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"Changing Relationships to Marine Resources: The Commercial Salmon Fishery in Old Harbor, Alaska."

Deborah Butterworth Robinson

Department of Geography

McGill University, Montreal

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Abstract

This thesis presents a case study conducted in 1994 concerning the effects of fishery management regulations on the Native village of Old Harbor, Alaska. Access to the traditional livelihood of harvesting marine resources has profound implications for the sustainability of the economy of Alaska's rural Native villages. The institution of the limited entry system in 1975 caused the transfer of commercial salmon fishing rights away from some Native fishermen and a reduction in local fishing jobs. Although the alternatives may have had similar or worse effects on the village, limited entry is perceived as a major cause of economic and social dysfunction. One of many factors that has integrated remote villages into the global market economy, it has exacerbated the uneven distribution of wealth in the community and contributed to a growing gulf between fishing as a business and a lifestyle.

Résumé

Cette thèse présente une recherche qui a eu lieu en 1994 concernant les effets des règlements de gérance de la pêche sur le village indigène de Old Harbor, en Alaska. L'accès au gagne-pain traditionnel de la récolte des ressources marines a des implications profondes pour soutenir les villages ruraux indigènes en Alaska. L'établissement du système de permis d'accès limité (limited entry) en 1975 a enlevé les droits de pêche commerciaux du saumon de certains pêcheurs indigènes et créé une réduction locale d'emplois de pêche. Quoique les alternatives aient eu des effets similaires ou pires sur le village, le permis d'accès limité est considéré comme une cause majeure du malaise économique et social. Un des nombreux facteurs qui a intégré les villages éloignés dans l'économie du marché mondial, il a exacerbé la distribution inégale de la richesse dans la communauté et a contribué progressivement à un écartement dans la pêche en temps qu'affaire et manière de vivre.

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The people of Old Harbor have my deepest gratitude for sharing their lives and telling their stories. The many fishermen who contributed their time to interviews and informal conversation about their livelihoods provided the backbone of this paper. The women of the village, through hours in banyas, kitchens and church, helped me to understand the shore life of their fishing village.

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Commission were generous with their time and resources essential to my work. Various members of Kodiak's fishing, management, and processing communities were generously forthcoming with their time to share experiences and opinions, thus bringing the whole picture together.

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Acronyms and Abbreviations

ADF&G	Alaska Department of Fish and Game (Fish and Game)
AFN	Alaska Federation of Natives
ANCSA	Alaska Native Claims Settlement Act
ANILCA	Alaska National Interest Land Claims Act
ANWR	Arctic National Wildlife Refuge
ASMI	Alaska Seafood Marketing Institute
BIA	Bureau of Indian Affairs
CDQs	Community Development Quotas
CFAB	Commercial Fisheries and Agriculture Bank
CFEC	Commercial Fisheries Entry Commission
CPE	Common Property Equilibrium
CPUE	catch per unit effort
DOC	Alaska Department of Commerce and Economic Development
EEZ	Exclusive Economic Zones
FRED	Fisheries Research, Enhancement, and Development (Division of ADF&G)
hp	horsepower
IRA	Indian Reorganization Act
IRS	Internal Revenue Service
ITQs	Individual Transferable Quotas
KANA	Kodiak Area Native Association
KNWR	Kodiak National Wildlife Refuge
KRAA	Kodiak Regional Aquaculture Association
MEY	Maximum Economic Yield
MScY	Maximum Social Yield
MSY	Maximum Sustainable Yield
NMFS	National Marine Fisheries Service
OAE	Open Access Equilibrium
OHNC	Old Harbor Native Corporation
PPE	Private Property Equilibrium
PWS	Prince William Sound
RurALCAP	Rural Alaska Community Action Program
S01K	Kodiak Area Salmon Purse Seine (Permit Designation)
S02K	Kodiak Area Salmon Beach Seine (Permit Designation)
S04K	Kodiak Area Salmon Set Gillnet (Permit Designation)
TAC	Total Allowable Catch
VPSO	Village Public Safety Officer
ZSY	Zero Social Yield

Chapter One: Introduction

I. Hypothesis and Research Approach

Access to the traditional livelihood of harvesting marine resources has profound implications for the sustainability of the economy of Alaska's Native (indigenous) residents. My hypothesis is that Alaska's limited entry system, a regulatory program that issued transferable permits to qualifying boat captains, thereafter requiring such permits for the right to fish, has been a significant factor in negative changes to Old Harbor's commercial salmon fishery. I will test whether the system has enhanced the economy for Native salmon-fishing communities as it was intended, or instead has been a contributing factor to changes in the economy, social structure, and culture of Old Harbor.

Much of the literature on Common Property Resources focuses on ownership rights and their affects on the resource. This study examines how limited entry, as an ownership arrangement, influences the people whose ancestors have been harvesting the salmon resource for thousands of years.

In developing a case study of the Alutiiq village of Old Harbor on Kodiak Island, I examined the changes in Natives' access to salmon starting with their first contact with Russian colonizers over two hundred years ago. Native territorial management of salmon streams (Black 1988: 50) was undermined by the Russian American Company, which supervised the drying of large quantities of salmon for Native sea otter hunters (Roppel 1994: 2). Native control of resource management was further eroded with the American development of commercial fishing on Kodiak Island, with the first salmon cannery in operation in 1882 at Karluk (Roppel 1994: 6). This background work is the basis for a historical pamphlet being produced for the village. The thesis focuses on the twenty years since 1975, when a system designed to limit access to the fishery introduced transferable entry permits, which henceforth were required by any operator wanting to harvest salmon commercially.

II. Methodology

Methods of participant observation, open-ended interviewing, and archival analysis were employed in this study. The researcher's involvement in Kodiak Island fisheries for a period of five years, including intermittent employment in Old Harbor, provided familiarity with the community, the residents, and the problem. A research field season in 1994 was supplemented by numerous data from state fisheries agencies and further literature review.

A. Goals, Purpose, and Implications

This project was initiated due to concerns, heard by the researcher over several years, that limited entry was having profound negative effects on Native communities. The goal of the research was to discover whether these concerns were well founded, or, if not, to find the factors that contributed to the perception of limited entry as the bane of Native fishermen. The purpose then was to suggest possibilities for approaching the problems associated with the limited entry permit system. The findings may implicate the State of Alaska for faults in this regulatory system, and could be used for political pressure to change the system. However, if the thesis does not place blame for these problems on limited entry, it could be used to support the placing fault or responsibility elsewhere, including on international, national, regional or local community factors.

B. Participant Observation

As a Fisheries Technician and Subsistence Resource Specialist with the Alaska Department of Fish and Game (ADF&G), I had worked with Kodiak fishers since 1986, and specifically in the Old Harbor area since 1988. The thesis project was facilitated by this experience with ADF&G and, following the Exxon Valdez oil spill in 1989, by a summer working as a data technician for the Alaska Commercial Fisheries Entry

Commission (CFEC). Old Harbor is an intriguing mix of the traditional and modern: it has retained its Native language and beliefs, and a strong Russian Orthodox Church, as much or more than any other Kodiak village. At the same time, Old Harbor has had greater success in fishing (as measured by the number of limited entry permits held) than other villages on the island. I became better acquainted with the village and further formulated the thesis while working with an archaeological survey team near Old Harbor during the summer of 1993.

C. Interviews

In early June 1994, documentation was gathered from the CFEC, the agency which regulates license limitation for the state. During a one day session at CFEC offices in Juneau, I visited the commission's archives and had several meetings with the staff. Bruce Twomley, CFEC commissioner, and several other members of the research staff responded to written questions that had been received in advance of my visit. Specific data on Old Harbor permits were supplied by request. Historical documents such as CFEC Annual Reports, litigation summaries and newspaper articles were also provided for my use.

I conducted field work in Old Harbor during June and July, and for two weeks in late September, 1994. During the first period, most active fishers were on the grounds during fishery openings, visiting the village occasionally. I interviewed retired and unemployed fishermen, elders, and others in the village. One excursion was made to the fishing grounds during this time, where several interviews were carried out, and a cannery's boat-crew records from the 1960s were copied. By late September, most salmon fishing had ceased, and the majority of the remaining permit holders could be contacted in Old Harbor.

Starting with the lists of original and current Old Harbor permit holders, I interviewed individuals associated with twenty-nine of the thirty-five permits held by

village residents between 1975 and 1994. I interviewed skippers who were given permits in the original issuance, those who had bought permits from outside the village, current and former crew members, men who had applied for but not qualified for permits, and a woman who has worked in fish processing. In all, 42 villagers were interviewed, including 34 past and current permit holders and seven crew members. The village consultants assisted in finding individuals and in tracing permits within families, between village residents, and outside of Old Harbor. Consultants also provided valuable information concerning the history of the local fishery. ADF&G's Subsistence Division helped by providing lists of village residents and house maps. I will not identify by name most of those who cooperated with interviews in order to protect those who chose not to be identified. On a small island such as Kodiak, it is difficult to maintain confidentiality -- even without names. I hope that I have done so to a degree that does no harm, and detracts neither from the value of this study nor from my expression of gratitude for the cooperation and support from many individuals in Old Harbor and around Kodiak Island.

Interviews with fishermen were open-ended, based on either a long-form or short-form questionnaire (Appendix B). Interviews were as short as five to ten minutes in a few cases. Longer interviews were conducted when questioning was productive and more information could be gained, and sometimes these were extended with informal conversation for several hours. Some interviews were more formal than others, a more conversational approach being more useful in some circumstances. A tape recorder was not used due to the sensitivity of interview material. Interviews were conducted in a variety of venues: individuals' homes and work places, the city office (when a private room was available), the (closed) village library, the village café, and aboard boats.

During August and September 1994, I interviewed several Native and non-Native fishermen from Kodiak City whom I knew to have fished in East side waters near Old Harbor. Past and present Department of Fish and Game managers and processing company managers provided additional perspectives on policy and economics of the

fishery.

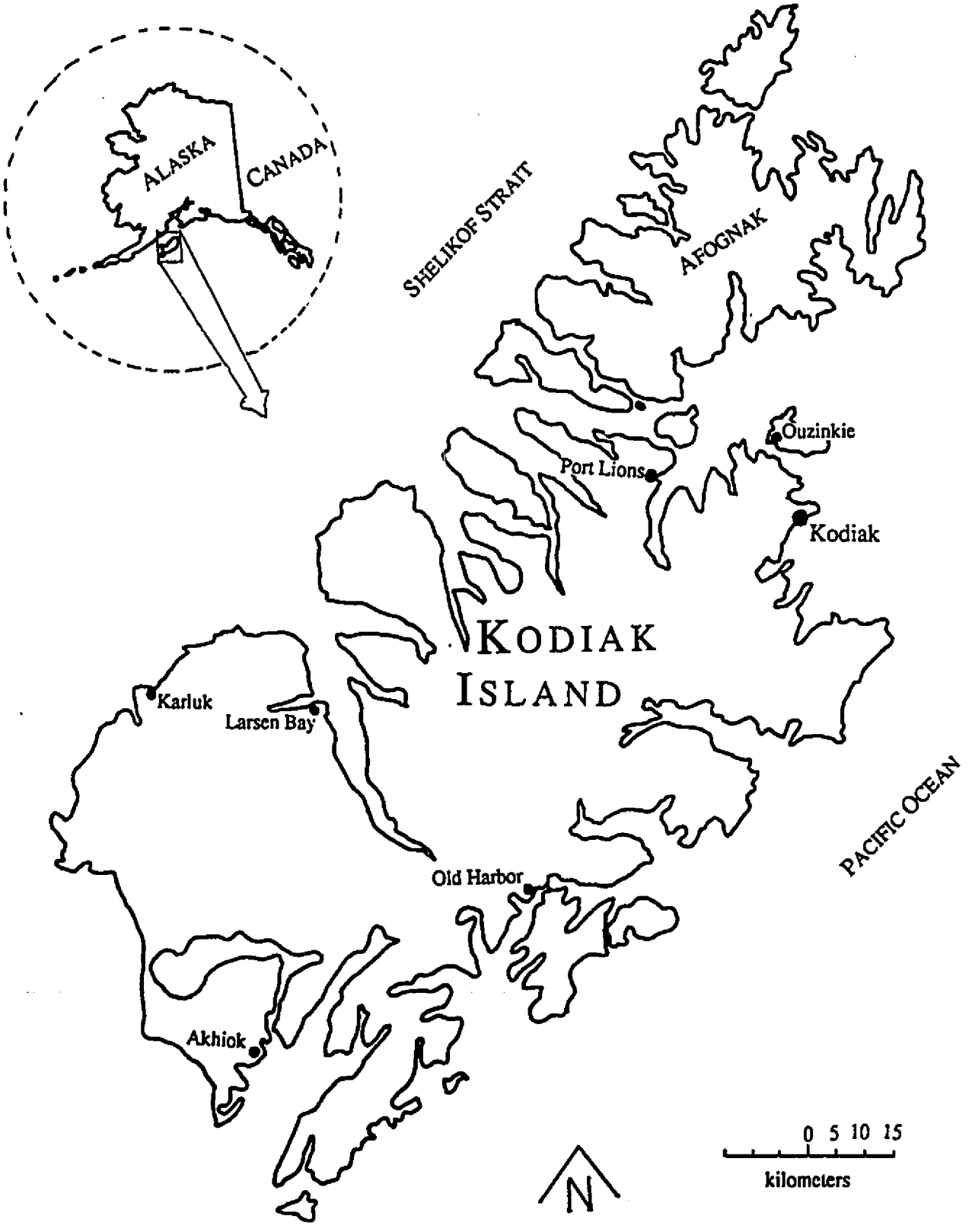
D. Research Ethics and the Role of Community Participation

The State of Alaska does not have a formal permitting process for research in rural communities, so guidelines suggested by the Alaska Federation of Natives (AFN) for research in Native communities, including involving community members in the research, were adhered to as closely as possible (See appendix A). Before research began, the research prospectus was sent to several members of the village tribal council, the city council, and the Native Corporation for approval, and telephone calls were made to key members of these bodies. The corporation president gave enthusiastic approval for the work, along with indications that funding support was possible. (The latter did not materialize.) The mayor approved of the project and agreed to provide office space. Two village consultants were hired to assist with development of the project, collection of oral histories, and interview logistics. Several people in the village provided ongoing feedback and advice. An information and discussion session on the research was conducted with the high school class, and resulted in further discussion with young people. Follow-up letters were sent to participants, and draft copies of the thesis were sent to several people in the village for comments and corrections. Those comments were reflected in subsequent drafts .

Final copies of the thesis will be provided for the city and school libraries in Old Harbor, and to other individuals and agencies that contributed data or support. A short history of the local fishery, as related by elders and gleaned from historical accounts and documents, is being produced for the village in recognition of their contribution to this study, and will be distributed to the school and the library.

Figure 1: Map of Alaska and Kodiak Island

Source: Prokopowich 1995: 61



E. Analysis

Interviews were coded for statistical information, and grouped together in categories representing subjective information such as opinions and anecdotes. Anecdotal information and opinions were correlated with fishery statistics and permit transfer data to assemble an overall picture of the state of the village fishery. This information is then compared to the literature on the strengths and weaknesses of limited entry.

III. Description and Background

Old Harbor, the site of my study, is a Native village on Kodiak Island Alaska, approximately 400 kilometers by air south of Anchorage in the Gulf of Alaska (see Figure 1). Of the six villages on Kodiak, Old Harbor has maintained the most viable and competitive fishing fleet, numbering around 30 boats. It is also Kodiak's largest Native village, with 284 residents counted in the 1990 census (U.S. Bureau of the Census 1990). The residents of Old Harbor are predominantly Sugpiaq, also called Alutiiq, Pacific Eskimos, Koniags, or Aleuts. The village, called Staruigavan by the Russians and Nunamiut in the Alutiiq language, supplied large quantities of dried fish for the Russian American Company's Native sea otter hunters prior to the American takeover of Alaska in 1867 (Davis 1979: 86).

The economy of Old Harbor is based on commercial fishing, municipal and tribal government, federal and state government transfer payments, and, to some extent, subsistence hunting and fishing. (Reliance on subsistence resources varies considerably according to the current success in the cash economy.) There are two grocery stores, a lodge and café, a pool hall and video business, and a home video rental business. A small amount of hunting, fishing and eco-tourist guiding occur, and it is in these areas that villagers see the possibility of economic development.

Commercial fishing on Kodiak has never been a guaranteed source of income. There have been many years when over-fishing or environmental conditions depleted

stocks to the extent that the fishery was reduced or closed altogether. In the late 1960s and early 1970s, fishers' incomes were getting smaller as more boats joined the fleet, while several bad years for fish returns made the future uncertain. This was an important factor in the decision to control fishing effort by restricting access to a limited number of boats.

Through an historical and contemporary survey of the salmon fishery in this village, I learned more about the standing of Native people in the salmon fishery under limited entry. Many fishers feel that limited entry has had direct negative effects on their lives and livelihoods. This thesis will describe the present position of Old Harbor fishermen within the harvest system and in relation to one another, and explore where changes are possible or necessary to improve the future outlook for the village.

IV. Thesis Structure

Chapter Two consists of a literature review on Common Property issues, focusing on the strengths and weaknesses of limited entry as a regulatory mechanism. The remainder of this thesis will concern the village of Old Harbor directly. Many of the subjects covered in the literature review will be discussed, however because of the limited scope of this document as a Master's thesis, they will not all be covered in depth. For instance, a detailed economic analysis of Old Harbor's salmon fishery will not be made. Instead, anecdotal evidence and details from everyday life on the fishing grounds will be presented.

Chapter Three will be the core of the thesis, examining the salmon fishery since the institution of limited entry. The chapter will discuss data on permit transfers, including the transfer of fishing rights within the Native community and away from the village into the control of outsiders. Also in this section I will discuss the re-structuring of relationships between captains and crew members.

Chapter Four will address political structures and the control of resources, with a

sketch of politics at the village, regional, state and federal levels. The chapter will treate limited entry permit transfers and the political nature of the permit as a commodity. This section will outline the political means for changing fisheries policy and discuss ways in which Old Harbor Natives are using these mechanisms. Also discussed are changes in relationships between Native and non-Native fishermen, and fishermen and regulatory agencies.

In Chapter Five, the economy of the village fishery will be discussed in greater depth. The local economy is increasingly influenced by the regional and global economies. Old Harbor is now part of a world oriented more and more to money. The number of fishing jobs and fishing income will be explored, along with changes in and alternatives to the traditional fishing-based way of life.

In the thesis Conclusion, Chapter Six, economic and Common Property theories are applied to evidence of the case study. The researcher postulates whether the application of theory to this research suggests any new alternatives for management. Options outside of the established regulatory framework will also be considered.

Chapter Two: Literature Review. Common Property: The Fisheries

In this chapter, Common Property and Political Ecology literature is examined as it pertains to the case of Old Harbor salmon fishing. Also discussed are economic theories of the fisheries, particularly those focusing on license limitation as a management tool.

Use rights in the world's ocean fisheries have undergone drastic changes over the past 500 years. Fisheries are now often considered to be common property resources, and in many situations have been openly accessible. During the late middle ages, regional and national claims to specific fishing grounds and sea routes in many parts of the world were upheld as long as they could be defended. When exploration expanded globally and exclusive claims impeded trade and colonization, Britain and the Netherlands adopted the doctrine of "freedom of the seas," which served as license to dominate and control resources under previous ownership arrangements (McGoodwin 1990; Christy and Scott 1965); other imperial powers had little choice but to join the fray. In the 1608 essay Mare liberum, Hugo Grotius (1916) argued that unlike land, the sea and its resources could be neither appropriated nor defended; nor could these resources be exhausted. Thus, property could not exist on the oceans (Christy 1965: 155).

Recent decades have overturned both of these premises for open access to the resources of the seas. Following World War II, claims to sea tenure increased dramatically as it became more clear that ocean resources were not, indeed, inexhaustible (McGoodwin 1990: 104). The United Nations Law of the Sea, in effect since 1982 though still not technically ratified, allows nations 200 mile exclusive fishery zones (Exclusive Economic Zones or EEZ) (ibid. 103). In 1975, the State of Alaska instituted a limited entry permit system, putting an end to uncontrolled, open access to its salmon fisheries (CFEC 1975). Limited entry in Alaska must balance between protecting the fisheries as a common resource for the good of all and safeguarding individual rights of fishers to make a decent living from fishing (Twomley 1994). "Optimal number" studies, as mandated by the outcome of the 1988 Alaska Supreme Court Case Johns v. State,

CFEC, 758 P.2d 1256, are one method to ensure this balance (CFEC 1991: 18).

During an era in which the possibility of exhaustion of fisheries resources was increasingly recognized, Gordon (1954) and Scott (1955) brought fisheries into economists' discussions of common property. Both wrote about rent (profit) dissipation under open access conditions in the fisheries, and suggested that appropriate arrangements could ameliorate biological and economic problems. Much of the ensuing theory of common property and fisheries regulation has focused on the manipulation of property rights: sole ownership, restricted access and open access.

Population growth is at the heart of Garrett Hardin's frequently-quoted article on common property resources (1968). Hardin's example uses as its model a common pasture, open to all herders for as many animals as they care to graze. When population exceeds a threshold level, additional animals put to pasture will subtract from the public good. The owner of the additional cattle will profit from one additional animal, but the overgrazing that results as more and more animals use the pasture is shared by all users and eventually leads to a depletion of the resource. This is referred to as the "tragedy of the commons" (Hardin 1968: 1244).

