FINAL REPORT

Economic, Social, and Psychological Impact Assessment of the Exxon Valdez Oil Spill

Prepared for:

Oiled Mayors Subcommittee
Alaska Conference of Mayors

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LIST OF ACRONYMS

AANHS	Alaska Area Native Health Service
ACFEL	Alaska Commercial Fisheries Entry Commission
ADCED	Alaska Department of Commerce and Economic Development
ADOL	Alaska Department of Labor
AFDC	Aid for Families with Dependent Children
ASAP	Alcohol Safety Action Program
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CES-D	Center for Epidemiological Studies Depression Scale
CHA	Community Health Aide
CHR	Community Health Representative
DSM-IIIR	Diagnostic and Statistical Manual of Mental Disorders, Version III-R
ESC	Emergency Services Council
FY	Fiscal Year
GAD	Generalized Anxiety Disorder
IAI	Impact Assessment, Inc.
IPHC	International Pacific Halibut Commission
KPB	Kenai Peninsula Borough
MAC	Multi-Agency Coordinating group
NGC	North Gulf Coast
PTSD	Post-Traumatic Stress Disorder
SLAC	Seward Life Action Council
VPSO	Village Public Safety Officer

SUMMARY

The wreck of the *Exxon Valdez* caused human as well as environmental damages, including harm to individuals, families, businesses, and local governments. In response to these damages to local populations, a study was initiated by the "Oiled Mayors," a subcommittee of the Alaska Conference of Mayors composed of Tribal Leaders and mayors of spill-affected communities. The study was to identify the economic, social, and psychological impacts from the wreck of the *Exxon Valdez*. This final report is a summary of the principal findings of this study, including recommendations to remedy some of the problems identified.

The study was conducted in 22 communities affected by the oil spill and cleanup. The study was designed to accomplish three specific tasks:

- Assessment of fiscal and operations impacts to local governments.
- Assessment of private sector economic impacts.
- Assessment of social and psychological impacts.

In all spill-affected communities included in the study, the assessment of fiscal and operations impacts to local governments was accomplished by interviews with key administrative and management staff about fiscal and operations impacts. Additionally, the fiscal records of communities were examined to extract the categories of fiscal impacts incurred by local governments. Private sector business impacts were assessed by a mail survey to 7,031 businesses in the spill-affected region. About 1,300 of these questionnaires were returned and analyzed for (1) participation in the cleanup; (2) business performance; pre- and post-spill business plans; and, (4) gains and losses resulting from the spill. Social and psychological impacts were assessed with three different methodologies. First, interviews were conducted with providers of social and mental health services and local leaders about the types of impacts experienced in each community. Second, archival data regarding public safety issues and the delivery of social and mental health services were examined. Third, a household survey was conducted with 596 individuals in 11 spill-affected and two "non-affected" communities (Petersburg and Angoon).

The report focuses on a qualitative assessment of impacts, analyzing relationships between exposure to the oil spill and cleanup and economic, social, and psychological impacts. The study identified two sources of impacts: (1) direct impacts from the spilled oil and (2) impacts from Exxon's privatized cleanup. In addition to short- and long-term economic losses by individuals, businesses, and local governments, the study identified three basic types of impacts experienced by spill-affected communities:

- Fundamental disruptions of usual ways of living, including the experience of personal health and well-being.

- Experiences of the loss of personal and community control over the daily events of living and doing business.

- A displacement of usual and expected actions, plans, and resources for responding to the demands of the oil spill and cleanup.

These three categories of impacts were common to all spill-affected communities, although there was variation in the specific types of impacts within these categories.

SOCIAL AND PSYCHOLOGICAL IMPACTS

Findings from this study indicate social and psychological impacts are associated with exposure to the oil spill and cleanup. Damages to individuals and damages to communities through social impacts are each individually damaging. However, the cooccurrence of these damages is especially harmful for at least two reasons. First, individuals rely upon community-based support systems for recovery from personal distress. Any harm to these social support systems thus impedes individual recovery. Second, damage to the ties that bind people together impedes cooperative action for the protection and safety of an entire town or village. The simultaneous damage to individuals and communities is important because it results in economic, social, and quality-of-life costs to the spill-affected communities.

Psychological Impacts

Findings from this study indicate psychological impacts are associated with exposure to the oil spill and cleanup. Several specific spill-associated psychological impacts were identified:

- Increases in the occurrence of the psychiatric disorders of depression, general anxiety disorder (GAD), and a condition known as Post-Traumatic Stress Disorder (PTSD). For example, in relationship to non-affected communities, spill-affected communities experienced:

  - A 90% increase in post-spill GAD.

  - A 99% increase in post-spill PTSD.

  - A 90% increase in post-spill depression.

- Increases in the occurrence of substance abuse and domestic violence. For example, in comparison to the nonaffected communities, spill-affected communities experienced:
  - 11.4 times more drinking.
  - 7.4 times more drug use.
  - 11.6 times more domestic violence.
- Measures of pre- and post-spill health status, which can be used as indicators of overall psychological well-being indicate:
  - The greater the exposure to the spill and cleanup efforts, the worse the perceived health status,
  - The greater the exposure to the spill and cleanup efforts, the greater the number of physical conditions verified by a physician.
- These findings are interpreted to mean that the more individuals and communities were exposed to the spill and cleanup, the more likely they were to have physical health problems and, by inference, psychological problems that had physical consequences.

Although there was an increase in mental health problems in all communities, these problems were especially prominent in Native communities. Also, with the occurrence of these conditions, community services to respond to these problems decreased. Among the reasons for the decreased availability of these services are:

- Persons already using existing mental health services used more of these services after the spill.
- The use of mental health services by new clients increased after the oil spill.
- Services in Native communities were decreased because persons usually delivering health and counseling services took cleanup-related employment.

Social Impacts

Household surveys and other interview data indicate that associated with the oil spill and cleanup is disruption of social integration with adverse consequences for social support within the affected communities. These impacts are especially severe in Native communities. Among the most important impacts contributing to the fragmentation of communities are:

Spill-Related Social Conflict

- 24% of household survey respondents said they knew of instances of conflict among friends in their communities,
- 40% of some Native communities reported cases of friendships ending over cleanup issues.
- 25% of the respondents reported arguments with others over the spill.
- Interview data indicate that friendship and family ties were damaged by spill-related conflicts.

Spill-Related Disruptions of Social Routines

- 20% to 40% of those interviewed indicated less time spent visiting with friends.
- 42% reduction among cleanup workers in their social visits with friends, compared to a 19% reduction for those who didn't.
- 70% decreased social visitation within some Native communities affected by the spill.
- 38% of those participating in cleanup activities reported reduced participation in community celebrations, compared to 12% of respondents who did not work on cleanup.
- 28% of those participating in cleanup activities reported reduced participation in religious activities, compared to 6% of respondents who did not work on the cleanup.

Disruptions of Household Relationships

- In most communities 15% to 30% of the households reported decreases in time spent associating with other community members. In some Native communities with high rates of cleanup involvement, 45% to 65% reported such decreases.

- 45% of those who worked on the cleanup reported less time spent with other household members, compared to 16% of those who did not work on the spill.

- Children in spill-affected communities reported instances of separation anxiety, and in all but two communities, more than 50% of the parents reported their children exhibited separation anxiety. Summed for the entire sample of parents in the household survey, 73% indicated that their children did not like being left alone, a phenomenon they attributed to the effects of the spill and cleanup.

- 79% of all parents reported that they did not get along with their children as well as they did before the spill.

- Interview data indicate that behavioral problems and other indicators of stress were present among children in the spill-affected communities.

Subsistence Impacts

Subsistence is a core cultural institution in Native communities. Damage to subsistence resources and to the meaningful activities that are part of this core institution thus damages the whole culture. The significance of this point cannot be overstated because embedded in the activities of hunting, fishing, and gathering is a way of life, a set of values, a way of seeing the world that values bears, salmon, eagles, and water as spiritual and social as well as economic resources. Threats to the resources and activities that are so fundamentally embedded within Native culture thus threaten that very culture itself and the meaning it gives to daily life. Recognition of this perspective is essential to understanding the significance of damages to subsistence resources and activities: It means that restoration of Native communities requires solving the economic problems related to subsistence damages *and* providing resources to treat the psychological damages, social disruptions, and fears of cultural disintegration related to the oil spill and cleanup. Without addressing the harm and hurt Native people experienced, the responsible parties are only worsening the blow to one of the core cultural institutions in Alaska Native culture.

- 35% of those interviewed said that the spill directly affected subsistence.
- 42% of those interviewed reported decreased time spent in hunting, fishing, and gathering activities.
- 35% indicated a decrease in time spent in joint subsistence activities with people from other households.
- 35% reported reductions in the amount of subsistence food shared with other households.
- 33% indicated a reduction in the amount of food available for sharing with elders.
- 30% indicated that they received reduced amounts of subsistence foods from other families since the spill.
- Interview data indicate that the disruption of subsistence activities is especially harmful to elders.
- Interview data indicate persisting concern about the health effects of eating contaminated wild foods.

Risk Perceptions

- 74.1% of those interviewed felt that the effects are permanent, or at least would be present for the rest of their lives.
- 50% of those interviewed said that the spill would still be having negative effects on their families in five years.

Recommendations Regarding Social and Psychological Impacts

Several types of recommendations are proposed: Increase mental health services; increase primary care services; increase economic assistance to spill-affected communities; increase contingency planning; increase dissemination capabilities; community involvement in disaster planning; and additional research regarding the long- and short-term social and psychological impacts.

IMPACTS TO LOCAL GOVERNMENTS

Two different types of impacts to local governments are summarized in this report: operations and fiscal impacts. Operations impacts refer to the disruption and displacement of the usual business local government. Methodological considerations limited the fiscal impact analysis to a qualitative assessment of the short-term impacts of the oil spill and cleanup.

Operations Impacts

Operations impacts to local governments were of three general types:

- Constraints on effective functioning.
- Changes in political context.
- Interactions with extra-community institutions.

Communities were faced with constraints on effective governmental functioning and provision of basic services as a result of the oil spill and cleanup. Effective functioning was constrained by (1) the excessive demands of responding to the oil spill and cleanup that displaced the usual business of government; (2) communication problems between local governments and Exxon, their community constituents, and state and federal agencies; (3) ethnic factors in the determination of how community leaders interacted with Exxon and VECO officials. The political context was altered by (1) factionalism within communities resulting from spill-related conflicts and (2) the emergence of new groups and political alliances resulting from spill-related issues. Interactions with extracommunity groups and institutions and groups such as Exxon and VECO resulted in communities feeling as if they lost control over the ability to run their governments and respond effectively to the oil spill. The privatized cleanup undermined the ability of local governments to contribute expertise, acquire and allocate resources, and otherwise effectively respond to the spill and cleanup. Extracommunity groups and agencies gave differential treatment to the affected communities. The response of Native communities was particularly affected by this differential treatment.

Fiscal Impacts

Fiscal impacts to local governments were of two basic types: expenditure and revenue impacts. Among the most important findings regarding revenue and expenditure impacts are:

- Billings to Exxon are a poor indicator of the overall costs to local government of the spill and cleanup because Exxon specified what it would and would not accept as a legitimate billing. Consequently, requests for reimbursement were often only for what communities knew they would receive and not their actual costs.

- Fiscal impacts were differentially distributed among the communities according to variations in preexisting revenues and expenditure patterns.

- Local governments were not reimbursed for many costs associated with the *Exxon Valdez* oil spill and cleanup.

- Fiscal impacts from the oil spill are still occurring. Given the patterns of revenue and expenditures among the affected communities, fiscal impacts will continue for several years.

- Restoration of local governments to where they were before the spill in addition to reimbursement for expenses incurred is a priority for full fiscal recovery from the spill and cleanup.

PRIVATE SECTOR ECONOMIC IMPACTS

A mail survey was completed by approximately 1,400 out of 7,031 private businesses targeted in the North Gulf Coast (NGC) region to assess the following information about impacts to local businesses:

- A qualitative assessment of the direct and indirect gains and losses related to the spill and cleanup.

- Determination of how these gains and losses were distributed across industry sectors and communities.

- Determination of the extent and magnitude of cleanup involvement and spill-induced shifts in business planning and capital investment.

Analysis of the data from the surveys was conducted using an export-base model which characterizes the economy of the region into "basic" and "support" sectors. Using this model, economic impacts were assessed by analyzing, among other things, the ratio of changes in employment between the two different sectors. Findings from the survey fell into the following categories:

- Industry composition of respondents.
- Direct participation in the spill cleanup.
- Overall business performance.
- Changes in business plans.
- Business gains and losses.

Industry Composition

The businesses which responded to the mail survey were distributed evenly across major industry sectors and across communities in the region. Within the basic sector, respondents came from primarily the commercial fishing, fish processing, tourism, and oil spill-related industries. The major businesses represented in the support sector include manufacturing, construction, transportation, utilities, trade, finance, insurance, real estate, and services.

Direct Participation in the Spill Cleanup

In response to questions in the survey about type of participation in the cleanup, the following findings were salient:

- The highest incidence of cleanup participation was among commercial fishermen, tourism, and service businesses.

- Contracting services, such as leasing and operating vessels, constituted the highest proportion of total respondent participation in the spill cleanup.

- Overall, 38% of NGC businesses participated in the oil spill response and cleanup activities.

- Valdez businesses registered the highest participation rates (62%). Soldotna businesses registered the lowest at 15%.

- As a group, commercial fishermen exhibited the highest incidence of spill cleanup participation (55%) compared with other industry sectors.

Overall Business Performance

The primary variables determining overall business performance following the oil spill were industry type and whether or not the business participated in the cleanup. Overall business performance for those businesses surveyed, is summarized in the following statements:

- Gross business income (i.e., total revenue) for all respondents collectively declined 5% from 1988 to 1989 despite gains of about 13% attributable to 1989 oil spill cleanup earnings.

- Support sector firms were the only industry category to show an income gain from 1988 to 1989.

- Firms that did not participate in the 1989 spill cleanup earned significantly more in 1988 than those that did participate.

- Firms that did not participate in the cleanup exhibited lower income levels in 1989 than those that did participate.

Changes in Business Plans

The business survey contained questions regarding business managers' plans to change business operations with respect to purchasing and selling equipment or property, capital investment, employment, and other aspects of strategic planning. The findings in this area are complex but, in summary, they show that businesses that participated in the spill cleanup accounted for most of the business net capital investment during 1989. Businesses that did not participate in the oil spill cleanup *sold* more assets than they purchased. Regardless of the degree of cleanup participation among business firms, the value of planned investment in business property and equipment over the medium-term was significantly reduced after the spill as compared to pre-spill levels of planned investment.

Business Gains and Losses

Findings in this area indicate that losses exceeded gains in all three categories assessed (profit, property, equipment) regardless of the respondents industry type and spill cleanup involvement. Total region-wide losses arising from the oil spill, the overwhelming majority of which are accounted for by losses of business profits, exceed spill-induced gains by a three-to-one margin.

PREPAREDNESS

Community-level preparedness for any future disasters, including another oil spill, requires attention to some specific "lessons learned" from the *Exxon Valdez* oil spill. Among the most important lessons learned are the needs for:

- A complete understanding of the risk factors of communities exposed to high-volume oil tanker traffic.

- Community-based response structures and an awareness of how these local structures integrate with other state, federal, or private structures. Communities should be aware of Incident Command Systems and Multi-Agency Coordinating groups as models of response structures.

- Community-level response plans that clarify lines of authority and decision-making responsibility. The best working response plans were those that were practiced regularly.

- Included in response planning should be an awareness of (1) what resources are useful; (2) the location of those resources; (3) how to access those resources; and (4) have the ability to access those resources.

- Given the legal and economic environment in which disasters occur, data systems should be in place that can document the personnel, operations, capital, opportunity, and other costs of response efforts.

- Develop a communication and rumor control system for keeping the public and all concerned parties informed about the progress of the disaster.

- Legislation and advocacy efforts should be implemented that recognize the need to prepare socioeconomic impacts, including recognizing the costs of responding to social, psychological, and economic impacts.

1.0 THE EXXON VALDEZ AS HUMAN DISASTER: THE PURPOSE OF THE STUDY AND ORGANIZATION OF THE REPORT

1.1 The Exxon Valdez Oil Spill Was a Human as well as an Environmental Disaster

The oil spilled from the wrecked *Exxon Valdez* harmed the lives of many Alaskans just as surely it as blackened beaches, suffocated seabirds and sank sea otters to the bottom of the ocean. Because of the oil spill and cleanup, fishermen did not fish and subsistence hunters did not hunt. Some businesses lost money while others gained large profits. Friends and neighbors sometimes were set against one another over inequities in opportunities and money lost and gained in the cleanup effort. Parents and children argued and fought. Uncertainty about the present and the future upset individuals and families. Some people became angry. Others were depressed. As a result of such tensions, the basic social fabric of some communities started to unravel. With such spill-related impacts happening in cities and villages from Valdez to Akhiok, the attention and resources of the spiller as well as federal and state governments focused almost exclusively on environmental impacts. Damages to local populations were unacknowledged or ignored. However, citizens and community leaders in the impacted communities could not ignore the economic losses, social disruptions, and personal distress that were happening because of the spill and cleanup. They also realized that these socioeconomic and psychological impacts have real monetary and social costs for their communities. In response to these damages to local populations, a study was initiated by the "Oiled Mayors," a subcommittee of the Alaska Conference of Mayors composed of Tribal Leaders and mayors of spill-affected communities. The study was to identify the economic, social, and psychological impacts from the oil spill and cleanup. This final report is a summary of the principal findings of this study. It also includes recommendations to remedy some of the problems identified.

The message that pervades this report is that the *Exxon Valdez* oil spill and cleanup hurt people as well as the environment. However, the damage to individuals, families, and communities has not received the attention or resources needed to do something about the resulting socioeconomic and psychological damages. Despite the expenditure by Exxon and its contractors of billions of dollars, there were important economic, social, and psychological effects from the spill and cleanup that were not addressed by the monies spent. In fact, this report argues that because of how the cleanup was organized and because of how the money was spent, the socioeconomic and psychological damages to the communities were worsened. The socioeconomic and psychological effects of the spill and cleanup are not over. This is the message that needs to be heard repeatedly by the spiller and by the agencies that have ignored the human impacts resulting from the *Exxon Valdez* event: *the effects of the spill are ongoing and the books are not closed on the damages experienced by the affected communities.*

1.2 The Importance of Human Impacts

Human impacts from the *Exxon Valdez* oil spill and cleanup are important because they have monetary and quality-of-life costs that adversely affect the present and future of the impacted communities. Among the prominent types of costs and quality-of-life issues are:

- Direct monetary costs from damages to resources that are integral to the economies because they support individuals, businesses, and governments in the affected communities.

- Long-term monetary costs from alterations to local economies resulting from how the oil spill and cleanup changed the structure and performance of business practices and planning in the affected region.

- Direct monetary costs from psychological impacts that result in lost productivity and increased costs for social and mental health programs to respond to the damages incurred (e.g., adding additional staff, creating new programs).

- Long-term monetary costs that result in the worsening of problems that go untreated or unaddressed and thus require more complex and intensive treatment. For example, anxiety or depression that goes untreated can result in physical health problems that require medical assistance and their accompanying costs; psychological interventions for long-term problems can require hospitalization or more specialized treatment; or in the worse case, an untreated psychological problem can result in suicide.

- Social impacts damage community-based social support networks resulting in increased mental health costs and medical care costs.

- Damage to the perceived quality of life can result in direct monetary costs from out-migration, decisions by businesses and individuals not to locate to an impacted community, and other monetary losses that result from value changes related to a altered social environment.

- Social damages can spawn new political activities, new political awareness, and a new regulatory environment that alters how individuals live their lives, businesses pursue profits, and government functions vis-a-vis its corporate and individual citizens.

These kinds of issues interact with one another, but they are experienced by individuals in the affected communities as part of a total event. For example, what happens to water fouled by oil can affect a person's business and this can affect his or her mental health, family life, and social relations just as surely as it affects profits and losses.

In one sense human impacts are important because they represent lost opportunities for individuals, families, businesses, and communities. They have caused the redirection of human, fiscal, and material resources away from individual and community development and betterment. Rather than the normal processes of social change and community development, resources have been focused on recovering from the negative effects of the spill and cleanup. While the social and psychological impacts of the spill cannot be as easily quantified as the costs to businesses and governments, they are equally real and no less important, especially to the people whose lives have been changed as a result. As this study clearly shows, many residents were deeply distressed by the effects of the spill and the social disruptions of the cleanup. Although individuals sometimes made large sums of money overall, the billions of dollars made and spent on the spill and cleanup did not make things better. The combined effects of the spill and cleanup intruded into most aspects of people's lives: their psychological well-being, family, and marital relations; interactions with neighbors and coworkers; their job satisfaction; their personal and business plans for the future; and their attachment to their community and to the state of Alaska. A fundamental tragedy of the spill is that life in these communities will never be the same.

1.3 The Organization of the Study

In August 1989 the city of Kodiak, representing the "Oiled Mayors," issued a Request for Proposals to study the economic, social, and psychological impacts from the *Exxon Valdez* oil spill. This study was funded with grant monies from the Alaska Department of Community and Regional Affairs. After award of the contract to Impact Assessment, Incorporated, the study began in late November 1989 with a completion date of September 1990. The study specified that 22 communities were to be included in the study. The following communities, and their pre-spill populations, were included in the study:

Kodiak	6,774	Chignik Bay	128	Port Graham	195
Akhiok	93	Chignik Lagoon	55	English Bay	200
Karluk	82	Chignik Lake	170	Valdez	3,313
Larsen Bay	149	Kenai	6,543	Cordova	2,048
Old Harbor	322	Soldotna	3,668	Whittier	206
Ouzinkie	204	Seward	2,400	Chenega Bay	84
Port Lions	300	Homer	4,338	Tatitlek	120
		Seldovia	565		

These communities comprise about 32,000 persons of the approximately 65,000 persons living in the regions most directly affected by the oil spill. Hereafter, we will refer to this group of cities and villages as North Gulf Coast (NGC) communities.

The study was designed to accomplish three specific tasks:

- Assessment of social and psychological impacts.
- Assessment of fiscal and operations impacts to local governments.
- Assessment of private sector economic impacts.

To accomplish these tasks, the study was organized to assess the wreck of the *Exxon Valdez* as a type of technological disaster with unique characteristics and to establish the needs of the affected communities for immediate information.

1.3.1 Characteristics of the Exxon Valdez Oil Spill as Technological Disaster

Technological disasters (i.e., disastrous events resulting from human and/or technological failure) have some predictable characteristics. These characteristics guided the present assessment of economic, social, and psychological impacts. Preliminary information about the oil spill indicated that this event had unique elements that resulted in specific types of impacts. Among the most obvious of these unique characteristics is that the wreck of the *Exxon Valdez* resulted in three distinct but interrelated disasters:

- The environmental disaster that resulted in the contamination of large areas of one of the most scenic and productive maritime regions in the world.

- The human disaster from the direct effects of the oil spill on people and their families, traditions, businesses, and communities.

- The disaster created by the cleanup of the oil spill and the social, cultural, and psychological disruptions that it caused.

Collectively, these three disasters disrupted the lives of individuals, families, and communities in very real ways. In formulating an assessment of impacts we focused on the interaction among these three disasters and specifically upon the direct impacts from the spill and the response-generated impacts. The response-generated impacts are those resulting from Exxon's expenditure of billions of dollars in organizing a privatized cleanup. As we will show in this report, these are among the most damaging and hence unique

characteristics of this event: a billion-dollar cleanup harmed many of the affected communities much more than it helped them.

In addressing the study tasks, we examined the *Exxon Valdez* oil spill as a type of technological disaster similar to the accident at the Three Mile Island nuclear power plant and the leakage of toxic gas in Bhopal, India. Scientific knowledge about technological disasters suggests some predictable outcomes of such events, including:

- Persistent uncertainty about the environmental, health, social, and economic effects of the event. Increased social and psychological distress accompanies prolonged uncertainty about event consequences.

- Different explanations about the cause, course, and cure of the effects of the toxic substance create contradictory assumptions about the risks and outcomes of the event. Such different constructions of the event create social conflict.

- Threats of the recurrence of the event lead to social, political, legal, and regulatory responses by affected individuals, communities, and governments.

- These events produce psychological symptoms. In comparison to natural disasters such as hurricanes and earthquakes, the psychological effects of technological disasters are more severe and longer lasting.

- The psychological stress experienced by individuals not only persists for long periods of time, but the symptoms may not appear until well after the event has occurred.

- The greater the scope and duration of the event, the more severe are the social and psychological effects.

These and other characteristics of technological disasters suggest that there are different types of social and psychological as well as economic damages.

1.3.2 The Structure of the Study Was Dictated by Needs for Immediate Information

To meet needs within the affected communities for timely information about spill-related impacts, the study implemented an assessment of economic impacts to private businesses and fiscal and operations impacts to local governments almost immediately. However, this timely implementation of the study also resulted in some restrictions on how the work was to be conducted. First, the assessment of fiscal and economic impacts was limited to 1989,

although it was recognized that impacts might occur in 1990 and beyond. Second, the research was to be conducted as a point-in-time study (i.e., cross-sectional) rather than over several points in time (longitudinal study) to identify some of the more immediate consequences of the spill and to set the stage for additional work to identify the full range of impacts from the event. The present study does not claim to define the full range of impacts since other research strategies and techniques are needed over a longer period of time to fully document the consequences from the oil spill and cleanup. However, this study demonstrates that there are important socioeconomic and psychological consequences and that such impacts are widespread. Further study is needed to fully understand how long these impacts will persist and if they will diminish or increase over time.

The study is based on several different types of data. Social and psychological impacts were assessed by interviews with providers of social and psychological services, interviews with knowledgeable informants in the affected communities, and by a survey of about 596 individuals in 11 affected and two non-affected communities (Petersburg and Angoon). Impacts to municipalities and tribal governments were assessed by interviews with officials (e.g., city managers, mayors, department heads, tribal council staffs) about impacts to departmental operations (e.g., port, harbor, public works, and administration) and any additional costs related to changes in these operations. Additionally, fiscal impacts were assessed by examination of revenue and expenditure records for 1989 and three years prior to the spill. Private sector economic impacts were assessed by analysis of about 1,400 responses to a survey mailed to 7,031 businesses in the affected communities and by examination of secondary data from state and federal sources.

1.4 Purpose and Organization of the Report

The basic purpose of this report is to present findings about the economic, social, and psychological effects of the *Exxon Valdez* oil spill and cleanup for use by communities and local officials. The findings presented in this report focus on ongoing impacts that need to be mitigated and impacts for which action plans need to be constructed to prepare for any future disasters. To achieve this purpose the report (1) summarizes the analysis of survey, interview, archival, and observational data about the economic, social, and psychological effects of the oil spill and cleanup; and (2) presents recommendations about areas of impact that need attention by communities, state and federal agencies, and other responsible parties. Generally, the recommendations offered specify the types of problems to be solved rather than the mechanisms that are needed to solve them. Specification of mechanisms is a complex area that requires its own planning and development process.

The impacts and consequences of the oil spill and cleanup presented here are condensed from interviews, observations, and surveys done for this study. We do not present the actual

data in this report, in favor of summarizing the impacts as indicated by the data. This condensing of information combines the experience of numerous communities to specify impacts and what caused them. The specific types of impacts experienced varies across the affected communities, but whatever the variation all *the affected communities share a fundamental disruption of usual ways of living and the displacement of resources, actions, and plans with the demands of responding to the oil spill.* In short, the oil spill and cleanup came to dominate life in the affected communities and the demands of responding to the event changed how people live their lives, often with negative consequences.

There are four sections that follow this introduction. Section 2 is an overview of social and psychological impacts, including recommendations to address ongoing impacts. Section 3 presents an overview of operational and fiscal impacts to local governments. Section 4 is a qualitative discussion of short-term impacts to private businesses in the affected region. Section 5 is an overview of issues regarding preparedness for any future disaster events that rural Alaskan communities might experience. This discussion is based on the experiences of the affected communities and the lessons learned from the *Exxon Valdez* oil spill.

1.5 Definitions of Impacts

For purposes of this report it is useful to have some abbreviated working definitions as a guide to the reader regarding the meaning and characteristics of economic, social, and psychological impacts.

Economic impacts are those dollar losses and gains experienced by individuals, businesses, and governments; *and* those alterations of business plans and economic opportunities that resulted from the oil spill and cleanup. Dollar losses and gains are among the most straightforward impacts to understand, although the calculation of these losses and gains is a complex process.

As we use the term in this report, a *social impact* is one that disrupts or interferes with the usual patterns of interactions and meanings attributed to individual and group activity. This definition presupposes that the actual state of a community system is changed as a result of exposure to an external event. Specifically, there are changes in the meanings attributed to patterns of individual and group experiences. For example, animosities that develop between individuals or communities because of how cleanup resources were distributed may change patterns of friendship, association, work groups, and cooperation that temporarily or permanently alter power alignments, consumer behavior, cooperation, and other such interaction patterns within communities. Or, after being paid wages of $16.69 per hour for cleanup employment, an individual's assessment of the value of his or her labor may be reevaluated and result in altered employment expectations and work-seeking behaviors. In

this case, the meaning that an individual attributes to the value of his or her labor has changed. Implied in this definition and in these examples are several characteristics of social impacts that are both explicit and implicit in the presentation of material in this report:

- A social impact results in changes that are directly related to or induced by a specific event such as the *Exxon Valdez* oil spill.
- The structure, that is, the types or relationships among groups (e.g., power relationships) and other social elements (e.g., roles and statuses) can change.
- Structural changes can affect the ability of communities to recover from a disaster or to restore the system to its predisaster state.
- Alterations of meanings related to an event may be significant sources of change.
- Alterations in the continuity of individual and group experience are directly related to the exposure event.
- Impacts can have either positive or negative valences; that is, they can be understood as beneficial or harmful.

A *psychological impact* is a change in the usual state of an individual's cognitive and/or emotional functioning that is directly related to or induced by an event such as the *Exxon Valdez* oil spill. In this report the discussion focuses on the stress that individuals, households, and communities experience, as well as the cognitive, emotional, or behavioral changes that are directly related to the oil spill and cleanup. Specifically, the study addresses three types of psychological distress:

- Psychopathology directly or indirectly related to the oil spill; e.g., the experience of depression related to the event.
- Personal changes directly related to the event, but which do not result in psychopathology; e.g., feelings of anger, frustration, fear, etc.
- Adverse behavioral changes directly related to the oil spill and cleanup; e.g., increased substance abuse, domestic violence, or criminal behavior.

These working definitions of economic, social, and psychological impacts guide this presentation of information about how communities are affected by the oil spill and cleanup. The definitions are purposefully broad to incorporate a range of individual and group experiences among the communities exposed to the oil spill and its cleanup. Importantly, these definitions also emphasize direct or induced relationships to an external event such as the oil spill. Although such broad definitions raise questions about the degree and significance of impacts (e.g., How much of a change does it take to make an important impact?), these issues are addressed by generally relying upon the informants' definitions of what is large or small and what is or is not significant.

2.0 AN OVERVIEW OF SOCIAL AND PSYCHOLOGICAL IMPACTS

2.1 Individuals and Communities Were Harmed by the Oil Spill and Cleanup

Damages to individuals as well as the social ties that bind persons and families into communities are significant outcomes of the *Exxon Valdez* oil spill and cleanup. This section examines these issues and their implications by discussions of the following points: why the co-occurrence of psychological and social impacts is important; the oil spill and cleanup as sources of exposure to impacts; the three basic types of social and psychological impacts resulting from the oil spill and cleanup; and, the methods used to determine these impacts. Next, psychological impacts are summarized with data that show that exposure to the oil spill and cleanup is related to the increased occurrence of depression, anxiety, a stress-related condition known as post-traumatic stress disorder, increased substance abuse, increased domestic violence, and changes in health status. Then, social impacts are summarized with data that show event-related disruption of the ties that integrate communities, increased conflict within communities, disruption of usual household patterns and relationships, distress among children, and damage to subsistence harvesting, a core cultural institution that integrates and sustains many Native communities. This section closes with recommendations about increased attention to mental health issues; primary health care in all communities, but especially Native communities; economic assistance for social and psychological impacts; contingency planning for social and psychological impacts; communication and community involvement in disasters; and, the need for additional research about social and psychological conditions in the impacted communities.

