feeding ecology.

621. Measure growth and productivity in areas with different food availability

Once analyzed, existing data on sea lion biology and the distribution and abundance of fish stocks should be used to select study areas (e.g., Ugamak Island, Marmot Island, Forrester Island, and Rogue Reef). Variables other than food availability must be considered in area

selection and evaluation of results (e.g., predation, disease, and migration costs). A variety of parameters, including pup production and survival (Sections 3 and 442), sex/age class distribution (Section 441), and individual size and condition (Sections 432 and 445), should be measured in these areas. Satellite telemetry should be used to define the areas used for feeding (Section 613), and data should be collected on foods being consumed (Section 611). Standard resource assessment techniques, modified as necessary, should be used to monitor the abundance and characteristics of prey in the feeding areas (Sections 6141 and 6142).

As an alternative to, or in addition to, use of study areas with natural variations in prey resource characteristics, fisheries could be regulated as a means to manipulate food availability (see Section 64). Design of such a manipulative study should take into account information on prey identity (Section 611), feeding areas (Section 6131), and food requirements (Section 612). It would be necessary to monitor the abundance of prey in the study area (Section 6141) in order to measure the actual effect of regulations on prey resource availability.

622. Develop models for individual and population energetics, growth, and productivity

One or more models will be required to integrate the information described under Section 621 and related Sections. A model or models should be developed to help assess the energetic needs of sea lions, and how variations in availability of food as a whole, and of individual prey species, may affect nutritional status of individuals. The influence of nutritional status on growth, condition, reproductive performance, and survival should be modelled. As a final step, models should be used to help assess how variations in individual parameters may affect population status and trend.

Models should be designed so that they not only integrate existing data but can also be used in a predictive mode to project how variations in prey availability may affect the status and trend of sea lions in various areas.

63. Determine effects of fisheries on sea lion prey

The abundance of commercially harvested fish stocks is known to fluctuate, sometimes declining drastically. In most cases the role of fishery removals in such stock declines is unclear. However, it is clear that some stock fluctuations have been due to overfishing (Pruter, 1976; Megrey and Wespestad, 1990).

In addition to gross changes in long-term overall abundance, fisheries may affect sea lion food availability by changing small scale distribution, abundance, and behavior of prey. Intensive pulse fisheries clearly reduce the density of fish in specific areas. The activities of boats and gear may cause changes in the behavior and characteristics of prey aggregations. Subtle ecosystem changes may accompany large human-induced removals of major species.

631. Determine effects of fisheries on sea lion prey

Traditional fishery assessments usually attempt to gather broad scale information on stock abundance. Data are gathered at the times and areas when sampling can be conducted

most efficiently. Results of such assessments may be used to track overall changes in stock sizes, but they are of limited value for assessing changes in prey availability in sea lion feeding areas. Data that have been and are being collected using hydroacoustics may be very useful for identifying localized concentrations of fish that can serve as sea lion prey.

The influence of fisheries on prey in the actual areas used by sea lions for feeding can be addressed in two ways. Detailed assessments of short- and long-term effects can be conducted in feeding areas before, during, and after fishing activities occur (feeding areas will be identified by studies described in Section 613). Alternatively, comparisons can be made of prey stock characteristics in similar areas that are and are not fished (see Section 621). Some of the data required for these comparisons may be collected in studies described in Section 6141. However, additional sampling (e.g., time series that span the course of fishing activity) will be necessary to assess changes in prey stocks that may be specifically attributable to fishery removals. Special attention should be given to the depth distribution of the species and size classes of prey needed by sensitive age/sex classes of sea lions (e.g., juveniles).

632. Model effects of fishing on prey composition, distribution, abundance, and behavior

Models may prove useful for evaluating the possible effects of fishing on prey availability. Current models used for stock assessment should be applied to specific areas to look at how removals affect abundance of various age classes of prey. Data from field studies will be needed for the development and testing of models that describe effects on prey distribution, abundance, and behavior. Models should be designed so that they can be used to predict how various levels and types of fishing may influence availability of prey for sea lions.

64. Ensure adequate food availability in feeding areas

For the Steller sea lion population to grow (i.e., recover), measures must be taken to ensure that food availability is not limiting. Fish stocks must be assessed and monitored on a local basis along with certain parameters of the sea lion population. Where prey abundance is low, or where the sea lions show signs of nutritional stress, prey availability must be increased, if possible. The types of prey available and the energetic cost of obtaining the prey should be acceptable in all critical feeding areas. If a fishery is having detrimental effects on prey availability, either through removals of target species or bycatch, additional regulation of the fishery may be necessary. Coordination among agencies and organizations involved in development of necessary regulations should be provided by the Steller sea lion Recovery Plan Coordinator (Section 71).

641. Regulate fishing areas, seasons, and types of operations

In some instances, it may be possible to reduce competition between commercial fisheries and sea lions by changing fishing areas, seasons, time of day, and types of operations. Studies should be initiated on the amount and species of fish, including bycatch, taken by fisheries under various conditions. These results should be compared to studies of sea lion feeding ecology (Sections 611, 612, and 613) to determine the extent of overlap, especially for any age/sex classes that are likely to be food limited (e.g., weaned pups or lactating females). Where alterations in operations can reduce competition, appropriate changes should be initiated and the sea lions monitored for responses (see Section 621).

642. Regulate fishery catches

Development of fishery management policies and plans must take into account the types and amounts of food needed to support a recovering sea lion population. The mechanism by which sea lion food requirements are accounted for in the calculation of acceptable commercial harvest levels should be explicitly described. Where appropriate, a specific portion of the acceptable biological catch should be set aside for sea lion consumption. Alternatively, natural mortality estimates used in models should be modified to ensure that predator consumption is adequately provided for. If there are signs that prey availability is being reduced by a fishery such that it is a limiting factor in the recovery of the sea lion population, then restrictions should be placed upon the commercial fisheries' allowable catches to the extent necessary to ensure adequate prey. Quotas for catches should be set on a regional and seasonal basis for each stock of each prey species identified as important (Section 614). If certain age/sex classes of sea lions are found to be especially food limited, then special efforts should be made to regulate total allowable catches in their feeding areas.

In addition to regulatory needs described above, it may be desirable to manipulate fisheries as part of experiments to determine the influence of food supply on sea lion growth and productivity. Studies of this type are discussed in Section 621.

7. Implement Recovery Plan and coordinate recovery activities

The principal responsibility for implementation of the Steller Sea Lion Recovery Plan lies with the NMFS Office of Protected Resources. Recovery actions will need to be coordinated with the NMFS regional offices and other involved resource management agencies and user groups. The Steller Sea Lion Recovery Team should be used to evaluate the ongoing recovery program, and to recommend changes including updates to the recovery plan. International coordination may also be necessary in order to implement an effective recovery program. Education and enforcement are critical components of the overall recovery effort.

71. Establish a Steller sea lion Recovery Plan Coordinator staff position

NMFS should hire a full-time person to coordinate recovery efforts for Steller sea lions. Duties of the Steller sea lion Recovery Plan Coordinator should include:

- a. Coordinate all aspects of NMFS sea lion recovery efforts, such as evaluation and development of regulations, designation of critical habitat, and Section 7 consultations;
- b. Provide liaison with regional Fishery Management Councils, state fishery managers, FWS wildlife refuge managers, enforcement agencies, researchers, and other interested parties;
- c. Publish annual activity reports and work plans;
- d. Facilitate and coordinate research activities, including development of scopes of work for contracts;
- e. Coordinate data management and assist with data analysis and distribution.

72. Maintain the Steller Sea Lion Recovery Team

NMFS should continue to fund the costs for operation of the Steller Sea Lion Recovery Team. The Team should conduct an annual review of information from research and monitoring programs and recommend changes in research programs and management strategies, where necessary. The annual review should be completed in time to make recommendations for research and management for the following year. The Steller Sea Lion Recovery Plan Coordinator and other management agency representatives should attend Team meetings to provide coordination and agency input. The Team should revise and update the recovery plan at appropriate intervals.

73. Monitor Section 7 ESA requests for consultation

Existing personnel in NMFS who deal with ESA Section 7 requests should also deal with consultations relative to Steller sea lions. This should be done in collaboration with the Steller sea lion Recovery Plan Coordinator.

74. Develop mechanisms for international conservation efforts

The United States, Canada, and Russia have a particular interest in conservation of Steller sea lions since virtually all rookeries occur within their territorial seas. Because sea lions move freely across the boundaries separating these nations, conservation efforts put in place by each nation should be closely coordinated. Conservation measures may be of some significance to other nations (e.g., Japan, Taiwan, Poland, Peoples Republic of China, and North and South Korea) that conduct commercial fisheries or other activities in areas where sea lions occur. Those nations should be made aware of measures that are in place, and the need to ensure that their citizens act accordingly. Where appropriate (e.g., during range-wide surveys), close coordination of research activities is also desirable.

741. Distribute Recovery Plan to other involved nations

Copies of the approved Steller Sea Lion Recovery Plan, and other information such as implementation plans, should be sent to appropriate agencies and organizations in the Soviet Union, Canada, Japan, Taiwan, Poland, Peoples Republic of China, and North and South Korea.

742. Develop bilateral or multilateral conservation agreements

NMFS should work with the Department of State to develop and implement agreements with Russia and Canada to coordinate conservation efforts for Steller sea lions. Joint research programs to look at interchange of animals between areas, and for comparison of biological characteristics and population parameters among regions are needed. Some of the management issues that should be considered include adequacy of protective regulations, and mechanisms for allocating allowable take of sea lions between jurisdictions.

75. Conduct information and educational programs

Many of the regulations that are put into place to protect Steller sea lions will apply to all members of the public. Public affairs personnel in responsible agencies should plan and implement well-rounded public awareness programs that describe the status of sea lions and the protective regulations that are in place. The public should be made aware that they can aid in the recovery effort by reporting violations of regulations, injured or stranded animals, and other relevant information. Types of coverage that might be effective include news releases, mail-outs, signs, public service announcements, interpretive programs, films, and environmental education lesson plans featuring sea lions.

Since fishermen in many areas may interact with Steller sea lions on a regular basis, it is particularly important that they be made aware of and kept informed about sea lion conservation efforts. Information can be distributed as part of ongoing regulatory programs (e.g., in logbooks and regulation books), as well as through media directed specifically at the fishing industry (e.g., trade magazines). Mail-outs to permit holders and signs posted in boat harbors may also be effective. Materials and trained personnel should be made available to assist industry in developing its own additional educational programs. Fishermen and their representatives should be encouraged to become involved in the development, evaluation, and implementation of sea lion conservation measures.

76. Enforce regulations

Regulations that are currently in place and that may be developed have a great potential for assisting in the recovery of the Steller sea lion population. The prohibition on shooting at or near sea lions, if enforced, could greatly reduce the number of animals lost to the population each year due to human-related factors. Elimination of this unnecessary and avoidable source of mortality should be given very high priority.

Members of the Recovery Team did not have the expertise to consider the mechanisms and costs of enforcement programs in detail. Although enforcement of wildlife regulations in vast regions, such as the waters off Alaska, is a very difficult task, existing personnel and programs could, if properly directed, provide significant benefits for sea lions. It is clear that enforcement of sea lion regulations and conservation measures would benefit greatly by increased cooperation and coordination among various agencies, including NMFS, the State of Alaska Fish and Wildlife Protection, and the USCG. In order to emphasize the importance of this item, the Recovery Team is specifically recommending that funds be provided for a person to coordinate Steller sea lion enforcement efforts.

761. Develop and improve systems for reporting violations

In addition to its role in directly protecting animals, enforcement of regulations is important as an educational tool. For example, if sea lions can be shot or harassed with impunity, an educational program is not likely to reach the offenders who are the major source of shooting mortality. Successful enforcement of regulations is greatly dependent on information derived from the public. A toll-free telephone number for reporting violations is useful, as is a guarantee of anonymity to informants if they so desire. A reward system for information leading to successful prosecution of offenders has been used by the State of Alaska

for fish and wildlife violations and has been quite successful (project Safeguard). All field personnel associated with Federal, state, and local resource management and enforcement agencies should be made aware of regulations and procedures for reporting violations. Trained observers should be placed in areas where people are most likely to interact with sea lions.

762. Provide adequate and effective field enforcement programs

Effective enforcement of regulations requires extensive field work and is expensive. In areas where fisheries are thought to pose significant problems, field camps ashore might be the most effective enforcement technique. Such camps would have to be within sight and sound of fishing operations, and equipped with the means to get to offenders rapidly. There is a history of harassment and deliberate shooting in certain fisheries that take place near important sea lion haulouts.

Control of human activity within prohibited areas around breeding grounds and haulouts is necessary and will take extensive patrol work. Care must be taken that the patrols themselves are not disruptive to sea lion breeding and feeding patterns. Careful coordination of enforcement efforts between Federal, state, and local authorities is necessary, as are educational programs within the agencies to overcome differences in approach and, in some areas, the lack of understanding of the seriousness of the sea lion population decline. Enforcement agents of all the agencies involved with the fisheries should be knowledgeable enough about the population status and the laws protecting sea lions to be able to work with and advise the industry, and to recognize and report violations.

When information is gathered that is likely to result in successful prosecution and conviction of violators, such cases should be given high priority by NMFS enforcement. It is essential that violators are prosecuted in a timely fashion so that the seriousness of regulations and the effectiveness of enforcement are made evident.

G. Implementation Schedule

As recovery plans are developed for each species, specific recovery tasks are identified and prioritized. As new information warrants, these plans, including tasks and priorities, will be reviewed and revised. In addition, funding and implementation of the tasks identified in recovery plans will be tracked in order to aid in effective management of specific recovery programs. NMFS believes that periodic review and updating of plans and tracking of recovery efforts are important elements of a successful recovery program. Information from tracking and implementing recovery actions and other sources will be used to review plans and revise them as necessary.

Recovery tasks within the Steller Sea Lion Recovery Plan are prioritized 1-3. The Recovery Team has deemed that a Priority 1 ranking is given to the highest priority tasks within this plan, and is given to those actions necessary to monitor the decline of, or to prevent the Steller sea lion, a species facing a high and continued magnitude of threat, from further declining. Within this recovery plan, Priority 1 tasks are characterized as being either administrative (A), management (M) or research (R).