The tragedy of the commons doctrine as presented by Hardin blames the system of property rights for resource declines (1968). Acheson (1989: 372) believes that problems attributed to open-access common property are more deeply rooted in "issues of population growth, industrialization, and the expansion of the capitalist system and markets."

Refuting Hardin's assertion that private ownership is one way to avoid "the tragedy of the commons" (1968: 1245), Berkes (1989), Feeny, Berkes, McCay, and Acheson (1990) and others contended that the culturally adapted systems of traditional societies prevented resource depletion, and that it is the deterioration of such systems that leads to the decline of common property resources. There is a growing literature on alternative controls to government regulation of common resources. Berkes (1985, 1989), Feeny,

Berkes and McCay (1990), and others consider that the current open access dilemma faced in many fisheries is due to the erosion of traditional common property regimes that acted as what Hardin terms "social arrangements that produce responsibility" and which are referred to by him as "mutual coercion" (1968: 1247). These management strategies would include a broad range of mechanisms, from taboos (Taylor 1990: 191) to territorial arrangements that restrict fishing (Lawson 1984). Townsend examined the soft-shell clam fisheries in Maine, and discovered that the highest yields were in areas with the tightest entry restrictions (Townsend 1985a: 63). Pinkerton (1981) approves of individual vessel quotas if they are tied to communities and are non-transferable.

I. Theoretical Approaches: Political Ecology

Political Ecology as described by Bryant (1992) deals with the contextual (political, economic, and environmental) sources of conflict over access to resources, environmental change, and the political ramifications of environmental change. Political economy is similarly formulated in the context of broader hierarchical systems and how they integrate into regional, state and world economies, affecting the management of resources (Butzer 1989: 202).

Political ecology is applied to the context of fishing by Gisli Pálsson (1991: 16). He criticizes Hardin for stereotyping common property users as independent agents, and says that Hardin "fails to recognize the social nature of production." Pálsson proposes instead an approach which recognizes that social differences may be paralleled by differential access to resources (ibid.: 24).

Along the lines of Berkes (1989), Acheson (1989), Feeny (1990), and McCay, (1987), who contend that private and state control of common property resources are not the only viable alternatives, Pálsson (1991: 38) recognizes the development of cooperative social institutions among fishers "which reduce competition and uncertainty" and "spread the risks of production." He recognizes too that culture's definitions of

property (i.e. fish as subsistence food versus for sale) have changed, along with social obligations such as sharing and reciprocity that once governed the use of common property resources (ibid.: 151-160). Berkes extends this system of reciprocity around resources to encompass social relations:

> Common property systems serve as interface, not only between society and resources, but also between the individual and the society at large. Social roles and obligations are often defined in terms of one's participation in work teams. ...there are social sanctions against excessive individual gain from a communal resource and against the accumulation of surplus (1989: 12).

II. Territoriality and Other Informal Common Property Systems

McCay and Acheson speak to one local management system for control of common property that is also used by fishers in Old Harbor: territoriality. (In Chapter 4, the difference between official fishing districts and local territorial waters will be discussed.) These authors see territoriality as a means for the development of restricted common property which not only limits effort, but changes attitudes towards the resource. "If we can keep others out, it makes sense for us to do something about our own behavior" (McCay and Acheson 1987: 11).

Ostrom outlines characteristics of group dynamics that are necessary for formulation of common property resource solutions, and factors that prevent such formulation (1990: 21). She notes that actions which may be rational for an individual, when taken collectively may lead to irrational outcomes, or, alternatively: why should someone contribute voluntarily to the collective good if they cannot be excluded from collective benefits (ibid.: 3-4). Young blames this individual irrational behavior for overcapitalization, lack of economic rents, and depletion (1983: 122). In his examination of limited entry in the early 1980s, he found problems with the trend towards professionalization of the fishery: it is worse for the stocks, as lifestyle fishermen will harvest less (ibid.: 134); employment and crew status were not addressed in the rules, leaving their positions vulnerable (ibid., 138); the state is not yielding any rents as

manager of this common resource (ibid.); and the buy-back program, a basic part of the statute for restricting entry, was a failure (ibid.: 140).

Acheson claims that social scientists are now (relative to when Hardin first discussed the tragedy of the commons in 1968) more inclined to

> ...believe the problems blamed on open-access property rights are more closely related to political economy--issues of population growth, industrialization, and the expansion of the capitalist system and markets. (1989: 372).

This view seems to underlie all other evidence collected during this research. Monetization of the Native economy, professionalization of the fishery, and the world market price for salmon can be concluded to motivate social, cultural, political and economic changes more than any single regulatory factor.

III. Economic Theory and the Case of Limited Entry

Restricting access to formerly openly available common property resources will have various effects on efficiency and equity, depending on how laws are written and enacted. Access-limiting systems imply agreement by users for rates of use, distribution of returns, and conservation goals (Young 1983: 123). According to one researcher (Townsend 1990), success in reducing effort improves with increased restrictions, though such programs are often more expensive than less restrictive alternatives, both for enforcement and to the fishermen in high costs of compliance (ibid.: 371). License limitation programs have been implemented all over the world, including in fisheries for salmon and lobster in Canada and the United States; rock lobster, scallops, and abalone in Australia; pelagic fisheries in South Africa; Norwegian herring; and Japanese inshore fisheries (Townsend 1990; Cicin-Sain, Moore, and Wyner 1978).

A. Rights of Access to and Ownership of Common Property Resources

The current basic theory of fishery economics is that free access to fisheries and

competition among many users will cause each individuals to disregard their own cumulative effects on future fish stocks, and thus on future catch opportunities (Hannesson 1991: 401). Open access fisheries, such as existed for salmon in Alaska from the first commercial operations over a hundred years ago until 1975, are not seen to operate in economically optimal ways (Anderson 1986: 192). Competition for the largest possible share of the catch will result in inefficient overuse of the factors of production (Hannesson 1991: 401). Congestion in the fishery (too many boats) causes harvest costs to rise as stocks diminish (Hartwick and Olewiler 1986). The Common Property Equilibrium (CPE, the level of effort where average cost equals marginal revenue for fishers) will be inefficient, whereas Private Property Equilibrium (PPE) may be preferred due to less effort per cost required to catch fish (ibid.). Standard management tools currently used to increase efficiency over the CPE are limitation of entry (to fishers or vessels); controlling access to stocks through season, area and gear restrictions; and augmentation of resources through aquaculture (fish farming) (Cicin-Sain et al. 1978: 22), enhancement (hatcheries), and habitat improvement (Copes 1980: 145).

There are four generally recognized types of property rights alternatives to open access in the fisheries: privatization, indirect control through a landing tax, license limitation, and Individual Transferable Quotas (ITQs). Alternative arrangements include fractional licensing (Townsend 1992), socialized control of public property, territorial rights, and rule by social convention or tradition (Young 1983; Berkes 1985). A combination of these types is also possible, a much discussed example being co-management.

In both Canada and the United States, salmon fishermen were concerned with protecting fishing rights of certain groups under limited entry. Fishers classed by gear type, geography, ethnicity, and commercial or non-commercial use wanted to be sure of equitable allocation of permits for their groups (Rettig 1984: 236). After failing federal court tests on the first two attempts at enacting restricted access laws, Alaskan lawmakers

were very careful to design the 1973 limited entry statute so that it would not explicitly bar access to non-Alaskans (ibid.: 239). This was accomplished, in part, by using an index of historical "dependence on the fishery" and alternative employment opportunities (Young 1983: 129) as gauges of eligibility that would favor Alaskan rural residents (Rettig 1984).

The allocation of permits poses difficulties at later stages of license limitation programs as well. With transferable licenses, those potential participants most capable of raising capital to buy a permit have the advantage (Anderson 1986; Young 1983).

1. Sole Ownership

Scott (1955) asserts that in the short run, sole ownership would not differ greatly from an open access situation. Even in the long run, "Only if there is an opportunity for adopting alternative fishing techniques that reduce the investment necessary for a given output is there an argument in favor of sole ownership" (1955: 121). Theoretically, a sole owner would maximize the present value of the fishery by maximizing current returns while planning "for the optimum series of landings through the ensuing future periods" (ibid.: 123). Depending on fish population dynamics and discount rates, it is quite possible for a sole owner to decimate stocks (ibid.).

Informal contracting systems and fishermen's unions restrict access to some publicly owned fisheries, often through the indirect tools of price setting and quality control standards (Johnson and Libecap 1982). Such informal arrangements lack the sanction of law for enforcement, but like sole ownership have some positive effects, including taking the burden of regulation costs away from the government (Johnson and Libecap 1982: 1007).

2. Taxes

Taxes as a mechanism to limit effort tend to be extremely unpopular among fishers,

unless revenues are channeled directly into programs, such as research and enhancement, that promise eventual returns (Rettig 1984: 234). In situations where high prices for fish stimulate chronic excess harvest capacity, Rettig believes that taxes could be effective in controlling effort over the long term. He believes that it is impractical to implement taxes for short periods due to difficulties in adjusting for changing economic factors and the political obstacles involved.

Townsend (1990: 373) concedes that although taxes could improve the success of limited entry programs, political forces usually favor opening access to more fishers, rather than taxation. Taxes as a limitation tool are made impractical by certain vocational fishers, who would be able to afford to pay royalties at a rate that would put full-time fishers out of business (Owers 1975: 24).

3. License Limitation

Limited entry is any program wherein "some institution establishes administrative pre-conditions that determine who may or may not fish" (Townsend 1990: 359). A license limitation system restricts access to fish stocks by requiring permits (or licenses) in order to fish, a limited number of which are issued to fishers that qualify (Anderson 1986: 211), usually by virtue of their history in the fishery (Townsend 1992: 185). Permits are given to individuals, usually vessel captains, or assigned to the unit of gear itself (e.g., a fishing boat) (Anderson 1986). A limited entry permit often specifies the type of gear to be fished (purse seine, gillnet, troll, etc.) and may be restricted to maximum length, tonnage, or some other feature correlated to harvest potential (ibid.: 212). In the process of "limitation" of already overcrowded fleets, reduction of vessels is seldom accomplished by the time appeals are made (Townsend 1992: 185).

Limiting the number of effort units (licenses) on the fishing grounds has the effect of increasing overall costs of harvest, an indirect result due to reactions of the fishers (ibid.). In the short run, reducing the number of licensed vessels allowed to fish should

lower effort: fewer boats cannot catch as much fish during an equal period of time. In the long run, stocks would increase due to reduced effort and, in reaction, fishers would do whatever possible within regulations to increase their Catch Per Unit Effort (CPUE) (ibid.). Individual fishers will find it profitable to expand their effort until their marginal costs equal the (now higher) returns.

Limited entry reduces the most important input used in production, the vessel or the vessel captain (Anderson 1985: 413). Losses are still possible under license limitation if short-run costs are higher than before limitation (ibid.: 417). With overall production theoretically lower, firms must increase marginal costs to expand production (ibid.). This process, referred to as overcapitalization or "capital stuffing," will be discussed later.

Rents will be positive when limited entry effectively reduces fleet size, until the point at which any gains are offset by substitution of unregulated effort (Anderson 1986: 214). License limitation does not effectively eliminate overcapitalization, allocation problems, or in some cases, the race to harvest, but some still consider it to be a preferred tool to use in concert with other tactics for effective management (Townsend 1990). Increases in effort are thought to be inevitable when limited entry is used without additional restriction, offsetting any gains of vessel reduction (McConnell and Norton 1978). But Crutchfield (1979) claims that the potential for capitalization of vessels is limited, and limited entry will yield gains provided that basic tonnage or length limits are in effect.

Limited entry is expected to generate economic benefits in the fishery, including capitalized rents in the form of increasing value of permits, and incomes above the opportunity cost of labor and capital (Townsend 1990: 360). If stocks are at or above maximum sustainable levels, increased employment and a higher consumer surplus should result (ibid.).

B. Management Strategies

Fishery management becomes more problematic as fishery complexity increases. In response to multiple factors and the usual accompanying slew of regulations, fishers can innovate gear or adopt new methods to circumvent attempts at limiting effort (Townsend 1990). Aspects of license limitation (the form of limited entry treated in this thesis) will be evaluated in greater depth. Anderson defines optimal harvest as multi-dimensional, including the following aspects: time patterns of harvest that reflect changes in annual catch and effort; size of catch; size of fish caught; size and composition of the fishing fleet; vessel operation levels; and spatial and temporal deployment on stocks. He asserts that ideal combinations of the above factors will result in the correct amount of fish being caught at their proper size and proper time at the lowest possible cost (Anderson 1986: 192).

There is a standard repertoire of techniques for managing fisheries: temporal, areal, and species-directed closures; imposed inefficiencies in the form of restrictions on boats and fishing gear; quotas and limits on size and number of fish caught; taxes on gear and effort; and access to the fishery (Anderson 1986; Hartwick and Olewiler 1986). Each management method has advantages and disadvantages depending on the context, but the effectiveness of management is thought to be due to some degree on who -- if anyone -- owns the resource.

1. Economic Models for Optimal Fishery Exploitation

Anderson (1986: 192) advocates a regulatory program that improves upon open access with what he terms the "optimal time pattern of exploitation." Such a management scheme would encourage innovative efficiency, be flexible to both biological and economic changes, and have the support of fishermen. The program should be sensitive to the effects of wealth distribution and employment while improving the balance of trade (ibid.). Traditional means of control under open access are criticized by economists as

inefficient. Potential gains of these strategies are dissipated by increased costs associated with their use (Anderson 1985: 409; McConnell and Norton 1978; Crutchfield 1982). Methods of imposed inefficiency may conserve stocks in the short run and protect fishers using inefficient methods, but they will not guarantee an ideal quantity of fish being harvested at the minimum cost to society (Anderson 1986: 196).

MEY (maximum economic yield), intended to protect the long run value-added revenue of people, is considered by many economists, including Anderson (1986), to be the optimal management goal. MSY (maximum sustainable yield), a strategy aimed at achieving the highest possible harvest while maintaining biological stocks, is commonly used by fishery managers, though a Kodiak salmon manager told me that after fifteen years of regulating harvests, he was not sure that there *was* such a thing as MSY (Prokopowich 1995a)!

Less well recognized (but probably included in some form in most management plans) is the strategy of MScY (maximum social yield), intended to maximize social factors such as employment and income distribution (Salz 1986). This system is inherently more complex and contains objectives that will inevitably come into conflict with each other (Charles 1988: 277). Panayotou (1982) goes even further to suggest two additional approaches: Zero Resource Rent/Open Access Equilibrium (OAE) and Zero Social Yield, (ZSY), which is oriented to employment maximization.

2. Management Tools

Many economists and managers agree that traditional management measures such as gear restrictions, quotas, and area and seasonal closures are best able to protect the viability of fish stocks (Rettig 1984; Townsend 1990). Gordon's (1954) and other classical economic models suggest that changes in property rights will halt depletion, but Rettig (1984), Townsend (1990) and others now believe that license limitation by itself will not prevent biological over-fishing. Townsend sees limited entry as more effective at

addressing short run externalities such as crowding, than at dealing with the long run concerns for stock viability that many limitation programs were created to protect:

> Under virtually all limited entry programs, no fisherman can invest in future catches by delaying current catches. The destructive effects of this inherent competition are constrained by the limits on effort, but the fundamental incentives for individual fishermen are unchanged (1990: 372).

C. Aspects of Limited Entry

Continual improvements in Alaskan salmon stocks since the mid-1970s cannot be attributed to changes in fishing effort; stock health is more likely due to enhancement projects, reduced high seas foreign fishing, and weather patterns (Young 1983). State support for hatchery projects, habitat improvement and other fishery enhancement and development in the state has increased concurrent with the implementation of limited entry, some of the moneys coming directly from fishing royalties (Adasiak 1979).

Fishery regulators and managers work towards exploitation of resources for the maximum benefit of society, but particularly for the economic welfare of fishers, fishing communities, and the fish processing and trade industries (Needler 1979: 723). Economic models generally consider wages as a cost in the calculation of maximum rents, but such paradigms were deemed unsuitable for limitation of Alaskan fisheries, where employment in fishing is highly valued (Needler 1979; Rogers 1979: 787).

1. Efficiency versus Equity

The goal of economic efficiency espoused by economists is not shared by fishermen, according to Rettig (1984: 246). Issues of equity are of greater concern on the fishing grounds (ibid.). Without popular support, he continues, levels of efficiency are not likely to change significantly. Wilson et al., from the perspective of institutional economics, note that there is a close relationship between economic efficiency and actual adaptive behavior by fishers (Wilson, Hardin, and Baden 1982). Limited entry is not

necessarily conducive to economic efficiency, as will be discussed further below in the section on "capital stuffing."

Concerns about biological depletion and allocative efficiency were theoretical forces behind the enactment of limited entry in Alaska, but the primary motivation for passing the law was a high rate of deficits in fishing during the early 1970s (Young, 1983: 133). Young states the objectives of limited entry as: ". . .efforts to enhance the manageability of the complex array of harvesting activities...and to ensure owners and operators of fishing gear a reasonable return on their investments of capital and time" (ibid.). One aspect of this complexity is the influx of fishermen from Washington, Oregon, and other states, who are resented by some Alaskan fishers (Young 1983: 149). Without limited entry, there could have been substantial increases in these "outside" fishers coming to Alaska, both following the U.S. Supreme Court "Boldt decision," which in 1974 granted 50% of available salmon to Indians of Washington (Young 1983, 149), and when closure of the Columbia River to salmon fishing in 1994 put many Northwest Coast fishermen out of business.

The realization of economic efficiency would reduce employment opportunities within the fishery, and in a poor labor market could result in lost jobs and incomes (Crutchfield 1979; Scott 1979: 725). Most efficiency models do not assess costs and benefits of rent gains versus income loss (Dupont and Phipps 1991: 210; Charles 1988: 277). Hannesson (1981) theorizes that employment needs in many rural areas may override criteria for efficiency, and that rent maximization as a primary objective is not possible in the fishery.

One reason for difficulty in limiting entry to optimal effort levels is given by Rettig (1984: 245), who posits that in times of economic distress, there is political pressure to provide as many fishing jobs as possible. Townsend (1985c) argues that open access is preferable to limited entry in that it provides "fallback" jobs at the floor level of the opportunity cost of labor, thus raising wages overall and giving communities increased

stability. Crutchfield (1979: 751) and others (Sinclair 1983) concede that though unemployment is not generally a by-product of limited entry, loss of jobs may be problematic in isolated rural communities with no employment alternatives. Sinclair (ibid.: 307) goes so far as to condemn limited entry as flawed, due to negative social consequences which he sees as overshadowing economic gains. In Alaska, support for restricting access through a permit system was limited, until several years of bad returns persuaded the majority of fishers that a more efficient alternative to gear restrictions and closures was needed (Young 1983).

Economic efficiency does not necessarily dictate the most socially desirable path for management. From welfare economics comes the idea that both efficiency and equity must be considered in the design of fishery regulations (Mueller and Wang 1981). Limited entry often has "profound distributional effects," according to Townsend (1990: 360), though a lack of information makes changes in equity difficult to assess (ibid.). Wealth disparities among fishermen are usually accepted when they are due to differences in skill, information or experience, but according to Rettig (1984: 235), skewed distribution of wealth is resented when it is the as a result of government programs.

Professional fishers have been able to secure their dominance in the fishery, and the inflexibility of assigned permits prevents re-structuring (Young 1983: 147). Sinclair reported that in Newfoundland, license limitation has "blocked any possibility for social mobility and has protected a local fishing elite" (Sinclair 1983: 311). He quotes a Newfoundland fisherman who expresses the seriousness of this social impact: "You feel you can't tie up at the same wharf as your neighbor when he's earning ten times as much as you are. It's even hard to call him a neighbor" (ibid.). Huq and Huq (1985) found that inequality among fishing people in Bangladesh was less where fishing was the least restricted. Karpoff theorizes that sub-optimal controls are able to pass because dominant sectors of the fishery have interests in re-distributing wealth (Karpoff 1987: 181). In

Alaska, there has been a significant shift in power away from (non-Alaska owned) processing companies, who used to lease boats to fishermen from a company fleet and chose who could skipper a boat (Young 1983: 148).

2. Inefficiencies of Limited Entry

Under license limitation programs, fleet redundancy and over-capitalization ("capital stuffing") are major causes of inefficiency and have received much attention in the literature. In some areas, rents have increased under limited entry, not due to any change in effort brought about by limitation, but because of higher prices for fish products (Townsend 1990: 372). If (or when) prices fall significantly, externalities that are masked by positive rents may emerge (Townsend 1990: 372; Young 1983: 142).

In an open access system, entry to and exit from the fishery relate to expectations of the present value of expected profits (Berck and Perloff 1984: 489). According to Berck and Perloff's model, myopic (irrational) fishers would enter the fishery only when fish stocks were greater than the steady state stock and instantaneous profits are possible, and would exit when rents are negative (ibid.: 504). Rational fishers would also judge whether there are a reasonably small number of vessels already in the fishery, and would enter when stocks are lower than a steady state level if the fleet is not already too large (ibid.).

The majority of limitation programs have not been successful in reducing vessels to an optimal number, and many have barely been successful in maintaining the status quo (Copes 1980; Rettig 1984). But as long as limited entry keeps the rate of entry into a fishery lower than open access entry, the congestion externality will be moderated (Townsend 1990, 372). When fleets are reduced, it is often the smaller, older vessels that are forced out. These boats may actually be the most efficient at catching fish at the lowest cost, the opportunity costs of both gear and crew generally being lower than that of highliners (Pearse and Wilen 1979: 768).