The *Exxon Valdez* oil spill and cleanup resulted in simultaneous harm to the psychological well-being of individuals and to the community ties that usually bring people together in times of adversity. The co-occurrence of these damages is especially harmful for at least two reasons. First, individuals rely upon community-based support systems for recovery from personal distress. Any harm to these social support systems thus impedes individual recovery. Second, damage to the ties that bind people together impedes cooperative action for the protection and safety of an entire town or village. Kai Erickson, a researcher of social and psychological effects from the Buffalo Creek flood, observed about situations where there is trauma to both individuals and the ties that connect them:

> When survivors suffer from loss of community as well as from individual shock, it is not just a question of getting them back on their feet but of seeing to it that there is some kind of communal ground, as it were, for them to stand on once they are upright. We can dress their physical wounds, provide good and shelter and clothing, console them for their losses, ease their grief, find ways to calm their anxieties. But until we restore the communal

> surroundings that was so vital to their sense of health and security, they will remain like refugees in their own land, damaged in spirit long after they have been put together again in body, and feeling a long way from home (Shkilnyk 1985, xvii).

Some communities and individuals affected by the *Exxon Valdez* oil spill and cleanup remain "a long way from home." This report stresses that the local community is a significant part of the recovery environment for the individuals, families, and households that were impacted by the spill and cleanup. To the extent that the events following the spill disrupted that recovery environment, individuals and families will experience a continuation of disaster-related stress, and their recovery will be inhibited. The rate of recovery for households will vary depending on the levels of impact experienced and on their available social, psychological, and economic coping resources. The differential rates of recovery of households can be one factor in slowing overall community recovery.

Data from this study show that in every study community there were reports of individuals experiencing anger, demoralization, depression, anxiety, fear, uncertainty, and other psychological effects from the spill and cleanup. Also, there are data to show that in most communities the connections that tie people together into a community were harmed. The following comments from residents in the affected communities reflect this damage:

> "It has drifted people apart. (It is) not the same as it was before. We used to help each other . . ."

> "The village got to be a whole family. Before . . . these people were one big family . . . but during the oil spill I noticed the village, that it's pulling away again, people started going into their own shells, and just pulling away. It was like people were mad at each other, they put a lot of stress on the workers."

> "There has been added stress within the community because of the oil spill. And this stress is in how people deal with each other. Being a small community it is already very segmented with the haves and the have-nots, or the family A versus family B syndrome, right side of the tracks versus wrong side of the tracks with families feeling like they have chips on their shoulders. And the spill has exacerbated this enormously. Who is making what money? Who is doing what job? Who is working today? Who is not working today? A lot of jealousy, and it is carried through the parents to the kids."

Assistance is needed both for individuals and communities to proceed with the ongoing process of recovery. An important type of assistance is the acknowledgement by all parties concerned that significant social and psychological impacts happened: A problem cannot be solved until it is recognized. This study demonstrates that social and psychological impacts resulted from the oil spill and cleanup. It also illustrates that there is recovery assistance for shorelines and wildlife, but very little for the people affected by the spill. For those living in the affected communities, the ecological damage was significant, but they must live every day with the social and psychological damages. As one community leader observed: "*You can deal with the dead salmon and the dead otters, but you can't deal with damage being done to the social fabric of this community.*"

Assisting communities to rebuild and helping individuals and families to recover requires recognition by the responsible parties and by political leaders that the social and psychological damages resulting from the spill and cleanup are as important as the oiled beaches and wildlife. For the present situation, as well as for any future oil spills or other such catastrophes, individuals, families, and communities need to be protected as much as the environment. The knowledge this study has produced about economic, social, and psychological impacts from the *Exxon Valdez* oil spill is a first step in identifying the types of impacts that occur and thus what kinds of protection might be required for any such future events.

2.2 Sources of Exposure to Social and Psychological Impacts from the Exxon Valdez Event

Throughout this and other sections of this report we identify two sources of "exposure" to the effects of the *Exxon Valdez* event: the oil spill itself and the privatized cleanup as executed by Exxon. The idea of exposure as used in this report is straightforward: both the oil spill and the cleanup are the sources of impacts to individuals, households, and communities. In examining these sources, we are also concerned with the *routes* or pathways from the sources to the affected individuals and communities. We are specifically concerned with economic, social, psychological, and physical routes of exposure. Both the spill *and* the cleanup as sources of exposure to impacts is significant because although we expect the spill to be a source of impacts we do not usually expect a cleanup process to be a source of predominately negative social and psychological impacts. The cleanup should be part of a recovery effort, but instead, Exxon's privatized cleanup disrupted communities, damaged social bonds, and harmed individuals. These ideas need some further brief development to set the stage for our discussion of social and psychological impacts.

The oil spilled from the wrecked *Exxon Valdez* damaged natural resources such as shorelines, otters, birds, clams, and other wildlife. A direct result of these damages was the closure of several commercial fisheries and warnings about consumption of other natural

resources used by Native communities as subsistence resources. Many communities were not exposed to the direct effects of the oil. However, a devastating characteristic of this event is that individuals or communities did not have to be directly exposed to the oil to be affected. Commercial fishing grounds and subsistence use areas outside community boundaries were oiled and such damages placed communities at risk for socioeconomic or psychological impacts from the event. Furthermore, the damage to shorelines or sites that have special cultural or personal significance was also harmful, as expressed in the following statement by a Chenega Bay elder who compared the oil spill to the 1964 earthquake:

> "All that is left of the former village is a lone school house on the hill above the beach where the community once stood. Since most of those who died (in the earthquake) were swept out to sea, the beach itself is the only memorial to their lives and the place where Chenegans return to pay their tribute to their deceased relatives. Now that beach, that memorial to our loved ones, is blackened with oil. It's as if someone picked a scab off an old wound that will not heal."

In addition to the beaches being blackened, the future also seemed black for Natives and non-Natives affected by the spilled oil. Damages from the oil spill itself created a sense of pervasive uncertainty about the present and future in most of the affected communities. Indeed, in this study this sense of uncertainty about the future was one of the most frequently mentioned personal responses to the oil spill. Individuals and families were unsure if they could fish. If they could not fish, they may not be able to make their boat and house payments. Families had to consider relocating. They wondered, how long would the effects of the spilled oil last? Would the damages last forever? Life was changed because of the direct damages from the spilled oil and people were unsure their lives and communities would ever be the same again. Not knowing what would happen in the short- and long-term created stress among many individuals and families in the affected communities. This stress, which grew out of concern about the effects of the oil spilled from the *Exxon Valdez*, gave people the feeling of personal harm and hurt.

Exposure to the effects of the spill also occurred by participating in the cleanup or social interaction with those working on the cleanup. Others were exposed because they were economically damaged by fishery closures or by the economic consequences of these closures. However, what was unique about this exposure is that some individuals made money and others did not, resulting in conflict and division within the affected communities.

The cleanup response system structured by Exxon and state and federal agencies privatized the cleanup so that Exxon paid for and controlled the execution of the response effort.

Exxon employed contractors such as VECO and NORCON to hire local residents at $16.69 per hour for cleanup work. Local boat owners were hired to aid in the cleanup at rates of anywhere from $400 to $3,000 and more per day. Exxon reports that about $2 billion was spent on the cleanup effort in 1989. However, Exxon's management did not consider local conditions or cultures in its hiring policies or in its structuring of wages for cleanup workers. Exxon imposed its own way of doing things, disregarding local knowledge and expertise. Additionally, Exxon incorporated most community-based volunteer cleanup efforts into its privatized work, often undermining the first steps towards local efforts to cope with the spill. Instead, the process of the cleanup disbanded the volunteer-helping activities within communities and substituted a paid effort controlled from outside the community. This privatized cleanup was often perceived by both those who did and did not work on the cleanup as "a public relations effort" rather than an honest attempt to stop the damage and clean up the oil.

This privatized cleanup undermined community integration. The cleanup further disrupted social cohesiveness and subverted any sense of individual and community control over the outcome of the spill. This disruption of community integration assumed many different forms, including the following:

- Social conflicts were created by hiring practices that sometimes put younger persons in charge of elders working on cleanup crews and by hiring staff away from businesses and governments.

- Social conflicts erupted over perceived differences in opportunities for cleanup employment or the acquisition of boat contracts.

- Local volunteer efforts were subverted by the privatized cleanup, thus undermining a self-determined community response to control the event.

- Community leaders were employed in the cleanup, thus creating dissonance about whether their interests were in protecting the community or making money for themselves.

- Spill employment of most able-bodied adults disrupted child care, education, and usual patterns of family interaction.

The already scarce resources that maintained these communities were thus dispersed and community-based response efforts experienced reduced effectiveness. These kind of impacts could have been minimized if existing conditions, cultures, and ways of doing business in local communities were taken into consideration in the structuring of a cleanup effort.

Instead of the cleanup aiding recovery, it impeded it with further social and psychological damages.

2.3 Types of Social and Psychological Impacts

This section describes three general types of social and psychological impacts experienced by the communities included in this study:

- Fundamental disruptions of usual ways of living, including the experience of personal health and well-being (e.g., changes in subsistence harvesting patterns and the social and cultural activities that accompany them; changes in socializing among friends; changes in consumer patterns; changes in political and social values, increased psychiatric disorders and domestic violence, changes in perceived health status, etc.).

- Experiences of the loss of personal and community control (e.g., VECO assuming control over volunteer community cleanup efforts; individual anger and frustration over the inability to fish because of the oil spill and cleanup).

- A displacement of usual and expected actions, plans, and resources for responding to the demands of the oil spill and cleanup (e.g., fishermen working on the cleanup rather than fishing; local officials locating boom rather than doing the business of local government; individuals changing plans about where to live and what they should spend money on, etc.).

NGC communities experienced unique combinations and degrees of these impacts, but whatever the differences in impacts among communities, they share the fundamental experience of disruption and displacement. Once the usual ways of valuing, planning, acting, and expecting (economically, socially, and psychologically) are disrupted and displaced, particular expressions of social and psychological consequences can result. Furthermore, these forces may spawn unpredictable outcomes: that is, a small to moderate size force that disrupts an existing community can result in major changes in how that community operates. A stable spinning top on a flat surface that is ever-so-slightly nudged and sent reeling off in unpredictable directions may serve as an analogy for this process. A small force can have a big consequence for the nature and direction of change, except that the *Exxon Valdez* oil spill was not a small force. It was a large event having major effects on the environment as well as on those communities with important economic, social, and cultural connections to that environment.

The three categories of impacts noted above had effects at three different levels. First, there were community level disruptions, including those affecting governments, businesses, and institutions such as schools. Second, there were also interpersonal disruptions such as those affecting family interaction, kin group relations, and the relationships among neighbors and friends. Lastly, there were individual impacts, disruptions that affected health and well-being. Recovery can be seen occurring at each of these levels. However, it is important to remember that recovery at one level is dependent on recovery at the other levels. For example, if a community remains divided and in conflict, interpersonal and psychological recovery may be impaired. Similarly, if a family has been disrupted by the effects of the spill, it may be more difficult for a child to recover from any psychological distress he or she has experienced. Thus, the issue of recovery is a complex and interdependent process. If a supportive recovery environment does not develop, or is undermined from cleanup-related conflict and divisiveness, then recovery at all levels could become a protracted process. Consequently, this report emphasizes the types of social and psychological impacts experienced as well as the interaction among impact types.

2.4 Methodology for Determining Social and Psychological Impacts

This assessment of social and psychological impacts is based on two different but complimentary methods. A "key person" methodology identified individuals such as social service and mental health providers, and other locally knowledgeable persons for interviews. Key persons were interviewed in all 22 study communities, resulting in over 100 interviews ranging in length from one to more than six hours. Interviews with key persons focused on types of impacts experienced, developing response efforts, and leadership roles. An in-person household survey was also administered. The survey covered the following topics (sampling, and other methodology issues in the household survey are briefly described in Appendix 1):

- Exposure to the effects of the oil spill or cleanup
- Household demographic information
- Changes in social relationships
- Changes in community integration
- Subsistence impacts

- Psychological impacts
  - Depression
  - General anxiety disorder
  - Post traumatic stress disorder
  - Health status
  - Alcohol use
  - Drug use
  - Domestic violence
- Cash income changes related to the oil spill

The household survey was administered to 596 randomly selected individuals in 11 study communities and in two non-affected (control) communities. These are listed in Table 2.1. The control communities were included for comparison with the affected communities to see if any differences in responses exist between communities exposed to the oil spill and those who are relatively unexposed (identified below as the "not-exposed" group). Those in the affected communities were further divided into two groups ("high-exposed" and "low-exposed") on the basis of their physical contact with the oil, property damage resulting from the oil spill, damage to subsistence and commercial use areas, and participation in cleanup activities.

Table 2.1
Household Survey Study Communities by Region and Affected Status

Affected				Control
Prince William Sound	**Kenai Peninsula**	**Kodiak Island**	**Alaska Peninsula**	**Southeast Alaska**
Chenega Bay Cordova Tatitlek Valdez	English Bay Seward	Akhiok Karluk Kodiak Larsen Bay	Chignik Bay	Angoon Petersburg

The combination of key person interviews and household survey data provide a rich and unparalleled look at the effects of the *Exxon Valdez* oil spill and cleanup on individuals and communities in the affected regions. The next two subsections summarize the findings regarding social and psychological impacts that became apparent from the use of these methods.

2.5 Psychological Impacts

Key person interviews and household survey data show that increased psychological distress occurred in the affected communities as a result of exposure to the oil spill and cleanup. Key person interviews with mental health professionals and other knowledgeable persons indicate that individual and family distress increased during and after the oil spill. However, professional resources to cope with these problems were operating at maximum capacity at the same time that community-based support systems were disrupted and conflicts within communities became common. The types of psychological distress and the professional response efforts to respond to this distress are the topics of this summary presentation of psychological impacts.

Much of the discussion in this section is based on household survey data. Again, for the interested reader, Appendix 1 discusses some of the sampling, statistical, and other methodological underpinnings for this section. Otherwise, we have minimized discussion of the technical aspects of the data in favor of summarizing the substance of the findings. Readers will observe that where data are reported in tables, the numbers do not always add up to the 596 individuals included in the overall sample. This is because not all individuals answered all questions and thus we only report on the number of persons in the sample that actually answered the questions.

2.5.1 Psychiatric Disorders

Three types of psychiatric disorders which are often outcomes of disasters were assessed using questionnaire instruments described in Appendix 1. These conditions are: general anxiety disorder (GAD); post-traumatic stress disorder (PTSD); and depression. Each of these is briefly described below.

General Anxiety Disorder: This is a condition that impairs individual functioning by a combination of several of the following symptom categories:

- Increased physical tension such as shakiness, restlessness, an inability to relax, and trembling.

- Increased nervous system activity such as sweating, heart pounding, diarrhea, upset stomach, lump in the throat, and other such symptoms.

- Persistent apprehension and worrying.
- Increased vigilance as indicated by difficulty in concentrating, feeling 'on the edge,' irritability, and impatience.

Post-traumatic stress disorder: PTSD is a condition that sometimes develops after a traumatic event that is outside the range of usual human experience. It is characterized by:

- Reexperiencing the trauma via dreams, recurrent thoughts about the events, or suddenly feeling or acting as if the event were recurring (flashbacks).
- After exposure to the trauma, a numbing of emotional responses, such as reduced emotions or constricted emotions.
- Hypervigilance about the event or things that remind people of the event that can lead to sleep disturbances, memory impairment, or avoiding anything that reminds people of the event.

Depression: Depression is a loss of interest or pleasure in almost all aspects of life. Depression is characterized by a number of physical and emotional symptoms:

- Loss of appetite or sexual interest.
- Feeling sad or hopeless.
- Weight loss.
- Sleep problems, and other such symptoms.

These are serious conditions that go beyond the experience of stress and actually impair the ability of individuals to function as they usually do in normal life.

Findings: The occurrence of these three psychiatric conditions was assessed in relation to the "high" and "low" exposure classifications referred to previously. The association of lifetime generalized anxiety disorder and post-traumatic stress disorder to exposure status

is described in Figure 2.1. Two concepts are used to analyze the connection between exposure and these psychiatric conditions:

- Lifetime prevalence refers to a person reporting symptoms of the psychiatric condition *sometime during their entire lifetime* as opposed to only after the oil spill;

- Post-spill prevalence refers to the reporting of the particular symptoms *only after the oil spill.*

The emphasis above shows that the important difference is between whether a person *ever* had the symptoms (lifetime prevalence) or these were present *only* after the spill (post-spill prevalence).

The lifetime prevalence of generalized anxiety disorder and post-traumatic stress disorder for study communities with all degrees of exposure (including the control communities) was 27.1% and 22.1%, respectively (Figure 2.1). The post-spill (i.e., symptoms reported to have been present within the year since the spill) prevalence of generalized anxiety disorder, post-traumatic stress disorder, and depression for study communities with all degrees of exposure was 19.2%, 9.9%, and 16.6%, respectively (Figure 2.2). There are two important findings here that need emphasis:

- A statistically significant association exists between the lifetime prevalence and post-spill prevalence of all three psychiatric conditions and exposure status. This means that NGC communities were (1) at risk for any additional stressors that might make these existing conditions worse and (2) people who indicate these conditions were present after the spill were likely to recall having these types of conditions before the spill.

- There is also a statistically significant association between the post-spill occurrence of *new cases* of generalized anxiety disorder and high exposure status. That is, those persons who were, according to study criteria, highly exposed to the spill and cleanup had a higher occurrence of general anxiety disorder.

Using the control group as a baseline, the oil spill and subsequent cleanup efforts had the following impact on members of the high-exposed group:

- A 104% increase in the lifetime prevalence of GAD.
- A 55% increase in the lifetime prevalence of PTSD.
- A 90% increase in the post-spill prevalence of GAD.
- A 99% increase in the post-spill prevalence of PTSD.
- A 80% increase in the post-spill prevalence of depression.

Within the affected communities, residents of small, predominately Native communities had higher rates of depression and generalized anxiety disorder than residents of large, predominately non-Native communities. Communities in the Kenai Peninsula subregion had the highest rates of depression and generalized anxiety disorder, followed by the Kodiak Island subregion and Prince William Sound subregion.

Each of these psychiatric disorders was further examined to determine if certain social or cultural factors contributed to the higher risk. An examination of the post-spill prevalence of depression in the affected communities (high and low-exposed respondents) by gender, ethnicity, and age found the following:

- Women had higher rates of depression, anxiety, and post-traumatic stress disorder than men.
- Natives had higher rates of depression and anxiety than non-Natives;
- Younger adults had higher rates of depression, anxiety, and post-traumatic stress disorder than older adults.

These findings, depicted in Figures 2.3 - 2.5, are generally consistent with research from other disasters such as the Mount Saint Helens volcano eruption.