STELLER SEA LION IMPLEMENTATION SCHEDULE					Est. Fiscal Year Costs					Comments
Plan Task	Task #	Priority	Task Duration	Resp. Agency	FY 1	FY 2	FY 3	FY 4	FY 5	
Map rookeries and haulouts	111	3	2 yrs	NMFS	20	20				
Map and describe feeding areas	112	2	2 yrs	NMFS						done with 111
Determine seasonal use patterns	12	2	3 yrs	NMFS		30	10	10		
Document effects of human disturbance	13	2	continuing	NMFS	10	10	10	10		
Prepare guidelines and regulations	14	1A	continuing	NMFS						included w/ 13 and 71
Identify and designate critical habitat	15	1A	continuing	NMFS						included w/ 11 and 71
Tag and brand pups	211	2	3 yrs	NMFS						included w/ 443
				ADFG						
				ODFW						
Monitor for marked animals	212	2	continuing	NMFS						included w/ 322,33, 342 and 44
				ADFG						
				ODFW						
				PRBO						
				UCSC						
				DFO						
				VNIRO						
				FWS/NWR						
Determine stock identity	22	2	4 yrs	NMFS	80	50	50	50		
Compile/analyze data for section 2	23	2	continuing	NMFS	10	10	10	10	10	
Develop survey procedures	31	1R	5 yrs	NMFS	50	75	75	75	75	
Survey adults and juveniles in AK	321	1M	every year	NMFS	85	85	85		85	FY 4 included w/ 341
				ADFG						
Count pups in AK	322	1M	every year	NMFS	150	150	150		150	FY 4 included w/ 342
				ADFG						
Survey pups and non-pups in CA and OR	33	1M	every 2 yrs	NMFS	25		25		25	FY 4 included w/ 341, 342
				ODFW						
Conduct range-wide survey of adults/juveniles	341	1M	every 5 yrs	NMFS				150		
				ADFG						
				ODFW						
				DFO						
				VNIRO						
Conduct range-wide pup counts	342	1M	every 5 yrs	NMFS				250		
				ADFG						
				ODFW						
				DFO						
				VNIRO						
Examine and sample dead animals	41	2	continuing	NMFS	15	15	15	15	15	
Collect and sample animals	42	2	1 yr							no cost estimate
Develop capture techniques	431	2	continuing	NMFS	5	5	5	5	5	
Develop condition indices	432	2	continuing	NMFS						included w/ 445
Determine sex/age of animals on rookeries	441	2	5 yrs	NMFS	100	100	100	100	100	
Determine pup production and mortality	442	2	5 yrs	NMFS						included w/ 441
Tag and brand pups and females	443	2	continuing	NMFS			40	40	40	
Monitor tagged animals	444	2	continuing	NMFS						included w/ 441
Obtain samples using non-lethal techniques	445	2	5 yrs	NMFS	50	50	50	50	50	
Compile a catalog of samples	45	2	continuing	NMFS	20	5	5	5	5	
Analyze samples	46	2	continuing	NMFS	200	50	50	50	50	
Compile and analyze data for section 4	47	2	continuing	NMFS	10	10	10	10	10	
Implement/expand stranding networks	511	3	continuing	NMFS	20	20	20	20	20	
Survey areas for dead animals	512	2	continuing	NMFS	30	30	30	30	30	
Monitor incidental take	513	1M	continuing	NMFS						included w/ ongoing programs
Investigate entanglement in debris	514	3	continuing	NMFS						included w/ 322,332, 44
Determine and monitor subsistence take	515	1M	continuing	NMFS	75	50	50	50	50	
				ADFG						

IMPLEMENTATION SCHEDULE Page 2					Est. Fiscal Year Costs					Comments
Plan Task	Task #	Priority	Task Duration	Resp. Agency	(thousands of \$)					
					FY 1	FY 2	FY 3	FY 4	FY 5	
Evaluate other deliberate killing	516	1A	continuing	NMFS						included w/ 76
Evaluate mortality by non-human predators	517	3	continuing	NMFS						included w/ 322,332, 44, and 511
Reduce incidental take	521	1A	continuing	NMFS	15	15	15	15	15	
Develop non-harmful deterrents	522	3	continuing	NMFS	15	15	15	15	15	
Minimize marine debris	523	3	continuing	NMFS						included w/ ongoing programs
Reduce loss rate in subsistence harvests	524	2	3 yrs	NMFS						included w/ 515,751
				ADFC						
Recommend maximum allowable take	53	1A	continuing	NMFS						included w/ 71
Collect and analyze stomach contents	6111	2	continuing	NMFS	10	10	10	10	10	
Collect and analyze scats	6112	2	continuing	NMFS	10	10	10	10	10	
Determine food requirements	612	1R	2 yrs	NMFS	200	100				
Determine feeding areas and strategies	613	1R	4 yrs	NMFS	250	250	250	250		
Characterize prey availability	6141	2	2 yrs	NMFS		200	200			
Determine caloric value of prey	6142	2	1 yr	NMFS		60				
Compile and analyze data for section 6	615	2	continuing	NMFS	20	10	10	10	10	
Measure growth and productivity	621	2	3 yrs	NMFS		1000	1000	1000		
Develop models for energetics	622	2	3 yrs	NMFS		20	20	20		
Measure effects of fisheries on prey	631	2	3 yrs	NMFS		150	150	150		
Model effects of fishing on prey	632	2	3 yrs	NMFS	20	20	20			
Regulate fishing areas/seasons/operations	641	1A	continuing	NMFS						included w/ 71, ongoing programs
				NPFMC						
				ABF						
Regulate fishery catches	642	1A	continuing	NMFS						included w/ 71, ongoing programs
				NPFMC						
				ABF						
Establish sea lion recovery coordinator	71	1A	continuing	NMFS	100	100	100	100	100	
Maintain sea lion recovery team	72	2	continuing	NMFS	25	25	25	25	25	
Monitor Section 7 ESA consultations	73	1A	continuing	NMFS						included w/ ongoing programs
Distribute recovery plan to other nations	741	3	continuing	NMFS						no significant cost
Develop international agreements	742	2	continuing	NMFS						included w/ 71, other programs
				DOS						
Conduct information/education programs	75	1A	continuing	NMFS	150	150	150	150	150	
				ADFG						
				CDFG						
				ODFW						
				DFO						
				PSMFC						
Develop systems for reporting violations	761	2	continuing	NMFS						included w/ 762
Provide field enforcement programs	762	2	continuing	NMFS	125	125	125	125	125	
				USCG						

2. APPENDICES

APPENDIX A. List of rookeries and haulouts to be counted annually and used in analysis of Steller sea lion population trend (see Sections II.B and E.321) (from Merrick et al., 1991).

Trend Count Site	Rookery	Haulout
<u>Central Gulf of Alaska</u>		
S. Ushagat I.		X
N. Ugashat I.		X
Ugashat I.-rocks to south		X
Sugarloaf I.	X	
Latax Rocks		X
Sea Lion Rocks		X
Long I.		X
Marmot I.	X	
Kodiak I.-Cape Chiniak		X
Kodiak I.-Cape Barnabas		X
Two-headed I.		X
Sitkinak I.-Cape Sitkinak		X
Chirikof I.	X	
Chowiet I.	X	
Ugaiushak I.		X
Sutwik I.		X
<u>Western Gulf of Alaska</u>		
Spitz I.		X
Bird I.		X
Clubbing Rocks	X	
Pinnacle Rock	X	
Sea Lion Rocks		X
Nagai I.		X
Chernabura I.	X	
Atkins I.	X	
Castle Rock		X

APPENDIX A (Cont.). List of rookeries and haulouts to be counted annually and used in analysis of Steller sea lion population trend (see Sections III.B and E.321) (from Merrick et al., 1991).

Trend Count Site	Rookery	Haulout
<u>Eastern Aleutian Islands</u>		
Amak I.		X
Sea Lion Rocks	X	
Amak I.-offshore rocks		X
Ugamak I.	X	
Round I.		X
Akutan I.-Cape Morgan	X	
Akutan I.-Reef Point		X
Akun I.	X	
Bogoslof I.	X	
Umnak I.		X
Adugak I.	X	
Vsevidof I.		X
Ogchul I.	X	
<u>Central Aleutian Islands</u>		
Chuginadak I.		X
Herbert I.		X
Carlisle I.		X
Kagamil I.		X
Yunaska I.	X	
Chagulak I.		X
Amutka I.		X
Seguam I.-Saddleridge	X	
Seguam I.-Other		X
Agligadak I.		X
Tanadaki.		X
Sagigiki.		X
Amlia I.-East Cape		X
Amlia I.-West Cape		X
Atka I.-Cape Korovin		X
Atka I.-North Cape		X
Salt I.		X
Kasatochi I.	X	
Ikiginak I.		X

APPENDIX A (Cont.). List of rookeries and haulouts to be counted annually and used in analysis of Steller sea lion population trend (see Sections III.B and E.321) (from Merrick et al., 1991).

Trend Count Site	Rookery	Haulout
<u>Central Aleutian Islands (cont.)</u>		
Anagaksik I.		X
Little Tanaga I.-SE Point		X
Little Tanaga I.-Straits		X
Adak I.-Cape Moffet		X
Adak I.-Argonne Point		X
Adak-Lake Point	X	
Gramp Rock	X	
Ulak I.	X	
Amatignak		X
Dinkum Rocks		X
Unalga I.		X
Kavalga I.		X
Skagul I.		X
Tag I.	X	
Ugidak I.		X
Amchitka I.-Ivakin Point		X
Amchitka I.-East Cape		X
Arugadak I.	X	
Kiska I.-Cape St. Stephens	X	
Kiska I.-Lief Cove	X	

Appendix B: List of selected rookeries and schedule for conduct of Steller sea lion pup counts (see Sections E.322, 33, and 342). Sites to be included for monitoring trend in pup production in the Kenai-Kiska region are indicated by an asterisk.

Rookery	1991	1992	1993	1994	1995
<u>California</u>					
all rookeries		X		X	
<u>Oregon</u>					
all rookeries		X		X	
<u>British Columbia</u>					
all rookeries		X		X	
<u>Southeast Alaska</u>					
all rookeries	X		X		X
<u>Eastern Gulf of Alaska</u>					
Seal Rocks		X		X	
<u>Central Gulf of Alaska</u>					
Outer Island*	X		X		X
Marmot Island*	X		X		X
Chirikof Island*	X		X		X
Sugarloaf Island*		X		X	
Chowiet Island*		X		X	
<u>Western Gulf of Alaska</u>					
Atkins Island*	X		X		X
Pinnacle Rock*	X		X		X
Chernabura Island*		X		X	
Clubbing Rocks*		X		X	
<u>Eastern Aleutian Islands</u>					
Akun Island*	X		X		X
Bogoslof Island*	X		X		X
Ugamak Island*		X		X	
Akutan Island*		X		X	

Appendix B (cont): List of selected rookeries and schedule for conduct of Steller sea lion pup counts (see Sections E.322, 33, and 342. Sites to be included for monitoring trend in pup production in the Kenai-Kiska region are indicated by an asterisk.

Rookery	1991	1992	1993	1994	1995
<u>Central Aleutian Islands</u>					
Yunaska Island				X	
Seguam Island				X	
Ulak Island				X	
Kiska Island				X	
<u>Western Aleutian Islands</u>					
Buldir Islands				X	
Agattu Island				X	
<u>Bering Sea</u>					
Walrus Island				X	
<u>Russia</u>					
all rookeries				X	

SCOMM

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The School of Fisheries and Ocean Sciences

University of Alaska Fairbanks

**Strategic
and
Capital/Facilities
Plan
1995**

November 1995



The School of Fisheries and Ocean Sciences
University of Alaska Fairbanks

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TABLE OF CONTENTS

BACKGROUND	1
THE APPROACH	2
MISSION STATEMENT	3
FUTURE PLANS	3
ACTION ITEMS	6
SUMMARY OF FINANCIAL SUPPORT NEEDS	8
RELATIONSHIP TO STRATEGIC PLAN: UAF 2000	11
CONTEMPORARY ELEMENTS OF THE SFOS LONG RANGE PLAN	14
STRATEGIC PLANNING COMMITTEE REPORT	18
CAPITAL PLAN AND FACILITIES DEVELOPMENT COMMITTEE REPORT	24
 SFOS Faculty	 Appendix A
SFOS Administrative Structure	Appendix B
Advisory Boards to SFOS and Its Units	Appendix C
Letters of Transmittal for	Appendix D
Capital Plan and Facilities Development Committee Report	
Synopsis of Facilities and Program Information	Appendix E
SFOS Long Range Plan	Appendix F

Summary of Actions
Board of Regents Meeting
December 1-3, 1994

School of Fisheries and Ocean Sciences Task Force

PASSED

"The Board of Regents requests that the University of Alaska implement the recommendations of the School of Fisheries and Ocean Sciences Task Force and adopt a strategic goal-setting document accompanied by a capital plan and academic plan by September 1995. The Board requests that the document be reviewed annually with any revisions to be accompanied by a progress report. This motion is effective December 2, 1994."

School of Fisheries and Ocean Sciences

STRATEGIC AND CAPITAL/FACILITIES PLAN 1995

This Strategic Plan is not intended to be rigid and immutable; rather, it is to be a living document continually under examination and revision. This will allow us to remain responsive to new opportunities and needs, and change our emphases as we accomplish some of the goals. A process for such review will be initiated immediately, to be described below.

BACKGROUND

This Strategic Plan evolved from a series of discussions following the formation of the School of Fisheries and Ocean Sciences effective July 1, 1987. While taking into account the recommendations from task forces and councils during this period, and considering the priorities identified in a previous Long Range Plan, the current plan recognizes that the School has reached a new threshold in its evolution, while the external environment, both federal and state, also has changed. Against the background of this changing world, the School needs to devise a strategy which will allow it to effectively serve the State while participating in the national and global marine and fisheries education and research community.

The first body which provided guidance to the School was a UA restructure Level II Task Force. This was composed of faculty, administrators and members external to the University; the task force was charged with defining steps needed to coalesce the School and providing guidance on the immediate actions required. Recommendations, such as the development of the Ph.D. program in fisheries, the appointment of an Advisory Council and the focusing of undergraduate fisheries instruction on the Fairbanks campus, were all implemented during the following years.

It would have been easier to build a strong School of Fisheries and Ocean Sciences had the university environment been one of financial growth over the past few years. SFOS was encouraged to produce a series of major budget increment requests during the late 1980s and early 1990s, to little or no avail. Then, the SFOS Advisory Council encouraged the development of a Long Range Plan and this, too, was done. We now need to look at the realities, and plan accordingly.

The future direction of SFOS must adhere to the Strategic Plan: UAF 2000, and also must take into account the recommendations of the Board of Regents Special Task Force which met during the summer of 1994. Further, the guidance provided by the thoughtful and constructive advice of the School of Fisheries and Ocean Sciences Advisory Council needs to be considered. The SFOS Advisory Council has repeatedly emphasized the unique opportunity offered through SFOS to pioneer collaborative fisheries and oceanographic programs in our state, where the marine environment is critical. This is one way in which the School can help to assure a healthy natural resource base for Alaska, and also contribute to a well-educated public that respects natural resources. The Council also has recognized the many areas of strength and excellence already present within the School.

THE APPROACH

The planning activities were initiated through two committees:

STRATEGIC PLANNING COMMITTEE

Membership: Ron Dearborn, John French (inactive), Hank Pennington (Chair),
Tom Royer, Bill Smoker, Arliss Sturgulewski (external), Craig Wiese

THE CAPITAL PLAN AND FACILITIES DEVELOPMENT COMMITTEE

Membership: Gil Bane, (external), Dick Bower (external), Mike Castellini,
John French (replaced by Scott Smiley), Tony Gharrett (Chair),
Dave Nebert (staff), Dan Ogg (BOR), Joan Osterkamp (staff),
Ray RaLonde

These two groups began their work in mid-winter, 1994-1995, and each has produced a report. These are included as submitted. The vision and philosophy embedded in the Strategic Planning Committee's report expanded the responsibilities of the School to the State of Alaska and to the School's constituents within the State, and those concepts are an important part of this plan. As an introduction to the two plans, this lead-in document incorporates an Action Plan, which will serve as the anchor for the broader goals and objectives of the Strategic Plan. Those portions of the previous Long Range Plan for the School which have not been accomplished, and which also were identified through the present planning process, have been abstracted into a section of this document. That Long Range Plan had been reviewed extensively and accepted by all parts of the School, and there was a desire not to jettison that effort. A small group of faculty and administrators therefore re-examined it in the context of the present plan. The complete Long Range Plan also is attached as an appendix. However, it is important to recognize that this current Strategic Plan is not a redevelopment or reforming of the Long Range Plan, but rather that both have elements in common and that there is value in continuity where appropriate, and that there is much to be gained by not abandoning history. In particular, the faculty asked that the mission statement developed early in the School's history be included.

MISSION STATEMENT

The mission statement presented here was developed as part of the SFOS Long Range Plan and is endorsed throughout the School.

MISSION

SFOS has the primary responsibility within the University for research, education, and public service in oceanography, marine biology, fisheries, seafood and fisheries technology, and limnology. Although our activities extend worldwide, the emphasis is on Alaskan waters and the Arctic. Through research, we seek to better understand physical, chemical, and geological processes in marine and freshwater environments; the interactions among environmental factors and organisms which control the productivity of aquatic ecosystems; the impact of natural environmental variability and anthropogenic environmental change on aquatic organisms, systems and resources; and the resource management and utilization methods which will lead to enhanced economic returns consistent with conservation of resources, habitats and environments. Through education we disseminate the knowledge gained through research, and through student participation in research we enhance their ability to apply knowledge to problem-solving and to expand upon what they have been taught. Through public education and service we inform the community about important marine and fisheries issues, develop utilization technologies and strategies needed by those who use marine resources, and assist them in applying these technologies and strategies. The School's goal is to maintain and develop the broad expertise among its faculty and students needed to contribute to the wise use of Alaska's natural resources.

