SUBSISTENCE USE OF FISH AND GAME RESOURCES IN ALASKA: CONSIDERATIONS IN FORMULATING EFFECTIVE MANAGEMENT POLICIES

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SUBSISTENCE USE OF FISH AND GAME RESOURCES IN ALASKA: CONSIDERATIONS IN FORMULATING EFFECTIVE MANAGEMENT POLICIES

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ABSTRACT

Both the Alaska Legislature and the U. S. Congress have enacted statutory priorities for subsistence uses in the allocation of fish and game under certain circumstances. At the same time, the need for research data on these uses was recognized. The State of Alaska addressed this need by creating the Division of Subsistence within the Department of Fish and Game.

The Division conducts applied social science research on the role of subsistence hunting and fishing in the lives of Alaska residents. Diverse methods are used to investigate questions about human ecology and subsistence systems. These techniques may include ethnohistorical investigations, literature surveys, participant-observation methods, interviews, surveys, mapping, and statistical analyses.

Subsistence economies in modern Alaska may be understood as non-codified systems of production, distribution and consumption which facilitate the harvest, use, and exchange of renewable resources.

These systems have some cash flow, but the cash sector is generally limited. It has been suggested that the "commercial: and "subsistence" sectors of the economy are complementary and mutually supportive in many rural Alaskan communities".

Although reliable data on subsistence uses in Alaska are extremely limited, field studies and experiences suggest certain components essential for effective management:

- Cooperation between managers and users in development of reliable data and management.
- Harvest levels based upon the ability of resource populations to sustain take rather than upon arbitrary limits.
- Management in light of all relevant factors -- not over-emphasizing harvest by humans.
- Effective mutual education about the desirability of management and the significance of local conditions.
- Meaningful involvement of users in development of regulations.

Potential benefits derived from implementing the suggested components include not only continued opportunities for subsistence harvests but also more effective management for non-subsistence uses. In addition, continuation of subsistence economies may mean that wildlife populations and habitats will continue to be important concerns in local and regional planning of land and water uses.

BACKGROUND

The Subsistence Priority in State and Federal Law

In 1978, the Alaska Legislature enacted a statutory priority for subsistence uses of Alaska's fish and game resources.[1] In 1980, Congress subsequently adopted legislative language for the Alaska National Interests Lands Conservation Act (ANILCA) which is similar in most respects to the definition and priority established by state law.[2] In addition, ANILCA provides, in part:

> It is hereby declared to be the policy of Congress that --
>
> (1) consistent with sound management principles and the conservation of healthy populations of fish and wildlife, the utilization of the public lands in Alaska is to cause the least adverse impact possible on rural residents who depend upon subsistence uses of the resources of such lands; . . .
>
> (2) nonwasteful subsistence uses of fish and wildlife and other renewable resources shall be the priority consumptive uses of all such resources on the public lands of Alaska . . .[3]

This strong statement is in keeping with the ANILCA provisions which require that federal land use decisions include evaluation of potential impacts on subsistence uses and resources.[4]

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1 See Ch. 151, 1978 Alaska Session Laws.
2 See 16 U.S.C.A. §§3113, 3114 (1980 Laws Special Pamphlet).
3 16 U.S.C.A. §3112 (1), (2) (1980 Laws Special Pamphlet).
4 16 U.S.C.A. §3120 (1980 Laws Special Pamphlet).

Research on Subsistence Uses and Their Importance

Both state and federal subsistence laws recognize the need for research on subsistence uses of resources.[5] The Alaska Legislature directly addressed this need by creating a new section in the Department of Fish and Game. The task assigned to the Division of Subsistence was necessarily broad because so little scientific research data on subsistence were available. The legislative mandate stated in part:

> The section of subsistence hunting and fishing shall . . . compile existing data and conduct studies to gather information, including data from subsistence users, on all aspects of the role of subsistence hunting and fishing in the lives of the residents of the state.[6]

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[5] ANILCA in 16 U.S.C.A. §3122 (1980 Laws Special Pamphlet), provides:

> The Secretary, in cooperation with the State and other appropriate Federal agencies, shall undertake research on fish and wildlife and subsistence uses on the public lands; seek data from, consult with and make use of, the special knowledge of local residents engaged in subsistence uses; and make the results of such research available . . . .