Figure 2.1
Lifetime Prevalence of GAD and PTSD
by Exposure Status

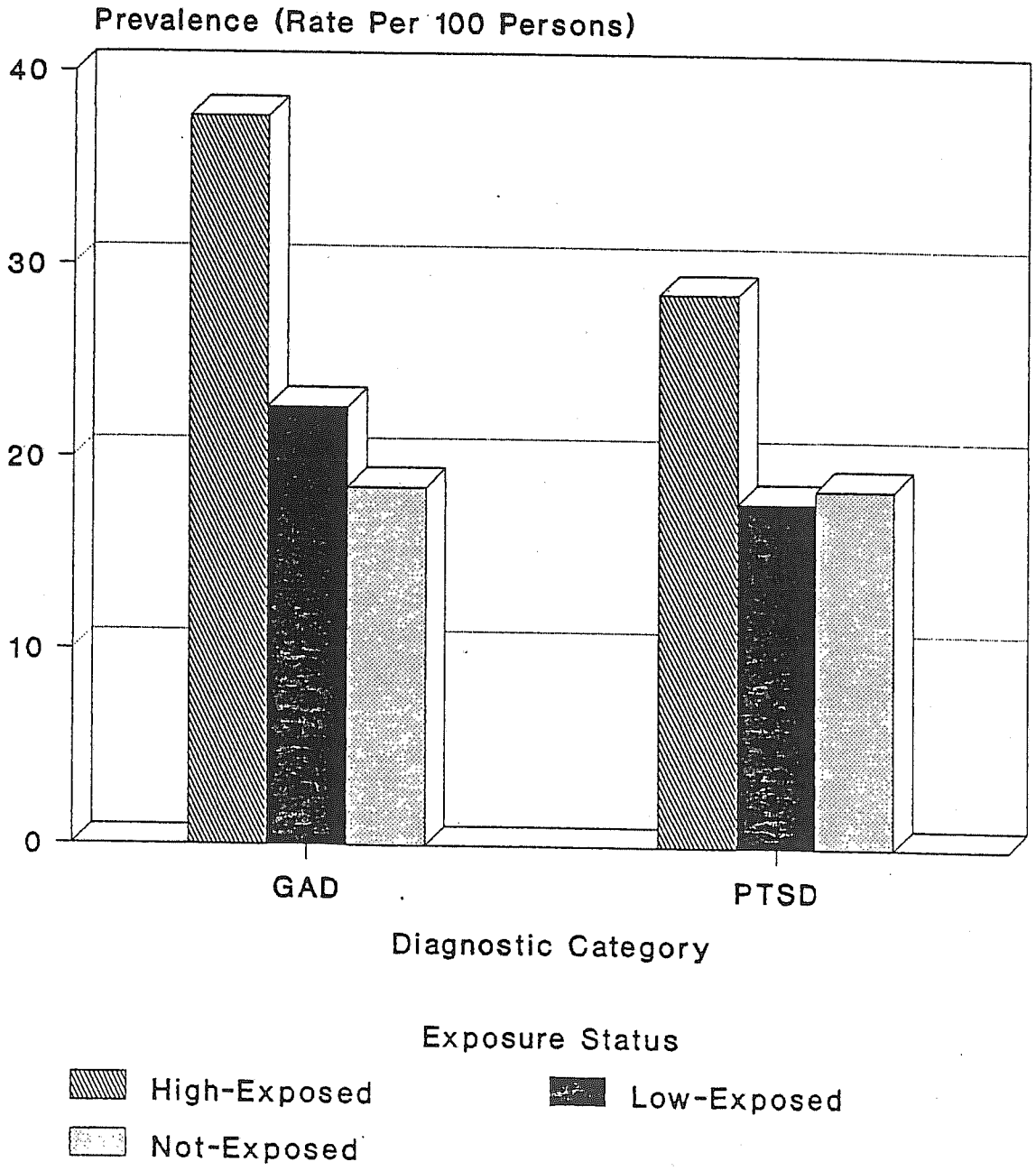


Figure 2.2
Post-Spill Prevalence of
GAD, PTSD, and Depression
by Exposure Status

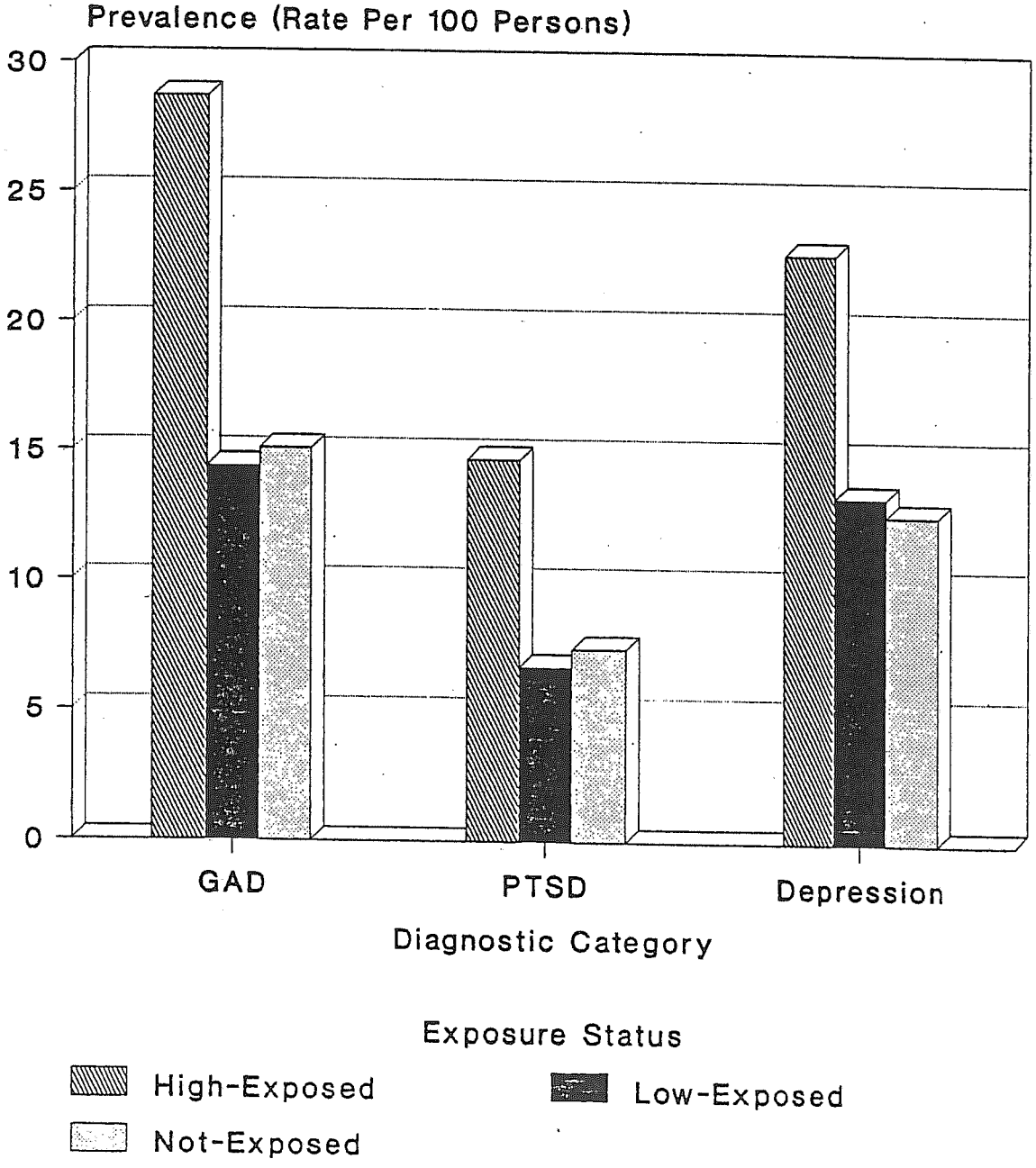


Figure 2.3
Post-Spill Prevalence of
Psychiatric Disorders by Gender

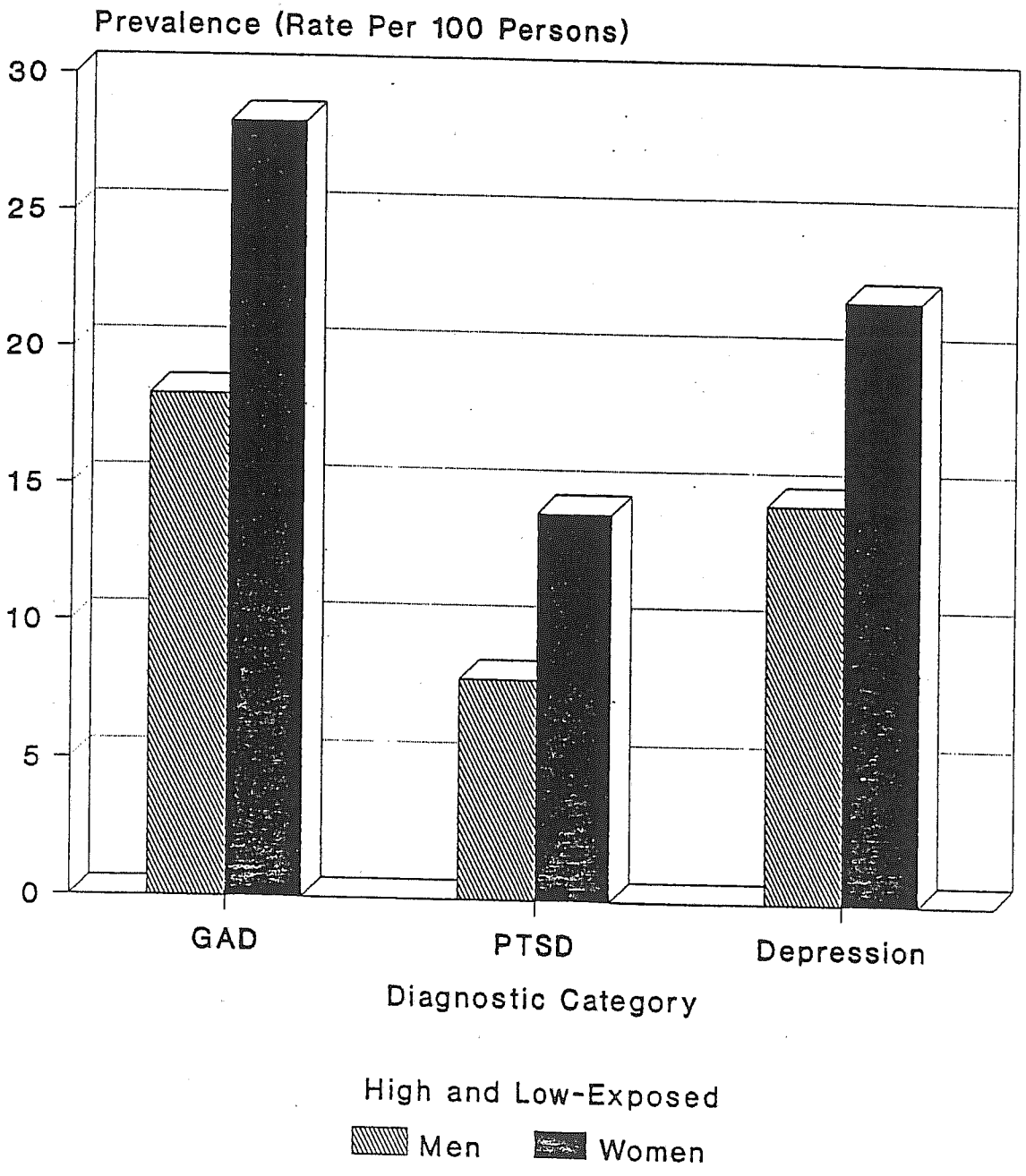


Figure 2.4
Post-Spill Prevalence of Psychiatric Disorders by Ethnicity

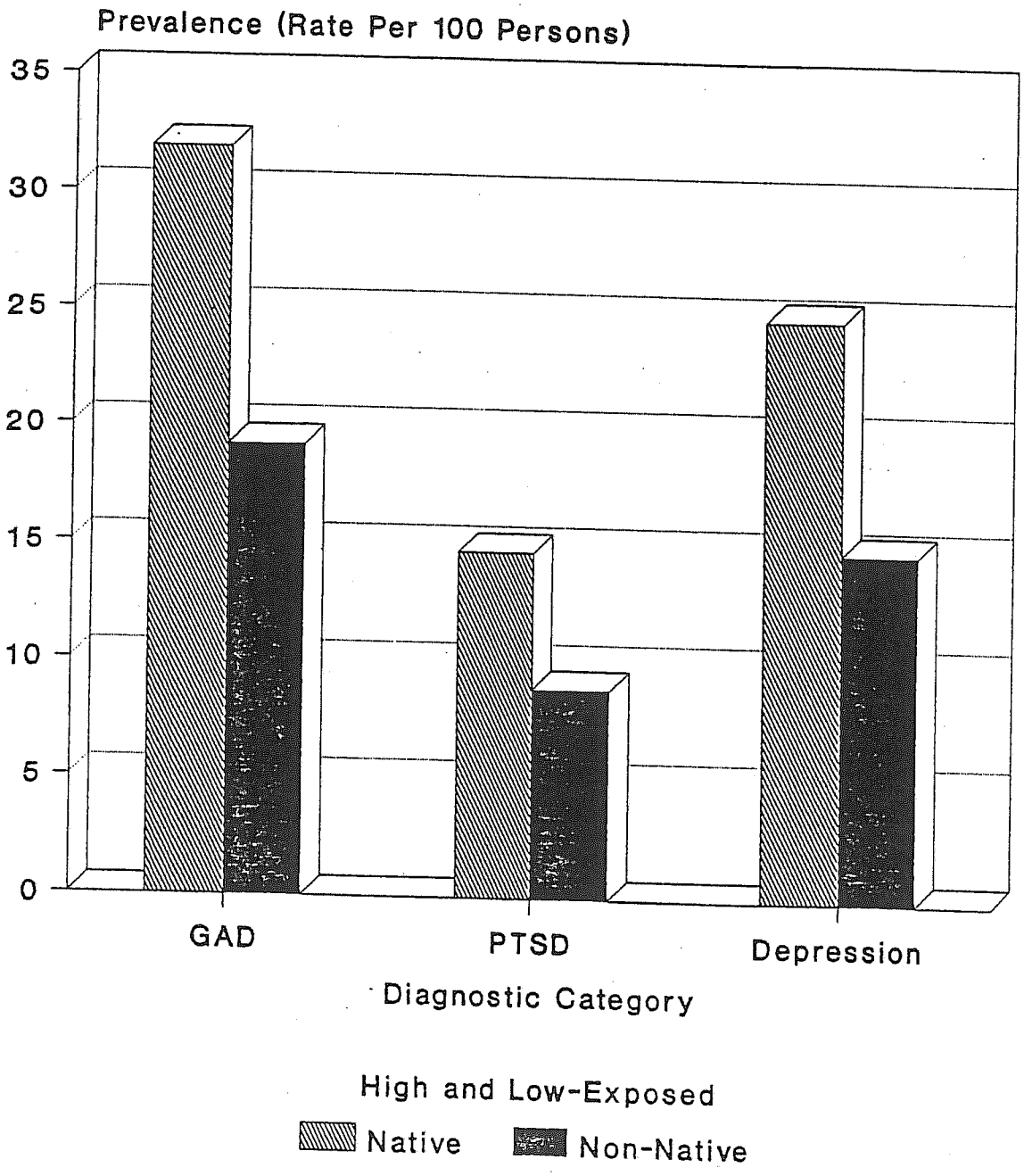
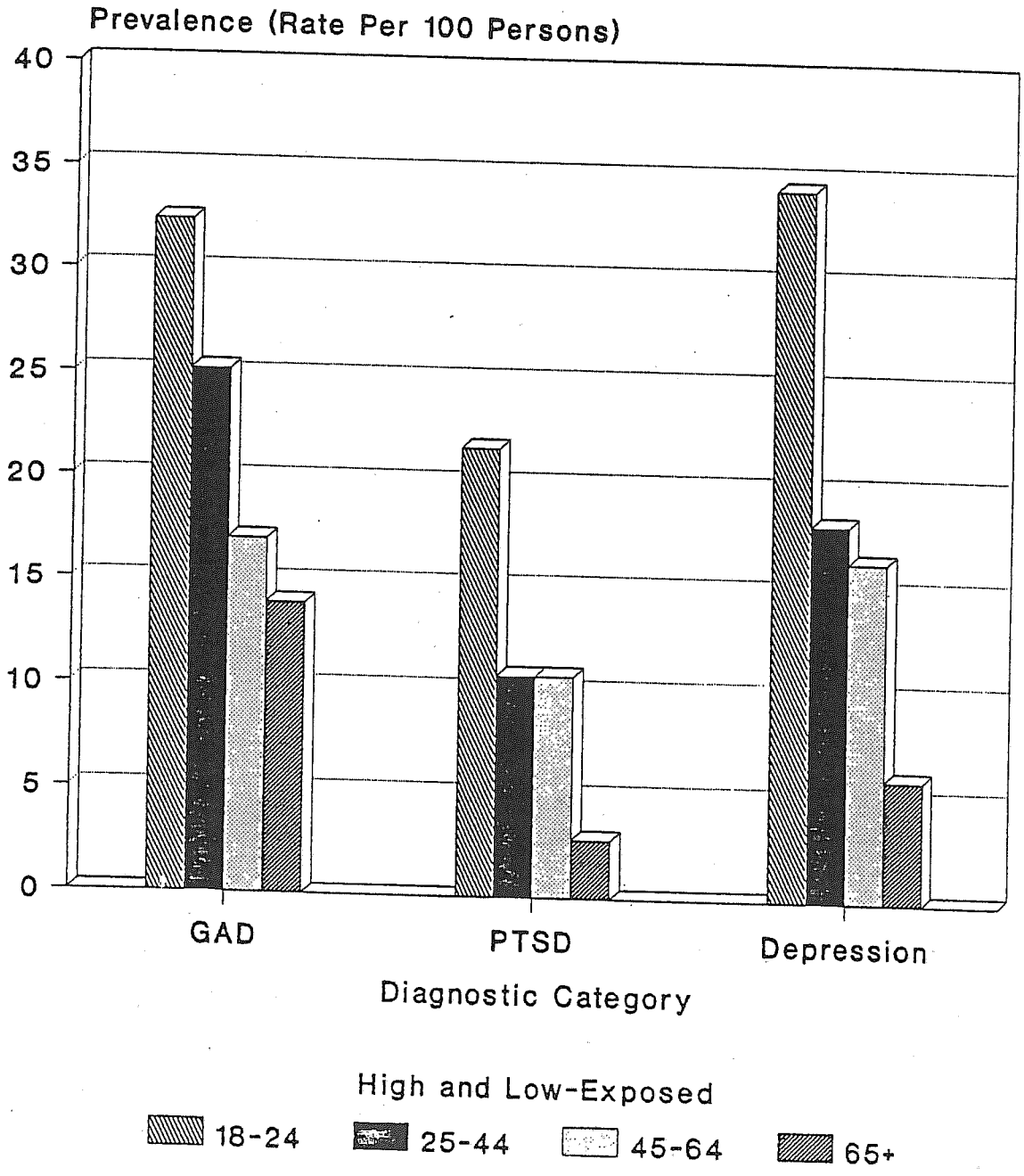


Figure 2.5
Post-Spill Prevalence of Psychiatric Disorders by Age



2.5.2 Substance Abuse and Domestic Violence

The impact of the oil spill and subsequent cleanup efforts on community perceptions of patterns of substance abuse and domestic violence is presented in Table 2.2. Highly significant trends (statistically significant at a probability level of less than 0.0001) were found in all categories. When compared to the control group, high-exposed residents were:

- 11.4 times more likely to report an *increase in drinking in their community.*
- 10.5 times more likely to report an *increase in drinking among family and friends.*
- 7.4 times more likely to report an *increase in drug use in their community.*
- 12.5 times more likely to report an *increase in drug use among family and friends.*;
- 11.6 times more likely to report an *increase in domestic violence in their community.*
- 21.9 times more likely to report an *increase in domestic violence among family and friends.*
- 6.6 times more likely to report an *increase in problems caused by drinking in their community.*
- 4.8 times more likely to report an *increase in problems caused by drinking among family and friends.*
- 4.2 times more likely to report an *increase in problems caused by drug use in their community.*
- 12.9 times more likely to report an *increase in problems caused by drug use among family and friends.*
- 7.1 times more likely to report an *increase in problems caused by domestic violence in their community.*

The data that demonstrate these findings are presented in Table 2.2.

Table 2.2
Problems with Alcohol, Drug Abuse, and Domestic Violence by Exposure Status

Social Unit & Issue Measured	Exposure Status		
	% High Exposed	% Low Exposed	% Not Exposed
Within the Community at Large			
More Drinking*	56.8	40.4	5.0
More Drinking Problems*	45.3	32.5	6.9
More Drug Use*	50.4	43.2	6.8
More Drug Problems*	39.5	30.8	9.4
More Fighting*	40.5	32.3	3.5
More Fighting Problems*	33.9	27.7	4.8
Among Family & Friends			
More Drinking*	29.3	15.3	2.8
More Drinking Problems*	26.0	13.3	5.4
More Drug Use*	21.2	10.8	1.7
More Drug Problems*	19.4	9.1	1.5
More Fighting*	19.7	3.8	0.9

* A chi-square test shows the trend has a probability for error of less than 0.0001.

2.5.3 Health Status

This study measured health status for two important reasons. First it is a measure of direct exposure to the physical effects of the oil spill and cleanup. Secondly, health status is often associated with an individual's psychological well-being. Data from the household survey and field interviews support the following summary statements:

- The greater the exposure to the spill and cleanup efforts, the worse the perceived health status.
- The greater the exposure to the spill and cleanup efforts, the greater the number of physical conditions verified by a physician.
- There is a direct relationship between exposure to the oil spill and cleanup and the existence of psychiatric disorders and health problems.

Tables 2.3 and 2.4 present information about responses to questions on the household survey concerning health status. Table 2.3 shows the occurrence of various conditions and whether or not those conditions were verified by a physician. A physician-verified condition is important because it adds a degree of confidence that the reported ailment is accurately identified. The most reported conditions are hypertension (19%), followed by arthritis (16.9%), skin rashes (15.4%), ulcers (13.3%), and emotional problems (12.9%).

Table 2.4 shows information about pre- and post-spill perceptions of health status and its association with exposure. The question from the household survey, from which these findings come, has a 5 point scale with 1 indicating "excellent" health and 5 indicating "poor" health. For the technical reader the information about means (i.e., the average on the 1-5 scale) and Standard Deviations (S.D. or the variation around the mean) for the analysis is included. For the non-technical reader, the shaded columns labeled "Mean" (i.e. average score on the 1-5 scale) indicate the point to be made:

- Health status prior to the spill was not associated with exposure status, indicating that the three exposure groups were fairly well matched with respect their baseline health status.
- Exposure status was significantly associated with perceived current health status and the number of physician-verified illness conditions occurring since the spill.

- A significant decline in perceived health status (indicated by the larger mean score) was found in the high-exposed and low-exposed groups but not in the control group.

Table 2.3
Prevalence of Medical Conditions

Medical Condition	Prevalence		
	Reported		Verified
	Number	%	%
Heart Disease	36	6.1	100.0
High Blood Pressure	115	19.6	97.4
Diabetes Mellitus	29	4.9	93.1
Thyroid Problem	22	3.7	95.4
Asthma	48	8.2	97.9
Cancer	27	4.6	96.3
Ulcer	78	13.3	88.5
Arthritis	99	16.9	65.7
Bronchitis	44	7.5	90.9
Chronic Cough	45	7.7	60.0
Skin Rashes	90	15.4	66.7
Neurological	19	3.3	94.7
Emotional	75	12.9	44.0
Oil Spill-Related	43	7.2	N/A

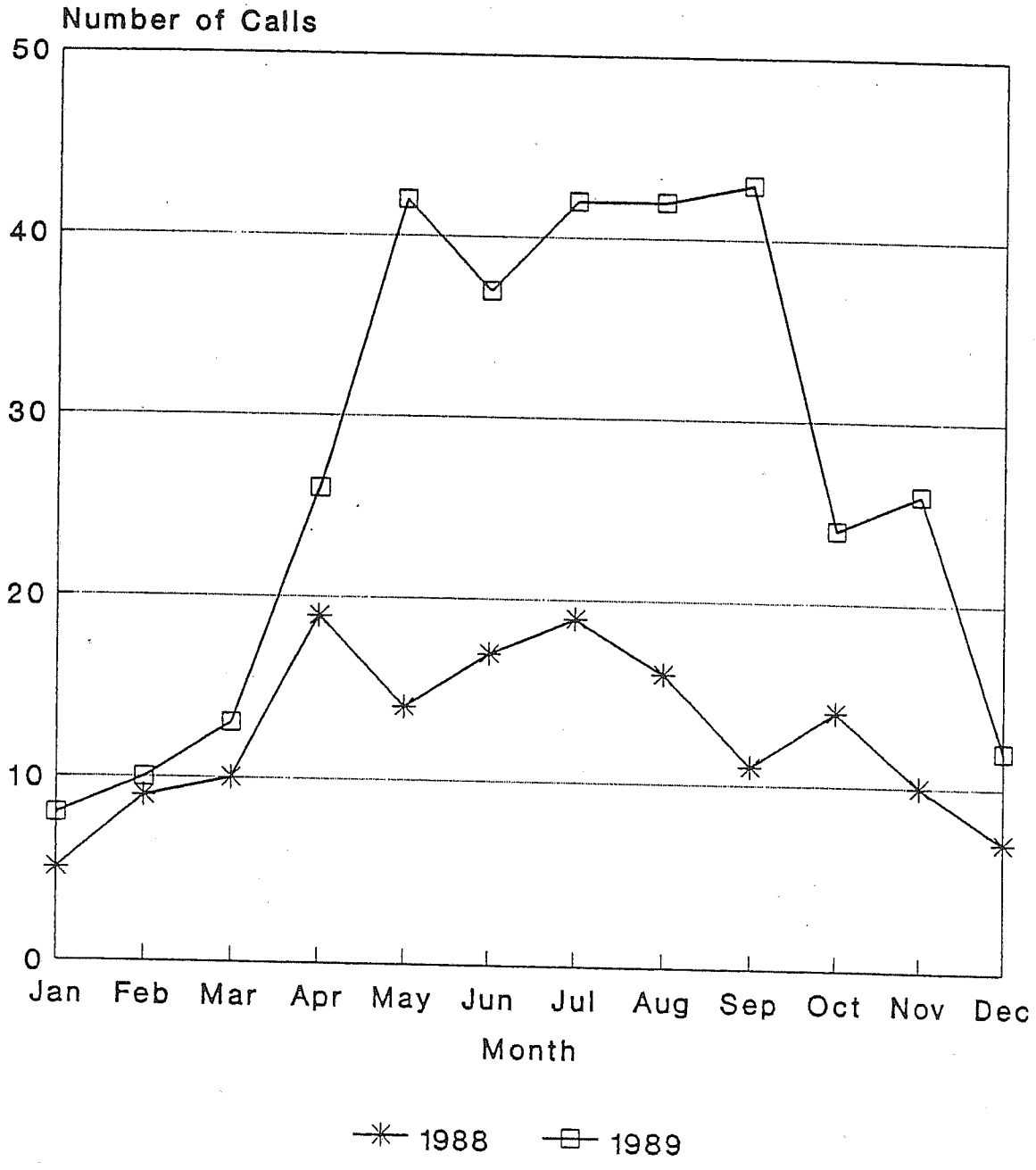
Table 2.4
Physical Health Status by Exposure Status

Exposure Status	Health Status					
	Prior to Spill		Since Spill		M.D. Verified	
	Mean	S.D.	Mean	S.D.	Mean	S.D.
High-Exposed (N=280)	2.33	1.08	2.74**	1.23	1.13	1.45
Low-Exposed (N=311)	2.34	1.07	2.43*	1.12	1.24	1.56
Not-Exposed (N=269)	2.30	1.08	2.34	1.06	0.65	0.94
Total Sample (N=591)	2.33	1.08	2.53|	1.16	1.03||	1.39

* $p < 0.01$ compared to health status prior to spill.
** $p < 0.001$ compared to health status prior to spill.
| $p < 0.01$ by exposure status.
|| $p < 0.001$ by exposure status.

Many of medical problems experienced by individuals in the study communities arose in the context of the cleanup. Some of the problems were of an emergency, critical care nature resulting from accidents incurred on the cleanup. Evidence of this type of cleanup-related medical problem comes from the dramatic increase in calls for emergency medical services and rates of hospital x-rays and laboratory procedures in many communities. As an example of the magnitude of health emergencies, a graph of emergency medical service calls from Valdez is shown in Figure 2.6 below. However, a number of nonemergency health effects from the cleanup, such as skin rashes and respiratory problems, were frequently reported by community health officers and other medical personnel. Some of these problems resulted from the inhalation of toxic fumes from exposure to the oil. However, members of a beach cleanup crew from Seldovia reported experiencing a variety of unusual symptoms such as headaches, burns, and nausea. Only after having the urine of crew members tested did they find out they had been working on a beach exposed to chemicals for bioremediation.

Figure 2.6
Emergency Medical Services Calls
City of Valdez
1988 and 1989



A comparison of health status by community and region found the difference in perceived health status before and after the spill was greatest in the Kenai Peninsula subregion, followed by the Prince William Sound subregion and the Kodiak Island subregion. The greatest differences in perceived health status before and after the spill were found in some of the small, predominately Native communities. The average number of verified medical conditions was greatest in the Chignik subregion (x = 1.45), followed by the Kenai Peninsula subregion (x = 1.39), and the Prince William Sound subregion (x = 1.12). *Four of the five communities with the highest average number of medical conditions verified by a physician were small, predominately Native communities.*

The household survey and other data show significant relationships between exposure to the spill and cleanup and psychiatric disorders and health status. This would indicate a need within the affected communities for help from informal social support systems or from social and health services within communities. The availability of social support systems is discussed in the section on social impacts, but in the next brief subsection an overview is presented of the availability and use of formal institutional resources within the affected communities.

2.5.4 Utilization of Mental Health Services

The data presented above show there were substantial psychological impacts associated with the *Exxon Valdez* oil spill and cleanup. Given these impacts, there are three points to make about mental health services:

- Although there was an increase in mental health problems in Native communities affected by the spill, the overall services available to respond to these problems decreased in Native communities.
- Persons already using existing mental health services used more of these services after the spill.
- The use of mental health services by new clients increased after the oil spill.

Each of these points needs some brief development. First, the front line services in Native communities for mental health and psychosocial problems such as alcohol and drug problems are the Community Health Representatives (CHR) and the Community Health Aides (CHA). More serious problems are referred to regional mental health providers. Importantly, in some Native communities the CHRs and CHAs vacated their positions, some permanently, some temporarily, for cleanup work. As in other Native communities, when

these individuals were faced with the inability of their families to acquire subsistence resources and the need for cash to buy food for the upcoming winter and beyond, they took the option that paid the most: cleanup work paid at least $16.69 per hour while the CHR or CHA positions paid about $8.00 per hour. Consequently, at a time when spill-related mental health problems in Native communities were increasing, the services to address these problems were decreasing.

Second, people who have mental health problems are among those most at risk for additional problems when an added stress such as the oil spill and cleanup occurs. Mental health providers in larger communities such as Seward, Valdez, Kodiak, and Cordova reported that many of the patients they were already seeing often took more time and more resources per visit than before the spill. Furthermore, the limited mental health services in these communities were often already operating at capacity. As the director of one clinic observed: "We were completely maxed out before the oil spill started. We were just running over capacity before that. So we had to do a lot of general adapting in order to deal with the oil spill." Thus, services that were already operating at capacity continued to serve existing clients who needed more time and therapeutic resources.

Third, the oil spill created the demand for new services at a time when these services were already in short supply. As a clinic director observed:

> Part of that is due to the fact that we would have a full house. So emergency services were -- you know, everything came in that way. Our out-patient load probably increased some, you know, because we tried to respond to the increased demand for out-patient demand for emergency services. It was a mess. And we did things like shorten length of treatment. We did a lot of just crisis intervention. And would only get people in to crisis intervention and get them out so you could make room for more people. We spent an immense amount of time actually doing [treatment] on an emergency, real short-term basis. Did a lot of adapting simply by cutting down on the amount of more lengthy [interventions] and shifting over to a mode of crisis intervention.

Another clinician observed:

> There was a domestic violence-related death in June, first part of June. And it was severe beating, so that got a lot of publicity that really effected the community and a lot of people . . . tuned into the domestic violence more and started using our services. We had a client . . . who called seeking services. She had waited until her husband had passed out from alcohol to make the

> phone call and while she was talking to our counselor, he came to and pulled a gun on her while our counselor was talking to her. . . . We would see that level of violence about maybe once every month to two months; sometimes it would go three months before we would have something that serious. We're seeing it now. A couple of times a month at least.

Statistics from communities with mental health resources support the interview data from clinicians and mental health directors regarding increased client loads. For example, data supplied by the Seward Life Action Council (SLAC) -- which is the nucleus for a number of psychosocial services in Seward -- provide an indication of these increases. SLAC provides counseling, runs the state's Alcohol Safety Action Program (ASAP), holds group meetings, and ran the Adult Action Center, an alternative meeting place to bars. The number of clients during the last six months of 1989 increased steadily at rates that were two to three times greater than the number of clients seen the previous year (Figure 2.7). Similarly, the number of outpatient visits increased during the same period, exceeding the number of visits during the previous year (Figure 2.8). Both of these graphs clearly indicate there was an increase in demand for mental health services during the summer and into the winter of 1989 compared to the previous year. These kinds of increases in demands for services were experienced by other communities as well.

In summary, the data presented in this section about psychological impacts and the resources to respond to them indicate that while spill-related psychological distress was increasing, formal services to address these problems were becoming more scarce. While people often resort to informal social support networks (such as friends and family) for help with personal crises, these community-based support systems were also disrupted by conflicts and divisiveness associated with the spill and cleanup. The next subsection describes the process of the disruption of these support networks.

Figure 2.7
Client Contacts by Month
Seward Life Action Council
July-December 1988 and 1989

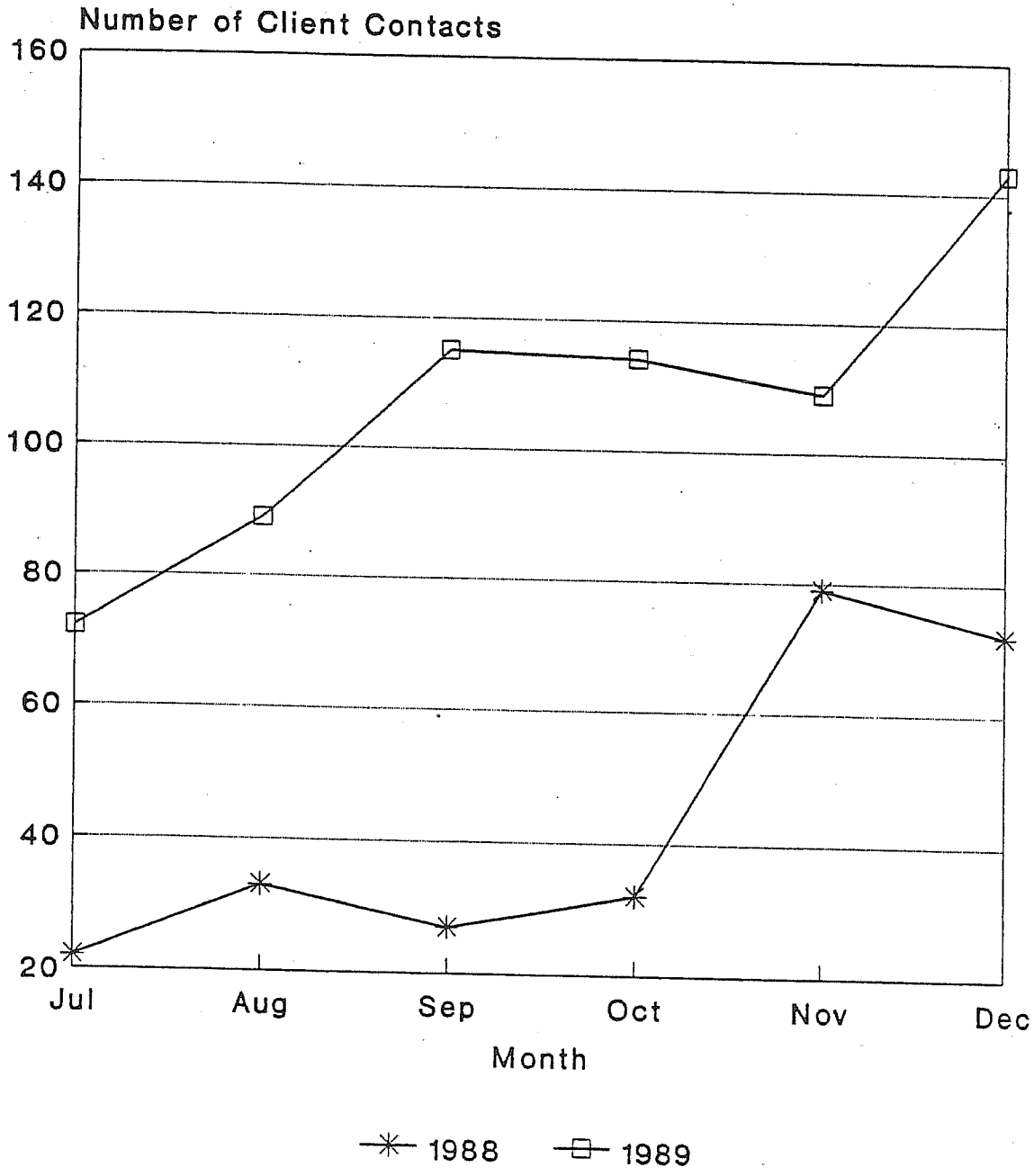
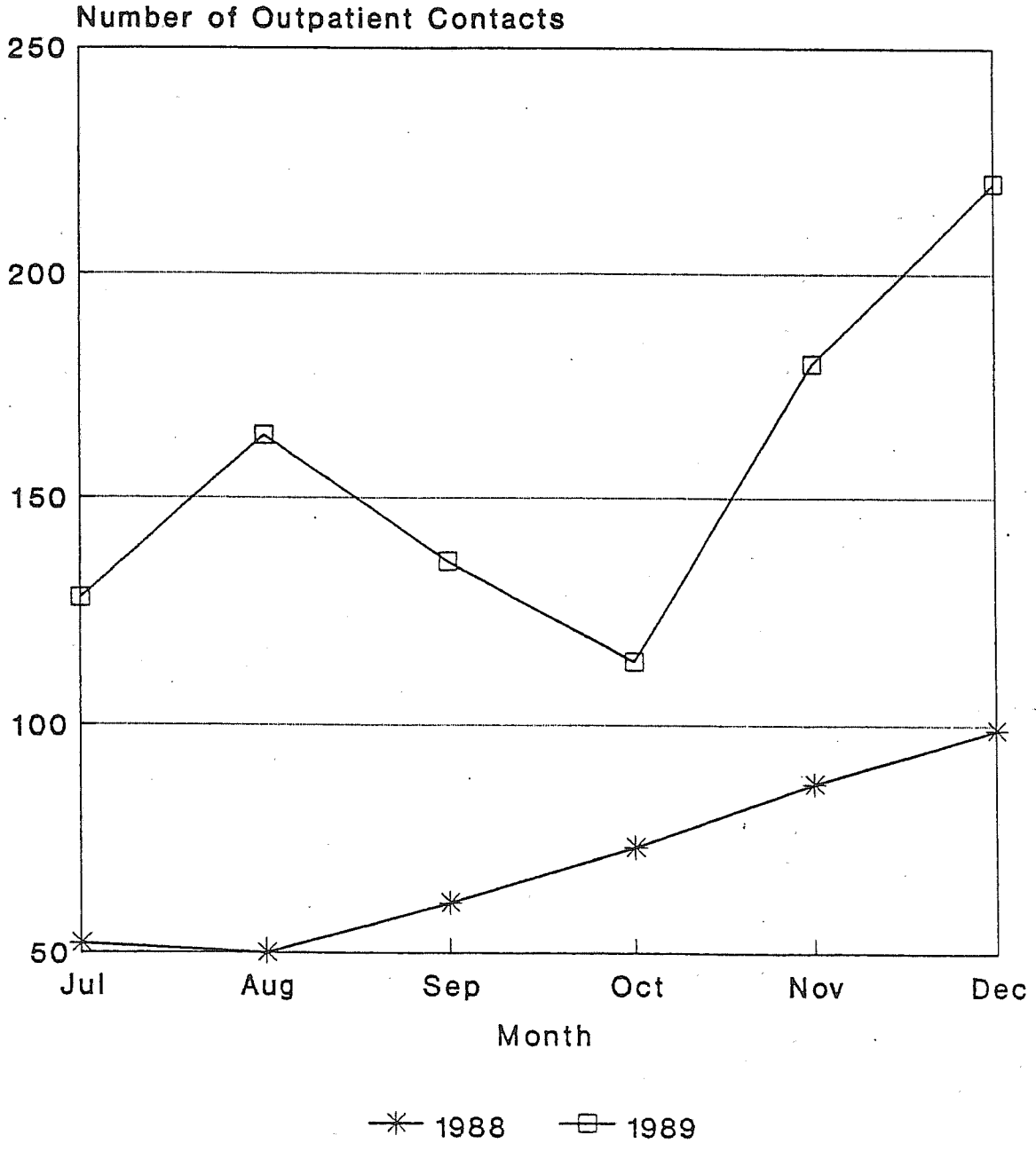


Figure 2.8
Outpatient Contacts by Month
Seward Life Action Council
July-Dec 1988 and 1989



2.6 Social Impacts

For the purposes of this report, social impacts of the oil spill refer to disruptions and alterations in people's ways of thinking and behaving that are oriented towards others (individuals, families, organizations, communities, etc.), reported by study participants *and* attributable to the disruptive effects of the spill and cleanup. These impacts encompass a wide range of social behaviors and feelings such as those between parents and children, between family/household members, among friends and neighbors, between residents and outsiders, among coworkers, and so forth. Most importantly, given the social connections of life in small communities, disruptions of relationships in one sphere can have a ripple effect throughout the community, compounding and perpetuating the negative social effects of the disaster. For example, if a family that fishes commercially concludes that the oil spill will have long-term negative impacts on fisheries, they may decide to live and fish elsewhere. Thus, changes in attitudes and perceptions can have concrete effects on behavior of households and, consequently, very real effects on community life as well. In addition, these perceptions can have a significant influence on how families feel about the quality of life in their respective communities.

According to the household survey and field interview data, residents in the affected communities experienced impacts of a social nature, either directly through involvement with the cleanup, or through social contacts, discussions, and arguments with others. The spill and the cleanup came to dominate the day-to-day lives of most residents in the affected communities, displacing the usual routines, actions, plans, and daily cycles with response to the oil spill. The duration of this disruption, lasting over one year, is a substantial stressor that also has had social and economic costs for the affected communities.

How much the cleanup disrupted the daily lives of residents in the oiled communities has an important effect on their overall perceptions of the spill as a disaster. People in smaller villages were found to be particularly sensitive to the social disruptions of the cleanup operations in their communities. As an English Bay resident remarked:

> When I was working [on the cleanup], there was so much confusion, so many people. Back and forth -- who was running the show? They'd tell you one thing and do another, the people that were leading. What made me angry, [it] seemed like they didn't want to help this community. Like they were against this village. They'd be helping other communities like Homer and Seldovia before English Bay. They'd keep them informed first.

Remarks such as these highlight the nature of social divisiveness that cleanup organization and policies created, both within and between communities in the affected communities in the Gulf of Alaska area. Social divisiveness has negative impacts in the areas of leadership, social services, maintenance of the social order, and social support resources in the affected communities.

2.6.1 Community Social Relations

Household survey and other interview data show that the spill and cleanup had generally harmful effects at the community level. In the household survey, most respondents agreed that the spill and the cleanup resulted in noticeable negative changes. In all the communities studied, more than two-thirds of the respondents indicated that they had seen undesirable changes in their communities, ranging from subsistence disruptions to new or worsening social problems such as crime and alcoholism. The smaller Native villages reported the highest rates of cleanup-related disruptions as well as negative impacts on traditional resource gathering activities.

The spill and cleanup dominated daily life for many in the affected communities:

- One-fourth of those interviewed actually worked on the cleanup.
- Another 40% had various other direct contacts with the cleanup activities.

These direct contacts include those made during the course of commercial fishing, recreation, and subsistence activities. In addition, the spill and cleanup was a common topic of discussion daily for more than two-thirds of the households in the study, indicating the level of involvement, both voluntary and involuntary, that people in the affected communities experienced.

One consequence of this community-wide preoccupation with the spill is that divisiveness and conflicts emerged over participation in the cleanup. By not participating in the cleanup some thought they were taking the "moral high ground" because the cleanup was perceived to be a meaningless public relations effort by Exxon. Others thought the cleanup effort was not perfect, but it was accomplishing something. Tne important point is that people were split about the cleanup and what it meant, which resulted in conflicts and divisiveness.