FUTURE PLANS

It is important to recognize that the priorities outlined here do not include the majority of our activities, but rather are those areas in which we must focus efforts in the near term.

Alliances and Partnerships

The School will place a strong emphasis on maintaining current strengths while developing new, and enhancing ongoing, partnerships with industry, resource management agencies, state and federal agencies, and international entities, with a view towards identifying needs, conducting programs in response to these needs, providing timely information and assistance, and sharing progress. SFOS must provide trained personnel in response to Alaskan industrial, research and management needs as a critical element in our service to the State. For example, the Juneau Center is a leader in developing new fisheries management techniques and also plays a major role in application of new fisheries scientific knowledge into the management efforts of the North Pacific Fishery Management Council. SFOS as a whole can be a powerful provider of courses to help resource managers develop professionally and incorporate new research findings and scientific techniques into their day-to-day efforts to manage

fisheries. We can do even more in serving resource management in Alaska. The same applies to resource utilization. In these areas, partnerships and alliances are a key strategy for the future. In ocean sciences, too, we serve a public need. For example, we need to understand coastal ocean dynamics so that coastal communities can deal with waste disposal without fouling their nearshore areas, we need to model the trajectories of tsunamis so that coastal communities can be warned and protected, and we need knowledge of benthic faunal assemblages in areas where offshore mining is planned. These, too, require partnerships among agencies and/or with coastal communities.

This element is critical to the UAF 2000 Goal "Be a Leading Partner with Communities, Industry and Government to Solve Specific State and National Needs." The associated objectives in the SFOS Strategic Planning Committee's report (p. 18-23) are "Partnerships for Well Managed Natural Resources" and "A Well Educated Public with Respect for Natural Resources."

Finances

The School of Fisheries and Ocean Sciences is facing difficult times financially, for two reasons. First, and most obvious, is the continuing decline in state appropriation funds relative to the increasing costs. Secondly, SFOS is heavily dependent on external funds, which are becoming increasingly difficult to secure and which now often come with reduced indirect cost recovery. This latter problem is in large part due to a heavy involvement in *Exxon Valdez* oil spill assessment and restoration research, but also results from the fact that many of the sources of external funding available for fisheries and fish processing research supply no funds to cover indirect costs. The Institute of Marine Science was built up beginning in the early 1960s based largely on external funds, and in this way has grown to be one of the two largest and most successful research institutes in the University of Alaska system. Now, we must be very careful to maintain the excellence and competitiveness, while not extending activities beyond our ability to maintain viable funding.

In response to these constraints, we will need to focus efforts and increase productivity in order to better utilize the limited state appropriation support. Our first thrust therefore will be directed at evaluating our productivity and taking steps to increase it. This is happening currently at FITC, and we will be launching a school-wide effort to identify appropriate productivity measures for all the major functions, with a view towards providing professional, teaching and research incentives and rewards. A review process involving faculty will be initiated, probably to be conducted in concert with the annual evaluation, and support for faculty initiatives or other rewards will be based on the results of the review as funds are freed up.

At the same time, we will try to identify new programs and new avenues for external funding. This will include continuing our private fund raising, our international efforts and creating new programmatic alliances with agencies. FITC is vigorously pursuing a National Science Foundation (NSF) University/Industry Center. We have initiated

meetings with the Alaska Department of Fish and Game (ADF&G) to explore mutual interests, and have formed a new partnership with the National Oceanic and Atmospheric Administration (NOAA) for Bering Sea fisheries research. The Sound Ecosystem Assessment (SEA) is another program which has developed through strong alliances with agencies and institutes.

Facilities

Arguably, facilities currently pose the greatest challenge to the effectiveness of our instructional and research programs. The School presently operates a number of sites, with permanent faculty clustered in four major areas: Juneau, Kodiak, Anchorage and Fairbanks. In addition, faculty are based at Seward and MAP agents are scattered throughout the coastal regions of the State. It is unlikely that the School of Fisheries and Ocean Sciences could accomplish its responsibilities based on one or two sites. The state of Alaska is so vast, and the coastline and problems so gigantic, that to some extent a distributed system is inevitable. In fact, SFOS is evolving *de facto* towards a functional structure with its core at the Fairbanks campus and three major coastal centers: Juneau, Kodiak and Seward. The Fairbanks campus provides a strong foundation of educational resources in the basic sciences, colleagues in a wide range of disciplines who collaborate productively in fisheries and ocean science research, and excellent research and teaching facilities. SFOS oceanographic and marine biological programs, the primary research activities in Fairbanks, aim to achieve a fundamental understanding of the ocean, upon which wise use of its resources and prediction of its response to human activities can be based. Each of the coastal centers has a primary mission, but also supports research and instruction (at least at the graduate level) on behalf of any of the missions of SFOS. For example, FITC is dedicated to supporting the fishing industry, and as a result its mission is highly applied. However, fisheries research is already conducted from the facility by faculty based elsewhere, and the site shows excellent promise for supporting marine biological research and instruction in addition to its applied mission. The Juneau Center maintains a strong and vital program related to fisheries, but faculty based there also conduct oceanographic and ecological research. Their primary benefit to Alaska, however, is highly trained fisheries scientists and scientific contributions to the effective management of Alaska's fisheries. Some graduate students based in Fairbanks or Juneau have committee members located, or take courses, at the other site. The Seward Marine Center supports oceanographic and marine biological research, and the new Seward Association for the Advancement of Marine Science (SAAMS) Alaska SeaLife Center will offer outstanding facilities for work with marine mammals and birds. The SFOS capital requests are in accord with this concept of distributed coastal facility support.

Faculty

SFOS currently has inadequate faculty expertise in some essential areas, for example, fisheries science, seafood/fishing technology and chemical oceanography. We will be requesting these positions as requisites for supporting the missions of the School,

recognizing that the need for marine and fisheries knowledge is vital to Alaska's future economy and well-being. Several replacement or challenge marine science faculty hires have been accomplished over the past few years, on the gamble that external resources can be secured for long-term support. This assumption is no longer valid for any faculty hires, but is especially unwise for fisheries or fisheries technology permanent tenure-track faculty.

Ongoing Review and Revision of the Plan

Responsibility for the review and tuning of this plan will rest with the Executive Committee of the School. This committee consists of the Directors of the Institute of Marine Science, the Fisheries Division, the Fishery Industrial Technology Center, the Alaska Sea Grant College Program, and the Marine Advisory Program, the Executive Officer, and Dean of the School, and is convened and chaired by the Associate Dean.

Not later than four weeks prior to the spring meeting of the Executive Council, the Dean's office will prepare a draft outlining accomplishments and actions, and provide these to the Directors. The Directors will then modify or revise the draft as it pertains to their area, involving faculty and staff in the review. Subsequently, the revised draft will be discussed at the Executive Council meeting, and accomplishments discussed, and changes in future directions and priorities will be reached by consensus. The resulting plan will then be presented and discussed at the spring meeting of the SFOS Advisory Council. Since the Directors normally attend this meeting, they will be part of the discussion and it will be possible to further fine tune the plan in response. The plan will also appear on the agenda for other Executive Council meetings, and faculty, staff and student input will be welcomed at all times.

ACTION ITEMS

2-5 Years

These are practical and specific actions which are viewed as internal guidance for SFOS operations. They are additional or complementary to the priorities identified under Future Plans above.

A. FURTHER THE DEVELOPMENT OF COHESIVENESS AMONG THE UNITS AND FACULTY OF SFOS.

This was recommended by the Board of Regents Special Task Force. It will be accomplished by:

- involving faculty throughout the School, and providing incentives for their pursuit;
- increasing faculty options to conduct research and participate in instruction at any SFOS site;

- development of clearly-defined criteria for productivity with appropriate measures and rewards, and a process for their application;
- identifying new opportunities for collaborative research, teaching and service measures and rewards, and a process for their application;
- acquiring communications equipment to enable, among other functions, regular "virtual" faculty meetings and courses offered at two or more sites;
- encouraging part-time participation by faculty at any and all SFOS sites;
- fostering close relationships among the marine advisory function and the research and education programs in SFOS;
- facilitating greater participation by faculty and students, especially at the coastal centers, in the Alaska Native Marine Science Internship Program, through enhanced communication facilities and travel support; and
- producing SFOS recruiting materials emphasizing interdisciplinary opportunities for graduate study.

B. DEVELOP THE FACILITIES NEEDED TO ENSURE THE ABILITY TO OFFER THE TRAINING NEEDED FOR PROVIDING EDUCATED MANPOWER AND CITIZENS, WHILE MEETING ACCREDITATION REQUIREMENTS AND FULFILLING THE SFOS ROLE IN STRATEGIC PLAN: UAF 2000, AS OUTLINED IN THE FINANCIAL PRIORITIES STATEMENT.

This implies, in the short term, adequate facilities at the Juneau Center, as well as enhanced facilities and housing in Kodiak and adequate oceanographic vessel docking capabilities. SFOS acceptance of graduate students, especially in fisheries, currently is limited by the availability of suitable space. In this regard, adequate facilities on the Fairbanks campus also are important.

C. ENHANCE THE FACULTY IN SELECTED AREAS NEEDED TO ACCOMPLISH THE MISSION.

The faculty body also will be focused over time, as positions become available through retirement or departure, in response to the evolving Strategic Plan.

D. INCREASE FACULTY AND SFOS ADMINISTRATION PARTICIPATION IN PLANNING AND DEVELOPMENT OF STATE, NATIONAL AND INTERNATIONAL RESEARCH PROGRAMS.

Although these activities are already extensive, funding opportunities can be enhanced by carefully directed release time and travel support.

E. EXPAND COMMUNICATION WITH THE PUBLIC, TO INCREASE PUBLIC AWARENESS OF THE RESOURCES AVAILABLE AT SFOS AND SFOS KNOWLEDGE OF PUBLIC NEEDS AND CONCERNS.

SFOS will address the legislative need for information and enhance public effectiveness in the resource management process through further public education.

Also, SFOS should respond to the needs of aquatic farmers, coastal and inland waterway communities, and other users of the marine or freshwater environments.

1. *Expand communications with the fishing industry through targeted publications, formal and informal meetings and other forms of communication.*

This dialogue will culminate in the development of joint projects with industry, will serve to apprise industry of research results and personnel available to assist with problems, and will also transmit the latest technology to industry.

2. *Cooperate with the Alaska SeaLife Center, using its facilities and the existing K. M. Rae facility, to inform the public about important marine and freshwater environmental and resource issues.*

3. *Facilitate and encourage faculty participation in K-12 education.*

We will help to initiate and develop students' interests in math and science, assist with marine-related curriculum development, and interact with and assist teachers. The use of electronic methods (i.e., the internet) will evolve as an attractive approach to presenting marine topics.

- F. MAINTAIN A STRONG PRESENCE ON THE FAIRBANKS CAMPUS, AND ULTIMATELY PROVIDE IDENTIFIABLE AND UNIFIED SFOS SPACE.

The facilities available for IMS research are substandard, and inadequate for one of the two largest and most successful research institutes in Alaska. The Fisheries Program has essentially no assigned space on the Fairbanks campus. The SFOS Advisory Council has recommended attention to this deficit, as has a previous accreditation team.

SUMMARY OF FINANCIAL SUPPORT NEEDS

Capital/Facilities

A. AUKE CAPE FISHERIES COMPLEX

Construction	\$11,000,000
Equipment and furnishings	\$2,000,000

We are seeking to identify external sources of financing for part of this cost.

For details of this initiative, please see the Capital Plan and Facilities Development Committee Report (p. 34). This initiative was strongly recommended by the SFOS Advisory Committee, to the extent that its letter report of the April 1995 meeting stated that the viability of SFOS may hinge on it.

Participation in this NOAA initiative as a co-locating party is a golden opportunity for the University of Alaska. Shared facilities, including a fisheries library, the creation of a critical mass of scientific expertise, and the consolidation of federal activities pertaining to Alaska in Alaska, are all prospects which make this facility critical to SFOS and to UAF.

The SFOS instructional program in fisheries will benefit enormously from this development, which will allow us to provide a concentration of expertise unavailable anywhere else. Given that we plan to offer an undergraduate year or years at the upper division level at Juneau for fisheries majors as well as entertain a growth in the Ph.D. program, this has the potential to make ours the premier fisheries program in the United States.

B. FITC PHASE II (THERE IS NO SPECIFIC FUNDING REQUEST AT THIS TIME)

This development is underway, with UAF participation through funds from the Exxon Valdez Trustee Council. The Kodiak Island Borough is taking the lead in developing the facility, which is to be a multiple-use building for federal and state agencies and the University. An important part of the UAF plan is to develop housing for visiting scientists and student dormitories, since the success of the SFOS Kodiak-based programs depends on this. Housing is so important for developing the Kodiak program that inclusion of faculty/staff/scientist housing in Phase II is an extremely high priority.

C. OCEANOGRAPHIC FACILITIES

Pier	\$4,000,000
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Within the next few years we anticipate replacement of the R/V *Alpha Helix* with a larger vessel. The proposed plan calls for UAF to be assigned the R/V *Oceanus*, a 177-foot vessel currently operated by the Woods Hole Oceanographic Institution. This plan is, of course, subject to change, but a replacement vessel within a few years is inevitable if we are to remain an ocean-going vessel-operating institution. At the same time, the initiative for the United States to acquire an Arctic Research Vessel is continuing to develop. If this vessel is built, we, as the arctic university, stand a good chance in the competition to be the operating institution. In light of these initiatives, the long-expressed need for new docking capability becomes more urgent.

D. A HOME BUILDING FOR SFOS

Ultimately, the identity and cohesiveness of SFOS will require a central headquarters. An identified building on the Fairbanks campus is needed to provide a focus for the School. This is an important part of the long range Strategic Plan. No specific dollar amount is given here, because we recognize that there may be a number of possible solutions to this need.

Faculty Positions (In order of priority)	Salary + Benefits
Faculty position in process engineering*	\$80,000
Faculty position in fisheries science	\$80,000
Faculty position in chemical oceanography	\$80,000
Faculty position in industrial systems modeling*	\$80,000
Associated start-up costs	\$100,000 per position
*May be filled by non-tenure track research faculty	

The positions identified here are only those for which the need is most urgent. The goals are to (1) achieve the "critical mass" of faculty needed to make FITC productive and responsive to industry needs, (2) ensure maintenance of accreditation for the undergraduate fisheries program, and (3) respond to rapidly emerging research needs and opportunities as well as to a need for broader instructional capability in chemical oceanography. There are other needs for faculty which also are great. Recognizing that new funding will be in short supply, these needs will be addressed by refilling positions as they become vacant. The process engineering position is the top priority because we have a mandate to provide, through FITC, a viable program in support of the fishing industry, and this is one area in which external funds to support the research are immediately available. The industrial systems modeler will further support this program. The second priority is for the fisheries position, which is urgently needed to maintain the quality and content of our fisheries instructional program and also to conduct research needed for the maintenance of Alaska's viable fish stocks. The chemical oceanography position is needed for instruction as well as in support of UAF's effective participation in current and planned arctic and fisheries oceanographic research, all with a strong potential for external financial support.

Infrastructure

Equipment and support for communications and networking	\$100,000 per year
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The School of Fisheries and Ocean Sciences is distributed throughout Alaska, and its effectiveness in fulfilling its mission depends on communications for operational, educational, research and extension purposes. Funds are needed for purchase and maintenance of hardware, including dedicated equipment for enhancement of the SFOS web site.

(n.b., Action Items not specifically mentioned will be accomplished by rebudgeting of existing funds.)

RELATIONSHIP TO STRATEGIC PLAN: UAF 2000

The mission of the School of Fisheries and Ocean Sciences meshes closely with University of Alaska priorities as outlined in Strategic Plan: UAF 2000 (shown below in italics—only pertinent numbered items are included). In this section a brief analysis is included, with emphasis on the future directions as manifested in the financial request and action steps.

- The SFOS plan supports the goal, "*BECOME THE WORLD'S LEADER IN ARCTIC RESEARCH AND GRADUATE EDUCATION*" through its commitment to further the excellence in research and graduate education in the marine and fisheries sciences. All the faculty positions identified in this document will support this goal. Further, the self-evaluation process described under the action items will support this goal of excellence in arctic research and graduate studies.