[6] AS 16.05.094 (1). Other duties described in the legislative mandate require that the Division of Subsistence:

> (2) quantify the amount, nutritional value, and extent of dependence on food acquired through subsistence hunting and fishing;
> (3) make information gathered available to the public, appropriate agencies, and other organized bodies;
> (4) assist the department, the Board of Fisheries, and the Board of Game in determining what uses of fish and game, as well as which users and what methods, should be termed subsistence uses, users, and methods;

In addition to conducting applied social science research, the Division of Subsistence performs diverse policy-related roles but does not have authority to make regulatory decisions, to manage resources, or to enforce regulations. The Division is the only agency engaged in comprehensive research on subsistence uses of resources, and the demand for these studies has increased exponentially. Previously unavailable data have enabled the Alaska Boards of Fisheries and Game to apply the subsistence priority (Thomas 1981) in their regulatory decisions and also have been used extensively in evaluating major land and water management issues (Veltre and Veltre 1981).

Understanding the Nature and Significance of Current Subsistence Uses of Resources in Alaska

The development of subsistence policy has been hampered by inaccurate assumptions about the nature of the resource uses involved.

Footnote (continued)

(5) evaluate the impact of state and federal laws and regulations on subsistence hunting and fishing and, when corrective action is indicated, make recommendations to the department;
(6) make recommendations to the Board of Game and the Board of Fisheries regarding adoption, amendment and repeal of regulations affecting subsistence hunting and fishing;
(7) participate with other divisions in the preparation of statewide and regional management plans so that those plans [recognize] and incorporate the needs of subsistence users of fish and game.

There are some well-known myths about fishing and hunting for subsistence. One is that subsistence activities are pursued using "primitive" technologies such as spears, bolas, and bows and arrows. Another myth is that subsistence refers to bare survival of persons in rural settings. A third myth is that the presence of cash transforms subsistence into something which does not require the harvest of fish and game. These erroneous notions make rational policy development more difficult by obscuring the true complexity and adaptability of subsistence systems. Research by the Subsistence Division is directed toward providing a more accurate portrayal of current subsistence uses in Alaska.

Alaska's human history is entwined with the use of wild renewable resources. Among northern aboriginal peoples, adaptations directly related to patterns and cycles of resource availability are among the key elements of sociocultural differentiation. After contact with western society, the harvest, distribution and use of locally available food and raw materials have continued to provide essential economic, nutritional, cultural and social benefits to a large number of communities and households. For non-Native residents as well, the use of fish and game traditionally has satisfied similarly important needs.

Today both Natives and non-Natives participate in subsistence economic systems. These economies may be understood as non-codified systems of production, distribution, and consumption which effectively facilitate the harvest, use, and exchange of renewable resources. Within subsistence economies, a substantial portion of the goods produced are for direct local consumption rather than for export and sale on external markets. Modern subsistence systems have some cash flow, but the cash sector is generally limited, seasonal, and tenuously linked with exogenous economic systems (Lonner 1980). Even in towns having viable non-subsistence sectors of production and exchange, subsistence production and distribution nevertheless may be functional and vital to the entire community at certain times of the year, especially for subcommunities, groups, or households within the town which rely on subsistence harvests. Recent data suggests that in many rural Alaska communities the "commercial" and "subsistence" sectors of the economy are complementary and mutually supportive (Wolfe 1981, pp. 88-96; Wolfe 1979, pp. 264-266; Ellanna 1980, Vol I).

Subsistence uses of locally available resources often provide substantial community and family self-sufficiency. In much of Alaska, the absence of reliable alternatives means that subsistence may be the only stable economic base. This is not to suggest that subsistence should be viewed as a less desirable alternative than the commercial

economies which typify most other areas in the United States. Indeed, because connections to commercial markets are limited, it has been argued that subsistence economic systems tend to be "buffered" against the vagaries of inflation and other external economic effects (Lonner 1980).