Another assessment of social relationships within communities was done in the household survey with questions about changes in social relationships. The relationship between exposure status and changes in specific types of social relationships is displayed in Table 2.5

Table 2.5
Changes in Traditional Social Relations
by Exposure Status

Changes in Social Relations	Total N	Exposure Status					
		High-Exposed		Low-Exposed		Not-Exposed	
		N	%	N	%	N	%
Not getting along as well compared with the same period in 1988							
Spouse or partner**	444	25	14.5	7	4.6	0	0.0
Children living at home**	371	14	10.1	5	4.2	1	0.9
Other relatives living at home**	188	11	17.2	2	3.7	0	0.0
Relatives not living at home**	536	24	11.6	9	4.9	0	0.0
Neighbors and friends**	565	28	13.1	9	4.5	1	0.7
People from other communities**	447	28	13.7	14	7.8	2	1.3
Coworkers*	483	20	10.6	15	8.9	5	4.0
Increased conflicts with							
Outsiders**	593	106	47.5	47	22.6	5	3.1
Friends**	591	89	40.3	30	14.4	4	2.5

x^2 test for trend * $p < 0.05$; ** $p < 0.001$

Money was the source of much of the friction experienced in communities. In Kodiak, for example, disagreements among fishermen concerning the distribution of monetary compensation for lost fishing to permit holders and crewmen by Exxon were unresolved as late as the winter of 1989 and the spring of 1990. Instances of crew members who did not hold permits or receive any crew shares led to animosity toward those captains who declined to sign for their "would be" crew members. These same kinds of concerns were problems in communities from Ouzinkie to Cordova.

Respondents to the household survey were asked their opinion about some people making money on the spill and others not. While the majority thought it was good that people were able to make money on the cleanup, there was significant variation of responses by community. For instance, 25% to 33% of the respondents in several of the small Native

(the different "N"s in the table reflect the fact that some people did not answer a particular part of the question). These data show that *social relationships among family members, relatives, coworkers, and friends and neighbors decreased among those most highly exposed to the oil spill and cleanup*. This is an important finding because it reflects an overall decline in social integration and hence the social support that individuals and families rely upon in times of personal and communal distress.

Exposure status was also significantly associated with the number of residents who reported conflicts with outsiders and with friends. Arguments between community members and outsiders who came to work on the spill were common in most of the communities. In all communities in the affected areas *between 30% and 50% of the respondents indicated they had "problems" with outside cleanup workers in their communities*.

Many of the problems mentioned involved drunkenness and obtrusive behavior on the part of outside cleanup workers. In some communities respondents noted a sharp cleavage in the community between insiders and outsiders, a cleavage accompanied by conflict and resentment. These spill-related conflicts are significant because they displaced the usual ways of living.

Not all of the social conflict caused by the cleanup occurred between residents and outsiders. There were also a number of conflicts reported among friends in communities, sometimes resulting in friendships ending. Respondents were asked about incidents where friends ended their friendships over the cleanup.

- 24% of the respondents said they knew of instances of conflict among friends in their communities.
- In several of the smaller Native villages, more than 40% reported cases of friendships ending over cleanup issues.
- 25% of the respondents reported arguments with others over the spill.

These disputes covered a range of topics including: the environmental effects of the spill, issues of fault and responsibility, whether to work on the cleanup or not, as well as related monetary and employment issues. These levels of disagreement and argument are an important indicator of the level of social turmoil that the cleanup operations created in some communities and reflect significant stressors that impaired social cohesion in the community as well as created further psychosocial stress.

communities said the unequal distribution of income derived from cleanup activities was bad. This is, again, indicative of the divisiveness and factionalism generated by the nature and organization of the cleanup process.

The following statements taken from the household survey illustrate some of the ideas people have about this issue:

> It was both good and bad because older people couldn't do anything. Exxon should have given everyone something because it affected everyone from elders down to babies.
>
> Both good and bad -- some people needed the money. Some people who made big money didn't know how to use it. One [person] would be gone for days and days working on the spill. When she got back she'd spend her time at the bar instead of with her children.

Both statements highlight people's ambivalence about the role of money in the cleanup. They also point to an awareness residents had of the types of social disruptions and problems being caused by the cleanup.

Related to explicitly monetary conflicts were those associated with the bureaucratic organization of the cleanup that was imposed on affected communities. Smaller communities were not used to working within such a hierarchically organized structure. In one Native village an informant reported significant factionalism in the community associated with VECO employment.

> Just because of a job title attached to your name, [it] gave you the reason to be somebody who turned down upon the rest of your community people . . . you earn the same amount of money as everybody else but . . . it just made you tend to be a lot more arrogant, which is so unnatural for English Bay, it's so unnatural for community members in that way.

Positive changes resulting from the oil spill and cleanup are indicated in some responses to the household survey. These often have to do with either economic benefits or an increased sense of communities pulling together in times of adversity. However, a dominant theme in the data is that when volunteer response groups formed, the increased sense of solidarity that often resulted was subverted by how Exxon privatized the cleanup. That is, volunteer

efforts were turned into efforts for pay and who was paid was often perceived to be inequitably distributed, thus creating conflict.

The spill and ensuing disruptions also resulted in a significant reduction in the frequency of social visits between families and participation in religious activities and community festivals. The extent of disruption in these activities is revealed in the following:

- 20% to 40% of those interviewed indicated less time spent visiting with friends.
- For those who actually worked on the cleanup, there was a 42% reduction in social visits with friends, compared to a 19% reduction for those who didn't.
- In two Native villages, more than 70% of those interviewed reported decreased social visitations.

Social visitation is an important factor in the overall integration of a community. It facilitates communication, interpersonal support, and material sharing among households. The negative impacts of the spill on subsistence activities also made fewer resources available for sharing among families, thus reducing an important social activity between households.

Cleanup workers also had significantly less time available to participate in religious activities and community festivals and celebrations.

- 38% of those participating in cleanup activities reported reduced participation in community celebrations, compared to 12% of respondents who did not work on cleanup.
- 28% of those participating in cleanup activities reported reduced participation in religious activities, compared to 6% of respondents who did not work on cleanup.

It can be seen that employment in the cleanup had significant effects on time available for participation in important social activities. Reduced time available for leisure and social activities can prolong disaster-related stresses in such circumstances, particularly when the overall community environment has also been disrupted.

The reduced time available to many in the impacted communities affected participation in community-oriented activities as well as the social activities already reviewed. One indicator of the decreased availability of time is the fact that in each of the communities in the survey, between 10% and 30% of the respondents indicated less time spent in volunteer activities. In small communities, volunteer activities often provide otherwise nonexistent social services and thus any reduction can be disruptive of those services. Overall, 27% of those who worked on the cleanup reported a drop in volunteer activities compared to 8% of those who did not.

The picture that emerges from these data is that the threads that weave the social fabric of communities into a whole were damaged by the spill and especially by how Exxon implemented its privatized cleanup. Instead of creating cooperation and pulling together to clean up the spill, the billions of dollars spent by Exxon created divisiveness and conflict within communities, damaging the social support mechanisms that would usually protect community members from harm.

2.6.2 Household Relations

Due to spill-related disruptions, there was a reported decrease in time respondents spent visiting with other household members.

- In most communities 15% to 30% of the households reported decreases in time spent interacting.
- In several native communities with high rates of cleanup involvement, 45% to 65% reported such decreases.
- 45% of those who worked on the cleanup reported less time spent with other household members, compared to 16% of those who did not work on the spill.

Similarly, from 10% to 30% of the respondents in each of the affected communities indicated less time available for family vacations as a result of spill-related activities.

Families that are poorly integrated and troubled by various personal problems before a disaster can be further weakened by a stressful experience like the *Exxon Valdez* oil spill. For example, if marital conflict, existed in a family before the oil spill, the additional stresses of the spill could increase the level of conflict creating an increasingly troubled family environment, with attendant negative psychosocial and interpersonal effects. The interference with family routines, as caused by the cleanup, is a distinct risk factor for many

families. As discussed in the previous section, marked increases in alcohol-related problems were reported, accompanied by corresponding negative effects on families.

Some of the statements taken from household surveys are exemplary of the types of interpersonal disruptions the cleanup created in various communities:

> Yes, as a family we kind of lost it . . . my husband . . . we were so close. Then the oil spill came and he is drinking more and [we] separated.
>
> . . . the loss of earnings of my husband [was bad] . . . and the fact that he wasn't here this summer. It was a burden on our relationship.
>
> My husband's alcoholism got worse. He had quit before the spill. Now we're separated because of the spill.
>
> [The cleanup] contributed to my breakup with my fiancee. The spill caused lots of pressure for me to keep my business going -- I was stressed and it affected my relationship.

In some instances, those people who worked long hours on the spill simply had less time and energy to devote to their family relationships. In other instances, the cleanup created tensions related to family roles. For example, in Native communities where there was little child care available, the oldest child was often placed in charge of siblings as parents worked on the cleanup. When mothers and fathers returned home there were conflicts over the eldest child once again assuming a "child" rather than a caretaker role. These types of conflicts seem small when viewed in isolation, but when viewed within the context of individual stress, community divisiveness and conflict, and household disruptions, they become more significant.

2.6.3 Children

Of all segments of a community, children are most vulnerable to the stress-related effects of disasters such as the *Exxon Valdez* oil spill and cleanup. In disaster situations children can be negatively affected by either direct or indirect exposure to the event. In the case of the *Exxon Valdez* incident, direct effects include children's observation of dead wildlife and oiled coastal areas. Indirectly, children can be affected by the disruptions in normal family patterns or parental relationships. For example, when parents were absent for significant

periods of time, as was common during the cleanup, children expressed a fear of being left alone; this is known as separation anxiety.

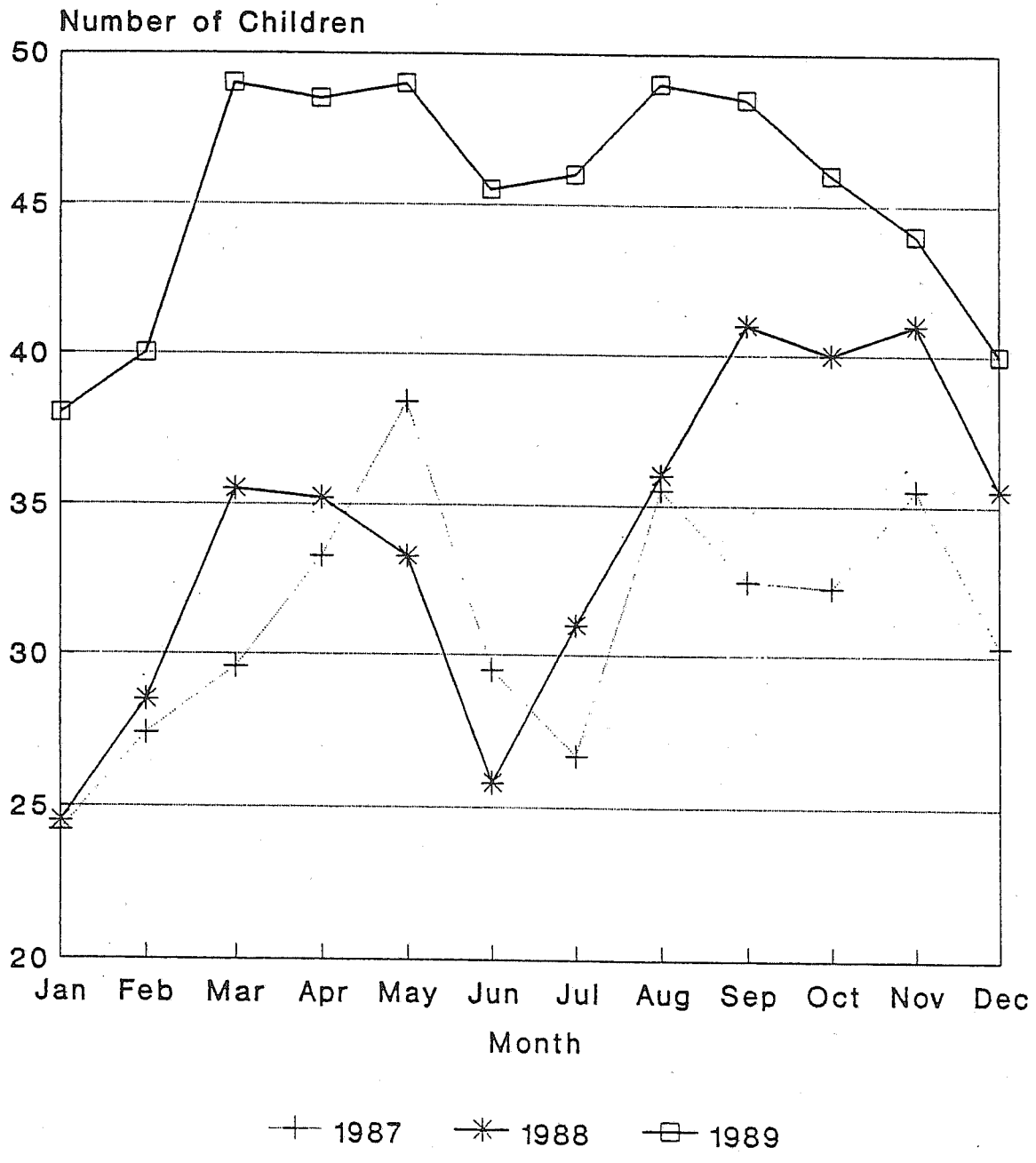
Data from the household survey and field interviews indicated that family life was indeed disrupted in the aftermath of the oil spill. In describing life for families during the cleanup, a resident of one of the affected communities commented:

> . . . [the jobs] were not just 8 to 5 jobs. They were like to 7 or 12 [at night] and sometimes longer. They worked until midnight unloading boats, got home, slept three hours, and got up and went back to work. So that put a lot of stress on the families, because one person wasn't there . . . and the children were scared because they didn't realize what was happening, because the adults were all excited . . . so the children were real concerned about it, what was going on and not understanding why they weren't able to clean it up and be involved in some way.

To deal with the demands of the cleanup, parents utilized formal and informal day-care options. Extended family members or siblings constituted the informal day-care providers. Often grandparents were left in charge of children they were unable to supervise adequately. Because of the informal nature of this type of day care, it was impossible to determine the amount of increase in its use. However, formal day-care centers typically maintain enrollment figures. This has allowed for quantification of increased utilization of day-care services following the oil spill. Analysis of these data confirm reports of extended periods of family separation. Following is Figure 2.9 which compares enrollment figures from 1987 - 1989 for a day-care center in Valdez. Although 1989 began with slightly elevated enrollment, the figures skyrocket following the oil spill in March.

Valdez was a community fortunate to have the resources for formal day care. In many communities, lack of day-care facilities was a major problem. Two-thirds of the parents in the household survey indicated they had problems finding suitable child-care services after the oil spill. However, there was significant variation between sites. In one Native village, only 11% indicated child-care problems while in another 80% reported such problems. In non-Native communities, the range was from 40% to 70% of parents reporting problems with day care availability. In part, these problems are a result of employees at day-care centers leaving their jobs to work for higher wages on the spill cleanup. These problems also result from the outside employment of family members who would otherwise stay at home and take care of children. Where there was a lack of day care, children were often unsupervised when they were not in school.

Figure 2.9
Average Daily Attendance
Valdez Day Care
1987-1989



As one former day-care worker from Cordova said:

> . . . [I] left my [day-care] job because we couldn't keep enough people working there. Child care is always a challenge but when $17 an hour is available rather than $6 an hour . . . The [day-care] job is harder also because of stressed-out kids, they are always away from [their] parents, the kids feel abandoned.

The implications of extended separation of children from their parents (or other permanent caretakers) are grim since much of the postdisaster stress experienced by children is mediated by their parents' response to the disaster. When family life, including the parents' relationship, is strained or disrupted the distress experienced by children is magnified and protracted, increasing the likelihood of subsequent psychological disorders. Indications of negative psychological impacts on children are evident in the data collected in the household survey as well as field interviews. In all but one of the study sites, more than half of parents interviewed indicated that their children became upset when people discussed the spill. This would indicate some children's desire to avoid reminders of the spill, a relatively typical stress reaction. It may also be that children were affected by their parents' distress in discussing the spill.

Separation anxiety is also commonly experienced by children following significant disasters. In all but two of the *Exxon Valdez* study communities, more than half of the parents indicated that their children exhibited separation anxiety. Summed for the entire sample of parents in the household survey, 73% indicated that their children did not like being left alone, a phenomenon they attributed to the effects of the spill and cleanup. The figures varied by site, with only 35% reporting separation anxiety at one Native village. In two other communities, Kodiak and Chignik, 85% of the parents reported such symptoms in their children. This is an important indicator of the disruptive effects of the spill and cleanup on children.

Separation anxiety in children may also be expressed by a strong desire for the reassuring presence of parents. The director of one of the day-care facilities in Seward, who had extended periods of contact with children, described the behavioral changes she saw in children following the oil spill. Many were irritable and cried more frequently than usual which the director attributed to feelings of anger and neglect because their parents were away from them for so many hours at a time. This director commented, "The kids had always used to color so nicely. But since the oil spill, they take a black crayon and cover everything black" which she believed was a manifestation of those feelings. In May 1989,

two months after the spill, the kids were learning about and drawing pictures of sea life. All of the children reportedly drew the oil spill as part of their pictures even though the subject of the oil spill hadn't been raised at the day-care center.

Another indicator of behavioral problems with children as a result of the spill was that 79% of all parents reported that they did not get along with their children as well as they did before the spill. There was some variation in responses between communities, with a range of 47% to 95% reporting worsened child-parent relationships. The figures suggest that there was a general deterioration of child-parent relationships because of disruptions in the family following the oil spill. In addition, approximately one-fourth of the parents indicated that their children had not been getting along with other children as well as before the oil spill.

Just as children were affected by the oil spill indirectly through their parents, exposure to the effects of a disaster can also spread indirectly through contact with other children. Thus, psychological distress can be spread much like a contagious illness. Similarly, through play and other social contact, children can address on a visceral (as opposed to adult intellectual) level, their fears and confusion regarding the disaster. One of the ways counselors in one community addressed feelings of impotence and alienation in children was to simulate an oil spill for them in an inflatable pool with the intention of giving the children a sense of what their parents were involved in.

She described the simulation this way:

> . . . they all made these little boats and they put their little toys in there and then [the counselor] took a can of oil and put it in the pool and watched [the kids] as they tried to clean it up, to explain to them what their parents were trying to do. So they were trying to pick it up with their little spoons, and they were trying to scoop out the oil and to show them how hard the job was that the adults were doing . . .

Although this research did not directly measure impacts of the oil spill on children, it is clear from household survey and field data that:

- Family life was disrupted so that children spent less time with their primary caretakers.
- Behavioral changes took place in children following the oil spill as reported by family members and day-care providers.

2.6.4 Subsistence Activities

Subsistence is a core cultural institution in Native communities. Damage to subsistence resources and to the meaningful activities that are part of this core institution thus damages the whole culture. The significance of this point cannot be overstated because embedded in the activities of hunting, fishing, and gathering is a way of life, a set of values, a way of seeing the world that values bears, salmon, eagles, and water as spiritual and social as well as economic resources. Threats to the resources and activities that are so fundamentally embedded within Native culture thus threaten that very culture itself and the meaning it gives to daily life. Recognition of this perspective is essential to understanding the significance of damages to subsistence resources and activities: It means that restoration of Native communities requires solving the economic problems related to subsistence damages *and* providing resources to treat the psychological damages, social disruptions, and fears of cultural disintegration related to the oil spill and cleanup. Without addressing the harm and hurt Native people experienced, the responsible parties are only worsening the blow to one of the remaining core cultural institutions in Alaska Native culture.

- 35% of those interviewed said that the spill directly affected subsistence.
- 42% of those interviewed reported decreased time spent in hunting, fishing, and gathering activities.
- 35% indicated a decrease in time spent in joint subsistence activities with people from other households.
- 35% reported reductions in the amount of subsistence food shared with other households.
- 33% indicated a reduction in the amount of food available for sharing with elders.
- 30% indicated that they received reduced amounts of subsistence foods from other families since the spill.

The percentage of residents who reported a decline in traditional subsistence production and distribution activities was significantly associated with exposure status (Table 2.6). Residents in the high-exposed group reported a decline in these activities at more than twice the rate as residents in the other two groups.

Table 2.6
Changes in Traditional Subsistence Activities by Exposure Status, 1988 and 1989 Compared

Subsistence Activity Compared with same period in 1988	N	Exposure Status					
		High-Exposed		Low-Exposed		Not-Exposed	
		Decreased		Decreased		Decreased	
		N	%	N	%	N	%
Time normally spent hunting, fishing, and gathering*	475	162	78.3	50	36.2	11	8.5
Time normally spent with people from other households hunting, fishing, and gathering*	459	141	71.2	42	31.8	4	3.1
Amount of harvested resource foods shared with others*	470	131	64.2	46	34.3	9	6.8
Amount of harvest resource foods received from other families*	382	92	56.1	25	25.3	3	2.5
Number of household members participating in hunting, fishing, and gathering*	436	102	54.3	32	26.2	6	4.8
Opportunities for children to learn hunting, fishing, and gathering skills*	454	91	46.9	21	16.3	2	1.5

x^2 test for trend * $p < 0.0001$

These figures represent significant alterations of activities that promote community integration and collective welfare. Cash infusions into local economies do not compensate for this weakening of activities that promote solidarity and cooperation between families in communities.

This reduction in subsistence activities can be attributed to three factors. First, many areas were closed to subsistence activities. Second, the safety of subsistence foods was a major issue, and many local residents voluntarily abstained from consuming subsistence products. Because the appearance of oil was sporadic in many villages, the testing of portions of beaches was not considered completely valid by residents. During the field visits, people expressed concern about their food supply, especially clams, and although some continued to eat them, the unknown factor of long-term effects and general toxicity were always present.

The following is typical of the concerns expressed about the safety of subsistence foods:

> There's no telling to what degree that shellfish is tainted. Until you get some real comprehensive results back from all the testing going on, they could go into a clam bed and take a sample here, and a sample there, and not get any tainted clams. But fifteen feet over here, where a couple of mousse patties sat down and went and sunk into the ground a little bit, you're gonna have a section of tainted shellfish.

Marine life was not the only subsistence food threatened. Hunting was curtailed in many communities because deer had been seen eating kelp from oiled beaches and people were afraid the meat would be toxic. Interview data also suggest general concerns and anxieties about the process of the testing subsistence foods and other biological samples for toxicity. Conflicting information, confusing messages about the safety of foods, and technical information that was not adequately interpreted for the affected communities increased anxieties, fears, and confusion about the potential toxicity of subsistence foods.

A third reason for the decline in subsistence activities was that people had less time for traditional subsistence activities because of the high level of participation in cleanup in most Native villages (45% to 86% of those interviewed by village). As a result, they did less resource gathering and had less food to share with kin and elders.

There was considerable variation in the degree of impacts on subsistence by community. Most Native villages had 100% subsistence participation rates before the spill. In one case

there was a 70% drop in these subsistence activities after the spill. Native villages in general were the most heavily impacted by disruptions in subsistence activities. The reduction or cessation of subsistence activities affects not only food supplies but an entire set of social relations and practices that are an essential part of kin group and community integration.

The non-Native communities in the survey averaged reported a 20% drop in subsistence activities due to spill and cleanup effects. Overall, 81% of the sample engaged in subsistence before the spill. After the spill, the rate had been reduced to 64%. These numbers only indicate whether or not people engaged in subsistence. Many who continued to gather subsistence resources did so at a much reduced rate, often because of concerns about the safety of the foods being gathered, or because fewer resources were available.

The following four graphs (Figures 2.10 - 2.13) show the comparative effects of the spill and cleanup on respondents in communities and villages from the household survey. The data presented refer to the amount of time spent in subsistence activities and the amount of subsistence foods shared with others.

The fact that subsistence activities were canceled or curtailed has implications for the internal features of household organization. 20% of the households in the survey indicated that they had fewer members engaging in resource gathering.

This reduction was caused primarily from the lack of time available for traditional activities due to cleanup-related employment. In some instances, the closure of areas and the suspected contamination of foodstuffs reduced the need for participation in subsistence. Native respondents frequently indicated there was less fish and game available. That which was available appeared negatively affected by the oil and people were simply afraid to eat it.

Another consequence of the reduction in subsistence activities was that family routines were disrupted. For Native families in particular, subsistence activities are an important part of the socialization of children in traditional skills and life-styles. 34% of respondents indicated that, because of the spill and cleanup, there had a been a reduction in opportunities for children to learn hunting, fishing, and gathering skills. The persistence of such disruptions into the future marks a potential source of discontinuity in traditional and culturally important skills and activities. The very fact that this core cultural institution was threatened caused distress and anxiety within Native communities.

Figure 2.10
Hunting, Fishing and Gathering Activity
Time Normally Spent Since the Oil Spill
Native Communities

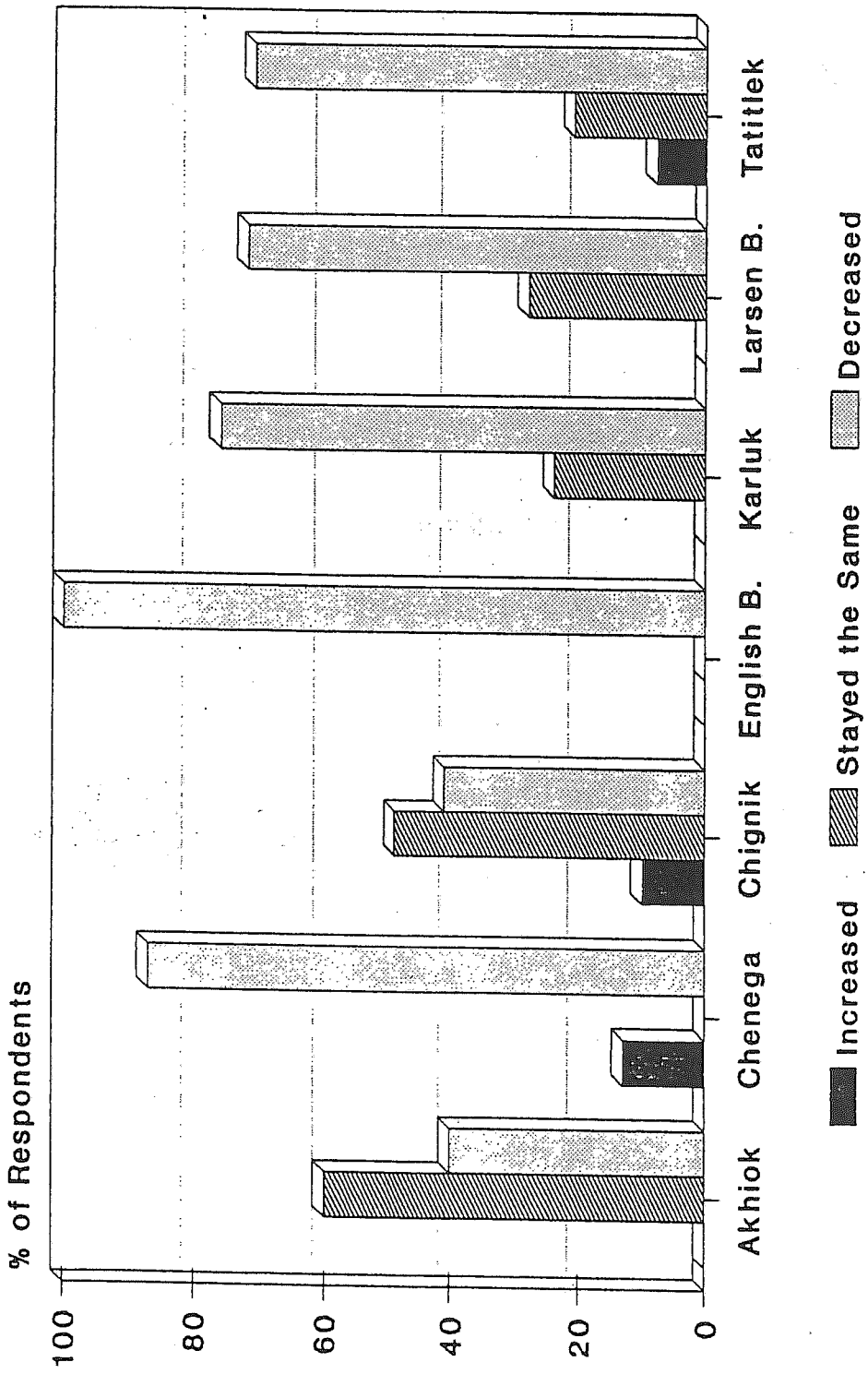


Figure 2.11
Hunting, Fishing and Gathering Activity
Time Normally Spent Since the Oil Spill
Non-Native Communities

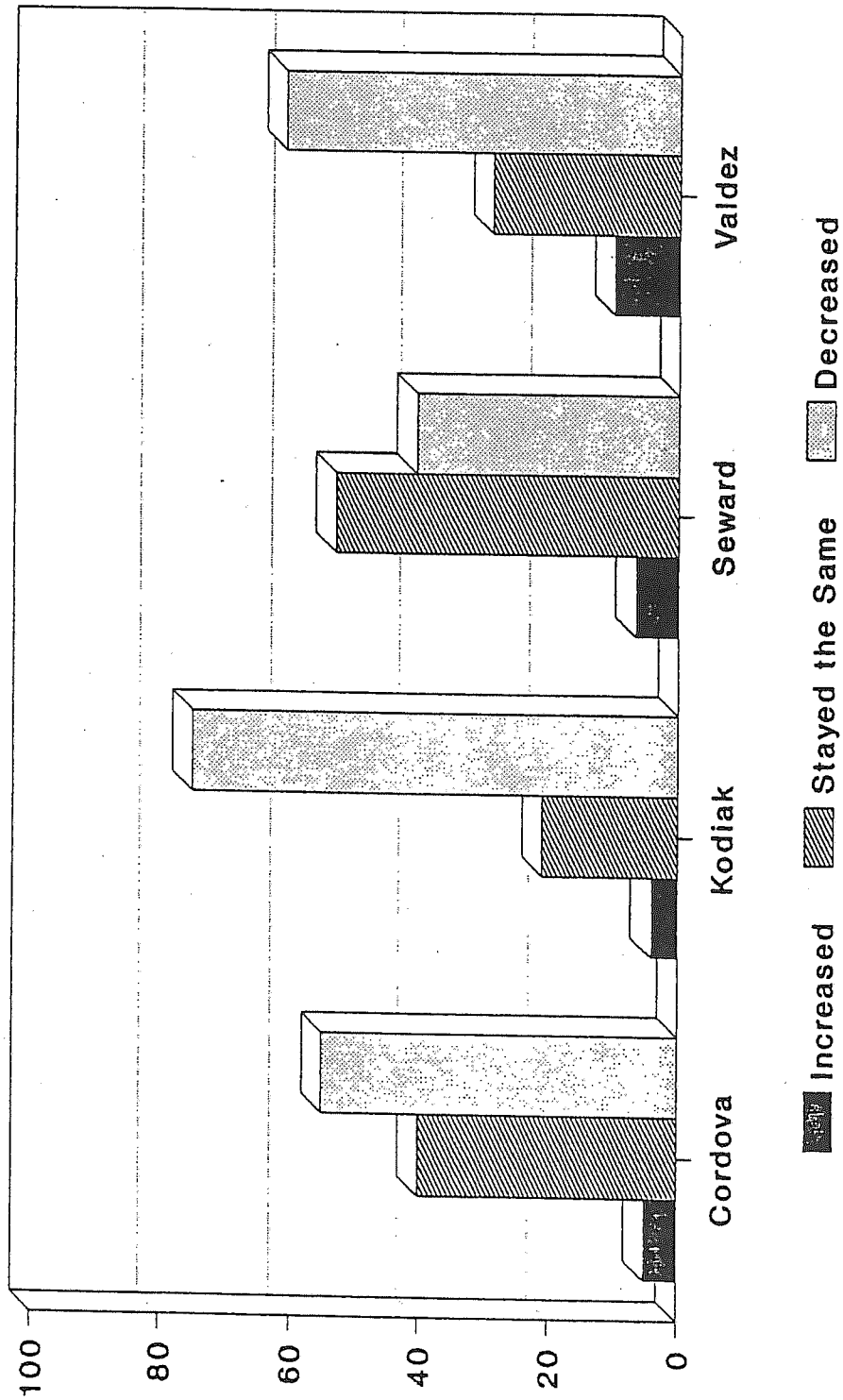


Figure 2.12
Hunting, Fishing, and Gathering Activity
Amount of Shared Subsistence Foods
Native Communities