A. Train graduate students who will play leading roles in tomorrow's society.

The proposed facilities will allow us to maintain and increase the number of graduate students in the area of fisheries. Fisheries is one area in which the potential for increasing the number of Ph.D. students is both possible and desirable. The demand is evident. The Auke Cape facility will allow a significant expansion of the fisheries graduate program. The planned housing in Kodiak will allow us to maintain and increase the number of graduate students there. It will also enhance programs through accommodating postdoctoral fellows and visiting scientists. We will continue to produce excellent graduates in the fields of marine biology and oceanography; our past graduates in these fields have made important contributions in research, education and public service.

B. Function as a national center of excellence in arctic and subarctic research.

- 1) Emphasize and encourage research to provide an understanding of physical, biological, and social processes and phenomena as they occur in or are relevant to the arctic and subarctic region and its population.*
- 2) Facilitate interdisciplinary research and graduate study.*
- 3) Improve and maintain the infrastructure for research and graduate education at UAF, including state-of-the-art facilities, equipment, and networking.*
- 4) Integrate all UAF campuses into research efforts, paying particular attention to the advantage afforded to UAF by the locations of and expertise at rural campuses.*

The SFOS plan endorses maintaining and promoting the excellent opportunities for graduate work in marine sciences and fisheries. The oceans are an important element of the Alaskan and arctic environment, and SFOS has the responsibility for research in all areas pertinent to them, whether basic or applied. Our

programs are largely interdisciplinary in approach. In order to reach its potential as a graduate/research entity, SFOS urgently needs the requisite facilities, hence the capital items identified in this document. SFOS's distributed nature encourages working with the rural and other campuses.

- The SFOS plan supports the goal, *"PROVIDE HIGH QUALITY UNDERGRADUATE EDUCATION FOR TRADITIONAL AND NON-TRADITIONAL STUDENTS."*

SFOS is dedicated to providing an outstanding undergraduate fisheries degree, and to this end is planning the facilities and staffing needed to accomplish this goal. Many Alaskan students are oriented from childhood towards a lifestyle that involves fishing. SFOS also provides undergraduate courses in marine sciences, including a course in the natural science core curriculum, which also supports our goal of an educated marine public.

B. 4) Regain Alaska's global leadership in distance delivery education.

SFOS needs to continue developing distance delivery as a tool—this was successfully initiated in fisheries instruction during academic year 1994–1995. Additionally, we are planning upper division residency for one or two years for fisheries majors at our Juneau Center as a tool for improving access to faculty and fisheries resources and broadening the students' experience. We intend to offer selected oceanography and marine biology courses at the coastal sites, if adequate distance delivery equipment becomes available.

- The SFOS plan supports the goal, *"BE A LEADING PARTNER WITH COMMUNITIES, INDUSTRY AND GOVERNMENT TO SOLVE SPECIFIC STATE AND NATIONAL NEEDS."*

A. [Be] The leading Alaskan Research Partner with communities, business, government agencies, the military, and other universities within and outside Alaska.

All units of SFOS are deeply involved in this area, which is a major emphasis in this plan. Cooperative work with other universities around the world is strong in the marine sciences and fisheries areas. For example current planning for PICES-related North Pacific Ocean research involves many SFOS faculty. Faculty engage in cooperative research with the National Marine Fisheries Service, the Alaska Department of Fish and Game, the Minerals Management Service, the National Biological Survey, the National Oceanic and Atmospheric Administration, the United States Forest Service, and more. The Strategic Plan places high emphasis on maintaining the national and global perspective. SFOS delivers a tremendous amount of public service to management and other agencies, including the North Pacific Fishery Management Council, the National Research Council, the National Science Foundation, the Western Regional Aquaculture Consortium and so on. The

Alaska Sea Grant College Program is dedicated to promoting applied marine and fisheries programs in Alaska as well as public outreach and education. The Fishery Industrial Technology Center joins with business and communities to solve practical problems relating to the fishing industry. The new positions and the high priority placed on housing are in accord with this mission.

- 1) *Place particular emphasis in areas of study that highlight our geographical location and our strengths.*

The School of Fisheries and Ocean Sciences has significant strength in oceanography, marine biology and fisheries. These are among the most appropriate areas for Alaska, which has the largest viable commercial fisheries resources and is bordered by the only U.S. arctic seas. University involvement in many areas specific to high latitude waters and their resources is important. The wedding between fisheries science and oceanography provides strong support for the basis of marine resource development and conservation. The importance of the fishing industry makes our applied industrial support and our extension programs vital.

- B. *[Be] a builder of human capital for Alaska with emphasis on the areas of our strength.*

- 1) *Work closely with industry and statewide and local agencies to determine trends and likely areas of growth.*

The School of Fisheries and Ocean Sciences has enjoyed a very high success rate in the placement of graduates in all fields. Many of the fisheries and marine sciences M.S. graduates remain in Alaska and occupy positions of responsibility with state agencies and research and educational organizations, and all the fisheries Ph.D. graduates to date are employed in the state.

- 2) *Create stronger ties between UAF faculty and staff and K-12 schools and students.*
- 3) *Create in each unit proactive outreach projects in the community and state and coordinate into the planning process the information those contacts provide.*
- 4) *Emphasize master's degree programs and selected doctoral programs in the humanities, social sciences, natural sciences, and engineering as professional and mid-career programs for Alaska's labor force. Encourage inter-institutional arrangements to create such programs in Alaska.*
- 5) *Emphasize vocational-technical programs to meet the workforce needs of Fairbanks and the rural areas of Alaska and to enhance economic development.*

Graduates of SFOS are highly successful in gaining professional employment with government agencies and academic institutions; many are now working in Alaska. The SFOS Marine Advisory Program also addresses the above goals, which could in a sense be viewed as the central mission of MAP. FITC, too, carries out many of these, especially 1), 3) and 5). Our fisheries graduate degree programs offer mid-career professional training for Alaska's labor force, and a large number of agency scientists have taken advantage of the opportunity. SFOS has a commitment to foster strong programs in marine sciences, fisheries, applied fishing technology and seafood science, and to provide excellent marine advisory services. This is reflected in the financial request as well as in the body of the plan.

- The SFOS programs allow full participation in the goal, "*BECOME THE EDUCATIONAL CENTER FOR ALASKA NATIVES*" due to our location at several coastal sites, and the nature of our programs which are intrinsically of interest and concern to Natives. We offer internships to Alaskan Native students through an externally-funded program, and we offer various training opportunities at coastal communities as part of our mission.
- The SFOS plan also supports the goal, "*BE THE ACADEMIC GATEWAY TO THE RUSSIAN FAR EAST, THE NORTH PACIFIC, THE ARCTIC AND THE CIRCUMPOLAR NORTH.*"

SFOS faculty, staff and students conduct research throughout the North Pacific, the eastern Arctic and the western Arctic. A close relationship exists and is fostered with organizations in Russia and Japan, and there is a developing relationship with China. SFOS scientists are involved in the planning of essentially all major North Pacific marine programs, and most arctic programs. Maintaining this international perspective is a priority. Specific examples of international cooperation include work with (and, in part funded by) the Japan Marine Science and Technology Center (JAMSTEC), a very close relationship with the fisheries academic and research programs at several institutions in Japan, but most notably with the Faculty of Fisheries at Hokkaido University, exchange visits with Russian scientists, and a heavy involvement in the North Pacific Marine Science Organization (PICES). The proposed faculty and facilities will contribute directly to enhance this kind of activity.

CONTEMPORARY ELEMENTS OF THE SFOS LONG RANGE PLAN

In this section, we have extracted and abstracted those objectives and strategies from the previous SFOS Long Range Plan which remain a priority. However, the new Action Plan incorporates concepts developed through the current strategic planning effort through the work of the SFOS Advisory Council and through the August 1995 meeting of the School's Executive Committee, and does not rest on the Long Range Plan. The Long Range Plan as updated in 1992 is appended; some of the objectives identified in it have already been accomplished.

INSTRUCTION IN FISHERIES AND OCEAN SCIENCES

OBJECTIVES

Improve the facilities and equipment available for instructional activities in the marine and fisheries sciences.

Emphasize quality instruction based on contemporary understanding of fundamental principles and their application to marine resource utilization, enhancement and management.

Offer appropriate fields of study, in tune with scientific objectives, the expertise of the faculty and state and national needs.

Maximize interdisciplinary instructional opportunities so that graduates are not only experts in their specialty, but also have an appreciation for the broader aspects of oceanography, marine biology and fisheries sciences.

Seek and attract the best graduates and undergraduates from among students residing in Alaska, in the nation and internationally, for continuing career development.

STRATEGY

Continually upgrade teaching equipment and facilities. Where appropriate, utilize existing research equipment/laboratories in the formal teaching program. Make more use of seaside laboratories, field stations and vessels in teaching programs.

Increase recognition in SFOS for quality classroom instruction and for advising and other graduate student training activities.

Provide opportunities for short-term exchange of faculty and students between the disciplines for seminars, short courses, workshops, guest lectures and, occasionally, full semester courses.

Encourage Alaska Native students to pursue degrees in marine science and fisheries through faculty/student mentoring programs.

Increase funding for graduate students and undergraduate internships as part of a more active recruiting program.

UNDERSTANDING OF MARINE AND FRESHWATER SYSTEMS

OBJECTIVES

Better understand the oceanographic environment, its natural variability, and the relationships between this variability and local and global atmospheric and climatic.

Increase knowledge of the biology of northern aquatic organisms, including their biochemistry, genetics, nutrition, physiology, behavior, productivity, and predator-prey interactions.

Understand the relationships between environment and ecosystem structure, function, and variability.

Develop an ecosystem-based understanding of the natural variability of fisheries, especially the relationships between recruitment, yield, growth and survival, quality attributes, and physical, chemical, and biological oceanographic parameters and processes.

Use basic understanding of the biology of commercial and subsistence species and the ecosystems of which they are components, along with data on fisheries resource utilization, to assess and predict the impact of fisheries on ecosystems.

Investigate the sources and fates of climatically active gases such as carbon dioxide, sulfur dioxide, and nitrogen dioxide in high-latitude oceans.

Use an understanding of natural environmental variability and its causes to identify, quantify, and predict changes caused by human activities.

Use knowledge of the effects of natural environmental variability on ecosystems to understand and predict the effects of anthropogenic environmental change.

STRATEGY

Fund and recruit new faculty in fields which can contribute to achieving these objectives. These should include outstanding scientists in physical, chemical, biological, and geological oceanography and marine biology who are interested in conducting research at high northern latitudes.

Fund and recruit new faculty in fields of fisheries and fisheries oceanography.

Increase participation in planning, development, and execution of national research programs which incorporate these objectives.

Facilitate planning, development, and execution of multidisciplinary research programs involving SFOS faculty and researchers at other institutions.

Promote interdisciplinary research on ecosystems supporting commercial, subsistence, and recreational fisheries and/or marine mammals. Seek more funding from state and federal fisheries programs and from industry.

STRATEGIES AND TECHNOLOGIES FOR INCREASING THE ECONOMIC BENEFITS OF FISHERIES AND OTHER MARINE RESOURCES

OBJECTIVES

Develop techniques to increase fishery selectivity, and to maximize seafood quality and shelf life after capture.

Assist in developing new seafood products.

STRATEGY

Recruit and fund new faculty with interests related to improved economic yield from marine resources, including the fields of aquaculture, food science and nutrition, and fisheries technology.

Increase information to state government on enhanced economic benefits through research, and seek state investment in this research.

Maintain a strong Marine Advisory Program and enhance extension relating to SFOS programs.

FACULTY INTERACTION AND COLLABORATION

OBJECTIVES

Improve communication among the SFOS faculty and staff.

Set up workshops for developing research projects and responding quickly to RFPs.

STRATEGY

*Maintain annual faculty meetings, encourage presentation of seminars when visiting [centers] of SFOS, and update electronic mail and fax directories.**

Have principal investigators exchange information on current areas of research, upgrade communications through SFOS, and improve early announcements and deadlines of RFPs.

*Develop research and teaching projects that involve staff from [throughout the School and from various] locations within the School.**

*Wording is changed in response to the current operating structure of SFOS.

STRATEGIC PLANNING COMMITTEE REPORT

September 1995

COMMITTEE MEMBERS

Ron Dearborn, Sea Grant
John French, SFOS (inactive)
Hank Pennington, MAP (Chair)
Tom Royer, IMS
Bill Smoker, Fisheries Division
Arliss Sturgulewski (external)
Craig Wiese, MAP

Rationale: School of Fisheries and Ocean Sciences

In the foreseeable future the School of Fisheries and Ocean Sciences must make critical decisions affecting not only its own programs and future, but also the natural resources, ecosystems, and economies of the State, and ultimately a significant portion of the world.

Although often perceived as remote from human impacts, Alaska's marine resources are profoundly influenced by global oceanographic processes which can dramatically affect conditions and biological growth rates. These processes now threaten to deliver pollution, just as they deliver the nutrients that fuel Alaska's fisheries. The marine organisms themselves can move far beyond national boundaries and live in many parts of the marine and freshwater environment during their life cycle. Global studies may apply directly to Alaska's marine environment and fisheries, and make national and international links to the world scientific community critical.

The SFOS faculty have a wide spectrum of interests, activities and backgrounds and are working to understand the marine environment and apply this essential knowledge to the needs of the citizens of Alaska. Support for these efforts is derived from a broad spectrum of sources ranging from federally funded peer-reviewed projects to state funding for marine industrial development. Bringing such diversity of disciplines, activities and funding to a single organization requires integrated effort and strong communication throughout the School.

The following Vision, Mission, Values, and Goals and Objectives are the core of a Strategic Plan which, when implemented along with a Capital Plan, will provide guidance to lead the School of Fisheries and Ocean Sciences into a challenging future. Annual reporting and periodic, regular review and revision of the Strategic Plan will provide opportunities to adjust the structure and function of the School to best respond to changes not foreseen at this time.

VISION: To be a leading partner for a healthy and productive ocean.

MISSION: Sound judgment in the use of the ocean.

VALUES: Partnerships, good work, worldwide alignment, learning, wise use of resources, collegiality, academic freedom, intellectual curiosity.