Use of locally available resources -- although dynamic -- is so well-established in many areas of Alaska that human communities may properly be viewed as integral parts of the ecosystems in which they participate. Accordingly, much of the Division's current research is, in effect, addressed to questions about human ecology. The presence and distribution of human populations as well as their social and cultural forms are viewed as beneficial adaptations, developed over time, in response to natural environments of fish and wildlife resources (Steward 1972; Cohen 1974; Vayda 1969; Lee and DeVore, eds. 1968).

Ethnohistorical data as well as information on current practices and use patterns are important in developing this picture of ecological relationships over time. Historic sites used for harvest or other subsistence activities provide a chronicle of relative resource abundance and movements (Fall 1981a and 1981b, pp. 3-8, Table 1, Map No. 1). Traditional names also provide valuable information on resource

use (Kari cited in Fall 1981b: Table 3). For example, the Dena'ina name for Point McKenzie near present day Anchorage in Cook Inlet, Dilhi Tunts'del'ust Beydegh ("hooligans are transported point") derives from the significant trade in eulachon oil which occurred here during April and May (Fall 1981b, p. 8). Similarly, names of sites, seasons, and activities offer keys to understanding the annual cycle of subsistence resource uses and, concomitantly, the resources upon which the local economy depended.

In order to assess current uses, a variety of well-established social science methods is employed by the Division of Subsistence. The Division has conducted research using literature reviews, oral histories, participant-observation methods, informal interviews, interview surveys, mail surveys, and combinations of these techniques. In addition, particular field studies may require stratified sampling, selection of index study communities, comparative approaches, longitudinal designs, and other specialized applications. After data have been gathered in the field, analysis involves standard quantitative and descriptive treatments. Quantitative information is evaluated using accepted statistical computer programs. Where appropriate, geographic data are mapped in order to facilitate their use in land and water management decisions.

CONSIDERATIONS IN SUBSISTENCE POLICY FORMULATION

Reliable research data on subsistence uses in Alaska are extremely limited; indeed, comprehensive research efforts are just beginning. Nevertheless, studies completed to date and current field experience permit generalizations indicating certain components essential for effective management of subsistence resources.

For purposes of evaluating the factors to be considered in formulating management policy, I shall assume that a fundamental management goal is to maintain the productivity of the resource base so human use may continue. In addition, I shall assume that the word "subsistence" does not refer to resource uses which are characterized by "primitive" methods or limited to bare, physical survival. Instead, subsistence involves the use of locally available resources primarily for local consumption as part of the complex economic systems described earlier.[7] Although other views of "subsistence" have been articulated

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[7] Alaska law provides a technical definition:

> '[S]ubsistence uses' means the customary and traditional uses in Alaska of wild, renewable resources for direct personal or family consumption as food, shelter, fuel, clothing, tools, or transportation, for the making and selling of handicraft articals out of non-edible byproducts of fish and wildlife resources taken for personal or family consumption . . . .

AS 16.05.940(26). The definition appearing in federal law is substantially similar but includes the limiting language, "by rural Alaska residents". 16 U.S.C.A. §3113 (1980 Laws Special Pamphlet).

based upon various configurations of political values, the assumptions offered here have the advantage of being consistent with available research data concerning resource uses in Alaska.

The following discussion draws upon research findings, field experiences, and other current developments related to diverse Alaskan subsistence uses.

Cooperation Between Managers and Users in Development of Reliable Data and Management

Effective management of wild renewable resources can be achieved only if resource managers have reliable data and if resource users cooperate in the implementation of the desired management regime. Of course, user cooperation is necessary in order to obtain high quality data on harvests and other aspects of subsistence use. However, accurate harvest data are of only limited utility if harvest timing or other features of the harvest are inconsistent with the management plan. Neither reliable data nor other types of cooperation are likely to result unless users are assured that their interests are recognized and their uses are protected. Because use of wild resources is so important to many communities and households, unrealistic regulations may virtually compel uses outside the regulatory system (Collins 1982;

Stickney 1981). If this occurs, the users may feel extremely uneasy[8] and reluctant to provide information.