3. Permit Value

One serious flaw of limited entry voiced by Kodiak fishermen but hardly mentioned in the literature is related to the capital value of permits, which is set on the open market. Fishers who have purchased permits and are paying on loans for them are unable to exit the fishery in poor years. Whereas, before limited entry in Alaska, fishers would pursue alternate occupations in years when runs were projected to be low, they must now participate in the fishery even if it means operating at a loss.

This is contrary to Levelton's comments concerning license limitation in Newfoundland. He projected that limited entry would eliminate the open access problem of new entrants coming into the fishery in prosperous years and being locked into the industry in subsequent poor years (Levelton 1979). Adasiak (1979) describes the contrast between fishing under limited entry and the "old days," when competition was not so keen:

> Prince William Sound fishermen sometimes wistfully look back for the days when fishing was somewhat more leisurely...those guys who buy their permits are really out there pushing (1979: 774).

The Alaska limited entry statute intentionally favors "vocational" or "professional" fishers (Owers 1975; Young 1983). A professional fleet will be more homogeneous than a mixed fleet, and therefore easier to manage (Young 1983; Dupont 1990). Limited entry does not automatically exclude "lifestyle" (non-business) fishermen from entering, but permit prices can be prohibitive (Young 1983: 135). Lifestyle fishers, which include subsistence oriented as well as more recreationally oriented commercial fishermen, may have better allocative efficiency than their more professional counterparts. Professional fishers are likely to exert greater pressure on stocks in their pursuit of upgrading gear or vessels and through the need to increase income to make loan payments on permits and boats, and have a higher opportunity cost for labor (Young 1983: 137).

4. Overcapitalization

An undesirable effect of limited entry occurs when there is a conversion from too many boats in a fishery to an inefficient excess of capital invested in each boat, referred to as "capital stuffing" (Townsend 1985b: 195). This problem is addressed by Anderson (1986) with his explanations of "output effect" and "substitution effect." The output effect occurs when limited entry encourages expansion and producing too much effort per vessel. Fishers will substitute unregulated factors for the infinitely priced constrained factors (Anderson 1986: 214). Campbell (1991) discusses capital stuffing as a product of artificial scarcity of restricted inputs under license limitation. This scarcity forces a vessel to increase the cost of its effort, "capital stuffing" or overcapitalization (ibid.: 262). If the number of vessels has been reduced under the regulations, the higher cost per vessel might be offset by reduced competition (ibid.).

The output and substitution effects are regarded as inefficiencies inherent in restricted access systems. Townsend (1985a: 196) suggests several other effects of capitalization that have more efficient and positive aspects: the "cost of capital effect," the "innovation effect," the "cross substitution effect," and the "consumer effect." First, a more stable and efficient fleet operating under limited entry will induce financial institutions to lower the cost of capital (in the form of loans, etc.) to fishers. This "cost of capital effect" in turn encourages the fleet to use more capital. The "innovation effect" is active when incentives for innovation are increased with a smaller fleet, the gains of efficiency being spread over fewer boats than under open access, and economies of scale lowering the cost of innovation. "Cross substitution" refers to the phenomenon of under-capitalization under open access (deferred maintenance, use of variable inputs instead of fixed inputs) and conversion to a more long term approach (using more fixed inputs) under limitation. Finally, Townsend describes the effect on consumption under restricted fisheries. With more capital available, fishermen are able to increase their utility function, thus operating at higher levels of comfort, safety, and efficiency (Townsend 1985b: 196).

5. Permit Buy Back

Alaska's limited entry statutes contained provisions for "buying back" or retiring redundant permits in order to eliminate excess capacity of the fleet, but this aspect of the program was never enacted, which Young considered to be a significant failure of the program (1983: 131). Buy back schemes are problematic in that stocks can fluctuate wildly from year to year. There is the danger that a small number of permit holders would reap "bonanza" rents in a good year and draw damning criticism of the limited entry system (why should a few people benefit from a common resource?), as happened in Chignik, Alaska in 1977 (Adasiak 1979: 773). At the other extreme, in years of poor harvests, few fishermen would earn reasonable returns (Young 1983: 140). Along with naturally occurring biological fluctuations, long-run market conditions can be mysterious enough to make setting the number of permits at an optimal level extremely difficult (Young 1983: 144). Factors as diverse as interest rates, permit prices, harvest levels, fish prices and the interplay between them complicate the matter (ibid.).

Added to all of the above, Campbell (1989: 21) finds that reducing the number of permits drives up costs for remaining fishers, and though increased cost per effort may help stocks, economic performance of the fishery may not improve. All things considered, it is unlikely that buy backs will be implemented in fisheries with over capacity (Young 1983).

6. Loan Subsidies

Both the United States and Canada have promoted low interest loan programs for limited fisheries. In Alaska's limited fisheries, a permit loan subsidy program was intended to give Alaska residents an advantage over out-of-state fishers for entry into the fisheries (Karpoff 1984a: 71). "Outside" fishermen would not be blocked from entering, but would not enjoy the mitigation of high permit prices received by Alaskans (Karpoff 1984a; Young 1983). CFEC studies indicate that rural Alaskans have been less able, due

to educational, cultural and other reasons, to take advantage of loan programs. Entry Commission transfer records bear this out, showing a net loss of permits from rural (often Native) communities (Kamali 1984; Tingley and Dinneford 1993; Young 1983: 150).

Alaskan limited entry permits were expected to acquire economic value as time went on, but no one foresaw the rapid and often dramatic price increases for salmon permits. Price increases for permits are thought to be attributable to increases in the price of salmon, and to regulatory and climatic conditions that favor the growth of the standing stocks (Karpoff 1984b: 70). In the late 1970s and 1980s, purse seine and gillnet permits sold for upwards of $100,000 in some areas, well above expected prices (Young 1983: 151; CFEC 1990). As Young predicted in 1983, permit prices have fallen again after several years of low prices and poor harvests (Thissen 1994).

Permit value conveys important information according to Karpoff (1984b: 1160). The current cash value of a permit reflects the income of fishers since the imposition of limited entry; indicates fishers' expectations of future fishing income; and incorporates the influences of state loans, Alaska Department of Fish and Game (ADF&G) run forecasts, and the risk-premium for fishing investments (Karpoff 1984b: 1160).

Karpoff (1984a; 1984b) modeled these factors and reached some interesting conclusions. He found the most significant catalyst for rapid inflation in the permit market in the late 1970s to be the state-subsidized loan program that funded up to 90% of the cost of a permit at below-market interest rates for Alaska residents. He attributed a 21% increase in permit transfers during 1979 to the new loan program. The loans provided original permit holders with windfall gains (Karpoff 1984a). Outsiders would pay higher prices for permit transfers, whereas the real cost of permits to Alaskans would not change.

Another model by Karpoff (1984a) tested the theory that fishers use a myopic outlook, utilizing only recent experience, in making projections for future harvests. Expectations of permanent rents were modeled using actual permit price data to estimate

a fisherman's memory at 2.56 years, the "average time lag between the estimated permanent rent and the observations from which it is estimated" (Karpoff 1984b: 1165). Fishers' consideration of the past two to three seasons for projecting future incomes is close to long term income expectations of other consumers (ibid.). Young (1983: 157) notes that permit prices may also be affected by the lack of a centralized, integrated market and information concerning supply and demand for permits being circulated only locally.

7. Costs of Regulation

Pecuniary benefits of regulatory changes must be weighed against costs for implementation, which will vary according to the degree of exclusivity desired (Pearse 1980). Though costs of the licensing system in Alaska are spread over several agencies and thus difficult to calculate exactly, Young (1983: 161) found that vessel licensing and permitting fees administered by the CFEC generated surplus revenue for the state's general fund in 1983. Ultimately, costs and benefits of limited entry are borne by fishermen. Some professional fishers have enjoyed significant indirect financial benefits as a result of permitting. A diminution in the pleasures of the lifestyle of fishing reflects one of the indirect costs (Young 1983: 162).

Anderson (1985) believes that license limitation as a sole regulation would be optimal, assuming that an optimal number of permits is reached. As discussed above, an optimal number of permits is difficult, if not impossible, to find or to maintain. Evidence shows that it is nearly impossible to reduce effort through limited entry: vessel redundancy is seldom eliminated, and capital stuffing makes up for most effort lost when reductions are implemented.

If one gives up hope of achieving great economic performance through license limitation, this management tool may be more attractive, but it retains serious flaws. Motivations for employment in isolated, remote, or depressed fishing areas are

contradictory to allocative efficiency. Employment is one of the many socioeconomic aspects of the fishery that may suffer under limited entry. My own research highlighted the skewed distribution of wealth being exacerbated by high permit prices, entrenchment of a guild mentality, and inflexibility of entry and exit. The literature corroborates these findings (Young 1983: 147).

Yet no alternatives seem particularly attractive. Individual transferable quotas (ITQs) have performance and conservation advantages, but also have the potential to worsen distributional problems. A fairly promising program in Greenland called "boat points" limits capacity of boats by assigning points to boat and gear according to their catching power. In order to upgrade gear or boat, boat points must be purchased from another operator (Flanders, Enequist, Young, and Rasmussen 1995: G1). The system is yet too new to judge, but is likely to have the same distributional effects as ITQs. Sole ownership, taxes, co-management, and other alternatives are also likely to change the current balance of control in the fisheries, and so remain unpopular among dominant groups and individuals. Territorial jurisdiction could be effective if agreements could be reached as to what territories are when stocks are mobile, but this can be difficult. These alternatives may become more attractive if poor conditions over a period of time level out some of the differences between professional and lifestyle fishermen. Meanwhile, the net of complex regulations must continue to grow to mitigate all possible externalities and cover loopholes and inefficiencies as they appear. Results that are disappointing to economists must still hold some satisfaction for fishermen, or they would be in another business. And the successful conservation of stocks? Where it occurs it may be thanks to limited entry or various other regulations, due to enhancement programs, or it may be luck.

Chapter 3: The Salmon Fishery in Old Harbor Since Limited Entry

I. Management

Salmon fishing around Kodiak Island is regulated by a number of agencies. Regulating mechanisms include: limited entry permits and vessel licensing controlled by CFEC (the "Entry Commission"); a 2% tax that is used for salmon hatcheries and fish habitat enhancement projects by ADF&G and Kodiak Regional Aquaculture Association (KRAA); a 2% raw fish tax that benefits the municipality; and maximums for boat size, net length, and other gear restrictions, set by the State Board of Fisheries with input from fishers and managers at public hearings held in Anchorage during the winter. Time and area closures are set by ADF&G in the City of Kodiak, based on Maximum Sustainable Yield (MSY) goals for catch and escapement, and announced by emergency orders publicized throughout the summer. Coast guard regulations imposed in 1994 requiring life rafts and other safety equipment for fishing boats act as an additional flat tax on every vessel and may be prohibitive for some small operators.

According to CFEC Chairman Bruce Twomley (1994), a "primary weakness" of limited entry is its "limited authority," resulting in a "growth in effort and capitalization of Alaska's fisheries." As gear restrictions have been slow to change, outfitting of large boats with sophisticated gear enabled fishers to catch more fish faster, if less efficiently, than the competition, and significantly increased the fleet's overall catching power from what it had been before limitation (see section on capitalization, Chapter 4). This could have been disastrous for Kodiak if it had not been for enhancement programs concurrent with limited entry that continue today to boost stocks far above depressed levels of the early 1970s. Table 1 shows that despite poor years, which are unavoidable due to environmental conditions, stocks are generally stronger now than before the permit system was enacted.

Management styles for area and time closures, adopted when Alaska took over fisheries management after statehood in 1959 (Lechner 1994), are tailored for catching a

Table 1: Kodiak Commercial Salmon Fishery Catch Figures 1965-1995

Year	Total Catch [1] (# of fish)	Total Value[2] in USD$	Average Exvessel (Landed) USD$ Value[2]		
			Purse Seine	Beach Seine	Set Net
1965 [2]	3,692,000				
1966	12,218,000				
1967	735,000				
1968	10,338,000				
1969	13,678,000				
1970	13,949,206	21,658,000	41,880	10,470	21,083
1971	6,378,179	4,973,000	$13,397	2,919	3,015
1972	3,883,197	3,909,000	9,233	647	1,451
1973	1,001,343	2,094,000	5,094	251	852
1974	3,329,427	4,808,000	15,993	4,406	4,828
1975	3,187,410	3,831,000	13,300	5,600	3,849
1976	12,484,451	16,976,000	43,017	11,035	14,481
1977	7,976,691	18,873,142	46,942	12,107	19,117
1978	16,942,215	30,357,179	70,685	14,772	22,711
1979	12,420,260	22,958,317	51,263	20,348	23,363
1980	19,157,249	27,410,296	62,363	23,385	21,215
1981	13,094,099	32,647,230	79,877	26,946	34,785
1982	10,891,952	18,803,822	39,309	11,038	28,889
1983	7,081,976	13,405,578	30,239	5,918	16,689
1984	13,678,005	25,948,012	71,550	12,341	26,552
1985	9,897,903	20,428,111	57,782	8,405	27,517
1986	16,304,165	38,723,877	92,696	11,885	68,700
1987	7,746,980	31,107,864	79,814	15,664	41,163
1988	19,009,757	103,816,936	252,403	47,017	119,013
1989 [3]	26,455,944	61,046,024	146,502	28,288	72,955
1990	12,122,389	52,61,853	113,326	10,424	66,715
1991	23,723,008	37,018,734	77,509	5,257	53,817
1992	8,462,464	40,495,222	98,086	5,436	41,984
1993	39,341,025	38,546,098	94,901	8,230	43,886
1994	12,098,324	27,523,835	67,986	9,489	47,528
1995	49,166,896	50,505,535	124,685	12,864	66,479

[1] Total catch in numbers of fish

[2] Value figures not available for 1965-1970

[3] Figures are estimates; actual harvest was very low due to closures prompted by the Exxon Valdez oil spill; fishermen were paid claims for probable value of their harvest by Exxon, based on CFEC historical catch and price figures and actual harvest

Sources: 1965-70 from Table 6, (Prokopowich 1995b: 31)

1970-95 from Table 17, (Prokopowich 1995b: 47)

prescribed number of fish, based on projected returns. Due to market demands for peak quality salmon, fishing is now managed to target fish when they are traveling towards their home streams to spawn. Formerly they were more often caught in schools near the stream terminus, where the brightness of the fish diminishes in fresh water. Competitive world markets demand fresh looking and tasting quality, which, according to one island processor, is not possible with the limited technology of older wooden boats.

Larger boats are able to operate at capes, where traveling fish come nearest to shore. Weather and sea conditions tend to be most extreme at capes, and small boats can fish in these prime areas only under relatively calm conditions. Smaller boats are often less seaworthy than larger ones, and not so apt to travel great distances to richer grounds. In this respect, they are more efficient than larger vessels that use fuel to chase after the largest concentrations of fish around the island, but they may not be able to net enough to survive.

II. Old Harbor's Fleet

As of the end of 1994, Old Harbor's salmon fishermen include four set gillnetters, one beach seiner, and 27 purse seiners. Because purse seiners are the predominant gear type and have undergone the highest transfer rates, this paper will focus on them. The seine fleet includes boats skippered by full-time village residents and part-time and former residents who have migrated to Anchorage, to other cities in Alaska, and to Washington, although data is limited for the most part to fishermen who identify themselves as full-time legal residents of Old Harbor. Some boat captains married village women, and have made Old Harbor their home, while others spend summers fishing alongside their brothers and in-laws, leaving the village in the fall.

III. Permit Transfers

The change in commercial fisheries management policy to a limited entry permit system allowed the transfer of fishing rights away from Native communities. There has been a significant shift in control of permits statewide from rural to urban residents, and Native villages have been especially hard hit (Kamali 1984; Tingley and Dinneford 1993). This is true in Old Harbor, where 31 purse seine permits were initially issued to villagers in 1975, and 27 were active in 1994.

Whereas Table 2 shows that island wide, Native Kodiak purse seiners lost permits in the years 1975-83, Old Harbor fishers gained permits slightly during that period, losing ground between 1983 and 1994. Decreases in Native holdings of salmon permits varied according to the fisheries, Kodiak Native purse seiners retaining more of the initially-issued permits than holders of permits for other gear types (see Table 3). Losses may have been due to increased competition, a rise in some fishers' standard of living that encouraged migration to cities, and an increasing cash incentive to sell out. As Young notes, poor people with little education tend to have cash flow problems, and are likely to use "an exceedingly high discount rate in calculating future benefits," making it more likely that they will sell permits to get cash (1983, 158). In many cases the sale of a permit provided a good source of cash, for instance to purchase a skiff, a four-wheeler, or hunting

Table 2: Frequency of Kodiak Purse Seine Permit Transfers Between Alaskan Natives and Non-Natives for 1975-1983 Period, by Year

Fishery	Year	Transfers from AK Natives	Transfers to AK Natives	Net +/- KOD
Kodiak	1975	0	2	2
Seine	1976	6	4	-2
(SOIK)	1977	8	4	-4
	1978	7	5	-2
	1979	7	5	-2
	1980	1	4	3
	1981	4	2	-2
	1982	8	1	-7
	1983	6	2	-4
Total 1975-1983		**47**	**29**	**-18**

Source: Kamali 1984

equipment. For some fishermen, who at retirement age, owned boats needing significant capital investment, selling their permit provided a pension fund.

How and why permits left Native communities is the subject of bitter folk legend (non-Natives got Natives drunk and bought their permits for virtually nothing), but it has not been studied on Kodiak. I was not able to confirm such a story in the Old Harbor case, though I was told that fishermen with substance abuse problems both actively solicited and were solicited by buyers. Interviews indicated that three to five of the permits that were sold to outsiders may have been transfers from substance-abusers wanting cash, whereas as many as three deals between villagers involved permit holders whose decisions to sell may have been related to their use of alcohol or drugs.

Table 3: Kodiak Limited Entry Salmon Permits by gear types held by Natives and Non-Natives

Initial 1975 Issue	# Native	(%) Native	# other	(%) other	Total Permits	Change in Native Permits	Change in % Native Permits
Kodiak Seine	154	(41%)	223	(59%)	377	--	--
Kodiak Beach Seine	11	(35%)	20	(65%)	31		
Kodiak Set Gillnet	50	(27%)	136	(73%)	186	--	--
1983							
Kodiak Seine	136	(36%)	241	(64%)	377	-18	(- 5%)
Kodiak Beach Seine	6	(17%)	29	(83%)	35	- 5	(- 18%)
Kodiak Set Gillnet	36	(19%)	150	(81%)	186	-14	(- 8%)

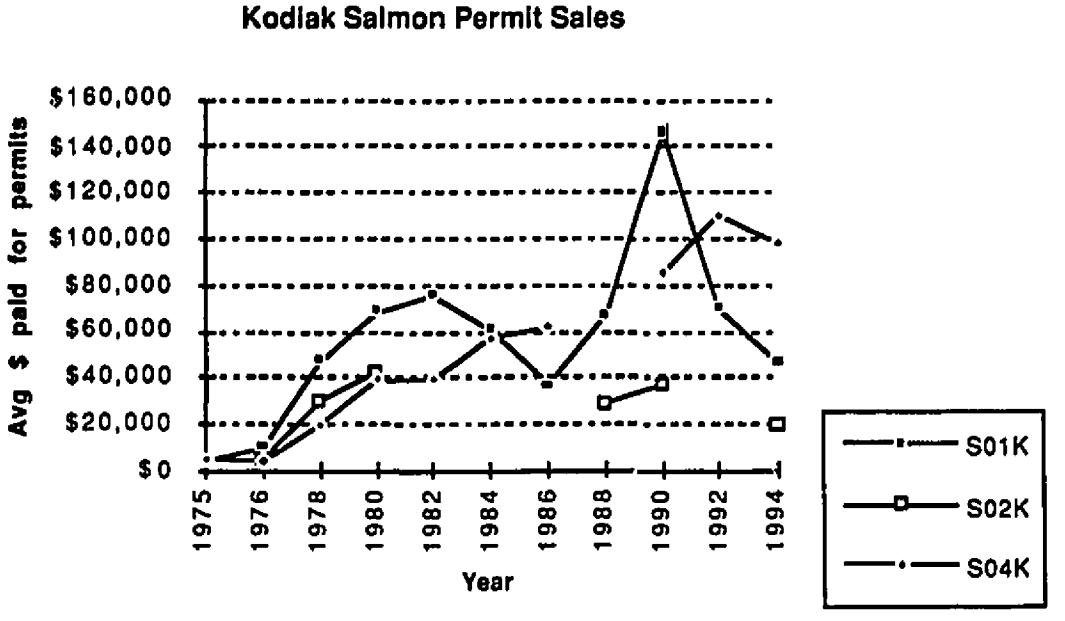
Source: Kamali 1984: 12, 15

Eight purse seine permits were either sold to fishermen from outside Old Harbor or lost to foreclosure, and at least two permits left the village when their holders moved their full-time residences to other parts of the state. Some of these were replaced by in-migration and buying permits from outside, resulting in a net reduction of 13% of Old Harbor salmon purse seine permits.

Permit prices have been dropping in recent years, but the substantial amount of cash that permit purchase still requires is a barrier to many buyers -- and an incentive to cash-poor sellers. The high increase in cash value of permits was not foreseen by framers of limited entry (Young 1983: 151), and though this could be considered a windfall for some fishermen, several Old Harbor men mentioned that transferability of permits was an invitation for exploitation, a "piece of paper that could be sold" -- and often was when alcohol problems were involved. The 60-day "intent to transfer" waiting period required by the statute was of no help that I could discern. When cash or barter deals sealed a bargain at day one, reneging by the seller 60 days hence would mean repayment of goods or money, and evidence showed that this rule either was not widely known or was ignored.