Goals and Objectives

A. GOAL: PROFESSIONAL ENHANCEMENT

1. *Focus area—UAF Students*

Objectives

- To identify opportunities and needs for producing excellent students
- To stay on and advance the cutting edge through relevant research
- To develop and deliver curricula
- To place students in marine science and resource management fields

2. *Focus area—Professionals in the Field*

Objectives

- To identify opportunities and needs
- To work with agencies (e.g., ADF&G and NMFS) to define and enhance curricula
- To develop and deliver curricula
- To foster professional development of faculty and staff

3. *Focus area—Vocational/Technical*

Objectives

- To identify information needs of resource users
- To develop and provide in-service technical training to users

B. GOAL: PREDICTION OF MARINE AND RELATED ECOSYSTEMS

1. *Focus area—Academic Science*

Objectives

- To determine research needs and opportunities
- To participate in the development of research plans
- To propose research
- To carry out research
- To disseminate research results

2. *Focus area—Cooperative Research Programs*

Objectives

- To work with resource agencies to identify research needs
- To develop and participate in federal, state, and foreign partnerships for research

3. *Focus area—Industry Driven Science*

Objectives

- To cooperate with and assist organizations conducting or fostering industrial science and technology
- To sponsor and participate in regular meetings with industry to learn needs
- To engage in research to help solve industry problems
- To publish and distribute data in forms readable by and useful to industry

C. GOAL: PARTNERSHIPS FOR WELL MANAGED NATURAL RESOURCES

1. *Focus area—Dynamic Marine Research*

Objectives

- To match resource questions with appropriate tools
- To join in cooperative science ventures
- To share research progress of School with resource research organizations

2. *Focus area—Effective Management of Resources*

Objectives

- To participate in management bodies
- To provide increased communication and interaction among agencies
- To identify and respond to research needs of management agencies
- To share progress of School with resource managers

3. *Focus area—Resource Users*

Objectives

- To help users understand the limits of current knowledge and the need for conservative management
- To develop relationships with user groups
- To provide information and personnel to companies
- To assist resource users in increasing value of exploited resources
- To share progress of School with resource users
- To provide information and assistance in contending resource users
- To refine and state appropriately to managers the needs of resource users

4. *Focus area—Policy Makers*

Objectives

- To propose and play a role in resource policy changes
- To clarify the role of UAF faculty in policy issues

- To provide information to policy makers
- To participate in policy formulation by executive branch agencies
- To be aware and responsive to policy issues in the Legislature

D. GOAL: A WELL EDUCATED PUBLIC WITH RESPECT FOR NATURAL RESOURCES

1. *Focus area—An Informed and Aware Public*

Objectives

- To establish SFOS as a credible information source for diverse audiences
- To conduct resource education programs for journalists
- To increase use of media by SFOS
- To meet educational opportunities for visiting public at school facilities, including the Alaska SeaLife Center, through design, display and programs

2. *Focus area—Public Participation in Political/Management Processes*

Objectives

- To support legislative need for information
- To help candidates address marine issues in platforms
- To help public be more effective in resource management process

3. *Focus area—Attracting and Retaining Children's Interest in Math and Science*

Objectives

- To determine ways to interest students in math and science
- To work with DOE and teachers to develop curricula
- To nurture K-12 students
- To interact with and assist teachers

E. GOAL: APPROPRIATE UTILIZATION OF NATURAL RESOURCES

1. *Focus area—Industry Involvement and Partnerships*

Objectives

- To work with industry in developing joint projects
- To apprise industry of research results and personnel available for assistance
- To transmit the latest technology to industry

2. *Focus area—Commercial Harvest and Processing of Fish, Shellfish, and Marine Plants*

Objectives

- To improve product quality among harvesters and processors
- To develop increased value products from traditional and underutilized species
- To foster more "value added" production activities in Alaska
- To reduce wastage or utilize non-target species
- To increase efficiency and productivity of harvesters and processors

3. *Focus area—Other Users of Finfish, Shellfish, and Marine Plants*

Objectives

- To work with subsistence, recreational and non consumptive users to identify research, education and service needs
- To respond to those needs

4. *Focus area—Other Marine Resources*

Objectives

- To identify research, education and service needs of water users, aquatic farmers, communities and other users of the marine environment
- To respond to those needs

F. GOAL: ACADEMIC FREEDOM AND INTELLECTUAL CURIOSITY

1. *Focus area—School Faculty*

Objectives

- To assure a degree of salary support for undesignated activities
- To enable faculty to pursue academic interests outside their current disciplines
- To increase the number of successful grant proposals from School faculty
- To increase accountability of faculty using state funds for the purpose of writing grant proposals
- To provide incentives for faculty to be active in diverse forums for setting research agendas
- To enhance sabbatical leave process by strengthening review of innovative thinking
- To identify and develop opportunities for accomplishing long-term good

2. *Focus area—Encouraging Development of New Ideas*

Objectives

- To provide a forum within the School to debate issues on the state and federal agenda well served by faculty insight
- To establish a forum for faculty in other disciplines to conduct interdisciplinary activities with SFOS faculty
- To encourage inter-campus cooperation in research, service and education
- To encourage team teaching in marine science and fisheries
- To consider broader resource needs in discussions of specific ideas

G. GOAL: INFRASTRUCTURE AND MANAGEMENT FOR A WIDELY DISPERSED SCHOOL

1. *Focus area—Managing School*

Objectives

- To support teaching, research and service
- To cooperate with other agencies in developing facilities
- To manage for the long-term good of the School, the State and its resources

2. *Focus area—Representing the School*

Objectives

- To articulate a long-term view of the School for funding bodies
- To look with broad vision at the School and the issues affecting it
- To define means for broader presentation of the School to diverse constituents
- To present the School to political bodies as an integral part of the state economy and source of practical knowledge
- To make presentations to the legislative committees and Board of Regents

3. *Focus area—Communication*

Objectives

- To develop a policy for dispersal of information while protecting academic freedom
- To define communication responsibilities of academic program chairs, dean, associate dean and faculty
- To incorporate communication of information to broader audiences into research projects, conferences and meetings, and extension projects

4. *Focus area—Collegiality*

Objectives

- To conduct regular SFOS faculty meetings
- To increase opportunities for off-campus faculty to conduct seminars on campus, and vice-versa

CAPITAL PLAN AND FACILITIES DEVELOPMENT COMMITTEE REPORT

Summer 1995

COMMITTEE MEMBERS

Internal:

Mike Castellini, IMS
Tony Gharrett, Fisheries Division (Chair)
Dave Nebert, IMS/SFOS Administration (staff)
Joan Osterkamp, SFOS Executive Officer (staff)
Ray RaLonde, MAP
Scott Smiley (replacing John French), FITC

External:

Gil Bane, Kodiak College
Dick Bower, Alaska Board of Fish
Dan Ogg, UA Regent (ex officio)

Conclusions Reached by the Facilities and Capital Plan Development Committee August 1995

The School of Fisheries and Ocean Sciences at UAF has primary responsibility for the marine-related programs within the University of Alaska. It carries out its mission and meets the needs throughout Alaska through its units: the Institute of Marine Science (IMS), the Marine Advisory Program (MAP), the Fisheries Division, the Fishery Industrial Technology Center (FITC) and the Alaska Sea Grant College Program. Each unit plays a different role in fulfilling the SFOS mission and has a different focus in meeting the University of Alaska's and the State's needs in teaching, research, and service. The diversity of the units and their broad regional representation are important in SFOS' success in such a geographically large and resource rich state with such a low population density.

This committee first developed preliminary facility descriptions and needs for each of the units in the context of their roles and activities within SFOS (Appendix E). From this preliminary effort, we have identified a number of situations that affect the ability of SFOS to meet the State's needs that can be addressed by facilities and capital planning. The things we have identified involve the fundamental functions of SFOS units and are relatively independent of the Strategic Planning that involves a more detailed examination of program directions and needs. The most critical facilities and capital planning issues that affect SFOS are the inadequacies of the fisheries facility in Juneau, the FITC facilities in Kodiak, and the dock in Seward. In addition, improved communication capabilities among the units would enhance their recognition and value.

The National Marine Fisheries Service (NMFS) is developing plans for a facility at Auke Cape (near Juneau) that will house the Auke Bay Laboratory and the Regional Office, which is responsible for marine fish management in federal waters adjacent to Alaska. SFOS was asked to participate in the planning. Because this offer provided an extraordinary opportunity to secure much needed space and to be a partner in developing the center of fisheries excellence in Alaska, SFOS has been participating in the planning. A variety of funding sources are being pursued, but funding has not yet been identified. The Auke Cape facility will allow SFOS to further develop its fisheries program and enhance its ability to prepare students to become professionals who manage Alaska's fisheries and to perform research and service important to Alaska's resource management agencies and to the conservation of Alaska's living marine resources.

The Phase II of facilities development for FITC in Kodiak is going forward. This development is being underwritten largely by the Borough of Kodiak and will enhance the ability of SFOS to serve the needs of Alaska's fishing industry and processors as well as develop its role in preparing students for work in the industry. Development of housing for students and visiting researchers is also important to success.

The dock at Seward will be inadequate for the new National Science Foundation vessel that SFOS will administer. The vessel is integral to much of the research and graduate education conducted on marine resources of Alaska's waters and as such is an important component that IMS plays in national and international marine and oceanographic research and education as well as within Alaska.

Communication ties the SFOS units into a single entity. It is also of fundamental importance to SFOS' ability to meet its education, service, and even research missions. Therefore, communication capabilities are extremely important to the integrity of SFOS. The Marine Advisory Agents are the "face" of SFOS to many marine resource users and communities throughout Alaska. It is important that they be able to communicate effectively with the public and other SFOS units using modern communication technology.

A Brief History of the School of Fisheries and Ocean Sciences, University of Alaska Fairbanks

The first Alaska Legislature, in recognition of the enormity of Alaska's aquatic resources and in order to reduce Territorial dependence on the University of Washington, Oregon State University, and other institutions for training professionals and conducting research on those resources, established in 1960 the Institute of Marine Science at the University of Alaska Fairbanks to provide a "program of education and research in physical, chemical and biological oceanography and related fields" (First Alaska Legislature, 1960). Over the past three and a half decades, IMS expanded to a maximum of 28 faculty, and now has 23 tenure track faculty (and four research faculty). The development of substantial

expertise in the major oceanographic disciplines occurred during the first two decades along with the expansion of faculty, and has enabled IMS to play leading roles in multi-faceted studies of Alaska's coastal and continental shelf waters as well as participate in studies throughout the world oceans. In 1970 the Institute moved its base of marine operations from Douglas, Alaska to Seward and, in 1980, began operating a 133-foot ice-strengthened vessel, the R/V *Alpha Helix*. Access to the newly acquired vessel greatly increased IMS' capabilities for oceanographic research. During the 1980s, IMS enhanced its national and international reputation with its participation in a broad range of research programs, extending from the Gulf of Alaska through the Bering and Chukchi Seas to the Arctic Ocean. The first of many graduate marine science degrees were granted to IMS students in 1965. Since that time, IMS students have earned approximately 150 graduate degrees, 30 percent of which have been at the Ph.D. level.

The second Alaska Legislature, to assist the State's fishing industry, appropriated funds for the Cooperative Extension Service (CES) to provide a fisheries extension program. In 1963, Fisheries Extension broadened its outreach efforts to include all of the maritime public and changed its name to the Marine Advisory Program. Since 1963, the MAP faculty has grown to seven field agents and five specialists. Several field agents have also developed specialty areas for their activities. MAP provides educational and technical assistance in the areas of fisheries, marine safety, business management, seafood technology, seafood quality, aquaculture, marine mammals, and recreation/tourism. MAP was a combined effort of Sea Grant and CES until it became a unit of the new School of Fisheries and Ocean Sciences in 1987. MAP receives funding support from both the Sea Grant Program and the State of Alaska.

Alaska has long acknowledged the need to conserve its fisheries resources, its foremost renewable source of wealth. In 1974, the University established a fisheries program at the University of Alaska, Juneau, which grew from one director in 1975, with part-time help from scientists at the National Marine Fisheries Service Auke Bay Laboratory, to a School of Fisheries and Science with 12 faculty and a dean in 1986. The Juneau Center, School of Fisheries and Ocean Sciences (JCSFOS) was established and incorporated into SFOS when the School was created in 1987.

The fisheries program on the Fairbanks campus was originally in the College of Natural Sciences. One fisheries faculty member was hired to coordinate that program in 1976. In addition, the Alaska Cooperative Fish and Wildlife Research Unit (ACFWRU) has provided faculty and support for graduate student projects since 1978. The Fairbanks fisheries program has focused on arctic and subarctic ecology and has taken advantage of the breadth of expertise of non-fisheries faculty at Fairbanks.

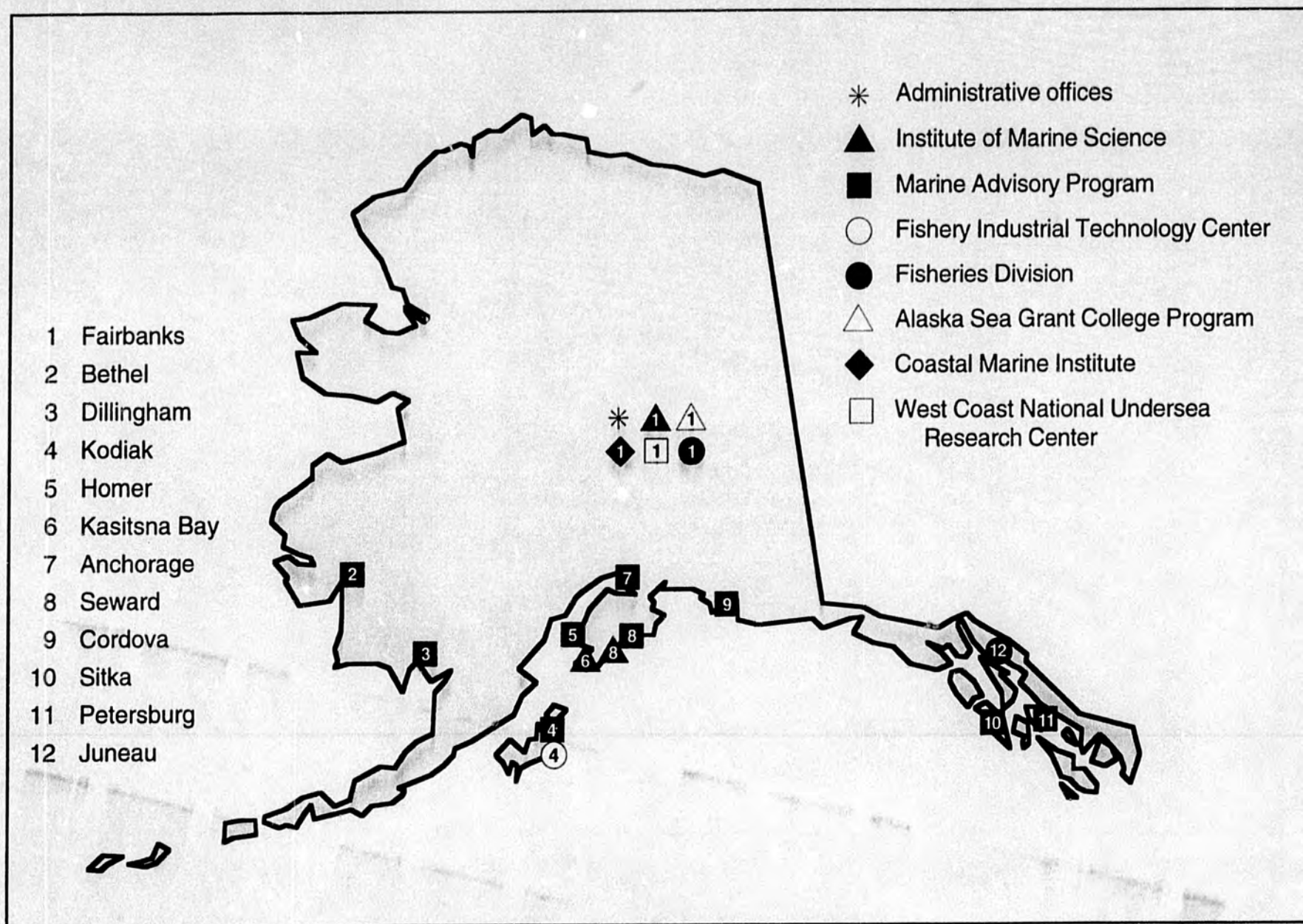
The Fisheries Division that resulted from restructuring remains geographically divided between Juneau and Fairbanks. Research and graduate teaching are the focus of efforts for the seven faculty now at the Juneau Center, School of Fisheries and Ocean Sciences. At the Fairbanks campus, three faculty are responsible for the undergraduate program and the Fairbanks graduate students, who are supported primarily by ACFWRU. Other SFOS

and Fairbanks faculty have research interests in fisheries related areas and contribute to the program. The combined research and educational programs at both locations provide an important pool of fisheries experts for the state of Alaska. Since 1965, more than 120 graduate fisheries degrees have been awarded by the University of Alaska. Eighty-five percent of those graduates are working in fisheries or closely related fields and 70 percent of the total reside in Alaska.

Sea Grant College status was awarded to the University in 1980 to maintain "a balanced program of research, education, training and advisory services in fields related to ocean and coastal resources" (1966 Sea Grant College and Program Act). The Sea Grant College Program was developed to "increase the understanding, assessment, development, utilization and conservation of the nation's coastal resources by providing assistance to promote a strong educational base, responsive research and training activities, and broad and prompt dissemination of knowledge and techniques" (1976 Sea Grant Program Improvement Act).

The Alaska Legislature acknowledged the State's responsibility to advance the development of its fishery industries. In 1981 the Fishery Industrial Technology Center, a "technology training and research center under the University of Alaska [that] is best able to aid the individuals and business in the development of fishery resources" (Alaska State Legislature, 1981), was established in Kodiak, a major fishing port in Alaska. Following the hiring of the first director in 1982, FITC grew to five faculty in 1986, with core expertise in seafood processing science and technology.