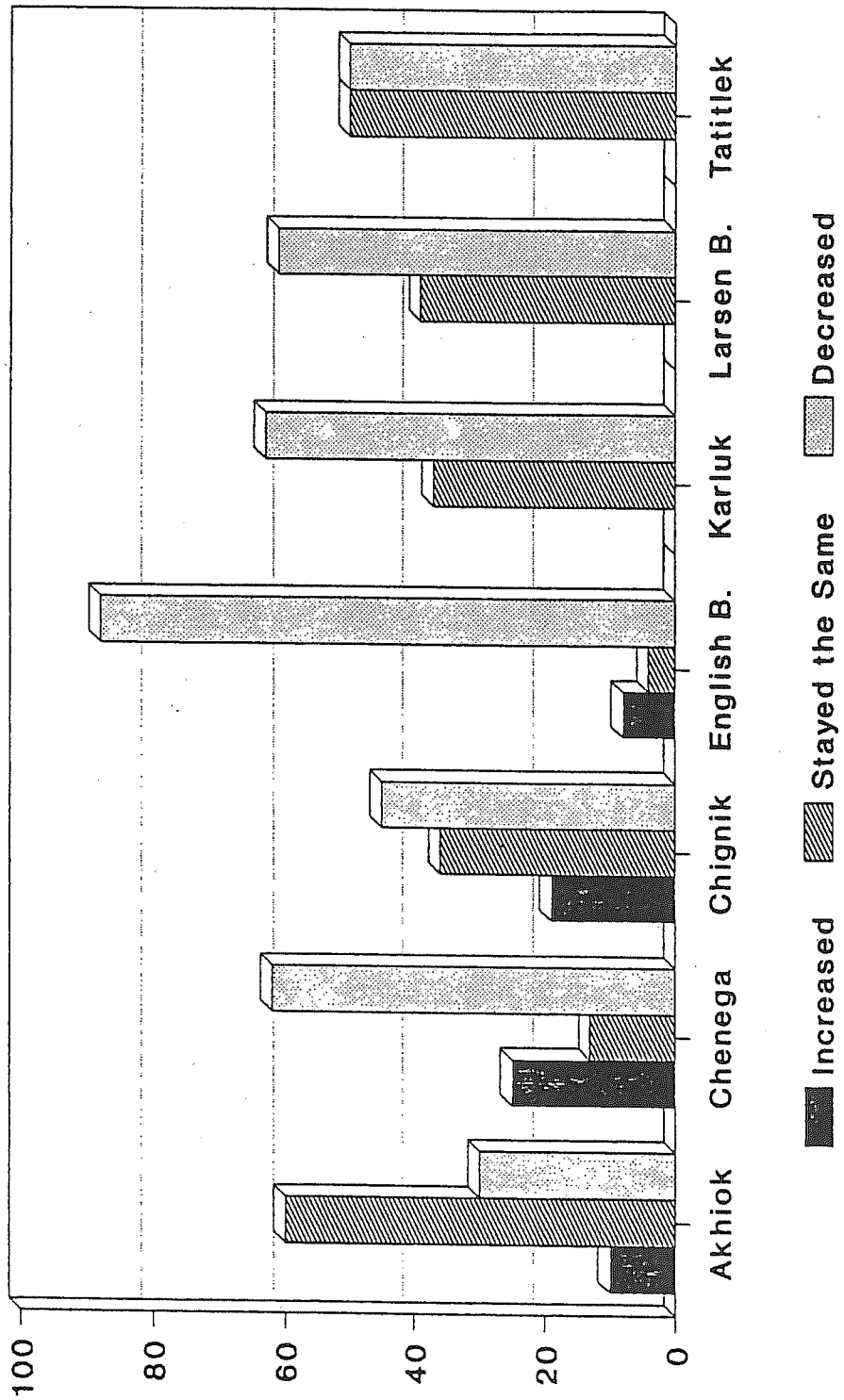
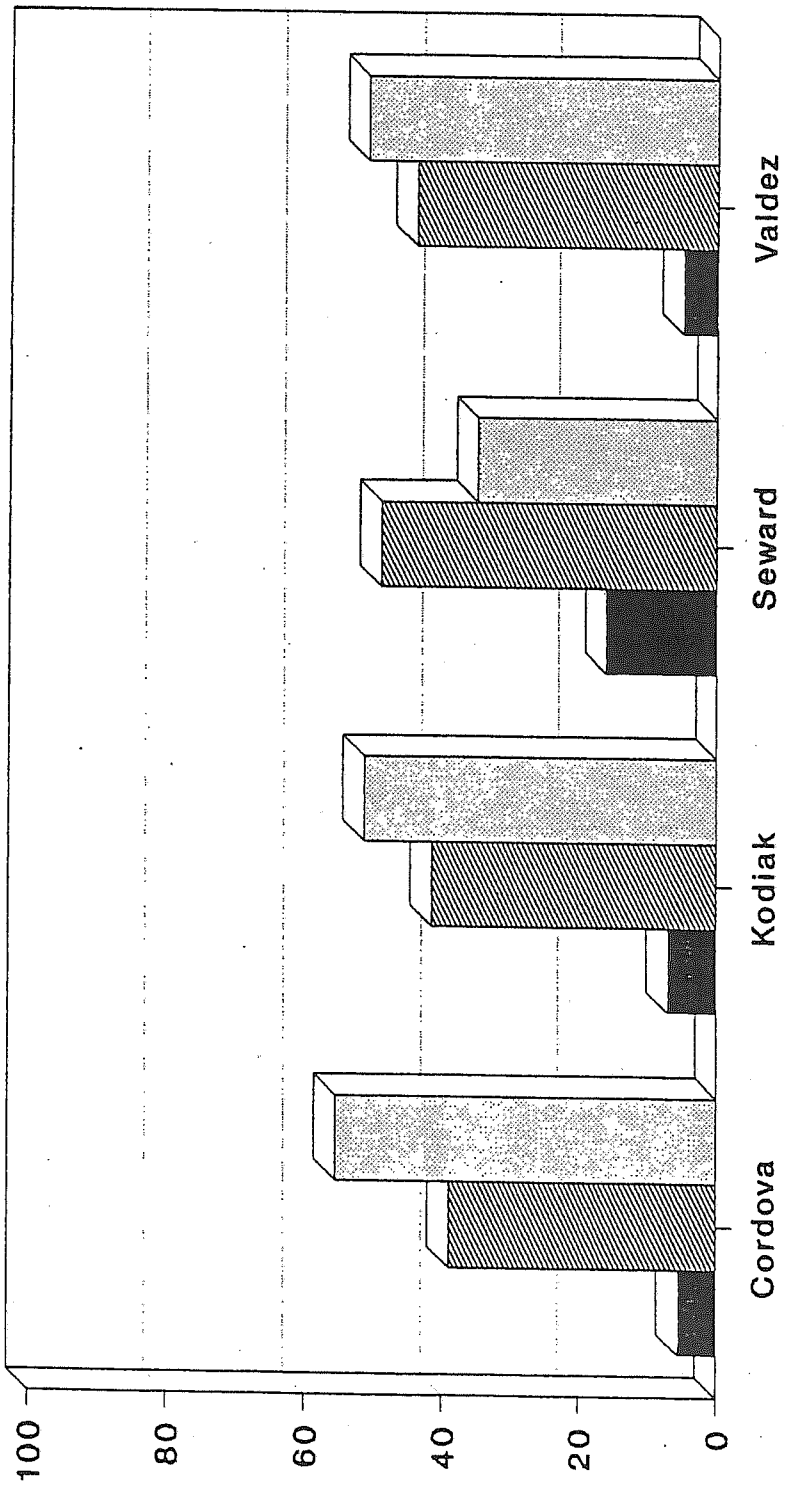


Figure 2.13
Hunting, Fishing and Gathering Activity
Amount of Shared Subsistence Foods
Non-Native Communities



The disruption of subsistence, and the subsequent concern about food safety has adverse implications for the continuation of traditional life-styles. Interview data suggest pervasive concern with the safety of subsistence foods and the consequences of altering eating habits to include store-bought foods. Foods from commercial outlets are believed to be less healthful than subsistence foods, in addition to being expensive. Elders in villages appear to be among the most affected by conflicts of substituting store-bought foods for subsistence foods. Interruption of the cycle of activity associated with subsistence has important symbolic significance for continuity in maintaining Native culture. For example, according to one local resident:

> It was very stressful because, you know, in the summertime that's when a lot of the elderly or a lot of the women are left behind to tend to their family, tend to their children. This is a time to share, a time to gather. This is how you show them this is how you survive in a village. You go down to the reef and you pick the bidarkies, you pick seaweed, you eat snails, you taught your kids the way life used to be . . . this summer you couldn't do that.

Another person speaking about the disruption of subsistence indicated similar concerns:

> When we worry about losing our subsistence way of life, we worry about losing our identity . . . It's that spirit that makes you who you are, makes you think the way you do and act the way you do and how you perceive the world and relate to the land. Ninety-five percent of our cultural tradition now is subsistence . . . it's what we have left of our tradition.

The disruptions to maintaining Native culture have raised pervasive fears and have increased fundamental concerns about cultural survival for many in affected Native villages.

In addition to general subsistence activities, questions focusing specifically on fishing were asked. Fishing was divided into commercial, subsistence, and sportfishing. Virtually all respondents in the survey engaged in at least one form of fishing: 44% fished commercially, 52% fished as part of their subsistence activities, and 74% fished for sport (the categories are not mutually exclusive). The rate of subsistence fishing was at or near 100% in several of the Native villages. In eight of the study sites, at least half the respondents fished commercially. Overall, Native villages tended to have a higher percentage of commercial fishing than the non-Native villages. Because of this dependence on marine resources in

Native villages, they were more vulnerable to spill-related disruptions from the start, and will remain so.

- 45% of those who fished said that their usual areas for fishing had been directly damaged by the spill.
- For those in Native villages, the range was 50% to 100% saying that there was direct damage.
- Overall, 72%, including Native and non-Native communities, indicated that the spill prevented their normal fishing activities. This was a result of the official closure of areas to fishing activities and restrictions on the type of fishing activities allowed in other areas.
- For Native villages, those saying the spill prevented fishing ranged from 80% to 100%.

These figures refer only to the *direct* effect of the spill on fishing activities. Fishing activities were also curtailed due to the hiring of fishing boats and workers to engage in cleanup-related activities. Low fish prices were reported as a factor in reduced commercial fishing for some respondents. Overall, then, the spill affected fishing activities of respondents in a number of ways, both directly and through the changes in local economies brought about by the cleanup.

Uncertainty and its social and psychological impacts was a repeated theme in the comments of many of those engaged in subsistence and commercial fishing in the aftermath of the spill. For example:

> . . . We don't know when we go out in the Sound to fish whether or not we'll be concentrated all in one area and whether we'll continue to see dead animals. It's really hard seeing all those dead animals.
>
> Hard to say [what the effects will be]. It depends on if our salmon run returns. They won't know for two or three years. If fishing is down it will affect all our incomes. My daughter and son-in-law were planning on coming over [to Cordova] and buying into my [fishing] business this summer but now they are uncertain -- don't know how the business will do.

> It affected my fish planning. There was less money, no halibut fishing, hard to plan for the future. [The spill] has caused family problems.

These statements illustrate the complex ways disruptions caused by the spill affected all areas of people's lives. The repeated theme of uncertainty emphasizes the magnitude of social and psychological impact in the study communities.

2.6.5 Public Safety Activity as an Indicator of Social Impact

Police activity records provide another set of indicators of social disruption in communities. Typically, police departments keep detailed records of the number of calls received and arrests made for a range of offenses. The largest increases in social disturbances occurred in communities that were inundated with newcomers in connection with cleanup operations. (There may be communities with larger increases in social disturbances, but only those communities with records could be included in this analysis). Sharp increases occurred in large communities such as Valdez and small ones such as Whittier. The total number of police responses, DWIs, and misdemeanors in Valdez rose sharply beginning in April 1989 (Figures 2.14 - 2.16).

Annual comparisons of police activity for 1989 and years prior are another way of showing increases in disruptive behavior associated with the oil spill and cleanup. Tables 2.7 and 2.8 provide a comparison of annual summaries from Valdez and Whittier for the years 1988 and 1989 and summary comparisons. Statistics for the year 1976 are presented for Valdez; 1976 was at the height of the pipline boom in the community, and comparisons may be drawn between the pipeline and spill booms in public safety activity.

Figure 2.14
Total Police Office Responses
City of Valdez
1988 and 1989

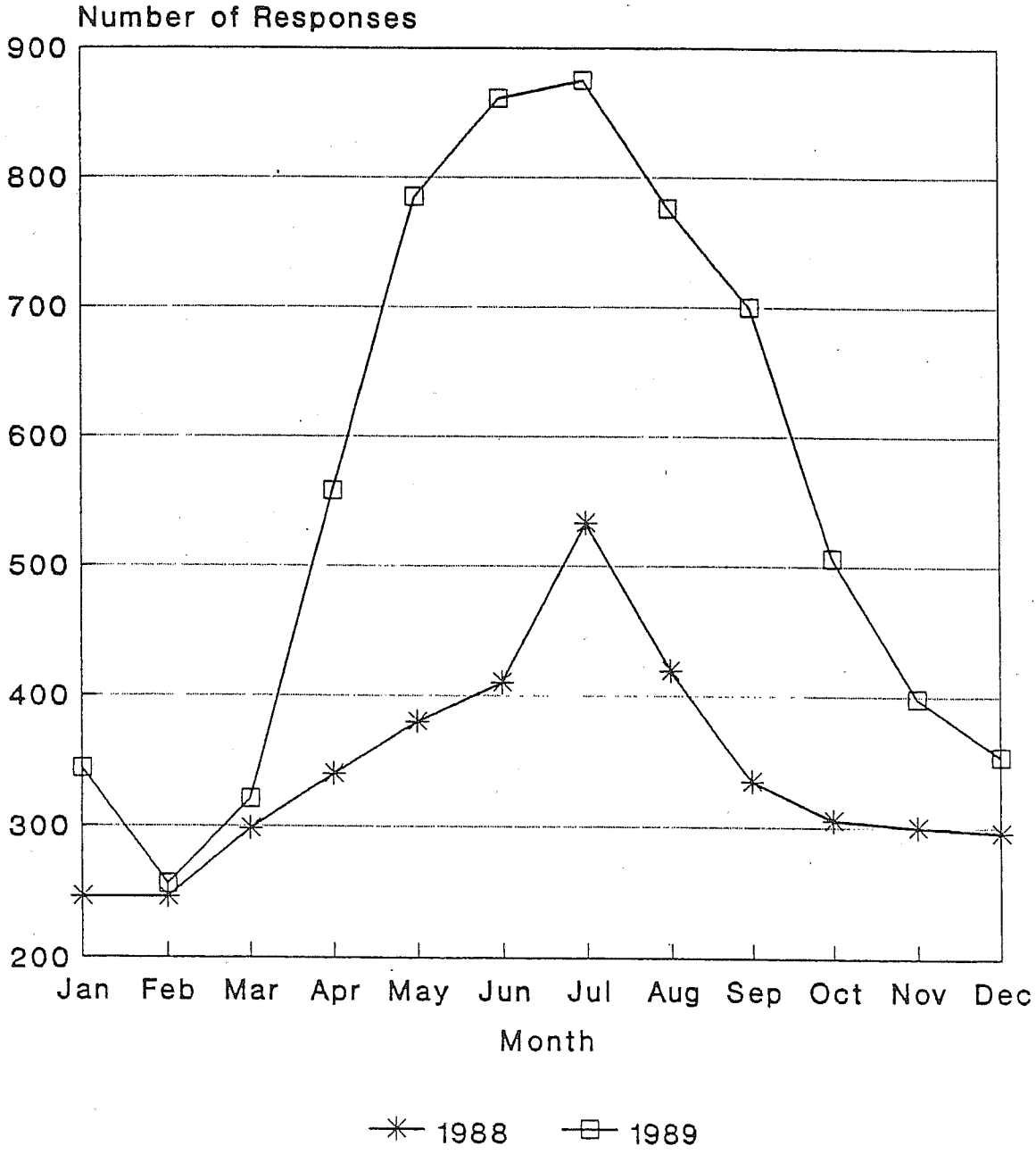


Figure 2.15
Police Officer DWI Responses
City of Valdez
1988 and 1989

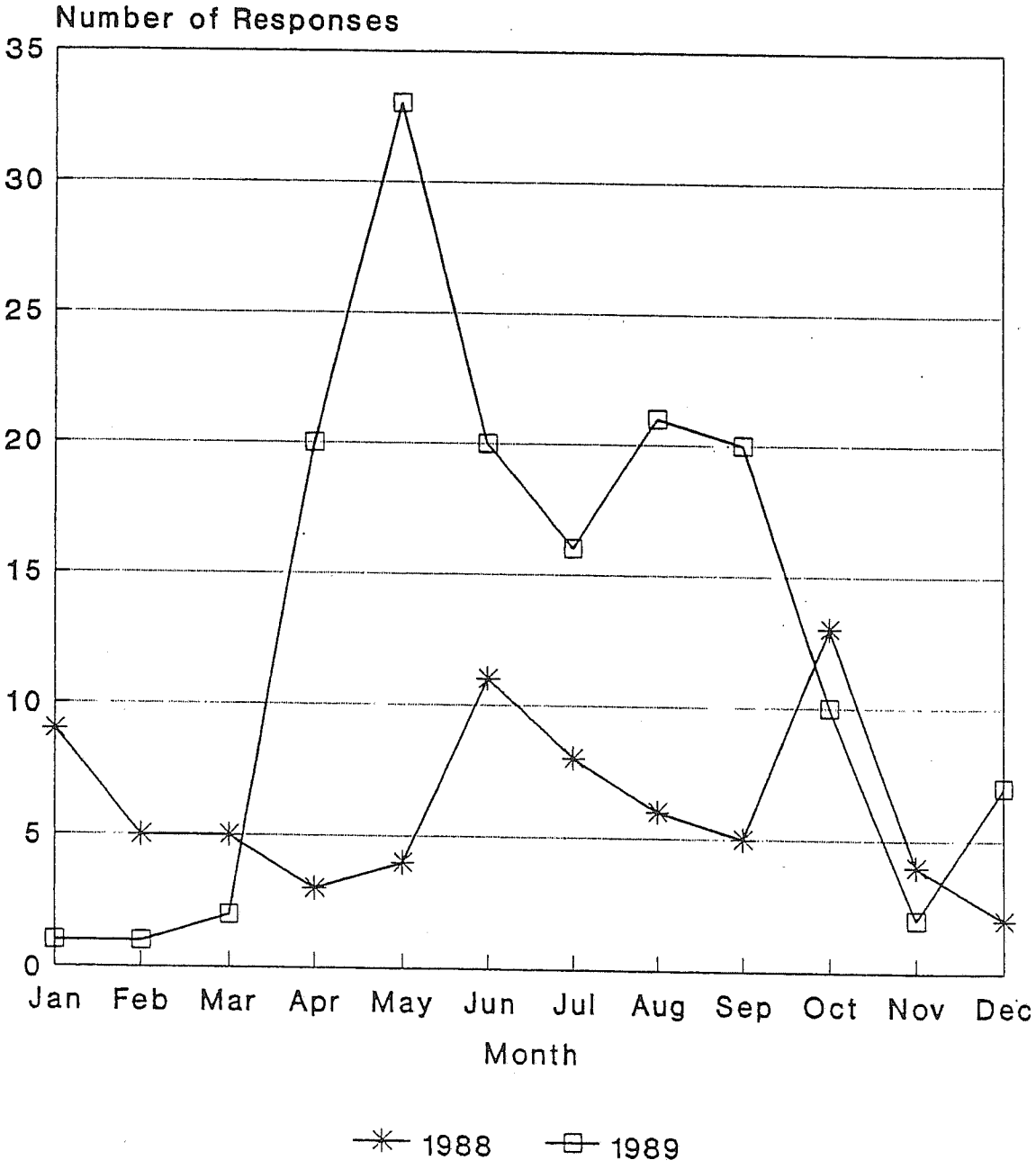


Figure 2.16
Number of Misdemeanors
Valdez Superior Court
1986-1989

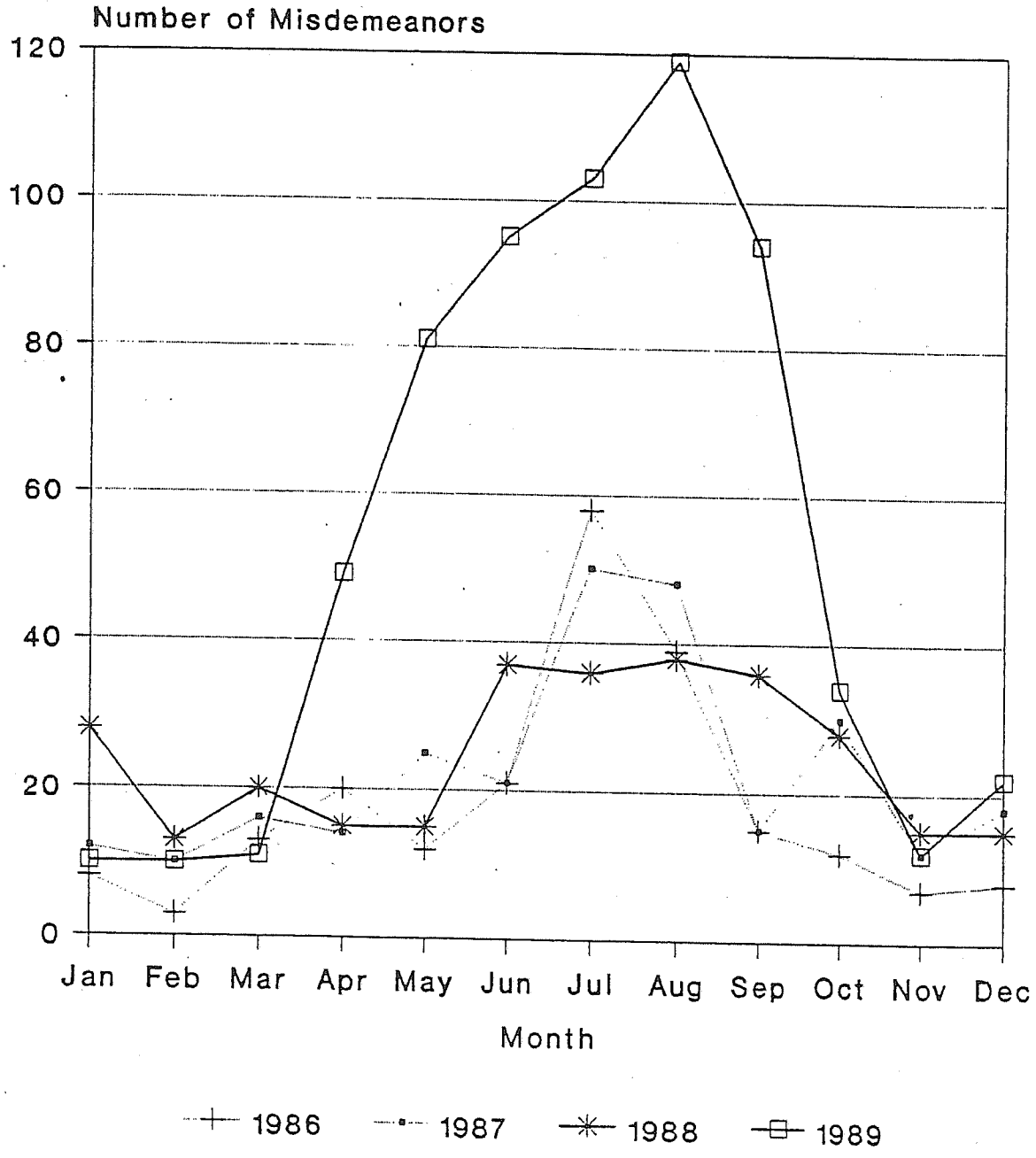


Table 2.7
Valdez Police Department Crime and Officer Statistics, 1976, 1988, and 1989 Compared

Activity	1976	1988	1989	1988-89 % Increase
Assaults	96	34	58	70.6%
Accidents	469	112	298	166.1%
Bar disturbances	205	56	130	132.1%
Disturbances	54	149	359	140.9%
Driving while intoxicated	NA	76	153	101.3%
Person-days in jail	520	1,845	2,660	44.2%
Traffic tickets	1,079	200	456	128.0%
Arrests	346	301	673	123.6%
Officer responses	4,762	4,111	6,734	63.8%

Source: Valdez City Manger's Office; Valdez Department of Emerge-

Table 2.8
Whittier Police Department
1988 and 1989 Comp

Activity	1988		
Total calls for service	337		
Total arrests	39		
Total cases reported	79		
Detoxification holds	n/a		
Incidents (noncriminal)	157		.9%
Alcohol-related calls	10		600.0%
Domestic violence calls	3	12	300.0%

Source: Whittier Police Department

These data show the range of problems encountered in only two communities, although they are illustrative of the types of social problems that emerged after the oil spill in a number of affected communities. While not necessarily representative, in a statistical sense, of all affected communities, the data nevertheless provide evidence of some of the social impacts of the spill and cleanup.

2.6.6 Risk Perceptions and Threat of Recurrence

In terms of perceptions of personal risk and environmental damage, it is clear that in virtually all of the communities studied, the majority of residents think that it will take *at least* five years for the physical effects of the oil spill to go away.

- 74.1% of those interviewed felt that the effects are permanent, or at least would be present for the rest of their lives.
- 50% of those interviewed said that the spill would still be having negative effects on their families in five years.

When asked about their estimates of the duration of spill effects, answers such as the following were typical:

> I don't know. When you think about all the [dead] animals, maybe 50 years. It takes crab years and years to grow . . . The dirty water will keep fish out of the water and will affect the growth of things that are here. (English Bay)

> I was programmed from some of the meetings. They had us convinced it would only take a couple of years, but I saw oil underneath the gravel areas that were cleaned. It's going to take a lot longer than they think. (Kodiak)

The fact that many people's subjective estimates of the severity of oiling in their local area differed from official figures is characteristic of such technological disasters. Technological disasters, particularly those with an unknown potential to cause major environmental damage, are likely to be feared by those exposed. People will understandably interpret the event as having caused significant and irreparable damage if that is consistent with what they have seen, read, and heard about the event. It is each individual's subjective experiences of the spill that determines the level of psychological distress he or she experiences.

Consequently, in assessing the psychosocial impacts of the oil spill, scientific estimates of oiling and damage are irrelevant, particularly when they are of dubious veracity or contradicted by other evidence. What is important is how individuals have come to define the event in their own minds. Different individuals within the same community consequently may experience the same disaster differently. Differing perceptions of the disaster can become the basis of dissonance, divisiveness, and conflict in communities.

Perceptions of the threat of disaster recurrence were assessed by asking people what they thought the likelihood of another spill in the next ten years was. In virtually all the communities, half or more of those queried thought that another oil spill was "very likely" or "almost certain" within the next decade. This indicates pessimism among residents that effective steps have not been taken to prevent a future catastrophe. This pessimism can also reflect an underlying psychological distress over the handling of the spill and the cleanup: 60% of those interviewed thought that Exxon/VECO's clean up was "not very effective" or "not at all effective." There was some variation by community. Percentages saying the cleanup was not effective ranged from 23% in one Native community to 73% in another village.

2.7 Recommendations

Following are recommendations for avoiding similar social and psychological impacts in the event of a disaster such as the *Exxon Valdez*. The recommendations mainly focus on the expansion of services. However, we wish to emphasize that local awareness of the impacts sustained in the aftermath of the *Exxon Valdez* oil spill constitutes a substantial step in preparing to deal with any future disasters. This awareness gives mental health service providers, among other local service providers, an idea of what can be expected in case of a disaster so that accommodations to increased demand in certain areas can be made.

2.7.1 Increase Mental Health Services

The findings presented in this section indicate that the expansion of mental health services to the communities within the exposed region is essential in order to handle increased cases of depression and generalized anxiety disorders and a high rate of post-traumatic stress disorder. The need for these services becomes even more critical when examined in the context of rates of alcohol abuse, drug abuse, domestic violence, and mental disorders throughout Alaska. For instance, alcohol was involved in 52% of all fire deaths, 80 percent of successful suicides, 68% of all drownings, and 52% of all traffic fatalities in Alaska in 1980 (Smith and Hardee 1983). More recent data indicate that alcohol-related (including alcohol psychoses, alcohol dependence syndrome, nondependent alcohol abuse, and

alcoholic cirrhosis) deaths among Alaskan Natives statewide in 1986 was 27.7 per 100,000 population.

Mental disorders and alcohol and drug abuse have also contributed to the dramatic increase in the suicide rate in Alaska since the mid-1960s. The annual age-adjusted suicide rate for all Alaskans during 1983-1984 (21 per 100,000 population) was 1.8 times the national average. The annual rate of suicide in Native Alaskans (43 per 100,000 population) was 2.2 times the rate in non-Natives (19 per 100,000). The years of potential life before age 65 lost to suicide for Natives was 1,684 per 100,000 population, 3.4 times the rate for non-Natives (Hlady and Middaugh 1986, 1988). Native suicides are more likely to be alcohol-related than non-Native suicides (Hlady and Middaugh 1986, 1988).

Alcohol, drug, and other mental disorders also represent a significant burden on existing health and social services throughout the state. Mental disorders accounted for 14,696 outpatient visits and 577 inpatient admissions in AANHS facilities in FY 1987. Excluding alcohol-related injuries and chronic diseases, alcohol abuse accounted for 2,397 outpatient visits and 341 inpatient admissions in Alaska Area Native Health Service (AANHS) facilities in Fiscal Year (FY) 1987 (AANHS 1988). Alcohol abuse was the third leading cause in inpatient days and the fifth leading cause of hospital discharges in AANHS facilities during FYs 1986-1988 (AANHS 1989). Alaskan Natives accounted for 53.3% of all clients served by drug and alcohol rehabilitation programs statewide in 1982-1983 (Smith and Hardee 1983). The admission rate of Alaskan Natives to the Alaska Psychiatric Institute is almost 2.5 times greater than the admission rate for non-Natives and 1.7 times greater than the admission rate for the total U.S. population (Smith 1977; Kraus and Buffler 1979).

In addition alcohol, drug, and other mental disorders represent a tremendous financial burden. In 1983, it was estimated that substance abuse in Alaska cost an estimated $180 million in services for abused and neglected children with alcohol- or drug-involved parents; death, injury, and property damage from alcohol-related traffic accidents; high- risk automobile insurance; Aid to Families With Dependent Children (AFDC), disability, and medicaid with alcohol involvement; criminal justice system costs for alcohol-related offenses; and lost income to families whose head of household has an alcohol problem (Smith and Hardee 1983).

Alcohol abuse in particular represents a tremendous financial burden to the individual and his or her family. Research has demonstrated that untreated alcoholics and their families have greater general health care costs than alcoholics and their families who are in treatment. These studies also demonstrate that alcohol treatment costs reduce general health care costs.

These disorders also represent a tremendous social cost to the state of Alaska in general and Alaskan Natives in particular. Domestic violence or child neglect is often associated with alcohol abuse (Shinkwin and Pete 1982; Smith and Hardee 1983), and alcohol is involved in approximately 80% of all violent crime in Alaska (Smith and Hardee 1983).

Mental health and substance abuse programs should be targeted to high risk groups within the affected communities, including women, young adults between the ages of 18 and 24, Alaskan Natives, and residents of small communities. The high response rates on questions concerning increased drinking and drug abuse and problems with drinking and drug abuse in the community and among family and friends suggest a willingness to acknowledge a problem with alcohol and drugs in the affected communities. In contrast, the response rates on questions concerning domestic violence were lower, indicating less of a willingness to acknowledge this problem. Residents living in the affected communities should be provided with increased drug and alcohol abuse services. In small, predominately Native communities, such services should be directed at the level of the household or community rather than the individual level. Our understanding of traditional Alaskan Native cultural modalities relating to illness and healing suggest that a group-centered approach would be more effective than an individual-centered approach to intervention and treatment.

2.7.2 Increase Primary Care Services

The high rates of depressive symptoms, generalized anxiety disorder, and medical conditions verified by a physician, combined with a significant decline in perceived health status, suggest that primary care (village clinics, regional health services, community health aides) will be severely impacted by the oil spill and subsequent cleanup efforts for the next few years and possibly longer. Other research has found that patients with depressive symptoms, even in the absence of clinical depression, had poor functioning as assessed by physical limitations, role performance, social activities, and number of bed days; their symptoms were thus of considerable clinical significance (Wells et al. 1989). Poor well-being and functioning are also of policy interest because of the societal costs due to loss of productivity, increased family burdens, and any associated use of health services (Lehman, Ward, and Linn 1982). This utilization does not extend merely to mental health services. Most persons suffering from clinically significant depressive symptoms do not receive treatment, and most in treatment consult a primary care physician rather than a mental health service (Goldberg and Huxley 1980; Weissman and Myers 1980). Reluctance to seek mental health services is particularly salient among Alaskan Natives because of the shame and cultural stigma associated with alcohol abuse and mental disorders (Klausner, Foulks, and Moore 1980; Kost-Grant 1983) and the constraints imposed on access to mental health care, especially in villages, by the necessity of leaving one's home, often for long periods. Respondents meeting criteria for somatization (those reporting a decline in perceived health

status since the spill) are more likely to use health services than nonsomatizers; of those respondents meeting criteria for a psychiatric diagnosis, somatizers preferentially use medical over mental health services (Escobar et al. 1987).