CFEC studies indicate that rural Alaskans have been less able, due to educational, cultural and other reasons, to take advantage of loan programs than urbanites (Tingley and Dinneford 1993). Within the village, information concerning state loans, Bureau of Indian Affairs permit down payment grants, and other government aid for rural fishermen is closely guarded, and tends to stay among the better educated and family-allied fishers. There is also a reluctance to enter into loan agreements, particularly among non-professionally oriented fishers, who are probably justified in concerns that they couldn't keep up with payments.

Figure 2: Kodiak Salmon Permit Sales Prices 1975-1994



Key: S01K = Kodiak Purse Seine
S02K = Kodiak Beach Seine
S04K = Kodiak Set Gillnet
Sources see Appendix C, Table A

Though the permit prices in Figure 2 and Appendix C may be slightly skewed upwards by figures for allowable state lending rates, they do reflect some of the rapid changes in permit prices. As Young predicted in his assessment of Alaska's limited entry program (1983), the market for salmon has taken a downturn, and permit prices have followed.

Once a fisherman has a permit, he is pressured to capitalize further in order to compete for available fish. For the fisher who has permit payments as well as vessel and gear loans, the pressure is tremendous. Competition strategies tend to favor the more professionally oriented, high-technology fishers.

In the initial distribution of Limited Entry permits, 31 salmon seine permits were granted to Old Harbor fishers. The original permits are traced below (see Tables 4 - 7) as

to whether they are still fished by Old Harbor residents, along with permits that came

Tables 4 - 7: Permit Transfer History

Table 4: Purse Seine (SO1K) Permits Transferred Out of Old Harbor 1975-1994

Transfers Out of Village	Initial Issue Permits	Transferred Permits
To relative outside of OLH	1	2**
To unrelated elsewhere in AK	2*	3
To unrelated outside AK	2	--
Migrated outside of OLH	3	4***
Total Out	8	9

* 1 was foreclosed by Alaska Department of Commerce
** 1 later sold after out migrating
*** 3 later sold after out migrating
[1] Tables 4 - 7: (Excludes permits transferred more than once between the same holders within a two year period) Data from CFEC 1994 Data sheets: "Initial Issuees to Old Harbor by Fishery and Year," "Transfers of Permanent Permits Holders to and from Old Harbor," "Current Holders of Permanent Permits Old Harbor, By Fishery," CFEC's 1995 electronic bulletin board data list of current permit holders: WWW.BBS.CFEC.STATE.AK.US, and field research.

Table 5: Purse Seine (SO1K) Permit Transfers Within Old Harbor 1975-1994

Transfers Within OLH	Initial OLH Issue Permits	Second Transfer and Migrated Permits*
Between linear descent relatives*	8	2
Between cross- cohort relatives**	3	3
Between distant relatives or non-relative in OLH	4	2
Total transfers	15	8

* Incidents of transfer of permits other than from initial holder, including transfer of permits migrated in or sold to Old Harbor holders; may include multiple transfer of an individual permit
** Father, father-in-law, grandfather etc., to younger generation or closest suitable heir
*** Husband to wife, brother, brother in-law, first cousin, nephew

Table 6: Purse Seine (SO1K) Permits Transferred Into Old Harbor 1975-1994

Origin of Permit	Transfers Into OLH
From relative outside OLH	2
From unrelated outside AK	3
From unrelated AK	2
Migrants	6
Total into OLH	13

Table 7: Summary of Old Harbor Purse Seine (SO1K) Permit Transfers 1975-1994

Permit Type	Total Transferred Out (Some >1 transaction)	Not Transferred Out	Permits Transferred within OLH	Remaining
OLH initial issue	11	9	11	20
Transfers into OLH	6	7	--	7
Current total permits		16	11	27

into the village after initial issuance. Of the 31 original permits, nine are still held by the original holders in Old Harbor, and eleven have changed hands but are still held by village residents. The remaining eleven original seine permits were sold or otherwise transferred outside of the village. Seven permits were inherited or bought from outside the village (three of them later transferred or migrated out again), and six permit-holders migrated with their permits to Old Harbor (three eventually leaving or transferring the

permits away from Old Harbor), resulting in a net replacement of six of the 10 "lost" original permits by the end of 1994 (31-11+7=27). Of four set gillnet permits originally issued to Old Harbor residents, one migrated to Kodiak city, but was replaced through purchase of a permit from a Washington resident. One beach seine permit is held by a resident who married into the village, whereas none were issued to villagers originally.

Migration accounts for the transfer of six seine permits out of the village. Two of these were bought from villagers by schoolteachers who later left the village (see below) and subsequently sold the permits to urban non-local fishermen. One permit is still fished in the area by a skipper who has moved his (official) winter residence to Anchorage but brings his family to Old Harbor during salmon season. Another Native fisherman left the village and sold his Kodiak salmon permit. One permit holder moved to another part of the state and retains his permit but did not fish in Kodiak in 1994. Two other fishermen are official residents but in some years live away from the village, where better schools and services are available.

The relative stability of Old Harbor's population over the past twenty years may indicate that migration from the village is consistent with population moving out of much of rural Alaska (Hamilton and Seyfrit 1994). Statistics show that permit ownership within the state has shifted away from rural to urban areas (Tingley and Dinneford 1993), and whereas migration is not yet the major vehicle for permits to leave Old Harbor, it may be more so in the future.

A. Profile of Initial Permit Holders

1. Professional

Of the ten original permit holders still fishing and living in Old Harbor, three brothers could be considered "highliners," professionally oriented fishermen who are among the top harvesters. They have continually upgraded their boats and gear, increasing boat size and horsepower, improving crew quarters, and modernizing gear:

capitalizing to stay competitive. Their fishing capacity has increased many times, and the yields of their competitiveness are invested in businesses in and outside of the village. Another permit holder in this group of professional fishers, though not so aggressive, has mid-range gear and is able to support his family with a second wage-earner in the family. (See Chapter 5 for more economic information.)

2. Lifestyle

The other group of original permit holders is made up of lifestyle fishermen. Three of these are now in semi-retirement, and either have made emergency transfers of their permits (temporary transfers or unofficial leases justified by poor health or other considerations) or are in the process of permanently transferring (giving or selling) their permits. One elder skipper was still fishing with an older vessel, though during the research period he was not observed to join the rest of the fleet for fishery openings; another was seeking to lease a boat to replace a wooden vessel that was no longer functional. Another lifestyle permit holder, needing boat repairs and without a crew, did not fish at all in 1994.

Of the eleven permits that were transferred within the village, six were passed along to close relatives: sons, grandsons, sons-in-law, nephews, and widows. Except in the case of inheritance after the transferor's death, some payment was made by the transferee, though not usually at full market value of the permit. This payment was usually made over time, usually in cash but sometimes in goods or services, to the transferor. One semi-retired permit holder said he would eventually sell outside of the village because the common transferor-financed payment plans rarely yielded full payment.

Though the cash value of a permit can be a boon to retiring fishermen, it poses problems for lifestyle permit holders with financial problems. Starting in 1978, up to 75% of the appraised value of a permit could be used as collateral for state permit loans (CFEC 1978). Default on such loans can lead to foreclosure and loss of the permit. The IRS

(Internal Revenue Service) has also become very aggressive in its attempts to claim permits as payment for taxes owed, despite vigorous opposition of the CFEC (CFEC-CFAB and Volunteer Work Group 1993). None of the lifestyle fishermen interviewed considered loans as a reasonable option for buying either new permits or boats, which, considering the 1994 market price of salmon, was probably prudent. As a result, a few of the lifestyle fishermen are still operating old wooden and early-model fiberglass boats, many of which cannot be insured and are unsafe; others make do with vessels 20 to 30 years old that have length, storage capacity, and horsepower significantly lower than their professionally-oriented counterparts -- all making it more difficult to hire good crewmen. Coast Guard regulations instituted in 1994 which mandate installation of life rafts and other safety equipment require several thousand dollars' more investment, without which skippers can be fined and prohibited from operating.

A cycle of under-capitalization and non-aggressive fishing tactics makes it difficult for lifestyle fishermen to fish competitively and keep a permit. Until the late seventies, canneries owned and maintained boats. Now they offer loans on the basis of fishing performance, and will not help non-professionally oriented fishermen out of financial trouble. One permit holder vowed that he would prefer to let his permit "die" than to sell it outside of his family. Non-payment of permit fees for two years results in the invalidation of that permit and would reduce the total number of permits in the fishery, though appeals are possible (Schelle 1995).

A few of the youngest skippers are determined to keep fishing, though most of them are getting schooling that will give them skills for complementary or off-season employment. Two young fishermen who had inherited permits saved crew earnings and were able to lease small fiberglass boats, which were fairly safe though not very competitive. This action fit with ideals I heard espoused by older professional fishermen: that starting small with motivation, anyone could make it. Another young permit holder who felt he did not have the support or professional experience to risk investing in a

better boat hired a skipper who had crewed many years for one of the most aggressive fishermen in the Old Harbor fleet. A young widow was permitted, after negotiations with the CFEC, to lease her permit until her son was old enough to take it over. She was very careful to pay the yearly registration to keep the permit viable, even if it meant borrowing the money to do so.

Borrowing money to buy or upgrade a boat, or the prospect of fishing hard enough to keep up with payments, taxes, and making a living for a crew of four, is beyond some fishermen. Several professionally oriented fishermen saw motivation as the dominant factor to fishing success. One elder said that fishing is now so competitive that it isn't *fun* anymore; for Native fishermen raised with high job satisfaction, cooperation, and frequent meaningful social interaction between boats, it is not difficult to understand that the motivation required today to be a competitive fisherman is stressful for a man wanting to make just enough to support a family. Social ills such as substance abuse may also influence fishing motivation and success. Three permits were transferred within Old Harbor from men who had substance abuse or "motivational" problems. One of these admitted that he drank too much, and decided to sell out before he had an accident. Thereafter he worked as a crewman and doing odd jobs. The second, who in the researcher's observations over a seven year period appeared to be an active substance abuser, reported that he had needed money for bills, and felt he had got a fair price for his permit. Interviews revealed conflicting stories of the third transfer, though the most complete explanation involved a judgment made by certain parties that the young man who had inherited a permit from his father was considered unable to fish and risked losing his permit outside the village. All three of these permits were transferred to members of one family.

A larger number of permits were transferred outside of the village. Two were bought by teachers who spent several years living in Old Harbor and fished during the summers, then moved away and sold the permits (as mentioned above). The permits were

both transferred from semi-retired elders, reportedly at the going market price, and provided welcome cash to the transferors. Both of the transferors had sons without permits with varying degrees of interest in fishing, which may have produced resentment. But these transfers were quite unlike the situation in Kodiak's south end gillnet fishery, where according to then Fish and Game manager Jack Lechner (1994), there was an eager group of school teachers who developed gillnet sites at a time when seasonal salmon fishing was not a viable occupation for Natives. When limited entry was enacted, these teachers applied for and were issued permits for small children and wives, while local Native villagers received few permits. Due to enhancement of south end fisheries, these permits later became very valuable. (Old Harbor holders of south end gillnet permits have retained them.)

A third transfer from a lifestyle fisherman was forced by state forfeiture after a series of bad seasons, poor financial management, and IRS problems. A fourth transfer was made to a man who had grown up in the village: he bought a permit from a man "in financial trouble" and later sold it off-island at a profit.

Three permits were sold to Kodiak fishermen, one of whom had heard that a good way to find a salmon permit was to go to a village and look for Natives who might want to sell. He made an arrangement with an Old Harbor permit holder who, after inheriting the permit, was not able to buy a boat. The transferor is being paid over ten years in an annual sum that supplements his income as a crewman. The second transfer involved a permit holder who was also having financial difficulties. After the IRS came to the village to collect several hundred dollars from him, asking him whether he had any vehicle, skiff, valuable property or even money in his pocket, he caved into the pressure from the IRS and from a prospective buyer who "kept bugging him." He sold the permit fearing that otherwise it might eventually be taken from him. A third Old Harbor fisherman was near retirement age when he sold his permit to a Kodiak man.

Washington State transferees bought two permits, one from a man who moved from

the village soon afterwards, and one from someone whose sons were not interested in taking it over. This completes tracing the 31 permits initially issued to Old Harbor men.

B. Acquisition of Permits

Over the years, thirteen seine permits came into the village. Three permit holders migrated to Old Harbor after receiving initial issue permits: one an Old Harbor resident who had been employed outside the village at the time of issuance, and two others, men who married Old Harbor women. One was passed down from a father to his son residing in Old Harbor.

Five permits were purchased by Old Harbor residents from outside of the village: three in 1975-76 from Washington holders by young men who had not qualified in the permit application process; at least one of these was financed by the cannery, and one was bought outright with savings. Two other permits were purchased from holders on other parts of the island, though one of these was later transferred out of Old Harbor due to the holder's inability to keep up with the payments. Indeed, making payments for permits (and for gear as well in many cases) introduces a great deal of pressure on the fisherman to catch fish. Many seine crews work eighteen hours or more a day during openings, making set after set, straining the water for a few fish or the occasional lucky haul.

C. Crew relations

Crew relations have changed significantly since 1975. Some of the change can be traced to a concurrent shift in the responsibility, once taken by the canneries, for paying the crew and filing taxes. Canneries had formerly leased boats to skippers as well as taking care of much of the paperwork involved in running a boat. Processors sold off the vessels to fishermen and relinquished other responsibilities and benefits around the same time that limited entry was instituted. An increase of financial pressures, paperwork, tax responsibilities, and the necessity of managing their own businesses meant that skippers

could get into trouble with the Internal Revenue Service more easily than in the past, and could be pressured to sell the permit to pay up. They were also able to pay crew less, or cheat them out of a portion of the agreed share, which was reported by a number of crew members.

The charge made by some crewmen that certain captains were "greedy" was echoed by boat operators who saw many young men (potential crew members) as "lazy." The researcher sees these as emotionally charged labels that reflect the growing gulf between captains and crew as owners and laborers. Crewman's wages on an average boat are now barely enough to support a single person, and supporting a family or saving enough money for a permit is difficult -- out of range for most men who work on deck. The number of fishing jobs has decreased overall; each permitted vessel employs one captain and three crew members.

The lure of fishing as lucrative seasonal work has diminished along with the price of salmon. In 1994 when fish prices were bad, unemployed village youths refused to "be treated like niggers" for very low wages, preferring to hang around the village without

Table 8: Permits and Associated Jobs

Year	# Permits	# Possible Fishing Jobs	Change in Fishing Jobs
1975 OLH Purse Seine Permits	31	124	--
1994 Purse Seine Permits	27	108	- 16/13%
1994 OLH Seine Permits with Landings	23	92	-32/26%

Source: CFEC Permit Transfer Data

work, thus earning the designation of "lazy" by some villagers.

Less competitive fishermen have a hard time making a living in the present market.

Two boats, needing repairs, their skippers in debt and unable to find crews, never left the dock all season. One permit holder did not own a boat, and in 1994 was not able to or did not lease a vessel. Threatened IRS attachment of fishing earnings at the cannery was a deterrent to potential crews for skippers who were known to have tax debts. The monetary value of a limited entry permit could be a liability in these situations; if other aspects of the fishing operation present financial strains, the equity of the permit may be in jeopardy along with the right to fish. As long as labor is the most flexible factor in the fishing equation consisting of vessel, gear, permit, and labor, crew are likely to suffer low wages. As shown in Table 8, only 23 of the 27 permits held by Old Harbor residents in 1994 had landings; in other words, four eligible permits were not actually fished due to vessel, crew, or other problems. Thus, although villagers hold only four fewer seine permits than in 1975, 32 fewer jobs were available -- a 16% decrease.

Whereas most fishing boats in the village used to be strictly family operations, more skippers now use crew from outside the village and outside the state. The pressure on captains to make payments, improve gear, and "get ahead" has contributed to cases of less-than-ideal crew-skipper relations. When a crewman has been shorted on his pay one year, he's likely not to risk working again for the same skipper. "Let them find some white nigger from Seattle to work for them," said one crewman who was now out of work. This "skipper-nigger" attitude is mentioned with disturbing frequency.

Limited entry puts an increased burden on crew relations, when crewmen see no hope of ever being able to skipper their own boat. One captain asserted that of eight or nine age-mates, he was the only one to get a salmon permit and become a skipper. He felt that the others had thought they would never get a permit, and by age eighteen or nineteen, had given up. He claimed that four of his cohorts were dead from alcohol or drug related causes, and four others were "wasted."

One crewman, formerly a permit holder, described being a crewman as being "like a mushroom on deck"; another said he lost interest in fishing after selling his permit, and

now finds himself with a very different attitude than when he was a skipper, often daydreaming while at work. The pride and enjoyment that were once part of being a fisherman is slipping away. In the new world of professional fishing, vessel owners, captains and permit holders own and control the means of production. Crewmen are increasingly alienated from their work, and reap less satisfaction and profit from their labor.

Chapter Four: Political Structures and the Control of Resources

I. General Political Structures

From the first attempts to enact limited entry in the late sixties and early seventies, Alaskans expressed concern for the livelihood of Alaskan fishers, particularly those who lived in rural areas and were economically dependent upon commercial fishing (CFEC 1975). Control of resources in Alaska is highly influenced by politics at the state, regional, and federal levels: through the courts, legislature, executive branch, and at the grassroots. Thus it is important to understand how power in the village is arranged, what political entities are available to facilitate action on resource-related questions and how Old Harbor residents use them.

A. Local

1. Formal: Tribal, City, and Corporate

The City of Old Harbor provides municipal services and is overseen by a mayor and a city council (DOWL Engineers *et al.* 1981). The Old Harbor Tribal Council, having seven members, is the tribal governing body of Native residents (which made up 89% of the 1990 population [U.S. Bureau of the Census 1990]), and as such is eligible to administer federal programs. Kodiak Area Native Association (KANA), the regional non-profit Native organization, currently takes responsibility for most of these federally-funded services, including health care, social services, employment assistance (DOWL Engineers *et al.* 1981), senior meals and the Village Public Safety Officer (VPSO) program.

The Old Harbor Tribal Council has independently solicited several grants, and has a regular bingo operation that produces a village emergency loan fund which in 1995 was used to help set up a preschool (Peterson 1995). In December of 1995, a tribal council representative made the first-ever report from any Kodiak Island tribal council to KANA's board of directors, a first step in making Old Harbor Tribal Council an autonomous governing body (ibid.). Old Harbor Native Corporation, the for-profit corporation set up under the terms of the Alaska Native Claims Settlement Act

(ANCSA), controls moneys and land for approximately 300 shareholders, fewer than half of whom are still Old Harbor residents.

In each of the arms of local government -- city, tribal, and corporate -- members of one large extended family and people who have married into the family are well represented and influential. In 1994 their positions included City Mayor, Corporation President, and members of the Tribal Council. There is some overlap of leadership between the three councils (at least one member sits on the City and Tribal Councils and is also on the OHNC Board of Directors), and an overall lack of clarity about which body is responsible for what. Although the city government has had strong mayors for the past 30 years or more (one retained the office for 27 years), tribal and corporation interests -- by nature less unified than municipal projects -- have not had consistent leadership.

2. Informal: Church, Families

In addition to the formal political structures within Old Harbor are the institutions of church and family. Old Harbor is the only one of Kodiak Island's six Native villages to have a full-time Russian Orthodox priest in residence. Nearly all of the village's Native residents are Russian Orthodox, and, although regular attenders of the once-powerful church are a small percentage of the population (5 to 10% on a typical non-holiday Sunday), the church still exerts some influence over people's behavior. There is a sense in Old Harbor that political power is legitimized by religion, as was demonstrated when the long-time resident, non-Native husband of a village woman converted to Orthodoxy two years after becoming mayor.

Nearly everyone raised in Old Harbor is related to many other villagers, often by more than one kinship tie. Politics between families are complicated and will not be explored here in depth. Economic and political power in the village is currently dominated by the Christiansen family. Being raised in this family does not guarantee success, but the family's religiosity, emphasis on education, and economic security seem to give an advantage to most family members. Family members are among the village's

most successful fishermen, own one of the two stores in the village, operate the fuel concession, lease out a pool hall and video business, run the café and lodge, and co-operate an eco-tourism and guiding business; a second grocery store, video business, and guiding operation are operated by other parties. These businesses provide needed services and employment. On the other hand, actual, perceived, and potential conflict of interest by village politicians seen to be favoring this large and influential family may be a stumbling block to advancing some projects that would benefit the entire village.

B. Regional and National: Tribal Councils, AFN, Corporate Finances

Interests of the Native residents of Old Harbor are represented regionally and beyond by the traditional Old Harbor Tribal Council and the Kodiak Area Native Association (KANA), Kodiak Island's regional Native non-profit corporation. Local tribal councils, under the umbrella of KANA, are organized either as traditional councils, evolved from former forms of self-government, or under the federal Indian Reorganization Act (IRA). The IRA is involved in self-government and deals with threats to political and cultural status and the maintenance of subsistence (Hildebrand 1983: 11). Old Harbor is currently following enrollment procedures necessary for an authorized IRA council (Peterson 1995). Through attendance at the statewide annual Village Participation Conference, consisting of Alaskan Native non-profit groups, villagers can meet with Natives from other parts of the state and share solutions to common problems. The Tribal Council is currently considering hiring a lobbyist to pursue state and local concerns, including possible amendments to the Alaska National Interest Land Claims Act (ANILCA) (ibid.).

