

# **Social and Economic Assessment of Major Oil Spill Litigation Settlement**

- Final Baseline Report -

Prepared for

**U.S. Department of the Interior  
Bureau of Ocean Energy, Management, Regulation and Enforcement**

Contract Number 0103CT72619



by

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November 2010

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*Sociocultural Specialist, COTR*

U.S. Department of the Interior

Bureau of Ocean Energy Management, Regulation and Enforcement

Alaska OCS Region

**November 15, 2010**

Dear Ms. Campbell:

We are pleased to submit this final baseline technical report for the project titled "Social and Economic Assessment of Major Oil Spill Litigation Settlement." The report is submitted as specified under Contract Number 0103CT72619, which calls for in-depth and long-term examination of major oil spill litigation and settlement.

The attached report describes the rationale used to guide the overall project, the nature of the case study approach on Kodiak Island, and the nature of the database that has been developed to enable long-term monitoring and analysis of litigation and settlement processes associated with the *Exxon Valdez* oil spill (EVOS). Such research, monitoring, and analysis are in keeping with BOEMRE's proactive interest in documenting and planning for beneficial and problematic implications of oil and gas development on the nation's Outer Continental Shelf.

The attached final baseline report will be followed by a final project report early in 2011. The final report will include extensive analysis of the effects of the EVOS settlement, and summary information of utility to BOEMRE and other agencies involved in the management of natural resources available along the nation's Outer Continental Shelf and Exclusive Economic Zone.

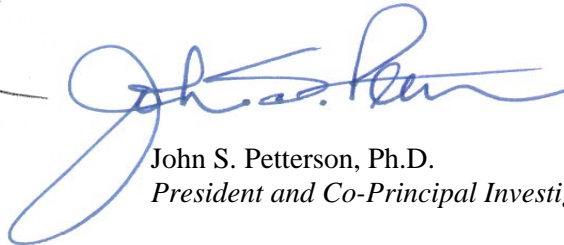
It has been a great pleasure to participate in this project and to contribute to the BOEMRE mission to further the base of knowledge needed to effectively administer development of oil and gas resources along the Outer Continental Shelf of Alaska and elsewhere in the United States. We wish to express our sincere thanks for your diligent oversight of this important project.

Sincerely,



Edward W. Glazier, Ph.D.

*Principal Investigator*



John S. Petterson, Ph.D.

*President and Co-Principal Investigator*

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This report does not, however, necessarily reflect the views or policies of the Bureau, nor does mention of trade names or commercial products constitute endorsement or recommendation for use.

### **Acknowledgements**

We wish to thank the many researchers and research participants who contributed their time and energy to this important project. It is our hope that their efforts will enhance understanding and mitigation of any deleterious human effects of oil spills or related litigation and settlement processes as these may affect communities in the United States and around the world.

We also thank the following researchers and reviewers for their gracious contributions: Courtney Carothers, Consulting Social Anthropologist, University of Washington; Lee Huskey, Consulting Economist, University of Alaska at Anchorage; William Nebesky, Peer Review Economist, State of Alaska, Division of Oil and Gas; Libby Stevens, Consulting Human Geographer; Stefanie Carlson, Consulting Data Analyst, State of Alaska, Commercial Fisheries Entry Commission; Paulo Morais, Consulting Marine Policy Specialist; Lance Kaufman, Consulting Demographer; Gregory Button, Consulting Public Health Specialist, University of Tennessee; Janet Cohen, Consulting Field Anthropologist, National Park Service; Rachel Mason, Consulting Field Anthropologist, National Park Service.

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### **List of Acronyms**

ABS	American Bureau of Shipping
ADCED	Alaska Department of Community and Economic Development
ADOLWD	Alaska Department of Labor and Workforce Development
AIOC	Amoco International Oil Company
ADF&G	Alaska Department of Fish and Game
ANCSA	Alaska Native Claims Settlement Act
ATC	Amoco Transport Company of Monrovia
BEA	Bureau of Economic Analysis
BMA	Bahamas Maritime Authority
BOEMRE	Bureau of Ocean Energy Management, Regulation and Enforcement
BP	British Petroleum
CEDRE	Centre de Documentation, de Recherche et d'Expérimentations
CFEC	Commercial Fisheries Entry Commission
CLC	Civil Liability Convention
COPE	Compensation for Oil Pollution
CPSS	Common Policy on Safe Seas Communication
CRISTAL	Contract Regarding an Interim Supplement to Tanker Owner Liability for Oil Pollution
DWT	Deadweight
EA	Environmental Assessment
EEC	European Economic Community
EEZ	Exclusive Economic Zone
EC	European Commission
EIS	Environmental Impact Statement
EP	European Parliament
ESMA	European Agency for Maritime Safety
ESP	Environmental Studies Program
EU	European Union
EVOS	Exxon Valdez Oil Spill

FEMA	Federal Emergency Management Administration
GDP	Gross Domestic Product
GRT	Gross Registered Tonnage
IACS	International Association of Classification Societies
IAI	Impact Assessment, Inc.
IFQ	Individual Fisheries Quota
IFREMER	French Maritime Research Institution
IMO	International Maritime Organization
IMCO	Inter-Governmental Maritime Consultative Organization
IOPC	International Oil Pollution Compensation
IOPCS	International Oil Pollution Compensation Supplementary
IRA	Indian Reorganization Act
ISER	Institute for Social and Economic Research, University of Alaska
ITOPF	International Tanker Owners Pollution Federation Limited
KMA	Kodiak Management Area
LOF	Lloyd's Open Form of Salvage Agreement
MARPOL	International Convention for the Prevention of Pollution from Ships
MMS	Minerals Management Service
MOU	Memorandum of Understanding
NAICS	North American Identification Classification System
NEPA	National Environmental Policy Act of 1969
NGO	Non-Governmental Organizations
NOAA	National Oceanic and Atmospheric Administration
NPFMC	North Pacific Fishery Management Council
NPS	National Park Service
OCS	Outer Continental Shelf
OCSLA	Outer Continental Shelf Lands Act
OPA 90	Ocean Pollution Act of 1990
PIL	Petroleum Insurance Limited
POLMAR	La Pollution des Eaux Marines
SAI	Standard Oil Company of Indiana
SASEMAR	La Sociedad Española de Salvamento
SDR	Special Drawing Right
SF 2003	Supplementary Fund
SIC	Standard Industrial Classification
SOLAS	Safety of Life at Sea
STCW	Standards of Training, Certification, and Watchkeeping
TOVALOP	Tanker Owners Voluntary Agreement concerning Liability for Oil Pollution
TSD	Time-Series Decomposition
UNCLOS	United Nations Convention on the Law of the Sea
USCG	U.S. Coast Guard
VLCC	Very Large Crude Carriers

## - Social and Economic Assessment of Major Oil Spill Litigation Settlement -

### **1.0 Introduction**

The following pages constitute the final baseline report for the ongoing research project titled “Social and Economic Assessment of Major Oil Spill Litigation Settlement.” The project has been developed and sponsored by the U.S. Department of the Interior, Bureau of Ocean Energy Management, Regulation and Enforcement (BOEMRE) Alaska OCS Region<sup>1</sup> to further the base of knowledge needed to effectively administer development of oil and gas resources along the Outer Continental Shelf (OCS) of Alaska.

The specific intent of the research described herein is to enable comprehensive assessment of the social and economic effects of major oil spill litigation and disbursement of compensatory and punitive damage awards in areas affected by the *Exxon Valdez* oil spill (EVOS). A case study of litigation and settlement processes on Kodiak Island is being used to generate information and policy recommendations of utility for management of oil and gas resources in Alaska and elsewhere in the United States and abroad.

The project is being conducted by Impact Assessment, Inc. (IAI). IAI specializes in social science research applications in relation to human activities on the OCS and along the coastal zone of the U.S. The descriptive and analytical materials produced for purposes of this project are specified under Solicitation No. 0103RP72619 and Contract No. 0103CT72619. These materials are intended as useful resources for BOEMRE and other agencies mandated to enable safe and responsible oil and gas development and transportation throughout the Exclusive Economic Zone (EEZ) of the United States.

### **1.1 Administrative Background**

The BOEMRE is responsible for administering oil and gas development on the OCS per stipulations in the Outer Continental Shelf Lands Act of 1953<sup>2</sup> (OCSLA). The agency is also responsive to the National Environmental Policy Act of 1969 (NEPA), which calls for use of natural and social science to contribute to decisions associated with major environmental policy around the United States. Both NEPA and OCSLA authorize BOEMRE to conduct and sponsor studies of coastal and marine environments potentially affected by oil and gas industry activities occurring on the OCS. These environments include critically important human processes that are amenable to social scientific inquiry and that must be addressed through programmatic research and analysis.

In keeping with these mandates, BOEMRE Alaska OCS Region administers the Alaska Environmental Studies Program (ESP) to “define information needs and implement studies to assist in predicting, projecting, assessing, and managing the potential effects of oil and natural gas development on the human, marine, and coastal environments of the OCS and [adjacent]

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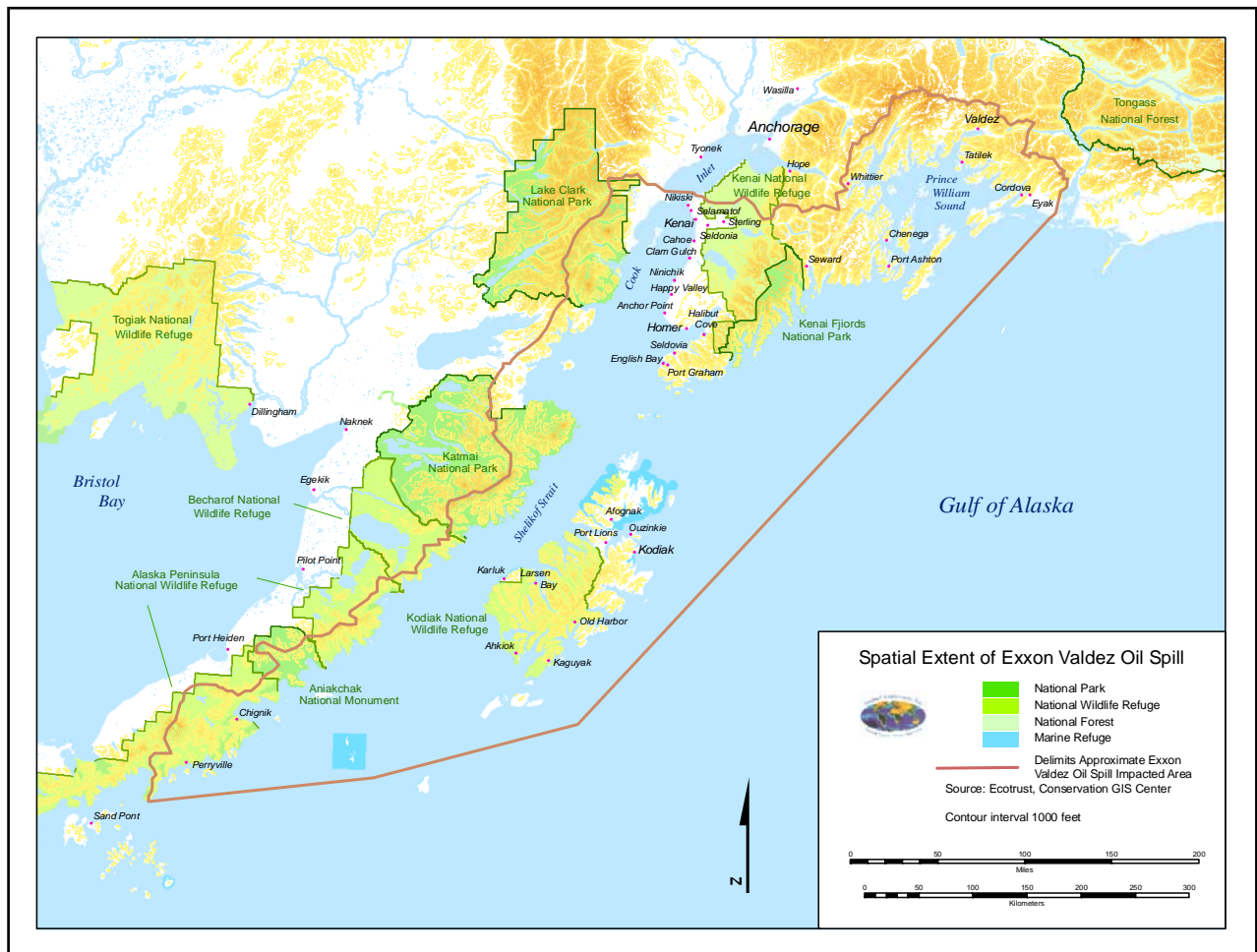
<sup>1</sup> Formerly the Minerals Management Service, Alaska OCS Region

<sup>2</sup> As amended through P.L. 105-580, December 29, 2000

coastal areas” (MMS 2002:1). Information from these studies is used for various decision-making and planning purposes, including those associated with agency Environmental Assessment (EA) and Environmental Impact Statement (EIS) documentation. Acting with this authority and with active attention to the long-term human implications of oil spills and related litigation and settlement processes, BOEMRE Alaska OCS Region ESP has sponsored and is administering the research project described herein.

## 1.2 Study Background

The supertanker *Exxon Valdez* foundered on Bligh Reef in Prince William Sound on March 24, 1989. The physical-environmental and human effects resulting from the far-reaching spill of some 11 million gallons of crude oil were unprecedented in the history of spill-related maritime accidents in the United States. Much research was undertaken to document the effects of the event, including a range of studies examining its social and economic impacts. An extensive literature addressing human dimensions of the oil spill was reviewed and annotated by IAI (1999); readers are referred to this bibliography for studies describing and analyzing the ways in which people in coastal Alaska were affected by and responded to the event and clean-up.



Map 1-1 Spatial Extent of the *Exxon Valdez* Oil Spill

Early litigation resulted in compensatory awards to commercial fishermen, subsistence practitioners, Alaska Native corporations, and other individuals and groups affected by the accident. A \$250 million settlement followed from the *Exxon Criminal Case*, which was adjudicated in October 1991: \$150 million of this was levied as fines; \$125 million of which was forgiven based on the corporation's efforts to respond to the spill. The remaining \$100 million was paid as restitution to state and federal government agencies. The *Exxon Civil Case*, also settled in October 1991, involved the distribution of \$900 million via a "Joint Trust Fund." Some \$684.1 million of the settlement was applied to restoration efforts managed by the EVOS Trustee Council beginning in 1992. The remaining \$215 million was applied to cleanup costs that had been borne by government agencies and Exxon. The *Alyeska Civil Case*, settled in November 1992, involved disbursement of \$29.7 million to the State of Alaska and \$2 million to the federal government.<sup>3</sup>

But the punitive phase of litigation associated with the *Exxon Valdez* oil spill (EVOS)<sup>4</sup> was protracted. Exxon Corporation continued to contest as exorbitant the award requirements set during class action punitive damages trials held in federal courts since 1994. Various corporate-level punitive damages cases heard concurrently with the Exxon case influenced the nature of arguments and appeals, and the length of time involved in adjudicating the case under due process.

The original punitive damages award figure of \$5 billion assessed in federal court in Anchorage in 1996 was found to be excessive by the Ninth Circuit Court of Appeals in 2001 and reinstated at \$4 billion in 2002. The amount was reviewed once again by the Ninth Circuit under newly developed U.S. Supreme Court punitive damages guidelines in 2003, and in 2004 it was ruled that an award of \$4.5 billion plus \$2.25 billion in interest was in keeping with the new guidance.

Subsequent appeal to the Ninth Circuit in December 2006 was based primarily on the arguments that previously-disbursed damage compensation awards mitigated the putative reprehensibility of certain of Exxon Corporation's spill-related actions, and that precedent in other corporate-level punitive damage cases indicated that damage awards in the Exxon case were excessive.<sup>5</sup> A three-judge panel upheld that rationale and reduced the award to \$2.5 billion, with interest.

On January 12, 2007, Exxon Corporation petitioned for a rehearing by the Ninth Circuit panel and for rehearing by the Court *en banc* to further reduce the settlement amount. The appeals

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<sup>3</sup> With unspent balances of the latter applied to the Joint Trust Fund.

<sup>4</sup> Grant Baker; Seahawk Seafoods, Inc.; Cook Inlet Processors, Inc.; Sagaya Corp.; William McMurren; Patrick L. McMurren; William W. King; George Norris; Hunter Cranz; Richard Feenstra; Wilderness Sailing Safaris; Seafood Sales, Inc.; Rapid Systems Pacific Ltd.; Nautilus Marine Enterprises Inc.; William Findlay Abbott, Jr., *Plaintiffs-Appellees vs. Exxon Mobile Corporation; Exxon Shipping Company, Defendants, Defendants-Appellants*. Signatory plaintiff categories include: aquaculture associations, area businesses, cannery workers, municipalities, Alaska Natives, Native corporations, personal injury, personal property, processor, real property, recreational use, subsistence, tender, and "oiled" and "unoiled" fishers.

<sup>5</sup> Based on precedent in *State Farm Mutual Auto Insurance v. Campbell*, 538 U.S. 408 (2003), it was argued that the ratio of punitive damages to "actual harm" was in the Exxon case too high. Actual harm was defined as the sum of the early compensatory damages verdict of \$287 million and Exxon's pre-trial settlements. The total harm thereby assessed was on the order of \$513 million.

were denied. A final appeal was heard by the U.S. Supreme Court, and in June 2008, it was determined that for a maritime case of this nature, punitive damages could not exceed compensatory damages, and thus the settlement was limited to \$507.5 million. The Supreme Court also determined that it would not decide whether interest on the settlement should be paid to the plaintiffs. In June 2009, the Ninth Circuit Court of Appeals decided that interest should indeed be part of the final settlement. Phased disbursement of the settlement and interest is expected to continue well into 2011.

### **1.3 Project Rationale and Parameters of the Settlement Award**

The baseline database described in this report was formulated based on the possibility that the total settlement award could be as large as \$6.5 billion, with significant implications for the lives of many of the roughly 32,000 plaintiffs, and their families and communities. It was known that individual awards would vary, however, depending on the demonstrable level of effect of the spill, as indicated, for example, by the extent of one's performance in the affected commercial fisheries prior to the event. Some settlement amounts would be in the thousands of dollars, as for minimally-involved crew members. But others could involve millions of dollars, such as those for Kodiak salmon seine owner-operators who were highly productive in the region prior to the spill and whose fishery underwent significantly detrimental changes after the spill event. Settlement allocation programs for this group of plaintiffs were developed primarily on the rationale of loss of income and way of life, and devaluation of permits and vessels. The formula and legal rationale for differential allocation of awards is complex. All settlement awards are subject to taxation.<sup>6</sup>

While the reduced settlement will not likely generate the kinds of changes that were possible prior to the Supreme Court ruling, the settlement and interest will nevertheless generate a variety of measurable impacts. Upon actual disbursement of the awards, it can still be expected that new opportunities will be available, with cumulative implications for the towns and villages in which such persons reside. In short, it was and is expected that settlement awards will enable individuals to act on the interests of self and/or those of the family and community. In reality, many of those who were originally affected by the oil spill reacted to the litigation process even prior to actual settlement. Some report having speculated on the amount and imminence of awards from the punitive case and making purchases or investments accordingly. Some have been directly involved in and/or have followed the case closely, expending time and resources in so doing. Two decades after the spill, plaintiffs' counsel report that at least 20 percent of those who were directly affected and involved in class action suits are deceased.

It is notable that social-behavioral reaction to settlement-related litigation and to broadly-distributed large-scale settlement awards is not well-known. In fact, there is a paucity of directly

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<sup>6</sup> Tax relief on settlement-derived income may potentially be achieved through the Exxon Valdez Oil Spill Tax Treatment Act (H.R. 1334 and S. 552). The Act provides that the plaintiffs or their heirs and dependents could: (a) average settlement income to reflect how fisheries income might have been earned had the oil spill not occurred or (b) make contributions to tax-exempt retirement plans. The rationale of the Act is that the oil spill led to diminished extent and value of seafood landings and subsequently to loss of income and opportunities to establish retirement plans.

related literature. The following pages constitute an initial report on a long-term study intended to contribute understanding to a little-known area of social inquiry.

The settlement in question has the potential to generate social, economic, and demographic effects in numerous communities throughout Southcentral Alaska. In fact, the potential scope of effect is such that the full range of communities and outcomes cannot be studied in full. A geographically-focused case study approach has therefore been advanced as means for delimiting, understanding, and representing an otherwise overly broad field of inquiry. In keeping with the geographic focus prescribed in the project solicitation, field research is focused on assessing the effects of the settlement in communities on Kodiak Island and throughout Kodiak Island Borough generally.

As noted in Table 1-1 below, which depicts settlement shares for each of the signatory plaintiff claim categories across the affected region, Kodiak is an appropriate location for study in that numerous fishery participants and Alaska Natives involved in the case are residents there. Plaintiffs in the Kodiak fisheries category will receive 20.1 percent of the total award.<sup>7</sup> The Kodiak salmon seine fishery was significantly affected by the spill, and will be allocated 14.5 percent of the total award.<sup>8</sup> Kodiak salmon set netters will receive 4.47 percent of the total. Note that some Kodiak-based fishery participants were involved in multiple fisheries in multiple locations and thus may receive multiple awards. Similarly, some plaintiffs may receive settlement monies based on their status as Alaska Natives affected by the spill, and also receive monies as participants in the oiled fisheries category and/or other categories. Table 1-2 below depicts the matrix of shares for plaintiffs in the oiled fisheries categories for Kodiak Island.

**Table 1-1 Matrix of Shares for Signatory Plaintiffs across Affected Region**

<b>Claim Category</b>	<b>Percent Share</b>	<b>Number of Plaintiffs in Category Who Reside on Kodiak</b>
Aquaculture Associations	1.910	1
Businesses	0.280	153
Cannery Workers	0.530	Number uncertain at time of writing
Commercial Fisheries Oiled	78.73	~2,500
Commercial Fisheries Unoiled	2.310	Number uncertain at time of writing
Municipalities	2.180	Kodiak Island Borough, Kodiak City, villages
Alaska Natives	6.640	~2,500
Native Corporations	0.650	5
Personal Injury	0.140	10
Personal Property	0.014	Uncertain at the time of this writing
Processors	2.099	5
Real Property	3.558	~250 oiled ANCSA land claims being filed by Alaska Natives
Recreational Use	0.008	~20
Subsistence	0.008	~100 non-Natives in addition to Alaska Native claims above
Tenders	0.940	~25
<b>TOTAL</b>	<b>100.0</b>	<b>~5,570</b>

<sup>7</sup> Plaintiffs in Chignik fisheries will receive 4.96 percent of the total award. Cook Inlet fishery plaintiffs will receive 24.3 percent, and Prince William Sound fishery plaintiffs will receive 29.4 percent. Actual dollar amounts to be disbursed to individuals in the various award categories cannot be confidently assessed until legal debate regarding the total award figure is fully resolved.

<sup>8</sup> Second only to plaintiffs in the Cook Inlet salmon driftnet fishery, who will receive 15.2 percent of the total award. Plaintiffs in the Prince William Sound salmon seine fishery will receive 11.75 percent of the total.



**Table 1-2 Matrix of Shares for Plaintiffs in Oiled Fisheries Categories: Kodiak**

<b>Fishery</b>	<b>Percent Share</b>	<b>Estimated Number of Claimants</b>
Dungeness Crab	0.034	25-35
Food Bait Herring	0.033	2-3
Miscellaneous Finfish *	0.029	~100
Miscellaneous Shellfish	0.017	35
Roe Herring Drift	00.17	~800 total
Roe Herring Seine	00.57	
Salmon Beach Seine	00.24	35
Salmon Seine	14.50	2,500
Salmon Set Net	04.47	500
Scallops	0.015	3-4
Area Total	20.10	~3,170

\*Primarily cod and pollock fisheries

Our analyses will draw on findings from research conducted throughout Kodiak Island Borough, in a manner that will enable inference and extrapolation of the effects of the settlement to other regions. Of practical significance to BOEMRE and its mandates, the research described herein has been designed to document and analyze the effects of the litigation and settlement sequelae of what was then the nation's largest oil spill to date. It will therefore illuminate the nature of an as-yet poorly understood but highly significant human dimension of oil spills in Alaska. Given that the social, economic, and environmental setting in question bears similarities to other maritime settings around the globe, the analysis may be useful for policymakers elsewhere in the U.S. and abroad.

#### **1.4 Principal Goal and Objectives**

The overarching purpose of this project is to contribute to the base of knowledge required for public officials to pursue balanced management of oil and natural gas resources in the federal waters of Alaska and other coastal regions of the United States. This is being accomplished through objectives associated with development of a large and multi-faceted database through which it will be possible to assess, monitor, and analyze the social, economic, and socio-cultural outcomes resulting from settlement of the EVOS punitive damages case and disbursement of the awards, while analytically controlling for the effects of other sources of change.

Using the combination of primary source and archival research methods reviewed later in this introductory chapter, the research team has compiled extensive information about social and economic trends and conditions in the study area. Despite the protracted nature of the litigation, the case has now been resolved, and the goal of the project must necessarily involve valid assessment of what fiscal empowerment has meant for the actors soon after settlement. But because disbursement is still occurring and insofar as reactions may occur over the long-term, the project also involves a longer-term post-settlement monitoring objective.

The baseline is limited to specific and readily measurable social, economic, and demographic variables deemed most useful for addressing the study research hypotheses. The hypotheses have, in turn, been formulated based on the needs of BOEMRE analysts who seek to understand macro-social changes in the study communities and region over time. Because the causal

stimulus for potential change in the study area is primarily fiscal in nature, indicator variables have been selected based on their sensitivity to rapid socioeconomic change. These constitute the focus of our methodological and analytical approach to the research problem at hand. Given the reduced settlement, only certain particularly sensitive variables will be considered in the final analysis.

In sum, the end goals of this project involve: (1) empirically-derived analyses of near- and long-term social and economic effects of oil spill litigation and settlement processes as exemplified in the EVOS case and as assessed on Kodiak Island, and (2) formulation of policy recommendations for mitigating potential problems associated with spill-related settlement processes and outcomes, as these may affect societies throughout the coastal and island regions of the United States in future years. The latter will draw not only on the EVOS case, but also on lessons derived from other large oil spills occurring in the U.S. and elsewhere.

### **1.5 Overview of Research Hypotheses**

Having completed a comprehensive study of the human dimensions of the *Exxon Valdez* oil spill in communities on Kodiak Island and in the remainder of the spill-affected region (Impact Assessment, Inc. 1990), research team leaders were, from the outset, familiar with the research sites and issues associated with the spill. Moreover, members of the team have been involved in ongoing social and economic research with fishery participants on Kodiak Island and across the larger region (e.g., see Impact Assessment 2004). Based on our background understanding of the study region and communities, various research hypotheses were developed to systematically examine the potential effects of the EVOS punitive damages settlement. The overarching hypothesis of the study was stated in the project solicitation; that is, that spill restoration and settlement monies would amplify social, economic, and demographic trends at household, community, and regional levels of analysis. This basic supposition drives development of a comprehensive baseline that is descriptive of trends and current conditions in the region.

A set of subsidiary hypotheses were developed and organized with regard to potential macro-social and macro-economic responses to the settlement as anticipated through our understanding of the region and literature of social change, and as expressed by public officials and fishery participants during the formulation of the research proposal. We note that: (a) the sub-hypotheses were conceived and expressed in general terms and are intended primarily to stimulate and organize meaningful and relevant investigation and analysis of the settlement, and (b) in the spirit of scientific inquiry, additional hypotheses have been developed and tested as understanding of socioeconomic conditions in the study region has grown, and as the empirical effects of the settlement have begun to emerge over time.

First, we hypothesized that unearned income resulting from settlement awards would affect the manner and degree of participation in commercial fisheries locally and in the Kodiak region generally. A basic uncertainty was whether such income will lead to increased investment in commercial operations or exit from commercial fisheries in the region.

Second, we hypothesized that settlement awards would influence the extent and manner of participation in subsistence fishing and hunting activities, with associated effects on related cultural activities. We anticipated that extensive unearned income may serve to reduce some of the tension experienced by Alaska Natives who historically have had to engage in some component of the region's workforce to simultaneously meet the economic demands of the household and perpetuate culturally significant subsistence hunting and fishing activities.

Third, we posited that the settlement would enable long-term residents to leave their communities for other parts of Alaska or elsewhere, thereby affecting a range of social and demographic conditions in Kodiak Borough. This may also be expressed in the inverse, since residents may potentially be able to live a more leisurely life in their home communities. As for each of our hypotheses, the amount of the settlement after taxes and the manner of its disbursement (i.e., graduated or lump-sum) has a significant bearing on behavioral response.

Finally, we postulated that spill-related litigation and settlement would amplify socio-political challenges within and across residents and groups of residents in the study communities. That is, we anticipated that financial empowerment would force difficult individual and collective decisions about the future of groups and communities across the region, and that these decision-making processes and their outcomes could cause new interpersonal and collective difficulties.

## **1.6 General Methodological Approach**

Our social scientific approach is indicated by the potential for macro-social phenomena that involve a source of rapid change. The vector of hypothetical social change of principal interest in this study is the punitive damages settlement and disbursement of associated monies. As reviewed in depth in subsequent chapters of this report, we have compiled a large database that is descriptive of recent trends and contemporary social and economic conditions in and across communities on Kodiak Island. These data constitute a baseline against which change resulting from the settlement may be described and explained. Potentially intervening sources of change, such as "rationalization" of the crab fisheries and the economic recession that occurred in the late 2000s, are also subject to documentation and monitoring, and will be analytically controlled to enable valid assessment of settlement-related effects.

Development of the baseline database required: (a) extensive review and compilation of information from a wide variety of archival sources, (b) observation-based fieldwork in the study region, (c) an ongoing series of in-depth interviews with knowledgeable fishery participants, elders, and local public officials (N=~150), and (c) focus group sessions conducted with government officials working in Kodiak Island Borough. Monitoring of conditions in the study area continues through use of the same methods.

Because certain information in the database derives from ongoing programs that are administered only periodically, the research plan involves use of an interim data collection strategy that is focused on acquisition of information from persons who are highly knowledgeable of relevant aspects of life in the study area. These data will complement periodically collected programmatic data as it becomes available. For example, we continue to monitor demographic

effects by consulting with local officials and the state demographer's office, and by directly observing demographic changes in the communities. The data and analyses resulting from this effort will be complemented with relevant data and analyses deriving from 2010 Census and/or from interim updates to the Census as these are made available.

Similarly, we continue to consult with knowledgeable persons and observe life in the communities to document and assess potential changes in local involvement in commercial fisheries and subsistence activities. Given the regularity of state and federal monitoring of commercial fisheries, data associated with such programs will readily inform our work. Acquiring current secondary source information about the nature and extent of local involvement in subsistence-oriented hunting, fishing, and gathering is more problematic in that such activities are only periodically monitored in the region.<sup>9</sup> Again, our strategy is to work closely with a select group of highly knowledgeable informants to update such information and to enable inference of post-settlement changes in the consumptive-oriented harvest of natural resources across the communities.<sup>10</sup> An important achievement of Phase One of this project has been development of rapport necessary for pre- and post-settlement consultation with such persons.

We note at the outset that individuals and households are important units of analysis in this study. This is so primarily because analysis of the perspectives and experiences of knowledgeable individuals provides insight into the collective macro-social processes that are the actual focus of the study. This is the essential value of the case study approach. The individual case, whether it involves an individual, a household, a community, or a specific situation, offers data and understanding about the larger social processes of which it is an indivisible element. The approach requires that sufficient cases are examined to ensure adequate understanding of variability.

Thus, in order to test hypotheses about macro-social and economic processes potentially associated with the settlement, we are examining trends, current conditions, and the potential for change for many cases at many levels of analysis. That is, we are investigating trends and conditions across Kodiak Island Borough<sup>11</sup> to aid in understanding the effects of the settlement across Southcentral Alaska and its affected communities; we are examining relevant aspects of life in communities on Kodiak Island to enable inference of settlement-related change across the larger Borough; and we are examining firms and households to infer change in and across

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<sup>10</sup> Household surveys are periodically conducted by the Alaska Department of Fish and Game in rural communities across Alaska. The most recent set of surveys was conducted in the Kodiak region between 2003 and 2005, thus providing a relatively recent benchmark against which change can be measured for certain key indicators. We are using social network sampling methods to identify persons who are highly knowledgeable of subsistence activities in the communities, and we will work with such persons after the settlement to update values for the indicators. Our sampling strategy is thus systematic and purposive and our queries will be such that another data point can be added to ongoing monitoring of important indicators such as the extent of community-specific participation in subsistence activities, per capita consumption of subsistence foods, and nature of interactive effects between involvement in commercial fisheries and subsistence activities.

<sup>11</sup> As borough-level data is the best available data for many of the economic and demographic variables anticipated to be valid indicators of settlement-related change, the baseline is particularly well-suited for enabling that level and those types of analysis.

Kodiak communities. Finally, we are working with many individuals who possess knowledge and expertise about families, communities, fisheries, and other relevant dimensions of life on Kodiak and across the larger region so as to enable inference at all levels of analysis.

## **1.7 Project Phasing and Component Methods**

This project has been designed to proceed in two basic phases. **Phase One** has involved compilation of a large dataset and monitoring system prior to settlement of the punitive damages case. As litigation was being progressing through the courts, we collected and developed a framework for organizing and managing extensive archival and primary source information about select social, economic, and cultural trends and conditions in the study area.

The first phase of the project involved five interrelated objectives. These were: (1) development of a research design and ethnographic field plan for conducting the research; (2) review and analysis of background literature and a wide range of secondary source data of relevance to the study, (3) conduct of extensive interview-oriented fieldwork with public officials, fishery participants, and others in the City of Kodiak and in the villages of Akhiok, Larsen Bay, and Old Harbor, (4) synthesis of the resulting primary and secondary source data into a coherent format of utility for analysts; and (5) completion of this Final Baseline Report, which describes the overall project and baseline and select trends and conditions in the study region prior to settlement of the punitive phase of EVOS litigation.

The framework and data system described herein enables monitoring and updates of key variables and indicators to a point in time just prior to settlement and disbursement. Per the variables reviewed in this report and information associated with a wide array of additional variables that constitute our now expansive dataset, a second round of primary source data collection has been undertaken as a central element of project **Phase Two**. That is, we have returned and continue to periodically work in the communities to systematically observe and document important social, economic, and demographic changes occurring after the settlement.

The research team has been monitoring relevant conditions and updating the database subsequent to delivery of this report and prior to and during initial disbursement of award monies. Settlement and initial disbursement initiated a rapid and significant response by our field staff, but our efforts have necessarily also accommodated phased disbursement and protracted individual and collective response to the settlement.

Phase Two has therefore involved and continues to involve ongoing use of existing and emerging archival data and appropriately-timed return to the study communities since the settlement. Fieldwork continues until sufficient information is gathered to enable comprehensive assessment of long-term local and regional social and economic change based on analysis of pre-settlement trends and conditions vis-à-vis conditions following from: (a) settlement of the case, (b) disbursement of the damage awards, and (c) other social and economic processes both related and unrelated to the oil spill and resolution of EVOS-related litigation.

## 1.8 Intent and Organization of this Interim Report

This report is intended to provide BOEMRE with a formal update on a long-term monitoring and assessment project. It is also designed to demonstrate the rationale and working utility of a baseline and monitoring framework for assessing social change associated with and distinct from the litigation and settlement processes.

We note, however, that this report does not itself constitute the baseline or monitoring framework. Only some of its elements and data for certain time periods are presented and described in the following pages. In reality, our database is too extensive to effectively describe in this venue, and much of it will undoubtedly be analyzed in ways that cannot be predicted at this juncture. Although data deriving from ethnographic research is used to support background description of the region, the intent here is in no way comprehensive ethnographic description of Kodiak Borough and its communities. Ethnographic description and a range of qualitative and quantitative analyses have been particularly useful in describing and assessing the social and economic effects of the settlement during the second phase of this project.

It should also be kept in mind that the ultimate intent of the project is not development of a baseline *per se*, but rather development of a valid assessment of the effects of the settlement and delineation of useful policy recommendations. The baseline and monitoring framework are needed to develop that assessment, but Phase Two of the project is equally or more important and we are now focused on additional factors, variables, and research questions that have emerged during the period following the settlement. These will be discussed in a forthcoming final project report.

In sum, the current report is focused on elucidating the logic and nature of the baseline and monitoring framework per the aforementioned research hypotheses. We describe the baseline and framework using specific variables and factors for specific points in time, but emphasize the flexibility of the framework and overall approach for updating with new archival data and for accommodating newly emerging factors, conditions, variables, and situations.

Following this introductory chapter, Chapter Two provides overview description of the study region. This is intended as context for elaboration of the aforementioned baseline and monitoring framework, which is initiated in Chapter Three. Chapter Four furthers the baseline by defining the most important sectors of the regional economy and identifiable trends in each. Chapter Five is focused on description of trends in Kodiak's critically important commercial fishing industry and implications of those trends for economic sectors across the study area. Chapter Six describes employment trends on Kodiak Island over recent decades. Chapter Seven describes select demographic and socioeconomic trends and conditions in the study region. Chapter Eight provides additional focus on pertinent conditions at the village level of analysis. Chapter Nine summarizes key project findings to date and presents additional context for conceptualizing the potential effects of the settlement and how these are examined during Phase Two of the project. References cited in the body of the report follow. Finally, Appendix A describes relevant aspects of the *Amoco Cadiz* and *Prestige* oil spills. This material is provided as comparative context and as an interim report on ongoing investigation of other major oil spills involving protracted litigation and complex social and economic consequences.

## **2.0 Overview of the Study Area**

This chapter provides a brief overview of the study region and communities. The primary intent of the material is to provide description of historical and contemporary context at a level of detail sufficient for conceptualizing the rationale and utility of the baseline and monitoring framework, description and examples of which begin in Chapter Three.

### **2.1 Physical Environment and Demographic Setting**

*Overview.* Kodiak Island is located in the southcentral portion of the Gulf of Alaska, about 250 air miles south of Anchorage. Encompassing about 3,465 square miles of land area, Kodiak is the second largest island in the nation after Hawai'i Island (the Big Island). The Kodiak Archipelago extends for some 177 miles along a northeast-southwest axis, no more than 25 miles south of the Alaskan Peninsula across treacherous Shelikoff Strait.

Given the moderating influences of the warm Japanese current, climatic conditions in this region of Alaska are considered temperate. Average lows in January are 30° F; average highs in July are 54° F. Rain, fog, and high winds are common. Average annual rainfall in Kodiak City is 55 inches, and average annual snowfall is 60 inches (Chaffin 1967).

Numerous bays, lakes, rivers, and estuaries transect Kodiak Island. Glaciers formed narrow fjords and valleys along the northwest coast. The east and southeast coastlines are commonly characterized by estuarine embayment. Sand and gravel beaches typify the western shorelines. Much of the terrain is heavily forested and mountainous. Maximum elevation is 4,400 feet at Koniag Peak. The landscape in the southern reaches of the island is characteristically wet, with extensive areas of grassy tundra. Seismic activity is extensive throughout the region.

Kodiak Island is sparsely populated and the remainder of the archipelago is largely uninhabited. As of the year 2000 Census, the City of Kodiak was home to some 6,334 persons. The six Alaska Native villages on Kodiak Island are much smaller. Ouzinkie was home to about 225 persons at the time of the Census. The population of Port Lions was 256 persons, the figure for Old Harbor was 237, Larsen Bay had a population of 115, Akhiok was home to 80 persons, and Karluk was home to only 27.

Personnel from the Alaska Department of Fish and Game (ADF&G), Division of Subsistence conducted household surveys in each of the villages during 2003. Census work associated with the survey generated the following population estimates (Fall et al. 2006), most indicative of declining population figures across the island: there were 73 persons in 15 households in Akhiok; 36 persons in 15 households in Karluk; 60 persons in 31 households in Larsen Bay; 190 persons in 76 households in Old Harbor; 204 persons in 69 households in Ouzinkie; and 191 persons in 71 households in Port Lions.<sup>12</sup>

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<sup>12</sup> IAI's work in Akhiok in 2005 indicated extensive in- and out-migration of the same otherwise long-term residents. Note that this project has benefited from the doctoral work of Courtney Carothers, which involved enumeration (in 2006) of 54 households and 85 residents in Larsen Bay, and ~100 households and 200 residents in Old Harbor.

More recent estimates generated by the Alaska Department of Community and Economic Development (ADCED) also suggest a trend of declining population figures for the villages. The agency estimated that 6,088 persons were residing in Kodiak City in 2005, and that 191 persons were living in Ouzinkie, 220 in Port Lions, 200 in Old Harbor, 97 in Larsen Bay, and 41 in Akhiok. The population figure for Karluk was again estimated as 27 persons.

The communities are separated by mountainous terrain. With the exception of the area around Kodiak City, local roads are not paved and tend to terminate at the periphery of the villages. Transportation to remote areas occurs by small plane or by boat.



**Kodiak Island**

The open ocean, straits, and more sheltered coves and fjords surrounding the Kodiak Archipelago are rich in marine resources. Kodiak-based fisheries are accordingly diverse and productive. Indeed, Kodiak City is consistently one of the most productive commercial fishing ports in the U.S. The port was ranked fourth in the nation in terms of commercial landings in 2005 (337.2 million pounds), and third in terms of ex-vessel value of those landings (\$95.8 million) (NOAA Fisheries 2007:7).

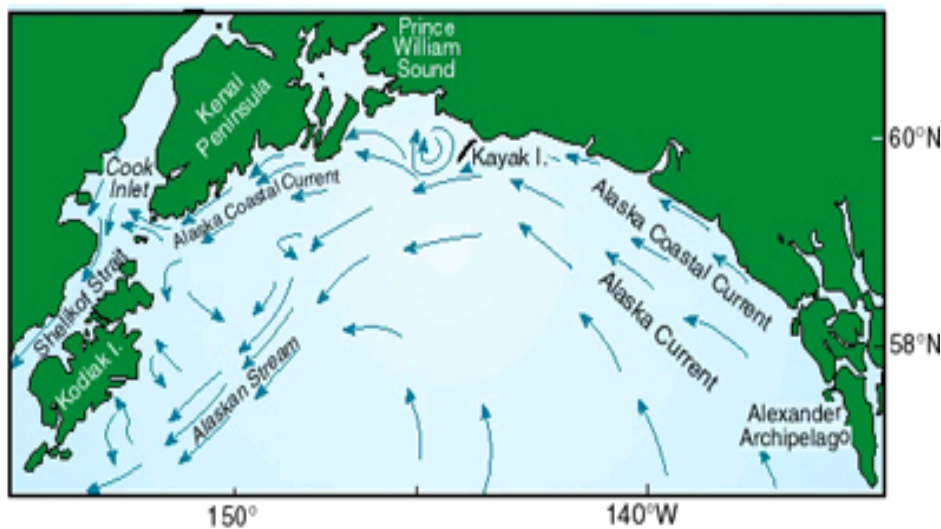
Subsistence-oriented fishing and hunting are important in cultural and dietary terms. This is especially so for Alaska Native residents, though many non-Native residents also engage in, and to some extent depend on, successful pursuit of wild foods. Introduction of various mammal species in the 20<sup>th</sup> century enhanced hunting opportunities as only river otter, ermine, red fox, tundra vole, and brown bear are endemic to the region. Introduced mammal species include Dall sheep, reindeer, snowshoe hare, red squirrel, beaver, Sitka black-tailed deer, Roosevelt elk, and mountain goats (Kodiak Island Borough Community Development Department 1983).



**Climatic Factors.** Large-scale decadal and longer-term changes in atmospheric pressure over the North Pacific can create rapid and significant changes in the marine ecological conditions around Kodiak. Several such regime shifts have occurred in the region over the past few decades. The first occurred in 1977 when the Aleutian Low intensified to generate a relatively strong Alaska Current, warmer average ocean temperatures, increased rainfall, and increased stability of the water column. The marine ecological effects of these changes included: an apparent doubling of primary productivity (Brodeur and Ware 1992); increased recruitment and survival of salmon, demersal fish, and flatfish; increased recruitment of rockfish; and decline of shrimp and forage fish populations (Anderson 2004). The latter effect may have contributed to a measurable decrease in marine mammal and seabird populations (Piatt and Anderson 1996).

Atmospheric pressure and oceanic regime shifts occurring in 1989 may have been associated with cooler and more variable temperatures in the Bering Sea and Gulf of Alaska. This, in turn, appears to have been associated with a decrease in primary productivity during the period. More recently, a general warming trend has been noted in the surface waters of the Gulf of Alaska (< 50 meters), and the 2005 trawl survey undertaken by NOAA Fisheries observed the highest summer water temperatures ever recorded in the region (North Pacific Fishery Management Council 2006).

**Oceanography and Indicators of Fisheries Productivity.** Two primary currents circulate in the Gulf of Alaska – the subarctic gyre in the central basin and the Alaska Coastal Current along the continental shelf. The Alaska Coastal Current bifurcates in the waters northeast of Afognak Island. One branch flows through Kennedy Entrance into Shelikof Strait. The other current flows along the south side of Kodiak Island (Stabeno et al. 2004).



**Map 2-1 Circulation Patterns around Kodiak and the Gulf of Alaska**  
(Image courtesy of Exxon Valdez Oil Spill Trustee Council)

Downwelling associated with coastal currents and gyres is suitable for groundfish fisheries in the region. These include fisheries for walleye pollock, Pacific cod, Pacific halibut, and sablefish (Francis et al. 1998). Total commercial landings of groundfish in the Gulf of Alaska increased from less than 50,000 tons in the 1950s to a high of 384,242 tons in 1965 (much of it rockfish),

and a near high of 377,809 tons in 1984 (much of it pollock). Pacific cod and pollock have continued to comprise significant proportions of landings across the Gulf of Alaska in recent years (North Pacific Fishery Management Council 2006), with some 100,000 pounds landed by residents alone in 2004 (see Chapter Five of this report). Salmon resources are abundant in the region, and as indicated throughout this report, they are central to social and economic dimensions of on Kodiak Island.

## 2.2 A Brief Social History of Kodiak Island

***Overview of a Complex Culture.*** Kodiak Island has been occupied by human groups for many thousands of years. Sites associated with what is called Ocean Bay culture were occupied at least 7,000 years before present (Saltonstall and Stefian 1999). Evidence suggests human presence in the larger Gulf of Alaska region occurred at least 10,000 years before present (Ackerman 1992). A succession of maritime societies have inhabited the Kodiak Archipelago over the millennia, each making widespread use of the region's extensive and varied marine resources. Known prehistoric cultural traditions include: Ocean Bay (ca. 4500-1400 B.C.), Kachemak (ca. 1400 B.C.-1200 A.D.), and Koniag (ca. 1200-1784 A.D.) (Stefian 2001).

The long history of society on Kodiak is a complex one. The people encountered by Vitus Bering in the mid-eighteenth century revealed cultural traits now known as Alutiiq, and most Alaska Natives residing on Kodiak today continue to assert an Alutiiq heritage. But that culture appears to have evolved in complex fashion through ongoing interaction between numerous Arctic and North Pacific peoples over the course of time. As evinced by archaeological data, Crowell and Lurhmann (2001: 25-29) assert that Alutiiq culture was influenced by Inuit peoples, Kachemak and Norton Traditions, and possibly by various people practicing Thule culture.

Alutiiq origin stories indicate influences from societies further north, and from Tlingit people to the south (Pinart 1873). Linguistic evidence suggests that Sugpiaq (Aleut) is closely related to central Alaska Yup'ik languages. Analysis of art, tools, clothing, systems of belief, and other Alutiiq cultural attributes and processes bear similarities to those of Yup'ik, Tlingit, and Unangan societies. Genetic evidence indicates relationships between Alutiiq, Inuit, Northwest Coast, and Unangan populations.

Such genetic and cultural influence and admixture is typical of all societies when considered over long periods of time. According to Crowell and Lurhmann (2001:29), a clearly distinctive (if evolving) culture developed in the Kodiak region at least a millennium ago. It was people of this cultural group who were first encountered by Russian and other explorers, and who called themselves *Qikertarmiut*, or people of the island, now know as the Alutiiq.<sup>13</sup>

Interactions with Russian explorers and fur traders occurred as early as the late 18<sup>th</sup> century. Russian sea otter hunters established the first non-Native settlement on Kodiak Island in 1784 near the present-day village of Old Harbor. Kodiak remained an important point of commerce

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<sup>13</sup> According to Crowell (2001:4), "Alutiiq" is the Sugpiaq term for "Aleut," which was first used by early Russian fur traders to describe indigenous peoples in the region. The term was eventually accepted by the native residents - who originally called themselves Supiaq (the real people).

for fur traders until the species was protected by international agreement in 1911 (Chaffin 1967). Russians brought various material items of utility for the original residents of Kodiak Island.

The history of interaction between Alutiiq peoples and Russians and others of European ancestry is laden with instances of violence and mistrust. Fall et al. (2001) assert that the early presence of Russians on the island significantly disrupted kin networks, social ties, and political alliances that were characteristic of pre-colonial Alutiiq society. Outsiders also transmitted new viral diseases for which the Alutiiq had not developed sufficient immunity. Epidemics took the lives of many. This challenging history is retold among contemporary Alaska Natives living on Kodiak and thus it bears some influence on contemporary interactions between Natives and non-Natives in and beyond the region.

Russians and other newly-arriving groups often tended to advocate the tenets of Orthodox Christianity. Some elements of this new system of belief became joined or syncretized with those of the Alutiiq, which emphasized (and to some extent among some Alutiiq continue to emphasize) the importance of the spirit world, spiritual relationships between humans and animals, mask symbology, ritualized dancing and feasting, shamanism, and reincarnation. Crowell and Leer (2001:213-214) assert that Russian Orthodoxy was embraced by the Alutiiq in part because its principles differed from those of non-Orthodox sects, which were being forced on them by Euro-Americans during the late 19<sup>th</sup> and early 20<sup>th</sup> centuries. Moreover, leadership from Orthodox dioceses in Russia was waning under conditions of diminishing funds, which allowed Alaska Native practitioners to organize and practice with some measure of autonomy in their home villages. Certain uniquely Alutiiq/Russian Orthodox practices are still common in the Kodiak region, including those associated with the Feast of the Nativity, the Eve of Theophany (Epiphany), and the Russian New Year.

***On The Significance of Alutiiq Heritage.*** We emphasize that the long pre-contact history of indigenous peoples in the Kodiak Archipelago is highly significant not merely as it relates to the social history and prehistoric record of life in Alaska. Rather, the history and the socio-cultural details of the indigenous past are also important elements of the contemporary heritage and identity of Alutiiq and other Alaska Native groups. While the meaning and experience of this heritage is difficult for outsiders to convey, it is clear that it is subjectively important for a variety of cultural, spiritual, political, and other reasons.

We do not attempt a full ethnographic account of historic or contemporary Alutiiq society in this report. The point being made in this overview is that contemporary Alutiiq people living in the study region identify closely with a truly ancient, if complex and ever-evolving culture. Only those qualified by birthright or rare circumstance enjoy access to that heritage, and thus the Alutiiq often view and present themselves as socially and culturally unique. The Alaska Native Claims Settlement Act of 1971 (ANCSA) formally empowered Alutiiq and other Alaska Natives in this regard. This has implications for the way in which such persons articulate with modern Euro-American society and its various constraints, opportunities, and influences.

As indicated by Johnson (2001:95), an indigenous heritage and indigenous rights to enact cultural practices are typically highly valued by Alutiiq people. Fieldwork in the study area bears out this perspective. Subsistence hunting and fishing are integral components of a larger

array of valued cultural practices in the Kodiak villages, and these will likely be dearly held by the Alutiiq when making decisions about their own future, including those associated with EVOS settlement or other potential sources of change:

Through generations of gradual cultural change and rapid transitions brought on by colonization and traumatic events, the Alutiiq people have remained adaptive and resilient while maintaining a strong connection with their distant past. They maintain the ability to decide who they are despite outsiders' attempts to decide for them. The right to decide who they are and what they will be called is clearly the exercise of self-determination.

***European and Euro-American Influences through Fishing.*** Whale hunters arrived in the Kodiak region in 1835 to develop what would be called the “Northwest right whaling grounds” (Chaffin 1967). The industry fell into decline by 1860 and was practically obsolete by 1880. An era of immigration followed the purchase of Alaska by the United States in 1867. Persons from Sweden, Finland, and Norway were among the first to arrive. Fishing and trapping were common forms of employment, and commercial fisheries developed rapidly in association with an abundance of marine resources available across the region.

The first salmon cannery was established on the Karluk spit in 1882. Seattle investors established four more canneries in the area by 1889. With a ready market for sockeye, the harvest correspondingly grew from about one million fish in 1887 to nearly five million in 1901 (Kodiak Chamber of Commerce 2006; Fall et al. 2001).

The population figures for Karluk reflect the growing fishing economy. In 1880, Karluk was home to around 300 persons. But by 1890, 1,123 persons were living in the area. About 495 persons were living in Kodiak City at that time. Other villages were sparsely populated in 1890, with about 20 persons living in Larsen Bay, 86 in Old Harbor, and 74 in Ouzinkie (Alaska Department of Community and Economic Development 2007).

Russian and Euro-American interactions with Native Alaskans initiated several changes in the sociopolitical nature of indigenous Alutiiq society. Marine resources that traditionally had been objects for reciprocal exchange and consumption were increasingly recognized for their value as export commodities. The attractions of the cash economy drew Alaska Natives into non-indigenous societies and economic entities, including trading companies, capital holding corporations, and processing firms (Fall et al. 2001:49-50).

Cannery owner-operators relied extensively on workers from China, the Philippines, Japan, and Mexico. Relatively few Alutiiq men were employed in the canneries, since they tended to prefer hunting, trapping, and actual harvesting of marine resources. Some reportedly did sell part of their catch to the canneries, and a few were employed building boats.

More significant economic relationships that developed between Alutiiq residents and cannery operators were noted in the 1930s, as some Alutiiq men operated cannery-owned commercial fishing vessels and some Alutiiq women began engaging in line work in the plants (Fall et al. 2001). Extensive commercial fishing activity in the summer months typically was followed by

subsistence-oriented hunting and fishing in the winter. Commercial trapping also supplemented household incomes during this period of history.

Alutiiq fishermen sought more independence from the canneries after World War II. But cannery owners tended to monopolize the salmon market via ownership and operation of many salmon traps and it was difficult for Alaska Native fishermen to competitively develop their own commercial operations (Colt 2000). A ban on traps was sought by independent operators and finally won in 1959, soon after statehood was established. Persons of Alutiiq ancestry worked in the Kodiak-based commercial fishing industry throughout much of the 20<sup>th</sup> century. Most also participated extensively in consumptive-oriented fisheries and maintained various elements of traditional life ways.

As fishery infrastructure grew in importance as the primary point of transshipment to other points in Alaska and to Seattle, the population of Kodiak Island gradually became concentrated in Kodiak City. By 1940, the population of Karluk had diminished to 192 persons. Ouzinkie was home to 253 persons, Old Harbor to 109, and Larsen Bay to 38. Some 864 persons were living in Kodiak City that year (Alaska Department of Community and Economic Development 2007).

***Evolution of Local Government.*** The political structure of pre-contact societies on Kodiak was based first on relationships between extended families, then upon tribal allegiances and hereditary chiefdoms. The political organization of post-contact Native villages is reflective of the influence of European agencies and institutions, representatives of which encouraged Alutiiq peoples to form village councils led by chiefs and elders, or elected representatives (Alaska Judicial Council 1999). The 1934 Indian Reorganization Act (IRA) codified federal recognition of these governing bodies and provided Native groups with a model for reorganizing the political structure of the village councils. Despite new empowerment, the authority of village councils was and is legally superseded by state and federal authorities.

Village-level council government developed in tandem with a style of government more typical of the lower 48 states. The latter was first engendered in 1884, when Congress passed the Organic Act allowing for an Alaska governor, establishment of a legal system, and institution of a federal court. The Alaska Territory Constitutional Convention adopted and ratified a Constitution in 1956. This became effective when the territory was formally inducted as a state in 1959. Government of the Kodiak polity was subsequently enacted via a complex hierarchy of village, borough, state, and federal political entities and relationships (see Chaffin 1967).

Kodiak Island Borough and other borough governments in Alaska govern via an elected assembly as in the manner of counties elsewhere in the nation. Kodiak Island Borough was incorporated in 1963. Daily operations are overseen by a borough manager. The City of Kodiak incorporated and elected its first mayor and city council in 1940.

***Overview of Land Holdings.*** The European concept and process of ownership of real property gradually replaced indigenous stewardship of the land and the characteristically flexible Alutiiq arrangement of moving villages in response to environmental challenges and availability of resources. Native villages persisted around the archipelago, though lands surrounding the best

anchorage typically became the property of non-Native persons with commercial interests, capital, and the ethos of private ownership of land. Federal presence was accelerated during World War II, as Kodiak became an important staging area for the Aleutian campaign and other North Pacific operations.

Today, five principal entities own land on Kodiak Island - the federal government, the State of Alaska, Alaska Native corporations, Kodiak Island Borough, and persons in the private sector. According to the Kodiak Chamber of Commerce (2006), private holdings account for only about 17 percent of total land area on Kodiak.

Distribution of land among Alaska Natives is based in the Alaska Native Claims Settlement Act (ANCSA). ANCSA was passed in 1971 after much struggle and negotiation between the Alaska Federation of Natives, federal and state government agencies, oil companies, and conservationists. Through a complex process of negotiations, 12 regional and more than 200 village corporations assumed ownership of some 44 million acres of land, including land in the Chugach National Forest, Kenai Fjords National Park, the Alaska Maritime National Wildlife Refuge, and the Kodiak National Wildlife Refuge (Mishler 1999).

ANCSA stipulated the transfer of some 675,000 acres of land to Alaska Native corporations in the Kodiak Archipelago. The Kodiak regional corporation is Koniag, Inc., which currently represents the interests of over 3,500 shareholders. Its extensive land holdings on Kodiak Island are being used for a variety of commercial, recreational, and cultural purposes. Afognak Native Corporation represents persons with ancestral ties to Afognak and adjacent islets. Its shareholders own some 160,000 acres of land. Natives of Kodiak, Inc. is owned by some 800 shareholders. It also maintains land holdings on Afognak Island and adjacent islets. Ouzinkie Native Corporation represents the interests of 410 shareholders and owns lands around the village on Kodiak Island. Akhiok Kaguyak, Inc. is the village corporation for Akhiok. As discussed later in the report, some 76,000 acres of its EVOS Land Trust holdings were liquidated in 2002. The Kodiak Tribal Council is the non-profit arm of the Sun'ak Tribal Council, which regained federal recognition in 2000. It represents interests of many indigenous residents living on Kodiak. Old Harbor Native Corporation represents the interests of some 350 shareholders and owns parcels of land around Old Harbor and Sitkalidak Island.

Native corporations own and maintain extensive lands in the Kodiak Archipelago, but a much larger land area of 3,400,000 acres remains under the jurisdiction of the federal government. Some 1.8 million acres of federal land in the region is managed by the U.S. Department of the Interior Fish and Wildlife Service.

The State of Alaska manages 639,000 acres of land on Kodiak. Holdings include five state parks totaling 56,448 acres, and much of the island's tidelands. Of note, the Department of Natural Resources leases portions of its tidal holdings to set netters in the region (Kodiak Island Borough Community Development Department 1983).

Kodiak Island Borough holds title to approximately 70,000 acres of land in the region, more than half of which is on Shuyak and Raspberry Islands. Most of these lands were acquired via a state

land grant entitlement in the 1970s. Sixty acres are designated for recreational use at 11 municipal parks on Kodiak Island (Kodiak Chamber of Commerce 2006).

**Historic Disasters.** On June 6, 1912 the volcanic eruption of Mount Katmai on the Alaska Peninsula covered Kodiak Island with 18 inches of ash, clogging salmon streams, filling lakes, and killing vegetation. Commercial salmon fishing and processing operations were obviated for much of that year. Numerous Alutiiq people from the Alaska Peninsula were transported to the village of Afognak. Pullar (2004) asserts that traditional knowledge about effective response to such events ensured the safety of Native residents. Although the eruption was more powerful than that of the 1883 eruption of Krakatoa in Indonesia, no lives were lost.

The earthquake and tsunami of 1964 destroyed 40 percent of the City of Kodiak’s downtown business area, and most of the city’s food supply. Damage to public and private property was estimated at \$22 million (Chaffin 1967). The fishing industry was particularly hard hit. Some 46 crab vessels were destroyed and 86 were damaged. Mishler et al. (1995) report that costs associated with losses of fishing vessels amounted to \$7 million in 1964 dollars. Canneries in Shearwater and Ouzinkie were also destroyed, as was much of the salmon fleet based there (Chaffin 1967). The village of Afognak was largely destroyed, and both Ouzinkie and Old Harbor required extensive rebuilding. Kaguyak villagers relocated to the existing community of Akhiok. There were 11 deaths in the Kodiak region (Mullan 2003).

### 2.3 Overview of Select Conditions and Trends: 1940-Mid-2000s

**General Demographic Trends.** The post-contact population of Kodiak Island grew slowly until the 1940s when America entered World War II (Fall et al. 2001). In the early 1930s, there were between 400 and 800 residents in Kodiak City. Between 1940 and 1950, military personnel and their dependents and associated contract workers constituted much of a growing population, which reportedly reached 15,000 persons. Infrastructure and services were necessarily expanded to accommodate the growth (Chaffin 1967).

**Table 2-1 Population Figures for Kodiak Island Communities and Borough: 1940-2005**

Community	Total Population by Year							
	2005 (est.)	2000	1990	1980	1970	1960	1950	1940
Akhiok	41	80	77	105	115	84	72	n/d
Karluk	27	27	71	96	98	129	144	189
Kodiak City	6,088	6,334	6,365	4,756	3,798	2,628	1,710	864
Larsen Bay	97	115	147	168	109	72	53	38
Old Harbor	200	237	284	340	290	193	121	109
Ouzinkie	191	225	209	173	160	214	177	253
Port Lions	220	256	222	215	227	0**	~	~
Kodiak Island	13,638	13,913	13,309	9,939	7,174	n/d	~15,000*	growing

Source: Alaska Department of Community and Economic Development (2007); \* Chaffin (1967); \*\*Community was established following the 1964 earthquake; n/d = no data

Some 15 percent of Borough residents reported Alaska Native ancestry as of the year 2000 Census. The percentage differed by community. About ten percent of persons residing in Kodiak City reported native ancestry. That figure was 94 percent in Akhiok, 96 percent in

Karluk, 79 percent in Larsen Bay, 86 percent in Old Harbor, 88 percent in Ouzinkie, and 64 percent in Port Lions. The year 2000 Census indicates that some 17 percent of Kodiak Island Borough residents have an Asian or Pacific Island ancestry. Nearly 60 percent of residents reported Caucasian status. Just over six percent of the population was of Hispanic origin. About 53 percent of the year 2000 population was male.