To meet this impact on primary care services, funds are required for additional primary care health providers in the affected communities. Additional training is also required to acquaint primary care health providers with psychological disorders and psychosomatic complaints resulting from exposure to the oil spill.

2.7.3 Increase Economic Assistance to Affected Communities

The unequal distribution of income acquired from participation in cleanup efforts appears to have contributed to community fragmentation and conflict. Efforts should be directed to redressing these inequities, especially if the long-term physical consequences of the spill continue to disrupt commercial fishing activities in the region.

2.7.4 Increase Contingency Planning Efforts

Contingency plans and response structures should be constructed that identify, among other things, leadership structure, the division of labor, decision making, and fiscal authority. Such planning can decrease the potential that local resources are overwhelmed by the need to innovate responses to an event. These contingency plans should include structures that can prevent or mitigate the effects of social disruptions; displacement of government, business, and household plans and actions; and prepare for increases in psychosocial distress.

Disasters tend to intensify or exacerbate ongoing social trends and problems. Community decision makers and social support services should be prepared for noticeable increases in alcohol abuse, drug use, crime, domestic violence, and child abuse, particularly if these were ongoing problems in the community prior to the disaster. Preparation for these problems should be proactive, not reactive.

Response efforts should avoid privatization as occurred in the *Exxon Valdez* oil spill because of the potential for extensive social disruption that results from unequal economic opportunities and competition for wage labor. Local level input into regional or statewide plans is essential so that local expertise and knowledge can benefit the overall response effort.

Contingency planning for future events of this type should also include consideration of the sheltering and feeding of significant numbers of outsiders who will enter the area to work

on containment and cleanup. Social impacts on small communities will be lessened if temporary facilities are planned to house and feed work crews. This will reduce the negative consequences of sudden increases in demands on existing housing stocks and food supplies. The provision of temporary shelter after natural disasters can be taken as a model in emergency preparedness plans for the communities affected by the *Exxon Valdez* oil spill.

2.7.5 Increase Information Dissemination Capabilities

A first priority is establishing a process of communication to keep the community informed about the nature and progress of the disaster. This communication process should also include structuring information gathering sessions from state, federal, and private entities who have knowledge about development of the disaster event. Rumor control must be part of the communication process. The communication process should also be structured to respond to information about the potential health effects of toxic substances, spilled oil, or other health-related concerns.

Communities must establish an information network to provide local and regional information on such disasters to the general public. Each community should have a public information officer or an equivalent to provide citizens with complete current information on the disaster and responses to it. Relevant political entities should establish informational hot lines to answer individuals' questions. Public forums should be scheduled a regular basis. Relevant officials from all concerned entities should meet with the public to answer questions and to address local concerns. The public forums should also be a mechanism for the dissemination of current information.

Households should be directly provided with practical information on how to cope with the range of common reactions to crises such as the oil spill. This information should emphasize simple techniques and activities that families can engage in to reduce stress and related interactional difficulties.

2.7.6 Increase Community Involvement in Disaster Response

Community leaders and organizational decision makers should institute mechanisms that provide for significant citizen involvement in all phases of response to, and recovery from, the disaster. The involvement of citizens as individuals and groups both improves morale in communities and reduces the stress of the disaster on individuals and families. The lack of control and involvement is generally experienced as alienating and demoralizing.

Social support networks are important in helping families cope with the various demands of disaster. Communities leaders should anticipate the disruptive effects of disasters on support networks. Enhancing informal support networks in ways appropriate to local conditions (or the provision of equivalent formal support services) will mitigate stress effects on families. Enhancing support networks should be part of predisaster planning and should include a range of community institutions and organizations.

2.7.7 Additional Research

Additional research is recommended to both address some of the limitations of this study and to examine the long-term consequences of the oil spill. As with any cross-sectional study, it is more difficult to determine causality in the observed relationships. For example, the cross-sectional design employed did not enable us to determine whether rates of psychiatric disorders or levels of perceived social support were different before and after the spill in the exposed communities. However, the consistent pattern of increasing rates of psychiatric diagnoses with increasing exposure to the spill and subsequent cleanup efforts does suggest a dose-response relationship. Nevertheless, the existence of a causal association between the oil spill and patterns of social and psychiatric disorder can best be determined by comparing baseline measures of these conditions with a set of prospective measures across time.

Despite these limitations, the implications of the findings of this study are clear. When the *Exxon Valdez* ran aground in Prince William Sound, it spilled oil into a social as well as a natural environment. That spill resulted in a decline in traditional social relations and subsistence activities and increased rates of depression, anxiety, and post-traumatic stress disorder. It also resulted in perceived increases in the amount and problems associated with drinking, drug abuse, and domestic violence and declines in perceived health status. Further research can help to determine whether these impacts are transient or whether they are consequences of permanent changes in the sociocultural fabric of these communities. Most respondents believe that the spill will have long-term effects. The incidence of post-traumatic stress disorder may not exhibit a significant increase from baseline levels for another two to five years. Psychological stress resulting from profound changes in social relations and economic activities may increase over the long term as these changes become more firmly embedded in the sociocultural framework of the exposed region. Medical conditions and psychological disorders will have an impact on future community relations and economic productivity. Increased alcohol and drug abuse will have direct costs in terms of health care and indirect costs in terms of unemployment and lost productivity. Increased alcohol and drug abuse will also contribute to increased community fragmentation and conflict. The belief that the effects of the oil spill on the environment are permanent or

may last for several years may affect future plans of these families to remain in the communities.

3.0 AN OVERVIEW OF OPERATIONAL AND FISCAL IMPACTS TO LOCAL GOVERNMENTS

> "Coming in at 8:00 a.m. Sunday when Exxon demanded a meeting . . . I'll never forget it . . . I was already frustrated because the council hadn't had a quorum and hadn't adopted the budget and all this work I was trying to do in the middle of the whole mess, basic city work wasn't being taken care of and that's what I mean: the whole city operation came to a standstill . . ."

Many local governments "came to a standstill" as a result of the *Exxon Valdez* oil spill and cleanup. From March 24, 1989 until well into 1990 the usual business of local governments were displaced by constant interactions with Exxon. These interactions included attending meetings, negotiating, preparing billings for reimbursement, organizing cleanup efforts, and otherwise becoming enmeshed in how Exxon and VECO imposed the cleanup process. The fiscal, personnel, and other resources of government were redirected to spill response. Plans for community development, capital improvements, and other programs were suspended in favor of spill response. The most radical examples of such disruption are in Native villages such as English Bay and Akhiok where local government operations were essentially suspended while workers and leaders took oil spill response employment. The dominance of the oil spill in the operations of local governments and the types of fiscal costs incurred in this response effort are the subjects of this section.

Section 3.1 presents a summary of the effects of the oil spill on day-to-day local government operations, focusing on the types of disruptions of usual business and the displacement of personnel and other resources that happened as a result of the oil spill. Section 3.2 summarizes the types of expenditure and revenue issues that emerged for local governments, focusing on categories of expenditures and revenues rather than on the amounts of gains or losses. This qualitative assessment of fiscal impacts is a direct outgrowth of how the Oiled Mayors wished this study to be performed. Consultations with finance directors from several communities resulted in a focus on expenditures and revenues for 1989. However, since the fiscal impacts of the spill extended beyond December 31, 1989, a compete fiscal impact assessment has yet to be performed. Instead, we use fiscal data to demonstrate the kinds of expenditure and revenue categories in which impacts occurred. Section 3.3 presents recommendations to avoid or ameliorate impacts to local governments based on lessons learned from the *Exxon Valdez* oil spill and cleanup experience.

3.1 Operations Impacts to Local Governments

Impacts to local government operations refers to the ways in which the day-to-day operation of municipalities was affected by the oil spill and cleanup activities. In this context we are referring to the ability of the police, fire, harbor, parks and recreation, public works, utilities, library, planning, finance, and other departments to maintain their usual levels of functioning. In addition to changes in departmental functioning, this analysis points out the breadth of effects of the oil spill and cleanup on local government employees. This includes the demands on employees' time and the ways they managed to integrate the responsibilities created by the oil spill into the daily routine.

Based on a thorough content analysis of field data, three general categories of impact have emerged:

- Constraints on effective functioning.
- Changes in political context.
- Interactions with extra-community institutions.

This section will address themes and issues in each of the above areas and provide the reader with an idea of the extent and magnitude of impact.

3.1.1 Constraints on Effective Functioning

Communities were faced with constraints on effective governmental functioning and provision of basic services as a result of the oil spill and cleanup. These constraints fall into the following general categories:

- Excessive demands.
- Lack of communication.
- Leadership style.

Experiences in these categories are elaborated in turn in the following sections.

Excessive Demands

Excessive demands that impinged on effective functioning may be broken down into two topical areas: demands on *municipal governments* and demands on regional *Native service provision organizations*.

Demands on Municipal Governments: Perhaps the most serious impact to local governments consisted of the excessive demands placed upon individuals in their capacity as community officials. This problem most severely affected the small communities where each person's contribution to the functioning of the community was vital. In many cases municipal employees gave up their jobs for the higher wages paid by Exxon and VECO. Consequently, fewer people were available to manage the increased work load presented by the oil spill. Overtime hours exceeded budgeted allotments and only in some cases were municipalities reimbursed for these expenses. Reimbursement by Exxon required detailed logging of expenses which was only possible for the larger communities where staff were available to maintain the logs. In the smaller communities, logging department expenses was impossible. Often one person wore the hat of more than one position as employees left and demands arose. For example, the Village Public Safety Officer (VPSO) in Chignik Bay headed up the emergency response for the Chigniks, and for a short period acted as the mayor.

One consequence of the excessive demands placed on local municipalities was the disruption of regular municipal operations, even in the larger communities. A particularly costly impact for small communities in this regard was the inevitable foregoing of grant writing for future funding of human services and capital improvements. Municipal officials simply had no time to attend to these duties in the face of the oil spill emergency. Almost without exception, such opportunities were lost and not reimbursable by Exxon. Routine maintenance of city property, such as sewer lines and snow plows, was not performed because of excessive demands on city employees from the oil spill and in some cases such lapses cost municipalities down the line because of malfunctions. And finally, the mere presence of Exxon or VECO cleanup operations in a community was disruptive to the routine functioning of municipal business because of the demands they placed on space and use of city property. Following is a comment from a department head:

> Like I said, we virtually shut down here for three weeks. I'm trying to think of what projects we were in the middle of. We've been in a long negotiating process for acquisition of a school site. That was postponed after [the oil spill]. We had

> hoped to start this wetlands identification process in the summer which was postponed until the fall. Just no one to take the lead, I guess.

Following are specific examples from various communities of how local government departments were affected by the oil spill and cleanup. Bear in mind that the best statistics came from the larger communities because they were typically able to retain staff and keep consistent records. Similarly, impacts to local governments in the smaller communities were more difficult to document although, in most cases, they were more devastating.

Administration/City Clerk/Finance

Larsen Bay: Almost all city employees left their jobs to work on the oil spill. The mayor became involved in Oiled Mayors meetings and few people were left in city positions. Those who stayed at their jobs were unable to take vacation time because there was no support staff to remain in their absence. In addition, council meetings were delayed because of the lack of a quorum for three consecutive months and city projects, such as the "mini-hydro project," were deferred.

Port Lions: City employees were used to build log booms with city equipment, sometimes on the payroll of the city. Although some of the labor costs were reimbursed by Exxon, the amount of bookkeeping increased. The number of W2 forms filed for 1989 increased to six times the average amount.

Seward: The regular work of the city clerk's office could not be deferred because of the oil spill. Consequently, employees worked an average of 14 hours per day while the Emergency Operations Center was operating. Oil spill-related work accumulated in the city clerk's office even after the community-based Emergency Operations Center was dismantled and its functions were taken over by the Multi-Agency Coordinating (MAC) group.

Public Safety

Kodiak: Many volunteer fire fighters left the force to work on the cleanup. Instead of the average five or six volunteers, following the oil spill there was usually only one or two available to assist the paid staff in responding to call-outs. In addition, there was an increase in emergency medical service calls of 57% in June and 86% in July 1989 compared to the same months in 1988.

Seward: Police department activity increased markedly between the months of April and September 1989 over the previous three years as measured by total arrests. Comparing 1988 and 1989, increases in total arrests were approximately 33% in April, 55% in May, 11% in June, 26% in July, and 31% in September. Also significant was the increase in alcohol-related offenses. While the number of alcohol-related offenses decreased by 11.4% between 1987 and 1988, the number rose 50.2% between 1988 and 1989.

Valdez: Demand jumped dramatically for police, fire, and emergency medical services (EMS) over activity levels of the previous year. Police activity was up across the board, and included a 140% increase in disturbance calls, a 124% increase in arrests, a 166% increase in accidents, and a 71% increase in assaults. Fire alarm call-outs increased by 88%. Ambulance call-outs increased by 115%.

Library/Museum

Seward: The primary impact to the library from the oil spill came from increased use of the facility as a place to pass time. The lounge area for recreational reading was constantly full of transient workers leaving little room for residents' use. Oil spill workers were unable to obtain library cards so circulation was not affected.

Seldovia: A volunteer librarian complained that many parents would "dump" their children at the library when it was open because there was insufficient child care elsewhere. Moreover, the multi-room at the library, which also houses administrative offices, was used by VECO and others, making it difficult to conduct business and creating " too much commotion for a library atmosphere."

Valdez: A record 1,488 new library cards were issued and the library saw intense demand as requests for information on the community and local oil operations skyrocketed and the library became a resource repository for oil spill information and related research. The library was also jammed with oil spill workers looking for a place to pass the time. On the other hand, the museum guest count in August and September was down by over 4,500 persons per month as tourism plummeted.

Engineering/Community Development/Utilities

Chenega Bay: The test sites established for the mariculture program, which the village had initiated with help from the North Pacific Rim, were completely destroyed

by the oil from the spill. The village administrator said the loss of the test sites was a "major blow to a project into which they were putting all their hopes."

Port Graham: The village normally employs someone to use the village truck to gather firewood and water. During the cleanup period, they couldn't find anyone interested in the job. This was a loss of an essential service since the elderly in particular are very dependent on such services. In addition, work on the dam was postponed due to lack of employees.

Valdez: Demand to the engineering department included building code enforcement, mobile home installation, building permit requests, sewer treatment plant operations, and water demand. Residential and commercial building permits issued more than doubled between 1988 and 1989. The community development department was hampered by new businesses, itinerant merchants, zoning questions, temporary structures, land leases, and land use permits.

Parks and Recreation

Seward: Typical summers require employment of eight temporary hires at the campground and four at the pool. During the summer of 1989 there were never more than four working at the campground and two at the pool at any one time. In response to early demand for use of the campground by transient workers, the city decided to officially open and begin collecting fees. However, this turned out to be a financial loss to the city and a further drain on police resources as the transients claimed they were unable to pay park fees ("while sitting next to three cases of beer."). Many drove recklessly, became rowdy, and verbally abused law enforcement personnel.

Valdez: This department had responsibility for temporary campgrounds, summer child recreation, and supervision programs. These all experienced significant increases in demand. As measured by revenues, there was an almost 300% increase in rental activities at the civic center, another responsibility of the department.

Counseling Center/Hospital

Valdez: The average number of new clients per month at the counselling center increased by 82%. Crisis calls to the Advocates for Victims of Violence during March through September 1989 increased 502% over the same period the previous

year. At the community hospital, outpatient procedures increased 100%, while emergency room visits increased 124%.

Whittier: Although the workload at the medical clinic didn't increase substantially according to clinic records, the receptionist at the clinic was frequently called out on emergencies in her capacity as an Emergency Medical Technician II. Consequently, the physician's assistant was left to run the clinic on her own. Because of the continuous demands on her time, she was unable to maintain records, which explains why clinic records do not reveal the high level of activity. At least half the overtime worked was not tracked because the clinic was too busy.

Public Works

Chenega Bay: The village land dump was severely affected by the cleanup effort. According to one village official, the excessive tonnage from the cleanup activities "cut the life [of the landfill] down by several years."

Port Lions: The city dump was overused from additional waste from consumer products due to the increase in the number of people in the community. Garbage collection increased to double, sometimes triple, the normal amount.

Valdez: The public works department was required to provide water and sewer service under conditions of unprecedented demand. No routine or preventative maintenance on roads, buildings, or heavy equipment was performed because of operating in a crisis mode. Collection of solid waste increased four to five times the normal volume; five to six years worth of landfill space was used during the summer of 1989.

Ports/Harbor:

Kenai: The biggest impact to any city department in Kenai was to the city dock facility which lost revenue with the closing of the driftnet fishery. The city submitted a claim to Exxon for $40,000 and, in the end, was able to recoup most of its losses from $32,000 compensation.

Seward: Lack of manpower to assist in the distribution of booms and other oil spill-related work persisted because the city was unable to compete with VECO wages. In addition, the harbor master was ordered by the city administration to assist in

local shore monitoring. This left the two office clerks to take care of all the business at the harbor itself.

Valdez: Activity at the container terminal increased a hundredfold. Transient mooring agreements for 1989 exceeded those for 1987 and 1988 combined. Boat lifts increased over 75%. Flight loads at the airport increased by a whopping 2,400%.

Education

Akhiok: The school lost staff substitute teachers and school aides during the 1989-1990 school year because these jobs became less desirable in light of the high wages many received working on the cleanup. As an informant explained:

> Before the oil spill, a job at the school was something that everyone wanted because it was steady employment and it was guaranteed for as long as you wanted it . . . Right now they're making a lot of money. They don't want to have to come up here and work at a job.

Seward: Seniors from the Seward high school, who owned boats and were old enough to work for VECO, wanted to drop out of school six weeks before graduating to capitalize on the opportunity to lease their boats for the cleanup. Fortunately, the principal was able to work out a program whereby students could work for VECO and complete school work so that no seniors were compelled to drop out of school. However, this placed extra demands on the principal who was required to spend substantial time trying to accommodate the students in addition to his regular duties.

Valdez: Enrollment for the summer semester at the local branch of the Prince William Sound Community College was down 334% from the previous year.

With this range of demand and impact on local government departments, it is no wonder local governments were ineffective. Departments and individuals had their regular work load in addition to demands brought about by the spill. Typically, not only were department heads called upon to handle increased demands in their own departments, but they were also called upon to perform additional work in areas outside their scope of activity. One way this was handled was through the use of alternative management structures. The types of structures utilized in some of the communities is discussed in section 5.2 below.

Demands on Regional Native Service Provision Organizations: The oil spill and cleanup severely constrained the ability of nonprofit regional Native organizations to deliver essential health, social service, and community development programs to the Native communities they serve. These organizations (e.g., The Kodiak Area Native Association, The North Pacific Rim and the Bristol Bay Native Association) have relatively small budgets that are composed of grant monies from various federal, state, and private sources. Staffing is sufficient to deliver the required programs, but not adequate to accommodate a major change in demand for services or an addition of new responsibilities. The oil spill and cleanup placed excessive demands on these organizations that were almost impossible to respond to because (1) grants had to be written and submitted to acquire money for programs or staff that were needed immediately; and (2) program staff were overwhelmed by the addition of new responsibilities and duties directly related to the oil spill and cleanup. Each of these points deserves brief elaboration.

The fiscal structure of Native regional nonprofit corporations that act as service delivery entities is such that there are relatively few or no discretionary funds other than monies designated by the granting agency for its particular program. Consequently, when there were new demands on these organizations to respond to spill-related problems in the villages, there were no funds immediately available to meet these needs. Thus, problems that required prompt solutions were addressed by writing grants that might produce results months in the future. This was frustrating and demoralizing for some staff in these organizations who perceived the urgency of the needs, but recognized their inability to do anything more than spend additional hours at work. As in many local governments, the staff in the regional organizations often worked extraordinary hours in responding to community needs. Staff in these organizations understood the problems, but at the same time realized they were essentially powerless to help because they were without the financial and personnel resources to do so. Bureaucratic impediments by the state, the federal government, and from Exxon added to their frustration in trying to meet the needs of the affected communities.

> And the bureaucracy was incredible! . . . They want you to write proposals for cripesakes . . . and go through the whole rigmarole, and you're sitting there in crisis, and they're calling and saying what can we do to help you, and you tell them, and they say well write a proposal!

And,

> I was very, very angry and I was very, very stressed out. And -- impotent. I had the anger -- and the absolute impotence. There wasn't anything to do about it! We didn't do anything about the oil, and we couldn't really do

> anything about the village, because (a) we didn't have any money, and (b) there wasn't time to help people in terms of mental health because they were all out working. You know? We had a bunch of little kids running around [too].

Staff in these organizations were also burdened with additional responsibilities that often displaced the work they would have completed otherwise. For example, a senior staff person from the North Pacific Rim reviewed his work log for several "typical days" during the summer of 1989. This log revealed that only two pieces of regular business were accomplished during this time period and the rest of the work was spill-related. The needs from the villages for information, for assistance in dealing with Exxon and VECO, and for support were substantial and meeting these needs displaced other usual business. For example,

> . . . our job was to try and maintain. We had health services that needed to be delivered, in fact we had hundreds of people, thousands of people more than we normally would see. We had child care problems that were just phenomenal . . . all the care givers in the communities went to work somewhere. Any able-bodied person felt it was their job, their responsibility, they needed to help protect their beaches and protect their village. And so grandmas and younger children and people who may not have been . . . fully capable . . . were left in charge of a lot of kids. . . . [People would say] "Here I'll be back in ten days," [and leave their kids with someone] and . . . without putting any blame on anyone for that it was just something that just happened.
>
> All of a sudden there was all this stress, and this demand and folks were going out on work crews and it was important to make money because it was real obvious that they weren't gonna be able to fish, and they weren't going to be able to go clamming. . . . Those were the kinds of questions we were being asked [of us]. Well, what did the villages want? . . . and they were asking questions that nobody could possibly answer. "When will it get here? What will happen? What will it be like afterwards?" And, people whose lives depended on those answers, their way of living. That got real critical and was real scary for [us].

Furthermore, the added administrative workload of dealing with Exxon and conforming to their bureaucratic procedures for reimbursement further added to the strains within these organizations. In an interview with a staff person about this increased workload, it was

reported that all of these additional demands and pressures generated stress which eventually created its own problems within organizations that were short on money, staff, and time, and long on demands to meet the needs of communities they service. Such conditions severely constrained the effective operation of these organizations.

Lack of Communication

Lack of communication typified relationships among community leaders, between community leaders and their constituents, and between community leaders and representatives of outside agencies in a majority of the study communities during the spill and cleanup. Epitomizing the lack of communication that existed is the fact that residents of the village of Tatitlek, located about six miles from Bligh Reef where the *Exxon Valdez* went aground, learned of the accident the following morning from the public media. As a result, decision makers within local governments had a dearth of information with which to adequately address the concerns, fears, and questions of residents. This tended to exacerbate the chaotic atmosphere in communities and foster distrust of outside agencies such as Exxon and VECO. Residents of many communities bypassed authorities to protect their streams, beaches, hatcheries, etc. by voluntarily constructing log booms. This type of action posed potential liability for Exxon because it went against the established line of authority which deemed the cleanup Exxon's (and therefore, VECO's) responsibility only to be surpassed by the U.S. Coast Guard. But more importantly, lack of communication ultimately hindered the progress of cleanup.

Communities which suffered most from lack of communication were typically small, composed of less than 300 residents. Village officials from Tatitlek think the state was more responsive than Exxon and VECO although they had a difficult time communicating with any outside group. The village relied a good deal on telephone calls from Valdez because it was the nearest city and because it became the command center of the spill. However, the telephone service to Valdez was often inadequate and communications with various groups in that city became problematic. When it made sense from a logistical standpoint to include these communities in cleanup operations, or to direct cleanup to these places, and such action was not taken by Exxon or VECO, many community leaders concluded that public relations rather than a thorough cleanup of the oil was Exxon's priority.

The city of Seward is the most striking exception to the general pattern of lack of communication. Despite the potential for conflict resulting from the differences in status of the lands surrounding Seward, those involved in Seward's emergency management effort ultimately unified into what was called the Multi-Agency Coordinating (MAC) group. There was almost unanimous agreement among informants that this action allowed Seward to survive the spill summer with minimal chaos in the community and to mitigate damage to

the environment to a degree that would otherwise not have been possible. Factors unique to Seward which facilitated the formation of a functioning and effective MAC group are:

- Seward's prior experience dealing with emergencies led to development of emergency management procedures which had been previously practiced.

- The long-term residency of Seward's city officials in Alaska had enabled them access to a network of friends in local, regional, and state governmental agencies. This facilitated the acquisition of needed materials and manpower.

- The military background and/or large project experience of some municipal department heads was credited with contributing to an awareness of the logistics of the emergency mobilization of resources and an understanding of the potential resources available through the Interagency Incident Management Team.

Information management techniques that were successfully used in some communities, and Seward in particular, are discussed in section 5.2 below.

Leadership Style

Differences in leadership style between those running the oil spill cleanup effort and local government leaders created difficulties in a number of communities. This was perhaps most pronounced in small Native communities, where differences in ethnicity and cultural understandings regarding the role of leadership were perhaps the most important factors in affecting local government-Exxon interactions following the oil spill. In small Native communities of the spill region, as elsewhere in rural Alaska, it is common for decision making on issues effecting the community to take place by consensus formation, even where the boundaries of authority are clearly delineated and tied to formal offices. Consensus formation is often a subtle and gradual process, and this leadership style is in stark contrast to that used by the Exxon and VECO establishment which featured a hierarchical line of authority and rapid decision making. In many cases, Exxon/VECO operations were conducted as if local leadership were organized along their model, to the effect that village administration and political processes were bypassed. Such action conveyed the message to many community leaders that knowledge and input from and respect for locals was not important. It should be clearly stated that while these difficulties were perhaps most apparent in the Native communities, similar difficulties were experienced in nearly all communities. In many Native communities regular political processes work toward the formation of unanimous consensus on vital, community-wide issues. In all communities,

consensus formation of some degree is always required over the long term. The difference is a matter of degree, not an absolute difference.

In many instances where Exxon and VECO initially denied any threat from oil, community leaders were left to develop their own local response efforts. Sometimes the leaders of these local response efforts did not hold formal leadership positions in the communities. They emerged as leaders when the need arose. When Exxon or VECO subsequently concluded that it would, in fact, be necessary to conduct cleanup operations in some of these communities, they would rarely work with the leadership structure established by the community. Again, an exception to this was Seward where all efforts directed at oil cleanup were run through the MAC group. Evidence of the status of the MAC group as the ultimate authority for the cleanup in that area was shown by Exxon's acceptance to work within its structure.

3.1.2 Changes in Political Context

Significant impacts from the *Exxon Valdez* spill were experienced as changes in the political context of the communities in the region. These fall into the following two general categories:

- Factionalism.
- Creation/utilization of new/unusual entities.

These are discussed in turn in the following section.

Factionalism

Factionalism resulting from chaos within local governments was a serious impact primarily for small communities. One could pick a number of examples of communities that were beset by political factionalism within the community at large as well as within city hall. In several communities that were not immediately impacted by the spill, citizens were often critical of their local government's failure to anticipate the approach of the oil and its seeming reluctance to implement a response plan. In some communities it was not elected officials that took the lead in organizing a response team but private citizens such as a local businesspersons, fishermen, and others. There were also criticisms in some communities of the use of money which had been specifically allocated to oil spill expenses.

Intergovernmental conflict also came about following the oil spill. One example of this type of bureaucratic factionalism was the strain between the city and tribal governments in a

number of villages. In some cases, both were involved in negotiations and claims with Exxon and VECO and conflicts arose about billings for the use of community facilities.

Another source of factionalism had its roots in competition between the Native villages for oil spill relief money from regional Native service provision organizations such as the Kodiak Area Native Association and the North Pacific Rim. In some cases, villagers themselves had to compete for boat charters and do other things which were foreign to their way of life in the interest of securing money. It was the opinion of a number of informants that the competition for money, on a municipal and individual level, distracted Native village leaders from sharing and working together -- things which could have served a unifying function during the crisis.

Creation/Utilization of New/Unusual Entities

The parameters of local government action were brought into relief during the oil spill cleanup period. This was especially true for those communities not experienced in emergency management. Local governments were obligated to seek strategies for responding to the oil spill. Examples of the creation of new or activation of alternative entities included:

- The activation of the Emergency Services Council (ESC) for Kodiak Island.
- The formation of the MAC teams in the Kenai Peninsula Borough communities of Seward and Homer.
- The formation of a number of local volunteer response teams.

In the case of Kodiak, the city of Kodiak and the Kodiak Island Borough got together early on in the spill and decided to trigger a response from the EMS, an intergovernmental group that included the commander of the local Coast Guard base, the mayor of the Kodiak Island Borough, the mayor of the city of Kodiak, and the city manager of the city of Kodiak among its members. This group managed a vessel sign-up list, dispatched vessels, gave out weather reports, tracked the spill, and started, and subsequently backed, the use of a geotextile (also called Typar) for boom construction and other means of collecting the oil from the water. The ESC was in charge of management of spill response for approximately the first three weeks of the response, after which day-to-day management of the response was turned over to Exxon. Under the auspices of the EMS, however, public meetings continued to be held, and the council acted as a watchdog for the interests of the Kodiak Island communities during the Exxon-run phase of the response. The council also split up initial and continuing

tasks between its constituent entities. For example, the borough took on all of the financial responsibilities of the response, while the city took on the responsibility of some of the personnel management. MAC group formation is discussed in detail in section 5.2.

Except for the MAC groups in Homer and Seward and the EMC in Kodiak, it was not uncommon for the formal outside institutions, such as Exxon, VECO, the Department of Environmental Conservation, or the Coast Guard to disregard local response groups. (The emergence and utility of alternative management structures is discussed more fully in section 5.2.)

3.1.3 Interactions with Extracommunity Institutions

Interactions between communities and institutions from outside of those communities during the oil spill and cleanup were often problematic. These problems fell into the following general categories:

- Behavior in communities.
- Corporate versus municipal authority in the privatization of the cleanup.
- Differential treatment of the communities.

These issues are discussed in turn in the following section.

Behavior in Communities

Without exception, municipal officials whose communities were host to Exxon and/or VECO representatives reported that these entities were "taking over" the space and disrupting the workings of city government. In Valdez, for instance, Exxon representatives moved into the area of the state building occupied by the court. The magistrate in Valdez reported continuous interruptions by oil spill-related personnel. They requested use of phones, fax machines, and space continuously. On a 24-hour basis, applicants for oil spill employment filled the halls around the magistrate's office, often prohibiting entrance or exit. An empty alcohol bottle was found once in the judge's chambers -- evidence of an act which, according to the magistrate, constituted the utmost in disrespect and disregard for public property.

In small villages, the presence of Exxon or VECO personnel was more imposing. In Chenega Bay, for example, villagers were "intimidated" by the corporate response to the oil spill. One administrator said he felt the community had been taken over by outside forces and had lost considerable control over decisions that seriously affected its future. This

administrator thought both corporate and agency officials were insensitive to the importance of their way of life and desire to maintain autonomy. He cited one elder who said during the early days of the crisis the cleanup effort was "like having the beast coming down on you." In regard to villagers' role in the cleanup effort, one informant said, "it was like being the bottom rung on a ladder." This type of experience in the small, primarily Native communities fomented feelings of loss of control and alienation which, in the long run worked against the best interests of both parties. In regard to the behavior of Exxon and VECO representatives in Karluk, one resident commented:

> . . . and I think there was a lot of self-esteem damage out here the way the VECO people talked down to them when they were working. Like, you know, me smart white man, you dumb or something. So I think that had a real damaging effect on some of them . . . and it just built frustration up, and people start thinking 'well, who am I?'