The Alaska Federation of Natives (AFN) works with state and federal politicians; the village corporation has both been affected through investments in the world market and by national interest in land conservation, and been effective politically, with lobbyists in Juneau and Washington, D.C. Old Harbor Native Corporation (OHNC) must also look outside the village to answer to needs of OHNC shareholders, many of whom live outside

the village or outside the state.

State programs for Natives active in Old Harbor include the Rural Alaska Community Action Program (RurALCAP) and the Alaska Rural Development Council (Peterson 1995). Non-Native government structures in the village are the City Council, which reports to the Kodiak Island Borough, and the school system, controlled by the Kodiak Island Borough School Board -- which currently has no Native representation (ibid.).

AFN, a body representing Alaskan Native Corporation shareholders and dealing with diverse Native interests, is largely controlled by the Native corporations (Flanders 1989) and was instrumental in drafting ANCSA (Arnold 1978). Since 1971, AFN has been an important negotiator with federal and state governments to ensure that Native interests are addressed (Silverman 1994). The Federation has a powerful voice, and as the forum for profit-corporation interests, it attracts the attention of non-Native corporations and politicians (Peterson 1995). Many Old Harbor residents, from school children to elders, attend the annual meetings of the AFN and AFN Youth Convention each year.

II. Resource Politics

A. Land Base: Federal Government, Old Harbor Native Corporation (OHNC)

Under terms of the 1971 Alaska Native Claims Settlement Act, Old Harbor Natives (OHNC) were given title to approximately 50,000 acres on Kodiak Island and 65,000 acres on nearby Sitkalidak Island (Christiansen 1994). In the late '80s and early '90s there was a burgeoning of development of remote lands for hunting, sport fishing, and eco-tourism camps on Kodiak Island. Native corporations on the island responded to this trend, and to the pressure imposed by ANCSA to operate at a profit, by opening their lands within and adjacent to the Kodiak National Wildlife Refuge (KNWR) to large commercial bear-viewing operations and other sorts of eco-tourism and sports guiding. This move resulted in adverse public opinion, concern of Refuge managers for the integrity of brown bear habitat preservation, and worry by local shareholders that

subsistence resources would be swallowed up by visitors.

After nearly two years of negotiations and debate, Old Harbor made a decision that was intended to prevent development and to secure the future of its land base. In May 1995, Interior Secretary Bruce Babbitt signed documents with OHNC president Emil Christiansen, selling 29,000 acres of OHNC land on Kodiak and granting conservation easements to the United States Department of the Interior on another 3,000 acres for the sum of 14.5 million dollars (Whitney 1995). The land, which was purchased with Exxon Valdez settlement money (designated to mitigate habitat loss and damages caused by the 1989 oil spill) will be incorporated into the Wildlife Refuge (ibid.). Terms of the agreement also dictate that the Old Harbor Native Corporation will

> preserve 65,000 acres of land on nearby Sitkalidak Island as a private wildlife refuge, for eco-tourism and other appropriate economic uses consistent with perpetuating Sitkalidak's highly significant fish, wildlife and wilderness values. (Walker, Rieben, and U.S. Dept. of the Interior 1995)

The village corporation will retain approximately 15,000 acres outside of refuge areas at Kiliuda Bay, north of Old Harbor, and some land around Old Harbor for subsistence uses, to "preserve traditions" and for "economic development purposes" (ibid.). It is not yet clear to what extent the development of eco-tourism or the conservation easements might affect subsistence harvest areas. The bulk of the settlement, along with proceeds from a previous land deal in which OHNC had a share, has been placed in a permanent trust for future generations.

The economic and political ramifications of formation of Native corporations under ANCSA extends beyond the nearby land and national interests in the protection of bears of Kodiak Island. OHNC was involved with negotiations concerning trading surface rights of Kodiak area land for subsurface rights to oil and gas reserves in the Arctic National Wildlife Refuge (ANWR). Concurrent with these negotiations, OHNC made an agreement with Texaco for options on potential subsurface rights to be awarded (pending legislation that would open ANWR to drilling), and received over $5 million from the oil

company for this pledge (Morris and Pisem 1995). The corporation in turn spent over $100,000 in 1987 in lobbying Congress to pass legislation that would open ANWR (Bureau of National Affairs 1995).

B. Fish Base

1. Formal Structures

a. Official Regulatory Channels: Fish and Game, the Board of Fisheries, and the Commercial Fishieries Entry Commission

Inshore fisheries in Alaska are regulated by the state. Salmon fisheries on Kodiak Island are managed by the Alaska Department of Fish and Game according to parameters set by the State Board of Fisheries. The "Board of Fish" mandates gear and vessel restrictions and particular time and area closures, such as those imposed in some areas to allow a quota of traveling fish to reach the fisheries in their "home" regions.

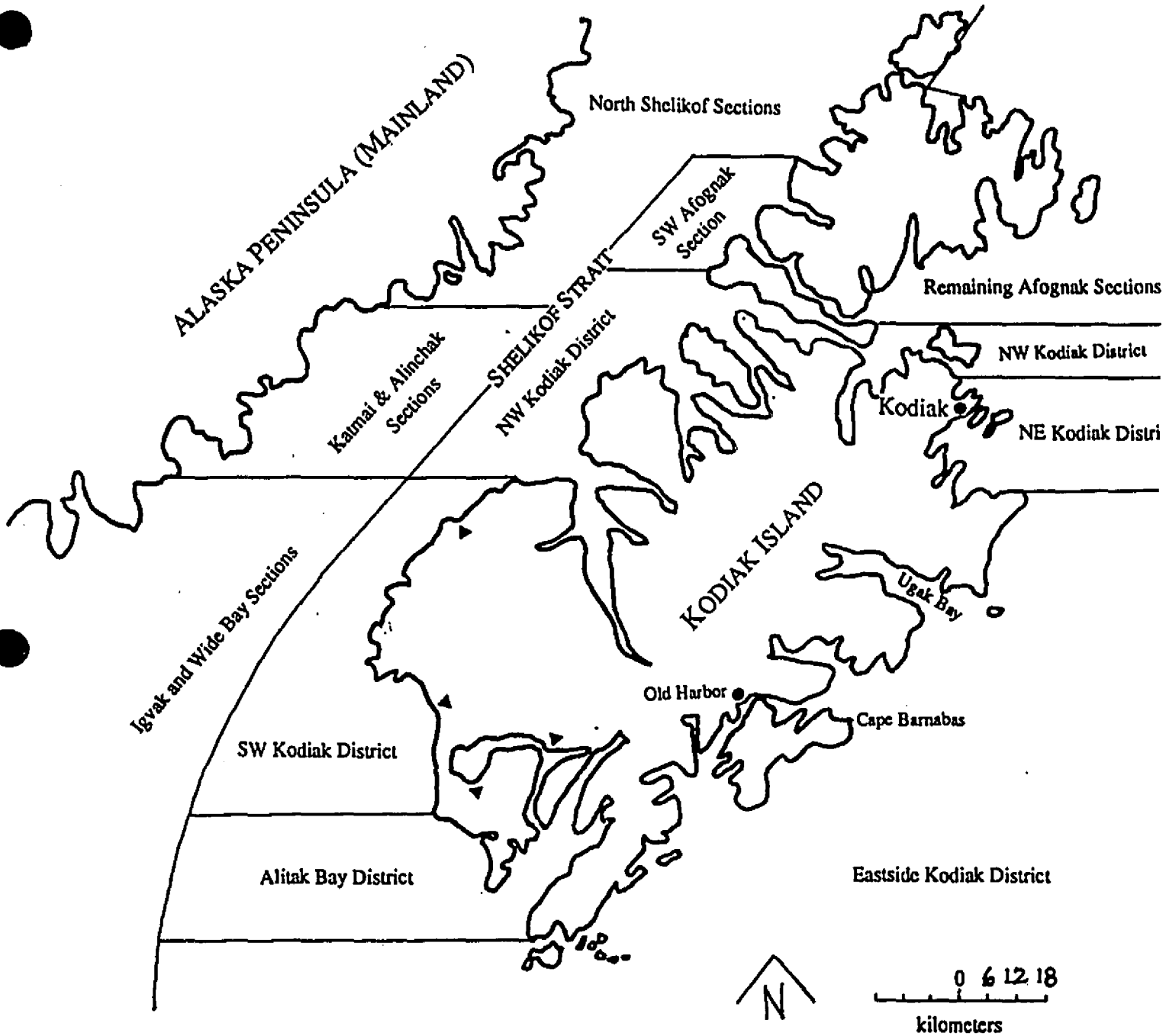
The state is divided into management units, the Kodiak area including waters of the Kodiak archipelago and the nearby Katmai coast "mainland" district (See Figure 3). Vessel operators must possess a limited entry permit for commercial harvest of salmon, and can operate a vessel in only one management area salmon fishery per year. Within each management area, "districts" are opened as fish appear and when escapement (numbers of fish escaping upstream to spawn, counted through weirs on the major salmon-producing streams or estimated by aerial survey) is sufficient to allow commercial harvest.

Fishery managers depend on input from fishermen for a complete picture of conditions on the fishing grounds. Within the past ten to fifteen years, ADF&G's relationship with Old Harbor fishermen has been transformed from an adversarial to a cooperative one. One anonymous observer characterized the Old Harbor fishermen of twenty years ago as "having larceny in their hearts," whereas managers now consider the spirit of open communication from that side of the island to be exemplary. This benefits Native fishermen as well; the department reacts quickly to their reports with actions that

may protect subsistence harvest, apprehend "creek robbers", or open an area to fishing.

Kodiak's first salmon "opener" of the season occurs in early June. By regulation all fishing must cease by the end of October (Prokopowich 1995b: 10), but most vessels quit by early or mid-September. During the summer, districts are opened and closed by emergency order depending upon where there are harvestable concentrations of fish.

Figure 3: Map of ADF&G Fishing Management Units



_____ ADF&G Management Unit Borders (Larger Districts are further divided into Sections)

▲ Major Sockeye (Red) Salmon Runs

Source: Prokopowich 1995: 86

Depending on run strength and environmental conditions, openings may be few and far between or interminably long; some areas may have strong returns while other districts have few openings. Within the Kodiak area, purse seine vessels are officially restricted only by these area and time closures, and may legally fish in any open waters. In practical terms, fishermen tend to fish preferred areas with which they are the most familiar, ranging as far as their fishing confidence, vessel speed, efficiency, and safety allow and competition dictates, for maximum catches.

Along with management of corporation land and moneys, Old Harbor Native Corporation involves itself with politics outside the village to defend local interests. In the spring of 1994, OHNC funded several Old Harbor fishermen to attend state Board of Fisheries meetings in Anchorage. Their testimony, which referred to certain "traditional" and long-standing fishing practices, was pivotal in swaying the Board to allow continuation of salmon fishing in certain areas around Kodiak (including Cape Barnabas, near Old Harbor) on stocks that spawn in Cook Inlet, affecting fishermen in that part of the state.

b. Information Availability

Bruce Twomley, chairman of the CFEC, stated that although the agency has offered educational programs on dealing with limited entry to rural Alaskans, they have never received any requests from Kodiak Island fishermen. CFEC has sponsored workshops at annual meetings of the AFN and in communities of western Alaska. Topics covered have included permit brokering, IRS problems, and alternatives for permit funding. CFEC has consistently tried to take a pro-rural, pro-Native stance in everything from writing the original statute to providing ongoing education. Twomley acknowledged that life in Alaska's villages was drastically changed within a short period by a combination of limited entry, ANCSA, state oil revenues, and local high schools as mandated by the Molly Hootch case[1] (Twomley 1994).

[1]In 1976, Hootch v. Lind, a suit brought against the state of Alaska, was resolved in favor of the plaintiff.

Although there is one limited entry permit broker in Kodiak and others around the state, Twomley recommends communities setting up regional brokerages for Natives' benefit. Community brokers could help to prevent permits from being sold outside of the village, and get the fairest deal for buyers and sellers. Elaine Dinneford, CFEC researcher, commented that professional brokers do many bulk mailings, offer free trips to Hawaii, etc. in order to attract transfers; Native brokers would have to "fight fire with fire, and get over the information problems" (Dinneford 1994). Communities could facilitate transfers without a full-blown brokerage just by keeping better track of when permits are for sale (ibid.). Another CFEC suggestion was for village corporations to have revolving loan funds for permit acquisition.

c. Access Rights Development

Alaska Federation of Natives provides a forum for concerns on resource issues other than land, including workshops on limited entry by the CFEC (as mentioned above), and other topics. Community Development Quotas (CDQs) is an exciting program that begun in 1992 in Bering Sea coastal villages (now in 56 villages). CDQs allocate to Native villages a fixed percentage of groundfish catches of newly organized fisheries. CDQs have given Bering Sea villages control of 60% of the area total allowable catch of pollack, based on a minimum catch of 1.4 - 2 metric tons. CDQ communities may decide whether to catch the fish themselves or lease the privilege; so far CDQ-controlled programs, including catch monitors, have lowered bycatch rates by 50% and show promise for controlling overcapitalization.

Qualifying communities must have an approved development plan and must be located within 80 miles of the coast--excluding the Gulf of Alaska (Ginter 1995). Ginter, who is Limited Access Planning Chief of the National Marine Fisheries Service (NMFS),

---

The result was a state mandate to build high schools in rural villages so that students would not be forced to leave their homes to finish high school (McBeath and Morehouse 1980: 69). Previously, Native students (including those from Old Harbor) had the option to attend Mt. Edgecumbe School in Sitka, go to BIA schools outside of Alaska, or move to a regional center where high school was available.

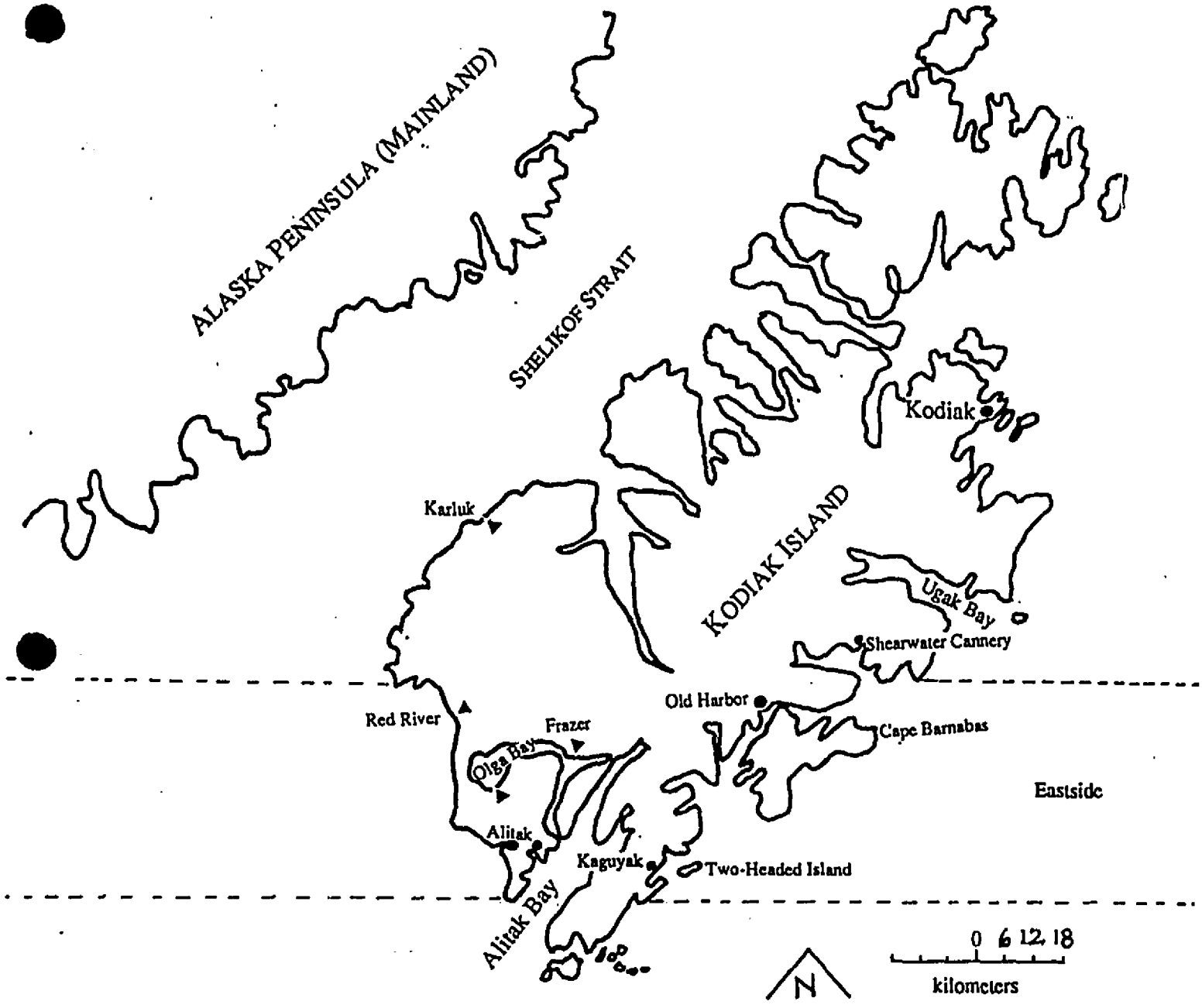
reported that from 1992-94, CDQs generated 43 million dollars for jobs, training, infrastructure, and community development. Because of the entrenchment of the groundfish and salmon fisheries around Kodiak Island, CDQs would not be feasible for pollack or other groundfish in this area. There may be applications of the CDQ model suitable for Old Harbor in developing sea urchin and sea cucumber fisheries, shellfish mariculture, and in the investment of other available funds.

2. Informal Structures

a. Information Control

Both the BIA and State/IRS programs mentioned above were known to professionally-oriented fishermen interviewed, whereas the at-risk and lifestyle-oriented fishermen targeted by the programs did not have (or perhaps did not acknowledge or assimilate) the information. In the traditional Native culture oral, not written, communication was the norm; those who have not adapted to dealing with lawyers and banks, and to reading newspapers and bulk mailings are left out of much that the predominant society has to offer, whether good or bad. Information is a valuable commodity, shared within small circles and guarded as carefully as any fishing secret. Native fishermen do possess a communication advantage over their non-Native counterparts: a secret code. Though none of the generation still operating boats in Old Harbor is fluent in the Alutiiq language, they speak enough to use Alutiiq as a code. On the fishing grounds, skippers can communicate fish activities and share location and catch information over the radio with brothers or friends in a different area without fear that they will disclose information that will summon unwanted competition.

Figure 4: Map of Old Harbor Local-Traditional Fishing Territory



"Eastside" fishing areas traditionally extended from Kiliuda Bay, near Shearwater Cannery, where much of the village spent summers fishing until the cannery was destroyed in 1964, south to the area around Kaguyak, a village also destroyed by the 1964 tsunami. Many Old Harbor fishermen also fished the Alitak area and did pre/post-season gearwork at Alitak area canneries. In 1994, most fishers also regularly fished the Alitak area, where red salmon runs have increased in recent years. About half the fleet travel as far as Red River, and a small number (4-6) will go any distance in the Kodiak area for the best salmon fishing.

---------- - Approximate borders of local-traditional fishing zones

▲ Major Sockeye (Red) Salmon Runs Source of Base Map: Prokopowich 1995: 86

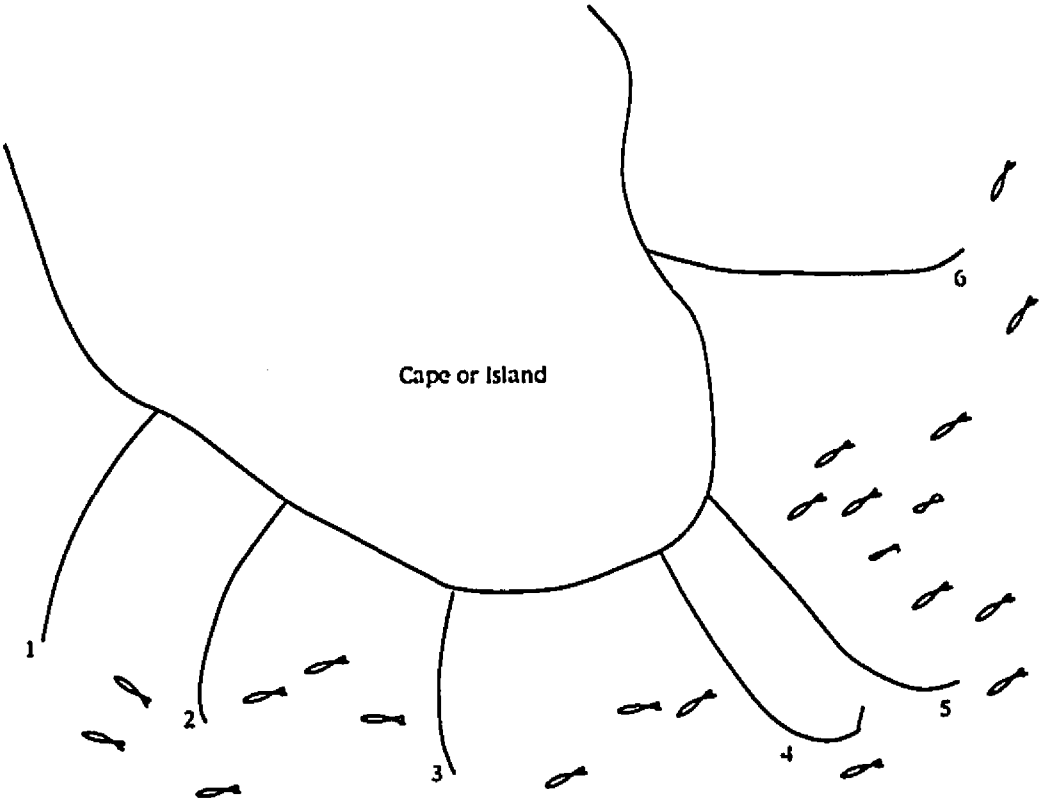
b. Territorial Control

ADF&G district boundaries define where the salmon fleet may fish legally at any given time (See Figure 3). These districts are divided into sections, which are opened at specific times when fish are present in sufficient numbers for harvest. Before the days of 1400 horsepower fishing vessels and openings by emergency order, village men fished as locally as possible (See Figure 4), most returning to Old Harbor for weekly Sunday closures. Fishing grounds in the vicinity of Kaguyak eventually were included in Old Harbor's territory after that village was destroyed by the 1964 tsunami, and at least one Kaguyak seiner relocated in Old Harbor. A few small-scale fishermen still stay close to home, but few seiners confine themselves anymore to a local territory, instead following the greatest concentrations of fish wherever districts are open. The traditional fishing territories near to the village are still defended to some extent, especially when the fishing is good and local boats outnumber non-locals.