In 1987 when SFOS was created, the University of Alaska merged fisheries and ocean sciences faculties into the unified School to improve coordination and efficiency. SFOS, with a combined faculty of 52 (plus three active faculty with emeritus status) is now able to pursue more complete and well-integrated studies of marine and freshwater processes and resources.



School of Fisheries and Ocean Sciences Administration

prepared by Dave Nebert

A. OVERVIEW

The SFOS administrative offices provide administrative integration and support for the entire School in the areas of planning, personnel, purchasing, proposal preparation and fiscal management.

B. FACILITIES

The SFOS administrative space is adequate for present and anticipated needs but the floor plan is poorly designed for the functions provided. A rearrangement of existing space is desirable from a functional and presentability standpoint. Ideally, a well thought out entry and office area with visual appeal would be desirable.... if we ever have sufficient funding for amenities.

There is an area adjacent to the SFOS office area that is now being used as a lounge. The space is illegal since it forms a part of a hallway in which combustibles are not permitted. It's important that we wall in this space, no matter what the use, as soon as possible since it may need to be cleared out if requested by the University Fire Department.

SFOS units on the Fairbanks campus are widely spread, in several buildings, none of which is occupied exclusively by SFOS units. And in spite of the fact that IMS is one of two large research institutes on campus, there is no IMS or SFOS building and this has hindered the development of a local identity on campus. While this is of a lower priority than many other concerns within SFOS, a plan to draw together all of the Fairbanks SFOS units into one building should be established as a long range goal as it will serve to strengthen both individual units and the school as a whole.

C. REMEDIES

Minor changes to the SFOS office layout can be made from time to time to improve the functioning of the office as required without major modifications. When funding is difficult to secure, it is not reasonable to divert funds for major modifications to the SFOS offices.

While not one of the highest priorities in SFOS, it is in the best interest of the School to bring all units on the Fairbanks campus under one roof. This should be considered as a long term goal for SFOS. There are no long range plans in place to accomplish this goal and with the present funding picture, it does not look like'y. However, opportunities may arise and the School must be poised to take advantage of them.

Academic Program

prepared by Laura Bender

A. OVERVIEW

There are two academic entities within the SFOS Academic Program. One is the Graduate Program in Marine Sciences and Limnology (GPMSL), and the other is the Fisheries Program. The former consists of a Program Head who is a full-time IMS faculty member. The Fisheries Program does not have a program or department head, but is administered by the Director of the Fisheries Division, currently located at the Juneau Center. The Academic Program has a 3/4 time support staff person located in the Irving II Building of the Fairbanks campus. Currently there are 22 full-time and 17 part-time oceanography students, ten full-time and four part-time marine biology students, and 26 full-time and 22 part-time fisheries students. Thirty-five of these fisheries students reside with the Juneau Center and 13 students are in Fairbanks. We also have five interdisciplinary seafood science and nutrition students at FITC in Kodiak. All full-time students in Fairbanks have at least a desk and a chair, but because of space limitations, they are often located a distance from their major professors and cohorts.

The Academic Program administrative assistant is responsible for all inquiries and tracking of students from admission through graduation. Coordination of semester classes and numerous other responsibilities involving the Academic Program are centered in the support office. Anything having to do with students, classes or the degree program is funneled through this office.

B. FACULTY

The Academic Program does not contain faculty in the same way other units do, but does have direct faculty involvement as described in the overview above.

C. FACILITIES

The only space specifically assigned to the Academic Program is the 120 sq ft room occupied by the administrative assistant. There are also three classroom/conference rooms routinely used by GPMSL and the Fisheries Program in Fairbanks, but those spaces are listed under IMS. Other campus units, including Summer Sessions, frequently use these classrooms when they are not being used for SFOS classes.

Present office space for support staff is limited. It is not near other administrative support and therefore the Academic Program cannot easily share part-time student or staff personnel. The office would be more effective if there was access to student part-time help. The existing office space would be adequate if storage was available at a nearby location. If student record storage must remain in the office, a larger office is required. An increase to 150-200 sq ft would be adequate with an optimal layout.

Student office space assignments, including desks and bookcases are somewhat haphazard, which results in some students having less than adequate work space. Oversight for student space should be through the Academic Program office.

D. REMEDIES

Nearby storage space should be found to alleviate crowding in the Academic Program office. Other options include moving the office to a somewhat larger room and/or relocating to an area where shared help could be more readily obtained. It is also recommended that student space assignments be controlled through the Academic Program office with input from faculty.

Fisheries Division

prepared by Tony Gharrett

A. OVERVIEW

Alaska's marine resources are key to Alaska's economic present and future. Renewable marine resources could continue to support Alaska after non-renewable resources are exhausted if sufficient care and planning are devoted to their maintenance and protection. However, the recent problems facing salmon and marine resources in the Pacific Northwest and the collapse of the east coast marine fisheries foretell a similar potential fate in Alaska. It is essential to commit now to Alaska's resources, rather than wait until they are directly threatened. A strong, preemptive effort is required to avoid erosion of the resource.

Fisheries Division faculty vigorously contribute to research on Alaska's fisheries resources, educate fisheries scientists, and serve as advisors to fisheries resource management bodies. The research broadly includes salmon, marine and freshwater fish, and invertebrate resources important to commercial and recreational fisheries as well as to the ecosystem. The research that the faculty conduct is the primary source of support for graduate students. That research is an important component of the education for students who are future resource managers or will work in the fisheries industry. Faculty members participate in committees advisory to the North Pacific Fishery Management Council, sit on the Board of Directors for the Prince William Sound Aquaculture Association, and are called on by the National Research Council to examine national problems or to review the results of those efforts.

The Fisheries Division, which includes ten faculty located on both the Fairbanks and Juneau campuses, resulted from consolidation in 1987 of the fisheries programs at the University of Alaska Fairbanks and the University of Alaska Juneau. Previously, both programs offered M.S. and B.S. degrees in fisheries. The restructuring enabled the University of Alaska Fairbanks to develop a Ph.D. degree in fisheries, but the undergraduate program in Juneau was discontinued. Having the Fisheries Program

and faculty split between two campuses creates some challenges in curricular offerings. Both instruction and research at each campus require some of the same expertise; and in the recent fiscal climate, the breadth of the program has been reduced. The erosion of the Juneau fisheries faculty (no vacated faculty positions have been filled since the restructuring) and small size of the Fairbanks faculty have created problems in course offerings at both sites and have limited the number of graduate students that can be accommodated. The Capital Plan and Facilities Development Committee recognized that the problems experienced by Fisheries Division faculty occur in the other SFOS academic units too. Maintenance of a core faculty in fisheries has been deferred in the same way that maintenance of physical facilities has been deferred.

FAIRBANKS

A. FACULTY

The fisheries faculty in Fairbanks is understaffed. The undergraduate fisheries program has 1.5 fisheries faculty. The undergraduate curriculum was one of the problem areas noted by the Northwest Association of School and Colleges accreditation team, but until the students can get together more with the fisheries faculty, it will be difficult to strengthen the program. The graduate fisheries program is primarily supported by the Alaska Cooperative Fish and Wildlife Research Unit. Although the graduate program benefits from the breadth of offerings at the Fairbanks campus, it lacks the fisheries offerings that are available at the Juneau Center where most of the fisheries faculty reside.

B. FACILITIES

The only facilities devoted to the Fairbanks fisheries faculty are their offices. There are no graduate student offices, no dedicated teaching lab, and faculty do not have research laboratories.

C. REMEDIES

Providing office and laboratory space would alleviate some of the problems, but as long as the fisheries faculty and programs are geographically split, there will be both redundancy and competition for faculty resources to provide strong programs. It is not possible to cleanly separate the undergraduate and graduate curricula. Many entering graduate students come from disciplines such as mathematics or biology and need introductory (upper division) fisheries courses to fill in their backgrounds. Both undergraduate and graduate students deserve a reasonable variety of marine and aquatic science related courses. One possible course of action is to consolidate the faculty and programs at the Juneau Center. However, the facilities in Juneau are presently inadequate to accommodate the students, faculty, and staff in Juneau; and

adding more faculty and students would only make the situation worse. As a solution to the space problems, planning for an adequate facility has begun (see below). Discussions of the possibility of consolidating fisheries programs and faculty in Juneau are being made and the academic/fiscal climate seems right because the system-wide Academic Council has recently issued a call for enhanced collaboration between faculties of the statewide University of Alaska. Locating the last two years of the undergraduate fisheries program at the Juneau Center (SFOS) would require the cooperation and support of UAS.

Consolidating the fisheries faculty in Juneau is not without disadvantages. At the present time, the graduate program in Fairbanks is primarily due to the Alaska Cooperative Fish and Wildlife Research Unit and its Leader, Jim Reynolds. Whereas the graduate students in Fairbanks do not have ready access to faculty and courses in Juneau, they do benefit from a diversity of (non-fisheries) faculty and broad curriculum support available on the Fairbanks campus. The research focus of many of those students is on arctic and subarctic ecosystems. Consolidation at the Juneau Center would reduce access to those habitats and probably reduce emphasis on that aspect of fisheries science. The role and activities of ACFWRU must be considered carefully in any changes in the graduate fisheries program.

JUNEAU

A. FACULTY

Although larger than the fisheries faculty in Fairbanks, the Fisheries Division faculty at the Juneau Center is also understaffed. Since the restructuring of SFOS in 1987, the Division at the Juneau Center has lost a fish pathologist and a quantitative fisheries management specialist and will soon lose a salmon management biologist to retirement. The initially small size accompanied by loss of faculty jeopardizes the program as a whole; there is barely a critical mass. Plans are being made to replace the retiring faculty member with a quantitative fisheries scientist, the discipline needed most immediately by the program. Other specific disciplines that the Fisheries Division needs to support its educational and research programs include (but are not limited to) fish/shellfish physiology, salmon management biology, fish/shellfish pathology, and habitat/freshwater ecology.

B. FACILITIES

As a result of the formation of SFOS, the Fisheries Division now shares facilities with science and math instructors at UAS. The Anderson Building, originally constructed for the Juneau fisheries program is shared between UAS and the SFOS Fisheries Division faculty. Since SFOS was created, the building has been inadequate for the fisheries program; part of the fisheries faculty and the outdated computer laboratory are in leased quarters approximately 1.5 miles away (a new lease is being bid and

those faculty may have to move again); student office space has been lost to student housing (which is also limited); faculty and students share extremely limited lab space (there is little security for research or isolation of experiments using hazardous materials); and developing UAS programs are creating additional pressure on space availability in the Anderson Building. The Northwest Association of Schools and Colleges accreditation team noted in 1993 that the sub-par facilities in Juneau and the dispersal of faculty and students continue to compromise the Fisheries Division programs.

C. REMEDIES

The primary solution to Juneau's facilities problem is development of appropriate adequate space for the Fisheries Program. The U.S. National Oceanographic and Atmospheric Administration (NOAA) has begun planning a new facility located at Auke Cape near Juneau which will house the National Marine Fisheries Service regional office, NMFS Auke Bay Fisheries Laboratory (ABL) personnel and labs, and the National Weather Bureau. SFOS was invited by James Baker, Administrator of NOAA, to participate in the project and SFOS has been involved in the planning process since 1992. Of course, UAF participation in the process is ultimately subject to availability of funds, but the opportunity offered by this project is unique in our history. Co-location of the Juneau Center with and strong ties to NMFS would follow a successful pattern observed at a other universities such as the University of Washington, Scripps Institution of Oceanography, and the University of Rhode Island; moreover, one of the primary reasons a fisheries program was developed in Juneau was the proximity to the professional resources of ABL. NMFS enthusiastically supports the concept and has been very supportive in helping us to participate.

Planning the (possible) SFOS component of the Auke Cape Facility has been based on a core of 12 faculty. This number would provide a solid core of disciplines (including those described above); it is not unreasonable to expect the program to grow to that size within a decade. Twelve is certainly not a maximum number that might be expected in a world-class fisheries program, but provides a reasonable basis for planning in the near future. For planning purposes, each faculty member was considered a unit that averages (conservatively) one technical staff and four graduate students. A space requirement study (Alpha Engineering Group and MAKERS architecture and urban design) for offices, wet and dry laboratories, classrooms, and administrative facilities for 12 faculty, 12 technical staff, 48 graduate students, and five administrative staff members indicated an area of 22,075 net sq ft (31,838 gross sq ft) and a cost of about \$11 million, exclusive of furniture and equipment.

FACTS ABOUT FISHERIES IN ALASKA, THE FISHERIES DIVISION, FISHERIES GRADUATES

Alaska has

- 1/2 of U.S. coastline
- 2/3 of U.S. continental shelf
- 56% of U.S. fish and shellfish landings
- Only one graduate fisheries program

Fisheries in Alaska

- Is the largest private employer, about 20% of jobs
- Is a renewable resource, unlike oil and minerals

University of Alaska fisheries graduates since 1965

- More than 120 M.S. and Ph.D. degrees
- 70% work in Alaska
- 85% work in fisheries or closely related fields
- Many are mid-range federal and state career biologists in Alaska, agencies include ADF&G (including 4 regional supervisors) and NMFS (including many at the GS 12 levels or higher).

Demography of 1994-95 graduate students

- Mid-career agency employees
 - ADF&G (3 M.S. and 2 Ph.D.)
 - NMFS (4 Ph.D.)
 - USFWS (1 M.S.)
 - USFS (1 M.S.)
- Foreign (6, including Japan, Germany, Argentina, Greece, and China)
- Other (29)

Student admissions

- In 1994 SFOS was the only UAF unit with a significant increase in applications
- Faculty and facility constraints resulted in a decreased acceptance rate

Source of Fisheries Division funding

- Between 1991 and 1994, every dollar of state funds leveraged \$1.80 in other funds

North Pacific Fishery Management Council

- 6 Fisheries Division faculty serve on committees
- Terry Quinn chairs the Scientific and Statistical Committee (SSC)

Fishery Industrial Technology Center (FITC)

prepared by Scott Smiley

A. OVERVIEW

The Fishery Industrial Technology Center's mission is to help increase the value of fisheries in Alaska. FITC does this through teaching, research, and service. FITC's enabling legislation lists three areas of focus: harvesting, processing, and conservation of resources. The highly applied nature of FITC's mission—working on research instigated by industry—makes it unique within the School of Fisheries and Ocean Sciences, and within the UA system.

FITC's location in Kodiak complicates its teaching mission. It is a distant and expensive town. FITC has no housing facilities for students; and its graduate students are seriously burdened with costs and the lack of affordable housing. Transportation of our faculty to Fairbanks to teach seafood science does not seem cost effective given the lack of a food science program and low undergraduate enrollments. When the housing planned for Phase II is constructed, FITC will be better able to attract students. This will allow us to increase our graduate student enrollment and to attract undergraduates for semester long programs or summer courses.

The term "service", as applied to FITC, means being responsive to the needs of the Alaskan fishing industry. The recipients of FITC's service include the major corporate processors, minor processors, and thousands of fishermen and harvesters. Also included are cannery workers and rural communities. Fishing is the largest employer in Alaska, and the second largest in terms of economic value. FITC's service involves increasing the value in this industry through training of personnel and research and development on a variety of industry problems.

There are five principal areas of application for FITC's efforts: harvesting, processing, quality, contaminants, and ecosystem research. Each has the potential for significant impact on the fishing industry in Alaska. It is critical that the highly applied nature of our research be understood; FITC's research is principally directed by the industry itself. In collaboration with industrial partners, we are pursuing a variety of projects in these areas. Few of these involve basic research; and in most cases the time to market for the research we are involved in is a matter of months or only a few years.

B. FACULTY

A single non-tenure track researcher conducts FITC's efforts in harvesting part time; FITC plans additional non-tenure track staff in this area. There are 2.8 full time equivalents (FTE), all tenured, and one non-tenured faculty, each directing a major part or all of their efforts to seafood processing. Seafood processing is our most active research focus. We will need to hire another seafood process engineer soon, and to augment existing and new faculty with non-tenured staff. FITC has 2.0 FTE faculty

working indirectly in the area of quality: a microbiologist and a biochemist. We anticipate developing these areas using non-tenure track staff in the fields of refrigeration and cryoprotectant technology.