For example, Robert J. Wolfe conducted his initial research on food production in a village near the mouth of the Yukon River in 1978 (Wolfe 1979). Village residents recognized that regulations did not reflect certain characteristics of their harvest activities, such as spring take of waterfowl. Accordingly, local representatives insisted upon guarantees of confidentiality at the outset, in addition to the anonymity which Wolfe had already built into his design. Limitations on that portion of the research data dealing with waterfowl were imposed as preconditions to his conducting any research in the village (Wolfe 1982). Representatives of Yukon delta residents feared adverse enforcement attention if details of waterfowl use on the delta were published and they took action consistent with this concern.

By contrast, a different regulatory climate existed on the delta when Wolfe conducted additional research during 1981. In the interim, federal enforcement policy had moderated, and proposals to amend

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[8] This discomfort is not merely due to anxiety about possible arrest. Many subsistence users strongly desire to comply with societal standards but believe they cannot do so and still provide for their families (Davidson 1974). In addition, some rural residents attempt to comply with ill-suited regulations simply from a sense of deference to the legal system, frequently absorbing significant losses and hardships in the process.

migratory bird treaties had been made.[9] There was less fear among delta residents that information presented about their use of migratory birds would result in damage to their communities, and their representatives approved the reporting of important harvest and use

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[9] Migratory birds are addressed in bilateral treaties between the United States and Canada, Japan, Mexico, and the Soviet Union. The most recent agreement, signed with the Soviet Union in 1976, authorizes the United States to set seasons which permit the taking of migratory birds and their eggs by indigenous inhabitants of Alaska for their own nutritional and other essential needs, but the seasons must provide for the preservation and maintenance of the migratory bird stocks. See Convention Concerning the Conservation of Migratory Birds and Their Environment, Nov. 19, 1976, United States - Union of Soviet Socialist Republics, 19 U.S.T. 4647, T.I.A.S. No. 5604. The treaty with Japan contains provisions allowing harvests by Eskimos and Indians for food and clothing. See Convention for the Protection of Migratory Birds in Danger of Extinction and Their Environment, Mar. 4, 1972, United States - Japan, 25 U.S.T. 3329, T.I.A.S. No. 7990. The treaty with Canada prohibits the hunting of most migratory birds during spring and summer, with certain exceptions. See Convention for the Protection of Migratory Birds, Aug. 16, 1916, United States - Great Britain (signatory for Canada), 39 Stat. 1702, T.S. No. 628. The treaty with Mexico does not refer to subsistence hunting. See Convention for the Protection of Migratory Birds and Game Mammals, Feb. 7, 1936, United States - Mexico, 50 Stat. 1311, T.S. No. 912.

When the Migratory Bird Treaty Act was amended to implement the Soviet treaty, 16 U.S.C. §712 (Supp. III 1979), Congress indicated its intention that the language of the Soviet treaty should be followed in amending the treaties with Canada, Japan, and Mexico to provide consistency among provisions covering subsistence. See S. Rep. No. 1175, 95th Cong., 2nd Sess., reprinted in 1978 U.S. Code Cong. & Ad. News 7641, 7645.

Negotiations with Canada produced a protocol amendment signed by both parties on January 30, 1979. A request for negotiations on similar amendatory language was made by the Department of the Interior in late 1979. However, these negotiations have not been concluded; nor has the protocol amendment with Canada been ratified.

data (Wolfe 1982). The resulting research product provided previously unavailable insight into the complex socioeconomic systems of the Yukon delta (Wolfe 1981).

Subsistence uses in rural communities can be expected to continue regardless of whether harvest regulations are consistent with the realities of local practice. Quite simply, users will take the actions they believe necessary to provide for their families and communities. If seasons, bag limits, or other limitations are inconsistent with these practices, they will be perceived as irrelevant and are unlikely to be effective.

For example, the migratory bird treaty with Canada prohibits the taking of most migratory birds between March 10 and September 1. This would eliminate virtually all use of these resources in northern and western Alaska because they are not present prior to March 10 and are migrating again at the time the treaty would allow harvests in the fall. Of the species excepted, many are neither readily available nor commonly used throughout much of Alaska and Canada. Obviously, subsistence use of migratory birds is not likely to occur without violating these limitations.