The average annual unemployment rate in 2006 was 8.4 percent. As of 1998, the vast majority of jobs in the Borough were provided through local seafood processing firms. A total of 1,952 such positions were actively filled across seven processing firms that year. The Kodiak Island Borough School District employed 394 persons in 1998, and the regional hospital employed 168 persons. Other major employers in 1998 included the City of Kodiak which employed 163 persons, Safeway Stores which employed 155, Space Mark which employed 105, and Kodiak Area Native Association which employed 102 (Fried and Windisch-Cole 1999:8).

Village population figures have fluctuated over the decades, partly in association with levels of participation and production in the harvesting and processing sectors of the seafood industry. There are some opportunities for work in local and state government agencies and in Native Corporation offices, but commercial fishing and processing have historically been critically important venues for earning income. Seasonal fluctuations in village populations are associated with seasonal variation in the harvesting and processing of seafood.

While job availability is important in the modern context, migration in and out of Alaska Native villages undoubtedly relates to a complexity of factors. As discussed elsewhere in this report, our data suggest that while some people follow employment opportunities and the attractions of urban life, this is often conditioned by deep-seated interest in traditional life ways, by relationships with family members who continue to reside in the villages, and by lingering attachment to rural Kodiak Island. Thus, many people return to the village setting after pursuing interests in Anchorage, elsewhere in Alaska, or outside the region entirely.

Several significant broad-scale demographic changes occurred in the region during the latter half of the 20<sup>th</sup> century. The first can be attributed to the 1964 earthquake, when residents of heavily impacted villages were forced to relocate to more habitable areas. Port Lions was established during this period. A second shift occurred as the population of Kodiak Island Borough increased by nearly 26 percent during the first three years of the 1980s. Yet another occurred as the population increased by another 15 percent between 1990 and 1991. Some analysts attribute growth in the 1990s to an influx of newcomers who stayed on Kodiak following work on the cleanup phase of response to EVOS (Mishler et al. 1995). Finally, the 2004 estimate of 13,276 persons indicates a five percent decrease in population from the year 2000 Census. Extensive discussion of local and regional socio-demographic trends is provided later in this report.

***Trends in Marine Fisheries.*** The harvest and processing sectors of the Kodiak commercial fishing industry gradually expanded during the 20<sup>th</sup> century to accommodate all five species of salmon. By 1966, 18 processing plants were operating in Kodiak City, with eight additional facilities in outlying villages (Chaffin 1967).



Participation and production in salmon fisheries were unrivaled until the post-World War II years when improvements in transportation infrastructure and venues of distribution rendered crab fisheries increasingly lucrative. A crab cannery was established in Kodiak City in 1949. This was the first Alaska facility to process king crab in commercial quantities. Most catch was taken in the Bering Sea. Landings increased from 60,000 pounds in 1950 to 21,000,000 pounds in 1960. Some 94,000,000 pounds of king crab were landed in 1966. The shrimp harvest also increased rapidly, from 32,000 pounds in 1958 to an average of 11 million pounds in the early 1960s. The fishery peaked in 1971, with production reaching 82 million pounds (Chaffin 1967). The prosperity initially enjoyed by the crab fleet was not long-lived. By the mid-1980s, participants were addressing a variety of challenges associated with diminishing stocks. The shrimp fishery suffered as well, and by the late 1980s production was down significantly.

The Kodiak-based groundfish fleet developed in part due to the establishment of the Exclusive Economic Zone, as specified in the Magnuson Act of 1976. This precluded the participation of foreign fleets in fisheries occurring from three to 200 miles offshore. The harvesting and processing sectors of the groundfish fishery are now mainstays of the Kodiak fishing industry.

The commercial fishing and processing industries are of central importance to the contemporary economy of Kodiak and thus downturns in marine fisheries bear widespread implications. While the salmon fishery remains in a state of transition, some fisheries are growing. For example, the wholesale value of the Kodiak groundfish fishery increased from \$23.5 million to more than \$34 million between 1986 and 2004. Halibut, perch, herring, sole, and flounder are also highly valuable resources. Salmon has long been Kodiak's primary fishery in terms of pounds harvested. Indeed, there are more than 800 salmon streams in the Kodiak Management Area.

Salmon comprised 36 percent of the total catch in 2004, with an ex-vessel value of nearly \$19 million dollars (Kodiak Chamber of Commerce 2006). But the fishery has been increasingly challenged through depression of prices and a diminishing market share resulting from an influx of farmed salmon in world markets (Gilbertson 2003). Participants report that this situation began to affect the fishery at about the same time as EVOS, its associated closures, and putative challenges associated with public perception of tainted seafood. Some key informants suggest that market conditions for salmon may be on the rebound in that Alaska salmon fisheries are now achieving a national and international reputation for high quality wild products. Improvements notwithstanding, prices remain well below historic peaks. The market price for Alaska sockeye was \$2.71 per pound in 1988, 53 cents in 2003, and 67 cents in 2006.

Sepez et al. (2005:202) report that 1,569 commercial fishing permits and 1,263 crew permits were issued to residents of Kodiak City during the year 2000. These include both state and federal permits. Nearly 958 permits were being fished that year. The total pool of commercial permits issued to residents included 119 crab permits, 285 halibut permits, 152 herring permits, 540 permits for other groundfish, 58 sablefish permits, 348 salmon permits, and 67 shellfish permits. The authors also discuss the importance of sport fishing and guiding on Kodiak Island, noting that 11,331 sport fishing permits were sold on Kodiak in 2000, 5,030 of which were sold to residents of Alaska. Table 2-2 depicts the overall scope of participation in marine fisheries across Kodiak Island Borough for the year 2000. Information about the nature and extent of Kodiak-based subsistence fisheries is provided elsewhere in this report.

**Table 2-2 Licensed Participation in Commercial and Sport Fishing across Kodiak Island: Year 2000**

Community	Comm. Permits Issued to Residents *	Resident Licensed Crew Members	Local Seafood Processing Firms	Sport Fishing Guide Businesses**	Sport Fishing Permits Issued†
Akhiok	6	12	0	0	0 / 0
Karluk	0	6	0	6	8 / 79
Kodiak City	1,569	1,263	11+	Numerous***	5,030 / 6,301
Larsen Bay	22	29	1	26	75 / 497
Old Harbor	72	63	0	12	17 / 101
Ouzinkie	48	35	0	2+	46 / 55
Port Lions	49	41	0	11	18 / 148
<b>TOTAL</b>	<b>1,766</b>	<b>1,449</b>	<b>12+</b>	<b>&gt;100</b>	<b>5,194 / 7,181</b>

\* Includes both state and federal permits; \*\* Includes guide operations for both freshwater and marine species; \*\*\*The authors do not specify the total number of sport fishing guides operating from Kodiak City; † Number of permits issued to residents / Number of permits issued to non-residents; Source: Sepez et al. 2005



**Kodiak Harbor, 2005**

***Trends in Fishing Activities among Alaska Natives.*** Rates of participation of Alaska Natives in Kodiak commercial fisheries has followed the general trend of decline that began late in the 1980s in conjunction with falling prices for salmon (concurrent with the oil spill). But subsistence fishing activities continue to be of central importance to Alutiiq and other Alaska Natives living on Kodiak Island. Important resources include razor and butter clams, Dungeness and king crab, salmon, trout, char, halibut, rockfish, seal, and various waterfowl. Some persons who were formerly employed in commercial fisheries are now using their knowledge of local resources to guide visiting hunters and anglers. Socio-cultural and economic dimensions of the interface between subsistence and related cultural activities, commercial fishing, and other forms of involvement in the capitalist system that is now predominant in the region are discussed in greater detail later in this report.

***Transportation Services and the Aerospace Industry.*** Safe and efficient mainland-to-island transportation services are basic to the functioning of the economy and daily life on Kodiak Island. Air transport services are centrally important in this island setting. The Kodiak State Airport supports cargo and passenger jet and propeller services via three active runways. The airport is federally-owned but is leased to and maintained by the Alaska Department of Transportation and Public Facilities.

The Port of Kodiak on Chiniak Bay serves as a vital point of consolidation and transshipment for cargo arriving from the mainland and heading to Kodiak City and the outlying villages. Two full service marinas and three deepwater piers provide moorage for up to 650 commercial, recreational, cargo, passenger, and cruise vessels (City of Kodiak 2000). Many of the island's deep-draft bays are ice-free year-round, affording additional possibilities for temporary mooring.

The Alaska State Ferry system is also an important mode of inter-island and cross-Gulf transportation. Its fleet now includes 11 vessels and provides daily passenger, cargo, and vehicle service to 32 Alaskan communities. In Southwest Alaska, the ferry sails from Kodiak to Unalaska/Dutch Harbor, making stops in several communities along the way. It also connects Kodiak to the mainland road system via Valdez, Cordova, Homer, Seward, and Seldovia.

The Kodiak Launch Complex, developed and maintained by the Alaska Aerospace Development Corporation, is the nation's first launch complex not situated on federal property. A variety of aerospace missions are conducted from the site for the U.S. Air Force and/or NASA, including launches of sub-orbital vehicles, quick reaction launch vehicles, and atmospheric interceptors. According to an independent consulting firm, the facility generated a \$20 million impact on the Kodiak economy, including \$16.3 million in purchases and hospitality, and \$3.6 million in payroll. Some 45 workers were employed at the site in 2005, and spending reportedly generated another 80 jobs on the island that year (Kodiak Chamber of Commerce 2007).

***The Increasing Importance of Tourism.*** Kodiak has long attracted visitors. Most come to fish and hunt, hike, camp, engage in whitewater rafting, observe wildlife, and learn about island culture. The six state parks and the Kodiak National Wildlife Refuge attract many. According to the Kodiak Chamber of Commerce (2005), about 30,000 tourists visited the island during 2004. This was 31 percent of the Southwest Alaska visitor market (Kodiak Chamber of Commerce 2005). Kodiak tourists contributed nearly \$22 million in direct expenditures in 2004. The figure was \$15 million in 2005 (Kodiak Chamber of Commerce 2007). The recent growth of the charter/guide fishing industry is particularly noteworthy. In 1994, third quarter receipts in this sector summed to about \$175,000; by 2004, receipts for the same quarter totaled nearly \$700,000 (Kodiak Chamber of Commerce 2006).

***Kodiak's Public Sector.*** Establishment of a naval base on Kodiak in 1939 introduced a new governmental presence to the island. The facility was converted to a U.S. Coast Guard (USCG) base in 1972. USCG personnel and their dependants, the vast majority of which are non-Natives, now constitute a sizeable portion of local population. In 2004, nearly 1,100 active duty personnel and 1,700 dependents were living at the base. Integrated Support Command Kodiak is the largest Coast Guard base in the country. The base is located seven miles from Kodiak City.

This 21,000-acre facility is also home to Air Station Kodiak, the North Pacific Fisheries Training Center, Loran Station Kodiak, Electronics Systems Unit Kodiak, a Coast Guard Investigative Services office, Communications Station Kodiak, a 17th District Public Affairs Detachment, and a Naval Special Warfare Detachment. Additionally, the *CGC Spar*, *CGC Storis*, and *CGC Alex Haley* are based here (Munoz 2005).

Administrative offices of Kodiak Island Borough, the Kodiak National Wildlife Refuge, the Alaska Department of Fish and Game, and several Alaska Native corporations are based in Kodiak City. Government employment and expenditures are important elements of the local and regional economy. On average, the public sector engages about 35 percent of the Kodiak labor force and generates about 15 percent of its total economic base. Sales tax generated \$7.3 million in revenue in 2004. Capital funds are also generated through fees on use of city docks; this generated nearly \$315,000 during 2004. Property taxes generated \$8.6 million in 2004.

## **2.4 An Overview of Kodiak and the *Exxon Valdez* Oil Spill**

The *Exxon Valdez* oil spill was a highly significant event in the history of Kodiak Island and its communities. We regress from description of more recent conditions to provide the reader with a basic understanding of the event and the way in which it and its sequelae have conditioned the experiences of Kodiak residents since 1989.

Poor weather and various human factors preceded movement of oil from the grounded tanker in Prince William Sound to shorelines as distant as Ivanof Bay along the Alaska Peninsula. By mid-April 1989, extensive portions of the Kodiak Island shoreline had been affected by mousse, tar balls, and/or sheen emanating from the site of the grounding. The oil spread from the northern end of the island, along the west coast, and through many passages, coves, and small islands that comprise the Kodiak Archipelago (IAI 1990c: 37). Commercial and subsistence fisheries were closed throughout the region during the first year of the spill and an extensive response effort was undertaken with the intent of minimizing damage to the region's natural resources.

***Clean-up and Mitigation.*** Not long after the spill first occurred, it became increasingly clear to some that wind and current could ultimately drive the oil toward Kodiak Island. Local government officials, concerned fishery participants, and other residents therefore formulated response plans prior to the arrival of oil in the region. Community meetings were held on a daily basis. Officials interacted with the public to discuss the progress of the spill and strategies for effective response, and residents verbalized their own concerns and perspectives. By the time Exxon became involved, an involved local response plan had been developed. Local fishing fleets were prepared to respond, lists of local volunteers had been generated, and plans for treatment of oiled animals had been made (IAI 1990c: 38-39).



**Oil Spill Response Workers on Kodiak, 1989**

But interviews with local leaders indicated that Exxon personnel and staff working for its clean-up contractor, VECO, did not articulate effectively with local response planning and actual response efforts. Communications challenges notwithstanding, City, Borough, and USCG officials worked with Exxon and VECO, and with outlying village representatives toward an effective cleanup operation (IAI 1990c: 40).

The challenges were immense. The oil was distributed more sporadically than in Prince William Sound, but this merely forced a spatially interrupted cleanup effort. Cleanup methods included: pressure washing of beaches and rocks, removal and bagging of oiled debris and wildlife, cleaning of rocks with rags, and various forms of bioremediation. Some 46 percent of adults residing in Kodiak Island Borough were employed in oil spill cleanup jobs in 1989 (Fall et al. 2001). Household incomes were typically higher during the spill year than during previous years but returned to pre-spill levels when cleanup ended (Fall et al. 2001: 298). It should be noted that many non-residents were hired as well, with some friction noted between local and non-local workers and administrators (IAI 1990d: 42).

***Select Commercial Fisheries Effects.*** Concerns about the potential effect of oil on the region's marine resources and its prospective consumers led to cessation of most commercial fishing activities in most locations around Kodiak Island. Because Kodiak Island was homeport for numerous fishermen who plied waters outside the area, some were also affected by closures in Prince William Sound, Cook Inlet, and along the Alaska Peninsula. Many fishermen leased their vessels and/or directly participated in the cleanup. Crew members were often displaced and also worked on the cleanup. Some processing firms also became involved in the response.

In short, the fishing-based economy of Kodiak shifted to spill response and pursuit of compensation for lost fishing seasons (IAI 1990c:47). Exxon eventually paid out \$300 million in compensation to more than 11,000 people and businesses around the affected areas of Southcentral and Southwest Alaska (ExxonMobil 2007).

Indicative of the effects of the spill on participation in the region's marine fisheries in general, salmon landings from the Kodiak region decreased by 11.3 million fish in 1990, a 60 percent departure from 1989, and a 42 percent departure from the five year average. The return equaled nearly half of the pre-season harvest projection of 14.5 million salmon (IAI 1990b:31).

Given significant historic rates of participation and production, the Kodiak salmon seine fleet was most significantly affected by the spill event and associated closures. Other affected fisheries conducted from and around Kodiak included: Dungeness crab, food bait herring, roe herring drift, row herring seine, salmon beach seine, salmon set net, scallops, various finfish, and various shellfish. Again, some Kodiak-based fishery participants were also affected by closures and pricing problems to these and other fisheries conducted elsewhere in the larger region.

Not all fishermen elected to take clean up work and therefore lost both fishing income and income that might have been derived from work on the spill. Others earned extensive income via spill response and also received compensation from Exxon. Economic effects were therefore varied and driven in part by personal decisions. Of note, some fishermen who did not earn substantial income from cleanup work later felt at a disadvantage for competition with those who were able to upgrade vessels and gear with income generated by cleanup work (IAI 1990c).

Native villagers on Kodiak Island typically engage in commercial fishing activities at a higher rate than do non-Native villagers. Thus, such participants were disproportionately affected by the spill event in their home communities (IAI 1990d: 58-59).

***Effects on Subsistence Practices.*** Subsistence hunting and fishing and associated cultural practice were and remain important aspects of life on Kodiak Island. This is particularly the case in the villages. In the early 1980s, nearly all Alaska Natives on Kodiak used subsistence resources, with average per capita consumption of 148 pounds of wild foods per year. Fall et al. (2001:75) report that 96 percent of Native persons residing in the spill-affected areas harvested subsistence foods, 90 percent received them, and 79 percent shared them with kin or others.

Following the spill, ADF&G personnel considered closing subsistence fisheries throughout the Kodiak Management Area. But given punctuated distribution of oil around the island, it was decided that subsistence fishers should be allowed to retain the flexibility to shift harvest efforts to unaffected areas, and thus not all areas were closed.

Subsistence activities were disrupted nonetheless. Most village residents reported decreased involvement in fishing for food because of the oil spill. For example, while approximately 83 percent of households in Akhiok, Karluk, Kodiak, and Larsen Bay had engaged in subsistence activities prior to the spill, only 68 percent reported doing so after the spill. Some 60 percent of respondents reported that the oil spill had a direct effect on their normal patterns of hunting and fishing (IAI 1990c: 28). Fall et al. (2001: 208) report that subsistence harvest declined by 50 percent on Kodiak Island during the year following the spill. This related to: strategic avoidance of affected areas, worries about the health effects of eating contaminated wild foods, and less time for traditional activities given participation in cleanup activities.



Oiled Beach on Kodiak Island in 1989

IAI (1990d: xiv, 52) reports that the result of diminished participation in subsistence activities led to a variety of corollary social effects, including less time spent with people from other households and diminished availability of foods for sharing with kin, elders, and members of other households in one's home village and elsewhere on Kodiak. Decreased involvement in subsistence activities reportedly also led to increased reliance on store bought foods (IAI 1990c:47).

***Initial and Ongoing Litigation.*** The first of many lawsuits were initiated against Exxon Corporation only two weeks after the grounding of the tanker in Prince William Sound. Eight months later, more than 150 lawsuits had been filed. The cases and claims were gradually settled out of court, adjudicated, and/or consolidated for future hearing (the course of legal outcomes is outlined in Chapter One of this report).

Many thousands of claimants gradually became involved in a protracted punitive damages suit, the settlement of which is the vector of hypothetical social change that is the principal subject of this report. The ongoing series of legal debates, appeals and settlements, and associated speculation, opinions, and promises of favorable outcomes have constituted chronic sources of stress for many of those involved, including a disproportionate number of residents of Kodiak Island. As Mitchell (1996) notes and our own long-term involvement in research of the spill and its human dimensions, the far-ranging and prolonged litigation 'mania' following from the oil spill should be considered one of its most significant social impacts.

The situation also made clear the status of Alaska Natives and the legal capacity of the group regarding stewardship of natural resources. As Fall et al. (2001:183) assert:

“besides creating stress . . . litigation has underscored the legal vulnerability of Alaska Natives in claiming compensation for damages to subsistence inflicted by the spill. Litigation highlighted the opinion that, although Alaska Native people may use natural resources for subsistence, ANCSA terminated their right to act as legal trustee for those resources.”

**The EVOS Land Trust Process.** The Exxon Valdez Oil Spill Trustee Council was formed with funds from settlement of the *Exxon Civil Case*. Principal objectives of the Council involve: (a) the funding of projects that would protect wilderness habitat in oil-affected and adjacent areas around the region, and (b) the purchase of such lands for purposes of conservation.

Several Alaska Native corporations and entities on Kodiak Island participated in the large parcel buyback program established by the Council. The Old Harbor Native Corporation sold 31,609 acres of land to the Council for \$14.5 million. This acreage was subsequently incorporated as part of the Kodiak National Wildlife Refuge. The Trustee Council also purchased nearly 119,000 acres from the Akhiok-Kaguyak Corporation for a price of \$46 million. Koniag Inc. sold 117,000 acres of land for \$26.7 million. The Afognak Joint Venture group sold 42,000 acres for \$70.5 million. Seal Bay/Tonki Cape sold 41,500 acres for \$39.5 million. Finally, Kodiak Island Borough sold 27,000 acres for \$42 million (Phillips 1999). Some 7,000 acres of land was also purchased through its small parcel buyback program, 2,923 acres of which were located in the Old Harbor area. Other small parcels were located near Larsen Bay, inside Karluk Lagoon, and along the Ayakulik River.

The sale of land was intended to support Trustee Council goals and benefit Alaska Native corporation shareholders. Mishler (1999) asserts that proceeds have helped offset losses resulting from downturns in the commercial fishing industry, though it is not clear to what extent the spill and associated events can be blamed for long-term problems in the region's fishery, such as those associated with pricing of salmon in the world market.

The land purchase program was not without problematic effects. The Akhiok-Kaguyak Corporation, for example, experienced much internal disagreement over the course of distribution of buyback proceeds. Shareholders eventually took the corporation president and board to court to contest the proposed dividend amount. The board eventually settled out of court and the president was subsequently voted out of office (Mishler 1999). As discussed later in this report, Akhiok-Kaguyak Corporation later liquidated much of the \$36 million trust fund that had been part of the civil settlement. This resulted in two large settlements (~\$100,000) to individual shareholders and a range of subsequent changes, including, among others: increased mobility and hence increased in- and out-migration of residents; changes in patterns of employment, including temporarily diminished participation in commercial fishing (see Chapter Five of this report); and changes in spending patterns, including increased investment in materials for subsistence hunting and fishing and high rates of participation in those activities.

**Social Remediation.** According to Fall et al. (2001: 288), litigation settlement monies have led to some degree of economic and cultural revitalization in Alutiiq villages, including those on Kodiak. In many cases, village corporations and shareholders used settlement monies to improve infrastructure and other aspects of community life. For instance, some funds were applied to the *Kodiak Youth Spirit Camp* to educate youth about traditional Alutiiq culture, and to the *Kodiak Island Youth Area Watch*. The latter is an "ongoing community involvement project designed to engage students in projects with goals aligned with the general restoration efforts of the Trustee Council" (Schneider 2003). Fall et al. (2001: 300) further assert that while revitalization was being undertaken long before the oil spill and associated settlement monies arrived in the region, those monies do in some cases appear to have furthered those efforts.



### **3.0 Overview of the Settlement Baseline and Monitoring Framework**

This chapter describes the rationale and methods used to develop the baseline, monitoring, and assessment framework for examining the social, demographic, and economic effects of settlement awards on Kodiak Island. As discussed in Chapter One, the research methods and analytical approach are designed to examine long-term local and regional social and economic change resulting from: (a) settlement of the case, (b) disbursement of damage awards, and (c) other social and economic processes both related and unrelated to resolution of EVOS-related litigation.

#### **3.1 Analytical Focus**

The primary focus of the following pages is: (a) demonstration of the rationale and methods used to develop the baseline and monitoring framework, (b) depiction of key elements of the baseline and framework, and (c) actual assessment of trends for select variables of interest as needed to understand the implications of new sources of change such as that associated with the settlement or other events and factors such as the current economic downturn. Note that the database is too extensive to be provided in its entirety and thus we present only those variables and factors that are at once most pertinent to the research hypotheses and useful for indicating social and economic change. These include variables and factors relating to: measurable trends in population and migration, labor supply and participation in the labor force, trends in the entry and exit of business firms on Kodiak Island, employment in various economic sectors, earned and unearned income, and trends in resident fishery permits and gear ownership.

Given limited availability of relevant historic information, we begin coverage of the baseline and trends assessment with data from 1980. Data is compiled for subsequent years through 2006, as availability allowed at the outset of the effort. Monitoring and updating of key variables has continued through the present and will be concluded when sufficient data has been collected to enable comprehensive analysis of social and economic effects specific to the settlement.

The assessment includes forecast of economic and demographic conditions in Kodiak Island Borough. For purposes of that assessment, the EVOS punitive damages settlement is treated as an exogenous economic “shock” to the study region and its communities. We note at the outset that the structure of the awards and disbursement process are fundamental to the nature and extent of local and regional social and economic effects. Taxation and potential measures for tax relief also condition those effects. Disbursements can be expressed in terms of a net present value, which in this case has the potential to increase the wealth of some residents. The manner in which award recipients respond to settlement-related income is the central focus of this study.

The nature and timing of primary source data collection during Phase Two of the project has been sensitive to the reality that the disbursement process has been phased (as will be described in our final report), and that some time must elapse before awards can work through the economic system, and before recipients can react in a way that can be systematically assessed. The final analysis is proving to be both challenging and important since micro- and macro-social response to distribution of large-scale settlement awards is not well known.

### **3.2 Rationale and Methodology for Local and Regional Baseline Assessment**

We are operating from the perspective that a meaningful characterization of baseline social and economic conditions should be both descriptive and analytical. In this case, it must be capable of assessing the reactions of social actors to economic incentives arriving through an exogenous and much anticipated source.

***Key Economic Principles Used in the Study.*** Review of some basic economic principles may be useful for clarifying our approach. First among these is *optimization*. The concept of optimization in economics holds that consumers will maximize well-being through participation in the labor force, through constrained consumption, and via savings. Under these parameters, at any point in time consumers are constrained by a fixed income “budget.” All else held equal, disbursement of punitive damage awards may fundamentally expand household budgets while generating opportunities for saving and/or consumption. This may, in turn, reduce the need for optimizing well-being through behavior such as engagement in the workforce. As such, settlement-related changes in baseline economic conditions and variability in behavioral response to those conditions at individual and household levels of analysis may collectively and variably affect the local and regional economy.

Theoretically, producers such as commercial fishermen and other small businesses engage in a rational, utilitarian strategy of optimization; in this case, maximization of profit. Under most circumstances, profit maximization implies cost minimization and efficiency. In the face of rising local demand for goods and services, the rational business operator will seek to increase commercial opportunities either by improving use of existing capacity or by investing in greater capacity to produce and sell more goods and services. Choice of path to profit maximization will depend on available capital, labor costs, and a range of subjective decisions, with the long-term outcome of those decisions generating variable implications for the local and regional economy. Again, settlement monies have the potential to affect those conditions, decisions, and outcomes.

The concept underlying *equilibrium* theory as originally advanced by Ricardian economists is that, all things being equal, stability is the natural state of the economy (Wilk 1996:48). Today, equilibrium theory is considered useful as a conceptual model for understanding consumption and investment patterns in the face of fluctuating economic conditions and factors. That is, while consumers or producers rarely experience sustained conditions of social, political, or economic stability; and market conditions, cost factors, and consumption and investment opportunities are always changing; the behavior of the actors in question can be assessed against a model that has them continually reacting to such fluctuating conditions in a way that at once maximizes well-being and achieves systemic equilibrium.

***Specific Hypotheses.*** We use the principles of optimization and equilibrium to develop specific hypotheses about how settlement awards will affect the Kodiak Island Borough economy and its citizens. The hypotheses are as follow:

1. Settlement award recipients will increase consumption and investment spending above prevailing levels;
2. Settlement award recipients on the cusp of entry to or exit from commercial ventures will invest or re-invest in seafood-related industries and sectors, in real estate, and in other basic- and support-sector business interests;
3. Settlement award recipients will spend more than in the past; this will increase the size of the local support sector;
4. Settlement award recipients will change their pattern of labor supply by increasing involvement in leisure activities and/or through more active pursuit of subsistence activities; and
5. Settlement award recipients will emigrate from Kodiak.

Formulation of a regional economic baseline as guided by the above hypotheses warrants several considerations, framed here as questions. First, what are the most appropriate measures of regional socioeconomic change in this case? Second, what methodological terms are required to establish a baseline capable of evaluating the effects of settlement award distributions? Third, is it reasonable to evaluate the regional economic impacts of settlement award distributions using an approach similar to that available for assessing the effects of significant and distinctly tangible “milestone” events such as those enumerated in Figure 3-1 below?

Our baseline analysis focuses on a regional economy and socioeconomic system characterized by highly productive commercial and subsistence fisheries, guided hunting and fishing opportunities, scenic and wildlife values, and significant Coast Guard and strategic defense activities.<sup>14</sup> In general terms, evaluation of changes in these sectors arising from specific macro-economic events or actions is appropriately measured through variables that are indicative of change in socio-demographic, employment, and income conditions.

***The Export-Base Model.*** A regional export-base model and analytical framework is useful for describing and assessing the basic economic structure and socioeconomic trends in resource-dependent regions such as Kodiak Island Borough (Haines 1997). The economic base model is used to measure the magnitude of short-term direct, indirect, and induced effects from exogenous events (shocks) or significant structural changes imposed on local or regional economies.

Direct effects pertain to a significant event or anomaly that typically arises from outside of the regional economy and results in subsequent feedback effects through the process of interlinked

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<sup>14</sup> The United States Coast Guard typically employs some 17 percent of the Kodiak workforce and the Kodiak Launch Complex provided about 45 year round jobs in 2005.

income and spending. Injection of monies from clean-up efforts associated with large oil spills and widespread distribution of litigation settlement monies are examples of such events.

Feedback effects in this case include both indirect and induced elements of change. Indirect effects are driven secondarily by initial input of funds into an existing economic system. An example of this would be the spending of Federal Emergency Management Administration (FEMA) monies by local contractors and suppliers hired to respond to the after-effects of an earthquake. In the case of a litigation-related settlement award, monies will flow secondarily and indirectly through banks, real estate brokers, retail stores, and service providers such as travel and leisure firms. In the more customary case of a surge in export sector demand - such as for seafood products - indirect changes would involve increased demand for harvesting and processing capacity, logistics support services, and related employment.

Induced changes are generated by the additional wages and income received and spent in part or in total by the directly and indirectly affected entities described above. This secondary spending penetrates more deeply into support-service sectors and in turn generates economic expansion (or contraction) through successive cycles of income and spending. Taken together, indirect and induced effects are traditionally referred to as “multiplier” effects.

The regional export base model hypothesizes that change is initiated in the export-base sector of the economy - the part of the economy that is related to exogenous demand for raw materials or products such as seafood products, petroleum, timber, and tourism. As indicated above, the resulting expansion or contraction of local trade and service activities constitutes the multiplier process. The extent of the total direct impact of the exogenous shock is determined not only by its initial magnitude, but also by the nature of inter-industry relationships across a regional economy. For example, change in total rate of employment is typically related to a number of factors through various linkages and multiplier relationships. Such factors include extent of investment in local businesses and hence requirements for workers; the size of a given population hence demand for goods and services; subsidies available to supplement household income hence potential need for more or better job opportunities; and so forth.

Under the traditional export-base model approach, historic multiplier relationships are used to quantify the indirect and induced impacts of exogenous shocks. The baseline assessment developed for this study involves inferences about future economic change under slightly modified terms. Here, the export-base model conveniently separates support-sector income and employment from the basic and government sectors. The current assessment isolates the support sector because the effects of settlement awards are likely to be concentrated there - in the form of local consumption and/or investment. For example, settlement awards have the potential to affect the supply of seafood, in that some persons may leave their commercial fishing operations and others may invest in them.

Note that settlement awards are likely to affect support sector income and employment in a manner consistent with traditional multiplier mechanisms. But awards could also affect basic sector activity regardless of exogenous conditions in that sector. For example, distribution of settlement awards could be used to fund acquisition of gear and licensing for entry into certain fisheries where expected returns are marginal and would not, otherwise, justify such investment.

***Sequence of the Approach.*** In order to enable assessment of the effects of the distribution of settlement awards, we organize the baseline socioeconomic data into a time-series framework consistent with our modified export-base model. We then identify appropriate economic, demographic, and social time-series baseline indicators based on following criteria: (a) relevance to hypotheses, (b) degree to which quantitative and/or qualitative analysis is possible over time, and, (c) extent to which the data in question can be updated on a regular basis.

Next we evaluate seasonal and cyclical trends for select indicators. When analytically isolated, the time-series dimensions of the variables can provide a benchmark from which the effects of shocks or other anomalies can be assessed. The steps for accomplishing such assessment for the quantifiable indicators are as follow:

1. Per historic and contemporary patterns, project trend lines beyond date of settlement award income shock using a 95 percent confidence range (for quantifiable data);
2. Update baseline as new data become available;
3. Document the nature and timing of the income shock event as its manifests subsequent to the settlement; and
4. Compare projected baseline with actual time-series data.

Note that observed departures from baseline projections will be evaluated for a range of quantifiable variables. Factors and variables better suited to qualitative assessment of change will also be examined, as will the interactive effects of factors captured by both forms of data. For instance, we will examine decision-making processes about investment in marine fisheries and subsistence practices subsequent to settlement, and we will analyze the implications of those decisions for the larger social and economic systems that characterize the villages and region.

In sum, the general approach of this study is to compare measurements for empirically-derived time-series variables *ex post* settlement award disbursement, with baseline projections for those indicators. Baseline projections in this case are generated on the basis of conditions prevailing prior to settlement. Thus, the modified export-base model serves as a framework for examining macro-scale socioeconomic change, and component indicators are chosen for use in the model based in part on their capacity for testing the hypotheses of interest.

### **3.3 Review of Socioeconomic Conditions for Kodiak Island Borough and its Communities**

***Principal Formal Economic Sectors and Milestone Events.*** The commercial fishing industry is the largest sector in the Kodiak Island Borough economy. Public sector activity also plays a significant role in the regional economy. Borough government agencies, U.S. Coast Guard and other federal government agencies, transportation services, port services, support sector businesses, and land-based fish processing firms are all concentrated in Kodiak City. As is the case for Barrow, Bethel, Dillingham, Gulkana, King Salmon, Kotzebue, McGrath, and Nome,

Kodiak City is a center of commerce for smaller communities that are located in adjacent rural areas. Most residents of the villages and commercial fishermen working in the region periodically travel to or use Kodiak City for a range of services. Many also pass through Kodiak en route to Anchorage.

We begin discussion of historic events and trends via Figure 3-1 below, which summarizes per capita personal income and population figures for Kodiak Island Borough over the period 1969-2004. The figure also superimposes important institutional and economic events that have affected the course of economic development in the region. Note that numerous other events have occurred in more recent years; obviously these will be incorporated into the final analysis.

Among the most significant events during the period was establishment of the Magnuson-Stevens Fisheries Management and Conservation Act of 1976. The Act established the Exclusive Economic Zone (EEZ), which precluded fishing activity by foreign fleets in U.S. waters. It also called for the establishment of regional fishery councils to guide management of marine resources in the EEZ. The North Pacific Fishery Management Council interacts with NOAA Fisheries to manage fishing activity in the Alaska region. As such, 1976 was the beginning of an era of increased federal management of offshore fisheries in Alaska and elsewhere in the U.S., with ongoing implications for fleets based on and operating around Kodiak Island.

The American Fisheries Promotion Act of 1980 was also significant for Alaska and Kodiak-based fisheries. The Act led to establishment of joint ventures between domestic harvesters and foreign processing interests, with implications for the economic growth of groundfish fleets around the region.

Increases in general fund expenditures by the State of Alaska are associated with expansion of onshore and nearshore oil and natural gas production during the late 1970s and early 1980s. The oil and gas industry also stimulated spending in the private sector. Although specific local effects of the industry are difficult to identify in the Kodiak region, its generalized economic effects were significant for the entirety of Alaska throughout the period.

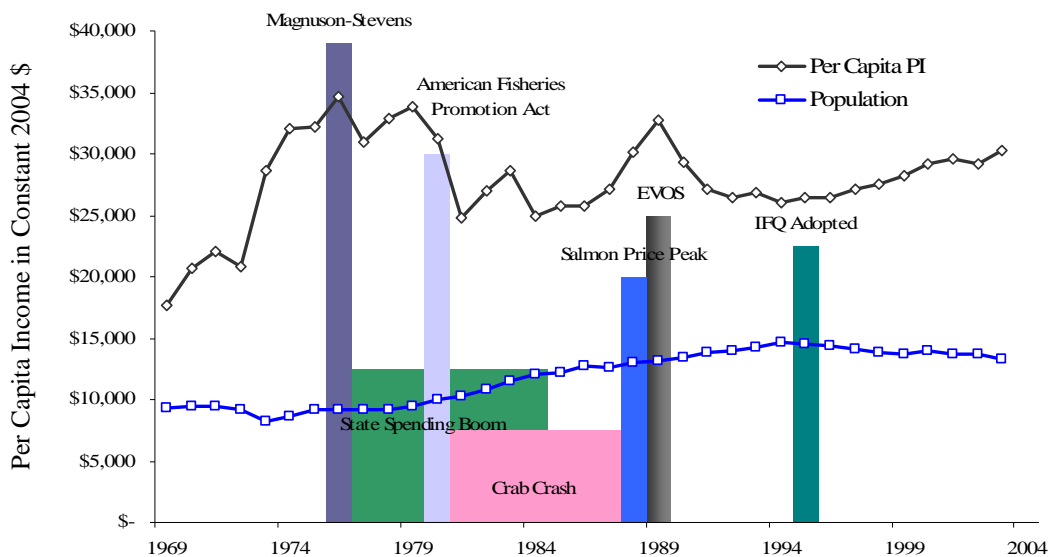
As noted in Chapter Two of this report, the Kodiak crab fishery began to diminish in significance in the early 1980s. A shortage of the resource in the Bering Sea led to especially acute effects for Kodiak since much of the fleet was based in Kodiak City. Both harvest and processing sectors were negatively affected.

Worldwide market prices for salmon peaked in 1988. Significant growth of the salmon farming industry and widespread availability of pen-reared product appear to have preceded subsequent market challenges encountered by Alaska-based harvesters and processors (Gilbertson 2003). Market conditions for Kodiak-region wild salmon have recovered somewhat, but they remain significantly below those achieved throughout Alaska during the early-to-mid 1980s. Meanwhile, the *Exxon Valdez* oil spill of March 1989 was a highly significant event in the Kodiak region. Most Kodiak and Gulf of Alaska fisheries were closed during the months following the spill. The closures coincided with the market challenges mentioned above and were also associated to some uncertain extent with public perceptions about oil-tainted seafood.

Participation in the Kodiak region halibut fisheries increased throughout the late 1980s and early 1990s. The Individual Fisheries Quota (IFQ) system was adopted in 1995 to address over-capitalized halibut and sablefish fleets.

While the implications of these milestone events and processes are not fully understood in the specific social and economic context of Kodiak, each did have a discernible effect on the region’s economy. When expressed in constant 2004 dollars, per capita income exhibited significantly greater variability during the 1970s and 1980s than during the 1990s and early 2000s. Sharp declines in per capita income during the early 1980s and early 1990s appear to have coincided with challenges in the salmon market and with decline of the Bering Sea crab stocks. The oil spill led to significant changes during 1989 and the early 1990s. The effects of fisheries legislation and state spending are less discernible. With the exception of a modest decline in 2003, constant dollar per capita personal income has increased in the Kodiak region since 1994. Meanwhile, total population, which previously exhibited two decades of steady expansion, has been trending downward since 1994, with the exception of a slight increase in 2000.

**Figure 3-1 Kodiak Island Borough Population and Per Capita Income: 1969-2004**



Source: Bureau of Economic Analysis, Personal Income by Major Source, Regional Economic Information System, Table CA05 (SIC and NAICS).

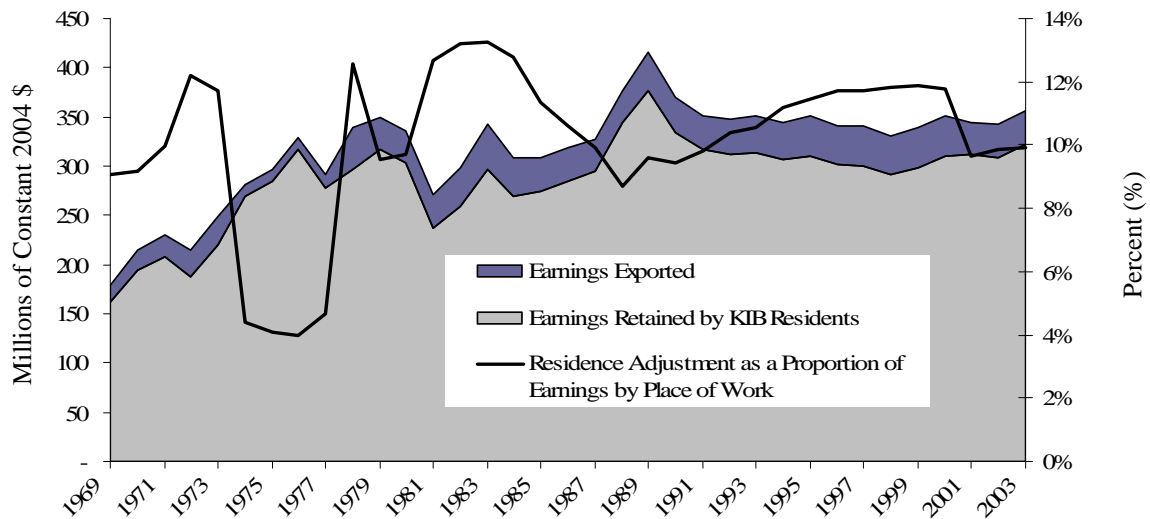
**Income.** The personal income indicator depicted in Figure 3-1 above is a “place of residence” construct. It incorporates earnings irrespective of *where* they were generated, and it also includes unearned income including dividends, interest and rent, and government subsidies (herein referred to as transfer receipts).

The distinction between place of residence and place of work is significant for all of the income and employment data considered in this study. Indeed, a significant portion of total regional

earnings are traditionally “exported,” and the Bureau of Economic Analysis (BEA) calculates a resident adjustment to depict such earnings. This averages to approximately 11 percent of total earnings in the region since 1990, as depicted in Figure 3-2 below. Chapter Four of this report provides in-depth analysis of the nature of resident versus non-resident earnings and employment in the seafood harvest sector, and is further indicative of the relative importance of exported earnings and employment.

Of particular note in the figure is a steady rise in per capita income beginning in 1994. This follows from a combination of relatively stable total earnings and a declining population base.

**Figure 3-2 Exported Annual Total Earnings by Place of Work: 1969 – 2003**



Source: Bureau of Economic Analysis, Personal Income by Major Source, Regional Economic Information System, Table CA05 (SIC and NAICS).

**Labor Force and Employment Factors.** Trends in the size of the labor force and rate of employment follow the trend line for total population during the period 1990 to 2004. The labor force includes adult working-age persons who are able and willing to work, including those who were unemployed at the time of enumeration. As depicted in Figure 3-3 below, both the count of persons in the labor force and persons actually employed increase through the period 1990 to 1994, and decline steadily thereafter.

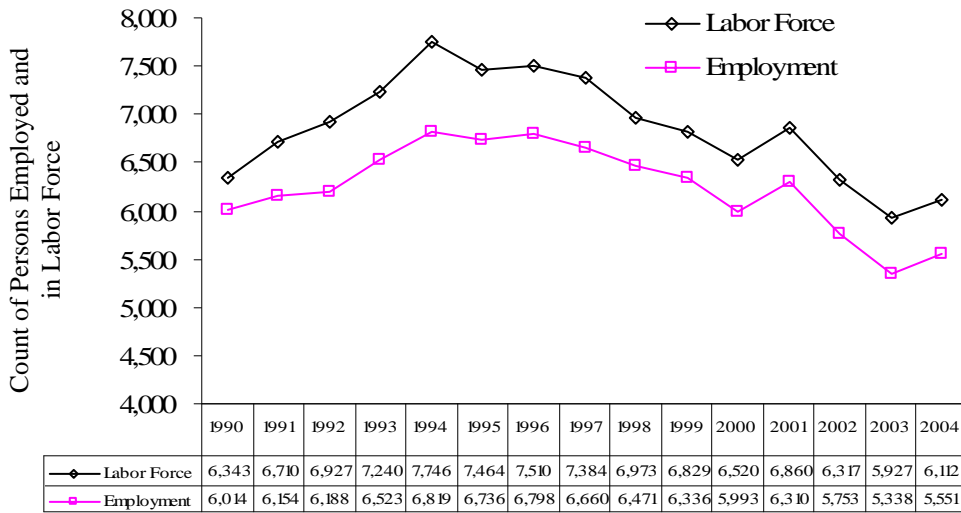
It should be noted that as for the population figures depicted in Figure 3-1, the measures of labor force and employment in Figures 3-3 and 3-4 address “place of residence” in contrast to “place of work” as depicted in Figure 3-2 above. The annual average rate of resident unemployment reaches a maximum of 12 percent in 1994 and averages about nine percent during the 15-year period 1990 to 2004.

Significant monthly variation is also noted of the region’s labor force (Figure 3-4), typically reaching a maximum in July and a minimum in December (Figure 3-5). As noted later in this



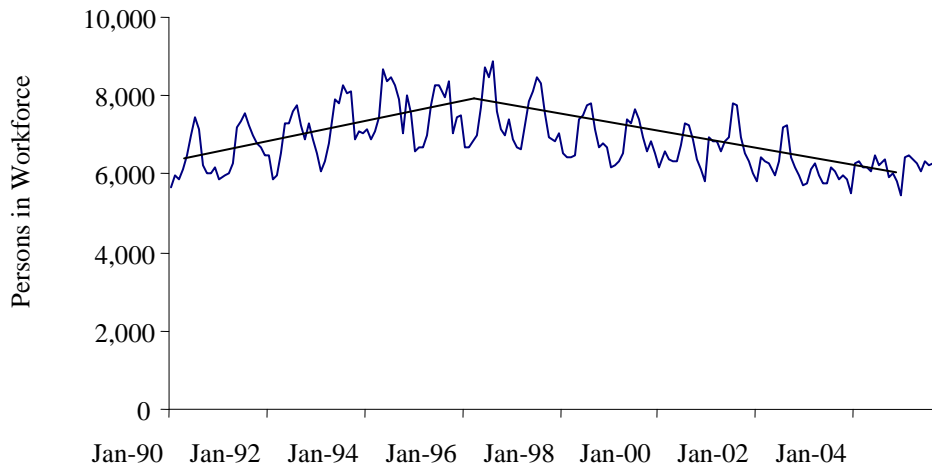
report, seasonal variation is typical of many sectors of the Kodiak economy and relates primarily to the seasonal nature of the seafood industry.

**Figure 3-3 Annual Averages in Labor Force Participation and Employment Counts: 1990-2004**



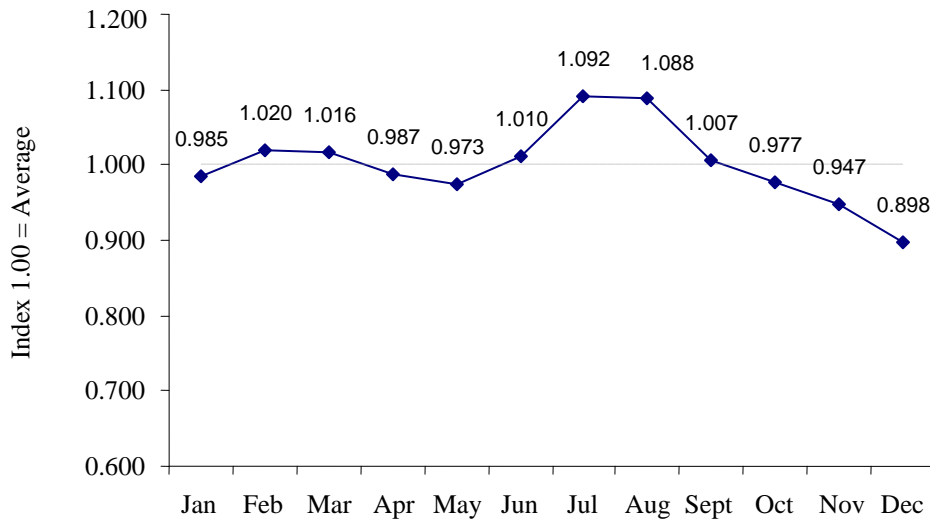
Source: Alaska Department of Labor and Workforce Development, Research and Analysis, Workforce Information, Current Employment Statistics, <http://almis.labor.state.ak.us/>.

**Figure 3-4 Size of the Kodiak Island Borough Labor Force by Month with Trend Line: 1990-2004**



Source: Alaska Department of Labor and Workforce Development, Research and Analysis, Workforce Information, Current Employment Statistics, <http://almis.labor.state.ak.us/>.

**Figure 3-5 Seasonal Index for Kodiak Island Borough Labor Force: January 2000-September 2005**



Source: Alaska Department of Labor and Workforce Development, Research and Analysis, Workforce Information, Current Employment Statistics, <http://almis.labor.state.ak.us/>.

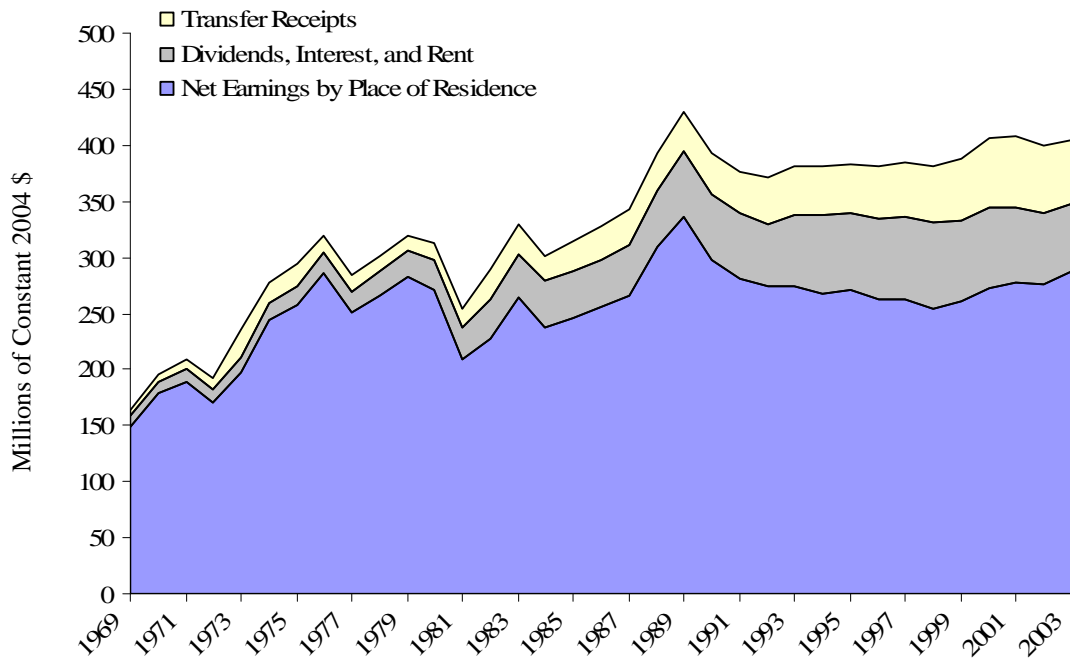
**Sources of Income.** The principle components of income for Kodiak residents are illustrated in Figures 3-6 and 3-7 below. Here the distinction of note is between earned and unearned income. Estimates of income are measured in constant 2004 dollars and are consistent with previous measures of personal income and earnings by place of residence (as per Figures 3-1 and 3-2, respectively).

Two sources of unearned income are considered here: (1) interest, dividends and rents, and (2) transfer receipts. The latter consist of all forms of public assistance. Unearned income accounts for a significant share of total income in this context. Both components have increased steadily as a proportion of total personal income until the latter few years of the 25-year time frame. Turning points indicative of declining proportions occur in 1998 for interest, dividend, and rental income; and in 2000 for transfer receipts. In the case of public assistance, the figure depicts two sharp positive increases - in 1973 and in 1982. A trough is noted for 1989. As might be intuited, the extent of public assistance during a given period tends to counter earned income for that period. These patterns are summarized in Table 3-1 and Figure 3-6 below.

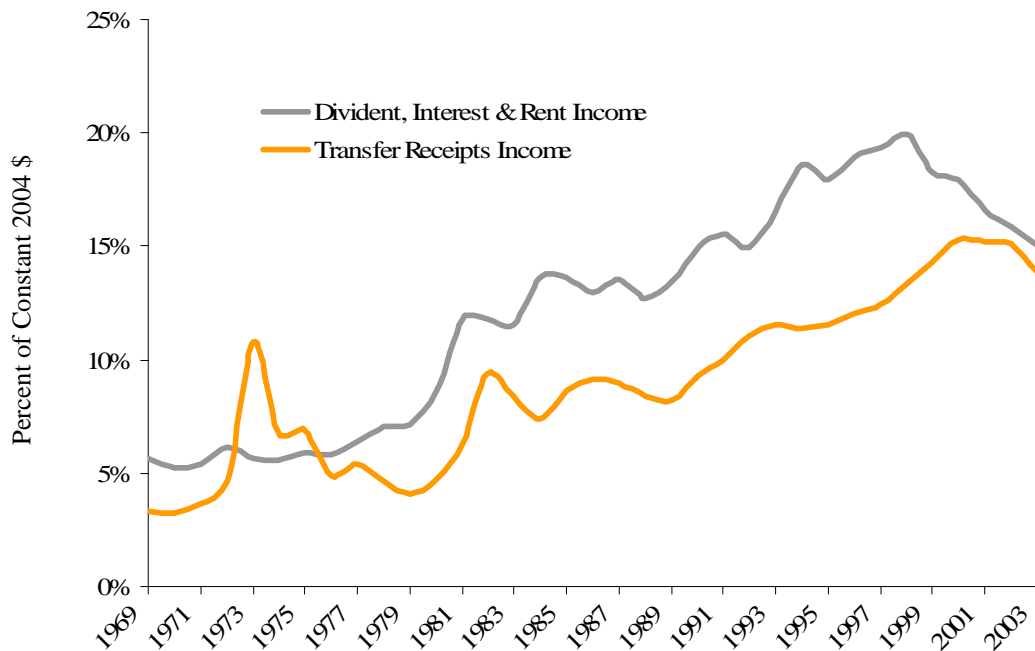
**Table 3-1 Components of Unearned Income as Proportion of Total Personal Income: 1980-2003**

Source	1980s	1990s	2000-03
Percent Transfer	8.0	11.7	14.9
Percent Dividends, Interest, Rent	12.4	17.5	16.4
Percent of Total	20.4	29.2	31.3

**Figure 3-6 Composition of Personal Income: 1969 to 2003**



**Figure 3-7 Proportional Amounts in Components of Unearned Income**  
(Percent of Constant 2004 Dollars)



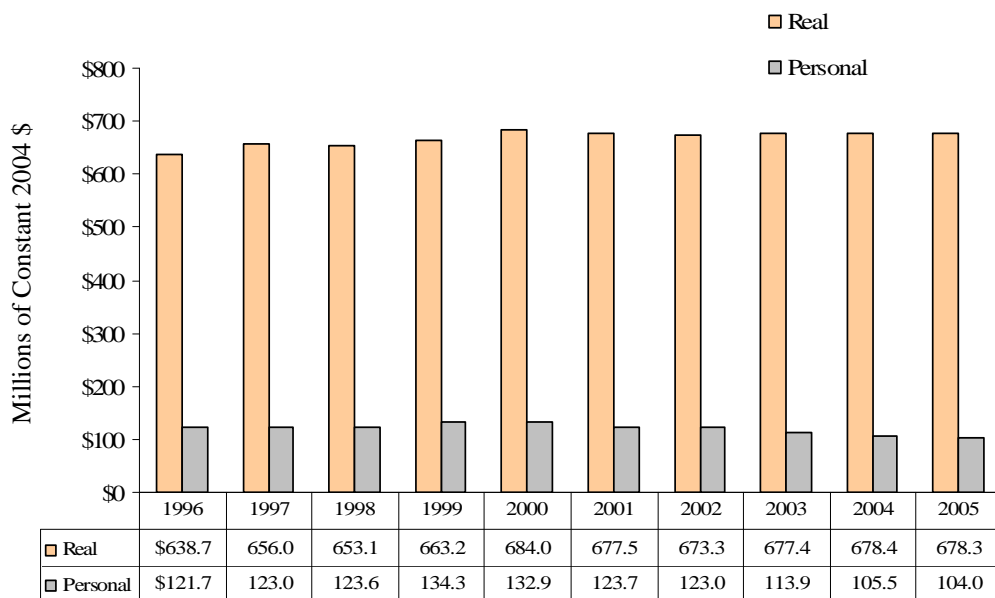
Source: Bureau of Economic Analysis, Personal Income by Major Source, Regional Economic Information System, Table CA05 (SIC and NAICS).

**Additional Key Indicators.** Additional indicators useful for characterizing economic trends in the Kodiak region are available in data generated by the Alaska Department of Labor and Workforce Development (ADOLWD). These are summarized in Figures 3-8 and 3-9, and in Tables 3-2 and 3-3.

Of particular note here is the status of real and personal property in the region for the period 1996 to 2004. Values are relatively stable throughout.

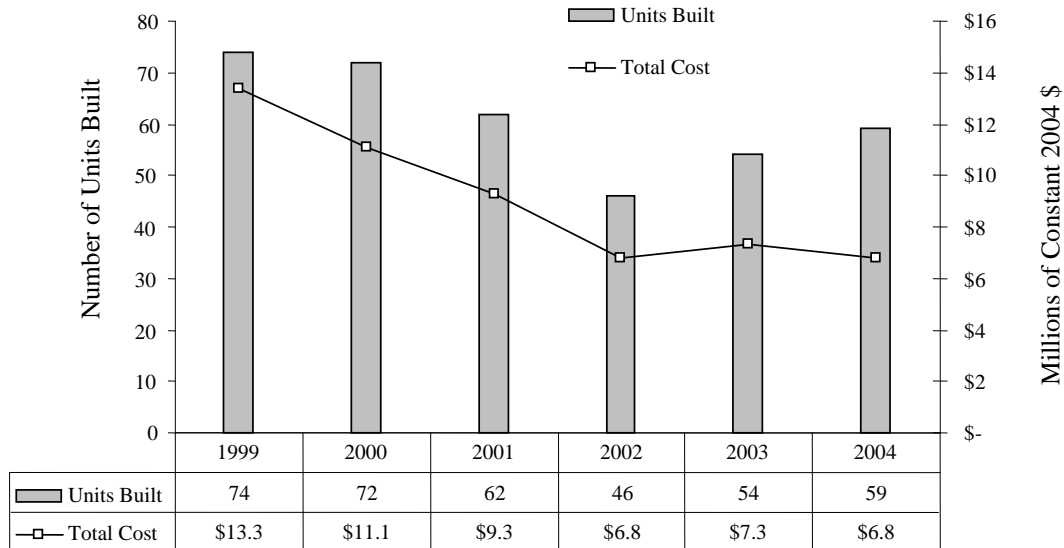
Construction activity is depicted in Figure 3-8 below. This is indicated by the number of building permits issued and the total cost of new construction. Most notable is a recent reversal of a strong downward trend occurring during the period 1999 to 2002.

**Figure 3-8 Per Capita Total Real and Personal Property Values in Kodiak Island Borough: 1996-2005**



Source: Alaska Department of Labor and Workforce Development, Economic Indicators for Kodiak Island Borough, Regional Information Report Center, <http://almis.labor.state.ak.us/>.

**Figure 3-9 Residential Building Permits & Total Construction Cost in Kodiak Island Borough: 1999-2004**



Source: Alaska Department of Labor and Workforce Development, Economic Indicators for Kodiak Island Borough, Regional Information Report Center, <http://almis.labor.state.ak.us/>.

**Table 3-2 Residential Building Permits by Types of Units and Cost\* of Construction: 1999 to 2004**

Year	Measure	Type of Construction				
		Total Residential†	Single Family Residential†	Five-plex or More†	Tri- or Four-plex†	Duplex†
1999	No. Units	74	52	10	8	4
	Cost (\$)	13,348,916	11,260,338	660,936	706,327	721,315
2000	No. Units	72	48	16	8	0
	Cost (\$)	11,079,272	8,508,283	1,595,728	975,261	-
2001	No. Units	62	40	12	10	0
	Cost (\$)	9,304,784	6,926,309	1,245,071	1,133,404	-
2002	No. Units	46	38	4	4	0
	Cost (\$)	6,768,626	5,897,880	465,743	405,003	-
2003	No. Units	54	46	8	0	0
	Cost (\$)	7,345,077	6,514,811	830,266	-	-
2004	No. Units	59	43	16	0	0
	Cost (\$)	6,794,177	5,630,805	1,163,372	-	-

\* Costs expressed in constant 2004 dollars. †All figures represent newly constructed units. Source: Alaska Department of Labor and Workforce Development, Economic Indicators for Kodiak Island Borough, Regional Information Report Center (see <http://almis.labor.state.ak.us/>).

**Table 3-3 Locally Assessed Taxes, Kodiak Island Borough: 1998 to 2004 \***

Year	Assessed Tax (\$)			
	Severance Tax	Bed Tax	Total	Per Capita Local Tax
1998	1,053,639	29,957	1,083,596	79
1999	1,121,800	44,156	1,165,956	83
2000	979,274	31,652	1,010,926	73
2001	910,123	45,291	955,414	70
2002	758,427	53,059	811,487	59
2003	720,503	31,212	751,715	54
2004	799,693	56,177	855,870	63

\* Costs expressed in constant 2004 dollars; Source: Alaska Department of Labor and Workforce Development, Economic Indicators for Kodiak Island Borough, Regional Information Report Center (see <http://almis.labor.state.ak.us/>).

**Assessing Trends in Subsistence Activities.** While not directly relevant or highly significant to the export potential of Kodiak’s formal economy, the subjective experience and informal economy associated with subsistence-oriented hunting and fishing are critically important aspects of life in the region. Indeed, as our interview data and data of observation clearly indicate, village life for many residents continues to revolve around seasonal participation in the various fish runs, hunts, periods of food gathering, and associated cultural activities, as it has for so many centuries. For many participants, money is used primarily as means for meeting cultural objectives. While many residents of Kodiak are fully aware of and engage in mainstream American culture, the modern culture of the Alutiiq family, village, and larger society remains critically important. Subsistence activities may rightfully be seen as central to that culture and society.

But individual and collective capacity to hunt and fish for consumptive and cultural purposes in rural Alaska is today often based in part on income derived through jobs in the commercial fishing industry, government, or other sectors of the formal economy. Corporate and government subsidies also help facilitate these activities and aid in the overall maintenance of the household. The benefits of corporate subsidies and public assistance notwithstanding, informants often relate that a lack of job opportunities in the villages is associated with a variety of social problems, including diminished capacity to engage in hunting and fishing activities.

A number of researchers have sought to address this issue in Alaska. For instance, Chance (1987) and Van Stone (1960) assert that while time applied to wage work brings in income that can be applied to meet the operating costs of hunting and fishing, it also reduces the amount of time available to actually engage in those activities. Dryzek and Young (1985) maintain that intensification of effort to earn money that can be used for subsistence activities constrains traditional practices and diminishes cohesion between families and individuals in Native communities. Wolfe (1984) suggests that successful harvest of wild food resources by Alaska Natives helps offset an inherently cyclical cash economy associated with commercial fishing. Jorgenson (1990:198-199) describes the practical rationale used by Inupiat Eskimos who

regularly fish for consumptive purposes with vessels and gear that were originally purchased for commercial fishing ventures that in reality are often not cost-effective.