In the past the Old Harbor fleet fit into the island fishing fleet by dominating their local area, and for the most part staying put there. Twenty years ago, for example, a group of brothers from Old Harbor used guns, cut nets, corked (see Figure 5) and rammed other boats to protect their territory. Today their reputation has cooled, but a boat can still be effectively shut out of fishing in the area by the Old Harbor fleet if it doesn't follow the local fishing rules. The standard "gentlemen's agreement" between seine fishermen in congested areas consists of an ordered line, wherein boats take their turn to set for a period of one half hour. In areas controlled by the local fleet, outsiders may have to conform to the usual rules, whereas locals with backup support may set for longer periods (2-1/2 hours has been reported).

In most areas around Kodiak Island, skippers may tolerate a single deviation from the rules, but they usually take joint action to prevent a rogue skipper from breaking the rules a second time. There is a conventionally prescribed distance between "sets,"

Figure 5: Corking



Sets 1, 2, and 3 are good sets, fished at distances far enough apart to allow each to catch fish. Set 4 is the best-situated at the head of the island; set 5 is "corking" 4, the corks of his net so close to 4's net (and set immediately afterwards)that 4 will not catch any fish. Set 6 is at a polite distance from the others, but not in a location that will be productive.

Figure 5: Corking

Source: Anonymous fisherman

depending upon the concentration of fish and characteristics of the location; "corking" is one effective technique to prevent another boat from catching fish. In situations where "special" rules apply, such as at certain times in Old Harbor area waters, a group of boats may prevent an outsider from catching fish at all. When an outsider fishing vessel is outnumbered, the skipper must choose between the hassles of tolerating local rules, and fishing elsewhere.

It is relatively easy to make life miserable for a single boat: several boats in a gang can prevent an unwanted vessel from catching many fish without actually doing anything illegal. This territoriality has been an effective locally adaptive control mechanism for Old Harbor fishers, but is not operable when large numbers of boats congregate, as happens more often as fishing pressure shifts to cape-intercept fisheries from more terminally-oriented fisheries. Technology, economics and demography have also changed the definition of "local" and altered who belongs to a community of fishermen. A single fishing boat's geographic range of activity has increased dramatically in the past 30 years due to the ability to travel quickly, the economic necessity of moving around, and regulated access to specific fishing areas. The level of competition has increased to such an extent that fishing only in the traditional grounds near the village won't pay the bills for most boats. The fleet now ranges farther to harvest the most desired species (red salmon, not available in significant numbers on the East side) and to exploit fish stocks wherever they can be caught in the greatest abundance. Large boats are better able to travel long distances and to fish in the most difficult conditions. World market quality demands dictate that fish be harvested when they are prime, which is most often farther from streams and settlements than in past fishing practice.

Groups of fishermen now ally themselves not only with those from the same village, but with congenial professionally or lifestyle-oriented colleagues. These alliances may provide companionship and friendly competition, share information, or offer help in emergency situations. Vessels may be classified as highly capitalized, high technology,

skippered by aggressive "professional" fishers; or may be those of the "sliver" or "mosquito" fleet, made up of older, smaller boats crewed by what Mason (1993: 41) terms "lifestyle" or "small-scale" fishers. (Some vessels fall in between these categories.) Mason writes,

> . . . people in Kodiak are preoccupied with the tensions between fishing as a lifestyle and fishing as a business . . . As a lifestyle, fishing is personal, local, small-scale and cyclical; lifestyle fishermen squander their money to start anew each season. Fishing as a business is impersonal, . . . large-scale and linear; business fishermen invest their profits to make more profits. (1993: 40-41)

The group of professional fishers is an unofficial club (Wilson 1990), with membership granted to a core of brothers and cousins of Old Harbor's most powerful family (the "C's"). Others join this group by demonstrating high motivation and aggressive fishing. They include men who have married into the family, aggressive fishermen outside of the family from the village, and ad hoc members who gain the rights and privileges of fishing with the "C Boys" through acquaintances made in school in Kodiak, during herring season and in other fisheries. Alliances formed outside of salmon season occur with increasing frequency as local vessels travel more widely around the island to participate in diverse fisheries -- as they must to keep up with payments on vessels, gear, and permits while supporting their families.

Lifestyle fishermen tend to associate with their fellows who fish nearby in the protected waters and stay closer to home. Smaller, lower volume local boats are generally favored by the "C boats" over outside vessels within Old Harbor's unofficial territory. The more sheltered inside waters where small boats can fish are sometimes at least verbally protected by the club from outsiders: a comment from a known and respected local highliner over the radio to an outsider may discourage encroachment on the traditional territory upon which small boats depend.

At other times the little boats are considered a nuisance, and are offered little respect. Several fishermen both inside and outside of the "C fleet" referred to an attitude of mere toleration -- as demonstrated by a fisherman's comments on the radio one calm day when

small boats shared prime fishing grounds: "I wish a breeze would come up and blow these mosquitoes away." The "Mosquito Fleet" or "Sliver Fleet" (referring to old wooden boats) is an annoyance that the big boys put up with; but the little operators cherish it as the last stand of old-style fishing. The Mosquito Fleet and a small group of young men starting out with small boats each function as their own club, sharing information with equally skilled and equipped colleagues to increase their fishing success.

Incidentally, the Cape Barnabas fishery that was protected by the testimony of Old Harbor Natives as their "traditional" fishing spot is no longer a hot-spot reserved for a few locals. When the fish are running thick at "Barny," dozens of boats from around the island are there, and standard rules apply. Old Harbor fishermen retain a small advantage at this, their best local spot -- but control of certain good fishing areas may be due, as much as anything else, to their local knowledge of where the rocks and snags are!

On less competitive or rich grounds, the crowds stay away because of a history of isolated threats of violence and stubborn claims to their control of East side waters. The reputation of the "C boats" and their rowdy "marine cowboy" skippers linger on, their territorial tactics effectively contributing to the fishing success of local fishers. As long as this territorial behavior remains within the law, it is the best tactic available to promote the efficiency and success of local fishermen. Territoriality also serves to protect local stocks and subsistence harvests from poaching: in one reported incident, vigilante action was threatened against a fellow villager who had been poised for "creek robbing."

Chapter Five: Economics

I. Economy of the State Fishery

A. Capturing Fishery Rents

In order to be a reasonable remedy to the problems of open access resources, a restricted access system must provide some benefits to the former holders of the common pool resource, benefits known to economists as "rents." This is especially important in Alaska, where fishing is among the top industries (with logging and tourism). Prior to statehood, Seattle-based canneries and other outside fishery interests successfully captured most fishing rents, and residents of the territory were able to do little about it (Roppel 1994).

1. Taxes

In present day salmon fisheries of Alaska, rents are most effectively captured through the levy of a "raw fish tax." There are three categories of raw fish tax in Alaska, all three of which affect Kodiak Island. By law, these taxes cannot automatically be dedicated for a specific purpose, but are deposited into the state's general fund, from which they can be allocated back into fisheries programs. The first, an enhancement tax, is elective on a regional basis (Dick 1996). In Kodiak, a 2% enhancement tax is levied on all landings and is returned by the state to the Kodiak Regional Aquaculture Association. KRAA has partially taken over hatchery and other enhancement operations in recent years from ADF&G's now defunct Fisheries Research, Enhancement, and Development (FRED) Division. KRAA and FRED Division have both contributed significantly to the growth and stability of Kodiak area salmon stocks. Thus, the tax indirectly benefits all people who depend on the fishery for a living, from fishermen and their families, to regulators, to processing workers and community service providers.

Fish processing companies pay a "business tax" that varies from 3% to 5% depending on whether the fish is processed onshore (by Alaskan workers) or on floating processor ships offshore. Business tax revenues remain in the state general fund and do not specifically benefit fishing communities (ibid.), though some indirect benefits would probably reach

communities such as Old Harbor.

Limited entry permit holders are assessed a "marketing tax" of 1% of the value of fish landed. This tax has regularly been appropriated to the Alaska Seafood Marketing Institute (ASMI) (ibid.), which has been particularly important in developing the domestic market for salmon as Alaska's share of the lucrative Japanese market has slipped in recent years, accompanied by falling prices.

2. Limited Entry: Keeping Rents in Alaska

An important measure of the effectiveness of the limited entry system is whether or not it has indeed controlled the amount of fishing effort in order to achieve the goal of safeguarding the livelihood of Alaskan fishermen. Looking at the numbers of Kodiak Area purse seine permits, we see that the system has had mixed effects. As shown in Table 9, the overall number of permits increased by 15% since the institution of the system. This occurred mostly in the first two years, 1975-77, due to appeals by rejected and late permit applicants (Tingley and Dinneford 1993). Alaskan residents in 1994 held a 3% greater share of S01K permits than in 1975, compared to out-of-state permit holders losing 4% of their overall share of

Table 9: S01K Permits Held by Alaska Residents and Non-Residents: 1975 and 1994

Year	Resident Permits		Non-Resident Permits		Total	
1975 (Initial Issue)	238	71%	96	29%	334	100%
1994	285	74%	97	25%	383*	100%
Change in #/%	+43	+11%	+1	+2%	+49	+15%
Change in % of Total	3%		-4%		----	

*One permit in 1994 was held by Alaska Dept. of Commerce
Source: Iverson and Dinneford. 1995: 231-33

S01K permits (Iverson and Dinneford 1995). This is no great victory for the limited entry system, but as many of the fishermen interviewed conceded, the situation could have been

much worse without limited entry. If Washington and Oregon salmon fishermen had free access to Alaskan fisheries when Northwest coast fisheries deteriorated and were finally shut down in the early 1990s, congestion in Alaskan fisheries would now be more severe.

Alaskan rural fishermen who fish in their local area (such as Old Harbor salmon fishermen) have, however, lost a share of permits to non-local and urban fishermen (see Table 10). In the entire Kodiak area, eighteen rural (local) salmon seine permit holders migrated from their residencies to urban or non-local areas; twelve were replaced by

Table 10: Net Changes in S01K Permit Distribution 1975- 1994

Year	Alaska Rural Local	Alaska Rural Non-Local	Alaska Urban Local	Alaska Urban Non-Local	Non - Resident	Total
Initial Issue 1975	69 21%*	10 3%	138 41%	21 6%	96 29%	334 100%
1994	55 14%	17 4%	164 43%	49 13%	97 25%	383** 100%
Net Change	-14 -7%	+ 7 +1%	+26 +2%	+28 +7%	+ 1 -4%	+49 +15%

Source: Iverson and Dinneford 1995: 231-33
* Percentages are out of all S01K permits
**One permit in 1994 was held by Alaska Dept. of Commerce

in-migrators, leaving a net loss to Kodiak village economies of six out of the 14 permits that are no longer fished locally by rural residents (Iverson and Dinneford 1995: 231-33). The remainder were transferred out of local villages to non-local buyers. These migrations and transferscause jobs, investments, and money to leave the local village.

B. From Local to Global Economy

1. World Salmon Market

As mentioned in Chapter 3, the world salmon market is considerably more demanding today than it was 20 years ago. Not only must producer quality standards improve continously in order to compete, but there is such a great supply of farmed salmon on the market that comes from outside of Alaska and the United States, that salmon prices will

continue to fall (Rigby, Ackley, Funk, *et al.* 1995; Welch 1994) (See Table 11). Preliminary prices for 1995 included 15¢ a pound for pinks and $ 1.05 for red (sockeye) salmon (ADF&G 1995).

Table 11: Kodiak Salmon Purse Seine Ex-vessel (Landed) Prices (per pound) 1978 - 1994*

Year	Chinook	Sockeye	Coho	Pink	Chum
1978	$ 1.14	$ 1.14	$ 0.91	$ 0.35	$ 0.41
1980	$ 1.01	$ 0.80	$ 0.69	$ 0.34	$ 0.51
1982	$ 0.96	$ 0.86	$ 0.79	$ 0.21	$ 0.36
1984	$ 0.93	$ 1.04	$ 0.85	$ 0.26	$ 0.34
1986	$ 1.10	$ 1.42	$ 0.68	$ 0.20	$ 0.33
1988	$ 1.45	$ 2.70	$ 1.28	$ 0.81	$ 1.13
1990	$ 1.06	$ 1.55	$ 0.75	$ 0.34	$ 0.51
1992	$ 1.02	$ 1.47	$ 0.56	$ 0.18	$ 0.39
1994	$ 0.72	$ 1.27	$ 0.69	$ 0.18	$ 0.23

*Source: CFEC 1996b,Commercial Fisheries Entry Commission, Juneau Alaska

Market prices are also influenced by the amounts of wild salmon harvested in Alaska. In bumper harvest years such as 1995 (see Table 12), volume may take the sting out of low prices despite a low harvest efficiency. Since the institution of limited entry, average earnings for Kodiak purse seiners have increased in real dollars, although after inflation, the actual change has not been as significant (see Table 12).

2. Local Remedies for Market Ills

Old Harbor fishers have discussed processing and/or marketing their own salmon -- cutting out the middle man. The village of Ouzinkie had some success with a small scale specialty smoked salmon operation. A longer airstrip completed in Old Harbor in 1993 can accommodate cargo planes large enough to transport marketable quantities of red salmon. In 1993, talk got so far as tentative deals with Louisiana restaurateurs, but as of the 1994 season these had not materialized.

Table 12: Estimated Salmon Harvest and Value for the Kodiak Area 1974-1995*

Year	Total Catch (# of fish)	Total USD $ Value	Avg. S01K Exvessel Value	CPI** 1982 (/.675= 1994$)	Adjusted Value in 1994 $
1974	3,329,427	$4,808,000	$15,993	2.029	$48,074
1976	12,484,451	$16,976,000	$43,017	1.757	$111,972
1978	16,942,215	$30,357,179	$70,685	1.532	$160,429
1980	19,157,249	$27,410,296	$62,363	1.215	$112,253
1982	10,891,952	$18,803,822	$39,309	1.035	$60,274
1984	13,678,005	$25,948,012	$71,550	0.961	$101,866
1986	16,304,165	$38,723,877	$92,696	0.913	$125,380
1988	19,009,757	$103,816,936	$252,403	0.846	$316,345
1990	12,122,389	$52,611,853	$113,326	0.766	$128,604
1992	8,462,464	$40,495,222	$98,086	0.713	$103,608
1994	12,098,324	$27,523,835	$67,986	0.675	$67,986
1995	49,166,896	$50,505,535	$124,685	n/a	n/a

* Source: Prokopowich 1995b: 47
** Based on 1995 Consumer Prices Index adjustments (U.S. Bureau of the Census 1995: 491)

3. Labor Markets

Old Harbor has little employment opportunity outside of fishing. In 1979, from a total labor pool of 190 residents, 100 (53%) had summer employment, 13 (7%) worked year-round, and 31 (16%) worked nine months per year, leaving 24% of the labor force unemployed (Davis 1979: 122). Davis estimated that in 1978, 84% of all jobs were fishing related, and only 44 nine or twelve-month positions were available in the village (ibid. 123-25). In 1980, when the total population was around 340 (Huskey 1986: 235), government programs and projects, including everything from temporary construction projects to KANA health aide, provided 29 jobs; "support sector" (vendors, transportation, etc.) employed 10; and 41 fishermen ran boats for all fisheries (Langdon 1986: 102; Huskey 1986: 220, 234). These 80 positions counted in 1980 did not include fishing crewmen, which would add an

estimated 100- 20 available seasonal jobs. In recent years, diversification into year-round fisheries and tourist development may have altered this picture slightly, but summer fishing remains the biggest opportunity for earning cash income.

a. Why Do Some Fishermen Not Work?

Outside workers including college students and seasonal migrants from California, Washington, and other parts of the "lower 48" states have provided crew and processing labor since the establishment of American commercial salmon fisheries in Alaska in the 1880s. In the earliest years, few Natives were employed in any aspect of salmon production; that gradually shifted with U.S. government pressure (Moser 1899; Kemp 1981; Roppel 1994). In many of the years between 1926 and 1964, most of the population of Old Harbor moved to Shearwater Bay, where the men fished and women worked in the cannery (Roppel 1994: 269). When limited entry was instituted in 1975, Natives (including urban and rural, local and non-local) were issued 41% of Kodiak purse seine (S01K) permits; 19% of all S01K permits were held by rural Natives who fished locally (Kamali 1984: 7).

Historically, Old Harbor fishermen stuck together. Most boats were crewed by the captain's immediate family or close relatives. In Old Harbor, loss of permits has meant fewer jobs on vessels for villagers (see Table 8), but fewer permits does not explain why outsiders are crewing and local men are unemployed. In 1994 the number of actual purse seine jobs offered was close to the number of males of working age (estimating from the percentage of males counted in the 1990 census [U.S. Bureau of the Census 1990] to 1994, accounting for deaths, disability, etc.). Some crewmen stated that in years when price forecasts were low, it was not worth the risk or hassle to work on other than a highlining boat. Prospective crewmen may not choose to work for abusive, dishonest, or financially unreliable skippers no matter what the possibilities for gain. With few full-time, year-round jobs in the village, waiting on shore for a possible temporary job (such as those available on a housing rehabilitation project in 1994), depending on family, finding odd jobs, living by subsistence

hunting and fishing, or relying on public assistance were preferred by some to working hard for little money or being badly treated on deck.

An estimated 25% of Old Harbor vessels employed one or more non-local crewman in 1994. "Greenhorns" walking the docks in Kodiak will often take any job that is offered, although with fish prices so low in '94, many regular crewmen took the season off, and inexperienced men could be more discerning. Several crewmen quit from Old Harbor vessels during the 1994 season and were not easily replaced.

It may be that the wages and variety of jobs now available makes fishing a less desirable option than it once was. Many crewmen and skippers thought that the low price of fish drove young men to seek alternative employment. Another view was that youth these days are "lazy," "spoiled rotten," and only "want to party." There may also be some truth in this assessment; social transfer payments for all of the United States increased more than eight and a half times between 1970 and 1992 (U.S. Bureau of the Census 1995: 374), making it easier not to work. Substance abuse problems are rampant among Old Harbor youth, as they are throughout rural Alaska. And as long as there is a non-local labor pool readily available to work, social troubles can be ignored and fishing jobs filled Seattle boys who are eager to be Alaska fishermen.

In economic terms, some factors of production such as labor and equipment may leave an industry because they are not covering their opportunity costs (what they are worth on the open market). For labor, the opportunity cost in fishing may equal the value of welfare or may be as low as zero (Hartwick and Olewiler 1986: 294). In the case of Old Harbor's salmon fishery, the fishermen who drop out of the labor pool are not being paid the full value of their labor, so they seek other opportunities.

b. Non-Fishing Options for Local Employment and Employment for Women

Fish processing was previously considered a more viable option to Old Harbor residents than it is today. A freezer-boat processor, the Sonya, operated in Old Harbor for several years

in the '60s and '70s (Roppel 1994: 118), hiring as many locals as cared to work. Kodiak area processing managers interviewed in 1994 doubted that Old Harbor could provide enough steady workers to sustain even a small processing plant now; power generation, very expensive in the villages, was another concern. In 1994 a record number (for recent years) of six Old Harbor people worked at the Alitak cannery. Although nearly all village women worked in the Shearwater cannery 42 kilometers north of the village before it was destroyed in the 1964 tidal wave, few villagers have any interest in such work now.

Hamilton and Seyfrit (1994) document migration patterns in the Northwest Arctic and Bristol Bay regions of Alaska wherein women move to cities more often than men. In those areas, subsistence hunting and fishing supplemented by temporary or part-time wage labor provide a satisfying lifestyle for men. Women no longer have as important a role in subsistence processing as they once did, and choose to pursue education and jobs that are more readily available outside of rural areas. There are some parallels in Old Harbor. Jobs available to (and held in 1994 by) women in the village include: teacher, teacher's aide, OHNC secretary, Old Harbor Tribal Council secretary, City of Old Harbor secretary and accounts manager, postmistress, senior cook, health aide, lodge co-manager, chambermaid, café cook, waitress, airline agent, and store clerk. Several young women worked at the Alitak cannery in the summer of 1994, a few fished on the boats of boyfriends or husbands, and some high-school aged girls did waitressing and baby-sitting.