Similar problems have arisen because of inconsistencies between regulations and social or cultural roles of subsistence. For example,

the usual "bag limit" concept in wildlife management allows a licensed hunter to fill his bag limit for the day or season and then to take no more animals. In rural Alaska, however, one hunter may be responsible not only for supplying his own immediate family but also for a system of community sharing with elders and others who need meat but cannot hunt. A hunter with those responsibilities may "overharvest" according to the bag limit; but when considered in light of the distribution among family and community members, the average individual use may be well within the established bag limit. In such circumstances, the regulatory intent actually may be met but the hunter and his social responsibilities are in conflict with the letter of the law (Skoog 1980).

Major discontinuities between management regulations and local practices may, in some instances, produce virtually total lack of management effectiveness. Our research suggests, for example, that in some interior Alaskan communities where regulatory measures have shown great inconsistencies with local practice, the regulations are considered to be applicable only to other users; in fact, to follow such regulations would, from the perspective of local residents, be irrational, since it would make long-established harvest strategies ineffective (Stickney 1981).

Instead, it is their belief that the Board of Game could not have intended the regulations to apply to subsistence uses or else the provisions would have been drafted differently. The practical effect of this discontinuity is that parallel systems now exist:

- codified management regulations and enforcement, and
- non-codified local practice and social control.

An additional problem for wildlife managers arises if this divergence is not recognized. Because most managers are accustomed to a system of regulatory restraints, it is easy to assume that regulations have direct effects in controlling harvests; that is, changes in bag limits or seasons are presumed to produce corresponding changes in behavior. Where this is not the case but management nevertheless proceeds without modifying the assumption, serious management shortcomings may result.[10]

[10] The significance of this effect should not be overstated, however. Harvest practices and cycles of activity are long-established in many areas. As a result, managers' assessments of population status may unknowingly take into account unreported harvest or other use characteristics that may affect resource abundance and distribution.

Harvest Levels Based Upon the Ability of Resource Populations to Sustain Take Rather Than Upon Arbitrary Limits

Because subsistence economic systems in Alaska are both diverse and dynamic, demand for resources should not be regarded as a constant. Indeed, variability in species selection and in food output over short- and long-term cycles may be one defining characteristic of subsistence economies. Demand for wildlife, like other products, is not static but is affected by many factors, including:

- the availability of the resource; (seasonal, annual, or longer-term fluctuations occur and populations are often subject to impact by "non-consumers" such as industrial development);
- the relative expense, in time, effort, and money, required to harvest a resource;
- the relative utility of a product in comparison with other products, including other species; and
- the relative perceived need for the resource.

(Wolfe 1979, pp. 214-244). Each of these is influenced by a number of other factors, such as resource population size, geographic distances of resources from a user group, levels of harvest for other species during a year, monetary income during a year, restrictions placed upon methods of harvest and harvest seasons, competition among user groups, climatic and geophysical conditions (such as ice conditions),

and other considerations. Many of these variables may fluctuate from year to year. It is clear that regulations are only one factor, and in many cases not a significant one, affecting demand for resources and harvest levels.

Because of these dynamics, arbitrary harvest limits have no place in a sensible management program. A static ceiling is not responsive to cycles of harvestable resources which often occur over long periods. If an arbitrary ceiling is imposed, it may lead to inhibition or distortion of harvest patterns associated with these resources and may cause unanticipated changes in other parts of the annual harvest cycle. The net effect could be impairment of both subsistence use patterns and management plans. An alternative approach would be based upon potentially flexible harvest levels or ranges derived from longitudinal data on resource populations and harvests by humans. Such an approach would allow for possible variation in use without adversely affecting the population base.

Management in Light of All Relevant Factors -- Not Overemphasizing Harvest by Humans

Harvest by people is only one of many variables affecting abundance and distribution of many species. Wildlife management analyzes the

dynamics of a species by means of population data (census, distribution and composition), fecundity and recruitment, mortality factors (including losses to predation, disease, weather, and harvest), and habitat condition (Skoog 1980). Overemphasis on the influence of the "human harvest" factor may lead to a mischaracterization of overall ecosystem dynamics and potentially ineffective management methods.