Besides present research at FITC, we anticipate expansion in the areas of refrigeration and cryoprotectant technology, paralytic shellfish poisoning (PSP) problems, and ecosystems research. FITC faculty are presently moderately involved in PSP research. We plan to augment our staff in this area by hiring non-tenure track personnel. FITC is not involved in ecosystems research. However, faculty based at IMS and the Juneau Center are expert in many aspects of this. One faculty member at FITC plans to develop faunal lists for the region. The focus of these efforts is to address fisheries concerns in the northern Gulf of Alaska. The addition of a computer modeler will contribute to solutions of these problem areas as well as to others such as process modeling and data base development.

C. FACILITIES

FITC devotes most of the space in the Owen Building towards processing research. Existing harvesting efforts use part of one office. Other currently available space includes laboratories for microbiology, chemistry, biochemistry, and engineering—disciplines intimately connected with our quality and contaminants efforts.

D. REMEDIES

FITC has an immediate need for another seafood process engineer, either tenure track or non-tenure track. We will soon need a computer modeler to work on various aspects of database development and modeling of process engineering problems. FITC has developed, with NMFS and ADF&G and the Kodiak Island Borough, a plan for the development of new facilities called Phase II. The details of square footage and cost are still being negotiated. Most important among the facilities collected under Phase II is the new housing. This housing will allow us to attract new staff as well as students. Using the housing, investigators from other SFOS facilities can visit Kodiak to conduct research. It will also enable graduate students, post-docs, and visiting investigators to come to Kodiak to assist in this research. There is a promise of a zero net cost to the University for the new facilities. The University's contribution to Phase II will be about \$3 million dollars from EVOS monies.

Phase II will allow us to pursue recovering valuable components from harvested species by implementing a biotechnological approach. Our efforts in harvesting research will be bolstered by the shore-side facilities designed into Phase II. Laboratories in Phase II will enable us to pursue the areas of quality and contaminants research efficiently. The P-2 level containment lab will allow us to do this safely. Phase II will provide seawater systems that make possible studies of benthic invertebrates that may serve as indicator species for analysis of the complex food webs of the north Gulf of Alaska. Their life history traits may also be useful in predicting the environmental influences over the ecosystem.

The Owen Building has some design defects, many of which are listed among the SFOS request for maintenance and renovation. In addition, computer system upgrades and networking, both within-house and between FITC and the main campus, are urgently needed. The problems described immediately above not covered by the new maintenance and renovation funds must be addressed soon. If feasible, FITC would renovate our pilot plant to allow compliance with our food processing certificate. This would add a cleanable ceiling 15 feet above the floor of the pilot plant. If funds were available, we would use the newly created space for storage of equipment. Equipping Phase II with scientific machinery, microscopes and computers, and the networking of Phase II with the Owen Building will be expensive.

Institute of Marine Science (IMS)

prepared by Mike Castellini

A. OVERVIEW

Alaska has great potential for gaining economic benefit from its vast coastal and broad continental shelf regions. The primary areas of potential economic benefit are minerals extraction, fisheries resource harvesting, and tourism. Economic opportunities in these areas can be maximized through intelligent management only if we have a good understanding of how the marine environment and the ecosystems within that environment function. It is therefore important to gather basic marine information from which we can gain an understanding of how physical, chemical, geological, and biological systems work in Alaskan waters. The Institute of Marine Science has been unraveling the workings of the ocean environment and the ecosystems contained therein since its inception in 1960. This effort has been beneficial to the State of Alaska as well as to the development of marine science in general.

The faculty of IMS have been particularly successful in competing at the national level for funding from the various federal agencies which support ocean and limnological related research. Faculty funded research supports a portion of the faculty salaries, most of the students seeking degrees, as well as research support staff (and there are also obvious spin-offs into the local economy of Fairbanks and the State). Information provided by these projects and the personnel supported by them provide the necessary background and the means for understanding Alaska's unique marine environment. The research at IMS, though primarily federally funded, helps to provide answers to managers in Alaska, which in turn helps them to solve Alaskan problems.

The primary products of the funded research at IMS are information and students. Some of the graduating students remain in Alaska to work with local Alaskan problems while others eventually take positions elsewhere. But even those students that choose to work outside of Alaska have contributed information about local marine related problems through their degree work at UAF.

B. FACULTY

IMS is strong in most oceanographic disciplines but is weak, in terms of numbers and breadth of faculty, in others, specifically chemical and geological oceanography and invertebrate zoology. IMS competes nationally and internationally for high quality graduate students. Since degree candidates in the ocean related sciences are required to take a broad spectrum of course work, it's important that IMS remain strong in all areas of ocean science. Failure to do so will make it difficult to retain the present high level of national and international credibility, to continue attracting top quality students, and to retain well qualified faculty. This, in turn, will make it difficult to remain competitive in attracting federal funding to address Alaskan marine research issues.

C. FACILITIES

Space assigned to IMS on the Fairbanks campus is adequate in most areas, but the unit needs a minimum of two additional research labs and a teaching lab since IMS presently has no teaching lab space at all and is short of labs for existing faculty. Additional lab and office space will be needed if the areas of deficiency noted above are addressed by adding new faculty.

IMS programs in Fairbanks are housed in several buildings on the West Ridge, none of which is occupied exclusively by IMS or SFOS. In spite of the fact that IMS is one of two large research institutes on campus, there is no IMS or SFOS building and this has hindered the development of a local identity on campus. While this is of a lower priority than many other concerns in SFOS, it should be established as a long range goal to bring all Fairbanks faculty together in one building since it will serve to strengthen both IMS and the School.

D. REMEDIES

It is a top priority within IMS, and should be a high priority item within SFOS, to expand existing IMS capabilities in the areas of chemical and geological oceanography and invertebrate zoology. This is needed to remain a viable full capability oceanographic institution able to compete nationally and internationally for funding and top quality students. IMS is successful with present capabilities, but to continue with this level of productivity given the changes in the funding picture, along with increasing demands, new expertise must be developed. Alaska is a large state and much work remains to be done in the marine environment if the State is to wisely manage its resources. However, IMS cannot be expected to deal with growing demands in marine research and academics unless existing strengths are broadened. In order to do this, it may be necessary to fill existing vacant positions within IMS.

Several units on the Fairbanks campus are scheduled to move into the new Natural Sciences Building. When this occurs, a number of "domino" moves are expected to occur that will free two labs and limited adjacent office space in the O'Neill Building. Since this is one of three buildings presently occupied in part by IMS, it seems

appropriate to request and expect that some of this space will be made available to SFOS for assignment to IMS. This will help meet present demands for lab space. If this opportunity does not occur, there are no other readily apparent solutions available to meet present or future IMS space needs.

Seward Marine Center (SMC)

prepared by Tom Smith

A. OVERVIEW

The School of Fisheries and Ocean Sciences' Seward Marine Center (SMC) was designed to be the Institute of Marine Science's ocean-side site dedicated to marine science research and education. The Center serves as the IMS and University National Oceanographic Laboratory System (UNOLS) staging area for shipboard oceanographic studies. It also provides facilities for shoreside research in addition to providing a focus for marine education for the general public.

SMC has laboratories, which include a high quality running seawater system, that are used in support of marine biological, chemical and medical research. The SMC seawater system was designed specifically to study high latitude fishes and invertebrates. Located on a deep fjord, the Center has the unique ability to easily obtain high quality, low temperature sea water with year round stable physical properties. This allows researchers to hold live North Pacific, subarctic and some arctic research fauna.

The adjacent non-profit Alaska SeaLife Center (ASLC) which is under construction is expected to provide University of Alaska staff, as well as other scientists, with facilities to study captive seabirds, marine mammals and fresh water organisms. It will also contain a fish genetics laboratory. The Alaska Department of Fish and Game operates a shellfish mariculture experimental laboratory and shellfish hatchery at the Seward Marine Center. It is anticipated that a building will be constructed on SMC land to house this operation. Both of these facilities are expected to have a positive impact on the marine research capabilities in Seward, but both are expected to require additional support from and interactions with SMC. During the summer months University of Alaska Marine Advisory Program and SMC staff operate marine science education programs aimed specifically at children and for the general public.

B. FACULTY

Two IMS faculty are presently located at the Seward Marine Center. Space for additional faculty or research staff is limited. SMC has facilities to support live research on fishes and invertebrates. Most of the work on bioenergetics of Alaska fishes, much of the information on the life history of Alaskan king and Tanner crabs plus the pioneering exploration of the neurochemical and neuroanatomical characterizations of salmonid brains are products of SMC. Additional faculty and researchers associated

with the School of Fisheries and Ocean Sciences may be assigned to the Alaska SeaLife Center once it is in operation.

C. FACILITIES

Present facilities includes a public education building, warehouse, two salt water laboratories, an upwelling pond, a four-plex apartment for visiting scientists, a dock, machine shop and outdoor salt water tanks as well as the sea water system previously mentioned. Three vehicles, two forklifts, a front end loader, a 20-ton crane and a dump truck are also available. The station operates the NSF owned 133-ft ocean going research vessel R/V *Alpha Helix*. A 26-ft research vessel and several skiffs with motors are also available for inshore research.

The Seward Marine Center laboratory and support facilities are near saturation. Increased scientific research or teaching, or the planned, NSF owned, UAF operated, Arctic Research Vessel, will require significant enhancements to the existing facility. This will include additional wet laboratories, classrooms, a lecture room, an increase to the library, as well as a new dock to accommodate the larger Arctic Research Vessel. A shared city, Alaska Department of Transportation, and university dock is planned but remains unfunded. The dock must be capable of berthing a 340-ft vessel and must allow the vessel to be loaded/unloaded for scientific cruises. It must provide year round docking, secure from adverse weather.

D. REMEDIES

Perhaps the most critical need for improvements at the Seward Marine Center is a dock to accommodate the planned NSF Arctic Research Vessel that is to be based in Seward and operated by SMC. If the ship cannot be accommodated in Seward, it is likely that the vessel will be assigned to a university elsewhere. In addition to the new ship, the development of the Alaska SeaLife Center and the ADF&G hatchery and research center are expected to increased demands on SMC facilities. The following list contains the *additional* facilities needed at SMC:

- Arctic Research Vessel dock – 380 ft (length)
- Off-site storage near new dock (non-heated, uncovered) – 1000 sq ft
- Flatbed truck for loading/unloading the Arctic Research Vessel
- Improved data communications link to Anchorage and the rest of the world
- Laboratory – 3200 sq ft
- Classrooms – 800 sq ft
- Lecture room – 750 sq ft
- Computer users room – 800 sq ft
- Research offices – 400 sq ft

Planning for the dock is on-going. Since there is a long lead time between planning and construction, it is important that funds for the construction of the dock be located and that planning be initiated for the other needed facilities.

Kasitsna Bay Laboratory

prepared by Tom Smith and Ray Highsmith

A. OVERVIEW

Kasitsna Bay Laboratory, situated on the south side of Kachemak Bay in Lower Cook Inlet, is owned by NOAA and leased to the University of Alaska Fairbanks' School of Fisheries and Ocean Sciences. The site is dedicated to support of shore side and offshore marine science research on the Kachemak Bay ecosystem. The site is semi-isolated, being nine miles by road from the town of Seldovia, which is serviced by the state ferry Tustemena and two air taxis. The ferry operates biweekly April through September, weekly October through December, and is shut down from January to March. Air taxi service is available year round.

B. FACULTY

There are no full time faculty or postdoctoral candidates presently attached to the facility. The Kasitsna Bay Lab is staffed with a facility manager and half time office manager. It is visited by approximately 40 researchers and/or research assistants and 105 graduate and/or undergraduate students per year.

C. FACILITIES

The site has one building and two trailers designed as dry labs. The trailers are double labs of 280 sq ft each; the building is divided into two 400 sq ft labs. Two housing units each have one bath, kitchen facilities, laundry facilities and a lounge. A total of 18 sleeping spaces are available. A 200 gal/min salt water system is available that draws water from a 30 foot depth at low tide. Salt water is not piped into the labs. Additional facilities consist of:

- Two 22-ft Boston whalers with twin 70 hp engines
- One 28-ft Munson aluminum boat with bow crane and twin 200 hp outboards
- One 10-ft aluminum skiff
- Shop and storage building -- 512 sq ft
- Generator building with a 30 kw emergency generator -- 144 sq ft
- Storage building (unheated) -- 168 sq ft
- Walk-in freezer -- 768 cu ft
- Shop and storage (unheated) -- 384 sq ft
- Facilities manager housing and storage -- 1,608 sq ft
- Four wheel drive trucks -- 2 each
- Two wheel drive truck -- 1 each

The laboratory has easy access to a rich marine environment and excellent tidal pools and a wide variety of beach types. The laboratory can support limited live research on fishes and invertebrates. A planned upgrade to the site's sea water system should

expand this capability. The dry laboratories are spacious and are well equipped. The site provides an ideal location at which to conduct intertidal field research and marine related classes.

The seawater system requires an upgrade and plumbing to make it available to the laboratories. New heating needs to be installed in one of the housing units, a new four wheel drive truck is needed, and replacement for the station's boats should be programmed. As the facility use increases, additional staff will be needed. The requirements for station maintenance and boat operations place a great demand on the single facility manager/maintenance mechanic. Both maintenance and usage demands peak in the summer when weather allows outside maintenance to be performed. Additionally, leave by the facility manager is difficult because of the need for a replacement.

All of the buildings need to have equipment replaced and upgraded but the budget does not allow an aggressive, planned replacement program. The remoteness of this site, however, demands such planning because of the extreme lack of supply and maintenance support available locally.

The station also needs to expand its communications capability. Only one telephone line is available and is shared between the facility and station management. The installation of electronic mail capability would be an asset to this site.

D. REMEDIES

Short term remedies require the scheduling of maintenance and upgrades to address the immediate needs of the lab. This may require hiring additional personnel for part of the summer season since this is the time when exterior maintenance must be done, yet it is the time when activities at the lab are the greatest, leaving little time for the facility manager to accomplish them. A more comprehensive facility upgrade must await the development of a detailed long range plan for the site.

Marine Advisory Program (MAP)

prepared by Ray RaLonde

A. OVERVIEW

The mission of the University of Alaska Fairbanks Marine Advisory Program is to provide education and public service to the citizens of Alaska, University of Alaska staff and faculty, and governmental agencies. Planning documents (e.g., Strategic Plan: UAF 2000; the SFOS Long Range Plan; SFOS Draft Unit Action Plan) define specifically the goals of the University of Alaska Fairbanks and the School of Fisheries and Ocean Sciences. From these goals the specific role of MAP is to:

- provide formal and informal instruction for citizens, university students, and K-12 schools;
- provide information to governmental agencies;
- conduct joint projects with the University, government, and private enterprise that focus on marine resource problems;
- transfer technology;
- collect and disseminate information;
- maintain community based advisory capabilities;
- establish an information network between the School, information services throughout the United States and internationally; and
- improve delivery of information through more effective strategies.

MAP facility requirements are often dictated by the need for accessibility to constituents in the communities where MAP offices are located and by the need to use distance communication capabilities. In small communities in Alaska this can place MAP in a precarious position of choosing an inadequate facility to ensure the requirement for access.

As an extension service for the University of Alaska Fairbanks School of Fisheries and Ocean Sciences, MAP is often seen as the primary mechanism of the School to meet its public service mission. In this respect, public access to the University is often directed through MAP. In complementary fashion, solutions are conveyed from the University to the public through the MAP program. In this delivery system, MAP needs to be equipped with facilities that are matched to the need to perform effective and efficient information transfer.

SFOS, Sea Grant, and many other organizations produce exceptional quality publications that should be displayed for public review at MAP facilities. A MAP office located within easy public access provides an opportunity for the University to communicate information on university activities directly to Alaska citizens.

MAP offices need storage space to hold the large amount of published information collected by MAP agents. With adequate display area, storage areas need not be located on the premises, but should be easily accessible.

Because of the need to provide public service, MAP agents and specialists often work unusual hours. This requirement means that MAP personnel must have 24 hour access to their offices. When meeting with constituents, MAP personnel need adequate space and privacy to house a small group (2-3) to meet in the MAP office. The need for privacy is important since MAP is often the vehicle used by citizens and agencies to discuss sensitive topics. When larger group meetings are necessary for discussions or teaching, other facilities are often available.