Based on these varying perspectives, we hypothesize that significant settlement awards will serve to heighten long-term participation in subsistence-oriented activities by reducing the amount of time that need be undertaken in the commercial fishing industry or in other forms of cash- and capital-generating labor. We assert that disbursement of settlement awards in the study region has the potential to alleviate the “tension” experienced by subsistence practitioners who may desire to hunt and fish for consumptive and cultural purposes, but who often must engage in some form of employment to generate income in order to support the household and to purchase and maintain materials needed to hunt and fish with success. The extent of this hypothesized effect depends, in part, on the amount of the awards ultimately disbursed to individuals residing in the villages. As noted in Chapter One of this report, on the order of 2,500 Alaska Native plaintiffs reside on Kodiak Island, some of whom are involved in multiple claim categories.

As for the full range of variables examined during the course of this study, testing hypotheses about the effects of settlement awards on subsistence activities in the study region will require analytical control of other factors that may also have an influence on individual and collective behavior. This will require in-depth and highly focused interaction with informants rather than extensive use of secondary data. Use of existing secondary data as a tool for monitoring and assessment is challenging in this case. ADF&G Division of Subsistence has systematically collected household survey data regarding subsistence practices in the Kodiak region, but practical constraints have limited the effort to once per decade since the 1980s. The most recent work was conducted on Kodiak Island in 2003. Thus, if the settlement were to occur in the near future, extensive periods of time would pass before the data are updated. Hence various events and social processes not related to the settlement would likely influence the nature and extent of subsistence activities in the region and thereby confuse any analysis based on archival data alone.

Of note, the oil spill itself may ultimately complicate analysis of trends in subsistence practices following the settlement. For instance, Short et al. (2007) have detected oil lingering in the substrate of cobble and boulder beaches and other areas at study sites in Prince William Sound and along the Alaska Peninsula. Findings from the most recent ADF&G household survey suggest that the majority of residents in the originally affected communities assert that subsistence resources “have not recovered to pre-spill levels” (Fall et al. 2006). The authors assert that while harvest levels approximate those documented prior to the spill in 1989, nearly 40 percent of residents in communities surveyed earlier in this decade report using at least one subsistence resource with less frequency due to the detrimental effects of spilled oil. Further, the authors report that 72 percent of respondents report that the “traditional way of life” has not recovered since the spill, and that confidence in eating shellfish was very low in many Kodiak communities. Despite the possible effects of response set and response bias on answers to queries about such a calamitous local and regional event, the findings make clear that long-term processes may indeed affect subsistence-related behavior – whether that behavior relates to actual availability and quality of wild food resources and pursuit thereof, or to the reporting of perspectives about the availability and quality of subsistence resources in the affected regions.

Our own data indicate that shellfish are indeed now rarely consumed by residents in the Kodiak villages for fear of contamination. Moreover, many residents involved in the current research also tend to assert that their communities became less oriented to fishing because of the oil spill. But it should be made clear that the latter attribution is often based not on an empirical understanding that the spill *caused* the full range of subsequent problems in Kodiak fisheries and fishery-dependent communities, but rather because the oil spill has become linked in concept and in explanation with various detrimental changes in community life.

In fact, many events and processes continually influence the manner and extent of subsistence activities on Kodiak Island and elsewhere. Alaska Natives living in spill-affected communities attend to various subsistence-related traditions with greater or lesser avidity for reasons that often either have little to do with the original spill event or that- in the absence of effective research methods and analysis- would be difficult to parse from the effects of the spill event and/or lingering oil. The commonality of refusal to collect and/or consume certain shellfish, such as clams, is a meaningful exception on Kodiak Island.

Clearly, demographic factors may bear obvious influence on the collective potential of a community to engage in extensive consumptive-oriented hunting and fishing activities. The availability of persons who are fit and able to engage in those activities is an obvious and undeniably critical factor for success. For instance, the population of Karluk on Kodiak Island has diminished significantly over the last three decades, concomitantly diminishing the potential scope of subsistence activities in that community. In small Alaska towns and villages such as the study communities on Kodiak, the loss of even a small number of fishers, hunters, and gatherers can have a dramatic effect on overall levels of production. Tragically, relatively high rates of alcohol and substance abuse and suicide diminish participation in traditional subsistence life ways in rural Alaska, and this problem has been documented in the Kodiak study communities during the course of the current project.

Knowledge of various cultural and environmental dimensions of the subsistence way of life and appreciation of that knowledge and lifestyle are also essential for the perpetuation of tradition. Clearly, willingness to engage in hunting and fishing activities and to share labor costs and the results of the effort are essential elements of life in small societies whose members enact norms that are typically more deeply rooted in cooperation than competition.

All of these factors and conditions may be positively or negatively influenced by a variety of events and social processes of varying scope, complexity, intensity, and duration – rendering valid explanation of trends in subsistence practices an analytical challenge. Events and processes of particular note include but are not limited to: (a) exposure to and engagement in cultural forces or activities that are either supportive of or contrary to the continuity of subsistence practices, (b) abundance or lack of abundance of desired natural resources, (c) changes in physical access to those resources, (c) changes in the quality of those resources and/or associated habitat, (e) availability of money or opportunity to earn money for investment in subsistence-related activities, and (d) exogenous events that preclude, divert, or support individual or collective attention to subsistence activities and/or associated cultural practices.



Interview data make clear that it is likely that each of these factors has played a role in shaping the nature and extent of subsistence-oriented fishing, hunting, and gathering on Kodiak Island since survey data regarding subsistence activities were collected by ADF&G in 1986. As noted in Chapter Nine of this report, it is difficult merely to discern clear patterns of harvest, use, and/or consumption of subsistence resources within or across the villages for the years in which those data are available. Again, the exception is Karluk. Although harvest data for the most recent survey year were not made available to the ADF&G researchers visiting that village, it is clear that diminishing participation and production can be attributed in large part to the decreasing size of the village population.

Our data suggest that while subsistence activities continue to occur with avidity in most of the Kodiak study communities, two primary challenges confront householders caught within and between differing cultures and societies. The first involves the desire of some residents to ensure that their children acquire an education that will enable advancement in contemporary American society. Some residents, or former residents, perceive that better educational opportunities are available in Kodiak City and Anchorage and have left or plan to leave the village to attain them. The situation may serve to explain population attrition in the villages as is noted elsewhere in this report, and when considered in conjunction with what has happened in Karluk, it is indicative of the potential effects of demographic change on the communal endeavor of consumptive-oriented hunting and fishing.

The second challenge relates to diminishing involvement of village residents in local and regional commercial fisheries. Our informants report that diminished involvement relates primarily to economic constraints including market prices for salmon, rising fuel prices, and the cost of skiffs, engines, and gear vis-à-vis a perennial lack of alternative employment opportunities. Such challenges can often be overcome through cooperation and pooling of resources within and between extended families, but they can also be compounded by a range of factors, as described above. In any case, diminished involvement of village residents in commercial fisheries has reportedly made it more difficult for many residents to engage in subsistence-oriented fishing activities.

**Summary.** In sum, the effects of ongoing social and physical environmental change on the manner and extent of subsistence practices and the cooperative pooling of labor and resources, sharing of harvested foods, and generalized reciprocity that characterize those practices, can be profound but difficult to discern. This is especially true in the absence of a research strategy that involves the empirical testing of clearly formulated research hypotheses, use of methods capable of detecting specific behavioral response to social and environmental changes over time, and means for establishing analytical control of intervening variables.

But we posit that specific exogenous events, especially those that are grand in scope and intensity, can indeed lead to clearly discernible effects on subsistence and associated cultural practices. As discussed in Chapter Two, this was certainly the case during the months following the oil spill itself - as IAI (1990a, 1990b, 1990c, 1990d) and other researchers working in the affected region were able to document (e.g., Fall et al. 1997; Picou, Gill, and Cohen 1997). We hypothesize that settlement will lead to effects on subsistence hunting and fishing activity, but in the reverse. That is, it is hypothesized here that settlement awards will reduce the amount of

time that village residents need to spend in the workforce, or out of the workforce with little available capital for investing in hunting and fishing activities, and that subsistence activities and related cultural practices such as sharing of resources and food-based traditional celebrations will be enhanced and so increase in frequency. The duration of such effects, if they occur as such, would also be subject to investigation.

Again, this form of hypothesis-testing approach requires an appropriate methodology and control of potentially intervening variables. For instance, if our hypothesis that the settlement will lead residents to emigrate from Kodiak holds true, there will be a smaller pool of persons available to maintain a subsistence-oriented culture and society in the villages. In this case, subsistence activities would be enabled, but they would be undertaken by fewer people. Thus, it will be necessary to examine and control for relevant forms of demographic change. Similarly, it is possible that new monies could exacerbate a reported trend of disinterest in subsistence activities noted among youth living in some of the villages originally affected by the oil spill.<sup>15</sup> Conversely, settlement monies may lead to re-investment in village-based commercial fisheries, with the potential for corollary increases in social and fiscal capital available to invest in and practice subsistence hunting and fishing.

The possibility that factors both related to and distinct from the settlement may tend to obfuscate analysis of its effects calls for a methodology that is: (a) highly focused on enabling comprehensive understanding of the immediate and longer-term social, cultural, and economic effects of the settlement, and (b) capable of identifying ongoing social and physical environmental factors that may influence the nature and extent of subsistence practices in the villages regardless of the settlement. Our intent is to undertake such an approach by continuing work with key informants in the villages to monitor potentially significant changes of relevance to participation and/or production in subsistence hunting and fishing prior to settlement. We will then re-enter the field after the settlement with a well-formulated and highly directed protocol capable of detecting and enabling explanation of potentially dramatic changes in subsistence practices, such as might be correlated with significant levels of emigration, extensive investment in subsistence gear, or extensive investment in commercial fisheries. The research team will observe the nature of social life in the community after settlement, and it will work closely and on an ongoing basis with a now well-established group of highly knowledgeable and locally-situated persons who can speak empirically both to the validity of hypotheses about settlement monies enhancing subsistence lifestyles, and to the existence and nature of factors that might obscure valid analysis of the effects of the settlement over time.

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<sup>15</sup> Fall et al. (2006: xlvii) report that 47 percent of respondents to the most recent household survey on subsistence activities in the spill-affected communities reported that “youth are not learning enough about subsistence skills, primarily because of disinterest.” But the authors also report that a majority of respondents in Ouzinkie, Larsen Bay, Old Harbor, and Port Lions, among other communities, report that kids *are* learning sufficient skills. The latter finding is in keeping with interview and observational data generated during the course of this project, which in sum indicate extensive inter-generational continuity in the learning and practice of consumptive-oriented hunting and fishing skills.

## **4.0 Support Sector Earnings and Employment Trends**

This chapter describes employment and related dimensions of the formal economy of Kodiak Island Borough. We focus especially on description of trends in earnings and rates of employment across the most significant sectors of the region's economy, as derived from industry-specific employment data compiled by ADOLWD and ADF&G.

### **4.1 Economic Sectors Defined**

The export-base model used in this study addresses three economic sectors, each distinct in terms of inter-industry relationships and multiplier effects. The traditional export sector is classified and defined here as the *basic* sector. This is sometimes termed the “goods-producing” sector. In the case of Kodiak Island Borough, the principal components of the basic sector include the harvest and processing components of the seafood industry, tourism, public sector construction, mining, agriculture, and forestry. The *support* sector includes local manufacturing, private sector construction, transportation, communications, utilities, trade, finance, insurance, real estate, and a range of service activities. Thus, the *support* sector includes employment in all industries not encompassed in the *basic* sector. Finally, the *government* sector incorporates federal civilian and military governmental activities, and state and local government.

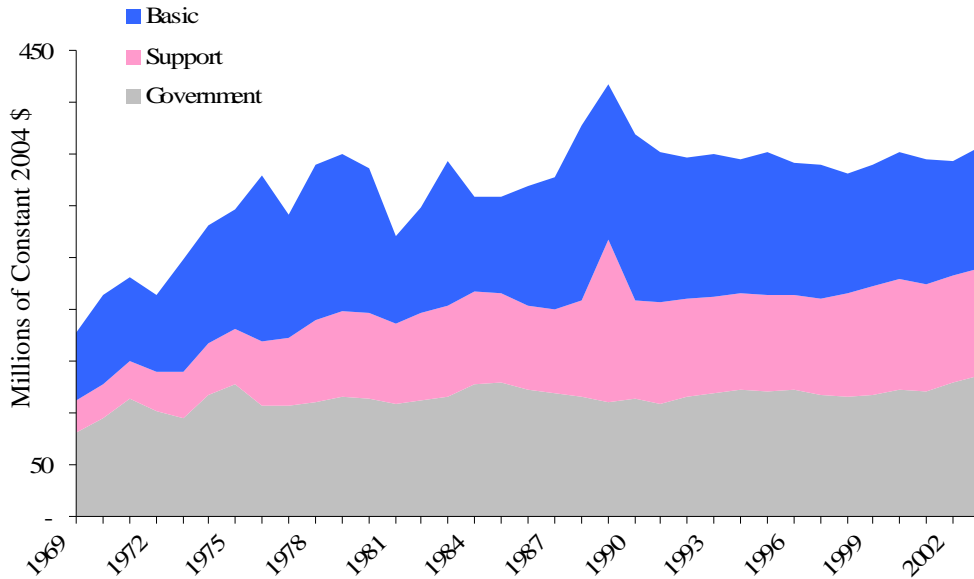
***Earnings by Major Sector.*** We divide aggregate earnings into the three sectors that conform to the export-base model conceptual framework described in Chapter Three. This framework provides a particularly convenient method for characterizing interrelated economic activity occurring in the Kodiak region over the course of time. The time series evidence depicted in Figure 4-1 below is similar to trends in per-capita income and suggests an economy that has transitioned from a state of significant volatility prior to 1990 to greater stability and mixed sector growth since 1990. The data clearly show that much of the early-period volatility was generated in the basic sector. The notable increase in earnings in 1989 captures response and cleanup activity associated with the *Exxon Valdez* oil spill.

It is important to point out that the industry classification system used for the BEA earnings data and for the State of Alaska Department of Labor and Workforce Development (ADOLWD) earnings and employment data underwent an important change in definition after the year 2000. The Standard Industrial Classification (SIC) system was used prior to that year, and the North American Identification Classification System (NAICS) was used after 2000. The implications of this change are discussed in Appendix A of this report. Note that while the change is potentially important for certain applications, it does not have a significant effect on the continuity of time-series data applied in the export-base model used for this study.

Figure 4-2 and Table 4-1 below provide detail about total annual earnings for Kodiak firms since 1990. Figure 4-2 decomposes basic sector earnings into: (1) fish harvesting and seafood manufacturing, (2) basic-sector components not related to the seafood industry, and (3) earnings derived from work in the support-sector and government positions. These three broad categories of economic activity appear to be approximately equal in terms of the scale of earnings generated

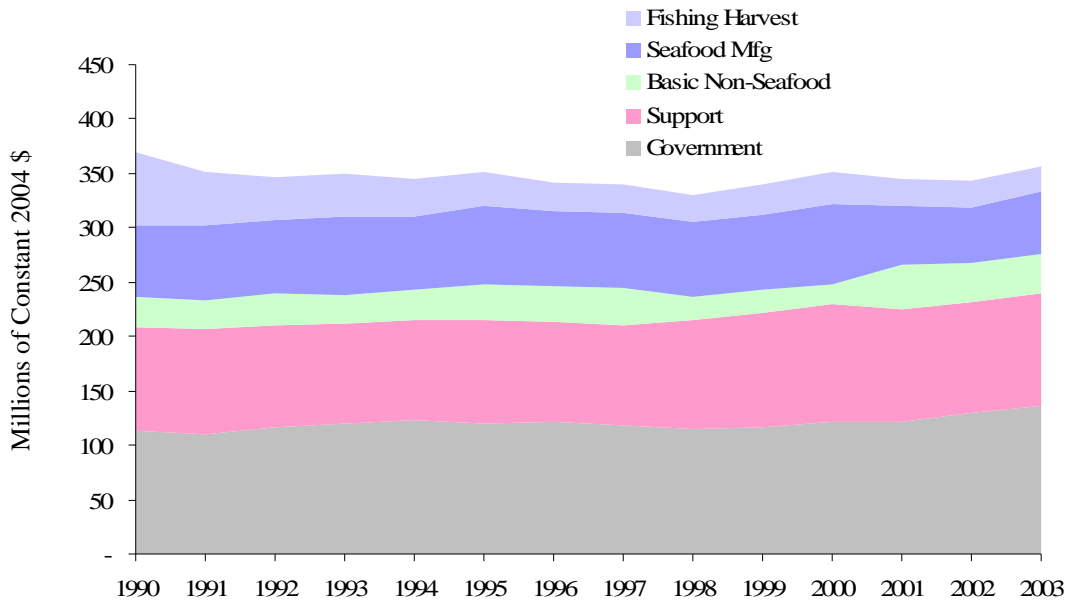
per sector (e.g., roughly \$125 million each in 2003). The aggregate situation depicted in Figure 4-1 suggests considerable inter-industry relationships and a moderate degree of stability across all sectors.

**Figure 4-1 Annual Earnings by Place of Work: 1969 to 2003**



Source: Bureau of Economic Analysis, Personal Income by Major Source, Regional Economic Information System, Table CA05 (SIC and NAICS).

**Figure 4-2 Annual Earnings by Place of Work: 1990 to 2003  
Export-Base Model Breakdown**



Source: Bureau of Economic Analysis, Personal Income by Major Source, Regional Economic Information System, Table CA05 (SIC and NAICS).

Note that growth in total annual earnings decreased by a modest two-tenths of one percent between 1990 and 2003. The recent 2.2 percent increase in basic sector earnings unrelated to the seafood industry was insufficient to offset declines in manufacturing earnings and the harvest of seafood. Meanwhile, contraction in net earnings in the basic sector was nearly offset by positive earnings in the support and government sectors (0.6 percent and 1.3 percent, respectively). In short, earnings data for Kodiak Island Borough indicate a stable regional economy in which contraction in the seafood industry tends to be counterbalanced by growth in the support and government sectors.

**Table 4-1 Descriptive Statistics for Annual Earnings by Sector: 1990-2003**

Year	Basic Sector				Support	Government	Total
	Total	Seafood Harvest	Seafood Manufacturing	Non-Seafood			
1990	159.9	66.8	65.4	27.7	95.9	113.4	369.1
1991	144.6	50.5	68.3	26.3	97.8	109.4	351.7
1992	136.8	39.3	68.1	29.4	94.3	116.1	347.3
1993	137.8	39.6	73.2	25.0	93.3	119.1	350.3
1994	129.2	33.9	68.1	27.2	92.9	122.7	344.7
1995	136.3	31.4	71.5	33.5	94.4	120.2	350.9
1996	127.7	26.7	68.6	32.4	92.2	121.7	341.6
1997	129.6	26.8	69.5	33.3	93.1	117.8	340.4
1998	114.6	24.6	68.6	21.5	100.0	115.8	330.3
1999	116.9	27.5	68.8	20.6	105.7	116.6	339.2
2000	122.0	30.1	73.7	18.3	108.1	121.6	351.7
2001	120.4	25.0	54.7	40.8	103.5	121.1	345.0
2002	110.5	24.2	50.3	36.0	102.8	129.6	342.9
2003	118.0	23.3	57.4	37.3	103.6	135.5	357.1
Annual Growth (%)	-2.1	-7.2	-0.9	2.2	0.6	1.35	-0.2
Statistical Variables	Basic Sector				Support	Government	Total
	Total	Seafood Harvest	Seafood Manufacturing	Non-Seafood			
Mean	128.9	33.5	66.1	29.2	98.4	120.0	347.3
Median	128.4	28.8	68.4	28.5	96.8	119.6	346.1
Standard Deviation	13.388	12.220	7.006	6.662	5.428	6.524	9.188
Sample Variance	179.244	149.330	49.087	44.376	29.462	42.557	84.412
Standard Error	3.6	3.3	1.9	1.8	1.5	1.7	2.5
Range	49.4	43.5	23.4	22.5	15.8	26.2	38.8
Minimum	110.5	23.3	50.3	18.3	92.2	109.4	330.3
Maximum	159.9	66.8	73.7	40.8	108.1	135.5	369.1
Ratio: Max/Min	1.4	2.9	1.5	2.2	1.2	1.2	1.1

Source: Bureau of Economic Analysis, Personal Income by Major Source, Regional Economic Information System, Table CA05 (SIC and NAICS).

## 4.2 Employment by Major Sector

The employment data compiled for this project were provided by ADOLWD. The ADOLWD ES202 monthly employment series is a reliable source of highly detailed time series employment data organized by industry. We apply the original ADOLWD industry groupings to the basic, support, and government sectors using the same principles and definitions applied to the BEA earnings data considered above. Again, a detailed breakdown of industry groupings and definitions is furnished in Appendix A.

The time series extends from January 1997 through March 2005.<sup>16</sup> It is based on *job-count* data reported by firms employing wage-earning workers. The data in this case include workers who live outside the Kodiak region, such as certain fishermen and certain employees in the processing sectors. The series incorporates all full-time and part-time jobs, but excludes business owners and other persons who are self-employed.<sup>17</sup> As such, the data do not incorporate employment in the harvest sector of the seafood industry. A customized tabulation was undertaken during the course of this study to generate valid information regarding seasonal rates of employment for harvesters active in the Kodiak Fisheries Management Area. This was completed via the cooperative assistance of ADOLWD and ADF&G. Seasonally sensitive estimates of employment in the harvest sector are depicted in Figures 4-8 and 4-9.

Average monthly counts of active jobs in the basic, support, and government sectors of the economy are shown in Figure 4-3 below. These data also cover the period January 1997 through March 2005. Employment in the harvest and processing sectors are not included; Table 4-2 differentiates basic sector employment within and outside of the seafood processing industry.

The data indicate a fairly stable regional economy in recent years, notwithstanding significant seasonal variation in the basic sector and a modest upward trend in employment in the support and government sectors. Note that the support sector involved many more jobs during the period than did the basic sector.

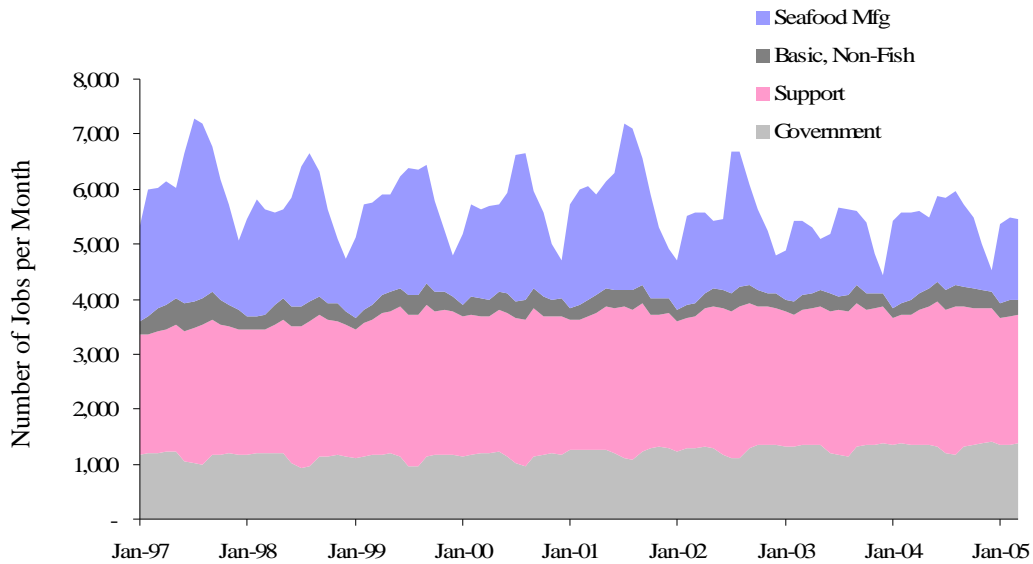
Analysis of trends in the seafood processing industry reveals extensive monthly variation in employment over the period in question. Overall volatility in that industry has nevertheless diminished markedly since 2003. Table 4-2 depicts the absolute range or “swing” between extensive and minimal rates of employment during the time series. This is fairly insignificant for the support and government sectors - 1.3 percent and 1.5 percent, respectively - but highly significant for the basic sector, for which a range of 6.5 percent is indicated.

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<sup>16</sup> Efforts are underway to obtain the ES202 monthly time series back to January 1990.

<sup>17</sup> As per differences in the NAICS and SIC coding systems, data prior to 2001 are comparable only for Total Non-farm Wage & Salary. Moreover, the source reports separately two or more wage and salaried jobs in cases where they are held by the same person. An alternative ADOLWD dataset based on *count of persons* rather than a *count of jobs* is described below.

**Figure 4-3 Average Monthly Employment: January 1997 – March 2005**



Source: Alaska Department of Labor and Workforce Development, ES 202 Employment

**Table 4-2 Summary Statistics for Average Monthly Employment**

Statistical Variable	Support Sector	Government Sector	Basic Sectors			
			Combined	Non-Seafood	Seafood Processing	
					1997 – 2002	2003 - 2005
Mean	2,492	1,211	2,023	320	1,860	1,285
Median	2,485	1,199	1,992	326	1,843	1,450
Standard Deviation	143	113	631	65	588	376
Sample Variance	20,495	12,679	398,053	4,288	345,826	141,743
Standard Error	14.4	11.3	63.4	6.5	69.3	72.5
Range	599	482	3,211	310	2,628	1,376
Minimum	2,160	940	589	189	694	346
Maximum	2,759	1,422	3,800	499	3,322	1,722
Ratio: Max/Min	1.3	1.5	6.5	2.6	4.8	5.0
Confidence Level (95%)	28.6	22.5	125.8	13.0	138.2	142.0
Count	99	99	99	99	72	27

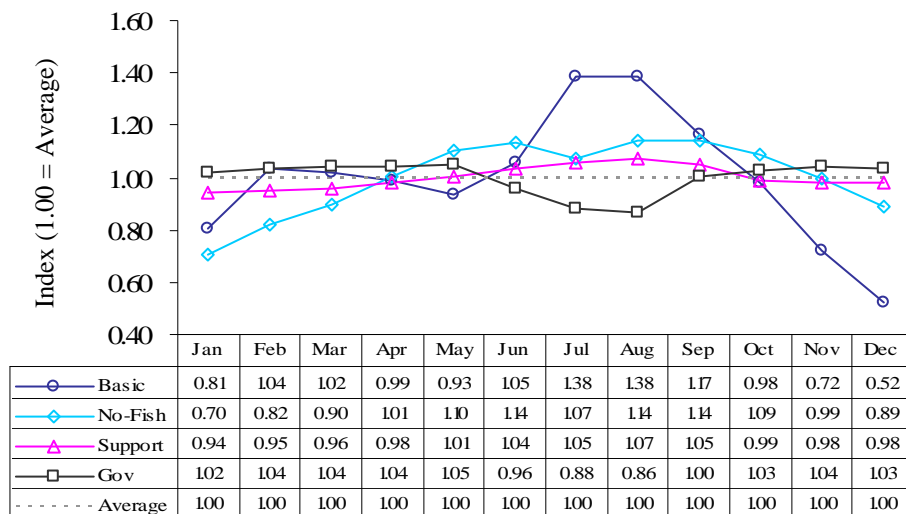
Source: Alaska Department of Labor and Workforce Development, ES 202 Employment

### 4.3 Seasonality of Employment

As depicted in Figure 4-3 below, there is extensive seasonal variation in the rate of employment across Kodiak Island Borough. This is indicated most clearly in seafood-related industries. For instance, employment in seafood processing firms varies dramatically between the mid-summer peak in July and the seasonal trough, which almost invariably occurs in December. Seasonal variation in government, support, and non-seafood basic-sector employment is comparatively modest.

Seasonal indices depicted in Figure 4-4 below confirm a summer peak in employment in both the basic and support sectors of the Kodiak economy. The government sector is an exception since it includes teachers not enumerated as active workers in the summer.

**Figure 4-4 Seasonal Indices for Monthly Employment by Major Sector**



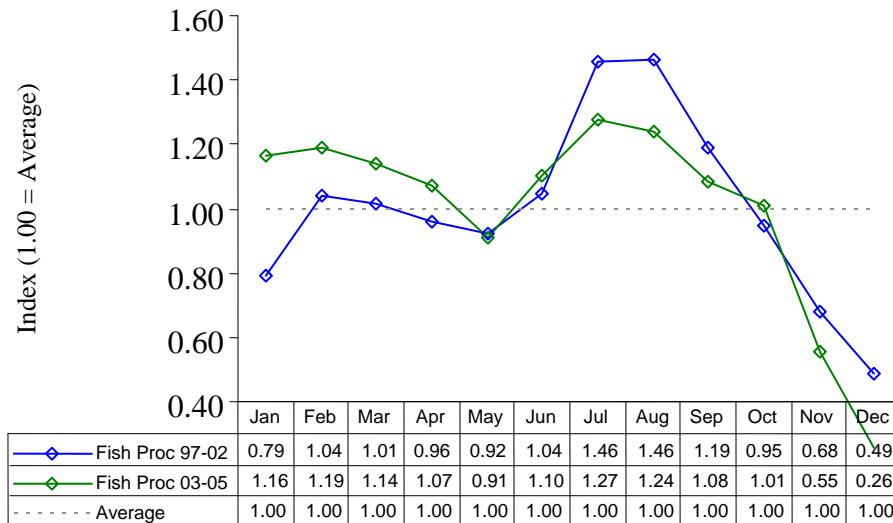
Source: Alaska Department of Labor and Workforce Development, ES 202 Employment

Depiction of seasonal variation in seafood manufacturing in Figure 4-5 below derives from analysis of the periods January 1997 through December 2002, and January 2003 through March 2005. These were chosen for diachronic analysis based on changes in the typical seasonal pattern of activity that began to be observed after 2002 (see Figure 4-3). Note that the data indicate a diminishing peak of employment in the summer months and greater off-season activity during the most recent period. Sharp declines in employment are noted during early spring and late autumn.<sup>18</sup> Consistent production in the groundfish and crab fisheries ensures some continuity in processing throughout the year.

<sup>18</sup> This absolute drop in seafood processing employment after 2002 does not appear to be a consequence of industry reclassification discussed in Appendix A. Fish processing is based on SIC code 20 (Food and Kindred Products, 1997-2001) and NAICS code 311000 (Food, 2002-2005). As discussed below, the number of units reporting employment exhibits a sharp decline during this period.



**Figure 4-5 Seasonal Indices for Seafood Processing Employment: 1997-2002 and 2003-2005**



Source: Alaska Department of Labor and Workforce Development, ES 202 Employment

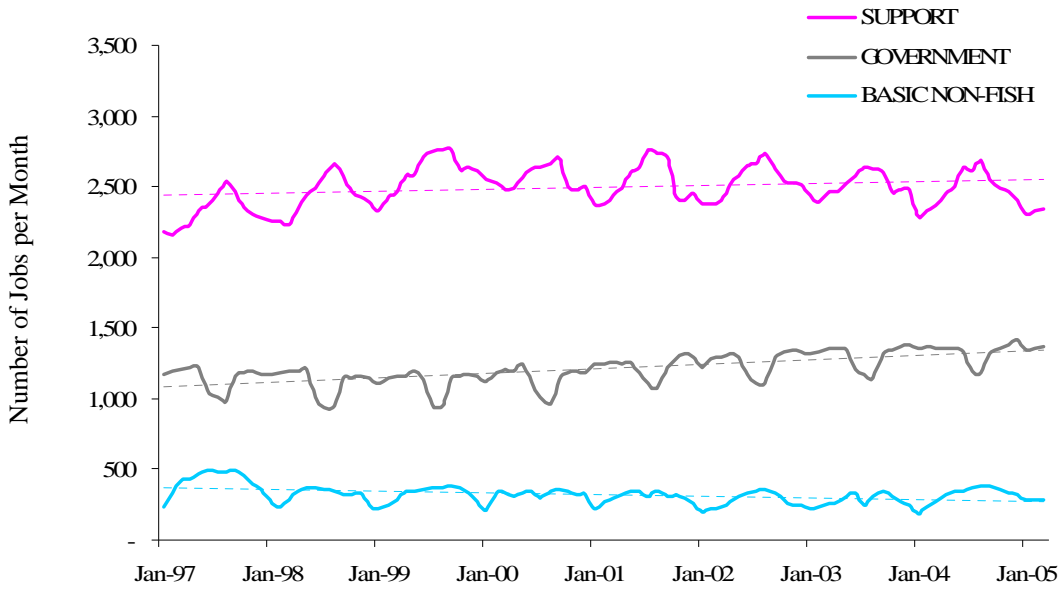
Our time-series data are reiterated in Figures 4-6 and 4-7 so as to enable further comparative analysis of seasonal and cyclical trends and patterns in regional employment. The data in Figure 4-6 pertain to non-seafood basic-sector employment and to employment in the support and government sectors. The long-term trends exhibited in these sectors are relatively neutral; rates of employment in the government and support sectors are trending slightly upward, while employment in the basic sector (*sans* seafood) appears to be slowly diminishing.

Analysis of monthly employment in seafood processing indicates a downward trend for the period 1997 to 2002. The pattern begins to reverse in 2002 (Figure 4-7). The shift is likely related to diminishing landings of salmon and groundfish and associated closures of processing plants in the region prior to the reversal. The number of processing firms reporting under employment security laws fell from 29 in 2002 to 19 in 2004. But improving conditions appear to underlay a subsequent increase to 23 firms by the first quarter of 2005.



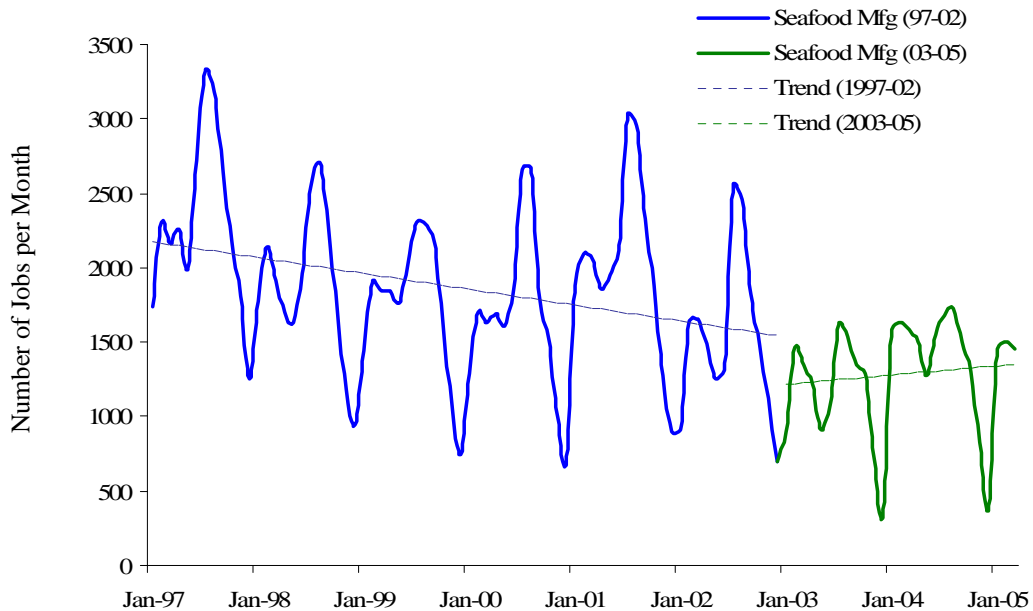
**Cannery at Larsen Bay, Kodiak Island, 2005**

**Figure 4-6 Reiterated Monthly Employment in Kodiak’s Support, Basic Non-Fish, & Government Sectors: 1997-2002**



Source: Alaska Department of Labor and Workforce Development, ES 202 Employment Series.

**Figure 4-7 Reiterated Monthly Employment in Kodiak Seafood Manufacturing: 1997-02 and 2003-05**



Source: Alaska Department of Labor and Workforce Development, ES 202 Employment Series.

#### 4.4 Employment in Seafood Harvesting

As noted above, our estimates for employment in the seafood harvesting sector of the Kodiak-based commercial fishing industry arise from collaborative work undertaken by ADOLWD and ADF&G for purposes of this study. The product of the effort, depicted in summary form in Figures 4-8 through 4-10 below, furthers understanding of employment patterns in coastal Alaska via time series analysis of a critically important industry that has historically been one of the most difficult to describe with precision. The methodology used to generate the data is consistent with the job-count definition in the ES202 measure, and is described in the February 2006 issue of *ADOLWD Trends*.

Indication of the existence of a job in the harvest sector during a given month in Alaska is based on commercial landings reported by individual permit holders. Particular species, gear types, crew size, and area of landing are reported. This enables an estimate of jobs irrespective of the job-holder's residency status. Residency is addressed separately based on a combination of landings and permit ownership data furnished by ADF&G and the Alaska Commercial Fisheries Entry Commission (CFEC).

The estimates shown in Figure 4-8 are based on landings for all major species except halibut.<sup>19</sup> Groundfish and salmon account for 55 percent and 38 percent of total harvest-related employment, respectively (excluding halibut). Analysis of employment specific to the Kodiak area halibut fisheries indicates some 206 jobs, or about 20 percent of all harvest sector jobs during the year 2000.

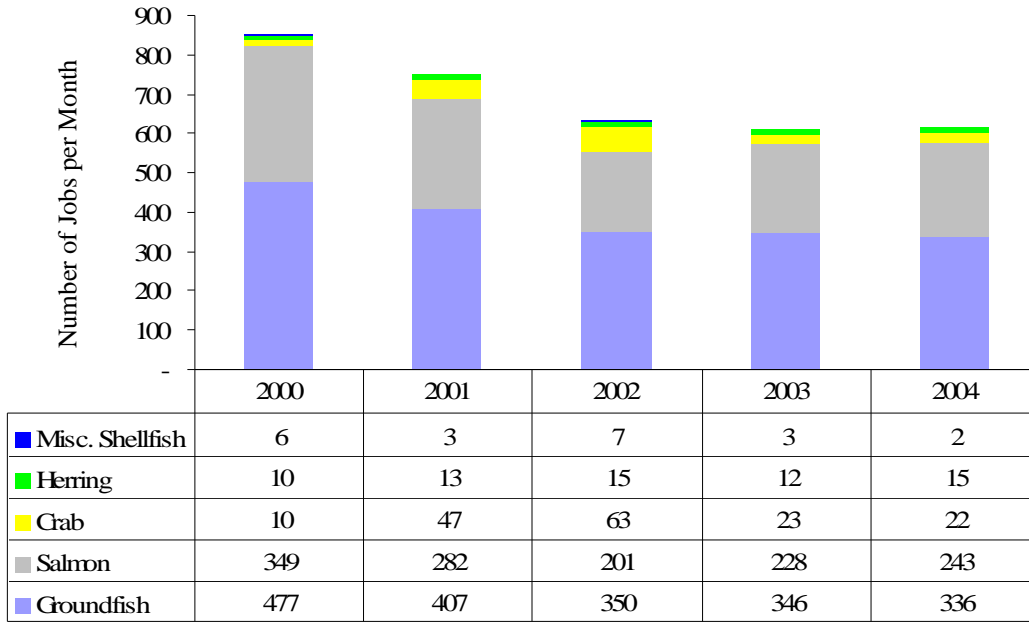
The timing of employment in the harvest sector is depicted in Figure 4-9. This follows the pattern of landings by major species. Groundfish is a year-round fishery with the highest levels of employment and production during the winter months and a secondary peak in September. Rates of employment in salmon fisheries peak in July, counterbalancing the summertime trough in employment in the region's groundfish fisheries. Harvest-specific employment in the crab fishery follows a pattern similar to that of groundfish, with an early winter peak in January and a secondary surge in August and September.

Figure 4-10 depicts employment in the harvest sector for the ADOLWD ES-202 time series. Analysis of the data clearly indicates that harvest-specific jobs constitute a critically important component of the regional employment base. Moreover, when expressed in monthly units, the data accentuate the seasonal nature of employment in the region, as previously demonstrated for the seafood processing sector and, to a lesser degree, for other industry sectors around the region.

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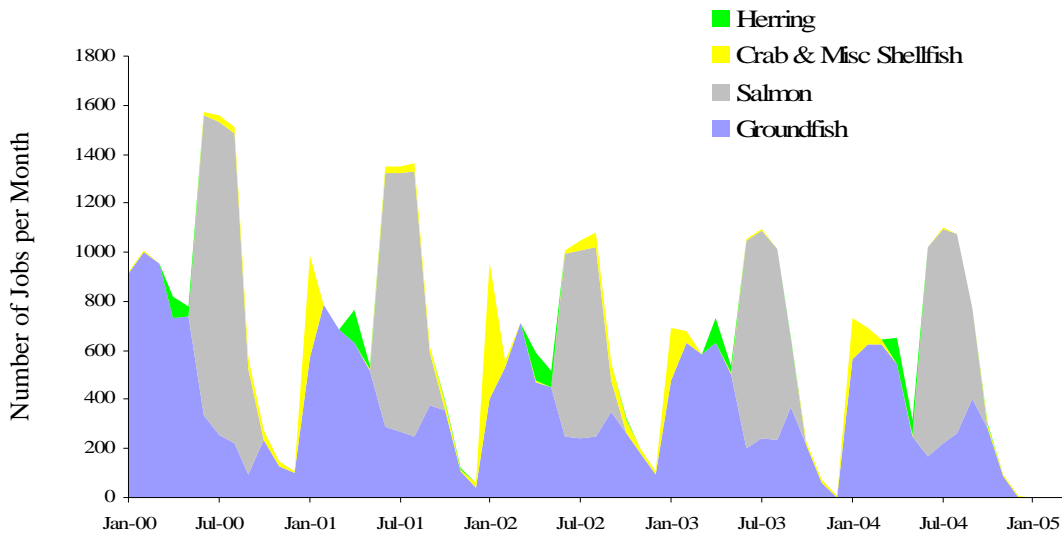
<sup>19</sup> Monthly employment estimates for the halibut fishery are available for 2000 only (206 jobs). These data are not depicted in Figures 4-8 through 4-10. Estimates of employment in the Kodiak halibut fisheries for the period 2001 to 2004 are forthcoming from ADOLWD and ADF&G.

**Figure 4-8 Average Monthly Employment Estimates for the Harvest Sector: 2000-2004 (Excludes Halibut)**



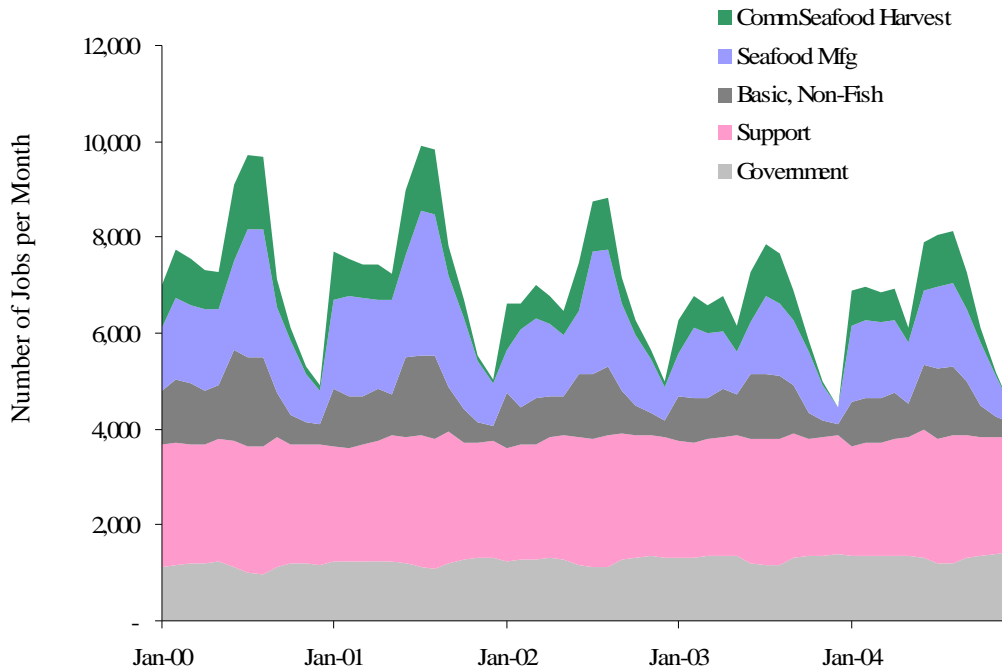
Source: Special Tabulations prepared by Alaska Department of Labor and Workforce Development and Alaska Department of Fish and Game. (December 2005).

**Figure 4-9 Average Monthly Employment in the Harvest Sector for the Major Species: 2000 - 2004 (excludes halibut)**



Source: Special Tabulations prepared by Alaska Department of Labor and Workforce Development and Alaska Department of Fish and Game. (December 2005).

**Figure 4-10 Monthly Employment by Major Sector: January 2000 – December 2004**



Sources: Special Tabulations prepared by Alaska Department of Labor and Workforce Development and Alaska Department of Fish and Game. (December 2005).

#### **4.5 Trends in the Entry and Departure of Business Establishments in the Region**

Table 4-3 below depicts patterns of business activity for the period 2002 through 2005, as indicated by the entry and exit of business establishments in the study region. The total number of active firms declined from 484 to 479 during the period. Although this is a one percent net decline, the percentage of firms in the basic sector rose by 6.1 percent, and the percentage of firms associated with the government sector rose by 13.2 percent during the period. Most of the loss occurred in the support sector.

Regarding the rate of establishment of new businesses in the study region, firms classified under the fishing, hunting, and trapping category increased from 12 to 17 units between 2003 and 2004. The number of firms in the beverage and tobacco category increased by two units in 2003, and firms in the transportation equipment manufacturing category increased by one unit. This activity was partially offset by a steep decline in the number of seafood processing firms active on the island. A total of 10 of 29 such firms went out of business between 2002 and 2004. Four processing firms started operating on Kodiak during the first-quarter of 2005.

A net loss of 23 business establishments in the support sector included 14 firms in the wholesale non-durable goods category, and nine membership organizations. The declines were partially offset by the entry of five social assistance-related businesses between 2003 and 2005. Other entries during this period included two outpatient health care firms, three firms classified under the leisure and hospitality category, and two under the maintenance and repair category. In sum, the regional pattern of recent business closings and openings suggests a slight downturn of business activity in a longer cycle of growth and contraction. The seafood processing sector is an exception in that so many firms ended operations during the period.

**Table 4-3 Entry and Exit of Kodiak Island Borough Business Establishments: 2002-2005**

Employment	Number of Reporting Business Units				Change (%) 2002-2005
	2002	2003	2004	2005	
<b>Basic</b>	82	81	84	87	6.1
Natural Resource	15	15	20	20	33.3
Mining	1	--	--	--	-100
Construction	35	40	40	39	11.4
Manufacturing (Non-fish)	2	5	5	5	150
Manufacturing (Fish Processing)	29	21	19	23	-20.7
Commercial Fish Harvesting	--	--	--	--	--
<b>Support</b>	349	346	333	332	-4.9
Trade, Transportation, and Utilities	143	136	131	128	n/a
Wholesale Trade	60	55	48	48	-25.0
Wholesale, Durable Goods	2	2	2	2	0.0
Wholesale, Non-durable Goods	54	48	42	40	25.9
Wholesale, Electronic Markets	4	5	4	3	25.0
Retail	46	45	47	48	4.3
Transport and Warehousing	31	30	30	29	-6.5
Utilities	6	6	6	6	0.0
Financial Activities	29	29	28	28	-3.1
Services	177	181	174	176	-0.6
Professional and Business Services	48	43	43	43	-10.4
Educational and Health Services	24	27	35	34	41.7
Out-patient Health Care	14	14	17	16	14.3
Hospitals	1	1	1	1	0.0
Nursing and Residential Care	--	1	1	1	--
Social Assistance	8	9	14	14	75.0
Leisure and Hospitality	44	47	45	47	6.8
Other Services	52	53	41	43	-17.3
Repair and Maintenance	10	11	11	12	20.0
Personal and Laundry	6	6	6	6	0.0
Membership Organizations, etc.	29	29	20	20	-31.0
Private Households	7	7	4	5	-28.6
Information	9	9	9	9	0.0
<b>Government</b>	53	55	60	60	13.2
Federal Government	13	13	15	15	15.4
State Government	24	25	27	27	12.5
Local Government	16	17	18	18	12.5
<b>Total</b>	484	482	477	479	-1.0

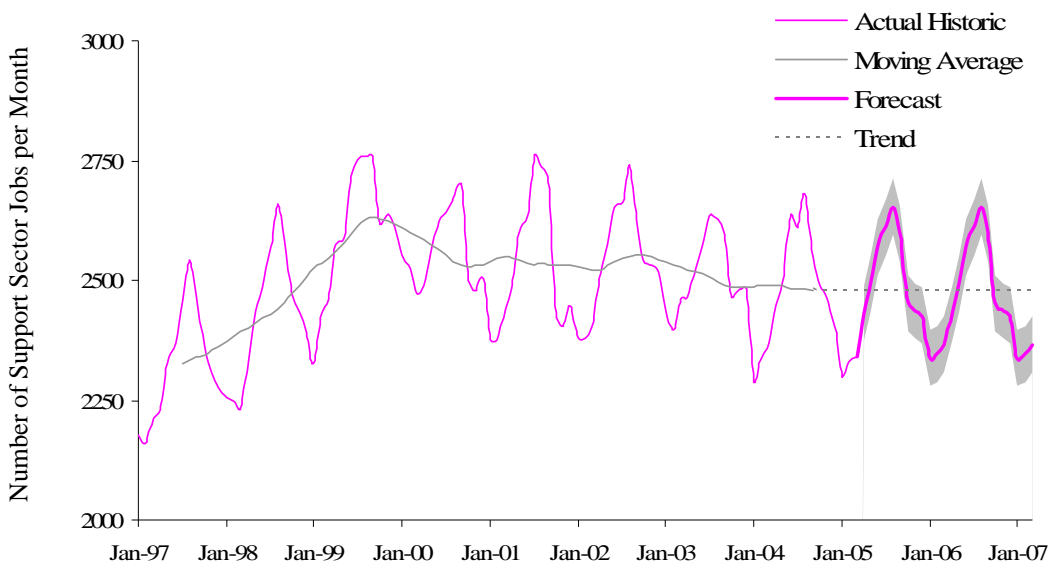
Source: Alaska Department of Labor and Workforce Development, ES 202 Employment Series.

## 4.6 Support Sector Employment

It is our assertion that the effects of income generated through EVOS punitive damage awards will be most clearly indicated in the support sector of the regional economy. In light of this, IAI has prepared a time-series decomposition (TSD) forecast model for support sector employment based on the 15-month period prior to January 2007. This will be updated with new data up to the point in time when punitive damage awards begin to be distributed in the region (see Figure 4-11 and Table 4-4). When distribution of settlement monies occurs, employment rates and extent of earnings observed over the subsequent 12 to 24 months will be compared with the most current forecast. If observed and expected values do not meet within a 95 percent confidence interval, this will provide a statistical measure of the impact of the income shock.

We posit that because revenue generated by the seafood harvest sector is closely associated with exogenous market demand, the effects of settlement monies on rates of employment and extent of earnings in that sector may be relatively more difficult to detect than for the support sector. But the statements of some public officials in the region suggest the situation is worthy of monitoring in that some seafood business and vessel owners and prospective owners may use the monies or some part thereof to invest in new or expanded operations.<sup>20</sup> This is in keeping with our second sub-hypothesis and will be addressed via ongoing monitoring of license activity, vessel registration data, and ongoing interviews with business owners and other knowledgeable persons in the region. Note that we expect punitive damage awards to influence the overall residency status of the harvest sector; this issue is addressed in Chapter Five of this report.

**Figure 4-11 Forecast of Average Monthly Support Sector Employment: April 2005 – December 2006**



Source: ADOLWD (historic) and Impact Assessment, Inc. (forecast).

<sup>20</sup> Note that some leaders in the Kodiak seafood industry argue that advancing age and indebtedness of award recipients may preclude widespread and extensive reinvestment in marine fisheries. Although perspectives on this issue vary widely, most informants state recognition of the significance of the timing of settlement and disbursement and its potential effects on spending and investment decisions.

**Table 4-4 Support Employment Forecast: April 2005 – March 2007**

Year	Month	Forecast	Trend	95% Confidence Interval		
				Upper	Lower	
2005	April	2,432	2,480	2,490	2,374	
	May	2,495	2,480	2,553	2,437	
	June	2,570	2,480	2,628	2,512	
	July	2,613	2,480	2,671	2,555	
	August	2,653	2,480	2,711	2,595	
	September	2,598	2,480	2,656	2,540	
	October	2,453	2,480	2,511	2,395	
	November	2,436	2,480	2,494	2,378	
	December	2,426	2,480	2,484	2,368	
	2006	January	2,339	2,480	2,397	2,281
		February	2,347	2,480	2,405	2,289
		March	2,367	2,480	2,425	2,309
April		2,432	2,480	2,490	2,374	
May		2,495	2,480	2,553	2,437	
June		2,570	2,480	2,628	2,512	
July		2,613	2,480	2,671	2,555	
August		2,653	2,480	2,711	2,595	
September		2,598	2,480	2,656	2,540	
October		2,453	2,480	2,511	2,395	
November		2,436	2,480	2,494	2,378	
2007		December	2,426	2,480	2,484	2,368
	January	2,339	2,480	2,397	2,281	
	February	2,347	2,480	2,405	2,289	
	March	2,367	2,480	2,425	2,309	

Source: Impact Assessment, Inc. (see Figure 4-8)

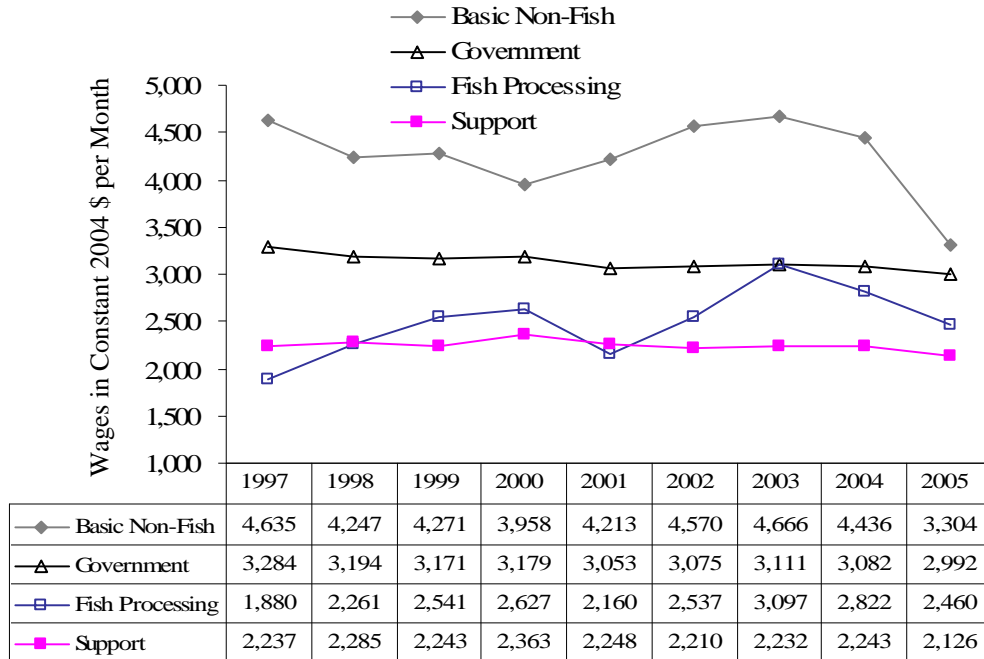
#### 4.7 Wage and Salary Earnings

Figure 4-12 below depicts average monthly wage and salary earnings by place of work as per ADOLWD employment security records. The data are depicted by economic sector for the years 1997 through 2004. Again, earnings from the seafood harvest sector necessarily are analyzed separately. As with the BEA-derived personal income and earnings data depicted elsewhere in this report, the following estimates are expressed in constant 2004 dollars.

When combined across all sectors over the nine year time series, average monthly earnings in Kodiak Island Borough were about \$2,600. But the figure varies significantly across sectors and an overall downward trend is notable. Earnings were highest for the basic sector at \$4,255 per month, though a sharp decline is noted after 2004. Average earnings in the support sector were about \$2,243 per month. Inter-annual variation noted in the seafood processing sector underscores statements made by processing firm owners about the challenges of maintaining operational consistency in an industry that is subject to volatility in global market conditions.



Figure 4-12 Average Monthly Wages on Kodiak, by Sector: 1997-2005



Source: Alaska Department of Labor and Workforce Development, ES 202 Employment Series.

## **5.0 Investment and Participation in the Seafood Industry**

As is elucidated throughout this baseline description and analysis, the Kodiak Island Borough economy is dominated by the seafood industry. The harvest, processing, and distribution of salmon, various groundfish species, halibut, and crab are vitally important. In fact, Kodiak-based fisheries are among the most productive in the world. As previously noted in Figure 4-10, average monthly employment in the harvest sector during the period 2000 to 2004 accounted for 600 direct jobs or about ten percent of monthly employment across all sectors of the economy. Harvest and processing employment in total accounted for over 30 percent of jobs on an average monthly basis.

In this chapter we develop and discuss additional indicators of select trends and conditions in the region's commercial fishing industry. Discussion is focused on trends in fishing effort, productivity, and gross earnings for major commercial fisheries in the region, with special emphasis on clarification of residency factors. The chapter includes a detailed assessment of residency factors for active salmon permits and to transfer of salmon permits between residents and non-residents.

### **5.1 Overview**

An important objective here is development of measures that are capable of characterizing the structure and performance of the Kodiak seafood industry over the course of time. The intent is development of robust description and analysis of trends and conditions as needed to enable valid assessment of future changes. Measures must be capable of contributing to analysis of the potential effects of exogenous shock on decision-making processes about investment and effort, and of potential changes in overall productivity in the harvesting and processing sectors.

The industry-specific employment data reported by ADOLWD are particularly useful in that it is possible to enumerate both the number of available positions and the number of persons actually employed. The measures are also capable of accounting for full- and part-time employment, and whether the job is held by a resident or non-resident of Kodiak Island Borough. Although it is possible to determine whether the indirect and induced effects of worker's earnings will be felt in areas other than Kodiak, description of remote effects are outside the scope of this study. The focus here is on Kodiak residents and Kodiak-specific effects.

The employment estimates developed in the previous chapter are useful indicators of the structure and scale of the region's seafood industry. Trends of change may be explained by a variety of factors, including seasonal and longer-term resource abundance, market factors, and investment and effort, among others.

***A Changing Salmon Market.*** While the perceived quality of Alaska salmon has always been such that its purveyors have been able to compete on the global market, the rapid emergence of large-scale salmon farming in countries such as Norway, Canada, and Chile has resulted in a significant expansion of the supply of salmon, and reduced market prices for salmon caught in Alaskan waters. While the apparent trend toward increased appreciation for wild salmon and

other seafood products from Alaska is relatively new (ADOLWD *Trends*, Oct 2003), it is potentially highly significant in economic terms and bears observation as a trend of improvement for Alaska-based fleets and processors.

***Rationalization.*** Fisheries “rationalization” or “rights-based” management involves the allocation of rights to commercially harvest seafood<sup>21</sup> and the creation of markets for the trading of those rights. Access rights typically take the form of individual fishing quotas (IFQs). This approach to fisheries management involves the allocation of a percentage of total allowable landings in a given commercial fishery to individuals legally possessing the rights to engage in that fishery.

IFQs present an alternative to open access fisheries management, wherein entry into a given fishery is open but restricted in terms of the type of gear that may be used, the number and duration of openings, seasonal or spatial strictures, and so forth. This strategy eliminates the derby-style of commercial fishing, formerly a common means for regulating commercial fishing activity in Alaska. This is a significant change in that rather than attempting to land the maximum amount of fish during openings of limited duration, commercial harvesters may, under the conceptual parameters of a rationalized fishery, distribute effort over a longer period of time and undertake operational strategies for minimizing cost to obtain a fixed share of total catch.<sup>22</sup>

IFQ programs for halibut and sablefish were implemented in Alaska in 1995.<sup>23</sup> An IFQ program for crab was implemented in 2004 and stipulates quotas for both permit holders and processors. Although impacts are still under evaluation, the program appears to have resulted in significant reductions in the overall size of Kodiak’s fleets, and some anticipate that seasonal variation in rates of employment and effort will be dampened over time.<sup>24</sup>

Others argue that rationalization programs can lead to socioeconomic effects such as loss of jobs in certain sectors, loss of bargaining power on the parts of crew and hired captains, increased entry costs, and disproportionate loss of fishing rights for crew, small vessel operators, and small communities. As such, rationalization programs can incur controversy. Given the potentially significant effects of rationalization for fleets in the study region, we are incorporating the theoretical perspectives and findings of Knapp (2006), Fina (2005), and Carothers (2008)<sup>25</sup> into our ongoing efforts to effectively monitor and explain changes in Kodiak area fisheries.

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<sup>21</sup> And more recently, the rights to process fish, as per crab rationalization in the Bering Sea, initiated in 2005.

<sup>22</sup> Note that a “limited entry” approach to management was first adopted in the late 1970s to regulate effort in the Bristol Bay salmon fishery.

<sup>23</sup> A cooperative allocation-based management system was implemented in 1999 to manage landings of Alaska pollock.

<sup>24</sup> Rationalization of Alaska crab fisheries involves allocation of landings quotas to fishing vessels rather than fishermen.

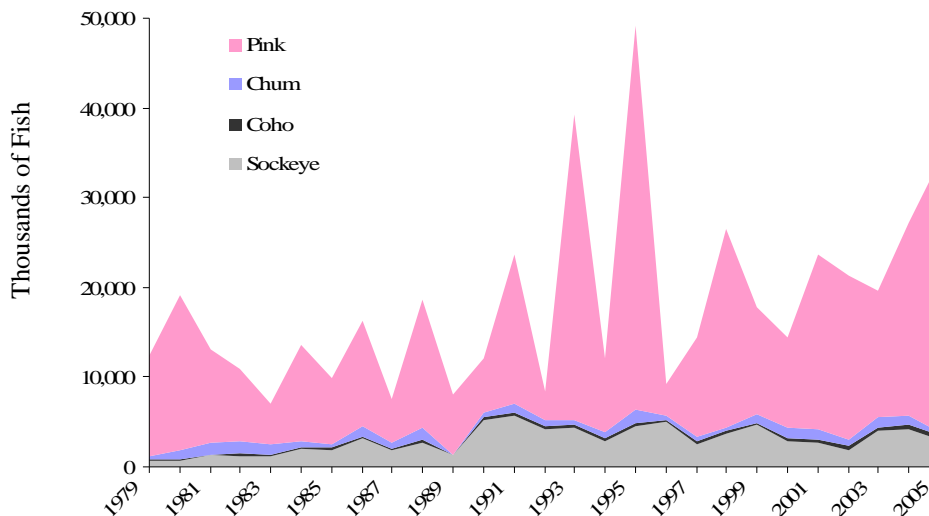
<sup>25</sup> Doctoral dissertation on this topic in the context of Alaska Native villages on Kodiak Island is available through the University of Washington Department of Anthropology.