Similarly, evaluation and prediction of the subsistence use component of this harvest should not rely solely on quantified harvest data for particular species. Research on the dynamics of social and biological systems interacting over time can provide much better indices of resource demand than single species harvest data. This is not to denigrate the importance of harvest data but merely to recognize its limitations for predicting future changes in subsistence practices.

Effective Mutual Education About the Desirability Of Management and the Significance Of Local Conditions

Accurate subsistence harvest data can be obtained only if users understand the purposes for which the data are being sought and if they preceive those purposes as consistent with desirable ends. In the field work conducted by the Division of Subsistence, evidence has been found repeatedly that management concepts, procedures, and agencies

are poorly understood in much of rural Alaska. Few distinctions are drawn between management or enforcement agencies such as the U. S. Fish and Wildlife Service; the Alaska Department of Fish and Game; and the Fish and Wildlife Protection Division (Alaska Department of Public Safety). In addition, the processes by which regulations are developed, the uses of research data, and the reasons for management choices tend to be much more mysterious to local users than resource managers frequently assume.

Subsistence Division field staff have noted that taking of fish or game frequently occur outside the regulations -- not because participants wish to break the law but because they perceive that the regulations are irrelevant to their long-established practices. In some areas the harvesters may be only vaguely aware of the regulations, harvest reporting requirements, or uses of management data. Even if the regulatory requirements are known, some residents have virtually no choice; to provide for their families is the major directive. Accordingly, if management is to be effective, a sensitive program of mutual education must be undertaken, in which each party seeks to understand the orientation of the other for their common benefit. This is particularly important where compulsory rules and regulations are not elements of the indigenous culture.

Meaningful Involvement of Users in Development of Regulations

Regardless of the quality of data gathered through field observations, local users consistently have additional information about production and exchange practices and resource conditions. The users typically have unique insight into what management measures are likely to be acceptable. Because effective management fundamentally depends upon voluntary compliance,[11] it is desirable to build these dimensions of user experience into the regulations.

Cooperation by users in implementation of management measures also is made more likely if the users have a meaningful role in formulating regulations. Effective participation means more than simply receiving information. Instead, it requires that user representatives be involved in understanding the problem to be addressed and in identifying management options. One potential component of this process is creation of a formal participation role such as the local advisory

[11] It is unrealistic to assume that enforcement activity will be adequate to assure compliance with regulations. For example, the Yukon-Kuskokwim delta contains more than 55 separate villages and many additional summer fish camps. Enforcement of fish and game regulations throughout this large area is obviously impractical unless most users comply voluntarily.

committee and regional council system established by the Alaska Board of Fisheries and Game.[12]

Another opportunity for strengthening cooperative relationships between managers and users is the employment of local field staff.[13] In this way, local people can be involved in resource assessment activities which provide insight into the issues of concern to regulatory authorities. After regulations have been adopted, local field staff can make unique contributions to the implementation phase,

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[12] On March 1, 1982, there were 67 local advisory committees recognized by the Boards; several petitions for new committees also were pending. The committees perform a variety of functions, including development and evaluation of regulatory proposals. See 5 AAC 96.050.

The Boards also have designated six regions within which operate councils composed of advisory committee representatives. The regional c›uncils are intended to facilitate communication among local committees, to provide a forum for resolving disagreements about management issues, to make recommendations to the Boards, and to perform a variety of other authorized functions. See 5 AAC 96.250. The importance of the regional council and advisory committee system also is recognized by federal law. See 16 U.S.C.A. §3115 (1980 Laws Special Pamphlet).

[13] The Division of Subsistence has enjoyed considerable success in employing local and bilingual staff in professional resource specialist positions and in technical assistant roles. Their contributions to field data and analysis have been substantial (See, e.g., Stokes, J. and E. Andrews, 1982). The Division views the technician responsibilities as valuable experience which may lead to higher level program positions.

The U. S. Fish and Wildlife Service also has employed local staff in gathering subsistence use data (See Copp, J. and M. Smith, 1981).