Corporate Versus Municipal Authority: Privatization of the Cleanup

The oil spill cleanup was characterized by disputes between local governments (and sometimes local residents) and Exxon/VECO about who had ultimate authority and responsibility for the cleanup. A number of local government officials reported that Exxon and VECO officials had little or no interest in working with local response efforts in progress before their arrival. In the words of one mayor:

> I had a sense for quite a while, especially with the Oiled Mayors, that Exxon felt they really didn't have any responsibility to the municipalities . . . it wasn't their responsibility. The local governments were more of a nuisance and an inconvenience than anything else in their overall plan of squaring things away.

This aspect of Exxon/VECO's management resulted from the fact that control of the cleanup was privatized. Privatization of the cleanup implies a number of different aspects:

- Exxon may run into *conflicts of interest* in the cleanup process such that business priorities may be at odds with how best to conduct the cleanup. Suspicions that Exxon's business interests superseded the welfare of communities and the environment were widespread.

- Exxon was *using local governmental entities as resources* in the cleanup rather than vice versa. This was seen repeatedly in communities. Many people felt disturbed that duly constituted legal authorities were effectively at the disposal of a privately held corporation and constrained in their operations by that corporation. One often-noted exception to this rule was the community of Seward where Exxon was working *within* the framework established by the MAC group.

- The control by outside agencies over the cleanup effort was offensive to local community leaders because their *local knowledge and expertise applicable to the cleanup was ignored*. In the words of an Ouzinkie official:

> I felt intimidated by the fact that they could impose themselves on us and our land and on our way of life with total disregard, with total disrespect of the leadership of each community, in which we have lived here all of our lives. We're able to handle our own affairs.

- Related to the issue of outside control of the cleanup, privatization caused *inter- and intra-community competition for cleanup employment and contracts*. In many of the smaller communities, a very significant percentage of community-based employment opportunities are available through the local government. These jobs are effectively filled by consensus based upon perceived need and social responsibilities, and not upon a job candidate's qualifications in the abstract. Allocation of employment by an outside entity insensitive to local social processes was disruptive in the extreme in some communities.

- Ultimately, privatization of the cleanup meant that Exxon, *a private corporation, extended control over public resources from Prince William Sound into the Gulf of Alaska*. This included human resources as well as natural resources. Exxon's span of control effectively encompassed the efforts of local municipalities (formal, jurisdictionally/institutionally-based efforts) and citizens (informal or noninstitutional efforts) to clean up the oil.

Differential Treatment of Communities

It is clear from study data that Exxon and VECO approached cleanup operations differently in different communities. Of course, it would be expected that operations would necessarily differ according to the unique location and geographic nature of communities. But aside from official cleanup operations, the way in which Exxon initially approached communities to deal with their concerns about damages due to the spilled oil was not based on a standard formula. Rather, it seemed that Exxon had a strategy to keep leaders of local government appeased by establishing personal relationships between them and Exxon representatives. Community perception about how Exxon approached and worked with local leaders is illustrated in the following quotation:

> I tell you what the most difficult thing to deal with was, and that was Exxon would send people into the community . . . someone characterized it once as sort of a virus that was entered into the community . . . and they would go search out key leadership and try to convert them to Exxon's side, and mechanisms that were used I think included trying to get some Exxon money in their hands, and there was probably other things. They would identify what would get somebody's attention or what was important to somebody and then they would try to feed them that so they would get them on their side.

Exxon representatives met every request of the leaders with the understanding that such action was highly unusual and must not be seen as a precedent for other communities without compromising the granting of future requests.

The Native villages on Kodiak Island and the Chigniks were first keyed into the unequal distribution of cleanup money from radio broadcasts from Kodiak city. In the words of a Chignik Bay informant, the radio transmitter that was set up for reception of these broadcasts was instrumental in informing residents:

> . . . because, you see, a lot of the fishermen here weren't really aware of what benefits . . . the Kodiak fishermen were receiving and so in the beginning Exxon tried to say, 'well, we're only going to pay you this much per foot for your boat' when the Kodiak fishermen were getting more and we didn't know that . . .

Rather than setting communities apart from each other, differential treatment motivated communities to unify and can probably be cited as one of the instigating factors in the formation of the Oiled Mayors.

3.2 Fiscal Impacts to Local Governments

In this section we present an overview of fiscal impacts reported by local governments in response to the *Exxon Valdez* oil spill. These response efforts resulted in requests for reimbursement to Exxon in excess of six million dollars. There were additional costs incurred by local governments and not submitted to Exxon. These were costs incurred indirectly, through lost opportunities, delayed or canceled capital projects, deferred maintenance costs, the "hidden costs" of having the usual business of government displaced by oil spill response, missed grant deadlines, and other such expenses that, although more difficult to quantify, meant real losses of money and services to residents of the affected region. Following a brief synopsis of the study approach used in assessing fiscal impacts and a note on constraints in interpreting the data, this section will describe the types of fiscal impacts which local governments experienced following the oil spill. The types of impacts will be grouped as either revenue or expenditure impacts.

3.2.1 The Study Approach and Its Constraints

This section discusses the methodology used in the assessment of fiscal impacts and then addresses various constraints that must be placed on the interpretation of the information on fiscal impacts presented in this report.

The Study Approach

The approach used in this study is a direct result of specific concerns of the Oiled Mayors in November 1989. In the immediate aftermath of Exxon's initial year cleanup, fiscal impacts to local governments were a pressing issue. Municipalities were expending monies not in their budgets in responding to the spilled oil; Exxon was reimbursing communities differently for the same types of expenditures; there was confusion about what costs could be recovered from Exxon; and communities realized that their expenditures were continuing at the same time that Exxon was suggesting that reimbursements might stop after September 15, 1989. These circumstances resulted in a need for timely information about the types of fiscal impacts incurred by local governments. Collecting information about these immediate issues was the dominant concern of local governments in conducting a fiscal impact assessment. Thus, the Oiled Mayors specified that the study was to produce information

about fiscal impacts. A study approach was prescribed using 1989 expenditure and revenue data. It was therefore always understood that while this approach would meet their needs for immediate information, it would also result in a less complete accounting of the costs of the spill to local governments. The press for a timely completion of the fiscal impact assessment resulted in adopting this short period, limited data accounting approach.

The "slice-in-time" approach examines local government expenditures and revenues during 1989 for a "before and after" the spill assessment. This methodology, however, can only be the initial step in assessing fiscal impacts. It should be recognized that a "with and without" spill assessment methodology would yield a more complete accounting of fiscal costs. However, given the Oiled Mayors' immediate needs for information about costs incurred by local governments, the slice-in-time approach was implemented. The data generated by this approach are both qualitative and quantitative. The quantitative data are the fiscal records about expenditures and revenues for 1989 and three previous years as well as the billings to and receipts from Exxon for spill-related costs. The qualitative data employed in the analysis and interpretation, on the other hand, are derived from interviews with key administrators, department heads, and finance directors about areas of spill-related costs that would otherwise not have been identified by the fiscal data. These two data sources were used to distill the fiscal issues discussed in this study.

It was recognized, from the outset, that there are variations in scale and organizational type that affect the nature of fiscal data maintained by communities. In recognition of this variation, communities were divided into three groups based upon community size, municipal classification, and existing systems for fiscal data management. These groupings are labeled "Group A", "Group B", and "Villages." Group A jurisdictions are full service communities, with populations in excess of 2,000 that maintain professional management and financial administrative staff. These communities have accounting systems that allow tracking of some types of spill-related costs, although there is variability in the capability to discriminate between spill-related and nonspill-related revenue and expenditures. The Group B communities are generally second-class cities although some may also have coexisting Tribal governments. These municipalities generally have limited professional accounting and management staff and the data systems, with some exceptions, have limited capabilities for generating reports that readily indicate spill-related costs and income. The Village category designates those communities that have primarily a tribal form of government. These communities have populations of between about 60 and 150 persons. The professional accounting and management resources in these communities are limited and the data systems are mostly manual. Furthermore, regional Native organizations such as The North Pacific Rim and the Kodiak Area Native Association perform some of the social and health services for these communities that are provided by local or borough governments in other communities. Fiscal data from these communities is, with a few exceptions, limited because (1) key administrative staff responsible for record keeping were

overwhelmed by other responsibilities, or (2) these staff went to work for VECO, leaving their work undone or in inexperienced hands, and (3) the existing record-keeping systems were not amenable to the same types of fiscal analyses that can be done with computerized record-keeping systems. Table 3.1 lists the groupings of study communities.

Table 3.1
Groupings of Study Communities by Type

Group A	Group B	Villages
Cordova	Akhiok	Chenega Bay
Homer	Chignik Bay	Chignik Bay
Kenai City	Larsen Bay	Chignik Lagoon
Kenai Peninsula Borough	Old Harbor	Chignik Lake
Kodiak City	Ouzinkie	English Bay
Kodiak Island Borough	Port Lions	Karluk
Seward	Seldovia	Port Graham
Soldotna	Whittier	Tatitlek
Valdez		

The data collected from each group addressed the same issues, but the data collection protocols varied according to the nature of fiscal records for each group. Group A communities were requested to fill out "fiscal templates" that specified revenue and expenditure data by department, by expenditure type (e.g., personnel, operations and maintenance, capital expenses, etc.) and by month for 1989 and for three prior years. Additionally, these communities were asked, as were all communities included in the study, to provide copies of all spill-related billings and receipts from Exxon. Group B communities were asked to complete a template similar to the Group A template, but modified to accommodate their particular fiscal characteristics. The data for these communities were compiled in quarterly format. Reports submitted to the Alaska Department of Community and Regional Affairs for 1986-1988 were used as the source of information about the previous year's patterns of revenues and expenditures. In some instances, these data from the Group B communities were incomplete because of the disruption of usual government routines and record-keeping practices. The Group B templates were not used in the villages because record-keeping practices in these communities did not allow use of the template approach, so interviews with key administrative staff about fiscal revenues, expenditures, and billings were used as the basis for analysis.

Constraints on Data Interpretation

Interpretation of the data regarding fiscal impacts needs to be preceded by some words on its limitations. These limitations fall into two types. There are those which emerge from *the data collection process* used and those which come as a result of the *privatization of the cleanup* which affected the type of data available for analysis.

The Data Collection Process: The data collection process described above offers useful information for identifying the types of fiscal issues reported by local communities, but it cannot quantify actual losses experienced by local governments. There are several specific reasons why this approach has limited usefulness in accounting for the spill-related costs:

- Data regarding fiscal impacts were collected only for calendar year 1989, but the costs to local governments of responding to the spill have extended into 1990 and will further extend into 1991. For example,
  - The usual lag in receipt of fish tax funds from the state of Alaska does not allow consideration of how these revenue sources were affected by the spill (e.g., spill-related decreases in fish price, the effect of fishery closures, etc.).
  - Spill-related impacts on property taxes would not necessarily be apparent in 1989 data.
- Restriction of the data collection period to the 1989 calendar year also does not allow consideration of the fiscal impacts from lost opportunity costs, the costs of deferred or delayed projects and maintenance, and other costs that are not directly revealed by revenue and expenditure data.
- Billings to Exxon for spill-related costs to local governments are not necessarily comprehensive because local officials did not recognize all spill-related costs in the turmoil of implementing response efforts.

Privatization of the Cleanup: In addition to the above caveats, there is a reason that the data need to be interpreted with caution.

Using billings to Exxon for spill-related costs as a primary indicator of costs to local governments underestimates actual costs. One of several reasons for

> **this is because some costs were purposely not included in billings since it was known that Exxon would not reimburse for them (e.g., mental health and social service costs).**

In the absence of any other funding sources to reimburse communities for spill response efforts, local governments relied on Exxon for reimbursements. In doing so, local governments had to defer to Exxon's rules about what was a legitimate spill-related expenditure. This sometimes resulted in circumstances in which municipalities asked Exxon for funds to protect the public health and safety and whether such protection would or would not be funded was Exxon's decision and not that of the communities. For example,

> . . . it is very demeaning to a community, to a mayor of a community to have to go to industry and say "we need another police officer or we need somebody else in our water department or we need . . ." and have the *industry* make that decision. "Well, [Mayor] we gave you another police officer last month, and we've looked at this and we don't think you need the police officer, but maybe you really do need somebody over in sanitary landfill now. Now, if you'd like to have a sanitary landfill person, we'll look after that." That's pretty demeaning and all of a sudden you lose control of your community and it's perceived and it's a real loss of control and most of us found that intolerable . . . .

Although the privatization of the cleanup resulted in communities feeling demeaned and lacking control over what was happening, most followed Exxon's rules for reimbursements because there were no alternatives. However, these reimbursements were selective and not necessarily based on costs directly attributable to the spill or cleanup. For example, costs related to mental health and social service impacts were almost uniformly denied as were costs related to child care for those engaged in spill response. In examining the "trees" of expenditure types, the "forest" should not get lost: Exxon decided the rules about what was a legitimate expenditure and what was not, and because local governments needed cash to pay for legitimate expenditures, they were forced to follow Exxon's rules.

Given these constraints, it is important to reemphasize that this study did not attempt a *total accounting* of fiscal costs to local government. Such an accounting would require expenditure and revenue data from March 24, 1989 through at least 1991 so that the full range of event-related costs can be developed. Also, such an accounting would necessarily have to go beyond the prescribed expenditure and revenue data collected in this study to include more extensive assessments of administrative and opportunity costs related to the effects of the oil spill and cleanup, added costs of providing different levels of services, and

other operations-related expenses that may not have been immediately recognized in the stress of organizing a response. However, the fiscal information collected for this study can provide the indicators needed to establish the types of revenue and expenditure issues recognized by local governments in the immediate aftermath of the *Exxon Valdez* oil spill and cleanup. The following two sections of this report focus specifically on revenue and expenditure impacts on study communities.

3.2.2 Overview of Revenue and Expenditure/Cost Impacts Experienced

Analysis of the expenditure and revenue templates data presented in Interim Report I and II indicates that major sources of income as well as areas of expenditures varied among communities. Differences in revenue and expenditure patterns indicate that there will be different patterns of fiscal impacts according to the importance of different revenue sources and the prominence of expenditure categories in local budgets. However, whatever the order of importance, the areas most affected among all communities are listed in Table 3.2.

Table 3.2
Major Areas of Revenue and Expenditure Impacts

Major Areas of Revenue Impact	Major Areas of Expenditure Impact
Public Works	Taxes
Public Safety	Intergovernmental Transfers
Port/Harbor	Charges for Services
Health and Hospital	Miscellaneous
General Government	

The following sections identify specific types of fiscal impacts to local governments. These impacts fall into two types:

- Revenue impacts
- Expenditure and cost impacts (unreimbursed).

Each type of impact is highlighted and followed by a brief elaboration.

Revenue Impacts

Fiscal impacts were differentially distributed among the communities according to variations in preexisting revenues and expenditure patterns.

The importance of this finding is that the unique circumstances of each community's pattern of revenues and expenditures must be understood to assess total impacts from this event. For example, within the four revenue sources cited above, there were several types of losses communities experienced, according to the prominence of these sources for specific communities, including:

- Sales Tax losses varied among the communities according to whether or not the community had a sales tax, the rate of taxation, damage to local industries that were affected by the spill, and other such factors. Sales tax losses were reported for the following reasons:
  - Loss due to fishery closures.
  - Retail business losses.
  - Boat rentals.
  - Exxon's failure to pay on rentals.

It is important to note that payments to individuals in communities, even in excess of typical earnings, do not necessarily translate into equivalent levels of sales and use tax revenues prior to the spill.

- Transient Occupancy Tax losses are attributable to the spill through shifts in types of persons residing in communities. In one instance spill workers became semipermanent residents in transient quarters, and local ordinances exempted these individuals from this tax, thus resulting in a net loss of revenue to the city.

- Raw Fish Tax revenues are a significant source of intergovernmental revenues to 15 cities and three boroughs in the affected region. Fish tax is calculated on the basis of the value of fish processed, with the normal method of allocation being 50% to the state and 50% local (with 25% to the borough and 25% to the city within a borough in those instances). Data for FY 1990 indicate that in each of these jurisdictions, with the exception of Valdez, there were decreases in fish taxes resulting from a combination of closed fisheries

and decreased fish prices, which were affected by the oil spill. (It should be noted that while raw fish tax revenues provide an important springboard for the discussion of impacts and general recommendations, there has been no fine-grained workup to date of raw fish tax levels for close analysis.)

- Harbor Revenues impacts occurred in most coastal communities. The principal cause of depressed revenues was from boats giving up berths while working for Exxon. (It should also be noted that in some communities that saw heavy harbor utilization for the cleanup process, revenues did not increase significantly, as harbor facilities are typically used to capacity during the summer. But they experienced substantial increases in operations and maintenance costs through increased volume demands. Harbor use trends were highly variable from community to community.)

- Rents and Leases were generally sources of income for communities, but the smaller Group B and Village communities received reimbursements from Exxon or VECO for services rendered, whereas larger communities generally did not experience these same problems. Similarly, these smaller communities often agreed "on a hand shake" to certain rates for reimbursements only to have the billings at these rates reduced. As noted elsewhere, a common tactic employed by Exxon or VECO was the use of verbal contracts and agreements with community representatives for many kinds of services. When, after a period of days, weeks, or months that industry contact person would be "reassigned," the basis for, conditions of, or express understandings achieved in that relationship would, effectively, be dissolved. This was particularly problematic in the smaller communities where such violations of personal trust left a residue of unreimbursed expenses and a lingering sense of betrayal.

While these types of issues address fiscal impacts from the event, preparation for any future disaster needs to assess community-specific revenues and expenditures and plans need to be developed that address how impacts can be mitigated or prevented.

Expenditure and Cost Impacts (Unreimbursed)

Local governments were not reimbursed for many costs associated with the Exxon Valdez oil spill and cleanup.

Interviews with department heads and key administrative staff in communities indicated that expenditure and revenue data from the fiscal templates completed by the communities do

not reveal the entire scope of costs of spill-response for local governments. Listed below are the types of expenditure and cost impacts drawn from analysis of the fiscal templates and field interviews. These and other costs need to be included in any full accounting of the costs to local government of the oil spill and cleanup.

- Deferred Maintenance was mentioned by large and small jurisdictions, but it was especially problematic for Native communities. The spill cleanup process created severe manpower shortages in a number of communities (along with an increase in service demand, in some instances) which required that necessary maintenance be delayed. This created at least two problems. First, the delayed maintenance will have to be performed in addition to ongoing duties, creating extra labor costs when it is done. Second, delayed maintenance is always more costly than timely maintenance. Finally, the wear and tear on capital items not maintained at appropriate intervals has implications for the serviceable lifetime of the affected items. Several examples may be seen from the city of Valdez. No normal maintenance was performed on the city streets during the summer of 1989 -- sweeping, painting, washing, sealing, and repair -- which is anticipated to double the work load when it can be done. Building maintenance needs increased dramatically with the wear and tear on buildings created by the crowded conditions. But, again, no routine or preventative maintenance could be performed. Wear and tear on other aspects of the public works/infrastructure system are hard to quantify, such as the need to overhaul a number of fire hydrants that were damaged when used as water supply, and so on. According to the director of public works, five to six years worth of landfill space was used during 1989, exceeding the permitted area. Routine maintenance was not performed on vehicles, particularly on snow removal equipment that is normally maintained during the summer, so the city fell behind on that, and older vehicles experienced a disproportionate number of problems. Routine maintenance was not performed on the sewer system, and that caused problems during the winter following the spill.

- Administrative Costs associated with spill response and ongoing government operations during the spill were substantial. Exxon allowed a 10% administrative overhead on billings, but many communities noted this was insufficient for the amount of administrative work required to produce the billings and track the reimbursements. Furthermore, the ongoing business of government required more administrative management because of the need for additional meetings, more supervision of staff doing tasks beyond their usual work assignments, recruiting and training replacement staff lost to

cleanup employers, and other such administrative tasks that were not immediately tied to local government response to the oil spill.

- Opportunity Costs resulting from grants not pursued, capital projects that were canceled or delayed, and other deferrals or cancellations of projects or activities resulted in losses that were not immediately obvious. The city of Valdez experienced at least three of these types of losses:

> Valdez had almost within its grasp the Brewery Project. . . . They were going to have, I'm sure, this beautiful bottle of beer with pristine mountains and water and so forth and it kind of got screwed. Now people don't see it as pristine as it was and so we lost that one. . . . I had a contract in hand -- a Japanese firm that wanted to buy glacier ice. It wasn't going to be a major project but it was going to be a nice project and would've put a couple of dozen people to work. So then when this hit, it was over and we lost that one. We had a mineral water project, same company, they wanted to do the mineral water. We lost that one just as quickly.

Loss of these projects cost the city quite a bit as money had been spent in marketing. Valdez also experienced a major setback in its comprehensive plan as planning functions were suspended in order to meet immediate needs caused by the oil spill.

- Increased Audit Fees were experienced by some and are expected by other communities.

- Increases in Insurance Costs resulting from increases in damage claims due to spill activity were a subject of concern.

- Bond Ratings and whether they have been or will be affected by the spill is an issue of concern.

- Attorney Fees, which were required for damage assessment and consultation in several instances, were not reimbursed by Exxon. But these costs were significant for most communities.

- Unreimbursed Direct Oil Spill Expenses, especially in smaller communities, are an ongoing problem. These are expenses that are considered directly related to the oil spill by communities but not considered so by Exxon. That is, while Exxon publicly acknowledged responsibility for costs incurred in responding to the spill, their legal representatives and staff working directly with the communities set out rather rigid definitions of what would and would not be accepted as a "direct" spill-related cost. Exxon refused to issue a clear statement of this policy, preferring instead to screen requests for reimbursement verbally on an as-needed, case-by-case basis. Thus, in order to quantify losses created by this prescreening process, it would be necessary to work with the finance directors directly to reconstruct the original requests.

- Hidden Costs Responding to the *Exxon Valdez* oil spill displaced the usual business of government, resulting in the hidden costs of canceling, deferring, or delaying this displaced business. Interviews with local government and regional organizations indicate that the usual business of local government was completely displaced by oil spill-related activity within most departments of local government. The work activity that was displaced still needed to be done and whether that work is accomplished by means of overtime, hiring of temporary staff, or adding to the future work load, there are added costs that result from the displacement of usual work by disaster response work. These hidden costs are typified in the following quotations:

> We spent most of our time in that office looking for money and trying to get our expenses compensated instead of doing the job because there was no source of funds; it was a major problem. A big part of the game is get the money so you can respond, so you spent most of your time, and most of your employees were spending their time, trying to get the money, so that you had negative productivity on some things. Then, you know, . . . and we did deal with issues on everything from day care to polluting our water system with float planes coming into our lake that we get water out of. I mean major issues . . . boats coming into our harbor and dumping oil in our harbor. I mean boat cleanup and you are finding out what is your right and how do you deal with something like Exxon . . . lots of attorneys' fees. Then you find out that

> legislation is not conducive to your town being 'slimed' by an oil spill.

And,

> Our city manager put in extra hours but so much of his day, that should have been done towards planning and plotting and scheming for the future of the town, was suddenly taken up so he lost a year in terms of planning for the community.

And,

> Virtually every department was impacted to some degree, now some of them much more than others. . . . Every time anyone made a decision it affected somebody else in another department and I know we lost hours and hours of time from our fire department and police department and port department and buildings and grounds department all of those guys got involved in just one (incident) . . . I think that people missed that and . . . it's not an easy concept to get across to someone, but somehow we lost 8 or 10 months. You get over it somehow and you get the job done, but *the kinds of things that [we] needed to be doing for our future we lost 8 to 10 months there when we weren't doing it.*

In the process of supporting the cleanup, local government staff and resources were consumed and the usual business of government displaced. Not doing this usual business has hidden costs that are apparent in 1990 and will continue into the future.

- Cash Reserve and Budgetary Disruptions Responding to the *Exxon Valdez* oil spill required access to cash reserves or a reimbursement process for funds that were spent but not budgeted. Local governments expended millions of dollars on direct oil spill-related activities or materials. Table 3.3 lists some approximate 1989 expenditures for major city jurisdictions included in the study.

Table 3.3
Spill-Related Expenditures for Selected Communities

Jurisdiction	Reported Spill-Related Expenditures
Cordova	$951,000
Valdez	$1,395,000
Kenai Borough	$1,180,000
Homer	$363,000
Seward	$292,000
Kodiak Borough	$1,781,000
City of Kodiak	$125,000
Whittier	$268,300
Seldovia	$154,200
Ouzinkie	$3,400
Port Lions	$160,500
Larsen Bay	$13,000
Old Harbor	$44,700
Chignik	$9,700

Some local jurisdictions did have reserves that could accommodate such expenditures, but others did not. There were instances where Exxon advanced communities funds for expected expenditures. However, there was no consistent policy or mechanism to advance funds to communities to pay for expected expenses. Thus, it was often the quality of individual relationships with Exxon officials, chance, political leverage, or the negotiation resources of communities that assisted with getting reimbursements or cash advances. For example, one small community near Kodiak Island reported that their opposition to placing an incinerator nearby for burning cleanup waste resulted in the nonpayment of billings for legitimate expenses.

The absence of systematic procedures for local governments to acquire cash to meet financial obligations illustrates the need for cash reserves and access to funds to pay for expenditures following a disaster emergency. This event also illustrates the importance of integrating fiscal officers into the decision-

making process of response efforts. It should also be clearly stated that for a period of time following the spill, many governments were devoted entirely to cleanup-related business, so the actual costs are very difficult to estimate. In Kodiak, for example, employees of the borough, from the receptionist to the top administrators, devoted their time entirely to the cleanup effort. It is not inaccurate, when discussing the period of the peak of cleanup effort, to characterize many of the employees of the borough as employees of the Exxon cleanup to the exclusion of their normal duties; in a number of cases the exclusive business of local governments was the oil spill.

3.2.3 Overview of Ongoing Revenue and Expenditure/Cost Impacts

The indefinite, nondiscrete quality of many of the fiscal impacts affecting local governments has important implications for prospects of restoration and recovery. This section reviews the long-term nature of these impacts and describes what is necessary to return the communities to "normal." This discussion falls into the following two categories:

- Continuing fiscal impacts
- Restoration and recovery

Continuing Fiscal Impacts

Fiscal impacts from the oil spill are still occurring. Given the patterns of revenue and expenditures among the affected communities, fiscal impacts will continue for several years.

There are ongoing revenue and expenditure impacts to communities associated with the recovery of monies spent during the 1989 calendar year. Some of the most apparent indicators of these ongoing fiscal impacts are the costs associated with doing work displaced by the spill and cleanup. This issue is typified in the following quotations from a public works director:

> . . . everything got behind in the city. . . . last year's budget all of a sudden was thrown on me -- on all the public works, water, sewer, streets, building maintenance, it was some -- I don't know the council came back and said they wanted me to cut $500,000 out of the budget -- we did just by canceling out programs that should have been started a year ago -- we said it's nuts the way things are going, we're never going to get it done, take it out of the budget -- building maintenance, things like that -- the same thing's true with the sewer

> and water -- I didn't, I couldn't, I didn't even have time to do a decent budget so we just sort of guessed at things.

The demands of responding to the spill, which displaced the usual work of local government departments, resulted in sometimes "off the cuff" planning and budgeting. The costs of limited planning and budgeting under stress are being experienced into 1990. In some of the smaller communities, raised expectations about the value of wage labor make hiring difficult for the temporary summer positions that do essential maintenance work. Similarly, labor costs are inflated for capital projects and work as a result of the wages paid during the cleanup. In both direct and indirect costs, the fiscal impacts to local governments are continuing and will continue into the future. Although Exxon may have declared the event over, local governments continue to incur spill-related costs.

Restoration and Recovery

> **Restoration of local governments to where they were before the spill in addition to reimbursement for expenses incurred is a priority for full fiscal recovery from the spill and cleanup.**

Exxon's reimbursement of reported community costs in response to the oil spill is only a starting point for full recovery from the *Exxon Valdez* event. Reimbursements by Exxon for legitimate spill expenditures only compensates communities for actions taken in defense of actual or impending impacts from the event. Recovery from the oil spill requires providing communities with fiscal, administrative, and other resources to restore the administrative and operational integrity of each local government to where it was before the spill. Smaller communities and Native villages are especially in need of restoration to their pre-spill state so that community development interrupted by the oil spill and cleanup can be reinstated. Without restoration to pre-spill conditions, local governments continue to face serious obstacles to the recovery process.

3.3 Recommendations to Avoid or Ameliorate Impacts to Local Governments

Local governments are in a position to affect the extent of damage of future disasters. Using the types of impacts experienced in the study communities as the basis, this section will provide recommendations for avoidance or amelioration of impacts to local governments. The organization of these recommendations will follow the same format used above in describing those impacts. That is, these recommendations will fall into two general

categories: operational impacts to local governments and fiscal impacts to local governments.

3.3.1 Recommendations to Avoid or Ameliorate Impacts to Local Government Operations

The following recommendations are provided to assist municipalities in preparing for future emergencies. In some cases, the recommendations are only applicable to an oil spill. But most could prove useful in any type of disaster emergency. The recommendations for this section are modeled upon the section above which described the types of operational impacts sustained by local governments. The section on operational impacts was organized into three categories as is this one:

- Constraints on effective functioning
- Changes in political context
- Interactions with extracommunity institutions

Constraints on Effective Functioning

- Excessive Demands: The problem of excessive demands was caused for either, or both, of two reasons: (a) because of a lack of manpower due to loss of staff to cleanup-related work and; (b) because of an increase in work load due to oil spill-related demands. To accommodate the increased demand in any future disaster, it is recommended that local governments be prepared to supplement their manpower.

  In many cases the extra manpower is required in skilled positions (such as city manager, mayor, or city clerk) because individuals in those areas are inundated with leadership demands. While it would be impossible to supplement manpower in those areas requiring knowledge of the local community, politics, etc., there are areas where temporary personnel could relieve the impacts resulting from excessive demands. These include:

  - Bookkeepers or accountants to assist in tracking and documenting disaster-related expenses.
  - Certified emergency response personnel to assist existing fire fighters, public safety/police, and emergency medical technicians.
  - Mental health workers to assist existing counselors.

- Lack of Communication: Chaos and lack of communication were important sources of local government impact. The problem of lack of communication existed on three levels: (a) between local governments and outside institutions, both public and private; (b) among local governments themselves; and (c) between local governments and their constituents. Recommendations for dealing with these communication problems will address each of these levels.

  - Local Governments and Outside Institutions: Recommendations concerning communication problems at this level need to address two distinct areas. First, there were communication problems which contributed to the chaotic quality of local government operations immediately following the oil spill. To address this problem, a representative from the municipality needs to be chosen prior to, or immediately following, a disaster. This person would serve as the contact for all outside institutions and all disaster-related information, requests for resources, etc. generated by the municipality would necessarily flow through him/her.

    Secondly, there were communication problems resulting from real deficiencies in local communication systems. This problem was especially serious in small remote communities, like the Chigniks, although Whittier, only 75 miles from Anchorage and serviced by regularly scheduled transportation, suffered from lack of communication capabilities. In many cases, this problem could be remedied by making it possible to install fax machines, telephone lines, radio receivers, etc. on short notice in the event of an emergency.

  - Local Government Intercommunication: On this level, the establishment of a forum for the exchange of information can prove highly effective in ensuring the equitable distribution of aid from outside institutions. In the case of the *Exxon Valdez* oil spill, the Oiled Mayors, acting on behalf of all the affected communities, served this function effectively.

    A similar type of committee, dealing specifically with emergencies, could be designed to exist on a permanent basis within the structure of the Alaska Conference of Mayors. This committee would not be active on a continuous basis but could be activated on short notice should an emergency affecting more than one community arise.

- Local Governments and Their Constituents: The demands placed on local governments by their constituents centered around residents' questions and concerns about the extent of oil spill damage and actions being taken to contain it. Ameliorating these types of demands requires municipalities to establish an effective communication system which will inform the public on a regular basis with accurate information supplied by a trusted leader. Specific recommendations in regard to communication can be found in section 5.6.

- Leadership Style: The conflict generated in many Native communities between Exxon/VECO and the local government resulted, in large measure, from cultural differences in management style. In the event of future disasters requiring the cooperation of Native leaders and outside institutions, two levels of recommendations are suggested. However, it first needs to be acknowledged by all parties that in certain types of disasters, such as the oil spill, local governments are actually the best resources available to assist in cleanup. This is because: they are most knowledgeable about the area; they are highly motivated to assist in cleanup and; local governments are in a position to harness the efforts of the community. Consequently, the first recommendation is to insure that communities have an active, if not controlling, share in decision making regarding cleanup. Outside agencies need to work within the structure of the local community. In the case of the *Exxon Valdez* oil spill, privatization of the oil spill worked against community participation.