## 5.2 Trends in Participation and Production in the Kodiak Salmon Fishery

This section of the report describes broad trends in participation and production in the Kodiak area salmon fisheries. Figures are used to summarize and depict trends in landings, ex-vessel value of the product, and the number of permits fished per the commercially licensed types of gear. We address all species of salmon currently pursued for commercial purposes in the Kodiak Management Area (KMA). KMA boundaries encompass state waters surrounding the Kodiak Archipelago south of the Cook Inlet Management Area and northeast of the Chignik Management Area.

Figure 5-1 below is accompanied by Table 5-1. These summarize total commercial landings of salmon in thousands of fish per year for the period 1979 to 2005.

**Figure 5-1 Total Salmon Landings, Kodiak Management Area: 1979-2005**



**Table 5-1 Summary of Annual Landings of Salmon by Species, Kodiak Management Area: 1990-2005**

Variable	Salmon Species				
	Chinook	Sockeye	Coho	Pink	Chum
Mean	20.8	3,828.0	349.0	17,057.4	817.5
Median	18.8	4,103.9	328.9	15,354.2	709.2
Maximum	41.0	5,702.8	496.1	42,849.3	1,522.8
Minimum	12.3	1,824.8	201.8	3,310.6	316.1
Range	28.7	3,877.9	294.2	39,538.7	1,206.7
Standard Deviation	6.9	1,097.4	78.7	11,177.2	331.4
	Confidence Limits (95 %)				
Upper	24.1	4,365.7	387.5	22,534.2	979.8
Lower	17.4	3,290.2	310.4	11,580.7	655.1

Source: Brennan, K., *Commercial Salmon Fisheries of the Kodiak Management Area: A Report to the Alaska Board of Fisheries*, Alaska Department of Fish and Game Fisheries Management Report No. 04-14 (January 2005), Table 4, p. 41.

Kodiak area salmon landings have long been dominated by pink or humpback salmon (*Oncorhynchus gorbuscha*), which is of relatively low value. Sockeye or red salmon is next in terms of landings, followed by chum or dog salmon (*Onchorynchus keta*), which is of limited value, and by coho or silver salmon (*Oncorhynchus kisutch*), which tends to approximate sockeye in terms of value. Although the annual volume of chinook or king salmon (*Oncorhynchus tshawytscha*) landed in the region is too small to be depicted on our scaled graphic, it is the largest and most valuable salmon landed in Alaska.

Note that escapement analysis provided in the 2005 ADF&G Fisheries Management Report suggests that KMA salmon stocks have been healthy in recent years. It should be emphasized, however, that salmon returns vary from year to year across the region as per a wide variety of biophysical factors and ecosystemic constraints and opportunities, including anthropogenic effects associated with fishing (Finney et al. 2000).

Although the research described in this report does not directly address biophysical factors affecting or associated with participation and production in the region's marine fisheries, we have developed rapport with long-term participants in the region's salmon fisheries and we are documenting their perspectives on patterns of resource availability and related effects on continued investment in the industry. Most informants agree that abundance of salmon fluctuates over time, and a range of explanations are offered for why that is so.

But abundance is not typically stated as a major constraint on success. Rather, most fishermen agree that the most significant long-term challenge relates to diminishing prices for salmon in the marketplace. Generally speaking, KMA salmon resources are said to have been sufficient over recent decades, whereas return on investment in harvesting them has not.

Total annual salmon landings and ex-vessel harvest value are summarized in Figure 5-2. Figure 5-3 presents the same information by type of gear. The figures include data for Kodiak residents and non-resident permit owners alike. Note that values are expressed in constant 2004 dollars based on an inflation adjustment using the GDP price deflator.<sup>26</sup>

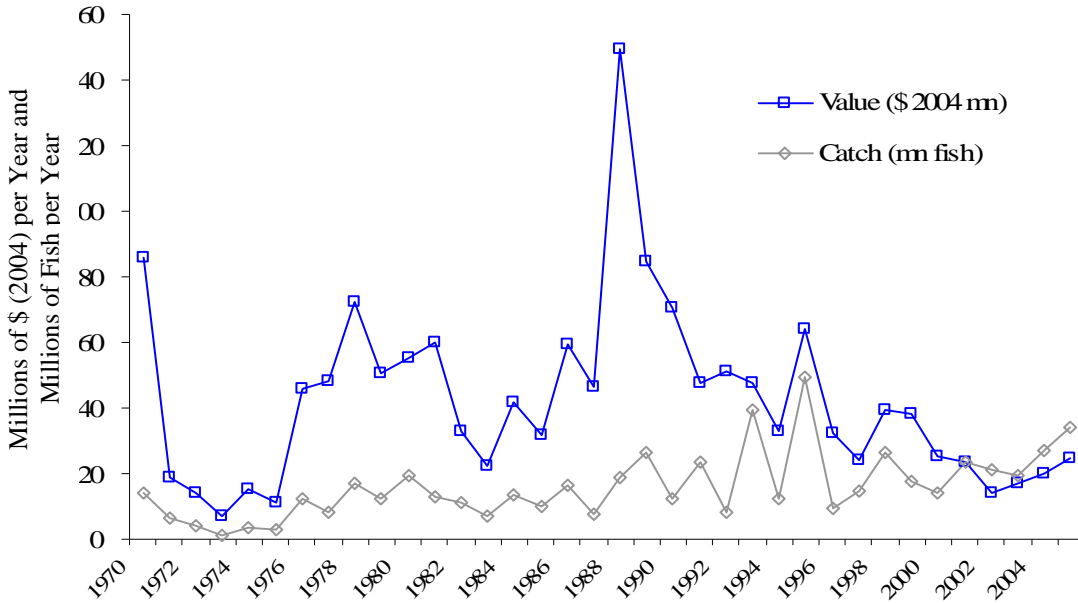
Landings of some 19 million salmon generated nearly \$150 million in ex-vessel value in 1988, for a record value of \$7.87 per fish. By comparison, the average value of KMA salmon during the period 1990 to 2005 was \$1.38 per fish.<sup>27</sup> Note that Kodiak residents landed about 60 percent of all KMA salmon taken during the period 1970 through 2005. Most landings derive from use of purse seine gear. Purse seines are large nets used to surround salmon. Small tender vessels are used to deploy and close the nets. These are subsequently loaded onto a larger mother vessel.

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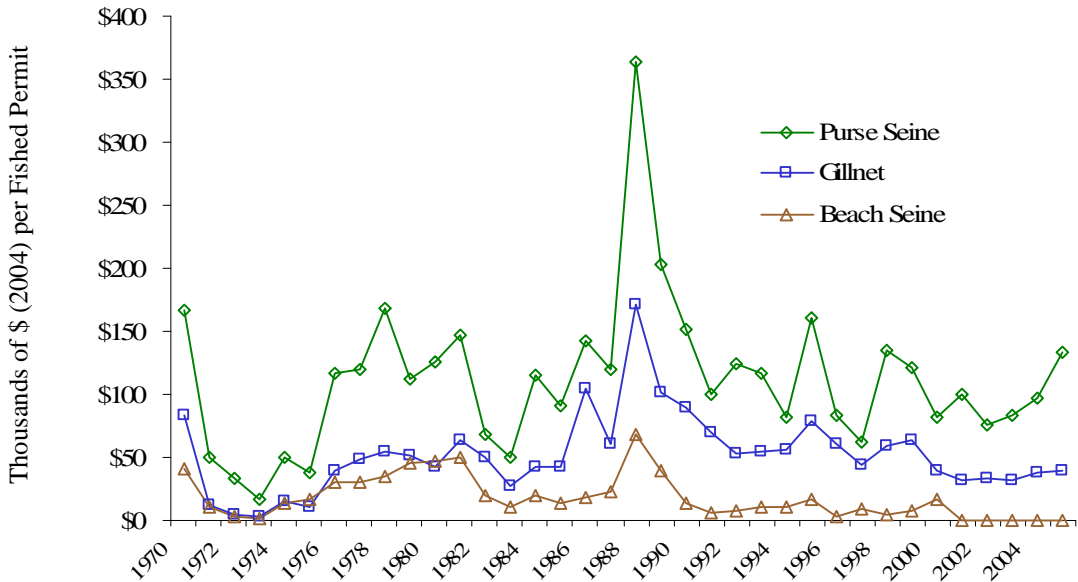
<sup>26</sup> Unless otherwise noted, all price, cost and value information depicted in this chapter is expressed in constant 2004 dollars as per the Bureau of Economic Analysis, National Income and Product Accounts, (<http://www.bea.gov/bea/dn/nipaweb/>), December, 2005.

<sup>27</sup> These average values do not reflect proceeds for direct market dock deliveries or postseason settlements.

**Figure 5-2 Total Salmon Landings and Ex-vessel Value: 1970-2005**



**Figure 5-3 Annual Salmon Landings per Fished Permit by Gear Type: 1970-2005**

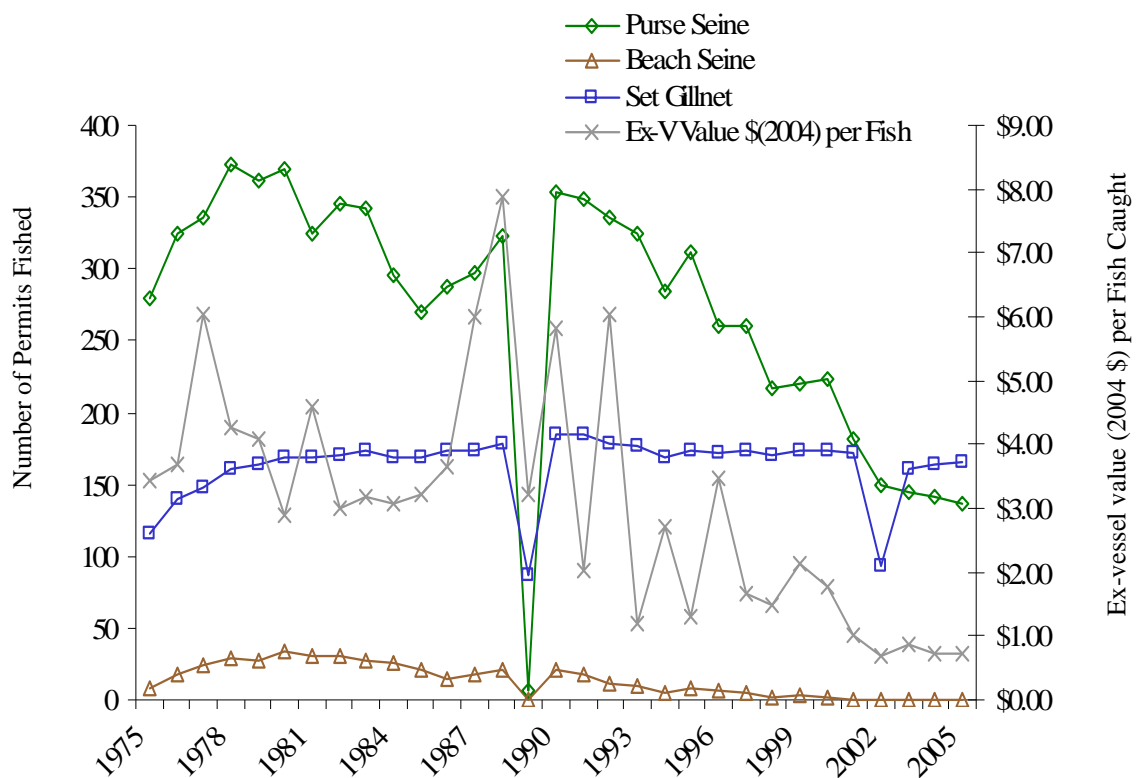


Source for Figures 5-3 and 5-4: ADF&G Annual Management Reports and Commercial Fisheries Entry Commission Report (2005).

The number and type of salmon permits active in the KMA between 1975 and 2005 are depicted in Figure 5-4. Note that the number of active set gillnet permits is relatively stable, with the exceptions of 1989 and 2002. The number of active purse seine and beach seine permits decreased steadily after 1990.

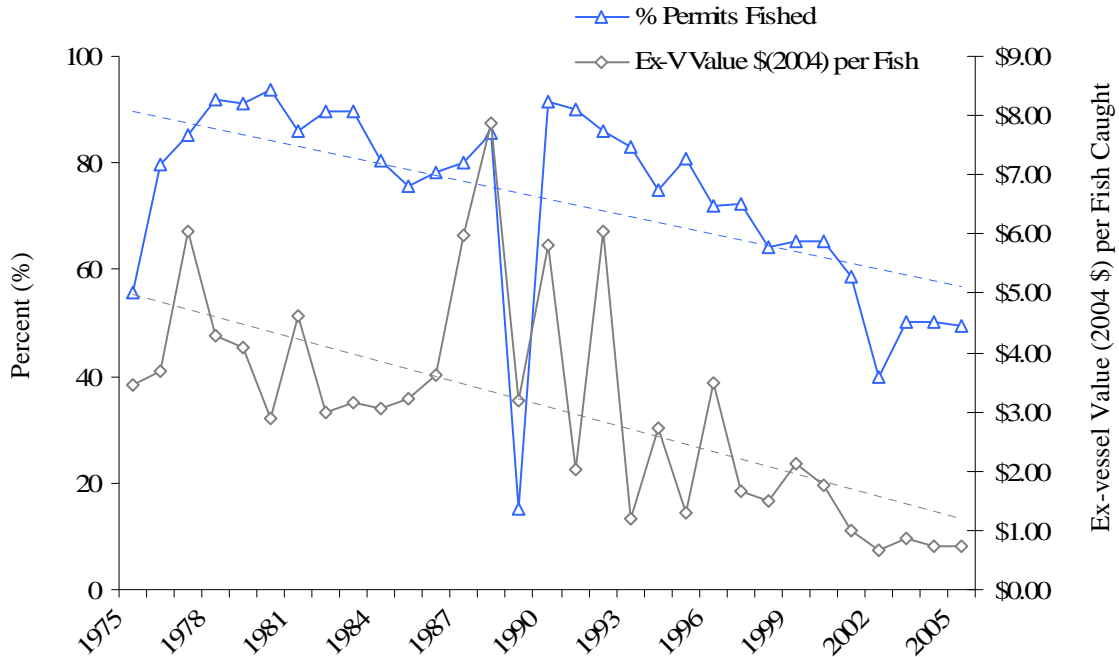
The number of active permits expressed as a proportion of total available permits (Figure 5-5) declined during the period. This is in step with a concurrent decline in the average ex-vessel value of landings (gray line and right-hand axis in both Figures 5-4 and 5-5).

**Figure 5-4 Active Salmon Permits by Type of Gear: 1975-2005**



Source: ADF&G Annual Management Reports and Commercial Fisheries Entry Commission Report (2005).

**Figure 5-5 Active Salmon Permits and Ex-vessel Value across all Type of Gear**



Source: Commercial Fisheries Entry Commission records and ADF&G fish ticket summaries.

The landings, ex-vessel value, and effort data presented in Figures 5-1 through 5-5 above incorporate the activities and proceeds received by both non-resident and resident Kodiak salmon permit owners who fished in the KMA during the period in question. Before addressing issues of residency in more detail, we describe participation and production in the KMA groundfish fishery.

### 5.3 The Kodiak Groundfish Fishery

Groundfish fisheries occurring in federal and state waters are managed by NOAA Fisheries per guidance established by North Pacific Fisheries Management Council (NPFMC) and ADF&G. Openings and closures vary by species and by allowable catch determinations based on year-round monitoring of direct and incidental landings. Most openings for groundfish in state waters are concurrent with those in federal waters.

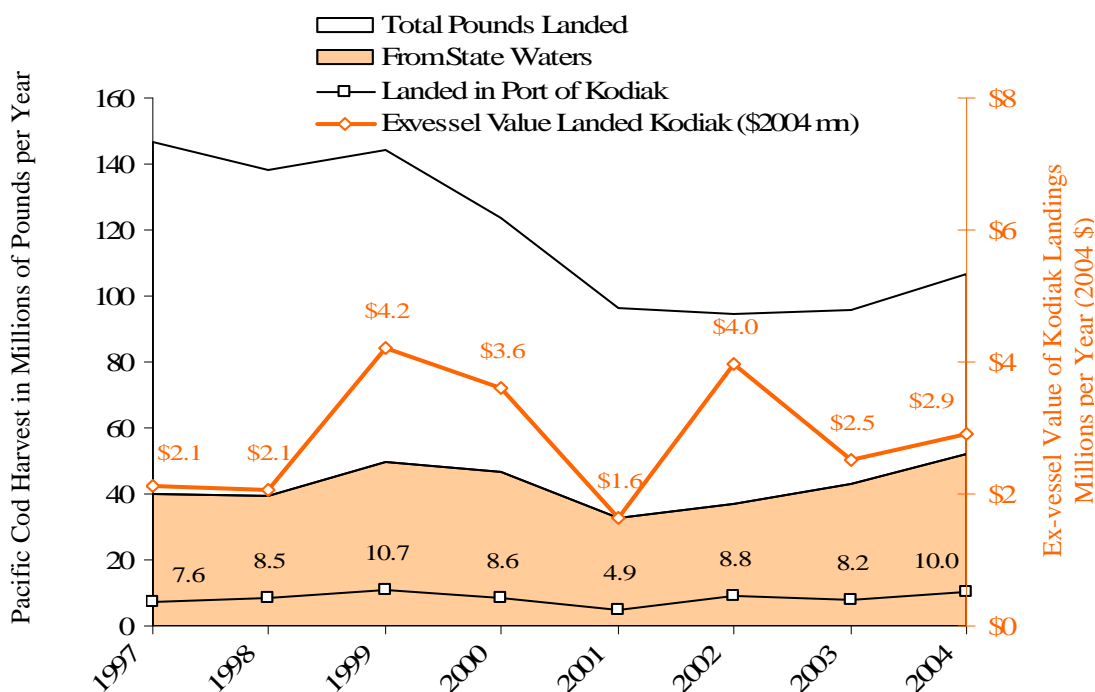
Pacific cod and walleye pollock are the principal groundfish species harvested across the region. Other species include ling cod, sablefish, and black rockfish.



Trends in total landings of Pacific cod are depicted for the Western and Central Gulf of Alaska in Figure 5-6. The volume of cod landed at the Port of Kodiak is relatively small, constituting about 16 percent of total regional landings for the period 1997 to 2004. Landings are serviced primarily by offshore factory ships based in Dutch Harbor; only a relatively small amount of groundfish is processed at the Port of Kodiak. Moreover, while Kodiak-based firms provide some logistical and physical support to vessels active in the regional groundfish fishery, most such services are provided from Dutch Harbor.

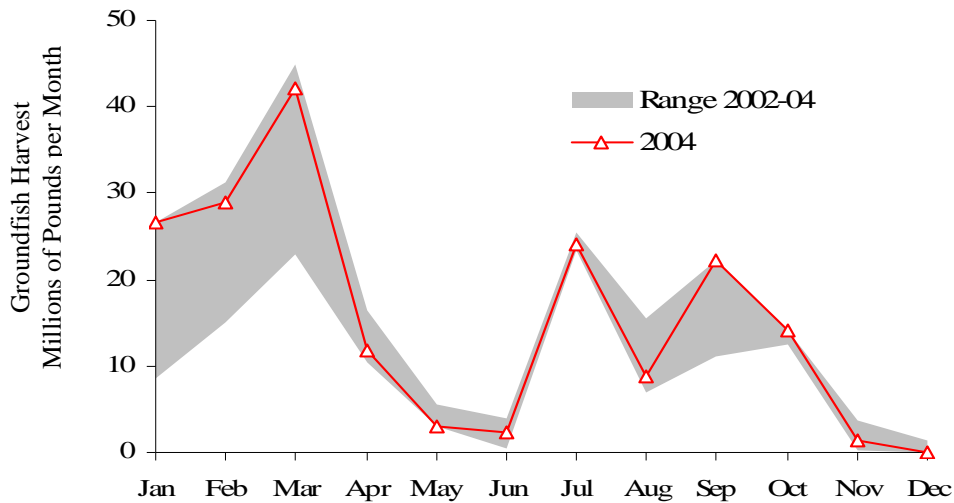
Figure 5-7 depicts monthly groundfish landings at the Port of Kodiak for the period 2002 through 2004. Bi-modal seasonality is notable, with a primary peak occurring during January through March and a lesser peak occurring from late summer to early fall. These peak periods of productivity tend to occur before and after the principal salmon season in part because of limited capacity of processors in the region. Combined capacity of Kodiak Island-based processors is estimated at about 4.3 million pounds per day (ADF&G, Dec, 2005, *FMR 04-14*, p. 6).

**Figure 5-6 Alaska Pacific Cod Landings and Ex-Vessel Value: 1997-2004**



Source: ADFG, Fishery Management Report No. 05-68, Tables 6 and 22, (Oct. 2005).

**Figure 5-7 Monthly Range of Groundfish Landings for the Port of Kodiak: 2002-2004<sup>a</sup>**



<sup>a</sup> Includes walleye pollock, Pacific cod, arrowtooth flounder, ling cod, black rockfish, and sablefish  
 Source: Special Tabulations from ADF&G corresponding to *FMR 05-58* (Oct. 2005).

#### 5.4 Effort and Production among Resident Commercial Harvesters

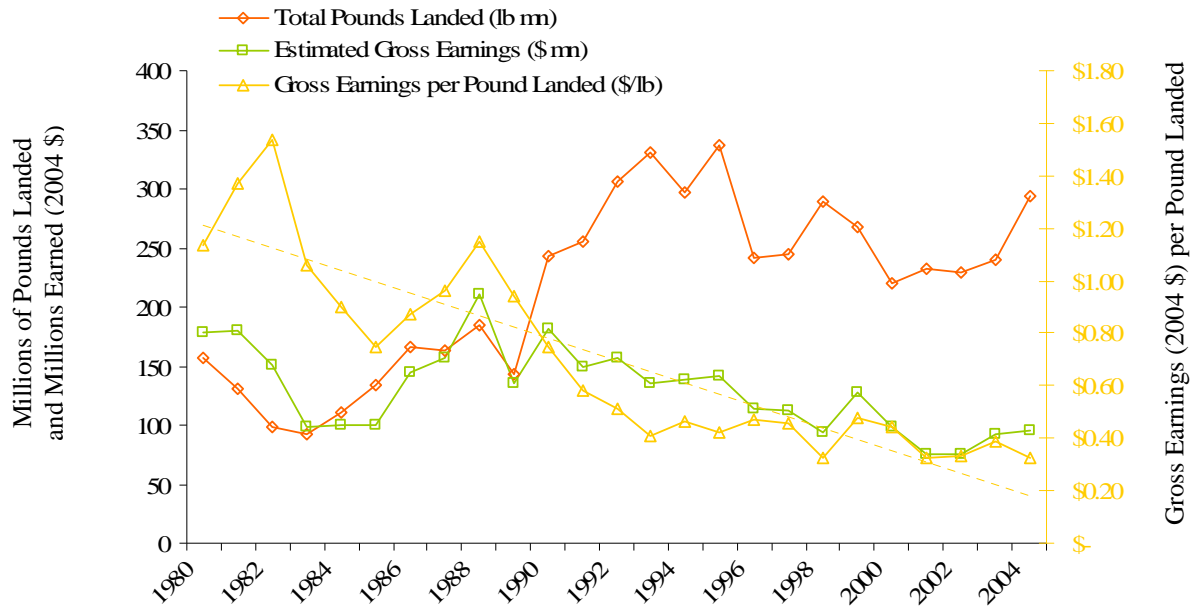
Figures 5-8 and 5-9 below depict trends in local participation and production for major state- and federally-managed Alaska fisheries. The figures depict combined data for: salmon, groundfish, herring, halibut, sablefish, crab, and other shellfish fisheries conducted in the KMA and beyond.

The effort data presented here derive from CFEC tabulations of permit activity. Effort is measured and reported in two ways in this analysis: 1) the ratio of the number of fishers to the number of permits fished, and 2) the number of permits fished to the number of permits issued in a given year. Production or productivity is measured and reported in terms of pounds landed per permit fished.<sup>28</sup> These data are generated from fish ticket receipts for targeted and incidental catch, and they are expressed in round pounds landed. Halibut is based on net pounds landed. Gross earnings data derive from CFEC estimates of average ex-vessel price per pound. Again, earnings are expressed in constant 2004 dollars per the annual GDP deflator series.

Note that the following data are specific to Kodiak residents only, but incorporate landings and earnings deriving not only from the KMA but also from elsewhere in Alaska. Thus, a Kodiak resident who harvests salmon in the Bristol Bay region would be enumerated here, as would his or her catch. Conversely, non-residents who fish for salmon in the KMA are not enumerated here, nor are their landings.

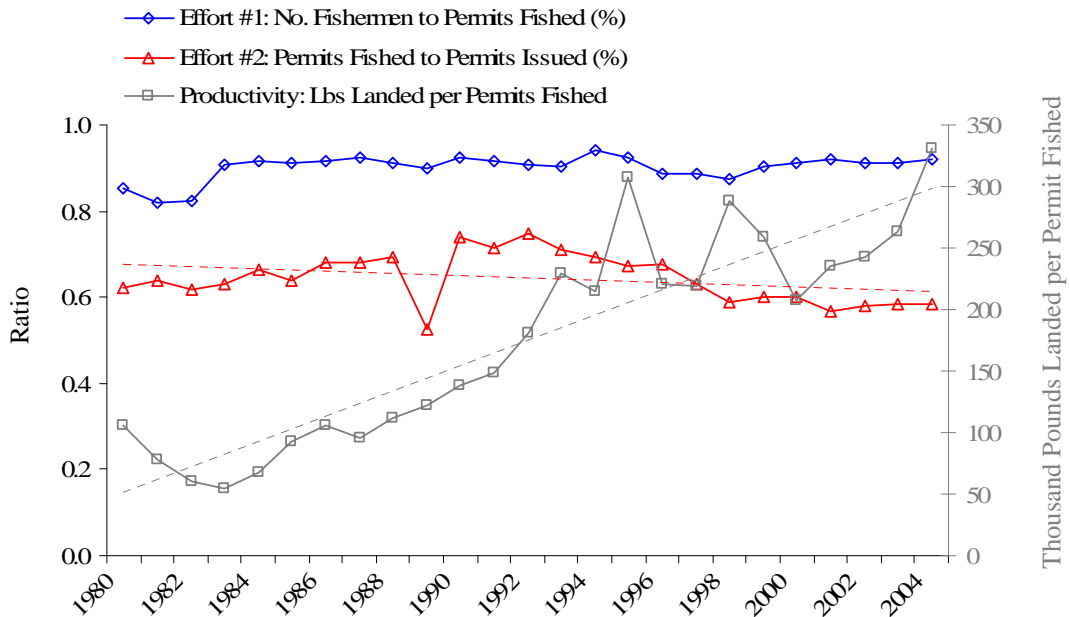
<sup>28</sup> The count of permits held versus permits issued is based on end-of-year tabulations for both limited entry salmon permits and open-access fishery permits. Permit revocations are excluded. Permits subject to transfer are counted only once. The count of permits held versus permits issued is not always equal because some permit holders do not use the permit in a given year. Limited entry permits must be renewed each year even if the permit holders do not participate. Permits are considered active only when at least one associated landing was made in a given year.

**Figure 5-8 Landings and Earnings for Kodiak Residents, All Fisheries: 1980-2004**



Source: CFEC Special Tabulations: Permit & Fishing Activity by Year, State, Census Area, or City.

**Figure 5-9 Effort and Production per Resident Permit, All Fisheries: 1980-2004**



Source: CFEC Special Tabulations: Permit & Fishing Activity by Year, State, Census Area, or City

Figure 5-8 above reveals that while the total volume of landings (orange line, left-hand axis) varies extensively early in the time series, variation dampens after 1989. Significantly, the trend in ex-vessel value of landings (gold line and right-hand axis) is toward decreasing value after 1989. Gross earnings (green line, left-hand axis) also diminish during the period. Again, the data validate the assertions of participants who report that while resource availability has been fairly stable in recent decades, market prices have tended to fall and cost factors have tended to rise.

Figure 5-9 above depicts measures of harvest effort and production for Kodiak residents across all fisheries for the period 1980 through 2004. The objective here is to explore the relationship between harvest effort and production on one hand and ex-vessel value and gross earnings on the other.

Note that while overall fishing effort in the Kodiak region has been relatively stable in recent decades, production has risen sharply over time. If our assumption that abundance of marine resources has not changed dramatically over the period is correct, an increasing level of production is, in this case, suggestive of increasing efficiency. Production is also inversely correlated with gross earnings.<sup>[1]</sup> We posit that this indicates a situation of periodic excess supply vis-à-vis limited capacity and demand, and this is supported by data from interviews with key persons in the harvest and processing sectors. Derby-style openings have tended to encourage harvesters to produce en masse. Given limited capacity to process, export, and profitably distribute seafood in distant markets, processors and buyers tend to be overwhelmed when marine resources are suddenly but predictably particularly abundant in the region. Supply exceeds capacity and demand, and buyers reduce prices. Although many do not agree with the approach, one intention of fisheries rationalization is to minimize such volatility by distributing effort and processing capacity more evenly over the course of the year.

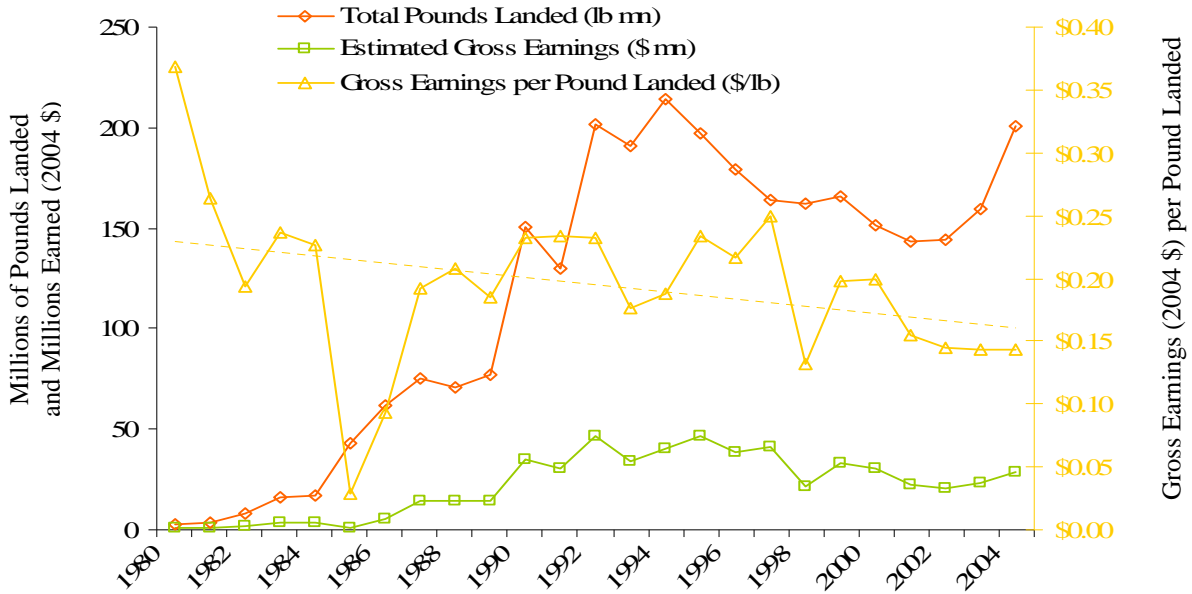
The following figures summarize trends in effort, earnings, and overall production for resident permit holders for the period 1980 through 2004. We depict data for: (a) all species of groundfish combined (Figures 10-11), (b) all species of crab (Figures 12-13), (c) halibut (Figures 14-15), and (d) all species of salmon (Figures 16-17).

The figures are indicative of variation across the fisheries over the course of time. For example, gross earnings have tended to decline for all fisheries except halibut, which exhibits a discernable upward trend. Although seafood landings often tend to be cyclical, production of crab landed from the KMA has diminished significantly since 2000. Production (gray lines in odd-numbered figures) has increased for all fisheries, again with the exception of crab, which exhibited marked variability after 1996.<sup>29</sup>

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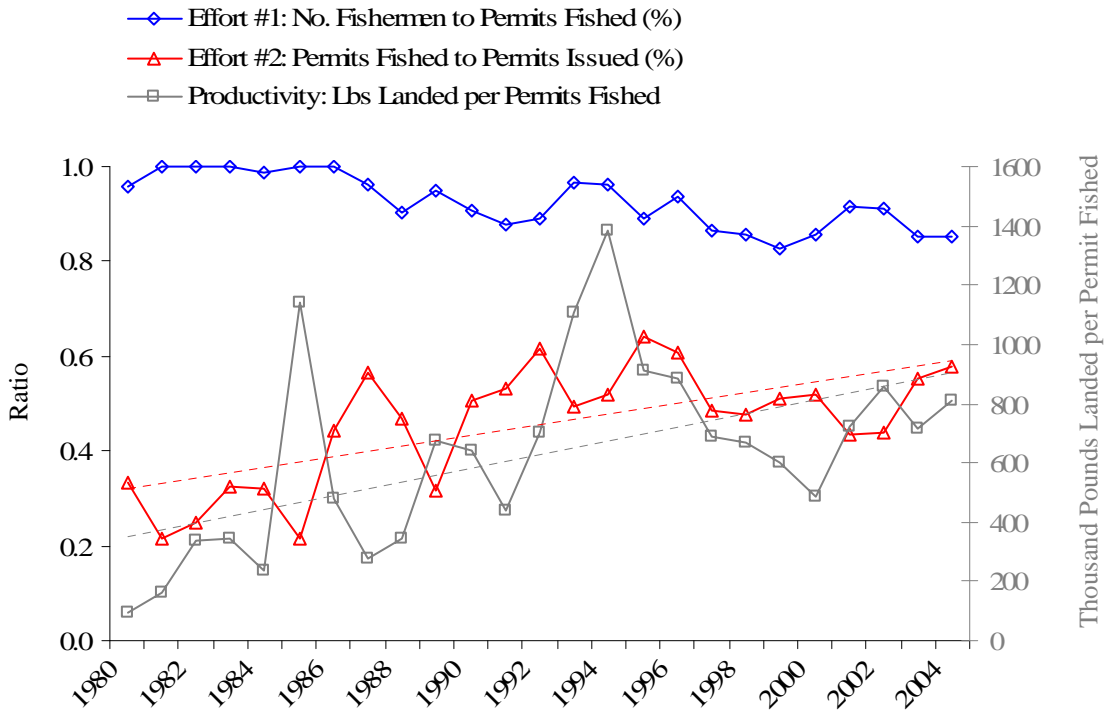
<sup>29</sup> Confidentiality restrictions require that at least three persons or permits be represented when expressing landings or ex-vessel value information for a given fleet, fishery, set of businesses, or other entity. This is not a significant problem for regional-level analysis, but it can challenge reporting and analysis for smaller fisheries and communities in the region.

**Figure 5-10 Landings and Earnings for Resident Groundfish Permit Holders: 1980-2004**



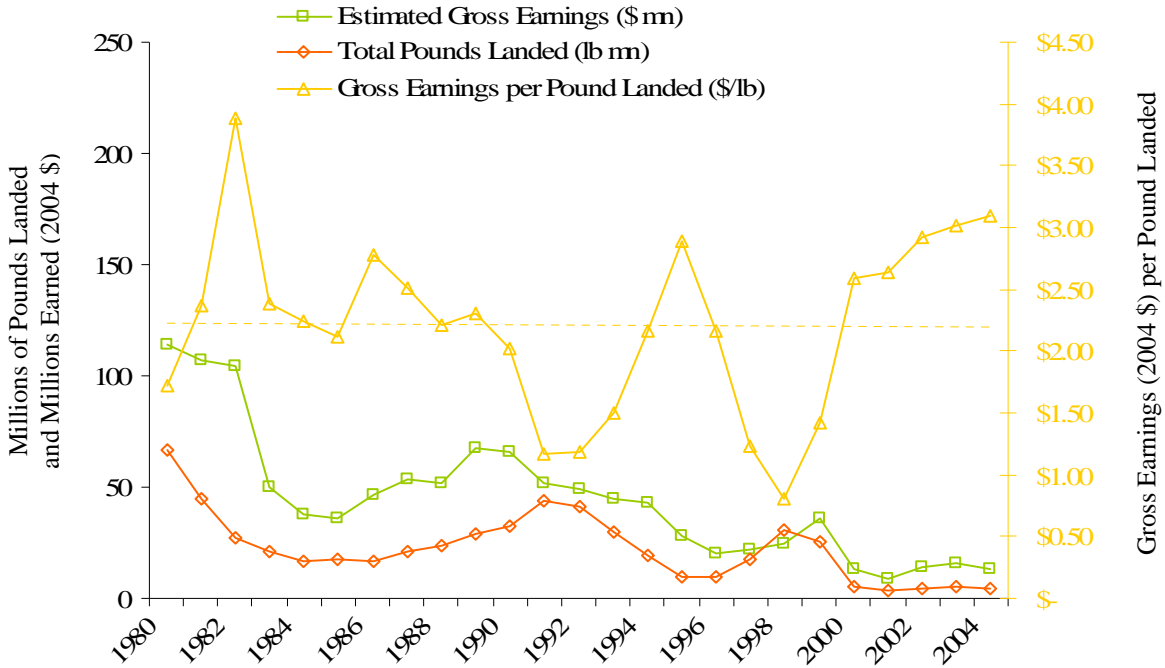
Source: CFEC Special Tabulations: Permit & Fishing Activity by Year, State, Census Area, or City

**Figure 5-11 Effort and Production per Resident Permit, Groundfish Fisheries: 1980-2004**



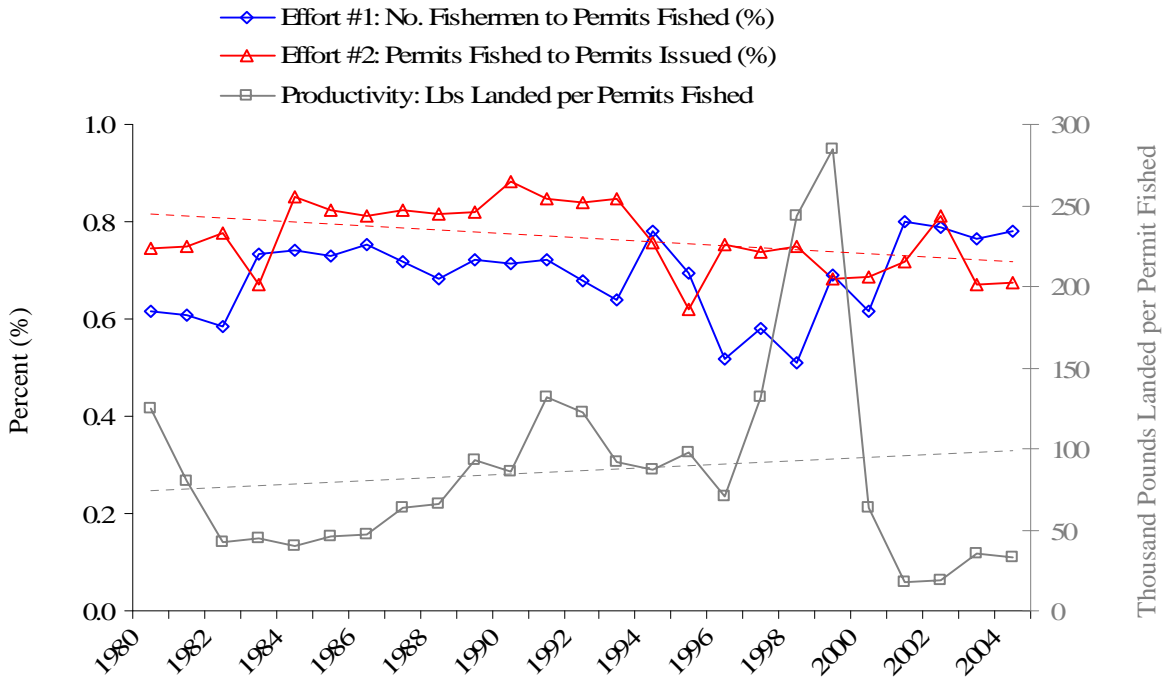
Source: CFEC Special Tabulations: Permit & Fishing Activity by Year, State, Census Area, or City

**Figure 5-12 Landings and Earnings for Resident Crab Permit Holders: 1980-2004**



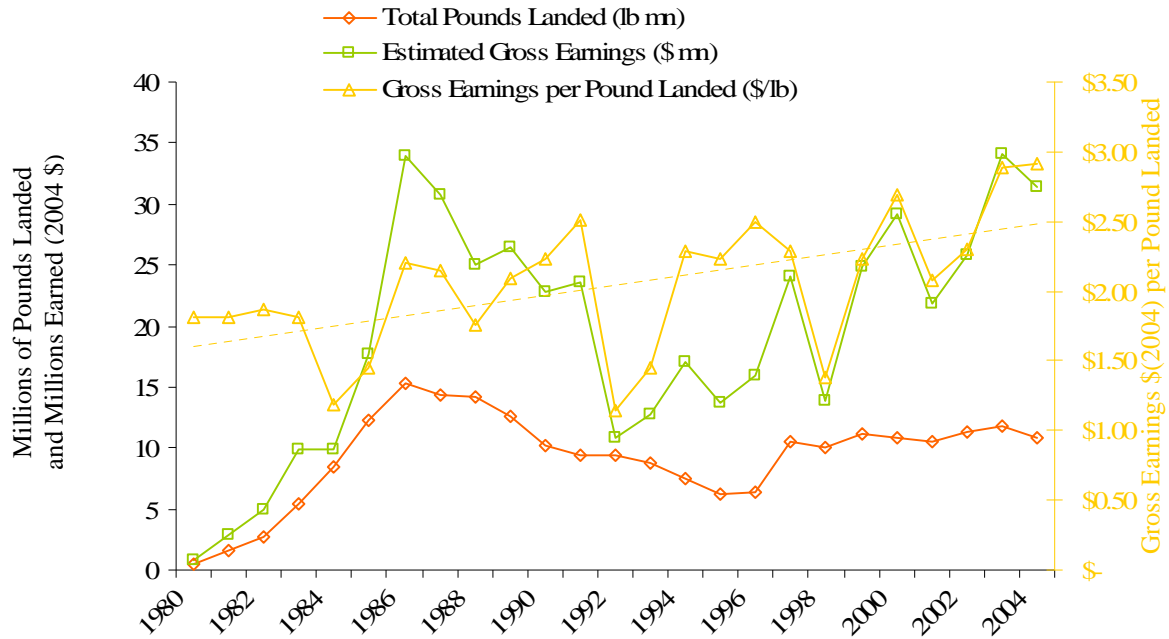
Source: CFEC Special Tabulations: Permit & Fishing Activity by Year, State, Census Area, or City

**Figure 5-13 Effort and Production per Resident Permit, Crab Fisheries: 1980-2004**



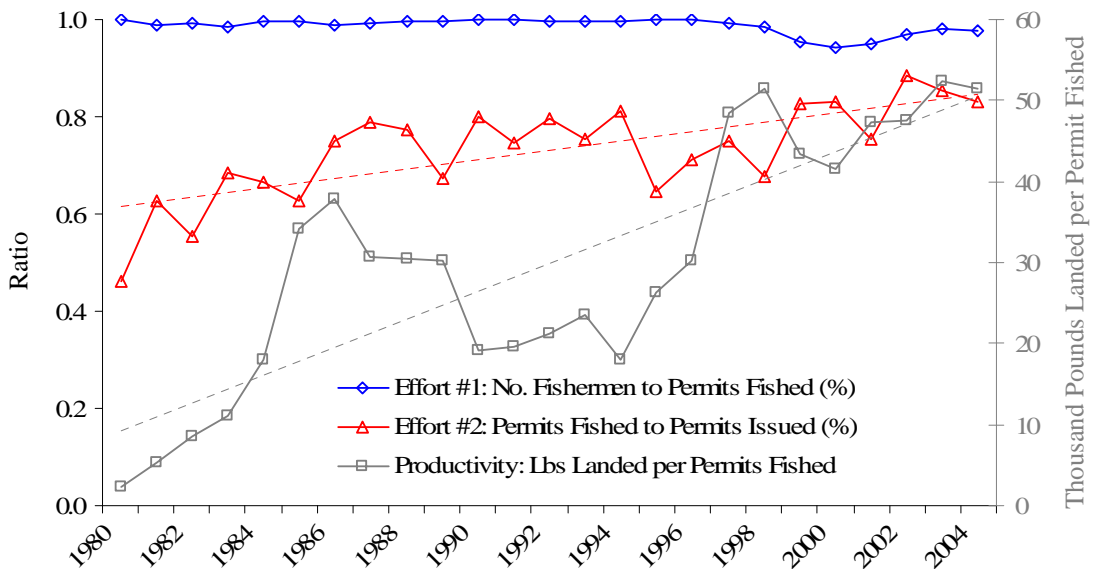
Source: CFEC Special Tabulations: Permit & Fishing Activity by Year, State, Census Area, or City

**Figure 5-14 Landings and Earnings for Resident Halibut Permit Holders: 1980-2004**



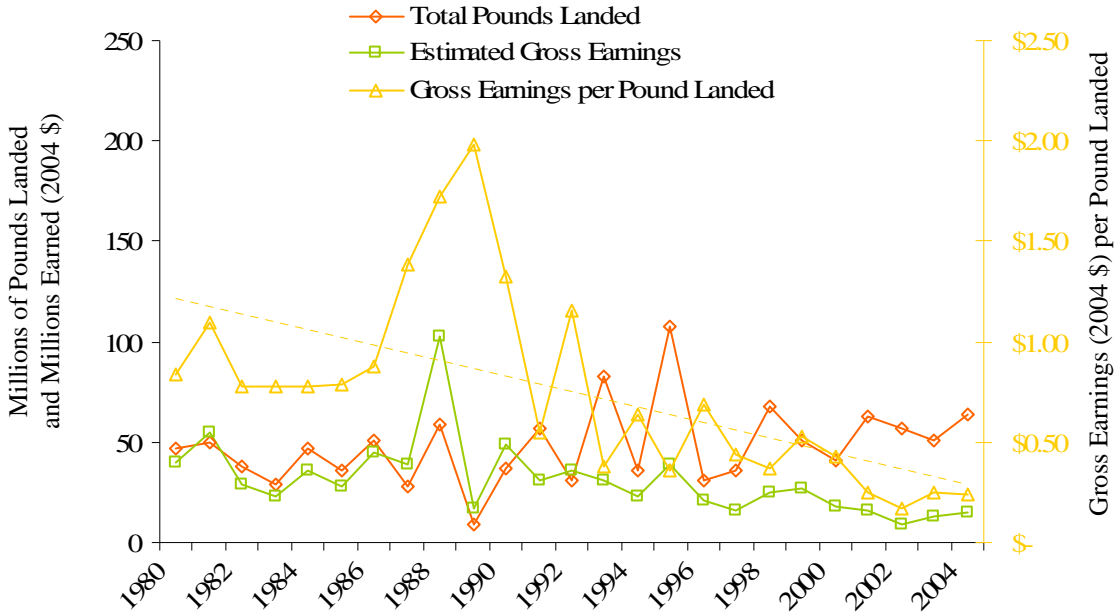
Source: CFEC Special Tabulations: Permit & Fishing Activity by Year, State, Census Area, or City

**Figure 5-15 Effort and Production per Resident Permit, Halibut Fisheries: 1980-2004**



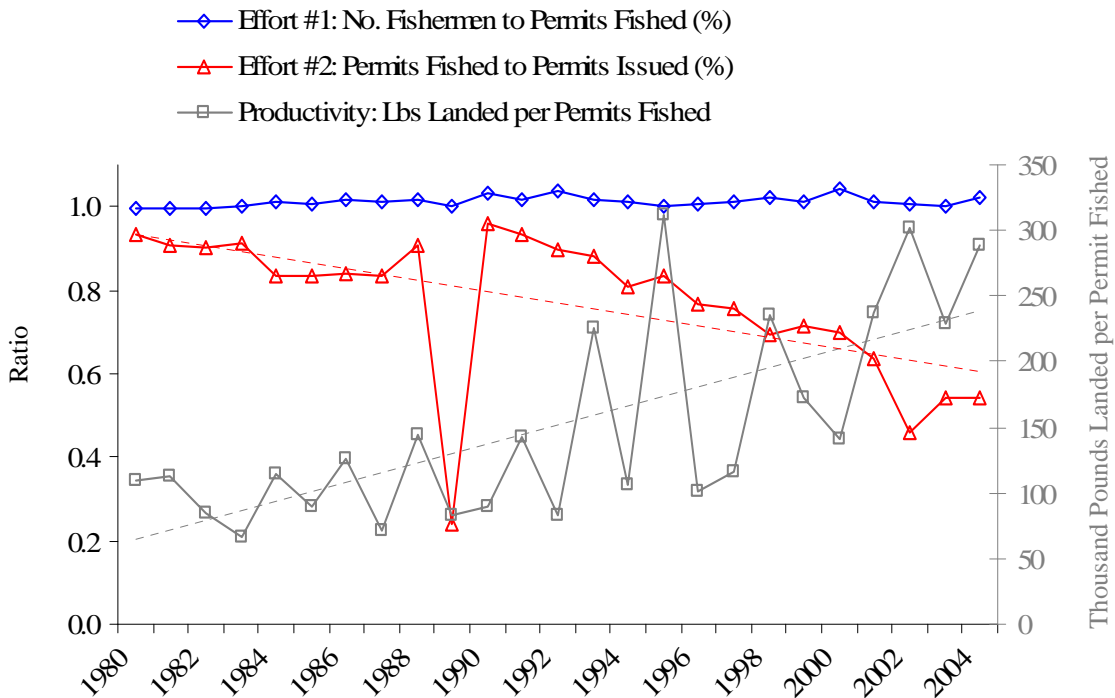
Source: CFEC Special Tabulations: Permit & Fishing Activity by Year, State, Census Area, or City

**Figure 5-16 Landings and Earnings for Resident Salmon Permit Holders: 1980-2004**



Source: CFEC Special Tabulations: Permit & Fishing Activity by Year, State, Census Area, or City

**Figure 5-17 Effort and Production per Resident Permit, Salmon Fisheries: 1980-2004**



Source: CFEC Special Tabulations: Permit & Fishing Activity by Year, State, Census Area, or City



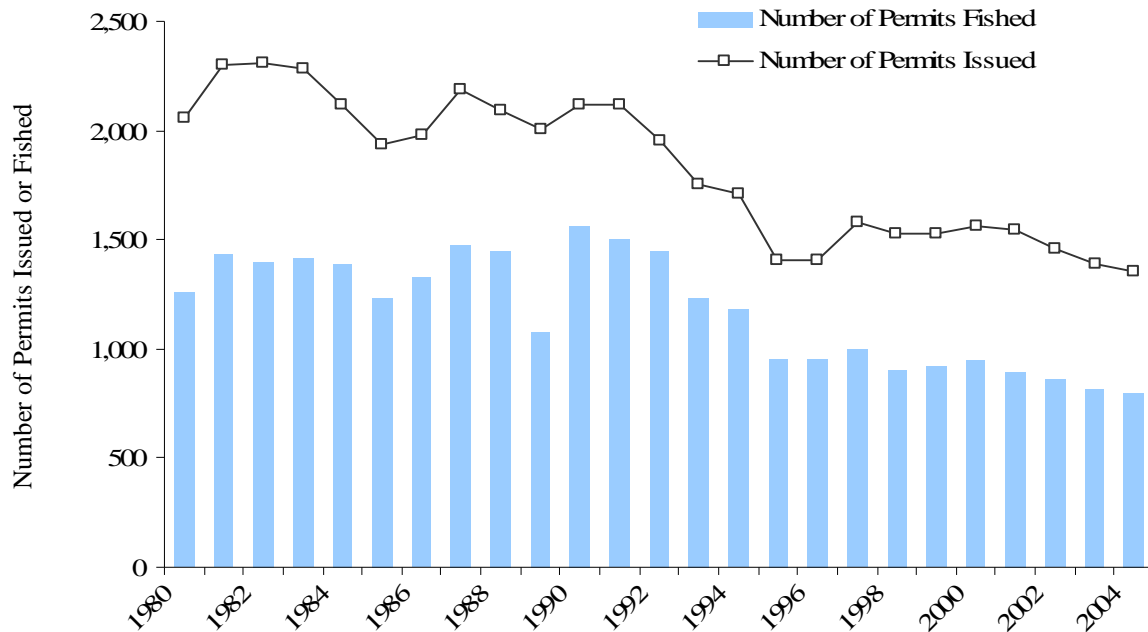
## 5.5 Community-Level Effort, Production, and Earnings

Kodiak Island Borough has thus far been the principal focus of this baseline characterization of commercial fishing activity in the study region. But given interest in the potential community-level effects of punitive damage awards following from settlement, we are also documenting and monitoring localized participation and production in commercial fishing.

The following figures thus summarize commercial fishing activity for select communities in the region. The data are less specific than those presented above in that we combine data across the major fisheries to represent basic trends in effort and production. We limit reporting of data to three communities for which there is notable variation in the nature and scope of fishing activity. These are: Kodiak City (Figures 18 through 20), Larsen Bay (Figures 21 through 23), and Akhiok (Figures 24 through 26). Additional data regarding recent activity in the harvest sector are provided for the six villages and Kodiak City in Section 8.2 of this report.

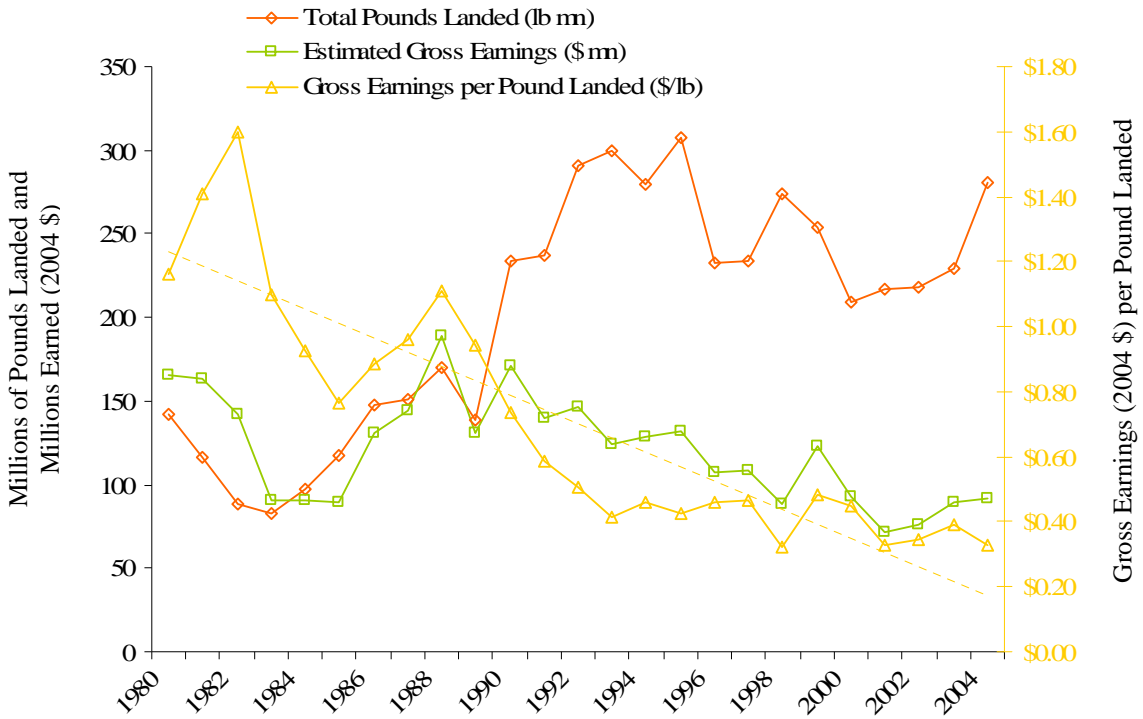
**Kodiak City.** Note that the number of commercial fishing permits used by residents of Kodiak City begins to decline in 1990. Given that most persons active in the harvest sector across the region are residents of Kodiak City, patterns of effort, production, and ex-vessel value are similar for local and regional levels of analysis.

**Figure 5-18 Commercial Permits Issued and Fished by Residents of Kodiak City, All Fisheries: 1980-2004**



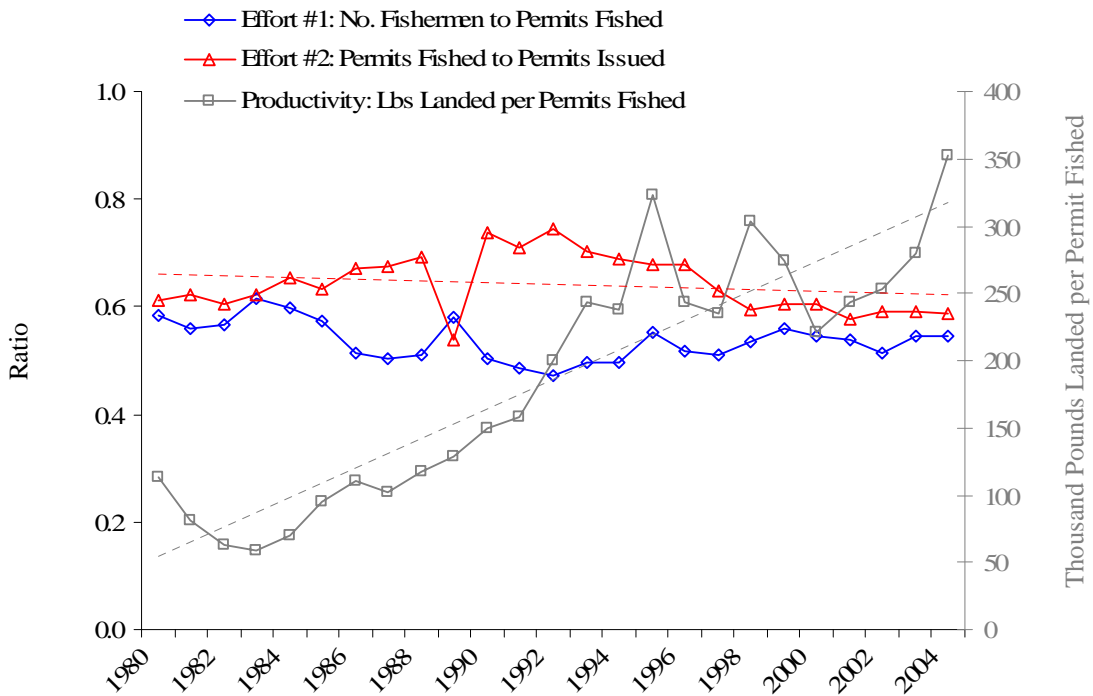
Source: CFEC Special Tabulations

**Figure 5-19 Landings and Earnings for Residents of Kodiak City, All Fisheries: 1980-2004**



Source: CFEC Special Tabulations

**Figure 5-20 Effort and Production per Permit for Residents of Kodiak City, All Fisheries: 1980-2004**



Source: CFEC Special Tabulations

**Larsen Bay.** A trend of declining participation in the commercial fishing industry is clearly indicated for residents of Larsen Bay. This validates interview data regarding local involvement in the region’s salmon fishery and the many challenges that have been experienced by residents active in that fishery during recent years. Most permits are for salmon; a few residents hold permits for groundfish, halibut, and crab.

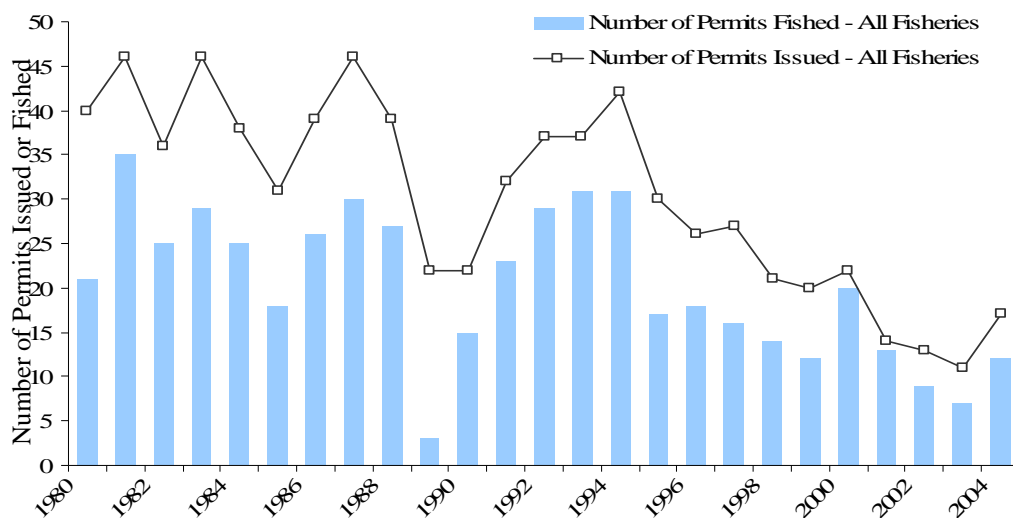
Our interview data indicate that 19 percent of all Larsen Bay households currently derive income from commercial fishing, down from 57 percent ten years prior. Participants in the study report that numerous families departed the village when the fishing economy was severely depressed in the early 1990s, and many mark this period with memory of the oil spill and frustration with the litigation process. One key informant described the situation in the following way:

“If it had been just a year or two of waiting for the [punitive] settlement, people could have and would have waited it out. But by about 1992 or 1993, when salmon prices didn’t recover, people just gave up. People just stopped waiting. That’s when some of the big families started leaving.”

Seven residents currently hold salmon permits and two hold tanner crab permits. Eight were issued a total of 18,000 pounds of halibut IFQ in 1995. But by 1997, 97 percent of the quota had been transferred out of the community, either through sale or emigration of shareholders.