As the extension part of SFOS, MAP should display the best and most effective presentations at public workshops and conferences. Facilities should enable productions of these presentation materials by adequate copying equipment, computer hardware and software, and audiovisual equipment. To the MAP agent these resources are an integral part of the facility in which the office is housed. Easy access to distance communication services including internet is important, especially for remote locations which need access to current information.

MAP is composed of faculty and staff positioned in eight locations: Anchorage, Kodiak, Dillingham, Bethel, Cordova, Sitka, Petersburg, and Homer. These facilities house seven specialist positions, seven MAP agents, and seven support personnel. Facility descriptions and needs for the future are different for each location. The following descriptions and assessment of facility needs is based on the emphasis for access as well as the actual facility currently in use.

ANCHORAGE

A. OVERVIEW AND STAFFING

The Anchorage facility houses five MAP specialists plus two support personnel who serve Anchorage and MAP field offices. In addition, the office supplies space as needed for field agent activities while they are in Anchorage.

The Anchorage office is located in the Carlton Trust Building at 2221 E. Northern Lights Boulevard #110, Anchorage, Alaska 99508. The office is situated outside the boundary of the University of Alaska Anchorage campus, but less than one mile from campus facilities. Carlton Trust Building also houses the Anchorage office of UAF Alaska Cooperative Extension and UAF Alaska Cooperative Extension Community Development Program.

B. EXTENSION/TEACHING CAPABILITIES

The Anchorage office consists of space for faculty and staff offices; storage; a support services room which houses the fax, photocopier, computer printers and work table; public reception area for display of publications and receptionist; and a library/conference room capable of seating approximately 30 people. The library contains several thousand documents, teleconference equipment, audiovisual equipment, and several large tables.

With assistance from a grant from the Alaska Seafood Marketing Institute, the office has computer capabilities to scan and produce graphic illustrations, and to edit video tape programs and MAP publications. In addition, MAP staff have access to UAA facilities which include faculty and support services, distance delivery, library, and communication resources. Photocopy capabilities are severely hampered because the current copier is in disrepair and breakdowns are a repeated occurrence.

C. EXISTING USABLE SPACE

The following are details on usable space controlled by Anchorage MAP including shared space available as a part of the lease agreement:

SPACE TYPES	NET SQ FT
Faculty and staff offices	870
Storage	124
Support services room	142
Reception area and reception office	176
Conference room and library	<u>550</u>
Total MAP controlled space	1,862

Facilities to which Anchorage MAP has occasional access for scheduled use:

SPACE TYPES	NET SQ FT
Large conference room	875

D. USE ANALYSIS

The space for instruction, support services, and office use is adequate for the immediate future. The conference room is particularly useful, enabling us to house meetings and classes. Computer equipment and communications capabilities are adequate, but in need of upgrading. Distance communications are hampered by aging equipment in need of replacement.

E. ANCHORAGE OFFICE REQUIREMENTS

There is no critical need for an immediate increase in space. More efficient use of existing space will allow us to continue operation with little capital outlay. This may require changes and/or additions of office furnishings. Purchase of a new photocopier is our most immediate need. Hard wiring our computers to the university network would be a very helpful improvement in our current electronic communication capabilities.

PETERSBURG

A. OVERVIEW AND STAFFING

The Petersburg office houses one MAP agent and one half-time office support person. The office is located on the main street in Petersburg at 219 N. Nordic Drive, Petersburg, Alaska 99833. Strategically positioned in a high traffic area, the office is within the immediate vicinity of the main boat harbor and seafood processing plants.

B. EXTENSION/TEACHING CAPABILITIES

The current location of the Petersburg MAP office has only been occupied since October 1994. The change in location was requested to enable greater visibility and improved public access. Since the move to the current location, walk-in traffic has increased substantially. The MAP agent is pleased with the change, indicating to us that the new location is ideal for maximum public access. Most of the equipment in the office is old and in need of repair or upgrading.

C. EXISTING USABLE SPACE

Areas to which Petersburg MAP has complete access are:

SPACE TYPES	NET SQ FT
Faculty and staff offices	650
Display	<u>50</u>
Total	700

D. USE ANALYSIS

The facility is being utilized to its maximum. The Petersburg office has an extensive number of publications, and also serves as a depository and distribution office for University of Alaska Cooperative Extension publications. Increased public access to these resources has vastly improved with relocation to the current site. Office equipment is old and needs frequent repair. A single computer, a Macintosh SE, is adequate for current use, but anticipated needs for electronic communication will require an upgrade.

E. PETERSBURG OFFICE REQUIREMENTS

There is no immediate need for a facility change of the Petersburg MAP office. Equipment to support the MAP office future needs are a photocopier, fax machine, computer upgrade to a Power Mac, and hard wiring the office to enable more efficient access to internet communication and the world wide web.

CORDOVA

A. OVERVIEW AND STAFFING

The Cordova office houses one MAP agent and one half-time support service person. The office is composed of a single office, storage closet, library shelving, and rest room. A small area (4x4 ft) is used as a fire pump room with access from the outside of the building. The building is located on pilings on the Cordova dock adjacent to Breakwater Avenue.

B. EXTENSION/TEACHING CAPABILITIES

The office, being the former Harbor Master's office, is in an excellent location for visibility and public access. Because the office is on the Cordova dock, it does not have the capabilities for expansion in this area. For larger meetings Cordova MAP has access to meeting rooms on a scheduled basis at Prince William Sound Community College, Masonic Hall, and the public library. Office equipment capabilities have recently been improved with purchase of a photocopier, fax machine, and contribution of a new computer and laser printer from Alaska Cooperative Extension.

C. EXISTING USABLE SPACE

SPACE TYPES	NET SQ FT
Office space	216
Library in office (shelving only)	20
Rest room	16
Display area	<u>8</u>
Total	260

D. USE ANALYSIS

The office is located in an ideal area for visibility and public access. The office is too small to house meetings larger than six people, and more space is needed for storage of publications. In general the location of the facility is excellent for MAP use, but insufficient space is definitely a constraining factor.

E. CORDOVA OFFICE REQUIREMENTS

Additional storage shelves are necessary for publications. Additional space is needed to enable publication display, meeting space, and space to locate equipment. To do this, however, would require moving to a less desirable location. Equipment needs to support the office are adequate.

KODIAK

A. OVERVIEW AND STAFFING

The MAP office in Kodiak consists of a full time agent, a half-time marine mammal specialist, and a half-time seafood specialist. The three MAP faculty are located in three separate offices within the Fishery Industrial Technology Center at 900 Trident Way, Kodiak, Alaska 99615. Located on Near Island, which connects to Kodiak Island via a bridge, FITC is less than one mile from downtown Kodiak. The main boat harbor and several fish processing plants are less than one mile from the MAP office.

B. EXTENSION/TEACHING CAPABILITIES

FITC is well known by the residents of Kodiak so access does not appear to be a problem with its location away from the main flow of traffic. MAP staff do not have designated office support staff or equipment, but resources from FITC are available for MAP use. Much of the equipment is personally owned by MAP faculty and used for work.

MAP faculty make extensive use of space at Kodiak College on a scheduled basis. Support staff and facilities at the College are also available for MAP use.

C. EXISTING USABLE SPACE

Facility space controlled by MAP faculty is:

SPACE TYPES	NET SQ FT
Office space for 3 agents	330
Storage	<u>40</u>
Total	370

Facilities managed by FITC which MAP does not control but has access to are:

SPACE TYPES	NET SQ FT
Library	720
Classroom/conference room	910
Laboratories on occasion	n/a*
Storage	400
Cold room	<u>100</u>
Total MAP controlled space	2,130

*Note: MAP staff are not considered tripartite faculty. Labs are available on an "as needed" basis and are seldom used for MAP activities.

D. USE ANALYSIS

MAP office space in the current FITC building is limited. Agents are finding that the approximately 100 sq ft per office is difficult to manage. MAP agents need space to house the collections of information, publications, etc. The FITC building has a library, but the information contained in the existing library collection has little information of use for MAP agents. The laboratories and classroom facilities at FITC are excellent. Location seems adequate since the community is aware of the FITC building site. The need to use personal computer equipment is a deficiency of the MAP offices in Kodiak.

E. KODIAK OFFICE REQUIREMENTS

Office space for agents needs expansion. At least 50 sq ft additional space is necessary for agents to be comfortably housed and hold private meetings in their offices. An extension section of the library or a separate room for document storage would also be helpful to reduce the cramped condition of the offices. Provision of computer equipment is necessary for the Kodiak MAP offices to allow agents to perform their duties.

DILLINGHAM

A. OVERVIEW AND STAFFING

The MAP office in Dillingham is a single room housing one MAP agent and one support person. The office is located in the front corner office of the University of Alaska Bristol Bay campus, a 12-room single story building. The building site is 1-1/2 blocks off the main business street of Dillingham between the high school and museum/public library buildings.

B. EXTENSION/TEACHING CAPABILITIES

The facility is adequate for extension activities. The size of the room is suitable for conducting small meetings. MAP has access to larger meeting rooms at the Bristol Bay campus on a scheduled basis. Office and communication equipment are also shared resources between MAP and the Bristol Bay campus. The office is a depository for MAP and Alaska Cooperative Extension publications.

C. EXISTING USABLE SPACE

Facilities where MAP has complete control are:

SPACE TYPES	NET SQ FT
Office space	252

D. USE ANALYSIS

The major concern for the Dillingham office is the effect caused by expansion of the activities at the Bristol Bay campus. Currently, increased use of the campus has resulted in the MAP office being used as a location for teleconference classes during the evenings, which restricts the office access of our MAP agent for evening work. With continued expansion of students and faculty, there is an increasing prospect for eviction. Some expansion of campus activities can be absorbed by the present building, but that would mean reduced space for MAP use. Any decrease in space will adversely effect the program's effectiveness.

E. DILLINGHAM OFFICE REQUIREMENTS

The present space available is adequate, but the addition of a small area for display of publications would be helpful. If required to move out of the building, MAP would need to invest in office equipment now available for use on a shared basis with the Bristol Bay campus. Location of the MAP office on a campus may detract some clients from utilizing MAP, but the in-town location and visibility outweigh any disadvantage. If moving is required, a downtown location is more appropriate than a location near the boat harbor since access would be better, particularly during the winter. Current computer capabilities are adequate, but the office has an older Macintosh computer that may need upgrading for the office to effectively use newer software and to improve communication capabilities.

SITKA

A. OVERVIEW AND STAFFING

Sitka MAP houses one agent and one half-time support person. The MAP office is located on Japonski Island in a building that was previously the administration office of Mt. Edgecumbe High School. The office is over one mile from downtown Sitka and is accessible by bridge. The address is 1297 Seward Avenue, Sitka, Alaska 99835. The office space is shared with University of Alaska Fairbanks Cooperative Extension and an alternative high school. The second floor is often used to house visiting sports teams.

B. EXTENSION/TEACHING CAPABILITIES

The office is isolated from the main traffic in Sitka. Prior to the current location, the MAP office was in the post office building in downtown Sitka. Since relocation the office receives very few visitors. The numbers dropped from several per day at the previous site to one or two per month at the current location. The building is in poor structural condition. Rooms are available for holding workshops, but they are often used for overflow activities from the Mt. Edgecumbe High School and as classrooms for the alternative high school. In summary, the current site is a poor location for the Sitka MAP office.

C. EXISTING USABLE SPACE

MAP controlled and space shared with UAF Cooperative Extension is:

SPACE TYPES	NET SQ FT
Office space	300
Shared space with Cooperative Extension	300
Display area*	<u>100</u>
Total	700

*Note: This area is difficult to control. High school students frequently vandalize it.

D. USE ANALYSIS

The actual area is adequate, but classroom access is often limiting. Meeting space is also limited or not available. The facility is aging. Heating is poor, windows are painted shut, and pipes that deliver water are badly corroded. The bathroom is unheated. Access problems cause the current location to be inadequate.

E. SITKA OFFICE REQUIREMENTS

MAP badly needs a publicly accessible office that has up-to-date facilities. Combined with Cooperative Extension, MAP needs at least 850-1,000 sq ft of space which has separated office space, a public area, and good access to classrooms.

Projected space requirements for the Sitka MAP office are:

SPACE TYPES	NET SQ FT
MAP office (exclusively MAP)	250
Public area (shared)	300
Classroom area (shared)	300
Storage (shared)	200
Support area (shared office machines etc.)	<u>150</u>
Total	1,200

Alaska Cooperative Extension and MAP are currently seeking new office space in downtown Sitka with good public access (American Disability Act approved).

BETHEL

A. OVERVIEW AND STAFFING

The Bethel MAP office houses a single agent who works one day per week for MAP. The remainder of the time our agent is employed with the University of Alaska Fairbanks Kuskokwim campus as staff for the continuing education program. The office is located at 201 Akiak Drive, Bethel, Alaska 99559.

B. EXTENSION/TEACHING CAPABILITIES

Located in the University of Alaska Fairbanks Kuskokwim campus building in downtown Bethel, the MAP office is in an excellent location for public access. The office is composed of a single room with very good opportunities to share the space resources with other tenants of the building.

C. EXISTING USABLE SPACE

Area controlled by MAP exclusively for the one day a week office is:

SPACE TYPES	NET SQ FT
Office space	200

Shared space is available. Two classrooms with 75 and 300 person capacities are available on a scheduled basis.

D. USE ANALYSIS

The MAP office is adequate for the needs of the program. The office is large enough that meetings can be held with a few clients. Display area is limited, and publications cannot be visually accessed by the public. In the near future the University of Alaska Cooperative Extension office will be moved into the building. This additional office is not expected to have an impact on MAP space requirements.

E. BETHEL OFFICE REQUIREMENTS

Facilities in the Bethel office are adequate. A display area would be helpful.

HOMER

A. OVERVIEW AND STAFFING

The Homer office houses one MAP agent and one support person. The facility is located on the second floor of the National Bank of Alaska building on 4014 Lake Street #201B, Homer, Alaska 99603 in the center of Homer. Housed with MAP on the second floor are the Natural Resources Conservation Service (NRCS) and the Agriculture Stabilization and Conservation Service (ASCS) which shares some facility space.

Homer MAP also uses an office in Seward, Alaska. This office is located in the K. M. Rae Building, a part of the SFOS Seward Marine Center. In this building our agent has access to an office, museum display area, and an auditorium that seats 100 people.

B. EXTENSION/TEACHING CAPABILITIES

The Homer MAP office is centrally located and access is good. Being upstairs in a bank building reduces visibility. An elevator allows for handicap access to the office. Meeting space is limited since the conference room seats only ten people comfortably and ventilation is poor.

The Seward MAP facilities are excellent for extension and education services. The auditorium is probably the best off-campus, educational facility UAF operates.

C. EXISTING USABLE SPACE

The following area is under complete control of MAP at the Homer site:

SPACE TYPES	NET SQ FT
Office space	268

Also at the Homer site, MAP has occasional access on a shared basis to the following facilities:

SPACE TYPES	NET SQ FT
Classroom and conference	231
Service area (e.g. kitchen etc.)	30
Storage	<u>73</u>
Total	334

At the Seward site MAP has access to:

SPACE TYPES	NET SQ FT
Office	80
Display area	600 +
Auditorium	<u>1000</u> +
Total	1,680 +

D. USE ANALYSIS

The Homer office is adequately placed and space is available to perform the necessary work. The conference room, storage room, and workroom are contained in the interior block of the building and lack windows. Air and heat circulation is a chronic problem that makes the conference room uncomfortable. The storage area is now filled to capacity. The conference room is used to store extra chairs, audio and video equipment, and a light table, all of which contribute to the overcrowding. Floor display area for Sea Grant and MAP publications is lacking. A hallway wall is used for hanging a display and there is a hanging bulletin board. Two bookcases in the reception office are for publication and video display.

The Seward site is utilized by our Homer agent two days per month, year around. During the summer MAP makes extensive use of the Rae Building auditorium for educational presentations and Elderhostel classes. The facility is excellent for these uses.