With the exception of teacher, these jobs are generally less well paying (on an hourly basis) than jobs such as heavy equipment operator and temporary construction worker, non-fishing jobs which are available to men in the village. There are no female vessel operators in Old Harbor and few women crew: two of the three known to have been working on salmon boats in 1994 did not remain the full season. High school girls expressed little interest in a career of fishing. The few who considered fishing as a job possibility lacked experience; whereas boys at age sixteen to eighteen often have five

years or more crewing experience, girls are not often raised with the expectation of becoming fishermen. Girls also voiced a disinterest in being married to a fisherman, demonstrating that whatever status or role that being a fisherman's wife may have had in the past does not meet the expectations of the younger generation. Even the boys had reservations about fishing careers, and most of those who did want to fish planned to combine seasonal fishing with teaching or other work. It is painfully obvious to young people that the "American Dream," complete with shopping malls, endless goods to buy, and ready-made entertainment, is not to be found in a remote Alaskan village.

Old Harbor's 1990 census statistics suggest that, as in other parts of Alaska, especially women are migrating out of rural areas. When women leave villages in disproportionate numbers, it becomes harder for men to find partners and to be content in their own lives. Of 1990's total population of 284 residents, there were 154 males and only 130 females -- significantly less than half. The village grew steadily from 54 people in 1920 to 340 in 1980, but by 1990 it had fallen below 1970 population levels (U.S. Bureau of the Census 1990; DOWL Engineers *et al.* 1981). It is unclear how much of this population loss is due to migration and how much is attributable to high rates of suicide and substance abuse-related deaths.

c. Economic Diversification

Eco-tourism guiding is seen as a major area for economic development in Old Harbor. The resources necessary to accomplish this development are mostly controlled by the same people who have done well in commercial fishing: those with nice boats, fishermen with money and time to develop tourist marketing and advertising, and the owners of the lodge, café, and other businesses. Because most local transportation to sites of interest is via water, owners of boats suitable for conducting passengers, those with sufficient capital to buy insurance and able to take the time and money necessary to pass the license required to carry passengers have a clear advantage in taking advantage of potential business. Tourism

operators will also have to deal with villagers' fears that tourist development may conflict with subsistence harvesting, and may meet political opposition on this basis. If fishing jobs and income in the village continue to decline, subsistence use is likely to increase, along with tourist-local conflicts.

In the late 1980s, a development project sponsored jointly by ADF&G, KANA, and a Japanese fisheries development agency attempted to culture scallops at several sites around Kodiak Island, including near Old Harbor. The experiment was of less-than-hoped-for scientific success, but still had potential: aggressive marketing, production leadership and labor were needed. Mariculture (sea-ranching as opposed to farming) of mussels has had some success around Kodiak; results of experiments raising oysters in local waters are unknown. Marketing difficulties and conflicts of mariculture gear with other fisheries are both legitimate concerns; both could be overcome with political will and personal initiative.

II. Capitalization

Making lots of money fishing is intoxicating. After a bonanza season in 1988, when high-school age crew members in Kodiak commonly netted shares of $30,000, one teacher commented that it was hard to teach them anything. With their new pickup trucks in the parking lot, ample spending money, and a career of the same ahead of them, students didn't need to learn much. The high salmon prices that contributed to 1988's boom are a thing of the past, but for some young men, the aspiration for wealth remains, keeping them hooked on commercial fishing through many boring hours of tedious labor on deck. For a fishing vessel owner who has tasted wealth and what it can buy in the wide world, the drive to catch more fish is a powerful motivation, and the need for bigger, faster, smarter boats is obvious.

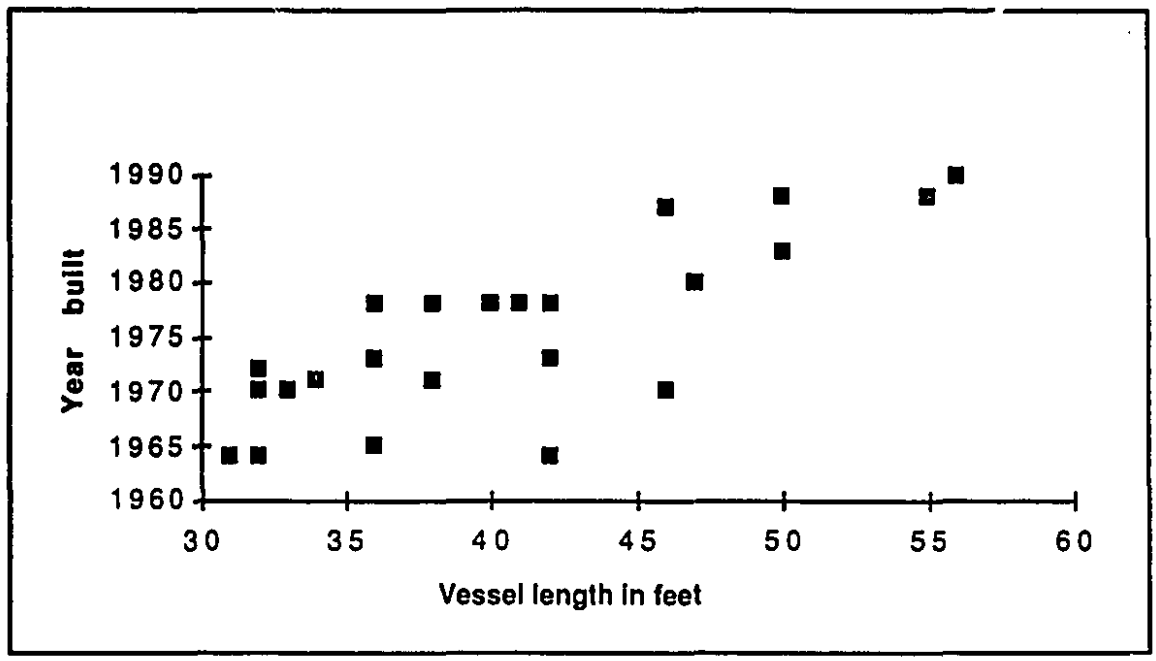
In research on fleet capitalization in Prince William Sound (PWS), Evelyn Pinkerton (1995) found that between 1975 and 1988, vessel values increased "tremendously." According to Pinkerton, PWS fishermen reinvested profits into their boats and gear for the following reasons: (1) enhanced runs

> made an outside "cape fishery" more feasible and attractive; larger boats could get there faster and carry more back; (2) tax policies allow write-offs for reinvesting capital in a business; ... you might as well put it into your boat instead of give it to the tax man. (3) the PWS fleet was mostly pocket seiners of c. 40 feet, without modern holding capacity. It was hard for these boats to resist the temptation to have a shiny new modern fleet such as existed elsewhere, whether or not that was the best long-term strategy in a highly dynamic ecosystem like PWS. (4) External sources of money from the oil spill in '89 apparently delivered the coup de grace to this tendency (ibid.).

A. Disparity of Vessel Upgrades

Around the time that limited entry began, most Old Harbor vessels fell within a fairly narrow range of catching power. No vessels were older than those that had replaced boats destroyed in the 1964 tidal wave eleven years previously, most were 38 feet in length (11.58 meters) or smaller, and a narrow range of horsepower (hp) did not allow any one boat an indisputable advantage. Presently, Old Harbor's fleet consists of boats built in a 26 year span of each other (1964 - 1990); wooden vessels 31 feet (9.4 meters) in length up to sleek new fiberglass limit seiners (56 feet /17.1 meters long) (see Figure 6); and slow 100 hp relics racing against seiners that can tow water-skiers or outrun state protection vessels with 1400 horsepower (see Figure 7).

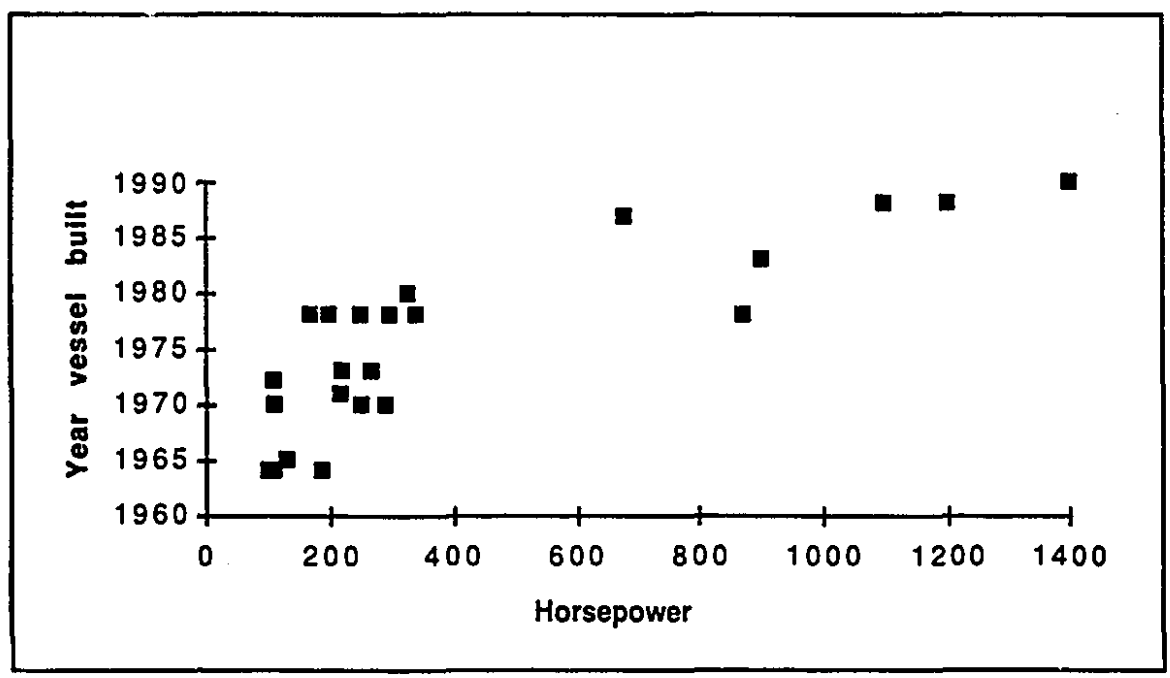
Figure 6: 1994 Old Harbor Fishing Vessel's Length by Year Built*



Source: 1995, CFEC Vessel Registration Data. (CFEC 1995c)

* 32 feet =9.8meters, 36'=11.0m, 42'=12.8m, 46'=14.0m, 50'=15.2m, 56'=17.1m

Figure 7: 1994 Old Harbor Fishing Vessel's Horsepower by Year Vessel Built



Source: 1995, CFEC Vessel Registration Data. (CFEC 1995c)

B. Economic Access -- Permit and Gear Financing
1. Processors, Banks

Capitalization for boats and gear is available from a variety of sources. Despite a major and calculated shift in financial responsibility and control away from salmon processors with the institution of limited entry, canneries remain an important source of loans for boats and gear for some Native fishermen. What has changed with the processors is that they are now very selective as to whom they support, investing in fishermen that promise returns and spurning those who are risky investments. Nearly all of the vessels in Old Harbor sell their salmon loyally to one buyer, but whereas that company and its predecessor formerly made loans and advanced credit and groceries to all of its boats, some of the lifestyle fishermen reported that all of the benefits now go to successful boats, and "the little guys" can no longer expect any kind of assistance from their former patrons.

2. State of Alaska, BIA

There are government programs that target "the little guy" in an attempt to help the less aggressive Native fisherman and to maintain his lifestyle. The BIA (Bureau of Indian Affairs, a federal agency) offers a grant program that covers the down payment on a limited entry permit for qualifying Native fishermen (Twomley 1994). The State of Alaska sponsors loans to up to $30,000 for fishers in trouble with the Internal Revenue Service (IRS) in attempts to free small-scale fishermen from back-tax debt that has prevented them from fishing (DOC 1995). Two of these "tax obligation loans" are held by Old Harbor fishermen, who qualify because their permits are their sole source of income (Burns 1996).

3. Loans versus Informal Financing

More mainstream loan programs available from the Alaska Department of

Commerce and Development (DOC) (the subsidized loans to Alaska residents mentioned in Chapter Two) and the Commercial Fisheries and Agriculture Bank (CFAB) were not widely favored by Old Harbor fishermen. Local fishermen, both professional and lifestyle, preferred not to take out large loans for vessels, permits or gear -- or at least did not like to admit they had done so. Value is seen in working one's way up, upgrading as success allows without borrowing amounts that would exert undue pressure on one's fishing style (e.g. pressure to fish illegally) or prove an unaffordable risk in a poor year. Motivation for gain beyond one's means is traditionally disapproved of, and may be interpreted as greediness.

Loan programs targeted for Alaskans have generally benefited urban Alaskans who are more willing to deal with paperwork and take risks (Tingley and Dinneford 1993), and in effect worked as a subsidy for them, to the detriment of poor rural (lifestyle) fishermen. However some Old Harbor operators do hold state and perhaps commercial loans. CFAB operates something like a credit union: it is owned by its members, and grants loans on a standard commercial basis to borrowers who are good financial risks. Information concerning specific borrowers (if there are any) in Old Harbor was unavailable to the researcher. The state's DOC loan program is restricted to Alaska residents, has lower loan maximums, and may in some cases require that 25% or more of the borrower's income come from fishing (Burns 1996). DOC personnel report that 20 loans have been issued by DOC to Old Harbor fishermen. Seven of these are S01K (Kodiak Area Salmon Purse Seine) permit loans, averaging about $100,000 each. (S01K permit value as of 4 January 1996 was $54,000.) Two gear loans averaging around $10,000 were issued, with the remaining eleven loans on vessels valued at a mean amount of $110,000 (Burns 1996).

Informal payment plans and handshake agreements within the village are preferred by some fishermen, though even highliners complained in 1994 that they had no financial slack with which to support sons or relatives. One fisherman claimed that informal

arrangements usually left the seller short, and selling to an outside buyer for cash was better.

In a CFEC survey answered by transferees, S01K (Kodiak Purse Seine) permit buyers were shown to have changed their financing tactics significantly between 1980 and 1994. Although self-financing has been the most popular strategy in buying a limited entry permit (averaging 49% of total transfer financing in these years, and 76% for 1994), state (DOC) loans were utilized heavily in the early 1980s. From a peak usage of 58.6% in 1984, DOC loans dropped to a 8.0% use rate by transferees by 1994. Neither commercial bank nor CFAB loans were ever popular lending sources for Kodiak area purse seiners buying a permit, the highest use-rates being 13.3% in 1991 and 11.8% in 1990 for those respective categories. Transferor financing decreased overall in the '80s and early '90s. Processor financing of salmon permits has been almost non-existent, though they may assist fishermen in funding gear purchases (Iverson and Dinneford 1995: 112-13). Favorable prices and harvests in the 1980s may have encouraged Old Harbor fishermen to borrow money for permits or gear, whereas the outlook for today's market dictates a more conservative strategy.

C. Fishing Revenues and Related Community Development

1. Subsistence Uses of Equipment

Subsistence harvesting and processing of fish and game, and collecting wood, requires specific equipment. Individuals generally own their personal garments and gun or fishing pole; costlier items such as nets and vehicles are often shared. Most access to harvest areas is by boat. Permit holders who own boats may have an advantage in having large vessels able to travel over large harvest areas safely (including to Kodiak for large grocery orders), but full-time fishermen often don't feel they have enough leisure time for subsistence pursuits during the fishing season. Every available seaworthy skiff (and some marginal ones) takes willing participants to harvest areas, or in some cases shares the harvest with villagers not having

equipment. Modern commercial fishing arrangements have not impaired the capacity for subsistence harvesting, and in fact may allow or necessitate non-permit holders to live off the land more than their wage-earning cousins.

2. Businesses and Investments

Almost all of the businesses in the village (as described in Chapter 1 Section C) were originally financed or continue to be financed through fishing revenues. For any venture requiring significant investment, commercial fishing has been the sole source for equity building.

A few successful fisherman living in Old Harbor also have investments outside of the village. These include shares in a Seattle office building and a remote lodge on Kodiak Island.

III. The Rich Get Richer: Economic Disparity

In 1994, 285 Kodiak Purse Seine (S01K) permit holders fished, with gross earnings of $19,250,419 and an per-boat average of $67,545. The 23 Old Harbor permit holders that made landings in 1994 averaged slightly less, grossing an average of $53,074 each for a total of $1,220,708 in salmon earnings for the village.

For twelve of the years between 1981 and 1994 (for which figures were available), the Kodiak fleet overall out-fished Old Harbor's fleet. Old Harbor's best season in this respect was 1981, when local boats averaged 99% of Kodiak boats' earnings. The lowest year was 1984, when the average Old Harbor fisherman made only 57% of the typical Kodiak permit holder's income. Averaged over all of these years, estimated gross earnings for an Old Harbor vessel came to only about 70% of the average Kodiak boat, although in recent years, averages have improved to the 79-88% range. There are several likely explanations for this: Old Harbor's fleet has a disproportionately large percentage of older, small, and locally oriented fishing vessels; fishing areas local to the village are relatively poor in sockeye (red) salmon (see Figure 4), the most valuable species; and few

run-enhancement programs have targeted East side fish production, contrary to other areas of the island. These factors would add up to lower production for a fleet that fishes locally on the East side; catches improve as the fleet is upgraded and individual vessels range further to harvest. For Old Harbor boats that remain locally oriented, pressure from an ever-more mobile Kodiak fleet on local waters may continue to drive harvests down.

Despite a low average for Old Harbor boats overall, some vessels do very well harvesting salmon. As seen in Table 13 for all Kodiak permits, highliners (top boats) commonly harvest three or more times the value of fish as boats in the fourth (lowest) quartile, 3.29 times the amount in 1994. Quartile figures for Old Harbor (Table 14), show that this gap is even more pronounced within the smaller fleet, where five out of 23 boats landed 50% of total village earnings, accruing an estimated 5.47 times as much as the thirteen lowest harvesting vessels.

Table 13: 1994 Kodiak S01K Quartile Earnings*

	Permits		Estimated Gross Earnings			
Quartile	Number	%	Total USDS	%	Average USDS	
1	32	11.23	$4,818,922	25.03	$150,591	actual
1	32	11.23	$4,818,922	25.03	$150,591	cum
2	46	16.14	$4,768,518	24.77	$103,663	actual
1&2	78	27.37	$9,587,440	49.80	$122,916	cum
3	67	23.51	$4,832,460	25.10	$72,126	actual
1,2&3	145	50.88	$14,419,900	74.91	$99,448	cum
4	140	49.12	$4,830,519	25.09	$34,504	actual
1,2,3,4	285	100	$19,250,419	100.00	$67,545	cum

*Source: CFEC 1995b, Kodiak Quartile Tables. For an explanation of quartile tables, see Appendix D.

Table 14: 1994 Old Harbor S01K Quartile Earnings**

	Permits		Estimated Gross Earnings.			
Quartile	Number	%	Total USDS	%	Average USDS	
1	2	8.7	Confidential			actual
1	2	8.7	Confidential			cum
2	3	13.04	Confidential			actual
1&2	5	21.74	$605,973	49.64	$121,196	cum
3	5	21.74	$326,674	26.76	$65,335	actual
1,2&3	10	43.48	$932,646	76.40	$93,265	cum
4	13	56.52	$288,061	23.60	$22,159	actual
1,2,3,4	23	100	$1,220,708	100.00	$53,074	cum

**Source: CFEC 1996, Earnings Quartile Report, Project #96107 (CFEC 1996a)

With vessels at opposite ends of the spectrum of modernity and catching power, the gap between professional fishermen and small-scale operators continues to grow. This effect is particularly harsh for those men working on deck, who are paid on a share system: a 10% full share for an adult on deck and 12% for the skiff man is average in Kodiak, with "half" shares paid to children and sometimes to "greenhorns." Old Harbor shares are reported by Mishler and Mason (In Press: 23) to be significantly lower: 5% of the catch for deck hands and 10% for the skiff man. A season's wage of $2650 or less is not enough to support even a single male for very long at the high cost of living common in Alaska's rural areas.

Chapter Six: Conclusions

I. Summary of Findings

Changes in Old Harbor fishing are driven by economics. Limited entry is one of many factors that propelled Old Harbor from an isolated, remote fishing village to being another spoke in the wheel of the modern global economy. Beginning in the early 1970s, the Alaska Native Claims Settlement Act, limited entry, and a more competitive and demanding world salmon market all contributed to increased pressures on local fishing communities, including Old Harbor and other villages and towns of Alaska.

The following are the attributes of limited entry and the world economy that have had the most pronounced effects on the fishing community:

- Non-resident Fishers: Limited entry has been successful at preventing a flood of out-of-state fishermen from entering the fishery.
- Permit Value: Introduces rigidity to the operation of fishing vessels, necessitating high initial investment and a businesslike orientation to avoid jeopardizing the permit itself; in a few cases not operating is the only option in order to avoid debt and retain the permit. The market for permits at times is so high that young people wanting to enter the fishery may be dissuaded.
- Permit Transfers: The practice has injected cash into the local economy in some cases, but favors those who deal well with paperwork and lawyers. Permit holders in cash-poor situations are vulnerable to transferring permits when under financial stress. The 60 day intent-to-transfer rule could protect transferorss, but is seldom or never taken advantage of, probably out of ignorance.
- Overcapitalization: The rush to catch the most fish the fastest has resulted in huge investments for permits and gear. Debt burdens put increasing pressure on operators to produce more at a lower cost, which often means that crews work harder for low hourly wages.
- Permits and Associated Jobs: The net loss of permits that have been transferred out of the village is not great, but it is magnified as follows: each

salmon purse seine permit represents four jobs. Several permits are inactive, the holders not wanting to or not ready to sell out, but unable to fish themselves -- contributing to the perception of fewer permits in the village. The transferred-out and inactive permits reduce the number of available jobs, forcing increased reliance on welfare, other cash sources outside the village, and subsistence harvests.