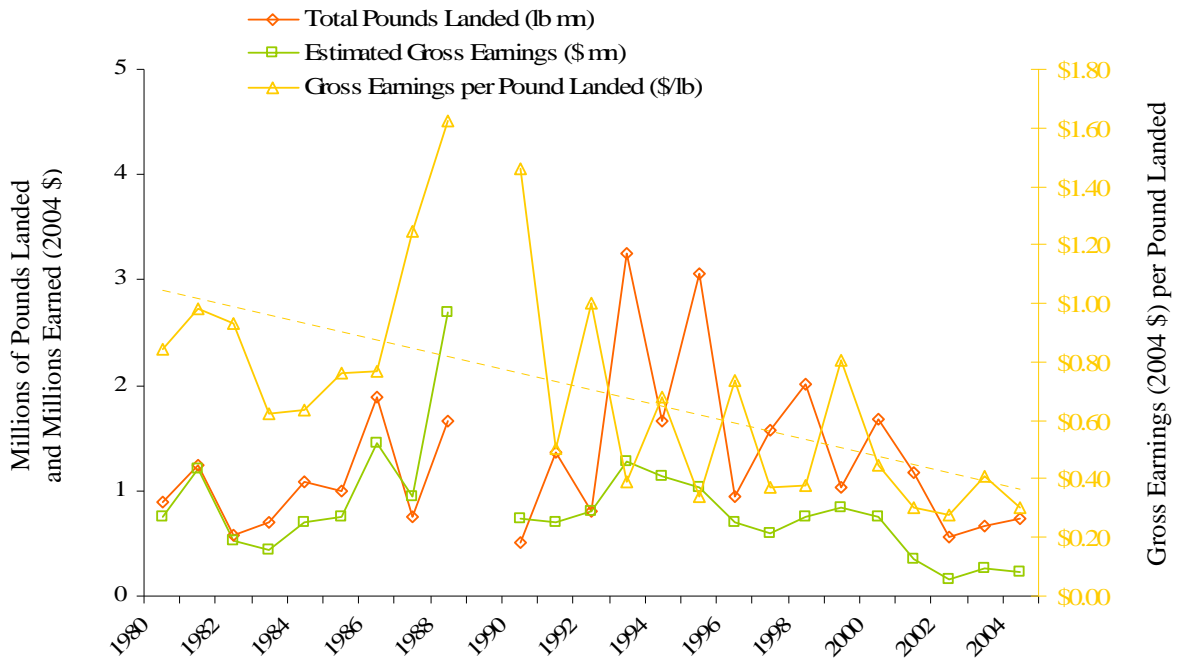
The recent upturn in the permit activity is indicative of improving market conditions for Kodiak-caught wild salmon. Although local participation in the region’s commercial fishing industry diminished significantly during the time series depicted in the figures, some residents report optimism that future years will be more productive, and some are poised to invest in vessels and gear should market conditions continue to improve.

**Figure 5-21 Commercial Permits Issued and Fished by Residents of Larsen Bay, All Fisheries: 1980-2004**



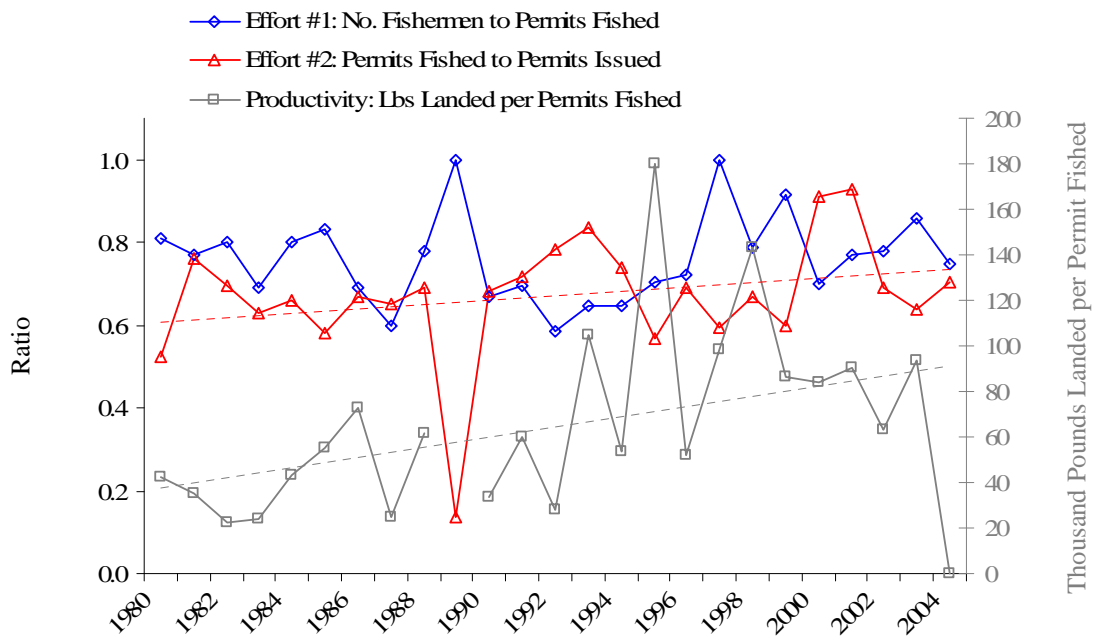
Source: CFEC Special Tabulations:

**Figure 5-22 Landings and Earnings for Residents of Larsen Bay, All Fisheries: 1980-2004**



Source: CFEC Special Tabulations

**Figure 5-23 Effort and Production for Residents of Larsen Bay, All Fisheries: 1980-2004**



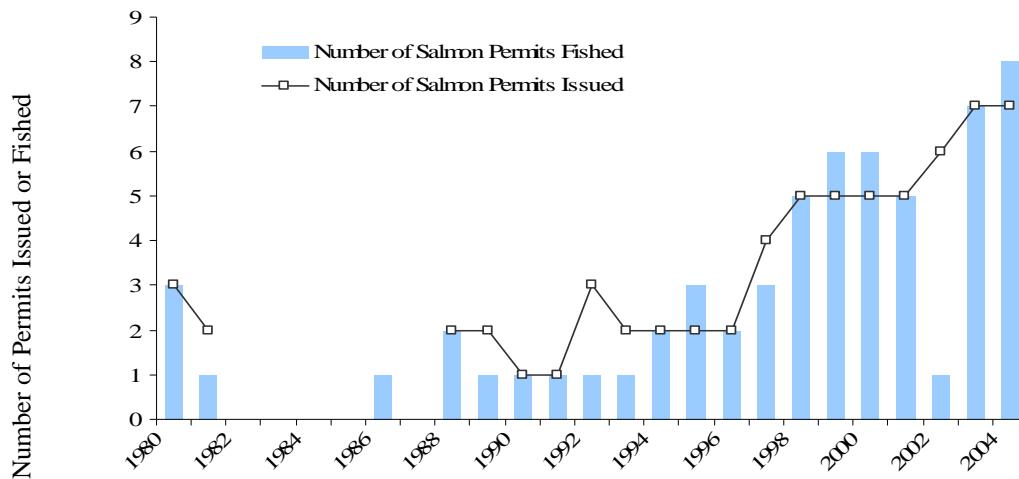
Source: CFEC Special Tabulations

**Akhiok.** Fisheries trends of interest for residents of Akhiok are unlike those for residents of Kodiak City and Larsen Bay. With the exception of an abrupt, single-year drop in activity in 2002 that is associated with the EVOS land trust settlement, the number of active salmon permits held by Akhiok residents increases dramatically after 1989.<sup>30</sup> Salmon is the only fishery in which Akhiok residents participate to any significant extent. One halibut permit was issued for the period 1990 through 1994, one groundfish permit was issued for 1997 through 2000, and one herring permit was issued for 2003 through 2004. Confidentiality restrictions under the rule of three obviated more extensive description of local involvement in the region’s marine fisheries.

Diminished use of commercial fishing permits by Akhiok residents during the year of the EVOS land trust liquidation (described in Chapter Two of this report) is indicative of temporary distraction from involvement in the industry. Interviews with residents support this explanation: many people left the community that year, and typical ways of living were in many cases temporarily altered. Conditions began to normalize the following year, and rates of participation in subsistence hunting and fishing were reportedly high in 2003 (Davis in Fall et al. 2006:140).

The case is particularly significant given the focus of this study on assessing the potential social and economic effects of punitive damage awards at various levels of analysis across the study region. Although the number of permit holders in question is relatively small, and greater variation in effect would be expected across a larger population of fishermen, the outcome of the Akhiok land trust issue may well be of predictive utility for monitoring the effects of the punitive damages settlement in the adjacent communities of Larsen Bay, Ouzinkie, and Karluk.

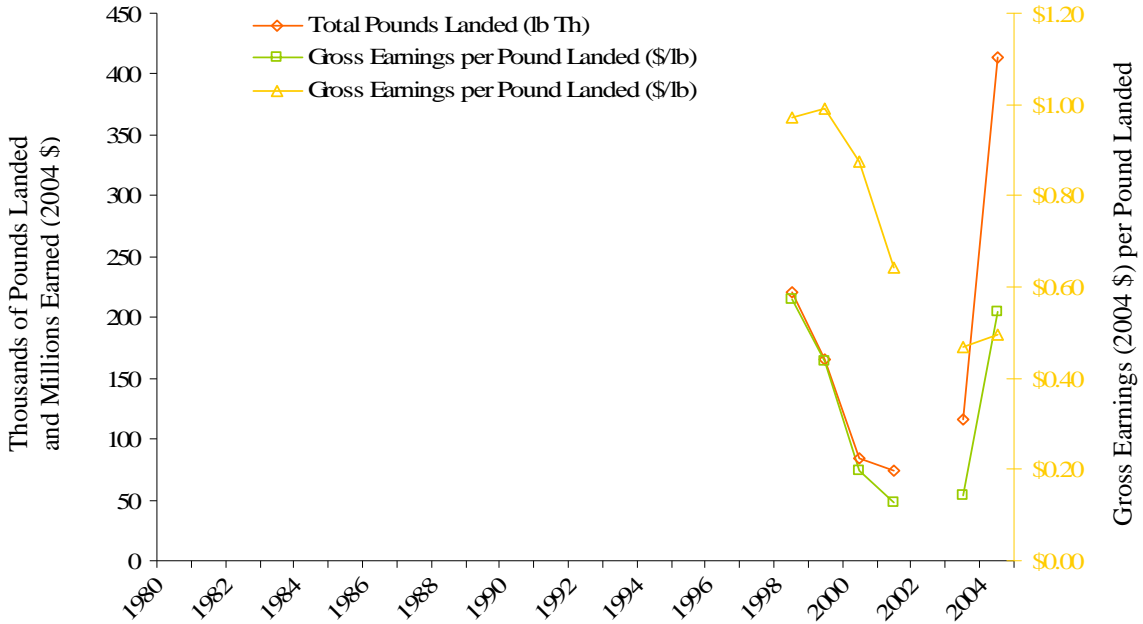
**Figure 5-24 Commercial Permits Issued and Fished by Residents of Akhiok, All Fisheries: 1980-2004**



Source: CFEC Special Tabulations

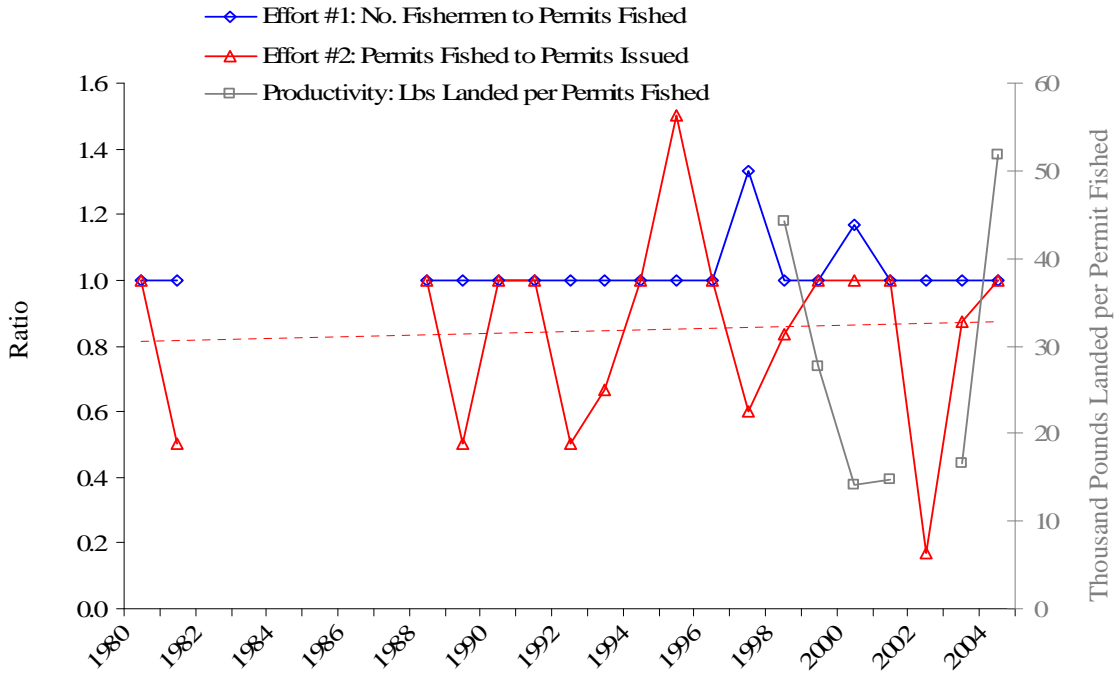
<sup>30</sup> Note that the number of permits fished is higher than the number of permits issued in certain years. This is observed in cases where a permit was revoked or where persons fishing under an interim-use permit eventually received permanent status.

**Figure 5-25 Landings and Earnings for Residents of Akhiok, All Fisheries: 1980-2004**



Source: CFEC Special Tabulations

**Figure 5-26 Effort and Production for Residents of Akhiok, All Fisheries: 1980-2004**



Source: CFEC Special Tabulations



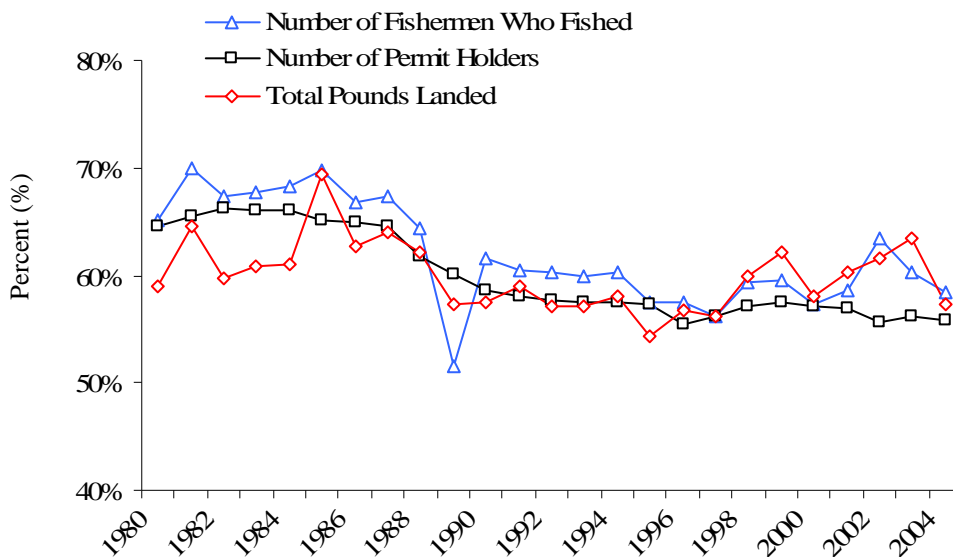
Traditional Structure in the Village of Akhiok, Summer 2005

### 5.6 Participation of Kodiak Residents in KMA-Specific Salmon Fisheries

The previous figures depicted participation of Kodiak residents in the major fisheries occurring within and beyond the KMA. This section focuses more specifically on the involvement of residents in fisheries that are executed wholly within the KMA. The descriptive analysis is intended to elucidate residency factors in the harvest sector of Kodiak’s salmon fisheries.

Figure 5-27 below depicts participation of Kodiak residents as a proportion of the: (a) total number of participating fishers, (b) total number of active permits, and (c) total landings of the five salmon species pursued within the KMA. The data cover the period 1980 through 2004. Significantly, a clear downward trend is indicated for each of the variables through the mid-1990s, but with improving trends thereafter.

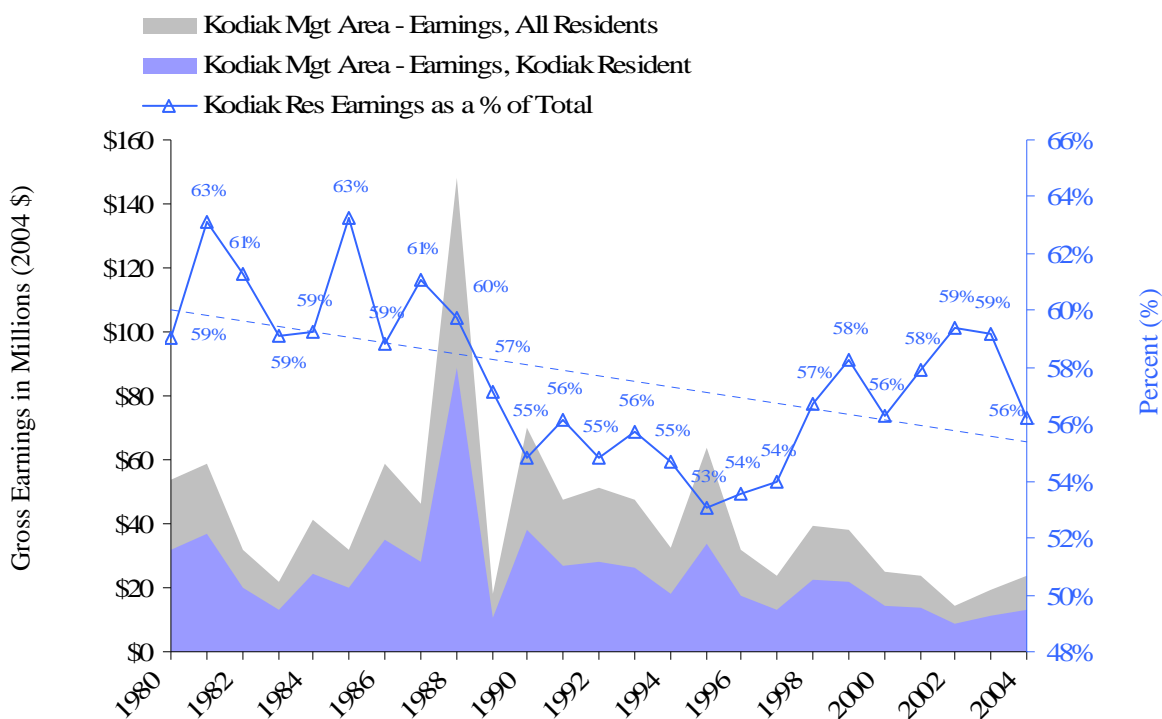
Figure 5-27 Proportion of Resident Fishers, Permits, and Landings for KMA Salmon Fisheries: 1980-2004



Source: CFEC Special Tabulations

Figure 5-28 below depicts trends in gross earnings for resident and non-resident fishery participants who harvested salmon resources in the KMA between 1980 and 2004. The figure also depicts revenue generated by residents as a proportion of total earnings generated through harvest of salmon in the KMA. Note that the figure indicates a greater proportion of resident earnings early in the period, followed by a downward trend during the mid-1990s, and a gradual return to former conditions late in the period. This validates interview data that is descriptive of increasing participation of Seattle-based fishermen in KMA salmon fisheries beginning some time after the oil spill.

**Figure 5-28 KMA Salmon Gross Earnings- Kodiak Resident vs. Total Resident and Non-Resident: 1980-2004**



Source: CFEC Special Tabulations



## 5.7 Residency and Permit Ownership

Figures 5-29 through 5-39 depict trends in residency status for limited-entry KMA salmon and roe herring fisheries during the period 1975 through 2004.<sup>31</sup> The data used for the exhibits is drawn from CFEC Report No. 05-3N (Tide et al. 2005) and related tabulations prepared by CFEC staff for purposes of this study.

Figure 5-29 summarizes residency status for KMA-specific limited entry permit trends across all salmon fisheries and gear types over the period in question. Figures 5-31 through 5-35 provide similar data for specific salmon fisheries.

The system for determining residency status is an important feature of the CFEC permit ownership and transfer database. The system defines five types of participants. These are as follow:

1. An Alaska resident of a rural community that is local to the fishery (for example, a resident of a village on Kodiak, such as Old Harbor);
2. An Alaska resident of a rural community that is not local to the fishery (for example, a resident of Seward, Alaska);
3. An Alaska resident of an urban community that is local to the fishery (in this case, Kodiak City);
4. An Alaska resident of an urban community that is not local to the fishery (such as Anchorage); and
5. A non-resident (such as a fishery participant from Seattle).

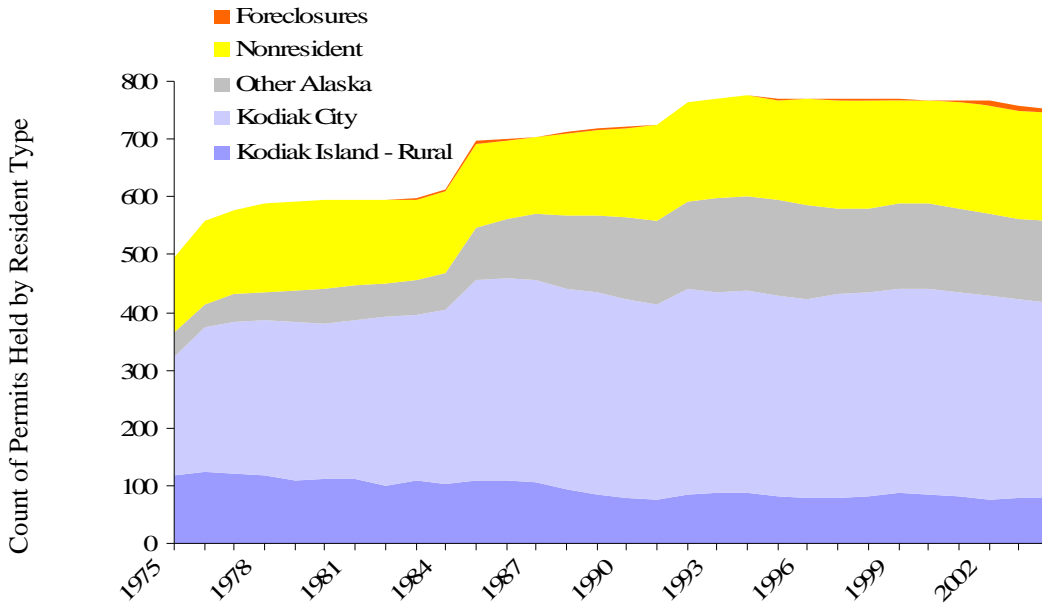
For purposes of this descriptive analysis, we have combined types (2) and (4) above to form a type called “Other Alaska.” We also include a foreclosure category. A total of 29 permits were foreclosed during the time period reviewed here. These normally occur when the owner of a nontransferable permit passes away or does not renew his or her permit. Administrative cancellations are not common but do occur in some instances. The highest number of foreclosures occurred in 2004, when eight permits were foreclosed.

The proportions depicted in Figure 5-30 correspond to the ownership levels exhibited in Figure 5-29 for resident categories. Rural Kodiak Island Borough resident ownership as a proportion of total permits held declined during the first half of the 30-year historic period and then leveled off. Permit ownership among Other Alaskans increased sharply from 1985 to 1995 then leveled off. Permit ownership is concentrated among residents of Kodiak City and remained stationary over the 30-year period. Non-resident ownership dipped in the late 1980s and then recovered and leveled off.

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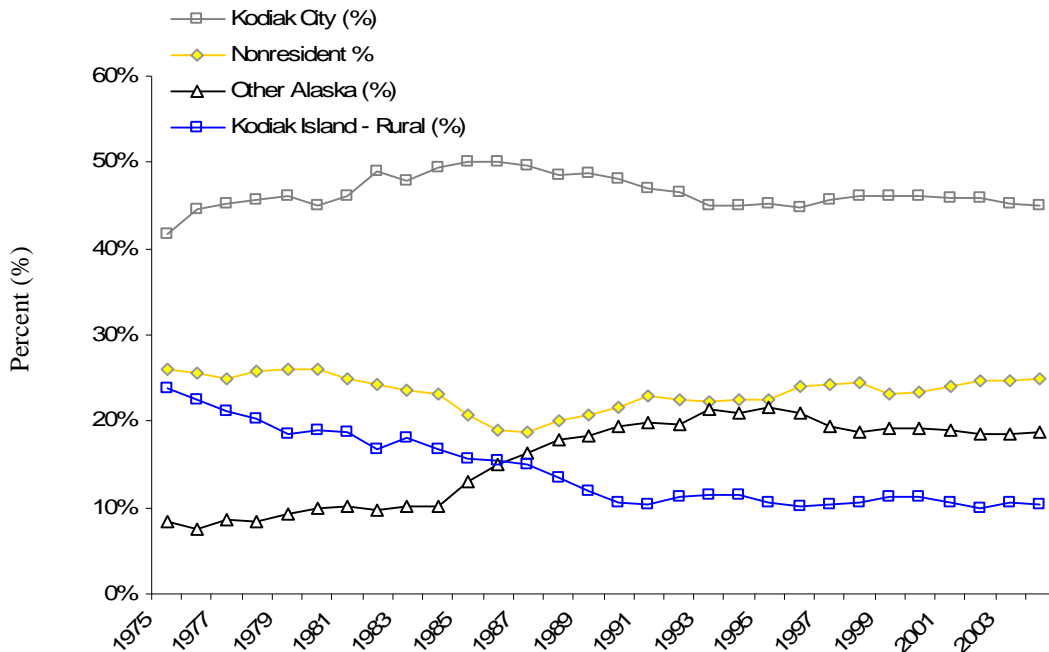
<sup>31</sup> The five limited-entry fisheries in the KMA include: salmon purse seine, salmon beach seine, salmon set net, roe herring seine and roe herring gillnet.

**Figure 5-29 Ownership of KMA Limited Entry Salmon Permits by Residence Status: 1975-2004**



Source: Tide et al. (2005) and CFEC Special Tabulations

**Figure 5-30 Ownership of KMA Limited Entry Salmon Permits by Residence Status (%)**



Source: Tide et al. (2005) and CFEC Special Tabulations

The data in Figure 5-29 above, and Table 5-2 below, indicate that total KMA salmon permit holdings for residents and non-residents increased from less than 500 in the mid-1970s to over 750 by the early 2000s. This is a 50 percent increase.

In keeping with interview data regarding diminished participation in commercial fishing in the region, permit ownership among residents of rural Kodiak communities declined by about one-third during the period; over 120 permits were held by rural residents in the late 1970s, and less than 80 were held in 2004. As expressed elsewhere in this report, this is particularly significant in that commercial fishing often provides an important source of livelihood that may be seen as a means for enabling subsistence practices and related cultural activities.

The number of Kodiak City residents holding permits during the period increased from about 250 in the mid-1970s to over 350 in the late 1990s. The number then dropped slightly. Ownership of KMA limited entry permits among other Alaskans doubled during the period. Ownership of permits by non-residents increased from about 150 permits in 1975 to about 185 permits in 2004.

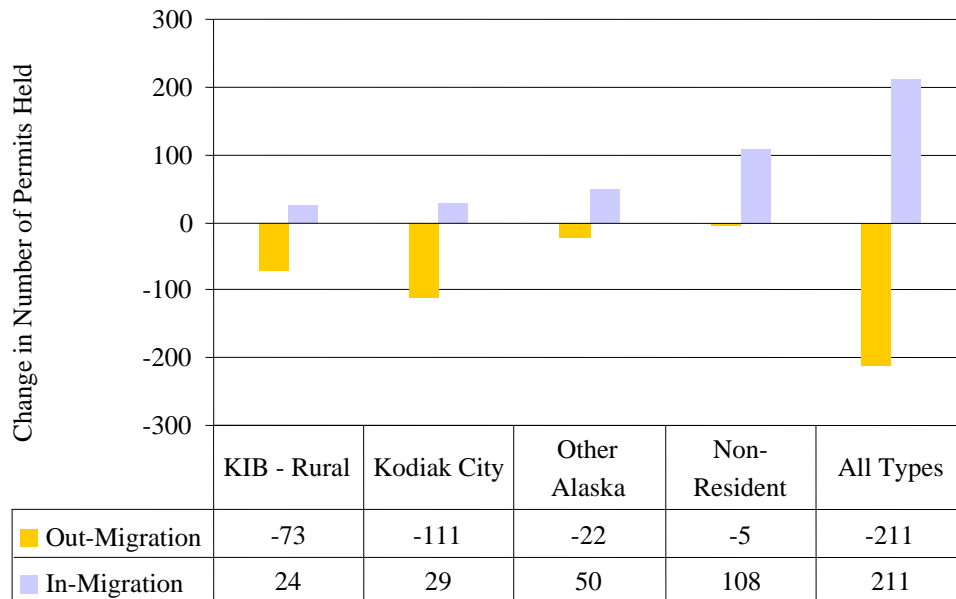
**Table 5-2 Average Number of KMA Salmon Permits Held by Residence Status and Time Period**

Year	Residence Status					Total
	Kodiak Island	Kodiak City	Other Alaska	Non-resident	Foreclosures	
1975 – 1989	109	295	74	144	1	622
1990 - 2004	82	349	150	178	3	761
1975 – 2004						
Maximum	125	356	167	189	8	776
Minimum	75	206	40	129	0	494
Std Deviation	15.9	41.8	22.6	19.7	2.3	85.6

Source: CFEC Special Tabulations

It should be kept in mind that the number of permits held per type of resident type can change because: (1) the permit holder migrates to another location, (2) the permit is transferred to another person, and (3) the permit is cancelled or subject to foreclosure. Migration and transfer of owners accounts for nearly all changes in ownership. Figure 5-31 below summarizes the effects of in- and out-migration on the distribution KMA salmon and roe herring permits among the various types of permit holders for the period 1975 through 2004.

**Figure 5- 31 In- and Out-Migration and Ownership of KMA Salmon and Roe Herring Limited Entry Permits: 1975-2004**

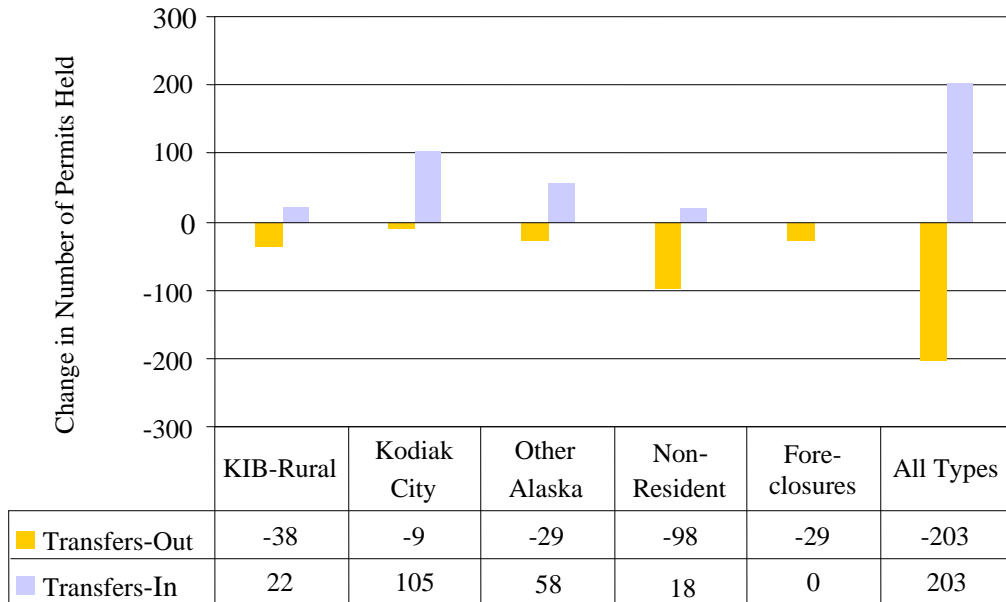


Source: Tide et al. (2005) and CFEC Special Tabulations

As is indicated in the figure above, out-migration of permit holders from both rural Kodiak villages and from Kodiak City was extensive during the period of interest. Some influx of permit holders from within Alaska is noted, but most new permit holders were arriving from outside the state.

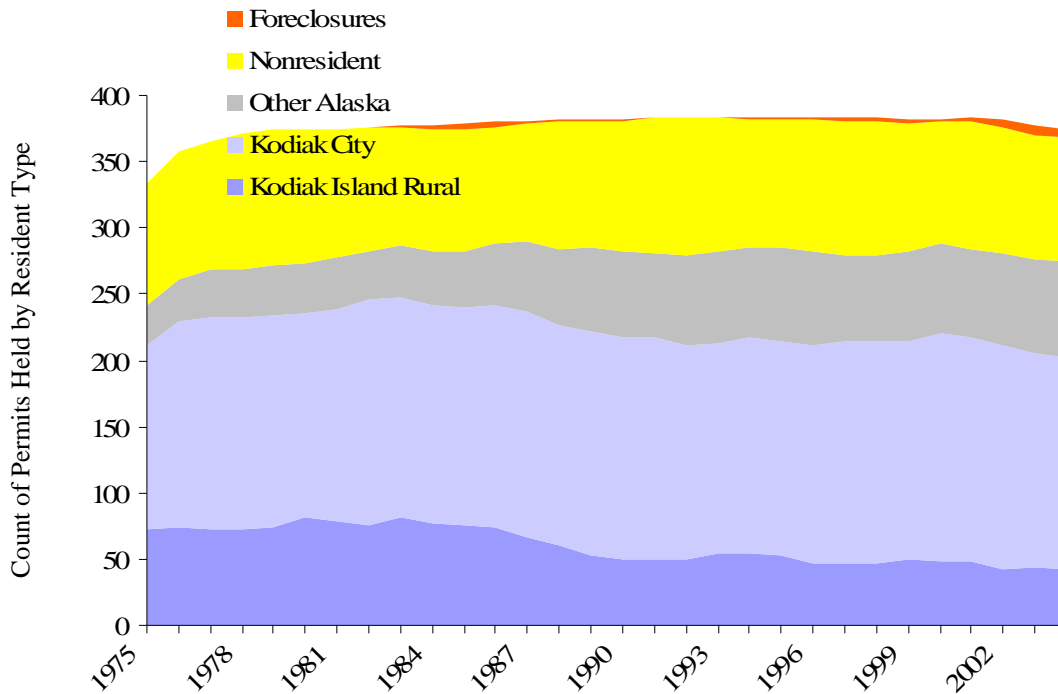
A different pattern is noted for transfer of permits. The outward rate of transfer is greatest among non-residents. This might be expected given the exigencies of seasonal travel to Alaska and other challenges associated with working in a distant location. Transfers are also common among residents of the rural villages. This is supported by interview data that are suggestive of exit from the commercial fishing industry during periods of challenging market conditions. Inward-bound transfers are concentrated among residents of Kodiak City and other parts of Alaska.

**Figure 5-32 Transfer of KMA Salmon and Roe Herring Limited Entry Permits: 1975-2004**



Source: Tide et al. (2005) and CFEC Special Tabulations

**Figure 5-33 Patterns of Ownership of Salmon Purse Seine Fishery Limited Entry Permits: 1975-2004**

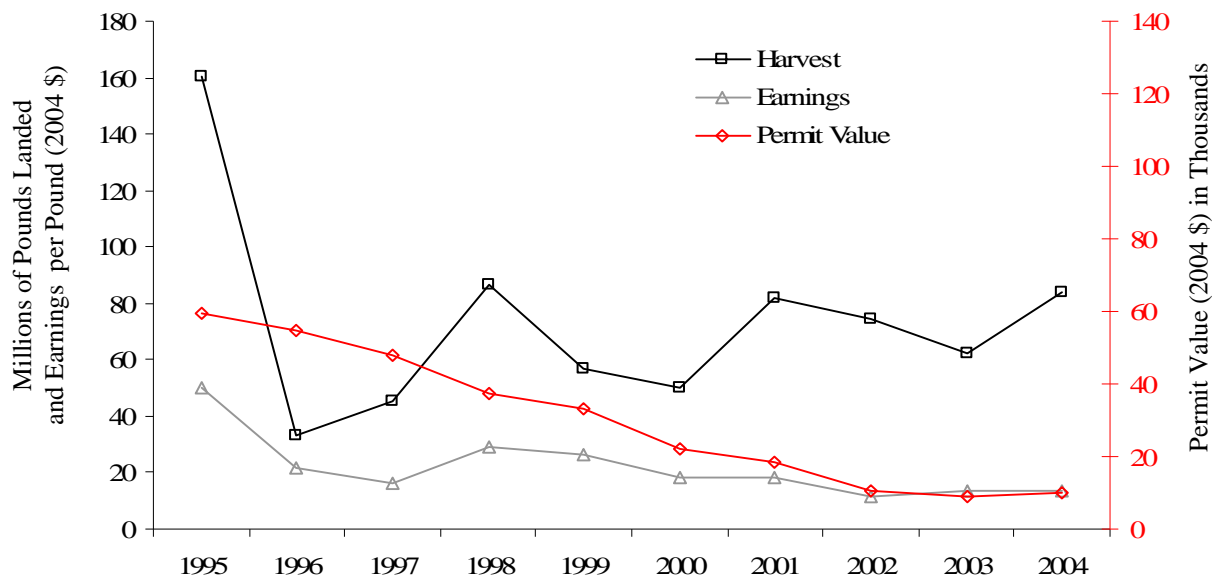


Source: Tide et al. (2005) and CFEC Special Tabulations

The data conveyed in Figure 5-33 above, and in Figures 5-34 through 5-38 below, are descriptive of patterns of permit ownership for specific limited entry fisheries in the KMA. Figures 5-34 and 5-35 summarize the relationship between landings, earnings, and permit value for the salmon purse seine and salmon set gillnet fisheries, respectively, during the period 1995 through 2004.

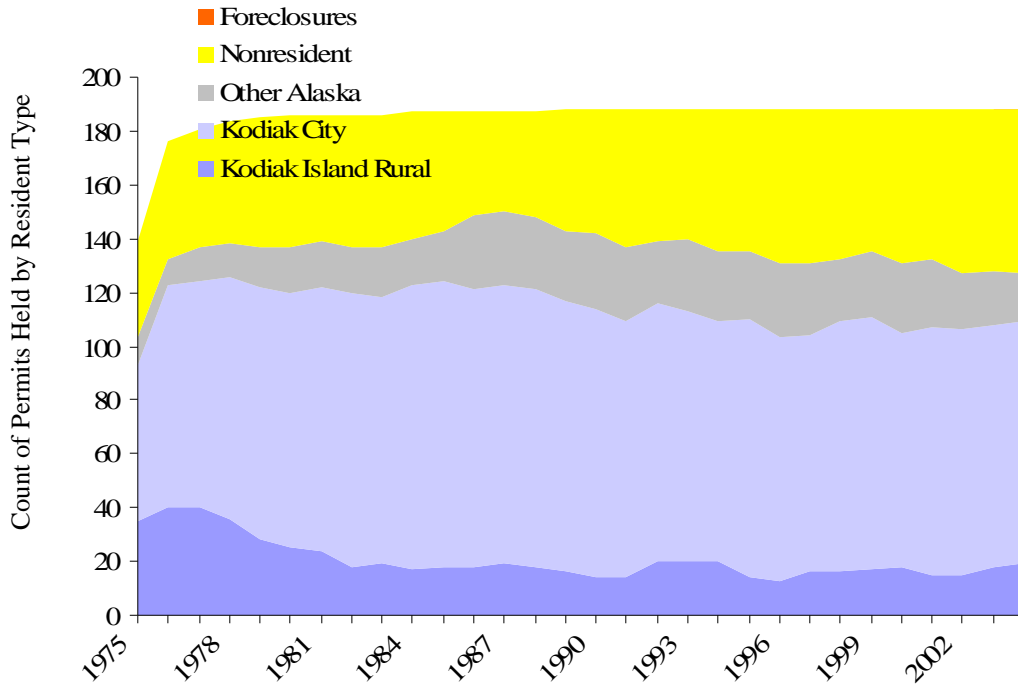
Note that for both the seine and set gillnet fisheries, the correlation coefficient between earnings and the value of permits is 0.7, indicating a strong linear association. This is intuitive, and in keeping with both interview data and theoretical concepts about optimization, in that actual and prospective permit holders typically base decisions about transfer and acquisition of commercial fishing permits in part on the likelihood that involvement in the fisheries in question will be profitable. It is also significant for this study in that decisions to invest or reinvest in the region's commercial fishing industry following disbursement of punitive damage awards will hypothetically be based in part on similar rationale.

**Figure 5-34 Landings, Earnings, and the Value of Permits, KMA Salmon Purse Seine Fishery: 1995–2004**



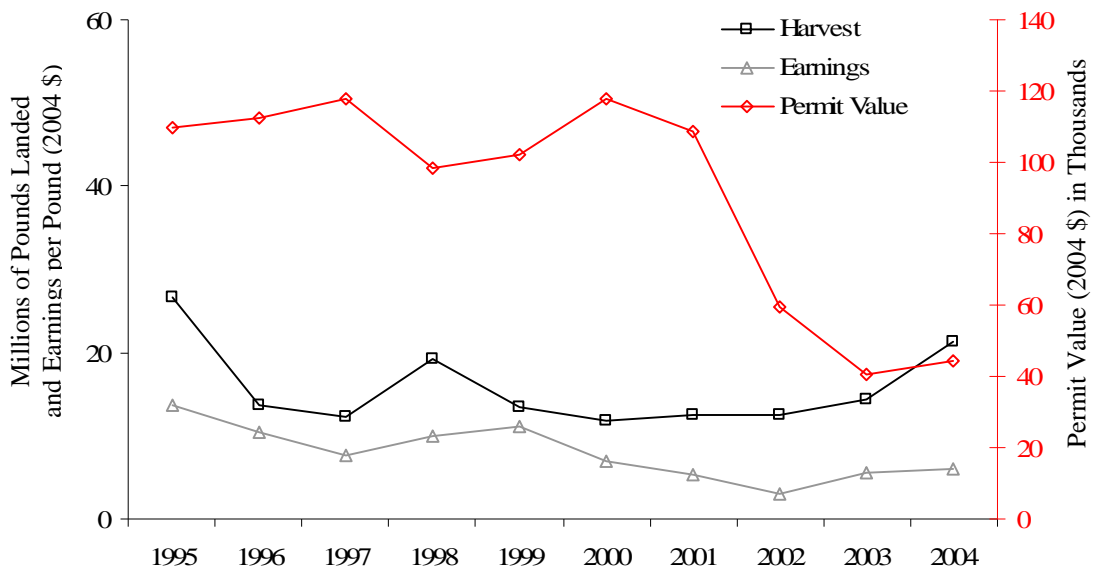
Source: Tide et al. (2005) and CFEC Special Tabulations

**Figure 5-35 Patterns of Ownership of KMA Salmon Set Net Limited Entry Permits: 1975–2004**



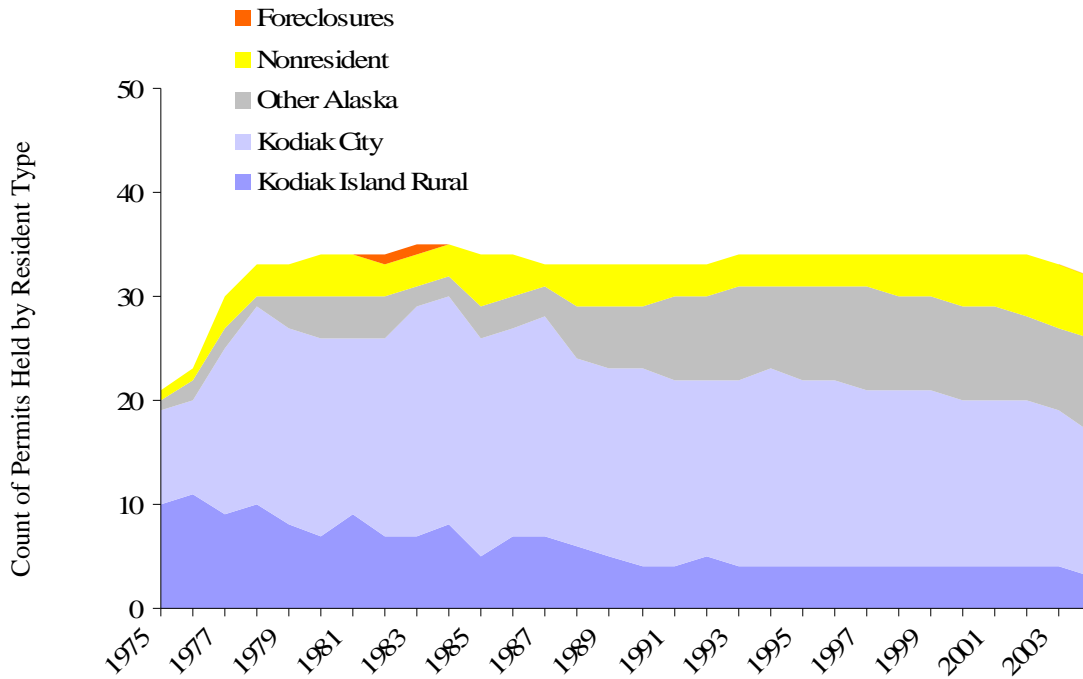
Source: Tide et al. (2005) and CFEC Special Tabulations

**Figure 5-36 Landings, Earnings, and the Value of Permits, KMA Salmon Set Gillnet Fishery: 1975–2004**



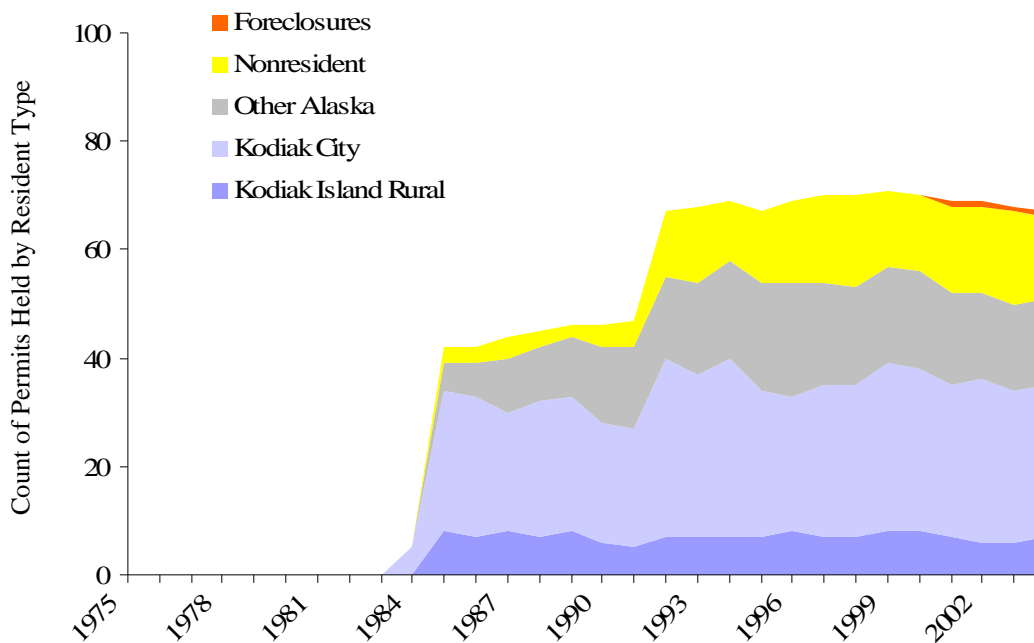
Source: Tide et al. (2005) and CFEC Special Tabulations

**Figure 5-37 Patterns of Ownership of KMA Limited Entry Salmon Beach Seine Permits: 1975-2004**



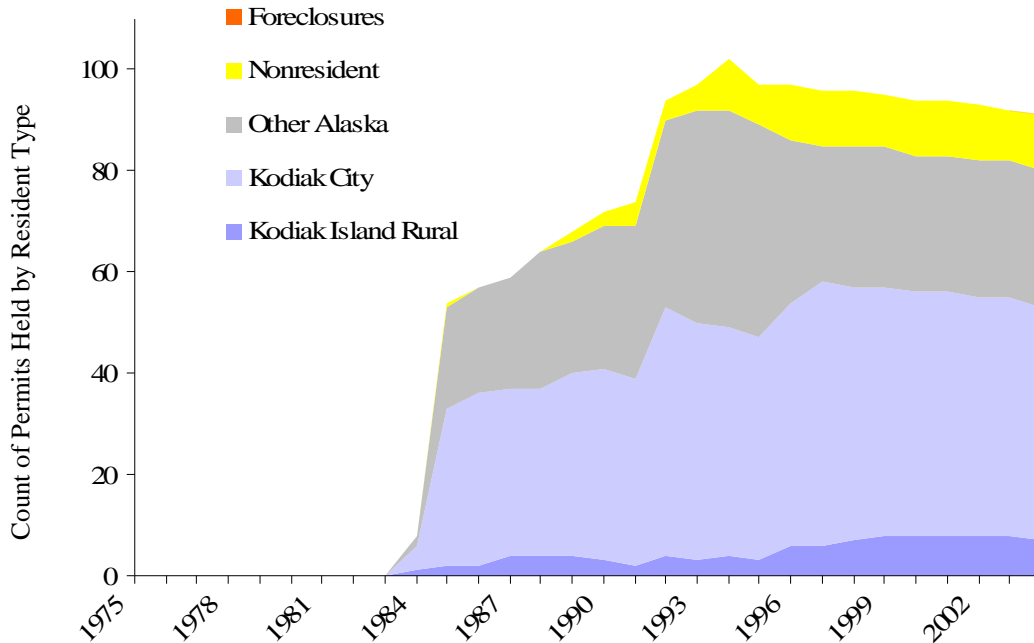
Source: Tide et al. (2005) and CFEC Special Tabulations

**Figure 5-38 Patterns of Ownership of KMA Salmon Roe & Herring Seine Permits: 1975-2004**





**Figure 5-39 Patterns of Ownership of KMA Limited Entry Salmon Roe Gillnet Permits: 1975-2004**



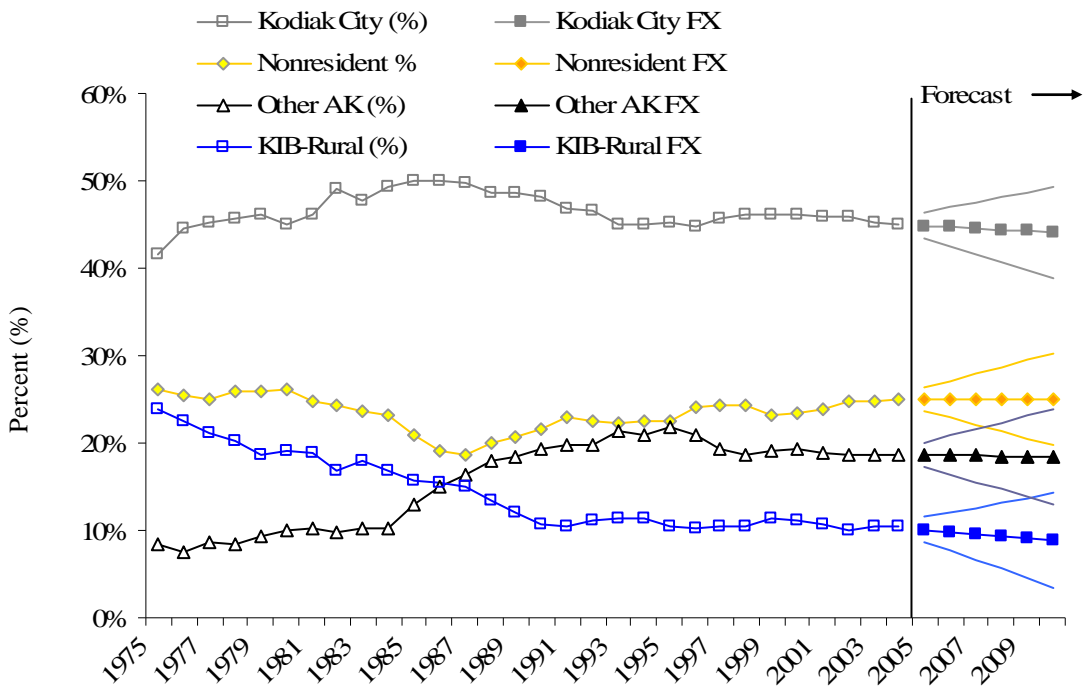
Source: Tide et al. (2005) and CFEC Special Tabulations

### 5.8 Forecast of Patterns of Permit Ownership

Figure 5-40 below presents a forecast for patterns of permit ownership for the period 2005 through 2010. The forecast was prepared using a Holt exponential smoothing model and data regarding historic changes in ownership as presented in Figure 5-30 above for salmon limited entry fisheries conducted in the KMA. The forecast assumes that new limited entry permits will not be issued by state government and that some foreclosures and forfeitures will occur during the period.

Results of the forecast model suggest that proportions of permit ownership will gradually decline for Alaskans. Non-resident proportions are predicted to remain constant at 25 percent. Note that the graph depicts 95 percent confidence intervals above and below the forecast data points.

**Figure 5-40 Forecasts of Ownership Patterns for KMA Limited Entry Permits: 2005-2010**



Source: Tide et al. (2005), CFEC Special Tabulations, and IAI Forecast



**Fishing Vessels in Kodiak Harbor, Summer 2006**

## **6.0 Labor Supply Trends and Employment Decisions**

This chapter describes recent trends in Kodiak's supply of labor and the distribution of the labor force across the region over time. Given potential for EVOS punitive damage awards to influence employment-related decisions of residents around the region, the discussion is relevant to understanding the potential macro-economic effects of this unique source of social and economic change. Special focus is applied to decision-making processes associated with jobs in the formal market sectors of the regional economy. Trends in participation in the subsistence sector of the economy, and interaction between formal and informal economic sectors are principal topics examined in Chapter 7. The final analysis will control for more recent economic changes in the region.

### **6.1 Engaging in the Labor Force**

**Decision-making.** Meaningful analysis of regional and local supply of labor must take into account individual decision-making processes regarding employment. Given the importance of the family unit, this may best be examined at the level of the household. Household employment decisions involve three components. First, the householder or householders in question must decide whether it is necessary to engage in labor and, if so, which member or members of the family will enter or exit the workforce. Second, if a decision is made to enter the workforce and assuming the worker or prospective worker has sufficient qualifications, he or she must decide where or in which industry to engage in labor. Finally, prospective workers and those who actually enter the labor force must decide on the amount of time that will be dedicated to the job.

Thus, there are numerous points at which the settlement monies may influence the decision-making processes of householders on Kodiak. The awards may be economically significant for some families and, as such, the monies have the potential to influence individual behavior, and thus collectively affect the region's workforce. For instance, settlement monies may, among other hypothetical outcomes, be: (a) invested in a manner that eventually generates sufficient income to preclude engaging in wage labor; (b) invested in a manner that encourages the establishment of new businesses, thereby changing the structure of the regional economy and workforce; (c) used to enable household members to gain education or acquire work skills for the purpose of attaining higher wages than might otherwise be available to them; (d) stimulate the support sector of the economy in ways that lead to more and more varied job opportunities through which householders may find employment; (e) influence decisions about becoming or remaining involved in risky occupations, such as commercial fishing; and (f) lead to spending behavior that will later require re-entry into, or more assiduous involvement in the region's workforce.

**Increased Affluence.** One outcome of the settlement is that it will at least temporarily render Kodiak households receiving settlement monies more affluent. Based on the findings of Knapp et al. (1984), who examined the economic effects of the Alaska Permanent Fund Dividend Program, an injection of unearned income is likely to lead to increased spending and consumption of goods, including those associated with leisure activities. The latter is typically

associated with diminished participation in the workforce, and given that settlement monies typically exceed the amount of Permanent Fund checks, we believe this is a reasonable hypothesis in the present case. But it should be noted that diminished participation in the workforce by those who receive settlements may be offset by an overall increase in employment opportunities resulting from a stimulated regional economy.

***Alternatives to and Persistence in the Commercial Fishing Industry.*** Note that potential outcome (e) above is of particular relevance to our hypothesis regarding investment or reinvestment in the region's commercial fishing industry. According to the Bureau of Labor Statistics (2005), commercial fishing is the nation's most dangerous occupation, with a fatality rate of 118.4 deaths per 100,000 workers. This is over 30 times greater than the average rate of fatality for industrial occupations. High risk coupled with a considerable history of market challenges and the wherewithal potentially afforded by settlement monies may well dissuade many from persisting in or entering the commercial fishing industry in the region.

Settlement monies may enable people to engage in activities other than fishing or those associated with fishing. For instance, settlement-derived income may enable recipients to invest in other businesses, to retire, or to become at least temporarily involved in leisure activities. The plans and perspectives of the future recipients vary extensively, and our interview data suggest that a wide range of factors will influence spending, investment, and employment-related behaviors following distribution of settlement monies. These include, but are by no means limited to one's: (a) philosophy on spending unearned income, (b) socioeconomic status, (c) job status, (d) level of existing debt, (e) interest in maintaining or establishing a business, (f) interest in staying on Kodiak, or lack thereof, (g) age and station in life, and (h) previous speculative investment or spending.

It should be noted that interview data make clear that not all informants express interest in leaving the commercial fishing industry. Many fishermen assert that fishing affords various non-pecuniary benefits. Indeed, many residents and settlement claimants are emotionally attached to the sea and to the ocean and fishing lifestyles despite the challenges these present. Moreover, many fishermen on Kodiak are highly accomplished at what they do, and some have few other job skills or means through which fishing-related loans and debts may be paid off.

The readiness of many to persist in the commercial fishing industry should not be underestimated. This in part underlies our supposition that settlement monies may well be used by many to support ongoing participation in the industry, or to enable employment in alternative positions that satisfy lifestyle interests. Ways and reasons for persisting in the fishing lifestyle were discussed in many interviews conducted for this study, and many fishermen envision that settlement money will help them avoid a "land job." It must be said, however, that some of this ongoing interest relates to gradually improving market conditions for salmon, and that perspectives on the future can change quickly in concert with fractions of dollars being paid for seafood products at the marketplace.

***New Options for Fishermen.*** It is clear that for many persons active in fishing in the Kodiak region, significant amounts of non-earned income would help initiate new business ventures or revitalize existing ones. Guiding visitors through fishing and hunting experiences has become a

popular form of enterprise in small rural villages throughout Alaska, including the study villages on Kodiak. Such businesses allow operators to continue working in a beloved natural setting while avoiding the constraints on freedom that many associate with other forms of employment.

As was expressed by a key informant and lifelong fisherman in one of Kodiak's villages, guiding can also be seen as a favored alternative to commercial fishing:

“For some fishermen it’s hard to change. But most realize [guiding] is the only way to make it now. I’ve lived by the sea my whole life; I didn’t have to, but I chose to. I went to college and had jobs. I chose to operate a lodge rather than stay in town [to work]. I realized that I could be doing the same things I used to do as a commercial fisherman – on the sea, with wild salmon . . .”

## **6.2 Overall Trends in Employment**

Tables 6-1 and 6-2 depict data regarding historic patterns of employment in the study region. Because participation in the workforce is inevitably affected by demographic factors such as age and gender, such factors are being monitored and will be analytically controlled to facilitate valid assessment of the potential effects of the settlement on rates of employment.

Participation in the workforce is also obviously influenced by the availability of jobs. This is an especially significant factor in the villages around Kodiak, where employment opportunities are perennially limited. The demographic term for a person who is interested in working but who cannot find a job is “discouraged worker.” The presence of such persons in Kodiak’s outlying villages is a common situation. While many residents value a subsistence-oriented lifestyle, some desire more income both to support that lifestyle and to enjoy amenities common elsewhere in Alaska and “Outside.” But interviews with public officials support the view that jobs tend to be scarce; though as reported by Tanana Chiefs Planning Director Edward Rutledge in Irwin et al. (1994, Volume III, Section 2.b), good data regarding the number of discouraged workers is not readily available for the following reason:

The Alaska Department of Labor's official definition of unemployment, currently in place, excludes anyone who has made no attempt to find work in the previous four-week period. Most Alaska economists believe that Alaska's rural localities have proportionately more of these "discouraged workers." What is not mentioned by the Department of Labor is that in most rural, remote areas, discouraged workers do not result from those individuals not seeking work, but as a result of no work being available during much of the year. Therefore, after a period of four non-working weeks, they drop out of the system and no longer register on unemployment statistics.

The rates of employment and unemployment are good indicators of the presence or absence of job opportunities in a given area, and a general estimation of the number of discouraged workers can be generated through interviews with key public officials. Kodiak officials report that this number has risen significantly as the region’s salmon fisheries have undergone various challenges. Most recent discussions indicate improving conditions and while the number of discouraged workers remains high, it is improving. We posit that settlement monies will lead to an increase in the number of jobs available in the support sector, even in the villages, and that the

disbursement of those monies will therefore be associated with a reduction in the number of discouraged workers and a concomitant increase in the overall rate of employment.

Table 6-1 below indicates some temporal variation in regional employment characteristics. Although formally collected data are not available for the period prior to 1990, public officials report that the regional rate of employment was very high in 1989 and 1990 due to increased opportunities associated with oil spill cleanup and restoration. Numerous persons traveled to Kodiak to work on the spill during that period, and spill-related opportunities also attracted local residents who would not otherwise have been employed.

Again, interview data suggest that diminishing rates of employment during the early 1990s relate in large part to deteriorating conditions in the regional seafood market. The pricing situation appears to have affected rates of participation not only in the harvest sector, but also in the processing, distribution, and support sectors of the industry.

**Table 6-1 Employment Trends for Kodiak Island Borough : 1980-2004**

<b>Year</b>	<b>Population</b>	<b>Number of Persons Employed</b>	<b>Percent Employed</b>
1980	9,939	4,642	46.7
1981	10,132	4,374	43.2
1982	12,623	4,408	34.9
1983	12,978	4,883	37.6
1984	13,207	4,866	36.8
1985	13,525	4,688	34.7
1986	13,467	4,981	37.0
1987	13,469	4,734	35.1
1988	13,698	4,835	35.3
1989	13,682	5,616	41.0
1990	13,309	5,742	43.1
1991	14,594	5,320	36.5
1992	15,059	5,811	38.6
1993	14,847	6,090	41.0
1994	14,158	6,308	44.6
1995	13,648	6,193	45.4
1996	13,716	5,733	41.8
1999	13,989	5,801	41.5
2000	13,913	5,701	41.0
2001	13,555	6,091	44.9
2002	13,649	5,616	41.1
2003	13,797	5,240	38.0
2004	13,466	5,507	40.9

Source: Alaska Dept. of Labor and Workforce Development, *Alaska Economic Trends*, (Feb.1996 and Sept. 1999), *Alaska Population Overview*, (1990 and 1999) and [http://www.labor.state.ak.us/research/emp\\_ue/KIBlf.htm](http://www.labor.state.ak.us/research/emp_ue/KIBlf.htm).

Note: A change in the method of estimating labor force statistics makes labor force and unemployment prior to 2000 not comparable with data after 2000.

Table 6-2 below depicts data for Kodiak Island Borough as per the decennial Census for the period 1980 through 2000. Note that the rate of unemployment in the region was considerably higher early in the period. Table 6-3 below depicts the most recent Census data available for rates of unemployment and participation in the labor force in Kodiak City and the villages. Data for Alaska and the United States are provided for sake of comparison.

Particularly noteworthy in the table are data suggestive of challenging employment conditions in the Kodiak villages. The indicators - low rates of participation in the workforce and high rates of unemployment – diverge rather significantly from the norm in some cases. But again, it should be kept in mind that while many villagers may be considered discouraged workers, valid data enumerating such persons are not readily available through archival sources.