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in part by conveying information to other members of the community.[14]

Local resource users have shown great interest in the management of fish and game. In several instances, user representatives have formed organizations to facilitate their participation in management. For example, coastal communities which utilize marine mammals have formed the Eskimo Walrus Commission (EWC). In addition to sharing information and advising on management matters, the Commission for two years has conducted studies, under a grant from the Alaska Legislature, on marine mammal use.

In support of the Commission, the Pacific Walrus Technical Committee (PWTC) was created at the suggestion of the U. S. Fish and Wildlife Service. The Technical Committee includes scientific and management personnel from federal and state agencies as well as Commission representatives. The PWTC provides technical information and liaison to the Commission. Together, the EWC and the PWTC provide a

[14] Management approaches sometimes have encountered resistance because they attempt to impose unfamiliar forms of social control which conflict with long-established local mechanisms. Traditional methods of encouraging socially acceptable behavior may help provide effective limits for use in fish and wildlife management. Indeed, it has been argued that such methods offer far greater potential for success than the Anglo-American codifications used in the United States. (See Worl Associates 1978; Worl, R. 1979; see also Hallowell, A.J. 1955).

direct user-manager dialogue and a means for shared management discussions. They also represent a significant initiative by local users in developing a meaningful management role.[15]

SUMMARY AND CONCLUSIONS

Effective wildlife management in Alaska requires an approach reflecting the realities of today's subsistence way of life. Otherwise, management will be hampered by a significant data shortfall, possibly producing virtual inability to manage. Wildlife managers have a real opportunity to gather reliable data and to achieve local cooperation. Because subsistence use data have not previously been available to managers, even a relatively small investment in the necessary research has produced a substantial return of usable information. The potential benefits include both better management decisions and more effective execution of management programs.

[15] Other users have established organizations with similar purposes. The Alaska Eskimo Whaling Commission is involved directly in monitoring bowhead whale harvest quotas, through a cooperative agreement with the National Marine Fisheries Service, U.S. Department of Commerce. Similarly, rural Alaskan users of the Porcupine Caribou Herd have joined with their counterparts in the Yukon Territory to form the International Porcupine Caribou Commission.

Short-term results may include not only better maintenance of the resource base but also continuation of opportunities for non-subsistence use. Wildlife users outside of Alaska may benefit directly from this improved management. In the context of migratory birds, for example, more reliable harvest and use data could lead to projections of take which, in turn, could produce more accurate assessments of harvestable surplus.

Plans for better research and management probably will be ineffective, however, if users perceive management to be either antithetical or irrelevant to their interests. To increase the probability that management will be effective, several specific measures have been suggested:

- Cooperation between managers and users in development of reliable data and management.
- Harvest levels based upon the ability of resource populations to sustain take rather than upon arbitrary limits.
- Management in light of all relevant factors -- not overemphasizing harvest by humans.
- Effective mutual education about the desirability of management and the significance of local conditions.
- Meaningful involvement of users in development of regulations.

These steps are mutually supportive and should not be considered in isolation.

Because subsistence economic systems are dynamic, research data should include all aspects of system functioning -- not merely harvest data. Only in that way will predictive ability be developed, since harvest data alone, even when suggesting historical trends, do not identify causal factors. In addition, existing data are inadequate in most parts of Alaska to allow reliable estimates of current harvests. Even if such information were available, resulting estimates would not provide an adequate basis for management because current harvest levels, lacking both longitudinal data and analysis of sytem dynamics, are not meaningful as projections for the future.

The potential rewards of realistic management policies for subsistence include long-term benefits as well. Wise harvest allocation policies will enable subsistence-reliant communities to retain the economic base which best meets their needs -- including nutritional, social, and cultural components. To the extent these communities continue their subsistence way of life, concern about wildlife populations and habitats will be an important theme of local and regional planning decisions. As with improved management, users in Alaska and in other places stand to benefit.

The value of using fish and game as part of the self-sufficiency base is, at best, difficult to quantify, but its importance to Alaskan communities and households is clear. Managing in recognition of

subsistence realities can protect these opportunities while maintaining the resource populations that all user groups value.

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