- Professional versus lifestyle approaches to fishing: Paying permit fees, loan management, paying taxes, and attending public hearings have become as important to fishing success as catching fish. Competition depends upon information and maintaining a financially stable business, and those fishers with less developed business skills find it challenging to make a living. The smaller, less capitalized vessels operated by most lifestyle fishermen can neither travel so far nor fish in such a wide range of conditions as larger boats so do not make as much money.

- Crew relations: Sons or other close family on a fishing boat may be in position to inherit the permit, or may have family support that enables them to buy their own permit. Most men and women working on deck have little hope of ever getting their own permit, and in addition, some must endure being treated "like a nigger" in addition to hard work, little sleep, cramped living conditions, and the ever-present dangers of fishing in Alaska. Particularly in low-money seasons, village men may decide that fishing is not a desirable occupation, forcing skippers to recruit outside of Old Harbor.

- World Salmon Market: Limited entry was intended to keep the optimal number of boats on the fishing grounds to provide a decent living to all participants. Fluctuations in fish stocks and prices are not necessarily reflected in the amount of participation in the fishery. In a year like 1994, when returns were moderate but prices low, some fishers might have stayed at home if not for pressure to pay permit or gear loans. If world salmon prices continue their decline, it will be increasingly difficult for small scale fishers to catch enough to live on, and for large boats to keep up with payments.

- Financing: In the past, canneries owned many of the fishing boats and maintained a patron role to Native fishermen, hiring them before and after the season to do gear work, supplying groceries, and extending credit. Supporters

of limited entry wished to loosen the control that processors held over the fishery for a hundred years. Now processors control Old Harbor fishermen as would any bank, offering loans to low-risk fishermen who have proven good fishing performance, and rejecting low-earning captains. There are many sources of loans and grants for rural Alaskans who want to take the pressure and the risk. It is most often the professionally oriented and the urban boat operators who are granted loans, thus increasing capitalization and making competition ever tougher for everyone.

- Economic Disparity: The above factors contribute to business-oriented fishermen doing better, and small-scale fishers earning less. This intensifies social stratification, which has always been present to some degree, but in the past was moderated by cultural institutions and behaviors.

Limited entry has had mixed success in meeting its goals of controlling effort in Alaska salmon fisheries. Biologically, enhancement and management for the Kodiak area have compensated for any increase in effort, keeping salmon stocks at a high and relatively stable level that is now more vulnerable to environmental factors than to over-fishing. The permit system has discouraged the entry of large numbers of out-of-state vessels, attaining some success at keeping fishing dollars inside Alaska. Economically, however, salmon fishermen are at the mercy of the world market, and earnings may continue to fall. Eliminating permits from the system is not possible under current state budgetary and political conditions; and average earnings would probably have to be considerably depressed for a prolonged period before an optimal numbers study could legally justify a permit buy-back program.

Old Harbor has adapted better than other Kodiak Island villages to the limited entry system and to an increasingly competitive and professional fishery. The most frequent complaints about the permit system are the difficulties experienced by young people in entering the system, and the tragic loss of livelihood experienced by permit holders (particularly those with substance abuse problems) who needed cash and transferred their

permits. On the positive side, the sale of a permit provided some cash income for fishermen who were no longer able to (or wanting to) fish for a living, and many who have permits and have kept up with the professionalization of the fleet have been very successful.

From the researcher's viewpoint, the most dramatic change in Old Harbor's salmon fishery over the past 20 years is the shift from a relatively homogenous fleet to a group of vessels widely disparate in aspects of catching and earning power (a condition noted by Townsend [1990] to be a fault of limited entry), safety, comfort, and fishing attitudes. For the older generation and those who value fishing as a lifestyle, fishing is not "fun," as it was in days gone by. Competition, pressure to make payments, and the need to travel long distances have transformed an occupation that formerly reinforced a sense of community, mutual aid, and economic cooperation. These qualities still exist among Old Harbor fishermen to some degree. But as evidenced by a trend toward migration, as noted in a 1986 study (Cultural Dynamics and Davis 1986:180), and a subsequent lowering of the population (U.S. Bureau of the Census 1990), village lifestyles -- including commercial fishing -- does not live up to the expectations of all residents. As Old Harbor's traditional and primary occupation, commercial fishing has not evolved in ways that favor the majority of residents.

The gulf between professional and small-scale fishermen is reflected in incomes, social status, and political power. Before Russian times, Sugpiaq (Pacific Eskimos) had higher population densities and a more diverse and stable resource base than other Eskimo groups; "...they occupied a culturally diverse region where warfare, slave-taking, social ranking, and role specialization were present..." (Fitzhugh 1988: 51). As in Greenland, where the society was also traditionally stratified hierarchically, a number of dominant families control certain fisheries (Rasmussen 1994). Rasmussen observed that this social structure has changed only in that the fulfillment of social obligations once integral to maintaining a socially ranked society have been abandoned, replaced by

government welfare and other social transfer payments and programs (ibid.).

The same seems to hold true for Old Harbor; in a "dog eat dog" world, those who can't keep up continue to struggle while the rich get richer. Economic pressure drives the exploitive behavior of some skippers, and contributes to social problems as much as any external factors. Small-scale, non-professionally oriented fishermen, crewmen, and potential crew are considered lazy by others. As victims of poverty, a myriad of social problems, and alcoholism, they may lack the motivation of more successful fishermen. No one in the village is immune to social problems. Differences in upbringing, and chance, are what drives some through problems and leaves others mired in them. "Greed" and "laziness" are not chosen behaviors; the labelling of people with these qualities reflects the emotionally-charged gap of class distinctions and wealth in Old Harbor.

Mishler and Mason (In Press) conclude that descendants of Scandinavian men that married Old Harbor women are instilled with a protestant work ethic that gives them an edge over fishermen without Scandinavian heritage. This seems to be true in some cases, but does not extend to all fishers with Nordic blood, nor even to all brothers in a single family. Another explanation Mishler and Mason (ibid.) give for the economic success of families with Scandinavian fathers is that, in a society where family obligations extend to both the side of the husband and the wife, the distant family of the husband was not a drain on household resources. Thus, these families were able to accumulate more wealth than those with more kin. Some of the most successful fishermen claim that village lifestyle is as important or more important than money and other aspects of mainstream life and values. My own experience is that mutual dependence and obligation forge strong ties that enhance community life. If economic times get harder, it is those ties that will see people through.

To adapt to economic and social changes, population growth, and a world market, a new approach to fishery problems is needed. Limited entry, that is manipulating access rights to fisheries, was not the magic fix that was hoped for. Nor would eliminating the

permit system for salmon necessarily have positive effects at this point. Community Development Quotas would not be applicable in the Kodiak area to long-standing fisheries, but some of the development plans that have resulted in CDQ communities may have useful applications for Old Harbor. ITQs and other transferable ownership systems are disliked around Kodiak because of the potential of wreaking distributional havoc on small communities. Thus the halibut and sablefish quotas that were to be implemented in 1995 (Jeffrey 1994) were strongly resisted locally.

When the idea of limited entry was introduced, it was a long-foregone conclusion that Kodiak waters were "common property" for all state residents. It had been two hundred years since the Russians began forcing the island's indigenous residents away from their subsistence territories in order to harvest sea otters for Russian profit (Pullar and Knecht 1992: 3). Nearly a century of American commercial salmon processing, including countless violations of federal protections for Native subsistence (Moser 1899), operated under the premise that fisheries were the property of those best equipped to exploit the resource. This "Freedom of the Seas," as codified in Alaska by limited entry, both grants Natives an equal chance to compete in the modern industry of fishing, and allows Natives to lose the legal right to make a living from commercial salmon fishing.

Territorial control of local salmon areas is an idea familiar to Old Harbor fishermen that hails back to aboriginal arrangements for management, and over the years it has been quite successful. A salmon "reservation" for Afognak Natives proposed early in the days of commercial fishing (Stone 1892) was untenable; it is doubtful that Old Harbor fishermen with highly capitalized gear would agree to limit themselves to a small local area, or that non-local fishers would concede the official state common property waters of the ADF&G Eastside District. However, in a scenario such as a skyrocketing of fuel costs wherein long-distance travel around the fishing grounds eliminated profits, different ownership arrangements for local territory might become more feasible. The assignment of a certain number of boats to each local fishing territory, based on the historical catch-

rates for that area, could be one way to re-localize Old Harbor's salmon fishery. Distributional issues within the territories would still have to be addressed.

II. Political Solutions

On a statewide level, limited entry is not likely to be eliminated. Partial solutions, such as corporate or community ownership of permits, have been considered by regulators and rejected for having more disadvantages than benefits. Loan and grant subsidies may appear to give some advantage to Natives and Alaska residents, but also have had the effect of inflating the permit market and raising the stakes for everyone.

The most helpful option in the realm of permit financing would be for the Old Harbor Native Corporation to establish a revolving permit loan fund for those with the greatest need. In order to do this, corporation priorities must change to favor employment of shareholders and village residents rather than to consider only the bottom line -- profits for shareholders. Afognak Native Corporation has started to make this transition with a program called "Dig Afognak" that develops cultural resources while training shareholders in archaeology, eco-tourism, and fostering Native pride. For Old Harbor, in-fighting must be worked out so that a loan program would be fairly accessible to all those who qualified.

The CFEC suggestion to form Native brokerages could also help to keep permits within the village and to enable residents to acquire new permits. Considering Old Harbor's history of exploitive informal brokering (reported by several residents), it would take a concerted effort to develop sufficient trust to make this happen. Such an effort would require cooperation between diverse interests in the community and would have to be motivated not for profit but for the benefit of the community as a whole. A regional coalition of Native fishermen with similar interests could be successful. As suggested by CFEC's Dinneford (1994), an effective mechanism for keeping permits in the villages would not have to be a fully professional brokerage; an open exchange of information would go a long way towards this end.

CFEC and other Native and fisheries organizations could be called upon further to help re-vitalize rural fisheries. Entry Commission officials said that they were willing to give workshops and to provide educational assistance in permit and financing related areas, but they have never been invited by Kodiak area fishermen. This may reflect a flaw in the agency's outreach program, but in the current budget slump they cannot be expected to do much more.

As was proven in the 1994 Board of Fisheries public hearings, rural Native voices are powerful when they speak out. As to the entire question of the survival of lifestyle fishing, here is the conundrum: in order to preserve traditional livelihoods and lifestyles, it may be necessary to speak out or to act in distinctly untraditional ways. But the potential trap of ANCSA, having to play *well* by western corporate rules in order to have control of resources for Natives, is not a foregone conclusion in any area of Native politics. Within the for-profit corporation, AFN, the traditional tribal council, KANA, and RurALCAP, there are opportunities to pursue community and resource issues on local terms, with good potential to solve problems. Networking with Native groups facing the same issues in other parts of the state through these organizations is one option to pursue to strengthen the Native political voice that was identified by an Old Harbor man; other tools await discovery.

Non-Native organizations such as city and borough governments, Fish and Game, the Board of Fisheries, and the Kodiak Island School Board vary in their receptivity to Native and rural concerns. All are equally responsible by law to rural and urban constituents, although Natives may have to be considerably more assertive to communicate certain needs. This is particularly important with the school board, as education becomes more vital in the business of fishing and in providing alternatives to seasonal employment.

III. Social Options

Disinterest in fishing, lack of hope of ever getting a permit, dishonesty in crew share payments and abusive working conditions all threaten the future of a village-based fishery. If

young people do not keep fishing, Old Harbor's cash economy will deteriorate -- but that may not be the worst thing for the village. Few people would choose to return to a traditional subsistence lifestyle, and it is unreasonable to think that divorce from the world economy is possible. In any case, social problems can be addressed by keys in the past, including pride and identity, and reliance on local resources and community. Political and economic means to mitigate the problems of permit acquisition, debt, and transfers can improve the situation to some degree. Limited entry may be a convenient culprit, but is just one of many external factors that are presently outside of the control of rural residents.

Many solutions depend on economics, but also on social factors within the fishery and in the village -- the two being to a degree inseparable. Kodiak Island Natives have suffered through 250 years of hardships that began with the first Russian contact (Pullar and Knecht 1992): from massacres and epidemics, massive inundation of foreign cannery laborers and over-fishing of subsistence salmon streams, to the current epidemic of alcoholism (ibid.). There is a strong Native pride movement among Kodiak Natives, and it is making some headway. Along with self-respect, there is a need for mutual respect of everyone in the community. Cheating and "nigger-treatment" undermine a strong fishery and a healthy community.

IV. Local Action within a Global Framework

The license limitation system is one element of an increasingly complex and inter-woven market economy that is altering the nature of commercial fishing and in turn the lifestyle of fishing villages. Natives have occupied Kodiak Island for around 6,500 years (Knecht 1992), with some of the oldest documented sites being on Sitkalidak Island near Old Harbor. During these thousands of years, the people survived on the sea: whales, seals, sea lions, halibut, and -- primarily -- salmon.

The people of Kodiak always traded widely, warred with neighbors, and continued to survive on salmon. Today's sphere of influence and interference between Old Harbor

and the rest of the world is boundless, but ultimately, local resources help to define boundaries and to establish identity. Nearly decimated salmon stocks have rebounded to yield tens of millions. And Old Harbor fishermen will find a way to keep fishing for generations to come, whether it is harvesting delicacies for Japanese and American consumers or filling freezers, drying racks, and smokehouses at home.

Appendix A: Alaska Federation of Natives Board Adopts Policy Guidelines for Research

As reported in the International Arctic Social Sciences Association (IASSA) Newsletter, Spring 1993 (Caulfield 1993)

By Richard Caulfield, Department of Rural Development, University of Alaska Fairbanks, Fairbanks, AK 99775, USA.

At its quarterly meeting in May, the Alaska Federation of Natives (AFN) Board of Directors adopted a policy recommendation that includes a set of research principles to be conveyed to scientists who plan to conduct studies among Alaska Natives. The principles will be sent to all Native organizations and villages in the hope that compliance by researchers will deter abuses such as those committed in the past which lately have come to light. Alaska Natives share with the scientific community an interest in learning more about the history and culture of our societies. The best scientific and ethical standards are obtained when Alaska Natives are directly involved in research conducted in our Communities and in studies where the findings have a direct impact on Native populations. AFN recommends to public and private institutions that conduct or support research among Alaska Natives that they include a standard category of funding in their projects to ensure Native participation. AFN conveys to all scientists and researchers who plan to conduct studies among Alaska Natives that they must comply with the following research principles:

- Advise Native people who are to be affected by the study of the purpose, goals, and time frame of the research, the data-gathering techniques, the positive and negative implications and impacts of the research.
- Obtain the informed consent of the appropriate governing body.
- Fund the support of a Native Research Committee appointed by the local community to assess and monitor the research project and ensure compliance with the expressed wishes of Native people.
- Hire and train Native people to assist in the study.
- Use Native languages whenever English is the second language.

- Guarantee confidentiality of surveys and sensitive material.
- Include Native viewpoints in the final study.
- Acknowledge the contributions of Native resource people.
- Inform the Native Research Committee in a summary and in non-technical language of the major findings of the study.
- Provide copies of studies to the local library.

Appendix B: Questionnaire

Name_____Commercial Fisherman?_____Wife_____

other_____Did your father fish commercially?

Years Fishing: Skippering yrs_____crewmember years___Permit holder years___

Yr received permit____Yrs fished before 1975_____

Areas fished _____

Original holder___gift___from whom_____relationship_____

Or how financed_____

Does fishing under Limited Entry protect the fish resource in a manner that provides a sustainable economy to all villagers?

What does limited entry mean in your life and to Old Harbor?

Is it a good system?___ Is it good or bad for Natives?___Why?

Does LE protect the resource sufficiently?

Jobs?
Has the role of women in fishing or in the family changed? Are the men away from the village more in summer now?

How and when did you get/not get or lose your permit?

Why did you get or not get a permit?

What are the alternatives?

How are the problems of LE, such as multiple children vying for a father's single permit, resolved in OH?

Can someone compete as a professional commercial fishermen, without either owning a boat or permit?

Notes

LONG INTERVIEW

Politics/relationships

How crew relations changed under a system wherein the position of skipper was made rigid (he being the permit holder had to be on the boat at all times) and terms of competition between fishermen was formalized. I will research how the Old Harbor fleet fit into the total island fishing fleet, and how has that changed since Limited Entry.

Why did those that sold their permits do so, and under what circumstances? Would their lives be different if they had not? What do you consider to be your resource-harvesting rights and how do you feel about those rights becoming transferable commodities on an open market?

What if any was your involvement in the process of conversion to LE? How do you view Limited Entry now?

Is there is a difference in attitudes and actions in the fishery between local Native Have affects of LE been different for Native and non-Native fishermen?

Does one group demonstrate more far-sighted "ownership" of the fishery? Has this changed since the Limited Entry system went into effect?

How village relationships have changed since 1975 and the imposition of Limited Entry, including who owns boats, crew relationships, women entering the fishery and time fishermen spend away from the village?

How has Natives' relationship to the packers changed since the early days of the fishery? What is it like now?

Relationship to Fish and Game?

To other fishermen?

Has LE Permit transfer activity been well known around the village? between Native and non-Native fishermen, fishermen and regulatory agencies, political pressure exerted by fish processing companies, and local strategies for fishing success (such as village alliances in fishing, control of local area) and direct marketing.

On a regional level, is Native participation in public hearings and other management input different in nature from that of non-Native fishermen?

What is village involvement with the AFN and other regional, state and federal Native groups concerning resource issues?

How can Native people be included in decision making in the community and at regional and higher levels of politics and policy-making?

Exxon oil spill prevented the salmon seine fleet from fishing for the 1989 season; what were the ramifications for the village?

ECONOMICS

Did the overall number of fishing jobs or skippering jobs change because of the new system? Did total fishing income coming into the village change?

Do fishing revenues fund other community development? What are the non-commercial benefits of boat ownership, e.g., for haulage or subsistence harvest?

How does the economy of the commercial fishery relate to subsistence pursuits?

The economy of fishing: cost and efficiency of large boats, reasons for large investments, marketing, capitalization.

Market economy changes on fishing economy?

Is anyone left out by Limited Entry, and is this likely to change with the current economic slump?

HISTORY

Traditional subsistence sources and areas will be identified before documenting the arrival of commercial fisheries. A historical summary of Russian salteries at Ugak, the nearby Shearwater cannery, the processor at Port Otto, and island-wide and global development of the salmon fishery will be presented. For the commercial fishery. Who worked when in fishing and processing, what gear types were used, who owned the gear, who was hired, how was subsistence integrated with commercial fishing, and which fishing areas were exploited by Old Harbor fishermen.

Appendix C: Table A, Average Permit Price by Year with Sources for Figure 2

Gear Type	1976	1978	1980	1982	1983	1984	1986	1988	
Kodiak Purse Seine	$9,736	$47,611	$68,625	75,511	$69,903	61,265	36,151	66,491	$1
Kodiak Beach Seine	$5,500*	$29,250			**				$36
Kodiak Set Gillnet	$3,900	$19,800			$57,033				$1(

Sources: CFEC 1995d; Tingley and Dinneford 1993; Thissen 1994; CFEC 1976; CFEC 1978.

*average not available; given is price after 1976 defeat of limited entry repeal vote, when prices generally increased

**less than 4 permits transferred

***based on 1989 price

1 based on average price of 2 permits sold by Kodiak broker

2 estimation by Kodiak broker; allowable state loan at $39,000

Appendix D: Explanation of Quartile Tables (CFEC 1996c)

Quartiles are defined as follows. Permits (excluding educational, hatchery, test, and reservation) are ranked, highest to lowest, by permit holders' estimated gross earnings in the fishery. The highest quartile contains the highest ranked permits that account for approximately a fourth of the fishery total gross earnings aggregated to the nearest permit. The second highest quartile includes the next ranked permit holders that account for approximately a fourth of the fishery total gross earnings aggregated to the nearest permit. The remaining quartiles are defined in a similar way.

The number of permits column contains two numbers for each quartile. The top number is the actual number of permits (permits actually fished) in the quartile. The bottom number is the cumulative number: the number of permits in that quartile plus the number of permits in each higher quartile. The cumulative number for the lowest quartile shows the total number of permits with fishery revenues.

The percentage of permits column contains two numbers for each quartile. The top number is the actual percentage of all permits falling in that quartile. The bottom number is the cumulative percentage of permits in that quartile: the percentage of permits in that quartile plus the percentage of permits in each higher quartile. The cumulative number for the lowest quartile is 100%.

The total earnings column contains two numbers for each quartile. The top number is the actual total estimated gross earnings for that quartile. The bottom number is the cumulative estimated gross earnings for the permits in that, and the higher, quartiles. The cumulative earnings for the lowest quartile is the total gross earnings in the fishery. The percentage of earnings column contains two numbers for each quartile. The top number is the actual percentage of total earnings for that quartile. The bottom number is the cumulative percentage of gross earnings for that, and the higher, quartiles. The cumulative percentage for the lowest quartile is 100%.

The average earnings column contains two numbers for each quartile. The top

number is the actual average or mean gross earnings for the permit holders in that quartile. The bottom number is the cumulative average gross earnings for the permits in that quartile and the higher quartiles. The cumulative average gross earnings for the lowest quartile is the average gross earnings for the fishery.

Source: 1996 Commercial Fisheries Entry Commission, Explanation of Quartile Tables. Juneau Alaska.

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