**Table 6-2 Structure of the Kodiak Island Borough Workforce: 1980-2000**

Population Aged 16 and Older	Year		
	1980	1990	2000
Total Population	7,206	9,482	9,794
Military	665	1,040	796
Civilian	4,707	6,524	6,466
Employed	4,365	6,178	6,131
Unemployed	342	346	335
Civilian Unemployment Rate (%)	7.3	5.3	5.2

Source: 1990 and 2000, US Census Bureau, Summary Tape File 3, P43 (2000) and P070 (1990); 1980, US Census, *General Social and Economic Characteristics, Alaska*.

**Table 6-3 Rates of Unemployment and Participation in the Labor Force, Kodiak Island: Year 2000**

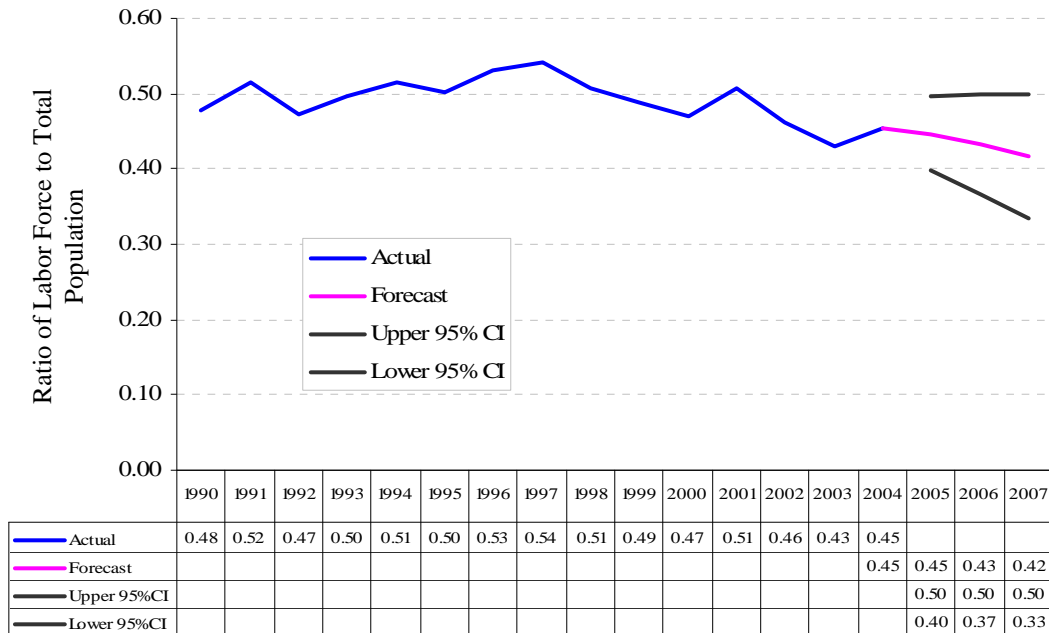
Community	Population 16 Years and Older		Unemployment Rate %			% in Civilian Labor Force
	Males	Females	Males	Females	Avg. Total	Avg. Total
Akhiok	35	22	5.7	13.6	8.8	61.4
Karluk	9	12	0	0	0	52.4
Kodiak City	2,498	1,991	4.0	3.0	3.6	75.1
Larsen Bay	35	25	5.7	8.0	6.7	65.0
Old Harbor	83	53	15.7	7.5	12.5	54.4
Ouzinkie	76	71	9.2	4.2	6.8	58.5
Port Lions	97	94	0	0	2.1	49.7
Kodiak Island Borough	5,296	4,498	3.5	3.3	3.3	74.1
State of Alaska	237,360	220,694	7.4	4.7	6.1	71.3
United States	~105 m	~112 m	4.0	3.3	3.7	63.4

### 6.3 Regional Employment Forecast

One dimension of the labor supply-related effects of the punitive damages settlement could be traced using labor force participation rates available from the Alaska Department of Labor and Workforce Development (ADOLWD). Figure 6-1 below depicts a forecast of annual labor force participation rates based on ADOLWD data for the period for 2005-2007. The forecast is based on an exponential smoothing of historic labor force participation rates for the period 1990 through 2004. Should significant deviation from the indicated rates of diminishing regional participation in the workforce follow distribution of spill settlement awards, labor supply effects

would be indicated. The situation will therefore be monitored immediately prior to and for some time following the settlement.

**Figure 6-1 Labor Force Participation Rate Forecast for Kodiak Island Borough: 2005-2007**



Sources: Alaska Dept. of Labor and Workforce Development, *Alaska Economic Trends*, (Sept. 1999 and Feb.1996), *Alaska Population Overview*, (1990 and 1999) and [http://www.labor.state.ak.us/research/emp\\_ue/KIBlf.htm](http://www.labor.state.ak.us/research/emp_ue/KIBlf.htm). Forecast and 95% confidence bands based on Double Holt exponential smoothing prepared by IAI.

## 6.4 Temporal Allocation of Labor

One indicator of utility for understanding employment characteristics in a given region is the temporal allocation of labor over the course of a given year, and trends in that distribution over the long-term. Table 6-4 below depicts trends in that variable as reported in the 1990 and 2000 Census years. The data are expressed in terms of persons working less than or more than one-half year during the year prior to the Census.

Note that 88 percent of the population reported working during 1989, while 84 percent reported working during 1999. This difference likely reflects the increase in spill-related employment opportunities available on Kodiak in 1989. The data percentages are otherwise fairly similar over the period in question.

Allocation of work effort is reflective of both the nature of demand for labor and the decisions of individuals in households to engage in the labor force. On Kodiak Island, where fishing is a mainstay for so many householders, work has long been a seasonal activity. During certain years, abundant seafood and good market prices can lead many to truncate the fishing season; sufficient monies can be earned during relatively short periods of time. Other years are more



challenging and people work for a longer portion of the year. Such patterns vary extensively across fleets and sectors, and over the course of time. Fried and Windisch-Cole (1999), assert that more people are now engaging in full-time work on Kodiak, and that the trend may relate to: (a) the increasingly year-round nature of the fishing industry on Kodiak (see discussion below), and (b) an increase in the number of processing workers who are year-round residents of the island.

Note that while the settlement may stimulate a greater number of full-time job opportunities in the region, we anticipate that it may also lead some direct recipients to allocate work effort in a novel manner. That is, some settlement recipients may well work fewer weeks each year. The duration of that behavior will likely be related to the amount of a given award, to initial and longer-term spending and investment patterns, and to the persistence of one’s work ethic vis-à-vis the arrival of unearned income, among other factors.

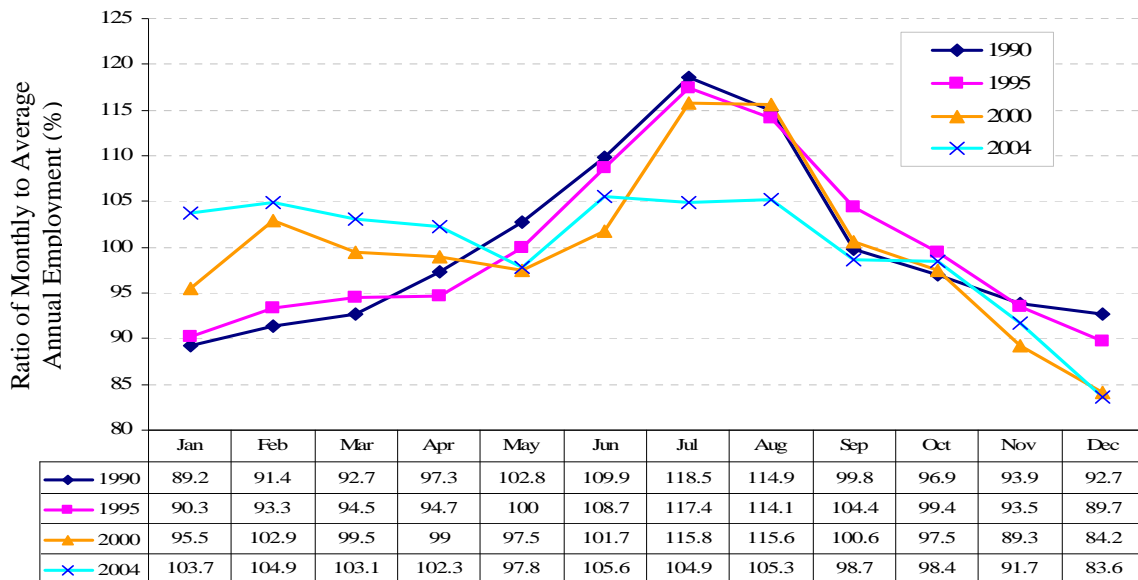
**Table 6-4 Annual Allocation of Work Effort in Kodiak Island Borough: 1990 and 2000 Census Years**

Persons 16 Years of Age or Older	% Population Working 1-26 Weeks		% Population Working 27-52 Weeks	
	1990	2000	1990	2000
Total Population	20.2	16.8	67.3	66.7
Total Workers	23.1	20.1	76.9	79.9

Source: US Dept. of Commerce, Bureau of the Census: 2000 SF3 P47; 1990 STF3 P076.

Figure 6-2 below revisits the seasonal nature of employment in the Kodiak region by presenting a comparison between monthly and annual wage and salary employment across all sectors. As was the case for data specific to the fishing industry, a summer peak is clearly noted for this more general employment dataset.

**Figure 6-2 Seasonal Nature of Employment in Kodiak Island Borough: 1990-2004**



Source: Alaska Department of Labor and Workforce Development, [http://www.labor.state.ak.us/research/emp\\_ue/kodiaklf.htm](http://www.labor.state.ak.us/research/emp_ue/kodiaklf.htm)

Of particular note in the figure is the significant decline in the seasonality of employment during 2004. The rate of employment during peak season declines from almost 19 percent above the annual average in 1990 to only five percent above that average in 2004. Moreover, employment is somewhat more evenly distributed across the year during 2004.

Finally, we present Table 6-5 below, which further illustrates change in regional employment characteristics between 1980 and 2000. We combine figures for sectors that are good proxies for gauging employment in the commercial fishing industry. These are: (a) Agriculture, Fishing, and Forestry, and (b) Manufacturing. Note that fishing-related employment decreased from 36 percent in 1980 to 25 percent in 2000. Since the relative percentage rather than absolute number of employees in the industry is diminishing, the figures suggest that, in terms of employment, the industry is being eclipsed by other sectors of the job market.

**Table 6-5 Distribution of Employment across Sectors in Kodiak Island Borough: 1980-2000 Census Years**

Industry Sector	Census Reporting Year					
	1980		1990		2000	
	Count	Share (%)	Count	Share (%)	Count	Share (%)
Agriculture, Fisheries, and Forestry	573	13.1	941	15.2	574	9.4
Manufacturing	1,005	23.0	873	14.1	1,029	16.8
<b>Subtotal</b>	<b>1,578</b>	<b>36.2</b>	<b>1,814</b>	<b>29.4</b>	<b>1,603</b>	<b>26.2</b>
Mining	5	0.1	12	0.2	26	0.4
Construction	197	4.5	393	6.4	331	5.4
Wholesale Trade	29	0.7	130	2.1	120	2.0
Retail Trade	605	13.9	877	14.2	656	10.7
Transport, Communications, and Utilities	352	8.1	504	8.2	529	8.6
Finance, Insurance, Real Estate	74	1.7	134	2.2	186	3.0
Services	972	22.3	1,702	27.5	2,005	32.7
Public Administration	553	12.7	612	9.9	673	11.0
<b>Total Employment</b>	<b>4,365</b>	<b>64</b>	<b>7,992</b>	<b>70.7</b>	<b>7,732</b>	<b>73.8</b>

Source: U.S. Dept. of Commerce, Bureaus of the Census: 1980 General Social and Economic Characteristics, Alaska; 1990: P077. Industry, 1990 STF 3; 2000: P49; Industry, SF3.

## **7.0 Patterns of Population Change in the Kodiak Region**

This chapter focuses on relevant dimensions of population change in the Kodiak study region. The issue of out-migration is particularly important in the study context in that punitive damage settlement monies may potentially be used by some residents to cover costs associated with moving from Kodiak Island. Although interview data suggest that this is but one of many spending options for resident claimants, it is a particularly important hypothetical outcome in that extensive out-migration would lead to secondary social and economic effects. For instance, old social networks and labor capital would potentially be significantly altered, and newly-arriving residents would likely bring differing cultural perspectives, job skills, and so forth. We review such issues in this chapter and again in the concluding summary of this report. Again, the final analysis will address important recent sources of change in the study communities and region.

### **7.1 Economic and Demographic Conditions and Patterns of Migration**

Population changes often reflect changes in the health of an economy, and the social and economic implications of change in population size and structure tend to be amplified when the population in question is relatively small and isolated. This is certainly the case for Kodiak villages and to a lesser extent for the region as a whole. For instance, closure of canneries in Karluk is associated with extensive out-migration, and without some form of economic stimulation that would serve to increase the size of the local population through in-migration, natural increase is unlikely to lead to growth of that community.

***Population Structure, Migration, and Population Size.*** Structural-demographic changes occur through both natural increase and migration. Demographers define natural increase as the number of births exceeding deaths during a given period of time. This is determined in large part by the size and age distribution of a population interacting in a specific location over the course of time. Migration and the characteristics of persons who leave the area in question can have a dramatic effect on the structure of the remaining population.

It should be kept in mind that changes in the age distribution of a given population will affect the rate of natural increase therein. For instance, the rate of natural increase will be greater in relatively younger populations. Thus, when numerous persons of child-bearing age depart from a region, population size obviously decreases, with a range of cascading effects on the social and economic attributes of that region. Similarly, the characteristics of persons who in-migrate can significantly affect the social, cultural, and economic characteristics of the region to which they migrate.

***Migration and the Attractions of Economic Opportunity.*** Significantly, decisions of individuals to migrate are often strongly influenced by the relative economic opportunities between places (Huskey et al. 2004). Under the conceptual parameters of economic rationality and optimization, people are more likely to move out of or into a community if the transition is likely to bear economic benefits. By extension, the population of a region is more likely to grow when its

economy is growing and when numerous income and employment opportunities are available both for residents and potential migrants.

Donkersloot (2006) investigated the situation in the Bristol Bay region of Alaska, and found that young women are significantly more likely than young men to emigrate for the purpose of finding opportunity in other parts of Alaska and “Outside.” The author asserts that this is one result of ecological and economic challenges in the region’s commercial fisheries. She argues that young women are experiencing more stress than young men and that they tend to aspire toward solutions that involve attainment of higher education and economic gain outside the village setting. This has obvious implications for the demographic structure of villages in the Bristol Bay region, with direct relevance to the situation in villages on Kodiak Island.

A prominent public official described a similar situation for the Kodiak villages, with the added perspective that while various programs provide incentives for youth to leave the communities, sufficient incentive to return is often lacking:

As more and more of them do that and receive scholarships, their draw to come back to the villages is prohibited because there are no jobs for them to use their educational background . . . So, they remain in the bigger cities or villages, you know, either in town or mainly in Anchorage or go outside of Alaska. So, the exodus is . . . people want their children to get a better education, the elders or the families, and then there isn’t the opportunity for them to come back. So, it’s like the village dies because of the exodus eventually.

***Subsistence Practices and Migration.*** But the decisions of some residents to leave or stay during periods of economic challenge may also quite obviously be influenced by attachments to various positive aspects of that place. The young men participating in Donkersloot’s study undoubtedly had strong reasons for staying in the villages. For instance, non-economic dimensions of fishing are often important attractions for persisting in a challenging endeavor. The social and cultural context associated with the fishing lifestyle can provide numerous incentives, particularly in indigenous settings. Indeed, economic problems can sometimes be overlooked in the presence of familial and cultural connections and other attractions to place (Glazier 2007).

As is noted elsewhere in this report, subsistence opportunities available in Kodiak villages can influence migration-related decisions. Many Alaska Native residents opt for the benefits of the subsistence-oriented way of life and defer moving away from their home communities despite the absence of opportunities and amenities available elsewhere.

Knowledge of natural resources and culturally appropriate hunting and fishing practices and use of natural resources are typically nurtured within well-defined social and cultural settings specific to the villages. Success in subsistence activities enables sharing and strengthening of social bonds in those settings. These factors tend to limit out-migration and can also ultimately attract those who previously left the community to return to the subsistence way of life in their home community.

## 7.2 Relevant Baseline Conditions

The data provided in Table 7-1 below reveal that extensive population growth has occurred on Kodiak Island since 1980. The 2004 population estimate of 13,466 persons is over 35 percent greater than the population figure for 1980. Most growth occurred in the 1980s and was in large part associated with: (a) regional expansion of the groundfish industry (Fried 1988), (b) growth in the then highly-profitable salmon fisheries, and (c) the labor force needed to support these fisheries.

**Stalled Economic Growth.** Economic growth slowed considerably after 1990 and was punctuated by only short periods of improvement. The downturn is in part reflective of difficulties in the region's salmon fisheries and associated effects on the larger economy (Fried and Windisch-Cole 1999). Note that the 2004 population estimate is accordingly similar to that originally achieved in the mid-1980s. The rate of growth on Kodiak Island has been slower than for the state as a whole since 1990. The rate of population growth measured between the 1990 Census and the 2000 Census for persons under the age of 64 was 11.2 percent for Alaska, and 2.1 percent for Kodiak Island Borough.

**Table 7-1 Kodiak Island Borough Population Figures and Rates of Change: 1980-2004**

Year	Population	Net Change	Rate of Change (%)
1980	9,939	--	--
1981	10,132	193	1.9
1982	12,623	2,491	24.6
1983	12,978	355	2.8
1984	13,207	229	1.8
1985	13,525	318	2.4
1986	13,467	-58	-0.4
1987	13,469	2	0.0
1988	13,698	229	1.7
1989	13,682	-16	-0.1
1990	13,309	-373	-2.7
1991	13,018	-291	-2.2
1992	14,635	1,617	12.4
1993	14,594	-41	-0.3
1994	15,059	465	3.2
1995	14,847	-212	-1.4
1996	14,158	-689	-4.6
1997	13,648	-510	-3.6
1998	13,716	68	0.5
1999	13,989	273	2.0
2000	13,913	-76	-0.5
2001	13,555	-358	-2.6
2002	13,649	94	0.7
2003	13,797	148	1.1
2004	13,466	-331	-2.4

Source: Alaska Department of Labor and Workforce Development, Borough and Census Area Estimates 1990-2004, <http://www.labor.state.ak.us/research/pop/estimates/04t2-1.xls>.

**Table 7-2 Components of Population Change: Kodiak Island Borough: 1970-2000**

Period	Start Population	Total Change	Percent Change	Births	Deaths	Natural Increase	Percent Change	Net Migrants	Percent Change
2002-01	14,167	-315	-2.2	207	41	166	1.2	-481	-3.4
2001-00	13,980	187	1.3	227	49	178	1.3	9	0.1
1999-00	*	*	*	*	*	*	*	*	*
1999-98	13,716	273	2.0	268	53	215	1.6	58	0.4
1998-97	13,648	68	0.5	258	47	211	1.5	-143	-1.0
1997-96	14,158	-510	-3.6	271	44	227	1.6	-737	-5.2
1996-95	14,847	-689	-4.6	266	63	203	1.4	-892	-6.0
1995-94	15,059	-212	-1.4	277	58	219	1.5	-431	-2.9
1994-93	14,594	465	3.2	285	46	239	1.6	226	1.5
1993-92	14,635	-41	-0.3	285	63	222	1.5	-263	-1.8
1992-91	13,018	1,617	12.4	271	44	227	1.7	1,390	10.7
1991-90	13,309	-291	-2.2	428	77	351	2.6	-642	-4.8
Population Change by Decade									
2000-1990	13,309	671	5.0	2,897	544	2,353	17.7	-1,682	-12.6
1990-1980	9,939	3,370	33.9	3,042	533	2,509	25.2	861	8.7
1980-1970	9,409	530	5.6	2,343	470	1,873	19.9	-1,343	-14.3

Source: Alaska Department of Labor and Workforce Development. *Alaska Population Overview, 2001-2002* Population Estimates and 1990-99 Population Estimates; \* data not available



**View of the Remote Village of Larsen Bay, Kodiak Island, 2006**

Table 7-2 above depicts demographic components of population change on Kodiak over the period from 1970 through 2000. The data derive from the decennial Census. Of particular note in the table, the estimated rate of natural increase was higher during the 1980s than in either the preceding or following decades. Also of note is the commonality of net out-migration during the period.

**Migration and Employment.** Net migration in this case indicates the net difference between the population moving to and from Kodiak Island. The trend of net migration in the region appears to be associated with general economic decline in the fishing industry, as discussed throughout this report. During the 1980s, when economic growth was characteristic of the region, net migration was positive. The Kodiak population grew by almost nine percent during the period. During the 1990s, when the economy began to decline, people began leaving the region. Emigration was common during the mid-1990s and the population diminished by almost 13 percent during the period.

The relationship between migration and employment can be both direct and indirect in nature. In some cases, out-migration can occur if the quality of available employment declines, or if wages are insufficient to maintain the requirements of the workforce. Emigration can also occur if opportunities do not meet the demands of population growth resulting from natural increase.

**Population Structure and Migration.** Population trends can also relate to changes in the structure of employment opportunities and, subsequently, to migration behavior. For instance, as described above, seasonal peaks in employment opportunities may be insufficient for some workers to meet cost of living requirements. This may result in out-migration despite apparent stability in overall annual average employment figures. Cyclic or rotational work opportunities, such as those provided by the U.S. Coast Guard on Kodiak, can also affect rates of in- and out-migration.

The full nature of patterns of migration occurring in the Kodiak region over time cannot be adequately indicated by net migration. It should be noted that people constantly move in and out of the region with little net change in the size of its population. Table 7-3 below illustrates this tendency toward population “turnover.” The table presents the results of the Census question, “where did you live five years ago?” The gross rate of immigration describes the share of the population that moved into Kodiak over the previous five-year period. This rate fell from 41.3 percent in 1980 to 30 percent in 2000. The rate of gross in-migration was positive even during the 1990s when the rate of net migration tended to be negative. Note that rates of population turnover tend to be affected by the age structure of a resident population. Younger persons are more likely to emigrate; elderly persons tend to be more likely to stay.

**Table 7-3 Population Mobility Figures for Kodiak Island Borough: 1980-2000**

Population Statistic	1980		1990		2000	
Total Population of Kodiak	9,939		13,309		13,913	
Kodiak Population Five Years Earlier	4,854		6,844		8,394	
Number of Persons Who Moved to Kodiak	4,101		5,053		4,173	
From Other Places in Alaska	705	17.2 %	1,112	22.0 %	974	23.3 %
From Other Places in U.S.	3,066	74.8 %	3,613	71.5 %	2,631	63.0 %
From Outside U.S.	330	8.0 %	328	6.5 %	568	13.6 %
Gross Rate of In-migration	0.413		0.380		0.300	

Source: US Census Bureau: Census 2000 Summary File 3, P24; 1990 Summary Tape File 3, P043; 1980 General Social and Economic Characteristics, Alaska.

As can be noted in the table, population turnover resulted in almost one-third of the Kodiak population being new to the region between 1990 and 2000. The characteristics of these new arrivals changed slightly over the period; they were more likely to have migrated from other parts of Alaska and from “Outside” in 2000 than in 1980.

In reiteration, natural increases in the size of the future population of Kodiak will be affected by ongoing changes in the demographic structure of the region. Table 7-4 depicts key demographic factors in this regard for the Census years of 1980, 1990, and 2000. It is important to note that over this time period, the proportion of females in the population increased from 44.2 percent to 46 percent, which is slightly less than the proportion of females in the state.

**Table 7-4 Population Structure in Terms of Age and Gender, Kodiak Island Borough: 1990-2000**

Gender	1980		1990		2000	
	Count	Share of Total (%)	Count	Share of Total (%)	Count	Share of Total (%)
Male	5,548	n/a	7,395	n/a	7,551	n/a
Under 5	517	9.3	742	10.0	631	8.4
5 – 19	1,284	23.1	1,604	21.7	1,844	24.4
20-44	2,872	51.8	3,844	52.0	3,182	42.1
45-64	744	13.4	998	13.5	1,538	20.4
Over 64	131	2.4	207	2.8	356	4.7
Female	4,391	n/a	5,914	n/a	6,399	n/a
Under 5	468	10.7	661	11.2	614	9.6
5 – 19	1,167	26.6	1,470	24.9	1,614	25.2
20-44	2,144	48.8	2,836	48.0	2,548	39.8
45-64	488	11.1	729	12.3	1,306	20.4
Over 64	124	2.8	218	3.7	317	5.0

Source: US Census Bureau, 1990 and 2000 Summary Tape File, 100-percent data; 1980 General Social and Economic Characteristics, Alaska.

Note also that the proportion of all persons over the age of 45 increased dramatically during the period in question. Meanwhile, the number of women between 5 and 44 years of age declined from 72 percent to 65 percent between 1990 and 2000. These changes strongly indicate future constraints on natural population increase in the study region.

***Ethnic-Racial Ancestry and Demographic Change.*** Table 7-5 below depicts characteristics of the Kodiak population in terms of ethnic ancestry. Because numerous workers come to Kodiak from around the world to participate in the seafood processing sector, the resident population has changed dramatically in this regard in the last decades. Workers who come to the area seasonally, gradually establish relationships to place and family and begin to stay. For instance, the percentage of residents who report Asian or Pacific Islander backgrounds more than doubled to 19 percent by 2000. There is now a strong historical association between persons of Filipino ancestry and the seafood processing industry on Kodiak, and an increasing level of participation on the part of Pacific Islanders. For further discussion of these phenomena, see Fried and Windisch-Cole (1999).



According to data provided by the decennial Census, the size of the population of Alaska Natives resident in the study region has increased over the last two decades. This followed a period of net out-migration during the 1980s. Although persons of European ancestry continue to comprise the majority of the resident population, the relative percentage of this group has dropped significantly over the time period examined here.

**Table 7-5 Ethnic-Racial Composition of the Population in Kodiak Island Borough: 1980-2000**

Population Statistics	1980		1990		2000	
	Count	Percent of Total	Count	Percent of Total	Count	Percent of Total
Total Population	9,939	100	13,309	100	13,913	100
Caucasian	7,148	71.9	9,467	71.1	8,805	63.3
Alaska Native/Native Am.	1,911	19.2	2,162	16.2	2,309	16.6
African American	73	0.7	138	1.0	153	1.1
Asian/Pacific Islander	807	8.1	1,542	0.116	2,646	19.0

Sources: Alaska Department of Labor and Workforce Development: 1990 and 2000 estimates: Williams, Race and Ethnicity in Alaska, *Alaska Economic Trends*, Oct. 2001. 1980 estimates: *Alaska Population Overview*, 1990 Census and Estimates, 1991.

## **8.0 Community-Level Factors and Effects**

Previous sections of this report have discussed some of the unique aspects of life in the Kodiak villages. These include, among others: (a) the Alutiiq heritage shared by many residents, (b) the commonality of reliance on wild foods, (c) geographic isolation and extensive out-migration, and (d) the interface between the informal subsistence economy that is so culturally meaningful to residents and the formal wage economy, which in the villages is dominated by commercial fishing and public sector employment. This chapter continues the discussion by providing data for select socioeconomic and demographic variables that are will likely be of utility for gauging the effects of the settlement.

### **8.1 Economics of Population Change**

As described in Chapter Two of this report, the Kodiak villages share government, transport, and service linkages with Kodiak City, but they are not road-connected. Travel to and from the villages is accomplished by air or sea transportation and is therefore relatively challenging. This renders the communities somewhat isolated and their residents somewhat independent-minded.

But this is not to say that the residents or the economies of the villages are autonomous. As is the case for Kodiak City, numerous village residents are involved in the commercial fishing industry, which is, in turn, linked to a market economy that is increasingly global in nature. As such, the regional and village economies are subject to exogenous economic trends and conditions. Village and regional Native corporations and local government are also important sources of income and jobs.

Somewhat unlike Kodiak City, a significant informal economy also operates in the outlying communities. As reviewed here and elsewhere, subsistence-oriented fishing and hunting, sharing of subsistence-oriented foods and the labor required to attain them are important dimensions of life in the villages. Village societies can be seen as straddling the past and present. Pursuit of wild foods and culturally-influenced sharing and reciprocity are as critically important as in centuries past. But the subsistence lifestyle and pursuit of mainstream American goals and material items requires cash and thus involvement in the larger society and economy of Alaska and beyond.

***Diminishing Population Size in the Villages.*** Demographic data indicate that the traditional-modern interface has been challenging for residents of the villages. Population loss has been highly significant in four of the six villages since 1980. Only Ouzinkie and Port Lions have grown over the 24-year period for which data are depicted (see Table 8-1 below). Even in these communities, growth has been modest in comparison to that of Kodiak City. The rate of population growth in Kodiak City was almost three times that of Port Lions, where the population increased by around 11 percent during the period. The proportion of the Kodiak Island Borough population included in the village counts diminished from 11 percent in 1980 to six percent in 2004.

**Table 8-1 Population Figures for the Outlying Communities on Kodiak Island: 1980- 2004**

Place	1980		1990		2000		2004		1980-2004
	Persons	% of Total	Persons	% of Total	Persons	% of Total	Persons	% of Total	Growth Rate %
Kodiak Is. Borough	9,939	n/a	13,309	n/a	13,913	n/a	13,466	n/a	n/a
Kodiak City	4,756	47.9	6,365	47.8	6,334	45.5	6,199	46.0	30.3
Kodiak Station	1,370	13.8	2,025	15.2	1,758	12.6	1,750	13.0	27.7
Akhiok	105	1.1	77	0.6	80	0.6	56	0.4	-46.7
Karluk	96	1.0	71	0.5	27	0.2	26	0.2	-72.9
Larsen Bay	168	1.7	147	1.1	115	0.8	96	0.7	-42.9
Old Harbor	340	3.4	284	2.1	237	1.7	196	1.5	-42.4
Ouzinkie	173	1.7	209	1.6	225	1.6	187	1.4	8.1
Port Lions	215	2.2	222	1.7	256	1.8	238	1.8	10.7
Remainder	2,716	27.3	3,909	29.4	4,881	35.1	4,718	35.0	73.7

Sources: Alaska Dept. of Labor and Workforce Development, *Alaska Population Overview: 1980 Estimates, 1990 Census and Estimates, Place Estimates 2000-2004*; <http://www.labor.state.ak.us/research/pop>.

Table 8-2 below depicts the relative proportion of Alaska Natives residing in each community at the time of the last three Census counts. As has been the case for many centuries, with the exception of Kodiak City, most residents of the outlying villages are Alaska Natives.

**Table 8-2 Proportion of Alaska Natives Residing in Kodiak Communities: 1980- 2000**

Community	1980	1990	2000
Akhiok	93.3	96.6	93.8
Karluk	100.0	91.7	96.3
Larsen Bay	84.3	87.5	89.2
Old Harbor	89.9	92.2	86.9
Ouzinkie	94.2	92.6	88.9
Port Lions	68.9	n/a	65.3

Source: U.S. Dept. of Commerce, Bureau of the Census: 2000 SF1 P7; 1990 STF1P006; 1980 General Social and Economic Characteristics, Alaska. Note: Definition for 1990 and 2000 includes American Indian and Alaska Native only plus other races to account for change in definition in 2000 Census.

The pattern of population change indicated in Table 8-1 above makes clear that out-migration has been significant in the villages despite the attractions for Alaska Natives of living in a place with an often long and intricate cultural history. But it should be noted that net out-migration does not mean these quality of life factors are unimportant. Indeed, interviews with local leaders and residents of the community clearly indicate that many strongly identify with the village setting and appreciate the social and cultural attributes that make each village unique in contemporary Alaska. But there are many challenges, economic and otherwise. Lack of opportunity coupled with social problems and attraction for amenities available elsewhere can override cultural ties to place.

**Economic Challenges.** We present Tables 8-3 and 8-4 below as means for illustrating key indicators of economic challenges that are now often characteristic of life in the villages. The data elucidate the fact that the formal economies of the six villages are relatively impoverished compared to that of Kodiak City, the Borough as a whole, the State of Alaska, and the United States as a whole.

Note that approximately 20 percent of households in four of the villages reported no earnings during the most recent Census. Both per capita income and median household income tended to be significantly below the figures reported for all larger units of analysis. Some variation is noted across Census years, with conditions tending to worsen over time, in some cases dramatically so.

**Table 8-3 Patterns of Income in Kodiak Villages, per the Decennial Census: 1980-2000**

Place	Per Capita Income (\$)			Percent of Households with Earnings (%)			Median Income (\$)		
	1980	1990	2000	1980	1990	2000	1980	1990	2000
Kodiak Island Borough	10,415	19,979	22,195	95	93	92	26,421	44,815	54,636
Kodiak City	12,030	22,951	21,522	95	92	90	30,512	46,050	55,140
Kodiak Station	n/a	10,924	14,234	n/a	100	100	n/a	34,196	46,189
Akhiok	n/a	14,793	8,473	n/a	100	80	n/a	42,500	33,438
Karluk	n/a	8,052	13,736	n/a	100	83	n/a	31,250	19,167
Larsen Bay	n/a	19,222	16,227	n/a	100	78	n/a	39,750	40,833
Old Harbor	n/a	8,008	14,265	n/a	84	77	n/a	16,875	32,500
Ouzinkie	n/a	16,530	19,324	n/a	84	85	n/a	48,393	32,500
Port Lions	n/a	14,960	17,492	n/a	87	89	n/a	40,938	39,107

Source: U.S. Dept. of Commerce, Bureau of the Census: 2000 SF3 P82; 1990 STF3 P114A, 1980 General Social and Economic Characteristics Alaska.

**Table 8-4 Families and Individuals Identified as Living below Poverty Level: 1990 and 2000**

Place	1990		2000	
	Families (%)	Individuals (%)	Families (%)	Individuals (%)
United States	10.0	13.0	9.2	12.4
State of Alaska	6.8	9.0	6.7	9.4
Kodiak Island Borough	3.7	5.5	4.6	6.6
Akhiok	0	2.5	5.3	9.9
Karluk	0	3.7	0	0
Kodiak City	4.6	6.2	3.7	7.4
Larsen Bay	3.2	3.1	27.3	20.5
Old Harbor	24.6	31.5	30.8	29.5
Ouzinkie	3.6	10.3	6.1	6.0
Port Lions	2.1	5.3	12.7	12.1

Source: U.S. Census Data, Tables DP3 (2000) and DP4 (1990); \* data not available

## 8.2 Recent Trends of Participation in the Harvest Sector

The scope, scale, economic significance, and subjective importance of commercial fishing in the Kodiak region have been discussed at length in this report. Local trends in fisheries effort, production, earnings, and associated issues were discussed for select communities in Section 5.5. This brief section describes recent levels of village-specific participation in the harvest sector, depicted in Table 8-5 below. Note that the table indicates the total number of permit holders resident in each village. The total number of *permits* held in each village is depicted for the year 2000 in Table 2-2 of this report. Of particular note in the following table is the extent to which participation in the harvest sector has diminished in each of the villages.

**Table 8-5 KMA Permit Holders, Licensed Crew, and Licensed Guides in the Villages: 2000-2005**

Community	Commercial Permits 2000 / 2003 / 2005	Licensed Crew 2000 / 2003 / 2005	Licensed Guides 2000
Akhiok	5 / 5 / 7	12 / 4 / 6	0
Karluk	0 / 0 / 0	5 / 2 / 2	6
Larsen Bay	17 / 9 / 11	24 / 19 / 20	26
Old Harbor	31 / 23 / 26	52 / 28 / 45	17
Ouzinkie	26 / 23 / 24	28 / 25 / 20	46
Port Lions	24 / 18 / 19	24 / 20 / 23	18

Source: Sepez et al. (2005) for year 2000 data, and CFEC for 2003 and 2005 data.

## 8.3 Village-Level Participation in Subsistence Activities

In analytical terms, the regional economies of Alaska may be seen as variably mixed economies that incorporate a market sector, a government sector, and a subsistence sector (Huskey et al. 2004). Kodiak is no different. The interplay between the informal economic aspects of subsistence hunting and fishing, and the formal aspects of the commercial fishing industry and other sources of income continue to characterize the village economies of Kodiak Island.

Subsistence-oriented hunting and fishing are undertaken by many non-Native and Native residents of Kodiak City and to residents of the smaller, more isolated communities in the region. It can be argued that those practices are particularly important to Alaska Native residents given: (a) the cultural meanings that underlay the natural world as perceived by persons of Alutiiq ancestry in specific social contexts across the region, and the pursuit of natural resources therein; (b) the importance of traditional practices associated with acquisition and sharing subsistence foods in such contexts, and (c) culturally-influenced preferences for wild foods, and the dietary imperative of consuming them in the absence of other suitably nutritious and readily available sources of protein, carbohydrates, and vitamins.

***Recent Trends in Subsistence Participation and Production.*** According to the ADF&G Division of Subsistence (2005), 1,923 permits were issued for subsistence fishing across the KMA for the 2004 season. Nearly 85 percent of the permits were issued to Kodiak residents and, of these, 76 percent were issued to persons with addresses in Kodiak City.<sup>32</sup> The reported

<sup>32</sup> Note that some percentage of villagers receives mail at postal facilities in Kodiak City.

level of harvest for the year 2003 subsistence salmon fishery was 40,568 fish, which was higher than the 5- and 10-year averages of 37,786 and 40,568 salmon, respectively. Nearly 94 percent of the reported harvest was landed by residents of Kodiak Island Borough. Over 80 percent of the take was sockeye, 15 percent silver, 3.7 percent pink, 1.2 percent king, and less than one percent chum (p. 120).

There are caveats to interpretation of subsistence fishing data in the region. The ADF&G Division of Subsistence (2005:120-121) notes that while acquisition of permits and thus reporting of subsistence activities have been problematic in the past, a newly established outreach program has the potential to improve the situation. The authors report (p. 121) that a total of 100 households in the Kodiak villages participated in the permit program in 2000, 189 participated in 2001, 167 participated in 2002, and 165 participated in 2003. Based on input from households involved in the program, the overall harvest of salmon taken via subsistence permits was 6,299 fish in 2000, 9,034 in 2001, 9,386 in 2002, and 8,714 in 2003.

Table 8-6 below depicts longer-term trends in the region-wide subsistence harvest of salmon. We reiterate that the information derives from programs in which landings are self-reported, and that the nature of those programs and hence the consistency of the data has varied over time. Other factors of significance for monitoring and explaining changes in harvest levels include: (a) biophysical parameters of the resource population and rate of return, (b) changes in allowable harvest levels in adjacent commercial salmon fisheries, (c) levels of escapement, and (d) changes in the size of the pool of residents who qualify for subsistence permits and/or are interested in subsistence fishing. As noted earlier in this report, while the study team will remain attentive to a wide range of variables and factors that may be useful for explaining changes in subsistence activities, the current study is focused on identifying and monitoring social and economic factors that may have a bearing on such changes in the region.

The data depicted below indicate a modest increase in participation in subsistence salmon fisheries in the KMA over the course of the study period. While the resident population has been relatively stable during this period, the ratio of the number of residents to the number of subsistence permits decreased from an average of 12-to-1 during the 1980s to about 7-to-1 after 1999. This means that an increasing percentage of the resident population has been using subsistence permits since permit data have been collected. The ratio of the number of salmon landed to the number of residents also increased. These trends are also depicted in Figure 8-1 below.

Salmon may be seen as a particularly important resource for residents, but other permitted subsistence fisheries are also conducted in the region. For instance, a subsistence fishery for halibut was designated in the KMA in 2003. Other permitted subsistence fisheries include: Pacific cod, ling cod, flounder, halibut, rockfish, Dolly Varden, king crab, Tanner crab, and Dungeness crab. Other marine resources used for consumptive-subsistence purposes in the study area include: clams, cockles, mussels, chitons, octopus, and sea urchins (ADF&G, Division of Subsistence 2006).

**Table 8-6 Reported Subsistence Harvest of Salmon in the Kodiak Management Area: 1980-2004**

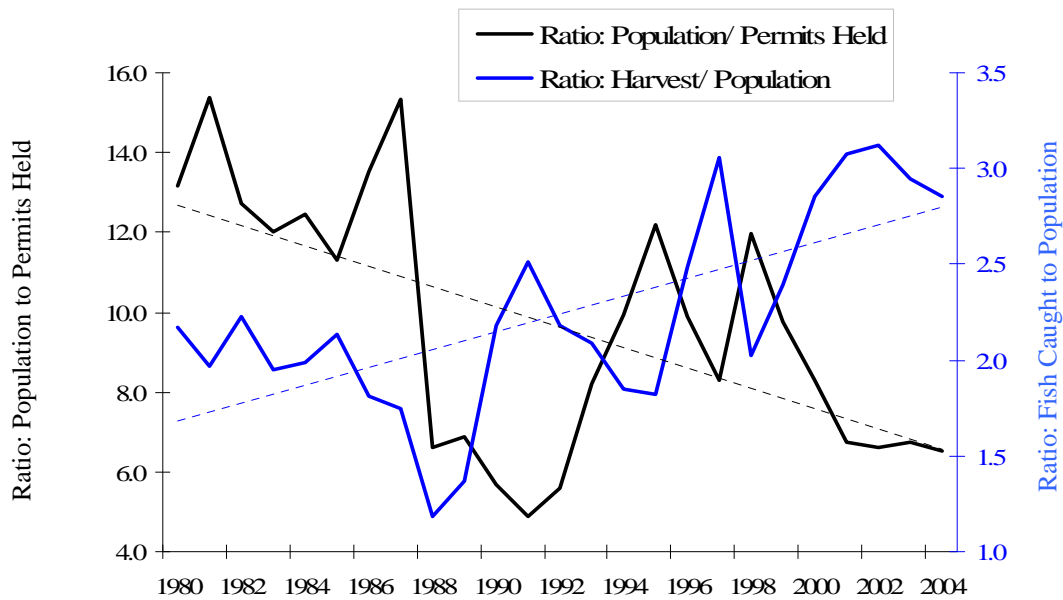
Year	Permits Held	Salmon Harvest (# of fish)	Kodiak Island Population	Ratio: Harvest/Permits	Ratio: Harvest/Population	Ratio: Pop/Permits Held
1980	756	21,541	9,939	28.493	2.167	13.1
1981	658	19,944	10,132	30.310	1.968	15.4
1982	993	28,142	12,623	28.340	2.229	12.7
1983	1,082	25,256	12,978	23.342	1.946	12.0
1984	1,061	26,290	13,207	24.779	1.991	12.4
1985	1,196	28,887	13,525	24.153	2.136	11.3
1986	996	24,455	13,467	24.553	1.816	13.5
1987	878	23,482	13,469	26.745	1.743	15.3
1988	2,066	16,171	13,698	7.827	1.181	6.6
1989	1,994	18,776	13,682	9.416	1.372	6.9
1990	2,340	28,977	13,309	12.383	2.177	5.7
1991	2,660	32,677	13,018	12.285	2.510	4.9
1992	2,614	31,934	14,635	12.217	2.182	5.6
1993	1,774	30,424	14,594	17.150	2.085	8.2
1994	1,518	27,856	15,059	18.350	1.850	9.9
1995	1,218	27,035	14,847	22.196	1.821	12.2
1996	1,429	35,163	14,158	24.607	2.484	9.9
1997	1,648	41,737	13,648	25.326	3.058	8.3
1998	1,145	27,783	13,716	24.265	2.026	12.0
1999	1,437	33,522	13,989	23.328	2.396	9.7
2000	1,679	39,753	13,913	23.677	2.857	8.3
2001	2,009	41,656	13,555	20.735	3.073	6.7
2002	2,068	42,622	13,649	20.610	3.123	6.6
2003	2,052	40,698	13,797	19.833	2.950	6.7
2004	2,063	38,403	13,466	18.615	2.852	6.5

Source: ADF&G subsistence permit database and Area Management Reports, Kodiak Management Area



**Village Residents Filet Halibut for Consumption and Sharing, Kodiak Island, 2006**

**Figure 8-1 Descriptive Ratios Indicating Involvement in KMA Subsistence Salmon Fisheries: 1980-2004**



Source: ADF&G, Divisions of Subsistence, CFEC

The ADF&G Division of Subsistence conducts household surveys of subsistence hunting, fishing, and gathering activities across the State of Alaska on an ongoing basis. Programmatic surveys were conducted in Kodiak Island communities during the mid-1980s, at various points during the mid-1990s, and during the early 2000s. Tables 8-7 and 8-8 below depict select findings from household survey work conducted in eight Kodiak communities during the period 1886-2003.

**Table 8-7 Consumption, Use, and Harvest of Subsistence Foods in Kodiak Communities: 1986-2003**

Community	All Subsistence Resources								
	Consumption per Person (lbs)			Households Using %			Households Harvesting %		
	1986	1990s*	2003	1986	1990s*	2003	1986	1990s*	2003
Kodiak City	n/d	151	n/d	n/d	99	n/d	n/d	88	n/d
Akhiok	162	322	n/d	92	100	100	83	100	100
Karluk	385	269	n/d	100	100	n/d	100	100	n/d
Larsen Bay	209	371	326	97	96	96	81	89	96
Old Harbor	423	300	358	100	100	100	98	100	98
Ouzinkie	403	264	n/d	94	100	100	91	100	80
Port Lions	333	332	n/d	99	100	100	94	100	98

\*The ADF&G data collection year varied across communities in the 1990s. For Kodiak City it was 1993; for Akhiok it was 1992; for Karluk it was 1991; for Larsen Bay it was 1997; for Old Harbor it was 1997; for Ouzinkie it was 1997; for Port Lions was 1993; Source: ADF&G, Technical Paper Number 312, August 2006 and Technical Paper 193, June 1993; n/d = data not available.



**Table 8-8 Participation in Marine and Terrestrial Subsistence Pursuits, Kodiak Communities: 1986- 2003**

Community	Percent of Households Harvesting														
	Fish			Salmon			Land Mammals			Marine Mammals			Other Resources		
	1986	1990s	2003	1986	1990s	2003	1986	1990s	2003	1986	1990s	2003	1986	1990s	2003
Kodiak City	*	71	*	*	69	*	*	38	*	*	1	*	*	76	*
Akhiok	83	96	100	83	96	100	50	67	73	17	25	18	58	88	100
Karluk	95	100	*	90	100	*	58	62	*	26	8	*	68	92	*
Larsen Bay	68	81	48	57	77	56	46	65	28	11	19	4	54	69	72
Old Harbor	89	84	86	89	81	85	75	54	64	48	35	29	50	93	91
Ouzinkie	76	87	73	73	81	75	56	49	43	47	28	20	79	100	88
Port Lions	88	87	82	86	82	78	65	58	52	11	4	17	59	98	96

\*The ADF&G data collection year varied across communities in the 1990s. For Kodiak City it was 1993; for Akhiok it was 1992; for Karluk it was 1991; for Larsen Bay it was 1997; for Old Harbor it was 1997; for Ouzinkie it was 1997; for Port Lions was 1993; n/d = data not available. Source: Fall et al. (2006); Technical Paper 193, June 1993; and Community Profile Database, Version 3.12; \* Data not available

The data depicted in the tables above provide compelling evidence that subsistence activities have been very common in households throughout the region during the period in question. Although pursuit and/or use of subsistence resources are essentially universal across the Kodiak region, variation in the kinds of foods residents have pursued over time is quite extensive. The types of food harvested by residents within specific communities also vary over the time series.

Such variation may be explained by a range of factors, including, but not limited to: (a) the relative availability of certain foods in specific areas over time, (b) the relative cost of pursuing each type of food from a given location, (c) changing local interests in consuming various types of subsistence foods, (d) changing interest in and/or capacity to engage in hunting, fishing, or gathering prior to the survey year in question, and (e) changing interest in or availability of store-bought foods that are deemed suitable substitutions for wild foods. Some baseline discussion of these and other factors is available in Fall et al. (2006), in data gathered through interviews conducted for the current study, and in other sources such as Carothers (2008). Phase Two of the current project will involve in-depth interviews with regional and community leaders to determine whether, to what extent, and how settlement monies have influenced these and other factors and the overall nature and extent of subsistence hunting, fishing, and gathering within and across communities in the region.

**Sharing and Reciprocity.** As discussed earlier in this report, sharing of subsistence foods is a critically important dimension of life in the villages, and in Kodiak City as well. In fact, it can confidently be said that the pursuit and sharing of foods for celebratory purposes and as part of informal economic arrangements involving specific and generalized reciprocity in sociological terms contributes significantly to the quality of life of many residents. Although our interview data and the work of others (e.g., see Fall et al. 2006) suggest that the oil spill disrupted subsistence hunting, fishing, gathering, and the sharing of harvest resources over the long-term, Table 8-9 below illustrates the ongoing commonality of the sharing of subsistence foods around Kodiak Island. Finally, Table 8-10 provides additional information regarding the involvement of village residents and households in subsistence-oriented activities during recent years.

**Table 8-9 Harvesting and Sharing Subsistence Foods on Kodiak, by Community: 1990's and 2003**

Place	Harvesting (%)		Receiving (%)		Giving (%)		Ratio of Giving: Harvesting (%)	
	1990s	2003	1990s	2003	1990s	2003	1990s	2003
Kodiak City	88	*	97	*	84	*	96	*
Ahkiok	100	100	96	91	83	82	83	82
Karluk	100	*	100	*	100	*	100	*
Larsen Bay	89	92	77	92	81	72	91	78
Old Harbor	100	98	95	100	79	79	79	81
Ouzinkie	100	96	94	98	92	86	92	90
Port Lions	100	98	100	98	91	91	91	93

The ADF&G data collection year varied across communities in the 1990s. For Kodiak City it was 1993; for Ahkiok it was 1992; for Karluk it was 1991; for Larsen Bay it was 1997; for Old Harbor it was 1997; for Ouzinkie it was 1997; for Port Lions was 1993; Source: Alaska Dept. of Fish and Game, Subsistence Division, Community Profile Database, Version 3.12, and Fall et al. (2006); \*data not available.

**Table 8-10 Additional Notes of Relevance to Subsistence Activities in the Villages**

Community	Households/Persons Per Household	Notes
Ahkiok	15 / 4.7 (2003)	Small village with relatively young population and nearly 56 % male; Long-term data suggest diminishing number of households and population; IAI research suggests recent extensive in- and out-migration of the same, otherwise permanent residents; Average household subsistence harvest was 873 lbs. in 2003; Informants report that subsistence hunting and fishing and related activities continue to be important, but that youth are not being exposed to knowledge as in previous generations.
Karluk	15 / 2.4 (2003)	Very small village with no school; Fall et al. (2006:165) report that data collection on harvest levels was problematic; Respondents did report that abundance of resources had declined in recent years, as had extent of sharing between households. The latter was explained in terms of lack of available resources and/or interfamilial factors. It was also said that subsistence skills were not being handed down because there were so few youth in the community (p. 167).
Larsen Bay	31 / 2.0 (2003) 35 / 2.3 (2006)	35 year-round and 19 summer-only households with summer sport fishing increasingly important; Population size diminishing significantly and poverty increasing over time; Population relatively aged, with mean age nearly 40 years; Average household subsistence harvest was 666 pounds in 2003; Diminishing size of households may account for diminished harvest levels last measured in 1993 (Davis in Fall et al. (2006:177).
Old Harbor	76 / 2.5 (2003) 78 / 2.6 (2006)	Moderate-size village, but resident population has diminished rapidly; Average age 35 years; Involvement in commercial fishing has diminished – a household survey conducted by Carothers (2008) suggests only 15% of households were earning fishing-related income in significant contrast to extensive involvement as recently as 10 years ago; Average household subsistence harvest was 948 lbs. in 2003.
Ouzinkie	69 / 3 (2003)	Relatively large and affluent village; Average age 34 years; Extensive local involvement in commercial fishing has diminished in recent years and an increasing number of fishermen are now working as hunting and fishing guides; Residents report extensive communication of subsistence-related knowledge; Average household subsistence harvest was 972 lbs. in 2003.
Port Lions	71 / 3 (2003)	Largest of the villages and largest percentage of resident non-Natives; Average age 37 years; Extensive involvement in commercial fishing has diminished in recent years; Slightly over half of residents reported that elders were exerting less influence than previously; Average household subsistence harvest was 559 lbs. in 2003.

Source: 2003 data derive from Fall et al. (2006); 2006 data derive from IAI's ongoing work in the region

## **9.0 Summary and Interim Conclusions**

This report describes what is now the second largest oil spill occurring in the United States, and one of the most important corporate-level punitive damages cases in the maritime history of the nation. The amount of the EVOS punitive damages settlement was contested in the courts for many years. The settlement was ultimately significantly reduced by a Supreme Court decision relating to what was deemed was an appropriate ratio between compensatory and punitive damages in a maritime legal context.

Despite the reduced settlement, various sums of money have been and are being distributed to many households across Southcentral Alaska. Because the amount of punitive damage settlement monies disbursed to claimants is based on a formula of relative economic damage experienced as a result of the spill, and because many Kodiak residents were extensively affected in economic terms, the region, its villages, and its residents comprise an ideal constellation of settings and subjects for scientific inquiry into the potential effects of the settlement.

This report is therefore focused on documentation of regional and village-level trends and current socioeconomic and demographic conditions on Kodiak Island. The description and preliminary analyses derive from a combination of archival and primary sources and are intended to function as a baseline against which the potential effects of the settlement may be measured, described, and explained. The report is also intended to be indicative of what kinds of factors and variables should be monitored prior to, during, and following the settlement. It should be noted, however, that: (a) only select portions of the database compiled for the project are presented here and additional trends data are available for use in monitoring and gauging the effects of the settlement, and (b) research undertaken following the settlement has indicated the need to accommodate important, newly-emerging factors and variables to be discussed in the final project report.

This concluding chapter summarizes key points developed in previous chapters and provides additional context for understanding the potential consequences of the settlement for residents of the study region. The relevance of various baseline components for the assessment phase of the project are discussed in brief, and anticipated methodological and analytical challenges are reviewed. The report concludes with brief discussion of select literature of relevance to the current case, and implications of the study for planning and environmental policy that is intended to mitigate the deleterious effects of large oil spills and associated litigation.

## **9.1 Summary Economic Overview**

The formal economy of Kodiak Island Borough is based largely in the commercial extraction, processing, and distribution of the region's rich marine resources. Raw and processed seafood products are the principal exports. The proximity of the island to the North Pacific Great Circle Route affords opportunities for transportation of seafood and other products to ports around the globe. Its location is also favorable in terms of strategic defense. Recreational opportunities are significant. As such, the economy of the Kodiak region is based in part on values inherent in local resources and geographic location.

But it should be noted that the functioning of the economy also requires extensive interaction with exogenous actors and entities. Nearly all of the goods, supplies, and equipment consumed or used by residents in the course of their daily lives and in the conduct of commercial industries and government must be imported. While reliance on external markets both for export potential and for goods and services required locally is common in other regions of Alaska and characteristic of Alaska as a whole, the situation is intensified in this remote island setting.

The Kodiak economy is also noteworthy in terms of earnings generated in the region by persons who legally reside elsewhere in Alaska and the United States. Resident adjustment figures generated by the Bureau of Economic Affairs reveal that the percentage of exported or “leaked” earnings has been increasing in recent years - from eight percent in 1990 to nearly 12 percent in 2000. Although the figure has begun to decline in association with decline in the ex-vessel value of salmon and departure of many non-residents from the fishery, we anticipate that it is likely to once again increase in conjunction with what some participants believe is a nascent trend of improvement in prices.

Key economic and demographic indicators are suggestive of extensive demographic and economic change in the study region subsequent to 1993. The number of persons living in the villages has for the most part declined, as has the overall population of the region. Rates of employment and the size of the regional labor force exhibited reversal of a trend of growth noted in the 1980s and, as expected, these were accompanied by an increase in unearned income. Again, our informants tend to attribute the changes to challenges in the commercial fishing industry, including a general loss of profitability associated with salmon prices and, subsequently, diminishing interest in participating. As activity in the harvest sector diminished, so it did in the processing and distribution sectors.

Subsistence hunting, fishing and gathering, and celebratory, ceremonial, and routine use and sharing of wild foods are critically important aspects of Kodiak society and its informal economy. Some informants assert that problems in the commercial fishing industry have affected involvement in subsistence fishing and hunting activities in the villages. It is said by some that over the last decade or so, fewer people and less capital have been available to maintain operations.

Some also report a trend of disinterest in tradition among youth in the villages. While this does not appear to be universally the case, some informants discuss conflicting values between generations. This issue may be worth considering following the settlement as residents make decisions about whether they will stay in the villages or seek new experiences elsewhere.

But many subsistence practitioners remain active on Kodiak Island. Thus, although it is apparent that income deriving from commercial fishing and other sources can enable subsistence-oriented hunting and fishing practices, certain residents have been able to pool existing resources and maintain sufficient interest in traditional ways of living to conduct those activities regardless of the observed downward turn in the regional economy. We anticipate that analysis of the enabling effects of the settlement may shed light on the nature of modern life in rural Alaska, and on the inclination of residents to forego or maintain traditional village life ways during what will

inevitably be another period of change following from the grounding of the supertanker *Exxon Valdez*.

## **9.2 Trends in Regional Employment and Earnings**

Data collected by the BEA indicate a fairly stable long-term pattern of earned income across the study region. Cyclical contraction in the seafood harvest and processing sectors tend to be offset by gains in the government sector and in support sectors unrelated to fishing, and vice-versa. Significant short-term earning anomalies have occurred on occasion, such as during the decline of the Bering Sea crab fishery in the 1980s, and following the *Exxon Valdez* oil spill when commercial fishing activity was constrained but short-term high-paying clean-up opportunities were abundant.

Cyclical and seasonal variability characterize the basic sector, which is affected by seafood harvesting and processing, also cyclical and seasonal in nature. The seasonal range in overall employment is 6.5-to-1 in basic-sector seafood manufacturing and 1.3-to-1 in the generalized support-sector. When controlling for seasonal variation, an apparent gradual reversal of decline in seafood production is noted beginning in 2003. What appears to be a turning point in the industry is further indicated through analysis of entry and exit of businesses across the region, per ADOLWD data covering the same time period. A net gain in seafood-related businesses is indicated in recent data collection years.

Employment trends in the harvest sector were compiled through a unique collaboration between the ADOLWD and ADF&G. Fish ticket data were used in conjunction with ADOLWD ES202 place-of-work employment data, which traditionally excludes fish harvest enterprises. The harvest sector employment data also indicate extensive seasonality effects. When expressed in annual average units, sharp declines in employment in the region's salmon and groundfish fisheries are noted, especially for 2001 and 2002.

Note that these data merely indicate the challenging human realities reported by participants active in the harvest and processing sectors during the period under examination. Informants report that the successes enjoyed and the profits earned in Kodiak fisheries during previous years were being superseded during the late 1990s and early 2000s by the realities of rising fuel prices and other trip and fixed costs, and by ever-diminishing return on investment given global devaluation of domestic seafood products. While conditions appear to have improved during the past few years, study participants continue to report uncertainty about the status and future prospects of the commercial fishing industry on Kodiak Island. This, in turn, lends to uncertainty in predictions about the potential fisheries-specific effects of the settlement, and points to the need for empirical investigation of the outcome.

Analysis of employment and earnings in the seafood industry clearly indicate seasonal and cyclical volatility. But the support sector is relatively stable in these regards, and thus it is amenable to forecasting. Our forecast model for monthly support sector employment is suggestive of a fairly stable trend with some intra-annual and long-term variation that is

undoubtedly linked to seasonal patterns in the regionally predominate and perennially volatile seafood industry.

This renders the comments of fishery participants regarding job alternatives highly significant. Many fishermen, and particularly those in relatively undercapitalized small boat fisheries, report that alternative skills and opportunities have enabled them to stay on Kodiak Island during recent downturns in the fishing industry. Many such persons appear to be dedicated to staying on Kodiak, and they strive to balance the challenges of doing so with the non-monetary benefits of fishing and daily life on the island. These benefits reportedly include, among others: the local presence of friends and family, solitude, abundant hunting and fishing opportunities, and the aesthetic pleasures of the natural surroundings.

Attractions notwithstanding, economic factors have forced some participants in both the harvest and processing sectors to leave the Kodiak region to seek opportunity elsewhere. As discussed throughout this report, the most recent downturn in the commercial fishing industry, now possibly abating, tested the fortitude of many residents, and it appears to correlate with an increased rate of emigration from the region.

We have thus observed variability in individual capacity for, and dedication to, remaining on Kodiak Island amidst the challenges of participation in the region's commercial fishing industry. This understanding underscores the importance of questions about the likely nature of individual and collective response to disbursement of EVOS punitive damage monies in the study region, and it reinforces our hypotheses about those effects. We continue to hypothesize a split effect, wherein: (a) some settlement recipients interested in staying on Kodiak use monies to invest or reinvest in the region's dominant industry and/or in related businesses, and (b) some recipients use settlement monies to emigrate and may or may not return. A range of social variables will be monitored to enable valid explanation of short- and longer-term patterns of response to the settlement. These data will necessarily derive not only from archival sources, but also from direct interaction with individuals and groups of study participants across the affected region.

### **9.3 Trends in the Seafood Industry**

**Overview.** When considered in tandem, harvest and processing employment have recently accounted for over 30 percent of active jobs in the study region. Baseline measures were used to characterize the structure and performance of these important sectors as undertaken by both residents and non-residents. We have focused on identifying the contributions of the former. The level of effort in fishing employment was measured in two ways: 1) the ratio of the number of fishers to the number of active permits, and 2) the number of active permits to the number issued in a given year. Production was measured in terms of pounds landed per active permit. We have also developed baseline indicators for residency composition of gross earnings.

While overall fishing effort in the study region has been relatively stable in recent decades, production has risen sharply over time. Thus, if it can be assumed that abundance of marine resources has not changed dramatically over the time period in question, an increasing level of production is suggestive of increasing efficiency.

Production is also inversely correlated with gross earnings. We argue that this is indicative of periodic excess supply in a context of limited capacity and demand. Limited duration openings have tended to lead to flooded markets. Given limited local capacity to process, export, and profitably distribute seafood in distant markets, Kodiak's processors and buyers tend to be periodically overwhelmed with product, and when supply exceeds capacity and demand, buyers reduce prices and harvesters suffer.

One intention of fisheries rationalization, not yet fully analytically demonstrated in the region, is to minimize such volatility by distributing effort and processing capacity more evenly over the course of the year. Significantly, as indicated by Knapp (2006), this may also lead to fewer jobs in the industry and a different overall structure of the fishery. The author notes in his preliminary analysis of the effects of rationalization on Kodiak's participation in the Bristol Bay crab fisheries that: (a) the number of Kodiak-based vessels involved in the red king crab fishery fell by 53 percent, (b) between 160 and 285 related jobs were lost on Kodiak, and (c) loss of overall earning on Kodiak were between one \$1 million and \$1.6 million.

Such effects would likely counter anticipated effects under our working hypothesis that the settlement would lead to increased investment in the commercial fishing industry. Rationalization has profound implications for the future structure of Kodiak fisheries and for levels of participation and production therein. This will be taken into account by many fishery participants making investment or divestment decisions following the settlement, and thus pertinent conditions and variables will need to be monitored and controlled to enable meaningful analysis of the effects of the settlement.

This study has revealed significant temporal variation in effort, earnings, ex-vessel value, and landings for individual fisheries across the region. Gross earnings per unit of catch tended to decline over the time series for all Kodiak fisheries except halibut, which exhibited a discernable upward trend. Landings, while highly cyclical, tended on the whole to be relatively stable. An exception is crab, landings of which have dropped significantly since 2000. Productivity increased in all fisheries, again with the exception of crab, which exhibited marked variability after 1996.

Under conditions of increased capital available to maintain operational efficiency, such as would follow the settlement and under an assumption of constant availability of resources, we would expect to see stable or increasing levels of production in the KMA. Earnings levels will inevitably relate to exogenous market factors, unless fishermen in the region can, in some manner, influence those factors. For instance, application of settlement-related monies to a joint marketing effort could potentially enhance pricing conditions for Kodiak seafood products.

***Challenges in Larsen Bay and the Indicative Case of Akhiok.*** We also examined fishing-specific effort and production at the community level, using Akhiok, Larsen Bay, and Kodiak City as case examples. In Larsen Bay, the number of issued and active commercial fishing permits follows a clear pattern of decline over time. Approximately half of the permit holders residing in Larsen Bay in recent year held permits for salmon. The remainder held permits for groundfish, halibut, and/or crab.

Residents explain that market problems have led many to find alternative forms of employment, and it is telling that rates of poverty increased dramatically in the village between the 1990 and 2000 Census years. This may well have worsened during the current economic climate.

Although the size of the fleet in Akhiok remains relatively small, the absolute increase in reported effort has been significant in recent years. For instance, the number of salmon permits used by residents increased from one to eight after 1989. This contradicts the situation in Kodiak City and Larsen Bay during the same period, where effort has fallen off significantly. The salmon fishery is the only fishery in which Akhiok residents participate to any significant extent.

The case of diminished use of commercial fishing permits following the EVOS land trust liquidation in Akhiok in 2002 may well portend an effect of the punitive damages settlement. Interviews with local leaders made clear that many residents left Akhiok that year, and all permits but one went unused. Rates of participation in commercial fishing and subsistence hunting and fishing began to normalize the following year. The words of a prominent public official may well be prophetic in this context and in the context of the settlement and its potential effects on fishery participants and other residents around Kodiak Island: “Yes, people will leave the island, they will try other things, but they will return to what they know.”

***Participation of Residents in Kodiak Limited Entry Salmon Fisheries.*** The total number of permits issued for commercial pursuit of salmon in the KMA increased from less than 500 in the mid-1970s to over 750 by the early 2000s. Some 24 percent of the increase resulted from the rapidly growing level of participation by non-Alaskans, most from Washington State. While a third fewer village residents participated in the fishery during the period, the number of permit holders residing in Kodiak City increased by about 40 percent, and the number residing elsewhere in Alaska doubled.

Many non-Alaskans participated in the KMA salmon fishery during our time series, but the number of residents with active permits stabilizes after the mid-1990s. When expressed as a proportion of earnings for all participants, gross earnings for resident participants appear to be cyclically variable, though reversal of a trend of diminishing earnings relative to the whole is indicated after the mid-1990s.

Earnings relate, in large part, to exogenous factors and conditions in the national and international seafood marketplaces. Based on the tendency of many seasoned fishermen to consider the economic context of potentially significant investment, it can be reasonably anticipated that decisions to invest or reinvest in fishing operations following the punitive damages settlement will relate in part to historical and then-going market prices for salmon and other seafood products. But, as discussed elsewhere in this report, many non-economic factors inform the decisions of fishery participants or prospective participants to engage or persist in commercial fishing, and these will also be weighed following the settlement.

Analysis of limited entry salmon permit transfer data indicates that the rate of transfers due to emigration from Kodiak City was nearly four times greater than that due to in-migration. Similarly, the rate of transfers due to people leaving the villages was nearly three times greater



than that due to people coming to live in the villages. This means that much of the turnover of permits is associated with people coming to Kodiak to fish from places outside the region.

As noted by various public officials during our work on the island, many persons come to Kodiak with the intent of staying but, in the end, reside only for short or moderate periods of time. Some transfer commercial fishing permits upon departure. A forecast of permit ownership using a Holt exponential smoothing model suggests that fewer Kodiak residents and Alaska residents will hold KMA limited entry salmon permits in future years, and that the number of non-resident permit holders will remain nearly constant.

The settlement may bear some effects on the empirical reality of future permit ownership. Under the study hypothesis of increased local investment in commercial fishing, an increase in the number of permits held by current and long-term residents of Kodiak Island would be expected in conjunction with a concomitant decrease in the number of permits available for transfer to persons from outside the region. This assumes: (a) reasonably stable availability of resources, (b) an otherwise fairly stable regulatory regime, and (c) reasonably favorable conditions in the market during and for some period after the settlement occurs. As such, monitoring and assessment will necessarily involve attention to studies of resource abundance and factors associated with regulatory and economic constraints and opportunities in the fisheries of interest.

#### **9.4 Population Change and other Demographic Factors**

Extensive population growth has occurred on Kodiak Island since 1980. The 2004 population estimate of 13,466 persons is more than 35 percent greater than the population figure for 1980. But most growth occurred in the 1980s, in association with regional expansion of marine fisheries and the work force needed to support them. Population growth has since leveled off and the rate of growth on Kodiak Island has been slower than for the state as a whole since 1990. This can be explained by naturally decreasing populations and net out-migration. The rate of population growth measured between the 1990 Census and the 2000 Census was 11.2 percent for Alaska, and 2.1 percent for Kodiak Island Borough.

Net out-migration clearly is limiting growth in the region. Again, in the absence of other explanatory factors, the trend of net out-migration appears to be associated with general decline in the fishing industry. During the 1980s, when growth typified the economy, the population grew by almost nine percent. Conversely, emigration was common through the early 1990s when serious challenges were first confronting participants in various sectors of the salmon fishery. The population diminished by almost 13 percent during that period.

Migration to and from Kodiak and its communities presents a variety of significant implications for this study. Migration factors relate to the manner and rate of participation in the workforce, to extent of participation in marine fisheries, to level of involvement in subsistence activities, and to social and cultural aspects of life across the island generally. But household-level decisions to move from one place of residence to another clearly involve many variables. We assert that these can be understood and documented only through direct interaction with the decision-makers and/or persons who are highly knowledgeable of the households and factors involved.

Thus, Phase Two of this project has necessarily involved an interview sampling strategy that enables understanding of such decisions vis-à-vis acquisition of settlement award monies and given the full range of other factors that may or may not be related to those decisions.

From an analytical perspective, a significant level of net out-migration from Kodiak during a period of relative economic stability would potentially indicate that something had occurred to inspire or enable many residents to move. Should this occur following the settlement, some refutable inference could be made that the monies were causal or associated with the situation. But again, empirical data would be needed to make such inference and to control for factors associated with migration decisions. Indeed, the recent economic downturn may well surpass the constraining or enabling effects of other factors now conditioning life on Kodiak Island.

The size of the awards in question, the phased manner of their distribution, and timing of their distribution within and across the study communities is likely to have some bearing on migration and other relevant behavioral phenomena. Alaska Department of Labor yearly population estimates, Census information that is indicative of local and regional population structure, field observations, and household and local leadership interviews regarding decision-making processes are some of the sources we are now using to develop and cross-validate meaningful explanation of post-settlement changes.

## **9.5 Village-level Factors and Conditions**

U.S. Census and state-generated demographic data indicate that the size of the resident populations in the villages has generally declined during the period 1980 through 2004. This appears to be closely associated with lack of economic growth and, in fact, some population growth has occurred in Port Lions and Ouzinkie, where economic conditions and trends have been relatively more encouraging. This suggests that the settlement may potentially lead to improved economic conditions in the villages, and hence reversal of the trend of diminishing population size. But such an effect would depend, in large part, upon spending behavior. Such an outcome is more likely in the event that extensive monies are invested internally; that is, in a manner that stimulates local business activity and/or public and private sector spending. If extensive monies are spent in a manner that does not stimulate the local economy, and/or if many residents emigrate, then the settlement is more likely to exacerbate the observed trend of diminishing population size.

As regards migration decisions specific to the villages, we posit that disbursement of punitive damage awards is likely to present widely differing influences that will relate to a range of cultural and situational factors and variables. For instance, people with strong preferences for the subsistence-oriented lifestyle are less likely to emigrate than persons who have been seeking experiences in other parts of the country. Our interview data suggest that participation in subsistence hunting, fishing, gathering, and associated cultural activities would be more extensive in the communities in the absence of economic constraints. Data also indicate that residents have been leaving the villages seeking job opportunities to reduce local economic challenges. Depending on the amounts and how they are spent, settlement-derived income has the potential to satisfy some of the travel-experiential interests of residents while also mitigating

local economic challenges and tendencies toward migration through increased availability of cash and/or enabling educational opportunities, new business ventures, or other long-term investments.

This perspective on potential spending patterns may be simplistic. The interplay between traditional culture and ways of life on one hand, and modern American cultural norms and capitalist-materialist tendencies on the other may play out in highly complex and unexpected ways in the village context following the settlement. There are few empirical studies available to guide efforts toward prediction. The case of Akhiok provides some highly relevant and empirical indication of effect, and as discussed later in this chapter, may also provide some guidance to residents in other communities.

For settlement claimants residing in or maintaining connections to one of the Kodiak villages, quality of life and social considerations may potentially bear influence on decisions to move back to, stay in, or emigrate from the community in question. Extensive settlement income may serve to mitigate the extant economic burdens of staying on Kodiak Island, buffer against potential future economic challenges, and enable the continuation of a preferred way of life often perceived as exclusive to one's home and family. But again, interest in remaining on Kodiak Island is by no means universal, and significantly-sized settlement awards may enable departure.

Analysis of the net demographic effects of the punitive damage awards requires clear understanding of trends and conditions in the structure and size of populations across the study region. These and other categories of demographic data will continue to be monitored and will be reassessed after the settlement. Explanation of post-settlement changes requires detailed analysis of interview data that reveal variation in the rationale underlying decisions of residents to move from or stay on Kodiak Island, and whether these were directly or indirectly related to the settlement monies, or altogether unrelated. While planners, demographers, and other public officials are able to speak to such issues and have been contacted following the settlement for this purpose, we are also working directly with representative groups of award recipients to determine the range of empirical outcomes of migration-related decision-making processes following the settlement.

## **9.6 Subsistence Practices and the Potential Effects of the Settlement**

Perhaps the most compelling data compiled during this study is that relating to ongoing involvement in subsistence activities across the study region. Most households across the region engage in pursuit of wild foods, and most are involved in the sharing of those resources. The value of wild foods as indicated through both secondary and primary source data collected during the course of this project both includes and supersedes dietary benefits. Such foods are used to eat, they are used for purposes of generalized and specific reciprocal exchange, and they are used for ceremony and celebration.

Given the critically important social, cultural, and dietary dimensions of subsistence-related undertakings in the villages, and the potential implications of unearned revenue being distributed in villages across the region, we are intent on assessing the effects of the punitive damages

settlement in this setting. We anticipate that the effect of the settlement on participation in subsistence activities will be similar to that likely experienced by those involved in commercial fishing in the region.

That is, on one hand, an increase in unearned income has the potential to allow householders to increase the amount of time they devote to leisure activities, and potentially to reduce time devoted to work, including work related to subsistence hunting, fishing, gathering, and processing of subsistence foods. This effect would be stronger in cases where store-bought products are viewed as suitable substitutes for subsistence foods.

But on the other hand, as posited elsewhere in this report, settlement award monies could also increase the amount of time and money available for engaging in subsistence activities and related cultural practices. From an economic perspective, this argument has three elements.

First, in households receiving significant settlement awards, it may be possible to substitute non-wage income for wage income. This would avail more time for hunting, fishing, gathering, and related activities.

Second, settlement monies may allow some subsistence practitioners or prospective practitioners to purchase gear needed to conduct subsistence activities, and/or to expand both the range of their activities and the type of foods that are harvested. Such monies may also enable long-term maintenance of existing gear and equipment.

Third, extensive unearned income may allow some householders to engage in networks of food-related reciprocity, thus tightening social bonds in and possibly between villages. That is, relatively affluent householders may be able to supply money to others who are relatively more capable of engaging in subsistence practices. Such behavior would thereby increase the overall extent of community involvement in what is often a way of life that is highly valued in non-monetary terms - if only vicariously or through sharing of wild foods and other forms of specific and generalized reciprocity.

From sociological and anthropological perspectives, the non-monetary benefits of subsistence may be seen as of primary importance to residents. While this phase of the study has not involved use of ethnographic methods that would elucidate the full nature of activities associated with fishing, hunting, gathering, processing, and preparing subsistence foods and other products, it must be emphasized that interview data indicate that these aspects of local life are indeed highly valued by many residents. Indeed, local society and culture are in many ways structured around subsistence-related activities, as they have been for centuries. It does not seem likely that this way of life will be universally abandoned, no matter the size or manner of distribution of the settlement awards. Rather, based on what is known about the communities and the cultural perspectives of many, we posit that it may ultimately be reified. This remains an empirical question of central importance to this study.

## 9.7 Considerations for Project Phase Two

The principal intent of this initial phase of the project was to establish a base of understanding about social and economic trends and conditions on Kodiak Island. This report describes much but not all of the data that have been collected to enable that understanding and it presents some of the preliminary analyses that have been generated to date. It should be kept in mind, however, that while the data and analyses necessarily relate to our working hypotheses, the settlement may lead residents of Kodiak Island to respond in ways that cannot be predicted and in social and economic settings that are perennially changing.

Social and economic conditions in the region are indeed variable and complex. The regional economy was internally robust at the outset of this study but in recent years has faltered along with other regions in the nation. The Kodiak economy is also related to seasonal, cyclic, and volatile forces and factors, such as the availability of migratory fish, and pricing in domestic and international seafood markets. Many residents express affection for and deep attachment to Kodiak Island, but there is also extensive turnover in the populations of its communities. Village residents are often deeply engaged in subsistence pursuits, but the capacity to do so is in part dependent on income derived through participation in activities that paradoxically reduce the amount of time available to hunt, fish, and gather wild foods.

The unique and complex social and economic characteristics of the study region and its communities, and the need for valid explanation of settlement-specific responses amidst shifting baseline conditions that are, of themselves, variable and subject to a range of intervening factors, required that an objective, encompassing, and flexible methodological and analytical approach was undertaken during Phase Two of this project. This approach and our research findings will be described in detail in the forthcoming final project report.

## 9.8 Conclusions

Focus group work conducted with public officials during the course of this project has made clear that the lives of many persons in the Kodiak region, including their own, have been significantly affected by the *Exxon Valdez* oil spill. Data from these sessions and from the scores of interviews conducted during the course of this project are replete with discussion of the life-altering nature of the event for residents across the region. Understanding of the scope and intensity of the event is furthered by our own work in affected Kodiak communities following the spill.

But the most striking, if obvious, element of such discussions is that the spill event is still running its course. The grounding of the *Exxon Valdez* and the spilling of its cargo have preceded a long series of ecological and social outcomes that continue to the present.

Although the current report has not focused on the economic effects of the spill and clean-up, economic analysis and interview data indicate that the effects of the event were not entirely

negative. Extensive capital was infused into the economy, and some of its effects were beneficial.

The physical environmental effects of the spill cannot in any value system be considered beneficial, and certain social and economic effects of the event were clearly detrimental (see, for example, IAI 2001; Fall et al. 2001; Gill 2007). Various unintended consequences followed from efforts to mitigate the event – during, soon after, and in the years following the spill itself. For instance, only a limited number of captains were hired to participate in the clean-up. Thus, while some fishermen earned extensive profits doing so, others did not and also could not fish for some time. Disproportionate effects played out as many lost ground in meeting the challenges of commercial fishing in and beyond the region, while others garnered capital for more avid participation in future years.

The deleterious effects of the spill for participants in the harvest sector of commercial fisheries across the affected region are at the heart of the rationale for the most significant award category in the litigation settlement process. We have sought to develop a case-specific understanding of the economic context within which settlement monies continue to be awarded to such persons, and a framework for monitoring and assessing the range of potential beneficial and deleterious, and intended and unintended consequences of the process.

Although there has been much speculation about the likely reaction of fishery participants and Alaska Natives, it is unfortunate that there is a paucity of literature or other empirically-derived understanding to guide those who have been developing plans to address challenges potentially resulting from disbursement of settlement monies into the economies of Southcentral Alaska and its communities. Study of gaming-related rapid socioeconomic change in Native American communities provides some guidance for anticipating effects in the villages in that gaming-derived monies were most beneficial when they served to empower tribal needs and interests (Taylor and Kalt 2005). The authors assert the benefits and explain why gaming has been successful on the reservations:

The results are remarkable. In all but two [of many] categories, Census-measured socioeconomic improvement is greater for gaming reservations than for non-gaming reservations . . . The reasons are to be found in the fact that self-rule brings decision-making home, and local decision-makers are held more accountable to local needs, conditions, and cultures than outsiders . . ." (Taylor and Kalt 2005:xi)

The difficulties of applying these findings to the current case are obvious, however. Gaming involves establishment of a long-term, locally-based, and internally-managed enterprise through which Native groups and individuals can find profitable means for integrating with the predominant capitalist system. This is somewhat akin to the establishment of Native corporations and affiliated enterprises following passage of ANCSA, although the long-term benefits and liabilities of that arrangement are still emerging in villages across Alaska. But the current case is different in any event, in that the bulk of the punitive damages settlement monies will accrue primarily to individuals rather than group entities, and there can be no certainty in an outcome that would involve cooperative business investments among individual recipients. One public official interviewed during the course of this project envisioned establishment of a fishing

cooperative via collective investment of settlement monies, but of course this outcome and its predicted benefits remain speculative.

Analysis of the economic impact of the Alaska Permanent Fund (APF)<sup>33</sup> is to some extent useful in elucidating the potential effects of the punitive damages settlement. Goldsmith (2001) describes the various ways in which the APF stimulates the Alaska economy and its regions via annual distribution of funds to individuals. Some of these effects may well be similar to what might occur following distribution of settlement monies, and Goldsmith's work has to some extent informed the monitoring and assessment categories developed for use in the current report.

But Goldsmith also notes (pp. 4-5) that relatively little is known about the full range of effects resulting from the APF. Moreover, the APF process is not likely to simulate the settlement award process in that APF dividends involve: (a) allocation to all residents of the state, (b) annual disbursement, and (c) relatively small amounts of money when considered against the probable magnitude of settlement awards. Finally, the APF program is well-established. Although the amount of the dividend is not known until it is actually issued, Alaskans can anticipate the annual arrival of an amount that can be estimated with some degree of precision based on dividends issued during previous years.

Conversely, EVOS punitive damage claimants waited for settlement in a state of uncertainty for many years. The amount was perennially contested and the end date of the disbursement process remains uncertain at the time of this writing in November 2010. Although this study has not focused on the various social or social-psychological implications of protracted litigation and anticipation of the settlement, our interview data underscore the profound effects of the process on the perspectives and experiences of claimants. Having waited, speculated, calculated, and reiterated for years, many prospective recipients report finally attempting to put the settlement out of the realm of thought. It is telling that many have not been able to do so. The settlement and now the disbursement process have loomed and persisted.

But there is at least one important similarity between the settlement process and the APF. The APF presents individuals with unearned income, with a source of income that theretofore did not exist. This is now also the case for settlement recipients. Much of the settlement planning-related work undertaken by various public officials and entities in the region has for this reason involved dissemination of information intended to help recipients envision the full range of options and implications associated with the spending of monies as they finally arrive.

The issues of spending and investment are at the heart of this project. Upon settlement, these began to be expressed as the causal forces for a series of social and economic consequences across Kodiak Island and Southcentral Alaska. But the unknowns of spending and investment behaviors under unusual conditions challenge our chain of hypotheses, research methods, baseline descriptions, and analytical approaches. We have not been able to readily anticipate what individuals are doing or will do with monies resulting from settlement of the EVOS

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<sup>33</sup> The APF involves the distribution of revenue from oil and natural gas development in the State of Alaska to full-time residents via annual cash payments. Each resident receives an equal share of a total appropriation; in some recent years individual shares have approached \$2,000.

punitive damages case. As such, we cannot easily predict its regional implications. There is little guidance in the literature and the perspectives and plans of the awardees often change, depending on the needs and interests of the day or month or year. The concepts of rationality and optimization would be more reliably useful if human beings always behaved in keeping with reason and established norms. But in fact, the settlement has the potential to present certain individuals with a new source of wherewithal and new spending options. Uncertainty remains. The intent of this work is not prediction, however. It is scientific inquiry, and the setting described in this report is well-suited for empirically-based social scientific investigation into a realm of human behavior that is at once little known and of significance for understanding the course of history of the State of Alaska and the long-term outcome of maritime accidents in the world's oceans.



## References

Abrahamson, Mark

1980 Sudden wealth, gratification and attainment: Durkheim's anomie of affluence reconsidered. *American Sociological Review*. Volume 45 (February): 49-57.

Ackerman, R.E.

1992 Earliest Stone Industries on the North Pacific Coast of North America. *Arctic Anthropology* 29 (2): 18-27.

Alaska Department of Community and Economic Development

2007 Community Database Online. Customized Data Queries. Available online at: [http://www.commerce.state.ak.us/dca/commdb/CF\\_CUSTM.htm](http://www.commerce.state.ak.us/dca/commdb/CF_CUSTM.htm)

Alaska Department of Fish and Game, Division of Subsistence

2005 2003 Annual Report. Juneau.

Alaska Judicial Council

1999 A Directory of Dispute Resolution in Alaska Outside Federal and State Courts, March 1999. Available online at: <http://www.ajc.state.ak.us/Reports/rjdir99frame.htm>.

Anderson, P.J.

2004 Gulf of Alaska Small Mesh Trawl Survey Trends. In J.L. Boldt (ed.) *Ecosystem Considerations for 2005*. Appendix C of the BSAI\GOA Stock Assessment and Fishery Evaluation Reports. North Pacific Fishery Management Council. Anchorage, AK.

Brodeur, R.D., and Ware, D.M.

1992 Long-term variability in zooplankton biomass in the subarctic Pacific Ocean. *Fisheries Oceanography* 1(1):32-37.

Carothers, Courtney

2008 Privatizing the Right to Fish: Challenges to Livelihood and Community in Kodiak, Alaska. Ph.D. Dissertation, University of Washington, Dept. of Anthropology. Seattle.

Chaffin, Yule. 1967. *Alaska's Southwest: Koniag to King Crab*. Kodiak from sea otter settlement to king crab capitol; history of hunting and fishing industries, island villages, and scenic beauty. Anchorage: Chaffin Incorporated.

Chance, N.

1987 Subsistence research in Alaska: premises, practices and prospects. *Human Organization*, 46 (1987): 85-89.

Colt, Steve

2000 Salmon Fish Traps in Alaska – An Economic History Perspective. Working Paper 2000.2. Institute for Social and Economic Research (ISER), University of Alaska at Anchorage.

Crowell, Aron L.

2001 Looking Both Ways. In *Looking Both Ways – Heritage and Identity of the Alutiiq People*. Aron L. Crowell, Amy F. Steffian, and Gordon I. Pullar (eds.). A project of the Arctic Studies Center, Department of Anthropology. National Museum of Natural History, Smithsonian Institution and The Alutiiq Museum and Archaeological Repository. Fairbanks: University of Alaska Press.

Crowell, Aron L. and Jeff Leer

2001 Ukgwepet – Our Beliefs. Alutiiq Spiritual Life and Traditions. In *Looking Both Ways – Heritage and Identity of the Alutiiq People*. Aron L. Crowell, Amy F. Steffian, and Gordon I. Pullar (eds.). A project of the Arctic Studies Center, Department of Anthropology. National Museum of Natural History, Smithsonian Institution and The Alutiiq Museum and Archaeological Repository. Fairbanks: University of Alaska Press.

Crowell, Aron L. and Sonja Luhrmann

2001 Alutiiq Culture – Views from Archaeology, Anthropology, and History. In *Looking Both Ways – Heritage and Identity of the Alutiiq People*. Aron L. Crowell, Amy F. Steffian, and Gordon I. Pullar (eds.). A project of the Arctic Studies Center, Department of Anthropology. National Museum of Natural History, Smithsonian Institution and The Alutiiq Museum and Archaeological Repository. Fairbanks: University of Alaska Press.

Davis, Brian

2006 Akhiok. Chapter VII in 2006 Update of the Status of Subsistence Uses in Exxon Valdez Oil Spill Area Communities, 2003. James A. Fall (ed.). Technical Paper No. 312. Alaska Department of Fish and Game, Division of Subsistence. Juneau.

Donkersloot, Rachel

2006 Youth Emigration and Reasons to Stay – Linking Demographic and Ecological Change in Bristol Bay, Alaska. Presentation delivered at the conference titled: Alaska Fishing Communities – Harvesting the Future. September 2006. Sponsored by NOAA Fisheries and University of Alaska Sea Grant. Doctoral Candidate, Department of University of British Columbia. Vancouver.

ExxonMobil Corporation

2007 ExxonMobil's Appeal of the Punitive Damages Judgment. Available online at [http://www.exxonmobil.com/corporate/Newsroom/NewsReleases/Corp\\_NR\\_App\\_eal.asp](http://www.exxonmobil.com/corporate/Newsroom/NewsReleases/Corp_NR_App_eal.asp).

Fall, J., L. Brown, J. Cohen, G. Jennings, R. Mason, R. Miraglia, C. Mishler, S. Skaggs, and R. Stanek

1997 Subsistence Harvests and Uses in Seven Gulf of Alaska Communities in the Second Year Following the *Exxon Valdez* Oil Spill. James A. Fall (Ed.). Technical Paper 218. Alaska Department of Fish and Game, Division of Subsistence. Juneau.

- Fall, J.A., R. Miraglia, W. Simeone, C. Utermohle, and R.J. Wolfe  
 2001 Long-Term Consequences of the *Exxon Valdez* Oil Spill for Coastal Communities of Southcentral Alaska. James A. Fall (ed.). Technical Report No. 163. OCS Study MMS 2001-032. Final Report for: Sociocultural Consequences of Alaska Outer Continental Shelf Activities: Data Analysis and Integration. Anchorage.
- Fall, J.A., R.J. Walker, R.T. Stanek, W.E. Simeone, L. Hutchinson-Scarborough, P. Coiley-Kenner, L. Williams, B. Davis, T. Krieg, B. Easley, and D. Koster  
 2006 Update of the Status of Subsistence Uses in Exxon Valdez Oil Spill Area Communities, 2003. James A. Fall (ed.). Technical Paper No. 312. Alaska Department of Fish and Game, Division of Subsistence. Juneau.
- Fina, Mark  
 2005 Rationalization of the Bering Sea and Aleutian Islands crab fisheries. *Marine Policy* 29(4): 311-322.
- Finney, B.P., I. Gregory-Eaves, J. Sweetman, M.S.V. Douglas, and J.P. Smol  
 2000 Impacts of climatic changes and fishing on Pacific salmon abundance over the past 300 years. *Science*. Volume 290, No. 5492, pp. 795-799. October 27.
- Francis, R, S. Hare, A. Hollowed, W. Wooster  
 1998 Effects of interdecadal climate variability on the oceanic ecosystems of the Northeast Pacific. *Fisheries Oceanography* 7(1): 1-21.
- Fried, Neal, and Brigitta Windisch-Cole  
 1999 Kodiak – The Big Island where Fishing is King. *Alaska Economic Trends*. Diane Kelm and Joanne Erskine (Eds.). September. State of Alaska Department of Labor and Workforce Development. Juneau.
- Gilbertson, Neal  
 2003 The Global Salmon Industry and its Impacts in Alaska. *Alaska Economic Trends*. Volume 23, No. 10. October. Juneau.
- Gill, D.A.  
 2007 Technological Disaster, Resource Loss and Long-Term Social Change in a Sub-Arctic Community: Alaska Natives and Commercial Fishermen in Cordova, Alaska – 2001-2006. Final Report Submitted to the National Science Foundation, Office of Polar Research. Washington, D.C.
- Glazier, Edward W.  
 2007 *Hawaiian Fishermen*. Belmont, CA: Wadsworth-Thomson Learning.
- Goldsmith, S.  
 2001 The Alaska Permanent Fund Dividend Program. Paper presented at the Conference on Alberta: Government Policies in a Surplus Economy. University of Alaska at Anchorage.

Haines, Anna L.

1997 Regional Economic Impact Assessments: An Annotated Bibliography of Selected Wisconsin Studies. Staff Paper 97.3, September 1997. Department of Urban and Regional Planning. University of Wisconsin at Madison. Madison, Wisconsin.

Huskey, Lee

2004 Alaska's village economies. *Journal of Land Resources and Environmental Law*. Volume 24, Number 435.

Impact Assessment, Inc.

2001 Exxon Valdez Oil Spill, Cleanup, and Litigation: A Collection of Social Impacts Information and Analysis. Final Report. MMS OCS 2001-058. Prepared for the U.S. Department of the Interior, Minerals Management Service, Alaska OCS Region. Anchorage.

1990a Economic, Social, Psychological Impacts of the *Exxon Valdez* Oil Spill: Interim Report One, Analysis of Fiscal Impacts to Local Jurisdictions. Prepared for the Oiled Mayors Subcommittee of the Alaska Conference of Mayors. La Jolla, CA.

1990b Economic, Social, Psychological Impacts of the *Exxon Valdez* Oil Spill: Interim Report Two, Public and Private Sector Economic Impacts of the *Exxon Valdez* Oil Spill. Prepared for the Oiled Mayors Subcommittee of the Alaska Conference of Mayors. La Jolla, CA.

1990c Economic, Social, Psychological Impacts of the *Exxon Valdez* Oil Spill: Interim Report Three. Social and Psychological Impacts of the Exxon Valdez Oil Spill. Prepared for the Oiled Mayors Subcommittee of the Alaska Conference of Mayors. La Jolla, CA.

1990d Economic, Social, Psychological Impacts of the Exxon Valdez Oil Spill. Final Report. Prepared for the Oiled Mayors Subcommittee of the Alaska Conference of Mayors. November 15. La Jolla, CA.

Irwin, M. (Ed.), E. Deoux, B. Garber, W. Hanable, G. Irvin, A.J. McClanahan, and H. Napoleon  
1992 Alaska Natives Commission, Final Report. Volumes I-III. University of Alaska at Anchorage, Institute for Social and Economic Research. Anchorage.

Johnson, John F.C.

2001 Repatriation and the Chugach Alaska People. In *Looking Both Ways – Heritage and Identity of the Alutiiq People*. Aron L. Crowell, Amy F. Steffian, and Gordon I. Pullar (Eds.). A project of the Arctic Studies Center, Department of Anthropology. National Museum of Natural History, Smithsonian Institution and The Alutiiq Museum and Archaeological Repository. Fairbanks: University of Alaska Press.

Jorgenson, Joseph G.

1990 *Oil Age Eskimos*. Berkeley: University of California Press.

Knapp, Gunnar

2006 Economic impacts of BSAI crab rationalization on Kodiak fishing employment and earnings and Kodiak businesses: A preliminary analysis. Institute for Social and Economic Research, University of Alaska at Anchorage.

Knapp, G., S. Goldsmith, J. Kruse, and G. Erickson

1984 The Alaska Permanent Fund Dividend Program: Economic Effects and Public Attitudes. Prepared for the Alaska Permanent Fund Corporation by the Institute for Social and Economic Research at the University of Alaska. Anchorage.

Kodiak Chamber of Commerce

2007 Kodiak Community Profile and Economic Indicators – 2007. Prepared by the Kodiak Chamber of Commerce and funded in part by the City of Kodiak and Kodiak Island Borough. Kodiak City.

2006 Kodiak Island Borough information website. Available online at <http://www.kodiak.org>

Kodiak Island Borough Community Development Department

1983 Kodiak Island Borough Coastal Management Program. Progress Report Reprint. June. ACE 6360219. Kodiak City, AK

Minerals Management Service

2002 Alaska Annual Studies Plan. Final FY 2003. Alaska OCS Region. Environmental Studies Section. U.S. Department of the Interior, MMS, Alaska OCS Region. Anchorage.

Mishler, Craig, Rachel Mason, and Jeffrey Barnhart

1995 An Investigation of the Sociocultural Consequences of Outer Continental Shelf Development in Alaska: Kodiak Island. OCS Study MMS 95-013, United States Department of the Interior, Mineral Management Service, Alaska OCS Region, Social and Economic Studies Unit.

Mishler, Craig

1999 Some Effects of Land Buybacks in Native Communities of the EVOS Region. Presented at the symposium *Legacy of an Oil Spill: Ten Years After the Exxon Valdez*, sponsored by the Exxon Valdez Oil Spill Trustee Council and the Alaska Sea Grant College Program.

Mullan, Kevin

2003 “Tidal Wave of ’64.” In *Iluani*, May 2003: 18-19.

Munoz, Andrew

2005 Greetings from ISC Kodiak. *Coast Guard Magazine*. Available online at: [http://www.findarticles.com/p/articles/mi\\_mOPBY/is\\_2005\\_April/ai\\_n13803322](http://www.findarticles.com/p/articles/mi_mOPBY/is_2005_April/ai_n13803322).

North Pacific Fishery Management Council

2006 Stock Assessment and Fishery Evaluation Report (SAFE). 2006. Prepared by the Plan Team for the Groundfish Fisheries of the Gulf of Alaska. Appendix C: Ecosystem Considerations for 2007. Anchorage, AK.

NOAA Fisheries

2007 Fisheries of the United States – 2005. U.S. Department of Commerce. National Marine Fisheries Service. Office of Science and Technology. Fisheries Statistics Division. Silver Spring.

Northern Economics

1994 Commercial Fishing Industry of the Gulf of Alaska: Final Technical Report. Prepared for Minerals Management Service, Alaska Outer Continental Shelf Region Leasing and Environment Office Social and Economic Studies Unit. Technical Report No. 159. September. Anchorage.

Phillips, Natalie

1999 Healing Lands: Alaska Invests in Nature. *Alaska Geographic*, Vol. 26 (1), 1999: 45-59.

Piatt, J. F., and P. J. Anderson

1996 Response of Common Murres to the *Exxon Valdez* oil spill and long-term changes in the Gulf of Alaska ecosystem. *American Fisheries Society Symposium*. 18:720-737.

Picou, S.J., D.A. Gill, and M.J. Cohen (Eds.)

1997 *The Exxon Valdez Disaster – Readings on a Modern Social Problem*. Dubuque, IA: Kendall/Hunt Publishing Co.

Pinart, A.

1873 Eskimaux et Koloches: Idées Religieuses de Kaniagmioutes. *Revue d'Anthropologie* 2: 673-680.

Pullar, Gordon

2004 Our History – Native Village of Afognak. Native Village of Afognak. Available online at [http://afognak.org/education/history\\_intro.php](http://afognak.org/education/history_intro.php).

Saltonstall, P.G., and A.F. Stefian

1999 Early Prehistoric Settlement in Chiniak Bay: A View from Zaimka Mound. Presented at the annual meeting of the Alaska Anthropological Association. Fairbanks.

Schneider, Teri

2003 Kodiak Island Youth Area Watch. Exxon Valdez Oil Spill Trustee Council. 2003. General Proposal. Anchorage. Available online at: <http://www.evostc.state.ak.us>.

- Sepez, Jennifer. B.D. Tilt, C.L. Package, H.M. Lazrus, and I. Vaccaro  
 2005 Community Profiles for North Pacific Fisheries – Alaska. NOAA Technical Memorandum NMFS-AFSC-160. U.S. Department of Commerce, NOAA, National Marine Fisheries Service. Alaska Fisheries Science Center. Seattle.
- Short, J.W., G.V. Irvine, D.H. Mann, J.M. Maselko, J.J. Pella, M.R. Lindeberg, J.R. Payne, W.B. Driskell, and S.D. Rice  
 2007 Slightly weathered Exxon Valdez oil persists in Gulf of Alaska beach sediments after 16 years. *Environmental Science and Technology*. Volume 41, Number 4, pp. 1245-1250.
- Stabeno, P., N. Bond, A. Herman, N. Kachel, C. Mordy, J. Overland  
 2004 Meteorology and oceanography of the Northern Gulf of Alaska. *Continental Shelf Research* 24: 859-897.
- Steffian, Amy F.  
 2001 Cummillallret – Ancestors. In *Looking Both Ways – Heritage and Identity of the Alutiiq People*. Aron L. Crowell, Amy F. Steffian, and Gordon I. Pullar (Eds.). A project of the Arctic Studies Center, Department of Anthropology. National Museum of Natural History, Smithsonian Institution and The Alutiiq Museum and Archaeological Repository. Fairbanks: University of Alaska Press.
- Taylor, Jonathan B., and Joseph P. Kalt  
 2005 American Indians on Reservations: a Databook on Socioeconomic Change between the 1990 and 2000 Censuses. The Harvard Project on American Indian Economic Development. Malcolm Werner Center for Social Policy. John F. Kennedy School of Government. Harvard, MA.
- Tide, C., N. Free-Sloan, S. M. Carlson, and K. Iverson  
 2005 *Changes in the Distribution of Alaska's Commercial Fisheries Entry Permits, 1975-2004*. Alaska Commercial Fisheries Entry Commission, Report No, 05-3N, Appendix C. Special Tabulations. Juneau.
- VanStone, J.  
 1960 A successful combination of subsistence and wage economies on the village level. *Economic Development and Cultural Change*, 8 (1960): 174-91.
- Wilk, R.R.  
 1996 *Economies and Cultures – Foundations of Economic Anthropology*. Boulder: Westview Press.
- Wolfe, R.  
 1984 Subsistence-Based Economies in Coastal Communities of Southwest Alaska. Technical Report No. TR-95. Prepared for the U.S. Department of the Interior, Bureau of Land Management (CT2-81), and the Minerals Management Service (14-12-0001-29076). U.S. Department of Interior, Minerals Management Service. Anchorage.

**Appendix A**

**Preliminary Review of the *Amoco Cadiz* and *Prestige* Incidents**

**and**

**International Maritime Transportation Policy**



## **The Amoco Cadiz Accident**

**Overview.** On March 16, 1978, the *Amoco Cadiz* supertanker ran aground three miles offshore of the northern coast of Brittany, France, near Portsall-Kersaint and 25 miles north of Brest (Davis 1998). At the time, this was the largest oil spill ever caused by a tanker. The spill still ranks as the world's fourth largest on the International Tanker Owners Pollution Federation Limited (ITOPF<sup>34</sup>) ranking scale (ITOPF 2004), or sixth, if considering spills from sources other than maritime transportation, such as the IXTOC I blow-out or the sabotage of Kuwait's oil fields during the 1990-1991 Gulf War.<sup>35</sup>

**Background.** The *Amoco Cadiz* was one of four sister ships built by Astilleros Españoles, SA (Astilleros), a Spanish shipbuilding firm with extensive experience in civilian shipbuilding. The vessel was designed by Amoco International Oil Company (AIOC), with oversight by the American Bureau of Shipping (ABS). Weighing about 109,700 gross registered tonnage (grt) with a 233,690 deadweight (dwt) and measuring 1,095.5 ft × 167.6 ft × 85.9 ft (B/L/D: 334 m × 51.1 m × 26.2 m), the *Amoco Cadiz* belonged to a new generation of supertankers known as "Very Large Crude Carriers," or VLCC.

Upon delivery in 1974, the *Amoco Cadiz* was registered under the Liberian flag as the property of another Liberian company, Amoco Transport Company (ATC) of Monrovia. However, operations were entirely managed by AIOC, which was then based in Chicago. Both companies were, at that time, fully controlled subsidiaries of Standard Oil Company of Indiana (SAI), also known as Amoco (Gaskell 1985; Kbaier and Sebek 1985; Cheminsky 1987). Originally a part of John Rockefeller's former Standard Oil trust, SAI merged with British Petroleum in 1998 to form BP Amoco, later reorganized as BP (BP 2006).

On February 7, 1978, the *Amoco Cadiz* left the Persian Gulf bound for Rotterdam, Netherlands, via Lyme Bay in England (Cheminsky 1987). The all-Italian crew of 43 was commanded by Captain Pasquale Bardari (Kiechel 1978). The cargo was comprised of 4,000 tons of bunker fuel and 219,797 tons (approximately 68 million gallons<sup>36</sup>) of a mix of light crude oils (121,157 tons of Arabian light and 98,640 tons Iranian light). The cargo was the property of Royal Dutch/Shell and insured by Petroleum Insurance Limited (PIL) (Kbaier and Sebek 1985; Cheminsky 1987).

**Steering Failure and Underlying Causes.** On the morning on March 16, 1978, as the *Amoco Cadiz* entered the English Channel in heavy seas and weather, the steering mechanism failed beyond repair. Although steering was ensured by a modern hydraulic system, the vessel had been built with no emergency or auxiliary backup system in place (Gaskell 1985) despite recommendations for such under the International Maritime Organization Resolution A.210 of 1971.

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<sup>34</sup> International Tanker Owners Pollution Federation Limited: [www.itopf.com](http://www.itopf.com).

<sup>35</sup> As provided in NOAA's Office of Response and Restoration website: <http://archive.orr.noaa.gov/photos/ships/ships.html>.

<sup>36</sup> Although depending on the physical characteristics of the oil, a ton of crude can be taken as 7.3 barrels, or 306.6 gallons.

It was later determined that design flaws in some components of the steering mechanism, coupled with and worsened by improper maintenance, contributed decisively to the sequence of events that set the *Amoco Cadiz* adrift. Complicating factors involved insufficient maintenance and servicing, and failure to address acknowledged problems. Apparent inattention to maintenance issues was evinced by the decision to dry-dock the *Amoco Cadiz* only once in four years, while two of its sister ships in use by SAI were serviced every year.

Subsequent investigation revealed that stresses to the steering mechanism caused an irreparable leak of hydraulic fluid and resultant loss of maneuverability. The owners were also found responsible for not providing satisfactory training and instruction to the crew (Gaskell 1985).

***The Grounding and Subsequent Spill.*** Around 10:00 AM on March 16, as the *Amoco Cadiz* lost its steering and started swinging to the left, the captain ordered for its single engine to be silenced and for a radio message to warn other seafarers in the area to stand clear of the tanker. The ship was exposed to 60-knot gusts and a 20-foot swell, with most of her hull assaulted by wave action. The vessel started drifting south, and about one hour later her position was some 10 miles north of the island of Ouessant, the westernmost point of France. No emergency or “SOS” signal was sent at this time (Kiechel 1979).

A call for salvage tugs was issued and the German tug *Pacific*, property of Bugsier, Reederei, and Bergungs, AG (Bugsier; Kbaier 1985), promptly started heading towards the *Amoco Cadiz* to offer assistance (Gaskell 1985). The *Pacific* was the only vessel of its kind within 150 miles of the drifting tanker. The captain of the tug, Hartmut Weinert, offered assistance under the terms of the Lloyd’s Open Form Salvage Agreement (LOF), an internationally recognized contract defining Lloyd’s of London as the arbitration location for any later claim and rewarding the salvager only if success was met. This is the “no cure, no pay” principle, albeit in more advantageous terms than normal towage contracts (Gaskell 1985). According to Kiechel (1979), the *Amoco Cadiz* was insured at \$15 million and the oil cargo was worth about \$24 million (1979 values), possibly ensuring some \$4 million would be paid to Bugsier if the efforts of the *Pacific* were successful.

Shortly after 1:00 p.m., the *Pacific* reached the tanker and by 2:00 p.m. a towline had been secured to the bow of the *Amoco Cadiz*. Conditions of the contract were not yet clearly defined and Ouessant lay only five miles away. Statements were made in the press and literature about delays in initiating rescue operations, as the captains haggled over financial arrangements (Kiechel 1979; Gaskell 1985; Davis 1998). Towing attempts were underway two hours prior to acceptance of an LOF by AOIC at 4:00 p.m.

Although the tug was rated at 10,000 horsepower, it was functioning closer to 6,000 and according to Kiechel (1979) towing the massive tanker was problematic. By 5:00 p.m., the tow line broke apart and by 8:30 p.m. a second line was set and fastened, this time astern. Attempts to save the tanker were futile. By 9:04 p.m., the stern of the *Amoco Cadiz* struck ground on Portsall rocks. A second definitive grounding occurred 30 minutes later. The captain and crew of the *Pacific* persevered in attempts to save the foundering vessel until the second towline also parted (Kiechel 1979).

The hull and three of its 15 storage tanks were ripped open on initial impact. Oil quickly developed into a 15-mile slick. By later that night, three miles of coastline had been blackened (Davis 1998). All systems were shut down for fear of an explosion. The crew failed to abandon the vessel and at approximately 11:30 p.m. the ship's radio was powered back on to broadcast the first and only emergency message.

At midnight, a French Navy helicopter hoisted the crew to safety. The Captain and a tanker-safety expert who had been on board to conduct crew training remained with the vessel until the next morning, when they were lifted to safety by another helicopter. Captains Barsari and Weinert were arrested the following day by French authorities (Kiechel 1979).

Throughout the following days, the grounded tanker lost most of its cargo and finally broke in two. The raging storm precluded intervention. By March 25, with some 30,000 tons of oil still trapped inside the tanks, French authorities took drastic measures by exploding the battered remnants of the hull, which released the remaining oil; this measure was taken to avoid any future spills and associated cleanups. At that point the oil slick had contaminated over 200 miles (320 km) of Brittany's irregular shoreline, home to nearly 240,000 persons. The nearby British Channel Islands were threatened.

***Initiation of Recovery Efforts.*** A national emergency response plan was enacted. Army and Navy personnel were deployed and were assisted by many hundreds of residents and volunteers. Severe weather complicated recovery efforts. The strenuous work of cleaning and removing debris lasted for months. A variety of methods were used, including chemical dispersants, booms, heavy machinery, and other tools. Exposed rocky areas showed the best results from recovery efforts, whereas many estuarine and marsh areas proved more difficult to clean and were eventually left to recover on their own (Cheminsky 1987; Davis 1998; ITOPF 2004).

Brittany's coastline is characterized by rocky headlands, large embayments, and small estuaries. Tides range between 18 and 27 feet (6 to 9 m). The intertidal and subtidal fauna and flora are diverse. The area supports extensive finfish, shellfish, and seaweed fisheries. In 1976, fisheries in this region accounted for 40 percent of the nation's landings of seafood products (Gundlach et al. 1983).

The spill led to extensive impacts to these fisheries and the environment generally. The region is one of the most favored resort destinations for travelers in France and tourism significantly affected by the spill (Grigalunas et al. 1986).

Fisheries landings and value declined quickly. An estimated 9,000 tons of oyster beds were destroyed by authorities for public health reasons and to safeguard the value of French oysters in the international market. About 20,000 birds and thousands of benthic marine organisms washed ashore during the months following the spill (Davis 1998; ITOPF 2004).

***Persistence of Oil Pollution.*** The intense wave action at the time of the spill led to a quick emulsification and dispersion of the oil through the water column. Some 15,000 km<sup>2</sup> of offshore waters indicated surface oiling in weeks following the grounding. Weathering, evaporation, and

biodegradation helped to diminish the physical effects of the spill. The persistence of oil varied according to the type of substrate, cleaning efforts, and manner of exposure to wave and tidal action. Areas openly exposed to ocean waves indicated rapid decline of hydrocarbons, whereas degradation was slower in the estuaries and other sheltered areas. Changes in the populations of several taxa and impoverishment of habitat were widely observed in the region.

***Another Spill and Subsequent Challenges.*** Two years later, on March 7, 1980, the tanker *Tanio* broke in two under heavy seas off Brittany, spilling 13,500 tons of oil and contaminating 120 miles (200 km) of the Brittany coastline (Thébaud et al. 2003). The most visible signs of pollution from both incidents were reportedly diminished within a few years – a result of intense cleanup and recovery efforts (Gundlach et al. 1983; ITOPF 2004).

But persistent contamination was a reality and long-term studies detected high amounts of weathered oil in salt marsh areas and lower concentrations of hydrocarbons in subsurface sediments of other areas as late as 1991 (Mille et al. 1998). The close proximity of several French and British marine laboratories and the involvement of the international scientific community led to extensive research of the spill and its long-term biophysical effects (Gundlach et al. 1983; ITOPF 2004).

The cleanup and recovery phases of the spills were costly, as were losses to the tourism and fishing industries (Grigalunas et al. 1986). Calculation of costs was challenging, and available data and methods to estimate losses were contested (Thébaud et al. 2003).

***The Regulatory Arena: International Conventions and Interim Agreements.*** During the aftermath of the *Amoco Cadiz* spill, ATC set up a fund of \$16.7 million, following the limits of “strict liability” of a ship owner for oil pollution costs as defined by the Civil Liability Convention (CLC) of 1969.<sup>37</sup> The CLC was an international treaty set by the Inter-Governmental Maritime Consultative Organization (IMCO)<sup>38</sup> in the wake of the *Torrey Canyon* accident off the coast of Cornwall in 1967 (Kiechel 1979; Gaskell 1985; Blanco-Bazán 2004).

The *Torrey Canyon* grounding and spill was the first such incident involving a supertanker. , The spill involved 119,000 tons of Kuwait crude (approximately 35 million gallons). Much of the coastline along southwest England, the Channel Islands, and Brittany was affected. Extensive ecological damage resulted not only from the spilled oil but also from powerful dispersants used to combat it (ITOPF 2004).

According to Bloodworth (1998), the *Torrey Canyon* “spill set off a firestorm of activity in the international realm,” with IMCO striving to establish an international mechanism for liability and compensation that would ensure payment under specified rules and regardless of fault - a departure from traditional maritime law. The CLC of 1969 was the outcome. It prescribed rules

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<sup>37</sup> Also known as the International Convention on Civil Liability for Oil Pollution Damage, Brussels, 1969.

<sup>38</sup> IMCO began operations in 1958 as a global specialized agency of the United Nations, later becoming the International Maritime Organization, or IMO (a detailed account of IMO’s evolution and role is given by Blanco-Bazán 2004).

of strict liability for ship owners, and coupled the limits of their liability to the tonnage of the ship. It also required compulsory insurance up to those same limits.

Two years later, again under the auspices of IMCO, the Fund Convention<sup>39</sup> of 1971 would take steps to create the International Oil Pollution Compensation Fund (IOPC Fund or 1971 Fund), intended to complement the CLC. It divided responsibility for oil pollution between the shipping and oil industries in the countries that ratified the treaties. This way, the CLC would provide a first-level of compensation up to certain limits, above which the IOPC Fund would then assist by providing additional compensation. By the time of the *Amoco Cadiz* incident, France had ratified the CLC. The U.S. chose not to endorse the CLC based on the Senate's determination that liability limits were too low (Gaskell 1985; Kbaier and Sebek 1985; Bloodworth 1998; Faure and Hui 2003).

Until economic sanctions provided by the Conventions were enacted, representatives of the tanker and oil industries stepped forth and voluntarily provided interim financial agreements under the guidelines of the treaties. For instance, a private compensation no-fault plan called TOVALOP (Tanker Owners Voluntary Agreement concerning Liability for Oil Pollution damage) was created in 1969 by the ITOPF on behalf of the tanker industry. At the time, the CLC and TOVALOP involved specific limits for liability compensation by the owners of the vessels, depending on tonnage and up to 14 million Special Drawing Rights (SDR).<sup>40</sup> Marine underwriters would not provide insurance above that limit.

A Contract Regarding an Interim Supplement to Tanker Owner Liability for Oil Pollution (CRISTAL) accord was signed in 1971 by various shipping companies. It supplemented the CLC with up to a combined value of 60 million SDR (Gaskell 1985; Bloodworth 1998). Thus, above and beyond the \$16.7 million ATC fund approved for the *Amoco Cadiz* incident, an additional \$13.3 million was made available from CRISTAL provisions in order to fulfil the \$30 million combined limit of the time (Kiechel 1979).

***The Continuing Legal Process.*** Claims for compensation from SAI and its subsidiaries were not filed in France, but in the United States. France itself brought suit to federal district court in Chicago. The move sparked considerable discussion, as it seemed to utterly disregard the conventions and limited liability values that France had willingly ratified. Under the CLC, the proceedings should have been instituted in France, the place of the accident, or Liberia, where the vessel was flagged.

As litigation proceeded, various questions were raised regarding jurisdiction, convenient forums, and applicable laws (Kiechel 1979; Gaskell 1985). The case became known as “the admiralty case of the century” (Kiechel, 1979). Kbaier and Sebek (1985: 250) described the proceedings as such: “...this was a disaster of just enough magnitude to remind the international community

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<sup>39</sup> Also known as the International Convention on the Establishment of an International Fund for Compensation for Oil Pollution Damage.

<sup>40</sup> Special Drawing Rights (SDR), as defined by the International Monetary Fund, replaced the original use of the French gold franc as the reference unit (Faure and Hui 2003). Given the current (3 April 2006) rate of 1 SDR = US \$1.438000, the maximum limits are of \$20 million for the 1969 CLC and \$86 million for the 1971 Fund (Source: IOPC Fund, available at: [www.iopcfund.org](http://www.iopcfund.org).)

that time had come to turn another page in legislative history, in this case relating to liability and compensation.”

A mass of claims and suits were submitted by the parties involved, as described in the final rulings of the process issued by the U.S. Court of Appeals for the Seventh Circuit, on January 24, 1992 (U.S. Court of Appeals 1992). According to Kbaier and Sebek (1985), these could be grouped into three main categories:

- (1) France filing complaints directly against SAI and AIOC for \$300 million, seeking compensation for pollution damages and cleanup costs. The position was that ATC was “no more than a front” (as quoted in Kiechel 1979) for SAI and AIOC, which managed the fleet;
- (2) Several local authorities and private parties, companies or individuals affected by pollution. This mixed group of nearly 150 claimants filed for compensation against all who could possibly be held liable: ATC, as the nominal owner of the vessel; AIOC as the operator; Astilleros, for faulty design and construction; ABS, for certifying the ship with the flawed components; and Bugsier, for negligence in the salvaging process (Gaskell 1985; Kbaier and Sebek 1985); and
- (3) The insurer of the cargo filed complaints against the Amoco conglomerate for loss of cargo, and against Bugsier for negligence (Kbaier and Sebek 1985).

The Amoco conglomerate sought for protection under the United States Limitation of Ship owner’s Liability Act of 1851 (LSLA), aiming for exoneration from or limitation of liability to the value of the vessel and freight had the act occurred without “privity or knowledge” of the owner (Gaskell 1985; Bloodworth 1998). Amoco also filed counter claims against France, the mixed group of claimants, and Bugsie, and cross-claims against Astilleros. The arguments regarding France were that: a) CLC rules were the only legal instruments available, thus restricting and limiting liability to the ship owner and precluding any further claims against SAI and AIOC; and b) that France should be found guilty of negligence by knowing of the situation and not assisting the ship in a timely fashion so as to avoid a spill, and furthermore by not handling the spill adequately and aggravating its consequences and damages (Gaskell 1985; Kbaier and Sebek 1985).

Amoco also sued ABS for negligence and breach of contract as supervisors of the construction of the vessel. But ABS, after settling with the other claimants, sued Amoco seeking reimbursement of expenses incurred with the settlements (U.S. Court of Appeals 1992).

In accordance with the decision on September 12, 1979, the proceedings, led by Judge Frank J. McGarr, were divided into two stages: defining liability limits and determining damages. After early examinations, jurisdiction of the Chicago court was considered valid and the adoption of the United States as a convenient forum (the *forum non conveniens* rule) for the process was accepted by all parties involved, with the exception of Astilleros.

Decisions regarding which nation's laws to apply in the case were laborious. French law was deemed appropriate unless American law provided differing stipulations, in which case the latter would be used. French law would be tied to the CLC provisions- to Amoco's advantage- but, in the end, it was U.S. common law that was adopted. Nevertheless, the Judge did address the CLC and French law, its application, and the restriction of liability to the ship owner, while dismantling several CLC provisions and considering that CLC terms were not the only legal solution for cases of damage by oil pollution (Gaskell 1985; Kbaier and Sebek 1985). According to Kbaier and Sebek (1985), this was "... without doubt, one of the most far-reaching conclusions arrived at by the judgment and departs from the classical rules of maritime law."

Later, British law was also consulted when dealing with claims from Petroleum Insurance Limited (PIL; U.S. Court of Appeals 1992). Gaskell (1985) provides a thorough analysis of the legal framework and decisions of initial proceedings, which lasted from May 4, 1982 until April 18, 1984. By then, it was determined that Bugsie could not be held liable for negligence in the salvage attempt, whereas Astilleros was deemed negligent by building defective pieces into the steering system.

Regarding the liability of Amoco and its subsidiaries, the court's decision was that all related companies were deemed jointly and strictly liable for negligence in the design, construction, maintenance and operation of the vessel. ATC was deemed liable for failure to comply with its duty of controlling and supervising for the proper maintenance and care of the ship, and AIOC was deemed liable for knowingly failing to ensure the seaworthiness of *Amoco Cadiz* by not taking necessary measures to detect and correct the flawed steering gear and not ensuring proper maintenance of the vessel and training of the crew. SAI was recognized as the corporate head of the former two companies and, as such, it was held liable for the actions of its subsidiaries (Gaskell 1985; Kasoulides 1988). This decision set legal precedent, determining that the responsibility for marine pollution ultimately belonged to the owner of the ship and overturning several mechanisms of immunity, such as the channelling and limitation of liability which had to that point been granted by the traditional rules of maritime law (Kbaier and Sebek 1985; Kasoulides 1988).

The second state of litigation lasted until January 11, 1988, when damages were awarded. However, both sides appealed the ruling: SAI appealed the finding of liability and Astilleros claimed lack of jurisdiction of the Chicago court, and the remaining claimants questioned the amounts of compensation. The case was then taken to the Federal Court of Appeals of the Seventh Circuit. Finally, on January 24, 1992, after nearly 14 years of litigation, it was decided that the Amoco group was to pay to the claimants and seek compensation from Astilleros. Settlement was later reached, by undisclosed conditions (Anonymous 1992a). The value paid by SAI amounted to \$204 million (Anonymous 1992b), far from the nearly \$660 million originally claimed by the French parties (Anonymous 1992c; Thébaud et al. 2003).

***Changes to French Policy in National and Transnational Settings.*** The French strategy for addressing offshore spills was reviewed in some depth after the *Amoco Cadiz* event. The review process gave rise to POLMAR (La Pollution des Eaux Marines) and CEDRE (Centre de

Documentation de Recherche et d' Expérimentations sur les Pollutions Accidentelles des Eaux<sup>41</sup>), in anticipation of future situations (Silvestre 1998).

Changes were also introduced to rules regarding navigation through the English Channel: tankers were to signal their entry routinely, navigating on predefined routes seven miles off the coast rather than the previous established five miles. Any problems occurring less than 50 miles from the French shoreline were to be promptly reported to authorities, as well as any tugs going to the aid of tankers (Davis 1998; CEDRE 2006).

Besides strengthening rules inside territorial waters and ports, France also acted on regional and community levels, usually under the guidelines defined by the IMO and international regulations or, in some cases, by more stringent directives adopted by the European Union (EU) (Hui 2004; Silvestre 2006). Several regional agreements aimed at tackling issues of marine safety and oil pollution were developed, such as the Bonn Agreement of 1983 (covering the North Sea) and the Lisbon Agreement of 1990 (covering the Mediterranean and Atlantic).

Other bilateral agreements between national agencies were also reached, such as the Mancheplan (France and the UK) or the Biscaye and Lion Plan (between France and Spain, covering both the Atlantic and Mediterranean). The focus of these agreements was on regional agreements for surveillance networks which allowed for faster exchange of information, and bilateral agreements for predefined plans of action with faster joint operational responses to oil spills. An underlying principle of these agreements was that all costs resulting from specific situations would be borne by the state requiring assistance (Silvestre 2006).

On December 11, 1999, yet another tanker grounded off the coast of Brittany, leading to a 20,000 ton spill and 250,000 tons of oily waste that spread over 240 miles (400km) of French coastline. The grounding of the 25-year old, Italian-owned and Maltese registered *Erika* tanker sparked intense discussions in the European forum regarding existing regulations and the need for widespread changes. Shortly afterwards, the EU approved stricter measures, named after the tanker (Faure and Hui 2003; Hui 2004).

***The IMO and the International Forum.*** Soon after the grounding and spill of the *Amoco Cadiz*, France urged the Legal Committee of IMO to prepare a new set of international rules regarding liability and compensation mechanisms for oil spills. In 1984, a few days after the initial ruling in the Amoco case, the International Conference on Liability and Compensation for Damage in Connection with the Carriage of Certain Substances by Sea was held in London. The outcome, also known as the 1984 Protocols, introduced several changes to the agreements of 1969 and 1971. A crucial change was the setting of higher limits of compensations, as previous limits were clearly insufficient to deal with the magnitude of recent spills and related claims. Channelling of liability to the ship owner was still seen as the best way to ensure a quick and simplified way of directing the claims and so it remained the main vehicle of compensation, although the conditions of liability were modified.

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<sup>41</sup> Literally translated: Center for the Documentation, Research, and Experimentation of Accidental Water Pollution (website: [www.le-cedre.fr](http://www.le-cedre.fr)). Set in place to improve the preparation for and intervention mechanisms to cope with accidental water pollution events, marine and inland, primarily in France.



The protocols adopted the concept of reasonable costs incurred in the restoration of damaged ecosystems. Taking into account the then-recent constitution of the United Nations Convention on the Law of the Sea (UNCLOS, established(December 10, 1982), the geographic reach of the CLC was reshaped to include the 200 nautical mile limit of the exclusive economic zone (EEZ) or equivalent area (Kbaier and Sebek 1985; Faure and Hui 2003). Yet, the 1984 Protocols were never implemented because the U.S. representatives, though involved in the discussion process, later refused to sign. The main point of discord revolved around limitation of liability, to which the U.S. objected, defending instead unlimited liability for damages (Faure and Hui 2003).

Following the Exxon *Valdez* spill in March of 1989, the U.S. Congress approved the Ocean Pollution Act of 1990 (OPA 90) (Bloodworth 1998; Hui 2004). Safety and construction standards for oil tankers allowed in U.S. waters were set at higher levels than those upheld by the IMO.

For instance, the Act initiated a process whereby single-hulled tankers would eventually be banned from plying U.S. waters. This unilateral decision led to some important changes in the international regime, as the IMO tried to close the safety gap between new and old tankers (EU 2000; Zia-Mansoor 2005). However, due to several other provisions set forth by U.S. regulations, such as the acceptance of unlimited liability, further involvement with the IMO and its international regimes became problematic and led to a separation of both systems (Faure and Hui 2003).

In 1992, the CLC and IOPC Fund Conventions were once more subjected to changes. The conditions for implementation were altered, removing the need for U.S. ratification. Limits of liability under the CLC and the Fund were thus effectively increased and the definition of “pollution damage” broadened as to include damages caused by contamination and the cost of “preventive measures” to combat said damage.

The CLC interval for compensation limits was set between 3 million SDR for vessels of 5,000 grt or less, and up to a maximum of 59.7 million SDR for ships above 140,000 grt. The IOPC Fund was increased to a ceiling of 135 million SDR, including compensation to be paid under the 1992 CLC. Less than one year after the *Erika* spill in 1999, and faced by the inadequacy of these limits, the IMO Legal Committee adopted an increase of the compensation limits by 50 percent (the maximum allowed under a so-called tacit amendment procedure of the Conventions), that came into effect in November of 2003. The CLC intervals were then set at the 4.5 to 89.8 million SDR range and the combined CLC/IOPC Fund’s ceiling was set at 203 million SDR<sup>42</sup> (Bloodworth 1998; Faure and Hui 2003; Oosterveen 2004). The EU played a strong role in this decision.

Regarding international adoption of the 1992 Conventions, Jacobsson (2005) points out that many of the countries that had signed these treaties had not been parties to the 1969 or 1971 Conventions, thus suggesting a growing acceptance and recognition of their validity as international compensation schemes (Jacobsson 2005). To facilitate further harmonization, a

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<sup>42</sup> Given the current equivalence SDR/US \$ rate (April 3, 2006), these values correspond to a \$6.5 to \$129 million interval for the 1992 CLC and a \$292 million limit for the 1992 Fund (including the CLC compensation).

compulsory denunciation mechanism was written into the 1992 treaties wherein the countries that had signed both versions of the protocols automatically ceased to be parties to the older protocols of May of 1998. Those entities that adhered solely to the original conventions were faced with the demise of the 1971 Fund in May of 2002, as its financial basis was eroded by the migration of contributors, and were therefore being urged to adhere to the 1992 Protocols as well (Faure and Hui 2003). By the end of 2006, the 1992 CLC included 115 member states, 98 of which are also part of the 1992 IOPC Fund. The 1969 CLC had 38 participating countries remaining<sup>43</sup> (IOPC 2006).

When the 1992 treaties were ratified and came into force in 1997, contracts for TOVALOP and CRISTAL - which had been functioning as interim liability and compensation agreements for more than 25 years – were not renewed and coverage lapsed (Bloodworth 1998). One of the consequences was that countries not participating in the CLC Fund/Conventions and which also could not reach voluntary agreement, would have to resort to domestic laws, in many cases directing their claims “against a flag-of-convenience company with no assets” (Faure and Hui 2003).

The 1971 and 1992 Conventions were widely adopted and have successfully dealt with some 135 claims amounting to nearly \$860 million (Jacobsson 2005). The underlying concepts of these systems dates back to 1984 and earlier. Several players, including the EU, have already voiced the need to revise and update the system so that it includes advances made in environmental law and improves the distribution of costs based on risks and profits, possibly encouraging the involved industries to move into higher levels of maritime safety and operation (Faure and Hui 2003; Oosterveen 2004).

The (in)adequacy of compensation limits to meet claims from serious oil spills remains a pressing matter. The 50 percent increase of limits after the *Erika* incident was deemed insufficient by several members of the IOPC Fund, and a special group was set to address this specific point. As a result, a three-layered system was devised and emplaced.

Adding to the 1992 CLC and 1992 Fund, a Supplementary Fund Protocol (SF 2003) was adopted in May 2003 and came into action on March 3, 2005. Its sole purpose was to provide extended compensation to claims admitted to the 1992 Fund but which surpassed this fund limits. The maximum limit under the SF 2003 was substantially increased to 750 million SDR,<sup>44</sup> including the amounts due from the 1992 CLC and Fund.

An additional organization, the International Oil Pollution Compensation Supplementary Fund (IOPCS) 2003, was created to manage SF 2003. Contributions to this new Fund derive from oil industries of the countries party to the Conventions (Oosterveen 2004; Jacobsson 2005). This has led to renewed discussions regarding the distribution of costs when dealing with increasingly higher limits of compensations. The oil industry claimed to be assuming the lion’s share of expenses and asked for fair distribution of costs between all parties involved, including ship

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<sup>43</sup> Detailed information regarding member states and the IOPC Funds is available at [www.iopcfund.org](http://www.iopcfund.org).

<sup>44</sup> Given the current equivalence SDR/US \$ rate, this value corresponds to a total of \$1,079 million.

owners and insurers. The argument is that it is the responsibility of ship owners to keep the vessels seaworthy and that imbalanced liability could have a detrimental effect on maritime safety.

The International Group of P&I Clubs (a 13-member “club” of insurance underwriters), representing ship owners/insurers voluntarily offered to increase liability limits for smaller vessels under the 1992 CLC and contended that the goal of these treaties was to provide an effective regime to address claims, but not to enhance safety or enforce existing rules. This view was supported by several member states of the IOPC Fund that had objected to the aforementioned review. A study was therefore commissioned by a Working Group of the 1992 Fund about the distribution of costs in past situations managed by the 1992 Conventions.

The findings were open to more than one interpretation. The share assumed by the oil industries had been rising over the years and the SF 2003 could indeed accentuate this imbalance. Some believed there was still room to improve the contribution of owners/insurers to cover overall costs (Faure and Hui 2003; Oosterveen 2004).

Aside from providing for higher coverage of compensation claims through the creation of the SF 2003, other issues such as limitation and channelling of liability, compulsory insurance, and the role of “P&I clubs” have been under scrutiny by the IMO as it aims to improve the current system. As before, the challenge is to install a system that, while ensuring rapid and adequate payment for claims, also promotes the adoption of higher safety standards by all the parties involved so as to diminish the likelihood of accidents while establishing fair balance regarding the roles and contributions of the various stakeholders (Faure and Hui 2003).

In addition to its role in setting international laws on liability and compensation for oil pollution events, IMO has developed more than 50 treaties and conventions (40 of them in force<sup>45</sup>) on several aspects of maritime safety and management of pollution risks. In some 50 years of activity, it became one of the most prolific treaty-making agencies of the United Nations (UN). The numerous important contributions made by IMO include treaties such as UNCLOS; SOLAS (1960<sup>46</sup>) concerning safety issues in merchant ships; MARPOL (1973/78) and subsequent amendments addressing marine pollution; and the STCW 1978 which sets international standards for seafarers (Blanco-Bazán 2004; Hui 2004). IMO currently involves 166 member states which account for 98.8 percent of the world’s shipped tonnage.<sup>47</sup> IMO has become an international forum for diverse and at times conflicting interests.

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<sup>45</sup> Detailed information regarding IMO’s mission and statutes, member states and Conventions is available at [www.imo.org](http://www.imo.org).

<sup>46</sup> SOLAS – International Convention for the Safety of Life at Sea; MARPOL - International Convention for the Prevention of Pollution from Ships; STCW– International Convention on Standards of Training, Certification and Watchkeeping for Seafarers.

<sup>47</sup> Detailed information regarding IMO’s member states is available at [www.imo.org](http://www.imo.org).

***The Role of the European Union (EU) in Maritime Pollution Policy.*** Over past decades, the course of the IMO and the development of international laws regarding maritime pollution and environmental safety have been strongly influenced by the actions of the EU and its member states (Faure and Hui 2003). Recognizing and supporting IMO's legitimacy as a competent body and arena to define important international standards in the fields of marine safety and pollution, the EU has often based its intra-European legislation on IMO conventions and resolutions (Hui 2004; Zia-Mansoor 2005).

The current structure of the EU requires that while each member state retains national sovereignty. Each must also conform to the directives of the European Parliament (EP) and Commission (EC). Internal differences and conflicting national agendas are common obstacles to development of standardized marine policy. However, member states are subject to penalties if they fail to meet agreed upon objectives. This ensures a level of cohesion that has granted the EU strong political leverage in international affairs.

IMO, on the other hand, cannot impose rules on states, but rather can only expect them to follow the international treaties they have signed and ratified (Hui 2004). Hence, as Zia-Mansoor (2005) comments on the matter of preventing marine oil pollution "the EU has stronger enforcement mechanism(s) than the IMO." Moreover, EU states retain full freedom to develop national legislation or trans-national agreements in and outside the EU, as long as they do not oppose EU legislation (Hui 2004). Thus, there is potential for added measures to ensure safety in the world's oceans.

EU marine policy has been developing in concert with expansion and development of the EU itself. From its inception in 1957, under the Treaty of Rome, the European Economic Community (EEC)<sup>48</sup> grew from the original six member states to the current 25 as of May 1, 2004. Prior to the entry of maritime nations such as the UK and Denmark, and the occurrence of serious oil spills in the late 1960's and 70's, there were few measures in place to address issues of maritime safety.

Following the *Amoco Cadiz*, the Council of the EEC set up an action program addressing oil pollution and it took initial measures to improve port control and navigation in European waters. It also recommended that its member states ratify international treaties such as MARPOL 73/78 and SOLAS (Hui 2004).

The Paris Memorandum of Understanding (Paris MOU) was an administrative agreement between signatories aimed at elimination of substandard shipping through coordination of port states and under existing and relevant international rules (Hui 2004). It was not an EU-level directive, but it did represent a statement of political will to face the problem of lenient flag-states or non-complying ship owners.

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<sup>48</sup> The "European Union" designation was only adopted after the Maastricht Treaty of 1992, which furthered the scope of transnational cooperation and integration within the EEC.

The Paris MOU countries enforced international rules in an aggressive and articulated way—inspecting and eventually detaining or refusing entry to substandard ships. Several other flag countries and the IMO saw the move as a unilateral show of force and pressure. This “pushing forward” inside the system would be translated into several amendments to existing IMO protocols in the next years, as the Paris MOU countries enforced the rules and repeatedly reviewed their guidelines to fit EU concerns and demands. The approval of OPA 90 was another unilateral action taken by an important player which the IMO would have to later accommodate (Blanco-Bazán 2004; Hui 2004).

In 1993, responding to the challenges set by the OPA 90 and changes in the international scenario, the EU published the Common Policy on Safe Seas (CPSS).<sup>49</sup> This was considered the real start of the EU’s maritime safety policy. It aimed at implementing and enforcing international rules in a uniform manner throughout the EU and recognized the IMO as the valid forum to do so.

The EU Commission implemented measures and produced numerous directives and rules that remain the core of the EU’s policy on maritime safety and established a framework of internal technical cooperation (EU 2000a; Hui 2004). As Hui (2005) points out, the actions seemed to be guided by an interest in attaining a balance between all parties involved in maritime activity, so as to create incentives to share the responsibilities of maritime safety and to prevent oil pollution (Hui 2003).

By the year 2000, the EU oil trade was the largest in the world, with some 800 million tons transported through EU ports every year. Crude oil imports represented 27 percent of the total world trade, with the U.S. close behind, accounting for 25 percent of the world total.

Some 90 percent of EU oil supplies are transported by sea. This puts the English Channel and the coast of Brittany in particularly vulnerable position. Concerned with recurring accidents and damages involving tankers inside its waters, the EU led the IMO to adopt higher standards on international rules and pressured member states to adopt them (EU 2000a; Hui 2004).

The EU adopted two sets of legislative proposals - the Erika I and II packages.<sup>50</sup> These tightened the existing regulatory framework (Hui 2004; Zia-Mansoor 2005). Erika I toughened the action of port states to compensate for the failings of flag states and ship operators in respecting the IMO safety regulations. Besides strengthening port inspection mechanisms to increase the level of mandatory compliance- by targeting ships that likely posed greater risks or risks of infraction- it proposed the exchange of information between flag states, port states, and classification societies. It also turned some previously optional provisions of European Directives into compulsory ones and set a specific timeline for the phasing out of single hull tankers from EU waters.

Erika II planned for the creation of a European Agency for Maritime Safety (ESMA), an improved information system to increase monitoring in European waters, and the creation of a

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<sup>49</sup> COM (93) 66 Final: a Common Policy on Safe Seas, 24 February 1993.

<sup>50</sup> COM(2000) 142 Final and COM(2000) 802 Final, respectively.

supplementary fund for oil pollution compensation. Erika I was adopted in March 2000, to take effect from July 2003 onwards, while Erika II was adopted in December 2000 and gradually adopted over the next years (EU 2000a; EU 2000b; Faure and Hui 2003; Hui 2004). However, the EU also went one step further, by pressuring the IMO to change the basic rules or risk unilateral action by the European block (Blanco-Bazán 2005).

The 50 percent increase in the compensation limits of the 1992 CLC and IOPC Fund resulted from strong pressure by EU members, especially France (Faure and Hui 2003). Addressing the insufficiency and limitations of the existing compensation mechanisms, the EU announced in 2002 its intention to create a separate third-level supplementary fund of its own, to be called the Compensation for Oil Pollution (COPE) Fund, intended to cover up to €1 billion (including the 1992 CLC and Fund compensations). This proposal was later presented by European member states to the IMO, which used it as a model for the creation of the aforementioned SF 2003. Upon approval of the SF 2003, the EU Council decided to drop the COPE proposal in favour of an IMO treaty (Faure and Hui 2003).

The phasing out of single hull tankers was another example of challenge to the IMO. Confronted by the establishment of the OPA 90, IMO introduced important amendments to the MARPOL Convention in 1992, to come into force in July of 1993. Defining design and construction standards for new and existing tankers, it included a provision specifying that new tankers (delivered after 1996) over 5,000 dwt would have to be fitted with double hulls or other IMO-approved design. Existing tankers (delivered before 1996) over 20,000 dwt would have to be converted and would be subjected to enhanced inspections.<sup>51</sup> It was accepted that removal or conversion of single hull tankers would have to happen over time, due to limitations in the world's shipyards (EU 2000; Blanco-Bazán 2005).

Concerned that single hull tankers forbidden entry into American waters by the OPA 90 before European bans were instituted would then be crossing European waters more frequently and increasing the likelihood of accidents, the EU pressured the IMO for a quicker phasing out of the vessels (EU 2000). MARPOL was amended once again in 2001, and a strict timeline for banning all single hull tankers was set for 2015 (Blanco-Bazán 2005). A few months prior to implementation of the Erika I package, the tanker *Prestige* sunk off the north coast of Spain.

### **The *Prestige* Accident**

**Overview.** The Greek-flagged *Aegean Sea* ran aground at the entrance of the harbour of La Coruña during a severe storm on December 3, 1992. The tanker burst into flames shortly afterwards. A large spill followed. Sixty miles (100 km) of coastline were contaminated, impacting artisanal fisheries in a region where 20 percent of residents were dependent on fishing. Local fisheries were at that time valued at \$300 million per year (Davis 1998; Pérez 2003). A second accident occurred in the region November 2002, when the *Prestige* tanker foundered 130 miles off the coast of Galicia.

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<sup>51</sup> Detailed information regarding IMO's Conventions is available at [www.imo.org](http://www.imo.org).

**Relevant Background Information.** The *Prestige* was a 42,820 grt single hull tanker built in Japan in 1976, owned by a limited liability Liberian company (Mare Shipping) with an administrative office in Athens (Universe Maritime) and sailing under a Bahamian flag. The insurer was the London Protection and Indemnity Club. The crew of 27 was composed of persons of Greeks and Filipinos, and the vessel was under the command of Captain Apostolos Mangouras. Certification of the ship's seaworthiness was ensured by the American Bureau of Shipping (ABS). The ship had been inspected by ABS in May 2002, with a special survey conducted one year prior, when extensive replacement of the steel side plating was conducted in dry-dock in Guangzhou, China.

After serving for several months in the Baltic Sea, the ship was loaded with 77,033 tons of No. 6 heavy fuel from Russia and Latvia and set off for Singapore via Gibraltar. The fuel the tanker carries has a characteristically high density and viscosity, with a low tendency to evaporate and disperse naturally (Suárez et al. 2005).

The ship had been chartered by the Russian company Crown Resources AG, based in Switzerland. It was part of the financial group Alpha. Shortly after the *Prestige* incident, this company parted from Alpha and became part of ERC Trading (Pérez 2003; Garcia 2004; Lloyds 2005; Loureiro et al. 2006; Suárez et al. 2005).

**The Foundering off Galicia and the Ensuing Spill.** On the afternoon of November 13, the *Prestige* was sailing around Cape Finisterra in Galicia (northwest Spain), under conditions of severe weather. By 2:50 p.m., an emergency signal was emitted, requesting the evacuation of the crew. The hull had been damaged, with a 33- to 50-foot gash on the side ballast tank No.3. The ship quickly started leaking oil and developed a 30-degree list. The Coast Guard of Galicia and the Spanish maritime rescue agency La Sociedad Española de Salvamento (SASEMAR) were alerted. Aerial reconnaissance confirmed that oil was being spilled and had formed a 20-mile slick.

Driven by 25-foot waves and force ten winds, the ship started drifting towards the rocky coast of Galicia. It was secured by two Spanish tugboats less than ten miles from the shoreline on the 14<sup>th</sup> of November. By then, salvage operations had been awarded to the Dutch company SMIT Salvage, in partnership with the Spanish Technosub, by means of a Lloyd's Open Form 2000 contract. After several failed attempts involving parted towlines, and with four tugs on site, a towline was finally successfully connected to the *Prestige*. The ship was boarded by salvage technicians and Spanish authorities, who began working with the Captain of the *Prestige* and two crew members.

The vessel was towed 60 miles (100 km) offshore, as ordered by the Spanish authorities, and instructed to remain in that position to await further guidance. The option of transferring oil to another container was deemed unfeasible by both SMIT and SASEMAR due to weather conditions. Entry into a sheltered place, as requested by the ship and suggested by SMIT, was flatly denied by SASEMAR, allegedly based on technical grounds and scientific advice. SMIT considered transporting it to the calmer African waters of Cape Verde to allow for the transfer of oil, a move criticized by Pérez (2005) as treating "developing countries as waste-disposal areas."

As the ship was taken further south, Portuguese authorities promptly dispatched a warship and denied entry. The *Prestige* was taken further out into the open Atlantic.

On November 16<sup>th</sup>, the gash on the hull was already 160 feet long (53 m); by then, the first oil slicks were reaching the shores of Spain. On the 19<sup>th</sup>, still being towed west under stormy conditions, the aft section sunk and the ship started ripping in two. A few hours later, both sections of the *Prestige* were sinking to the bottom of the ocean, with most of the cargo still inside. The final resting place of the *Prestige* would be at a depth of 12,000 feet (3,600 m), about 130 miles west of the coast of Galicia, still inside the Spanish EEZ. An estimated 10,000 to 20,000 tons of oil had already been spilled while the *Prestige* was afloat, and several smaller spills were generated after she sank (Cedre 2003; Pérez 2003; Lloyds 2005).

Although disputed, it was initially assumed by Spanish authorities and other experts that ocean conditions around the spill would contribute to gradual solidification of the remaining fuel, preventing its escape from the sunken tanks. If that were so, no further action would be needed. However, with fuel initially surfacing at a rate of 125 tons per day and still some two tons per day by mid-February 2003 (three months later), more drastic solutions had to be considered.

***Spain's Recovery Efforts.*** Spanish officials contracted the French Maritime Research Institution (IFREMER) to conduct an assessment at the site of the sunken vessel using the French deep-submersible "Nautile." Although operations were conditioned by poor weather at sea, several leaks were detected in the hull. These were sealed by technicians during March 2003. Fearing that corrosion would lead to release of the remaining cargo, the Spanish government decided that measures should be taken to extract the entrapped fuel.

A contract was awarded to the Spanish oil company Repsol to devise and execute the task. From May to September 2004, about 13,000 tons were retrieved from the hull using aluminium shuttle containers, which were lowered down to the wreck and filled with oil. When full, these containers were brought to subsurface level and emptied with water-injected flexible hoses connected to a surface tanker. Operations ended in September, as the oil amounts remaining in the wreck were considered minimal; special compounds were injected in the hull to accelerate degradation of the residues (Cedre 2003; IOPC 2006).

An estimated 60,000 tonnes reached the shoreline of Spain in several dense spills, over several months (Loureiro et al. 2005). Due to the high viscosity of the fuel which formed a thick emulsion with seawater, and the prevailing currents and wind conditions, these multiple spills drifted eastward, affecting some 1,200 miles (1,900 km) of coastline (Cedre 2003; IOPC 2006).

Most of the northern coast of Spain and an expansive section of the French Atlantic coastline up to Brittany were polluted. Galicia was the most heavily-impacted area as it was closest to the wreck site. The Spanish Autonomous Regions of Asturias, Cantabria and the Basque Country were also seriously affected, but with lesser intensity. France deployed extensive means to contend with pollution at sea. Shoreline contamination did occur, primarily in the form of tar balls. Limited oiling also occurred in Portugal (Cedre 2003; ITOPI 2004).



Response to the spill involved numerous means, both at sea and on land, with an unprecedented level of international cooperation (ITOPF 2004). Since the *Prestige* sunk in Spanish waters, response became the responsibility of the Spanish Government. All available means for recovery were therefore placed under Spanish jurisdiction, as long as the efforts took place in Spanish territory. Under the scope of the French-Spanish Biscay Regional Agreement, two specialized vessels for oil retrieval, a POLMAR plane, and other technical and specialized human means from France were made immediately available to Spain upon request for help, which occurred on November 14. On a higher level, the European Commission ensured quick diffusion of information, and supply of technical means and economic assistance during a later stage of recovery. Each member state willing to assist Spain was responsible for directly contacting Spanish authorities under existing agreements (Silvestre 2006).

A major offshore cleanup operation was carried out by specialized vessels from Spain and nine other countries and although efforts were challenged by bad weather, close to 20,000 tons of oily waste was recovered as of December 2002. The response fleet was initially under Spanish coordination and charter but, as the pollution entered the French EEZ in late December, management was shared by the two countries. By then, the slicks had become too fragmented to be efficiently retrieved by vessels and their deployment was cancelled.

Closer to shore and with improved weather conditions, over a thousand fishing vessels assisted in cleanup efforts in hopes of precluding further contamination. An estimated total of 40,000 tons of oily waste was retrieved. About 13 miles of floating booms were placed along the coastline of Galicia to prevent contamination of estuaries and other sensitive locations. But their use was impaired by rough weather (Cedre 2003; IOPC 2006). The coast of Galicia was eventually impacted by three large episodes of incoming oil (Loureiro et al. 2005).

The irregular and rocky outline of the shoreline often made access to and cleaning of oiled areas a difficult task, having to be conducted mostly in a manual fashion. Re-oiling of previously cleaned areas by re-mobilization of the oil was also a serious problem (ITOPF 2004; Pérez 2005). Some 141,000 tons of oily waste was collected in Spain, of which 97,000 tons were removed from Galicia. Efforts in France yielded about 18,300 tons of oily waste (ITOPF 2004; Loureiro et al. 2006).

Mobilization of resources occurred at several levels, corresponding to the political organization of Spain. The country is divided into 17 Autonomous Regions (Galicia being one), each with a local government that has to respond to the central administration in a system that resembles the federal government of the U.S. or Germany (Loureiro et al. 2005). The same structure is found in several public organizations that may be dependent on regional or central administration. By June of 2003, when cleanup efforts on land were mostly concluded, several thousand soldiers, contractors, and volunteers were assisting operations (Suárez et al. 2005).

**Media and Public Reactions.** The reaction to the spill generated a strong wave of solidarity, with thousands of volunteers and seamen participating in the recovery efforts, amidst strong criticism and social tension relating to management of the process by local and central authorities. Media coverage was unfavourable, even if often sensationalistic (Pérez 2005). In the wake of the spill, a broad political platform called “Nunca Más!” (Never Again!) was

formed. Comprising more than 40 trade unions, *cofradías*, and environmental non-governmental organizations (NGOs), the group became a strong and persistent social outcry of opposition (García 2004; Pérez 2005). Protests extended even to scientists. An open letter signed by over 400 scientists was published in the journal *Science*<sup>52</sup> (Freire et al. 2006).

***Environmental and Socioeconomic Impacts of the Spill.*** According to Loureiro et al. (2006), Galicia has suffered five of the eleven major oil spills in Europe in the last three decades, mainly due to its proximity to busy shipping routes and the existence of a major port and refinery in La Coruña (where the *Aegean Sea* spill took place). The coast of Galicia, namely the *Costa da Morte* (Coast of Death), is famed for its dangerous waters. Moreover, the region includes several estuaries, called *Rías Baixas* (Loureiro et al. 2005), which include a variety of wetlands, sandbanks, and diverse formations of ecological interest (Garza-Gil et al. 2006a). Much of this area is protected as reserves or national parks, and human activities such as fishing and tourism are common.

By the end of 2003, more than 1,000 km of Galician coast, including 745 beaches, had been affected by the spill. The impact was especially persistent around rocks, cliffs, and other areas, where cleanup was difficult or considered unsafe. In addition to effecting high rates of mortality for birds and marine mammals, the spill impacted larvae and juveniles of several commercially important species (Garza-Gil et al. 2006a; Loureiro et al. 2006; Pérez 2005).

The largest and most productive fishing fleet of the EU is based in Spain. Nearly one-third of the EU's total tonnage (grt) is produced in Spain, and Galicia's fleets alone account for ten percent. Nearly 8,000 vessels are based in the Galicia region (Garza-Gil et al. 2005b).

Fishing and aquaculture employ nearly 35,000 residents, and generate about two percent of the region's gross added value (Garza-Gil et al. 2006a; 2006b). Activity is concentrated in small family businesses. The actual number of persons dependent on the industries is much higher (Loureiro et al. 2006). Many fishers belong to groups or guilds called *cofradías*. Seafood processing and distribution businesses and other specialized maritime businesses are common in the region (Pérez 2005).

Fishery participants employ multiple gear types and target more than 50 species of fish, crustaceans, or other invertebrates. Aquaculture takes place mostly inside the *rias*, primarily for mussels, other shellfish species, and turbot (Garza-Gil et al. 2006b; Loureiro et al. 2006).

Fishing and shellfishing bans were established in increasingly larger areas of the Spanish coast following the spill. These lasted anywhere from two to ten months. In Galicia, about 90 percent of the coast was closed for fishing after mid-November. Although compensation was granted to fishermen by the local and central Spanish Government with assistance from the EU, the closures and subsequent effects on winter holiday sales led to extensive short-term losses to the local economy (ITOPF 2004; Garza-Gil et al. 2008b; Loureiro et al. 2006; Pérez 2005).

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<sup>52</sup> Consult: Serret, P., X.A. Álvarez-Salgado, and A. Bode (2003): *Spain's earth scientists and the oil spill*. *Science* 299(5606):511.

Tourism was also affected. Tourism businesses contributed nearly six percent of the gross added value in the region, and employed about five percent of the work force. A strong tourism marketing campaign was instituted to mitigate the effects of the spill (Garza-Gil et al. 2006a; Loureiro et al. 2006).

Damages and costs incurred by the *Prestige* oil spill have been addressed by several studies (see Garza-Gil et al. 2006a; 2005b; Loureiro et al. 2006). Considering the detrimental impacts to fisheries, tourism, and local ecosystems, and the initiation of cleanup and restoration efforts, the estimated short-term costs in Galicia amounted to €567 million during the period 2002 to 2004. For the entire area affected (including the Autonomous Regions of Galicia, Asturias, Cantabria and the Basque Country), the short-term costs for this same period amounted to about €770 million (Garza-Gil et al. 2006a; Loureiro et al. 2006). The costs of cleanup and restoration efforts were evaluated by the Spanish Government at €80 million, or 66 percent of the total costs, with the extraction of fuel from the sunken tanker amounting to €100 million (Loureiro et al. 2005).

***Claims and Litigation.*** Spain, France, and Portugal presented claims for damages to the CLC/IOPC Fund. As of March 16, 2006, 836 compensation claims totalling €38 million had been presented in Spain. The Spanish Government alone presented seven claims corresponding to €53.5 million. France filed 468 compensation claims totalling €108 million, and Portugal filed two compensation claims relative to cleanup and preventive measures totalling €4.3 million (IOPC 2006).

So as to reduce impacts on the local economy, Spanish authorities made direct payments to affected individuals and companies, thereby assuming their right to pursue later reimbursement of compensation claims. The EU diverted some €75 million from the European Cohesion Fund and other sources to cover some of the losses in specific sectors, such as marine fisheries (Loureiro et al. 2005; IMO 2006). Under the limits set by the CLC, the London P&I Club made €22.8 million available for compensation claims on behalf of the ship owner. Under the 1992 Fund, an additional €148.7 million were made available, corresponding to a total of €171.5 million. The Fund proceeded under the equal treatment rule to give equal priority to claims from all states. It also deemed the costs of fuel recovery from the wreck as not being eligible under 1992 Fund rules. As of March 2006, several claims were still being evaluated by the Fund (IOPC 2006).

It is worth remembering that the *Prestige* accident occurred about one year before the implementation of the 50 percent increase in the 1992 Conventions and more than two years before the SF 2003 (Oosterveen 2004). The event was therefore not covered by the higher limits (IOPC 2006). Under the rules of the CLC/1992 Fund conventions, the ship owner or insurer would not be obliged to provide compensation higher than the set limits unless found guilty of negligence. Since claims were higher than the Fund's limits, Spain and the other claimants would have to dismantle the limitation of liability to the ship owner/insurer or pursue other likely sources of compensation, either by agreement or litigation (Garcia 2004; Loureiro et al. 2006).

On November 15, Spanish authorities arrested 67-year old Captain Mangouras, Master of the *Prestige*, on charges of failing to cooperate with the authorities during the accident. This action

and the €2.9 million bail demanded for his release raised strong outcries about Spain's attitude toward what was increasingly seen as a scapegoat situation for the faults committed by several actors in the event.

After nearly three months in a high-security prison, bail was paid by the London P&I Club. But the Captain would be retained in Spain for two more years under strict conditions before being allowed to leave the country. In the meantime, a Spanish judge required a judicial investigation of the accident which led to several questions about the conduct of Spanish authorities at the time of the accident.

In Spain, local and central governments faced intense oppositions, with several political casualties. Criminal process was initiated in Galicia courts by the "Nunca más!" platform. In the EU forum, some were calling for strict and immediate measures for reprehensible actions. Meanwhile, several actors in the maritime world voiced concerns and staged protests about the risks of unilateral reactions by the EC (Lloyds 2005; IMO 2006). Coverage in specialized publications was intense and reflected ongoing campaigning of legislators, ship owners, and others (IMO 2006).

Over the next months, the inquiry process was heightened in an often conflicting way. On one side, the classification society, ABS, was being accused of negligence in the seaworthiness certification of the ship. The main accusations dealt with potential flaws in the ship inspection process, namely in assessing the structural integrity of the ballast tank and the quality of repairs to the steel plating. A later report by ABS refuted these accusations, and auditing by the International Association of Classification Societies (IACS) found no major flaws in ABS conduct, although it was deemed that there was room for improvements and changes to rules. The exact cause of the original gash was not determined, with a collision at sea or a breaking wave posited as possible causes. A loud bang was reportedly heard by the crew before the accident; stray containers and 200 51-foot logs had been reported lost on the stormy sea some hours before.

The Bahamas Maritime Authority (BMA) was also accused of failing to uphold IMO standards on a vessel sailing their flag, as were the insurer and vessel operator. A lengthy report released by the BMA two years after the wreck could not find sufficient evidence to pinpoint the initial cause of the structural failure that led to the sinking of the ship. Spain contested the accuracy of this report and IACS auditing (Lloyds 2005; IMO 2006).

On the other hand, Spanish authorities were accused of not providing a port of refuge for the stricken vessel. Claims were made that the spill would otherwise have been contained, causing less environmental damage, and that Spain had failed in its obligation to comply with European legislation regarding ports of refuge. But Garcia (2004) contends that Spain and Portugal were allowed to order the ship away from their waters under the INTERVENTION Convention.<sup>53</sup>

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<sup>53</sup> Referring to the IMO International Convention Relating to Intervention on the High Seas in Cases of Oil Pollution Casualties (INTERVENTION), 1969. Detailed information regarding the IMO Conventions is available at [www.imo.org](http://www.imo.org).

Spanish authorities were also accused of being directly responsible for the breaking and sinking of the vessel, when they ordered the *Prestige* to be towed for six days during inclement weather. Technical reports pointed that the mechanical stresses so inflicted on the hull far exceeded tolerable limits for a proper vessel, and even more so after Spanish engineers allegedly ordered that the ship's engines remain running while in tow. It later came to light that the technical and scientific advice supplied to Spanish authorities to legitimate their decision to send the *Prestige* out to sea possibly never existed at all, with the decision being made just a few hours after the initial emergency call (Lloyds 2005; IMO 2006).

As of March 2006, litigation related to the *Prestige* was taking place on two fronts, in Spain and in the U.S. In Galicia's court of Corcubión, the responsibility of Spanish authorities and those related to the ship was still being evaluated by a Spanish judge. In June 2005, this court had found that the shipping company's manager, Universe Maritime, and the ship owner, could both be held directly liable for damages. In a move of contested legality, the judge ordered freezing of assets and the deposit of €87 million as a security payment. In 2003, the Spanish central government also faced litigation via a group of French authorities seeking compensation under Spanish administrative legislation for pollution caused to France (Lloyds 2005; IMO 2006).

The other case involved ABS and the Spanish central government, representing the Kingdom of Spain. In May 2003, the central government had filed suit against ABS in a New York District Court under charges of negligence and responsibility for the *Prestige* spill. It claimed \$700 million in damages; addendum clauses would allow for later increases in the claims, since recovery operations were still underway.

Two months later, Spain addressed a request to the EC, asking that ABS be removed from the group of classification societies accepted by the EU. In July 2004, the negligence suit against ABS was extended to include two ABS units – ABS Group and ABSG Consulting. Also in May 2003, the Basque Country regional government filed suit against ABS in a Houston District Court, on the same grounds as above, claiming \$50 million in compensation. Later, in January 2004, action was extended with a suit against ABSG Consulting (an ABS subsidiary), demanding \$300 million.

In November 2005, the Basque Country case was consolidated with proceedings in New York, withdrawing the \$50 million claim after the central government paid \$60.1 million for cleanup costs and compensations to the fishing fleet. ABS had asked for the dismissal from both claimants, but lost. In turn, ABS filed counterclaims against the Kingdom of Spain for direct responsibility of the sinking of the ship (for reasons described above) and violation of international law. As of March 2006, litigation was still underway (Lloyds 2005; IMO 2006). In October 2004, facing the potential payout of claims, the IOPC Fund Executive Committee considered taking direct action against ABS as well. But it declined to do so when the implications and costs of litigation were considered (IOPC 2006).

***Aftermath of the Prestige Incident.*** In the months that followed the *Prestige* incident, the Spanish Government adopted a series of measures (Royal Decrees) targeted at single hull tankers and oil pollution. Similar activity was observed in France and other member states (IMO 2006).

One of the most far-reaching reactions to the sinking of the *Prestige* was seen at the Franco-Spanish summit held in Malaga in November 2002, where both countries agreed to forbid the transit of single hull oil-tankers over 15 years old through their respective EEZs. During December of 2002, three vessels were expelled from the French and Spanish EEZs as a result of this accord, and a fourth was refused entry into Spanish jurisdiction waters (Vivero and Mateos 2004). This unilateral measure, whose legality was contested as violating the UNCLOS provision that ensures the right to innocent passage and freedom of navigation (Blanco-Bázan 2005), was also adopted by Portugal and Italy (IMO 2006). The intention of banning single hull tankers from EU waters was amplified at the European Commission, whose vice-president at the time was Spanish national, Loyola de Palacio.

After intensive discussions, several actions were proposed in early December 2002. Besides speeding up and enforcing the adoption of the Erika I and II measures, it was decided that further actions be taken to increase port control and maritime safety, instatement of a system of criminal sanctions for parties responsible for marine pollution by gross negligence, and adoption of international conventions regarding compensation and liability schemes (EU 2002a). Actions were also brought against member states delinquent in transposing EU directives.

Later that same month, the EC would submit another proposal advancing a new timeline for the phasing out of single hull tankers, forbidding the transport of heavy grades of oil in single hull tankers to or from European ports, and strengthening inspection regimes for single hull tankers older than 15 years (EU 2002b). Several regulations and directives regarding maritime safety were instated shortly afterwards.

The phasing out of single hull tankers under a deadline previous to the one set by the IMO was one of the most problematic measures. Intended to coincide with the OPA 90 timeline, this measure set the EU in direct confrontation with the IMO (Hui 2004; Blanco-Bázan 2005). After intensive negotiations, changes were agreed upon at the IMO forum to regulations 13G and 13H of the MARPOL Convention, effectively meeting the timelines set forth by the IMO, EU, and OPA 90.

A third set of measures was announced on November 23, 2005 by the EC, tackling issues such as the expansion of the EU from 15 to 25 member states, and maintaining a healthy maritime sector and simultaneously upholding rules that promote maritime safety and protection of the environment. The proposals addressed private sector intervention in the liability and compensation mechanisms, standards of navigations, operational frameworks for accidents, mitigation and later investigations, reinforcement of port state authority, and monitoring of classification societies (EU 2005).

**Summary Remarks.** Though 22 years apart, the *Amoco Cadiz* and *Prestige* accidents illustrate what was once known as “governing by disaster” or as Blanco-Bazán (2004) termed it - the problem of “politics versus law.” Although events such as these involve relatively small amounts of oil vis-à-vis current amounts being spilled (Zia-Mansoor, 2005), and an even smaller fraction of the total amounts entering the ocean every year via other anthropogenic sources, large oil spills can bear extensive environmental and social effects, and they clearly capture public

Another point illustrated by these two spills is the dialogue (or confrontation) between national and regional regimes on one hand, and an international regime on the other (the IMO) in matters of global import. The situation requires management of the often conflicting interests of diverse actors from diverse parts of the world: ship owners from Europe *vs.* ship owners from Asia *vs.* ship owners from the U.S.; flag states *vs.* port states; importers *vs.* exporters of oil; legislators and companies in the environment *or/and* industry in question; even shipyards protected by national interests *versus* those exposed to competition in the global market. The situation also touches on the issue of national sovereignty in changing political and legal landscapes, and having to face the problems of wanting to move faster or slower than international regimes. The OPA 90 and some of the EU's decisions regarding oil pollution and maritime safety are examples of proactive policymaking.

Another important point relates to the issue of damages caused by spills and related compensatory payment. The current international convention of limited liability (Garcia 2004) has been under intense discussion (EU 2002a; Faure and Hui 2003). Besides the role that can be played by different entities in ensuring high standards of safety and operation as a precautionary perspective, there is also the matter of dealing with accidents as they happen and subsequent compensation (Faure and Hui 2003). The current three-layered system enjoined by the IMO provides an international framework with a compensation ceiling that may prove adequate (Blanco-Bazán 2004; Jacobsson 2005), though its adequacy relates to the frequency and magnitude of spills and the range of human and environmental considerations that are included in the ensuring costs.

## **References**

Anonymous

1992a "Amoco Cadiz Builders Settle." *Marine Pollution Bulletin*, Vol. 24(9): 427.

Anonymous

1992b "Amoco Cadiz Judgment Upheld." *Marine Pollution Bulletin*, Vol. 24(4): 178.

Anonymous

1992c "Amoco Cadiz Settlement." *Marine Pollution Bulletin*, Vol. 24(6): 279.

British Petroleum

2006 Corporate Information Available at:

[www.bp.com/subsection.do?categoryId=10andcontentId=2001674](http://www.bp.com/subsection.do?categoryId=10andcontentId=2001674).

Blanco-Bazán, A.

2004 IMO – Historical highlights in the life of a UN Agency. *Journal of the History of International Law*, Vol. 6: 259–283.

Bloodworth, S.

1998 Death on the high seas: the demise of TOVALOP and CRISTAL. In *Florida State University Journal of Land Use and Environmental Law*, Vol. 13(2). Available online at: <http://www.law.fsu.edu/journals/landuse/132.html>.

Cheminsky, R.

1987 *Superwreck: Amoco Cadiz - 1<sup>st</sup> edition*. William Morrow and Co. USA. 254p.

Center for Documentation for Research and Experimentations

2004 Institutional Information. Available at: [www.le-cedre.fr](http://www.le-cedre.fr).

Davis, L.

1998 *Environmental Disasters: A Chronicle of Individual, Industrial and Governmental Carelessness*. Facts on File. New York, USA. 246 p.

European Union

2000a Communication from the Commission of the European Parliament and to the Council on the Safety of the Seaborne Oil Trade. COM (2000) 142 Final. Commission of the European Communities. 121 p. Available online at: <http://europa.eu.int/eur-lex/lex/LexUriServ/LexUriServ.do?uri=COM:2000:0142:FIN:EN:PDF>.

European Union

2000b Communication from the Commission of the European Parliament and to the Council on a Second Set of Community Measures on Maritime Safety Following the Sinking of the Oil Tanker Erika. COM (2000) 802 Final. Commission of the European Communities. 116 p. Available online at: <http://europa.eu.int/eur-lex/lex/LexUriServ/LexUriServ.do?uri=COM:2000:0802:FIN:EN:PDF>.

European Union

2002a Communication from the Commission of the European Parliament and to the Council on Improving Safety at Sea in Response to the Prestige Accident. COM(2002) 681 Final. Commission of the European Communities. 27p. Available online at: [http://europa.eu.int/comm/transport/maritime/safety/doc/prestige/com\\_2002\\_681\\_de.pdf](http://europa.eu.int/comm/transport/maritime/safety/doc/prestige/com_2002_681_de.pdf).

European Union

2002b Communication from the Commission of the European Parliament and to the Council amending Regulation (EC) No 417/2002 on the accelerated phasing in of double hull or equivalent design requirements for single hull oil tankers and repealing Council Regulation (EC) No 2978/94. COM(2002) 780 Final. Commission of the European Communities. 13p. Available online at: [http://europa.eu.int/comm/transport/maritime/safety/doc/prestige/com\\_2002\\_0780\\_en.pdf](http://europa.eu.int/comm/transport/maritime/safety/doc/prestige/com_2002_0780_en.pdf).



European Union

2005 Communication from the Commission - Third package of Legislative Measures on Maritime Safety in the European Union. COM(2005) 585 Final. Commission of the European Communities. 8p. Available online at: [http://europa.eu.int/comm/transport/maritime/safety/doc/package3/en/communication\\_en.pdf](http://europa.eu.int/comm/transport/maritime/safety/doc/package3/en/communication_en.pdf).

Freire, J., L. Fernández, and R. Muinõ

2006 Role of the Spanish scientific community in the initial assessment and management of the environmental damages caused by the Prestige oil spill. *Marine Policy* 30 (4), July.

Faure, M. and W. Hui

2003 The international regimes for the compensation of oil-pollution damage: are they effective? *Review of European Community and International Environmental Law*, Vol. 12(3): 242-253.

Garcia, I.P.

2004 Comment: "Nunca mais!" How current European environmental liability and compensation regimes are addressing the Prestige oil spill of 2002. *University of Pennsylvania Journal of International Economic Law*, Vol. 25(4): 1395-1439.

Garza-Gil, M.D., A. Prada-Blanco, and M.X. Vázquez-Rodríguez

2006 Estimating the short-term economic damages from the Prestige oil spill in the Galician fisheries and tourism. *Ecological Economics* 58 (4), July.

Garza-Gil, M.D., J.C. Surís-Regueiro, and M.V. Varela-Lafuente

2006 Assessment of economic damages from the Prestige oil spill. *Marine Policy* 30 (5), September.

Gaskell, N.J.J.

1985 The Amoco Cadiz: liability issues. In *Journal of Energy and Natural Resources Law*, Vol. 3(3): 169-94.

Grigalunas, T.A., R.C. Anderson, G.M. Brown, R. Congar, N.F. Meade, and P.E. Sorensen

1986 Estimating the cost of oil spills: lessons from the Amoco Cadiz incident. *Marine Resource Economics*, Vol. 2(3): 239-62.

Gundlach, E.R., P.D. Boehm, M. Marchand, R.M. Atlas, D.M. Ward, and D.A. Wolfe

1983 The fate of Amoco Cadiz oil. *Science*, Vol. 221(4606): 122-129.

Hui, W.

2004 The EU marine oil pollution prevention regime – recent developments. *European Environmental Law Review*, Vol. 13(11): 293-303.

International Maritime Organization

2006 Information Resources on the “Prestige.” IMO Library Services External Relations Office, Information Sheet No. 35. 72p. Available online at: [http://www.imo.org/Circulars/mainframe.asp?topic\\_id=904](http://www.imo.org/Circulars/mainframe.asp?topic_id=904)).

International Oil Pollution Compensation

2006 Fund report. Available online at: <http://www.iopcfund.org/prestige.htm>.

International Tanker Owners Pollution Federation, Ltd

2004 Case studies information. Available online at: [www.itopf.com/index2.html](http://www.itopf.com/index2.html).

Jacobsson, M.

2005 The significance of the third tier supplementary fund and the on-going review of the international compensation regime. Presented at the Petroleum Association of Japan Oil Spill Symposium 2005, Japan. 9p.

Kasoulides, G.

1988 “Amoco Cadiz damages awarded.” *Marine Pollution Bulletin*, Vol. 19(4): 150-151.

Kbaier, R. and V. Sebek

1985 New trends in compensation for oil pollution damage. *Marine Policy*, Vol. 9(4): 269-279.

Kiechel, W.

1979 “The admiralty Case of the Century.” *Fortune*, Vol. 99(8): 78-89.

Loureiro, M.L., A. Ribas, E. López, and E. Ojea

2006 Estimated costs and admissible claims linked to the Prestige oil spill. *Ecological Economics* 59 (1), August.

Lloyds of London

2005 Salvage case report: Prestige. Available online at: <https://www.lloydsagency.com/Agency/Salvage.nsf/vwSalvageCases/952F3D178BA3850580256C7E00573320?OpenDocument>.

Mille, G., D. Munoz, F. Jacquot, L. Rivet, and J.C. Bertrand

1991 The Amoco Cadiz oil spill: evolution of petroleum hydrocarbons in the Ile Grande salt marshes (Brittany) after a 13-year period. *Estuarine, Coastal and Shelf Science*, Vol. 47: 547–559.

- Oosterveen, W.  
2004 Some recent developments regarding liability for damage resulting from oil pollution – from the perspective of an EU Member State. *Environmental Law Review*, Vol. 6(4): 223-239.
- Pérez, J. D. G.  
2003 Early socio-political and environmental consequences of the *Prestige* oil spill in Galicia. *Disasters*, Vol. 27(3): 207–223. Malden, MA: Blackwell Publishing
- Silvestre, D.  
1998 *20 YEARS AFTER THE AMOCO CADIZ*. Organisation générale de la prévention et de la lutte, Rapport de synthèse de l'Atelier 2 - International Scientific Meetings Preliminary Synthesis. pp: 47-51. Brest, France.
- Silvestre, D.  
2006 Les accords régionaux de coopération et leur fonctionnement dans la pollution du *Prestige*. Proceedings of 11<sup>ème</sup> Journée de Information du Cedre. CEDRE. 9p. Available online at: [www.le-cedre.fr](http://www.le-cedre.fr). under “Publications.”
- Suárez, B., V. Lope, B. Pérez-Gómez, N. Aragonés, F. Rodríguez-Artalejo, F. Marqués, A. Guzmán, L.J. Vitoria, J.M. Carrasco, J.M. Martín-Moreno, G. López-Abente, and M. Pollán  
2005 Acute health problems among subjects involved in the cleanup operation following the *Prestige* oil spill in Asturias and Cantabria (Spain). *Environmental Research*, Vol. 99: 413-424.
- Thébaud, O., D. Bailly, J. Hay, and J. Pérez  
2003 The cost of oil pollution at sea: an analysis of the process of damage valuation and compensation following oil spills. Service d'Economie Maritime, Institut Francais de Recherche pour l'Exploitation de la Mer. Centre de Brest, France.
- United States Court of Appeals for the Seventh District  
1992 *In The Matter Of: Oil Spill By The Amoco Cadiz Off The Coast Of France On March 16, 1978*. Available online at: <http://users.wfu.edu/palmitar/LawandValuation/chapter%201/Documents/AmocoCadiz.html>.
- Vivero, J. L. S. and J. C. R. Mateos  
2004 New factors in ocean governance. From economic to security-based boundaries. *Marine Policy*, Vol. 28: 185-188.
- Zia-Mansoor, F.  
2005 International regime and the EU developments for preventing and controlling vessel-source oil pollution. *European Environmental Law Review*, Vol. 14(6): 165-174.

## **Appendix B**

### **List of Archival Sources for Key Monitoring Variables**

### Key Economic Principles

Variable	Source
Kodiak Island Borough Population	Bureau of Economic Analysis (BEA)
Kodiak Island Borough Per Capita Income	BEA
Income Indicators	BEA
Place of Residence; Place of Work	BEA
Exported Annual Total Earnings by Place of Work	BEA
Annual Average of Labor Force Involvement	Alaska Department of Labor and Workforce Development (ADOLWD)
Annual Rate of Employment	ADLWD
Monthly Average of Labor Force Involvement	ADLWD
Seasonal Indices for Labor Force Involvement	ADLWD
Unearned Income Proportion of Total Personal Income	BEA
Transfer Receipts; Dividends, Interest, and Rent	BEA
Per Capita Total Real	ADOLWD
Personal Property Values	ADOLWD
Residential Building Permits & Total Construction Cost	ADOLWD
Local Taxes	ADOLWD

### Support Sector Earnings and Employment

Variable	Source
Annual Earnings by Place of Work	BEA
Fish Harvest; Seafood Manufacturing; Basic; Support; Government	
Average Monthly Employment by Sector	ADOLWD
Seafood Manufacturing; Basic Non-Fish; Support; Government	
Seasonal Indices for Monthly Employment by Major Sector	ADOLWD
Seafood Harvest Average Monthly Employment Estimates	ADOLWD; Alaska Department of Fish & Game (ADFG)
Monthly Seafood Harvest Employment by Major Species	ADOLWD
Herring; Crab and Miscellaneous Shellfish; Salmon; Groundfish	
Monthly Employment by Major Sector	ADOLWD
Business Entry and Exit	ADOLWD
Wage and Salary Earnings	ADOLWD
Average Monthly Wages by Sector	

## Seafood Industry Investment and Participation

Total Salmon Landings and Ex-vessel Value	ADFG
Summary Statistics for Yearly Salmon Landings by Species	K. Brennan; ADFG
Chinook; Sockeye; Coho; Pink; Chum	
Annual Salmon Landings per Fished Permit by Gear Type	ADFG
Purse Seine; Gill Net; Beach Seine	
Alaska Pacific Cod Landings and Ex-Vessel Value	ADFG
Total Pounds Landed; Total Pounds Landed from State Waters; Total Pounds Landed and Ex-Vessel Value in Port of Kodiak	
Monthly Range of Groundfish Landings from State and Federal Waters (all species)	ADFG
Landings and Earnings: All Fisheries; Groundfish Fisheries; Crab Fisheries; Halibut Fisheries; Salmon	Stephanie Carlson; CFEC Special Tabulation
Total Pounds Landed; Estimated Gross Earnings; Gross Earnings per Pound Landed	
Productivity and Effort per Permit, All Fisheries; Groundfish Fisheries; Crab Fisheries; Halibut Fisheries; Salmon	ADFG
Effort #1: Number of Fishermen to Permits Fished; Effort #2: Permits Fished to Permits Issued; Productivity: Pounds Landed per Permits Fished	ADFG
Kodiak City; Larsen Bay; Akhiok*	ADFG
Permits Issued and Fished, All Fisheries; Landings and Earnings, Combined Fisheries; Productivity and Effort per Permit, Combined Fisheries; *Salmon Permits Issued and/or Fished	ADFG
Kodiak Management Area Salmon Fisheries	ADFG
Number of Fishermen Who Fished (%); Number of Permit Holders (%); Total Pounds Landed	ADFG
Kodiak Management Area Salmon Fisheries Gross Earnings	ADFG
Earnings for All Residents; Earnings for Kodiak Residents	ADFG
KMA Limited Entry Permit Ownership by Resident Type, Combined Salmon Fisheries	Tide et al.; CFEC Special Tabulation
Foreclosures; Non-resident; Other Alaska; Kodiak City; Kodiak Island – Rural	
KMA Limited Entry Permit Ownership Proportions by Resident Type, Combined Salmon Fisheries (%)	Tide et al.; CFEC Special Tabulation
Non-resident; Other Alaska; Kodiak City; Kodiak Island – Rural	
Average Number of Kodiak Management Area Salmon Permits Held by Resident Type	ADFG
Foreclosures; Non-resident; Other Alaska; Kodiak City; Kodiak Island – Rural	ADFG
Cumulative Changes in Permits Held Salmon and Roe Herring Limited Entry Permits	ADFG
Cumulative Transfers In and Out by Resident Type Salmon and Roe Herring Permits	ADFG
Salmon: Purse Seine Fishery; Set Net Fishery; Beach Seine Fishery; Roe Herring Fishery	ADFG
Limited Entry Permit Ownership by Resident Type	ADFG
Foreclosures; Non-resident; Other Alaska; Kodiak City; Kodiak Island – Rural	ADFG
Harvest	ADFG
Earnings	ADFG
Permit Value	ADFG

## Labor Supply

Variable	Source
Kodiak Island Borough Labor Force Participation	U.S. Census Bureau
Kodiak Island Borough Work Effort	ADOLWD; U.S. Census Bureau
Population Working 1-26 Weeks/Year; Population Working 27-52 Weeks/Year	
Employment Seasonality	ADOLWD
Employment Distribution	U.S. Census Bureau

## Patterns of Population Change

Variable	Source
Kodiak Island Borough Population	ADOLWD
Year; Population; Net Change; Rate of Change (%)	
Components of Population Change	ADOLWD
Start Population; Total Change; Percent Change; Births; Deaths; Natural Increase; Net Migrants	
Population Mobility	U.S. Census Bureau
Moved to Kodiak: From Other Places in Alaska; From Other Places in U.S.; From Outside U.S.; Gross Rate of In-migration	
Composition by Age and Gender	U.S. Census Bureau
Composition by Race	ADOLWD
White; Native American; African American; Asian/Pacific Islander	

## Subsistence Participation

Variable	Source
Kodiak Management Area Subsistence Salmon Harvest	ADFG
Population Ratios: Permits Held and Salmon Harvest	ADFG
Kodiak Community Subsistence Participation	ADFG
Percent of all Households; All Subsistence Resources	ADFG
Consumption per Person; Percent Using; Percent Harvesting	
Percent of all Households Harvesting	ADFG
Fish; Salmon; Land Mammals; Marine Mammals; Other Resources	
Kodiak Subsistence Sharing (%)	ADFG
Harvesting; Receiving; Giving; Ratio: Giving/Harvesting	

## Community Factors

Variable	Source
Community Population	ADOLWD
Count; Share of Total; Rate of Growth (%)	
American Indian/Alaska Native Population Proportion	U.S. Census Bureau
Community Income	U.S. Census Bureau
Per Capita; Percent of Households with Earnings; Median Income	

**Appendix C:**

**Project Poster from Alaska Marine Science Symposium 2006**



# Social and Economic Assessment of Major Oil Spill Litigation Settlement: Analysis of Protracted Litigation and Response to "Windfall"

## INTRODUCTION

This poster summarizes the research and monitoring project titled "Social and Economic Assessment of Major Oil Spill Litigation Settlement," undertaken for the U.S. Department of Interior, Minerals Management Service, Alaska OCS Region. A longitudinal case study approach is being used to examine social and economic aspects of Exxon Valdez Oil Spill (EVOS) litigation and settlement processes and outcomes for Kodiak Island communities. Related aspects of spills elsewhere in Alaska are also being examined. Time-series data regarding economic, social, and demographic conditions have been compiled as basis for analyzing the effects of spill litigation settlement relative to other processes, including various other economic "shocks." The approach requires post-settlement data collection and monitoring. Uncertainty about the timing of appeals, remands, and ultimate settlement unavoidably affects the timing of the final analysis.

## RESEARCH GOALS

- Elucidate a largely unknown but highly significant dimension of oil spill consequences: the social and economic effects of disbursing large sums of settlement monies into small communities many years after the spill event has occurred
- Contribute to balanced decisions regarding the development and transportation of oil and gas resources in the federal waters of Alaska and elsewhere in the coastal zone of the United States

## PROJECT OBJECTIVES

- (1) Develop comprehensive baseline description of pertinent economic, social, and demographic conditions in study communities on Kodiak Island;
- (2) Develop empirical case studies assessing: (a) socioeconomic and demographic effects of liquidating EVOS Land Trust holdings in Akhiok, (b) social processes associated with damage claims among fishery participants & subsistence practitioners on Unalaska Island following the *Selendang Ayu* oil spill;
- (3) Return to Kodiak Island study communities following ultimate settlement and distribution of EVOS settlement award monies to assess the social, economic, and demographic effects of that process per the research hypotheses;
- (4) Generate national policy recommendations for addressing the broad range of human effects that can result from protracted litigation and prospective settlement associated with spills along the coastal zone of the United States.

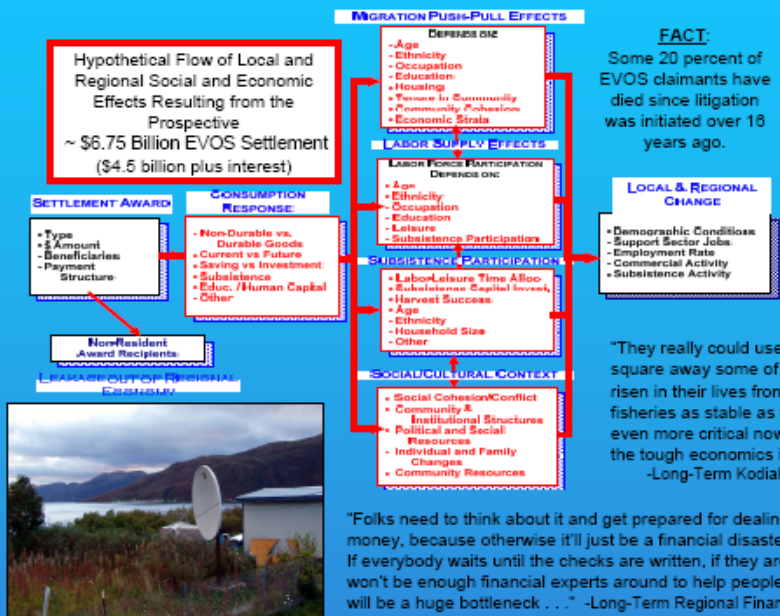
## 2006 Alaska Marine Sciences Symposium Poster Session Edward W. Glazier, Ph.D., Impact Assessment, Inc.

### PROJECT RATIONALE

The Outer Continental Shelf Lands Act established policy for managing resources on the nation's Outer Continental Shelf (OCS), and authorizes study of marine environments that may be affected by oil and gas development. The National Environmental Policy Act (NEPA) requires that natural and social science inform major environmental policy decisions. Under these mandates, the Minerals Management Service (MMS) analyzes environmental, socioeconomic, and socio-cultural information relevant to OCS-related decisions. MMS is motivated to study the effects of the Exxon Valdez Oil Spill (EVOS) settlement to gain insight into an unprecedented and complicated technological disaster process. This project will develop specific recommendations for managing potential future oil spills and related litigation procedures along the coastal zone of the U.S.

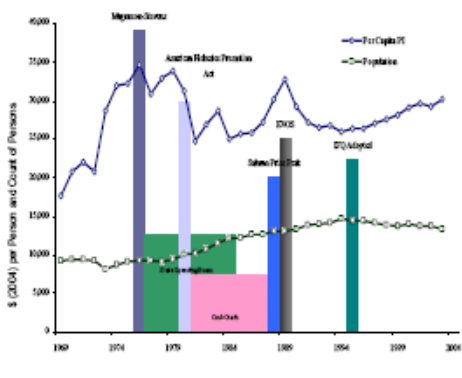
### RESEARCH HYPOTHESES

- **Overarching Research Hypothesis:** Spill restoration and settlement monies will amplify social, economic, and demographic trends at household, community, and regional levels of analysis.
- **Socio-Demographic Hypothesis:** Large settlement awards will lead to a significant degree of emigration from the study communities.
- **Fisheries-Specific Hypothesis:** Increase in non-earned income resulting from settlement awards will reduce participation in commercial fisheries in the study communities and in the Kodiak region generally.
- **Subsistence Practices Hypothesis:** Relatively significant settlement awards will increase participation in subsistence activities and harvest success, with associated increases in related cultural activities.
- **Economic Hypothesis:** The size and structure of the award, and socioeconomic and demographic attributes of award recipients will influence consumption and savings behaviors.
- **Social-Organizational Hypothesis:** Spill-related litigation or claims processes will lead to new socio-political challenges: (a) between fisheries participants in the study regions; (b) within/across Native corporations; and (c) between residents and groups of residents in Larsen Bay, Akhiok, and Dutch Harbor/Unalaska.



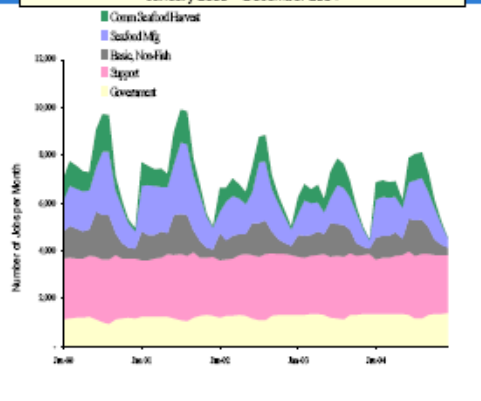
## Examples of Indicators being Used for Monitoring Changes Associated with the Prospective EVOS Settlement

Kodiak Island Borough Population and Per Capita Personal Income with Key Institutional and Environmental Milestones (Per Capita Income in Constant 2004 Dollars)



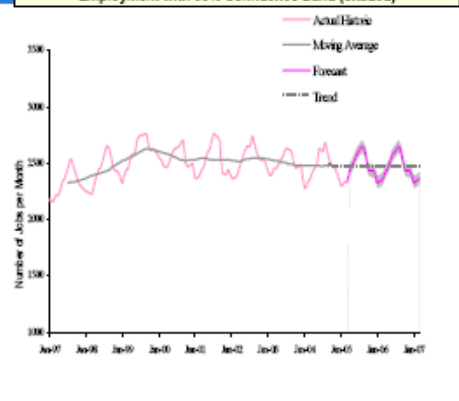
Source: US Dept of Commerce, Bureau of Economic Analysis

Monthly Employment by Major Sector, Kodiak Island Borough January 2000 - December 2004



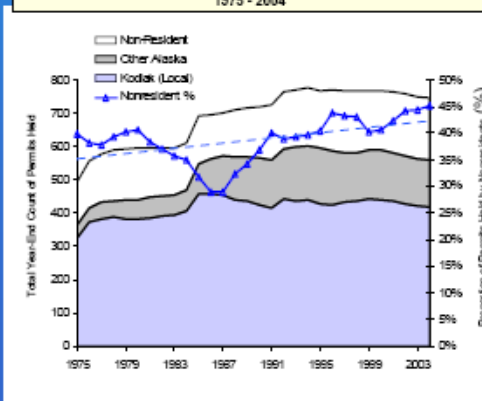
Alaska Dept of Labor and Workforce Development and ADF&G

Forecast of Kodiak Island Borough Monthly Support-Sector Employment with 95% Confidence Band (shaded)



Alaska Dept of Labor and Workforce Development and Impact Assessment, Inc.

Kodiak Fisheries Limited Entry Permit Ownership by Resident Type 1975 - 2004



Alaska Commercial Fisheries Entry Commission