  Secondly, on a less general level, representatives of outside agencies unfamiliar with small rural Alaskan communities ought to be briefed (perhaps by a local government representative early in the response effort) on the way of life in these communities. This would include providing information on the economic, social, and cultural history of the area. Perhaps with this information, representatives from outside agencies who are not familiar with Alaska would be sensitive to the concerns and behavior of locals.

Changes in Political Context

- Factionalism in the wake of the *Exxon Valdez* oil spill resulted from competition for control or for money. Remediation of factionalism requires that jobs for cleanup and decisions about the cleanup be channelled through one entity which makes it a policy to deal equitably with all parties. That

entity ought to be the local government for several reasons: local government is most familiar with local resources; the logistics of personnel management in a disaster can be negotiated and incorporated into existing emergency management plans and reviewed periodically with staff and; it would be consistent with public policy that local governments should be at the center of any structure responding to a community-wide emergency. It should not be a financial hardship for local government personnel to continue in their capacities; financial incentives should be offered so it is not more lucrative to participate in spill cleanup than attending to the matters of local government and the provision of basic, necessary community services.

Not all people in small communities feel the local government is impartial. There is always factionalism to some degree. However, to encourage total representation (in anything such as hiring for the cleanup) and minimize factionalism in the event of a disaster emergency, it is recommended that a volunteer citizen's group be formed. This group would meet with the city council on a periodic basis to discuss emergency preparedness. If the citizen's group and the city council have similar expectations prior to an emergency, the problems of intracommunity factionalism could be avoided or lessened.

- Creation/Utilization of New/Unusual Entities. The emergence of new entities in dealing with a disaster is certain to occur. The important lesson to be learned from varying community responses to the *Exxon Valdez* oil spill is that these entities must be incorporated into the overall response effort -- they must not be put in opposition to it. Again, Seward's incorporation of all kinds of groups into the MAC group ensured that everyone's interests were represented in the unified response and that there would not be competing forces in the cleanup which would be to the detriment of all concerned.

Interactions with Extracommunity Institutions

- Behavior in Communities. This problem fell into two types. First, there was a physical lack of facilities for the onslaught of outsiders into the communities. In this regard, local governments should be prepared to acquire portable trailers or other makeshift structures to accommodate the temporary residents. This would substantially minimized disruption to local government operations.

  The second type of problem in this category deals with general rudeness and misconduct by outsiders from the communities. The recommendation here is the same as that mentioned in Leadership Style above. Representatives of

outside agencies unfamiliar with small rural Alaskan communities ought to be briefed (perhaps by a local government representative early in the response effort) on the way of life in these communities. This would include providing information on the economic, social, and cultural history of the area. Perhaps with this information, representatives from outside agencies not familiar with Alaska would be sensitive to the concerns and behavior of locals.

- Corporate Versus Municipal Authority: Privatization of the Cleanup. Private entities involved in disaster response, as Exxon and VECO were, must be required to work within an emergency response structure that meaningfully incorporates local communities -- not use local governments as resources or treat them as competitors or potential liabilities. Response structures should be designated as "zones" or ecologically-based units that are founded on disaster areas parameters and include all jurisdictions within the zone. This allows for the effective marshalling of resources to bring them to bear on the problem. In this way communication effectiveness is maximized and redundant efforts are eliminated.

- Differential Treatment of Communities. The differential treatment of communities is a problem which can be avoided if communities are able to communicate with each other and "compare notes." The Oiled Mayors committee provided an ideal and effective forum for this type of sharing of information.

3.3.2 Recommendations to Avoid or Ameliorate Fiscal Impacts to Local Governments

A number of recommendations to ease the fiscal burdens on communities have come out of the fiscal data and interviews. These include:

- Government Reimbursements and the Privatization of the Cleanup. Private industry should not be placed in the position of prescreening government requests for reimbursements. An impartial entity should have decision-making authority over whether or not government expenses are spill-related, and mechanisms should be in place such that governments are financially able to meet emergency needs in a timely manner.

- Unreimbursed Costs. To lessen the chance of local governments not being reimbursed for costs incurred as the direct or indirect result of a disaster, it is recommended that all departments accurately document their costs and services. This is important to do on a continuous basis so that, in the event

of a disaster, increases or decreases in costs and services can be compared to pre-disaster levels. Departments or services which were especially hard hit following the oil spill were hospitals, mental health services, emergency medical services, police/public safety departments, and city administration. Adequate documentation of services was rare for many communities in many of these departments. Specific recommendations are set forth in section 5.5.

- Revenue and Expenditure Impacts. Governments should be compensated for all increases in expenditures attributable to disaster conditions; loss of anticipated revenues should be compensable as well. An independent entity, not the spilling party, should review such requests. Documentation and comparison to baseline conditions is essential in this analysis, especially when performed in conjunction with a "pre/post" event analysis.

- Cash Reserve and Budgetary Disruptions. The ability of a community to acquire cash up front, rather that justify every expense before reimbursement, helped tremendously in responding to the oil spill. In the event of a future disaster, mechanisms need to be in place which will provide communities with cash up front which they can account for at a later date. The money could be dispersed to local governments by boroughs or, if not part of a borough, given directly from the source to local or regional entities constituted to handle the emergency. (See section 3.3.3 below.)

- Continuing Fiscal Impacts. It should be recognized that fiscal impacts from such sources as deferred maintenance, hidden costs, opportunity costs, residual overtime, and so on will be ongoing. For example, increases in arrests during spill cleanup activity in Seward resulted in substantial increases in labor costs for police officers due to the necessity of increased court appearances months later. Other delayed appearances of costs are found in many other areas, including deferred maintenance. Mechanisms need to be in place to track these costs so that the books are not closed on costs prematurely.

3.3.3 Linking Operational and Fiscal Impact Avoidance

Ultimately, funding and organizational structures act hand-in-hand to lessen the effects of the spill on individual communities. Local governments and regional Native organizations exposed to the effects of the *Exxon Valdez* oil spill and cleanup had to rely on local resources to initiate and maintain a response. There were no contingency funds to assist with the costs of implementing a response nor were there uniform organizational resources to assist with the maintenance of essential government services when faced with such

overwhelming conditions. Also, in most communities, leadership as well as most other resources for spill response were overextended by the scope and duration of the event. Furthermore, communities did not have consistent means of acquiring information about the nature and progress of the spill. In these conditions, local communities generally had to innovate responses on their own, and the process of innovation consumed extensive time, personnel, and fiscal resources. The process of local innovation resulted in some important contributions to the cleanup such as the geotextile effort in Kodiak. However, the energy and attention required to innovate at the time of crisis, especially if the crisis is of immense proportions, means a drain away from the usual business of local government.

Where an integrating structure existed, communities had to innovate less and this allowed a more efficient use of local resources. Communities such as Seward that were fortunate enough to be near federal resources threatened by the event were able to participate in MAC groups which integrated local efforts with those of larger entities and buffered the effects of the event. They were able to participate in a planned response effort in which there was an organized decision-making process and the specification of a chain of command with well-defined authority in the response effort; and, through such a system Seward had access to a larger set of leadership and organizational resources that buffered the community from some of the more disorganizing consequences of the event in other communities. Representing the other extreme are some of the Native communities such as Port Graham, English Bay, and Karluk where the relatively few resources were dispersed by the privatized cleanup. In this situation some communities fared better than others, depending on their access to and control over extracommunity resources. Without buffering mechanisms to protect communities from being overwhelmed operationally and fiscally, communities did what they could with varying degrees of success.

4.0 AN OVERVIEW OF PRIVATE SECTOR ECONOMIC IMPACTS

4.1 Introduction

Not only did the wreck of the *Exxon Valdez* damage communities socially and injure individuals psychologically, but it also resulted in substantial economic impacts to local businesses. In this section we focus on presenting findings from a mail survey of North Gulf Coast (NGC) businesses and commercial fishing permit holders concerning spill-related economic impacts. This survey, in addition to secondary data from VECO employment records and state of Alaska fisheries and employment data, form the basis for this discussion. The survey was intended to provide the following information about impacts to local businesses:

- A qualitative assessment of the direct and indirect gains and losses related to the spill and cleanup.
- Determination of how these gains and losses were distributed across industry sectors and communities.
- Determination of the extent and magnitude of cleanup involvement and spill-induced shifts in business planning and capital investment.

The study was not structured to quantify the exact losses or other impacts related to the oil spill. Rather, the business survey provides data for a qualitative assessment of the types and distributions of impacts experienced by NGC private businesses with some order of magnitude estimates of losses. This analysis of the business survey and examination of secondary information indicates that the quantification of economic impacts requires additional quantitative data and evaluation of different modeling approaches to fully measure private sector economic impacts.

A brief word is in order here about modeling approaches and this report. The second interim report issued for this study presented a preliminary analysis of secondary data using an export-base model. This model characterizes the economy of the region into "basic" and "support" sectors. Using this model, economic impacts are assessed by analyzing, among other things, the ratio of changes in employment between the two different sectors. One of the most obvious limitations of this model is that changes in income cannot necessarily be judged by changes in employment. Another limitation of the export-base model is that it is most useful for understanding short-run fluctuations in demand for exports (i.e., exports from the basic sector) but it ignores supply-side factors. Nevertheless, given the needs for relatively immediate information, this approach was useful for a preliminary perspective on

private sector economic impacts. The emphasis in this report is on findings from the business survey that can be used to describe the categories of impact so that additional consideration can be given to alternative models for assessing private sector economic impacts.

In this presentation of findings, the idea of "economic sectors" is used to organize the data for the description of impacts to different industries and businesses. Three different sector groupings are used:

- Basic Industry Sector that produces raw or semiprocessed materials (fish products, oil, timer) primarily for export from the region.
- Support Industry Sector that provides goods and services that are generally not exported from the region. These industries are created in support of, or induced from, the traditional export base.
- Government Industry Sector composed of local, state, and federal government employers.

Specification of these three different sectors is intended to simplify the presentation of business survey results. At the same time, it provides an overview of impacts within the sectors, although we concentrate on the basic and support industry sectors in this discussion.

4.2 Methodology for Determining Private Sector Economic Impacts

The primary methodology for determination of private sector economic impacts was a mail survey. A mailing list of all businesses in the affected region was constructed from four major information sources:

- Alaska business license holders.
- Commercial fishing permit holders.
- Seafood processors.
- Large firms headquartered outside of study area.

From these information sources, a list of 7,031 businesses in the study's 24 communities was generated. The survey, which contained approximately 40 questions, was mailed on April 18, 1990 and a week later a postcard, including the phone number of the Impact Assessment, Inc. (IAI) Anchorage office, followed to remind recipients to return the

instrument or call with questions. IAI received approximately 100 phone inquires. After a preliminary analysis, a number of business were removed from the list of potential respondents in the study region due to factors such as not being in business at the time of the spill or moving to an area outside the study region. Ultimately, about 6,535 actual businesses were identified as the population for this study. On May 7, approximately 6,200 additional surveys were sent to those businesses from which IAI had not yet received a completed survey. By the end of July, approximately 1,400 questionnaires were returned and these formed the basis for analysis of survey results.

4.3 Business Survey Findings

To remain consistent with the content of the survey itself, the following section summarizes the analysis according to the following topics:

- Industry composition of the respondent.
- Direct participation in spill cleanup.
- Overall business performance.
- Business plans before and after the spill.
- Financial gains and losses from the spill.

The following discussion summarizes the findings regarding these topics (additional information about methodology is included in Appendix 2).

4.3.1 Industry Composition

The Oiled Mayor's study area covers spill-affected communities in Alaska's NGC region. It covers many hundreds of miles of coastline stretching from Cordova to the Chigniks, including communities in the Kenai Peninsula Borough and the Kodiak Island Borough. This study area encompasses 26 local government jurisdictions and 6,535 small and large business firms. The basic and support sector businesses included in the survey are listed in Table 4.1 below. It should be noted that in the classifications listed, the support sector accounts for approximately two-thirds of the total number of NGC business firms. Commercial fishermen and seafood processors account for the majority of the remaining one-third.

Table 4.1
Industry and Business Sectors Included in the Survey

Basic Sector	Support Sector	Government Sector
Commercial Fishing	Manufacturing (local)	Federal Government
Fish Processing	Construction (private)	State Government
Tourism	Trans., Utilities, Trade	Local Government
Oil Spill & Cleanup	Trade	
Other:	Finance, Ins., Real Estate	
Manufacturing (non-fish)	Services:	
Construction (public)	Personal	
Mining	Business	
Agriculture & Forestry	Auto & Miscellaneous	
Military	Repair	
	Amusement & Rec.	
	Health	
	Professional	
	Miscellaneous	
	Agric. & Forest (local)	

Other tables in this section use the same Group A and Group B community designations as specified in section 3.2, Fiscal Impacts to Local Governments. However, the Group B community designation in these tables also includes businesses in the Village category used in section 3.2. Table 4.2 indicates the percentages of survey responses by sector used for analysis. The overall response rate was approximately 20%, a highly acceptable rate for this type of survey. As can be seen in Table 4.2, responses are distributed evenly across major industry sectors and across communities. Figure 4.1 indicates the number of business firms by community in the study area. Figure 4.2 shows the industry composition within the study region and Figure 4.3 shows the industry composition by community, with all Group B communities lumped into one category.

Figure 4.1
Location of North Gulf Coast Industries
Number of Business Firms by Community

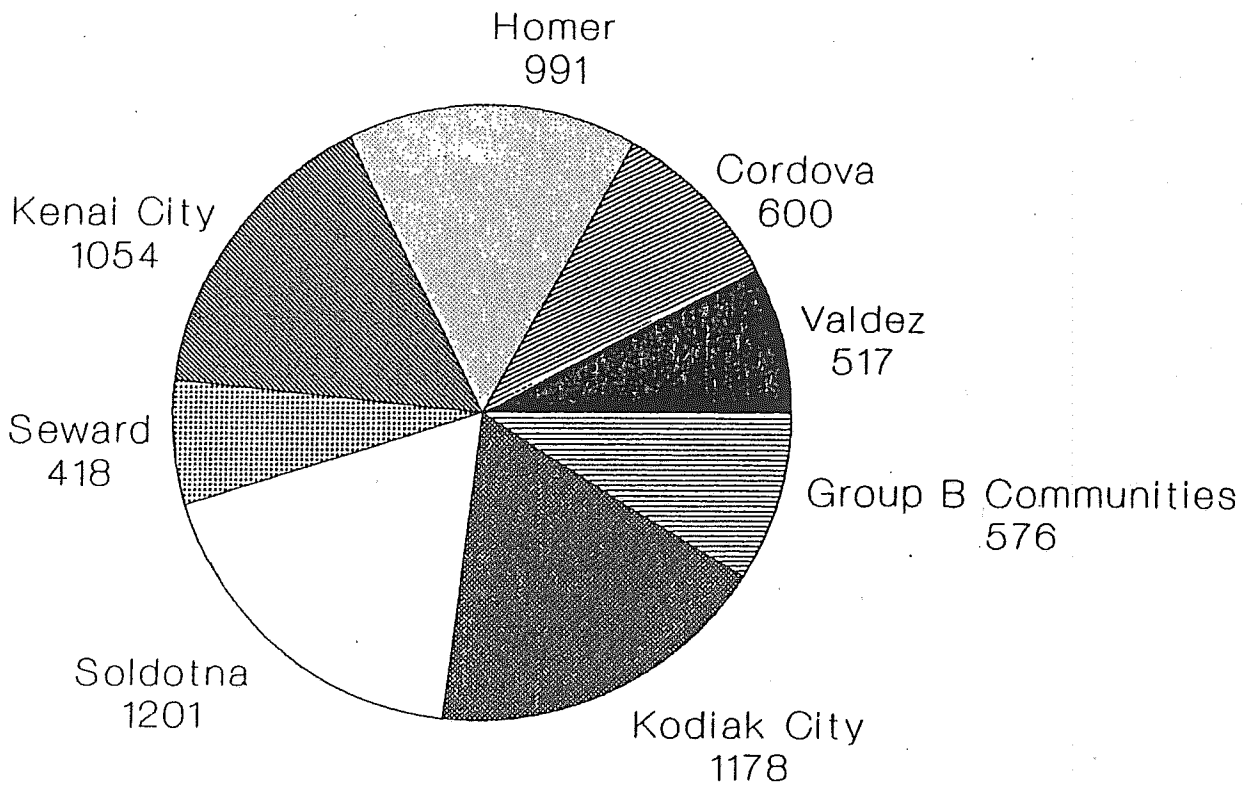
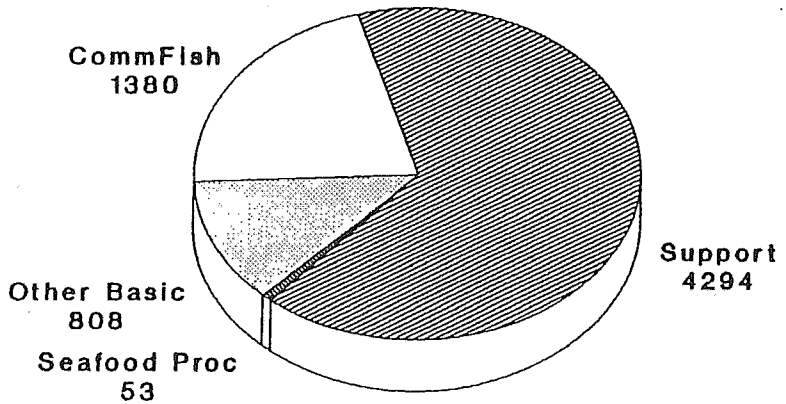
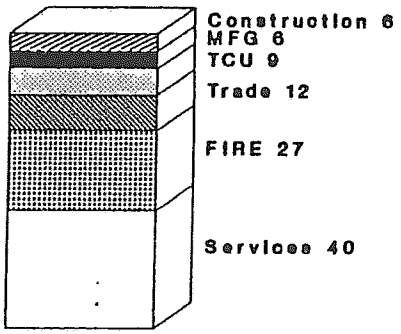


Figure 4.2
Industry Composition
of Oiled Mayors' Study Area



All Industries
(Number of Firms)



Support Sector Industries
(Percent of Firms)

Figure 4.3
Industry Composition
Business Survey Responses by Community

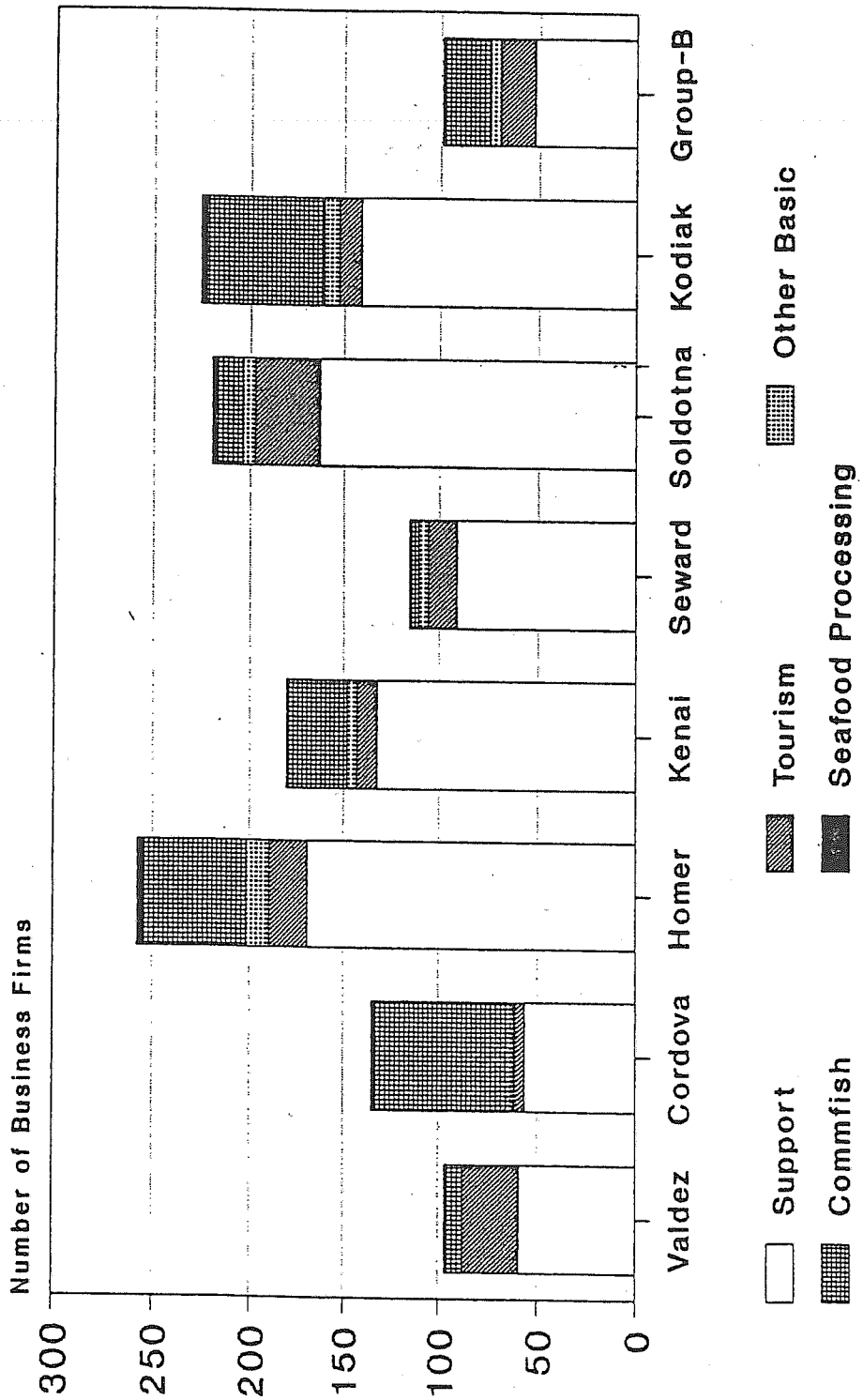


Table 4.2
Summary of Business Survey Response Rates
by Sector and Community

Sector	Group A Cities							Group A Total	Group B Total	Grand Total
	Valdez	Cordova	Homer	Kenai	Seward	Soldotna	Kodiak			
Commercial Fishing	16%	22%	45%	16%	8%	12%	19%	20%	12%	19%
Seafood Processing	20%	40%	57%	14%	25%	33%	20%	29%	25%	28%
Other Basic	19%	24%	26%	18%	37%	22%	20%	23%	32%	23%
Support Sector	19%	23%	23%	18%	29%	18%	19%	20%	17%	20%
Total Cases	19%	23%	26%	17%	28%	18%	19%	21%	17%	20%
Avg. No. Yrs. in Business	9	14	10	10	11	8	12	10	12	11

4.3.2 Participation in the Oil Spill Cleanup

Describing what happened as a result of the oil spill requires some appraisal of local business participation in the cleanup effort. The business survey directly assessed this issue by asking questions about the type of participation in the cleanup, if any, and if a business was created in response to the cleanup. Findings from questions about type of participation in the cleanup are summarized in Table 4.3, including how businesses responded when asked to choose from among ten oil spill response and cleanup activities ranging from contracting services to working crew. Tables 4.4 and 4.5 show these results by sector and community. Significant findings are as follows:

- The highest occurrence of cleanup participation was among commercial fishermen, tourism operators, and service businesses.
- Contracting services, such as leasing and operating vessels, constituted the highest proportion of the total respondent participation in spill cleanup.
- Overall, 38% of NGC businesses participated in oil spill response and cleanup activities.
- Valdez businesses registered the highest participation rates (62%). Soldotna businesses registered the lowest at 15%.
- As a group, commercial fishermen exhibited the highest incidence of spill cleanup participation (55%) compared with other industry sectors.

Businesses that did participate in the cleanup were asked a series of follow up questions regarding whether or not the business was created in response to the spill; business income; percentage of income derived from the cleanup; and changes in the cost of business operations between 1988 and 1989. Among the noteworthy findings are:

- 10% of the respondent businesses that participated in cleanup activities were created in response to the spill. This would translate to nearly 650 businesses region-wide (10% x 6,535 businesses).
- Only 5% of respondents that participated in 1989 cleanup activities gave high marks for cleanup success in restoring the environment in their area.

Table 4.3
Percentage of Businesses Participating in Spill Cleanup by Industry and Type of Cleanup Activity

Industry	Contracted Services	Leased Land	Leased Facilities	Leased Equipment	Leased Vehicles	Leased Aircraft	Lease & Op. Vessel	Leased Vessel	Worked Crew	Other
Commercial Fishing	28%		9%	32%	40%		69%	57%	47%	15%
Seafood Processing	1%	20%	3%	2%	7%		3%	1%		1%
Tourism	22%	20%	38%	13%	27%		12%	22%	17%	17%
Oil Spill & Cleanup	1%								2%	
Mining	1%								2%	
Logging/ Lumber	2%			4%						1%
Construct.	4%	20%	6%	9%			2%	3%	2%	5%
Agri/Forest			3%	2%				1%		1%
Manufact.	1%						1%			1%
TCU	4%		9%	6%	13%	100%	5%	4%	4%	2%
Trade	10%		6%	11%	13%		3%		9%	15%
Services	24%	40%	19%	20%			5%	10%	17%	41%
Other	3%		6%	2%			1%	1%		2%
Total	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Total Cases	118	5	32	54	15	1	129	72	47	144
% of Total Bus. Partic. in Cleanup Activity	10%	0.4%	3%	5%	1%	0.1%	11%	6%	4%	14%

- Nearly two-thirds of those that participated gave a poor evaluation ("hardly successful" and "not at all successful"). As a whole, participating Group A respondents were more critical of cleanup success than were Group B respondents.

Table 4.4
Business Participation by Sector in 1989

Sector	Did Not Participate	Did Participate
Commercial Fishing	45.3%	54.7%
Seafood Processing	60.0%	40.0%
Other Basic	56.1%	43.9%
Support Sector	68.9%	31.1%
Total	62.3%	37.7%

Missing Cases = 6

Table 4.5
Business Participation by Community in 1989

Community	Did Not Participate	Did Participate
Valdez	37.8%	62.2%
Cordova	44.1%	55.9%
Homer	62.8%	37.2%
Kenai	75.3%	24.7%
Seward	50.9%	49.1%
Soldotna	84.6%	15.4%
Kodiak City	58.6%	41.4%
Group B	58.6%	41.1%
Total	62.3%	37.7%

Missing Cases = 4

4.3.3 Overall Business Performance

Overall business performance addresses the following topics:

- Gross income.
- Changes in business performance and operating conditions from 1988 to 1989.
- Workforce issues.

Several questions on business performance were asked without specific reference to oil spill impacts. Others specifically concern changes in business conditions arising from the oil spill and cleanup. Findings regarding both those businesses that did and did not participate in the cleanup are indicated below.

Gross Business Income

- Gross business income (i.e. total revenue) for all respondents collectively declined 5% from 1988 to 1989 despite income gains of about 13% attributable to 1989 oil spill cleanup earnings.

- Support sector firms were the only industry category to show an income gain from 1988 to 1989.

- Although seafood processors and firms in other basic industries had gains of 12% and 20% respectively attributable to the oil spill, these industries registered a 10% drop in gross business income from 1988 to 1989.

- Businesses that participated in the cleanup exhibited higher income levels in 1989 than those that did not participate.

- Among cleanup participants, about one-third of all business income earned in 1989 was from work on the cleanup itself.

- Firms that did not participate in the 1989 spill cleanup earned significantly more in the previous year (1988) than those that did participate.

- Firms that did not participate in the cleanup exhibited lower income levels in 1989 than those that did participate.

Changes in Business Performance

- In comparing 1989 with 1988, a greater percentage of respondents indicated decreases in the average price and quantity of products sold even though the costs of doing business increased. This was true regardless of participation in cleanup.

- Participating businesses tended to increase the number of employees and size of their payroll while non participating businesses decreased the number of employees and the size of their payroll.

- Although businesses that participated in the cleanup had higher incomes, they were forced to turn away more customers than the non-participants.

- Businesses that did participate in the cleanup showed more net income increases (46%) than decreases (30%). Businesses that did not participate showed more decreases (36%) than increases (20%) in profit.

Changes in Business Conditions

- Business respondents that participated in the cleanup tended to be more critical than non-participating businesses of what the effects of the oil spill will be over the next three to five years.

    - 48% of respondents indicated a small or large negative effect, as compared to 40% negative for non-participants.

    - As a whole, business respondents indicating negative effects out-numbered those indicating positive effects two-and-two-thirds to one.

- Businesses are experiencing uncertainty about the future business climate and the potential to resume "business as usual."

    - One-third of all business respondents indicated that business conditions were not back to normal.

    - Over 20% of all respondents anticipated problems adjusting to post-spill business conditions.

Workforce Impacts

- Workforce availability was a problem for about 16% of business respondents. Most of these were forced to curtail operations because they could not find available labor for hire.

- 4% of total respondents indicated that "business virtually shut down due to serious hiring problems and worker turnover."

- Seafood processors, the largest employers among businesses surveyed, experienced a 35% decline in the number of employees from 1988 to 1989.

- Seafood processors indicated the greatest occurrence of problems with workforce availability.

- Commercial fishermen and other basic industry business firms also showed a decline in the average number of jobs (or crew members) from 1988 to 1989.

- Support sector businesses were the only group to register any gains in the average number of jobs.

Table 4.6
Change in Business Performance 1988 - 1989

Business Operations	For Businesses that Operated Before 1989						
	Large Decrease	Small Decrease	No Change	Small Increase	Large Increase	Not Applicable	Total
Businesses that Did Participate in the Spill Cleanup							
Quantity Sold of Products	32%	7%	17%	18%	13%	13%	100%
Average Price of Products Sold	27%	5%	37%	12%	2%	17%	100%
No. of Customers Turned Away	5%	2%	34%	8%	9%	43%	100%
Net Income (profit)	22%	8%	19%	26%	20%	6%	100%
Number of Employees	7%	5%	48%	14%	8%	18%	100%
Payroll	14%	5%	33%	14%	16%	18%	100%
Cost of Goods Sold	8%	2%	33%	16%	5%	36%	100%
Fuel/Energy Costs	7%	8%	36%	25%	7%	18%	100%
Amount of Debt	5%	8%	46%	10%	11%	20%	100%
Rent/Lease Costs	1%	1%	51%	10%	6%	31%	100%
Other Costs of Doing Business	4%	2%	36%	15%	12%	32%	100%
Businesses That Did Not Participate in Spill Cleanup							
Quantity Sold of Products	22%	12%	27%	18%	5%	17%	100%
Average Price of Products Sold	14%	5%	50%	9%	1%	21%	100%
No. of Customers Turned Away	5%	4%	41%	6%	3%	43%	100%
Net Income (profit)	22%	14%	32%	17%	3%	13%	100%
Number of Employees	6%	5%	51%	6%	1%	31%	100%
Payroll	12%	5%	39%	10%	2%	31%	100%
Cost of Goods Sold	5%	3%	43%	16%	2%	31%	100%
Fuel/Energy Costs	3%	3%	41%	25%	3%	24%	100%
Amount of Debt	1%	5%	48%	11%	7%	28%	100%
Rent/Lease Costs	1%	1%	54%	8%	3%	34%	100%
Other Costs of Doing Business	1%	1%	48%	11%	6%	35%	100%

Total Number of Cases = 1,190

Note: Number of Businesses Not In Operation Before 1989 = 151
Number of Businesses Not In Operation as a Percentage of 1,341 Completed Questionnaires = 11%

Table 4.7
Changes in Workforce Availability by Sector in 1989

Sector	No Change		Changes Did Not Interfere		Business Curtailed		Serious Hiring Problem		Other		Total	
	Cases	%	Cases	%	Cases	%	Cases	%	Cases	%	Cases	%
Commercial Fishing	69	28%	87	35%	37	15%	11	4%	44	18%	248	100%
Seafood Processing			1	8%	5	42%	4	33%	2	17%	12	100%
Other Basic	38	23%	65	40%	22	13%	10	6%	29	18%	164	100%
Support Sector	225	31%	263	36%	78	11%	26	4%	134	19%	726	100%
Total	332	29%	419	36%	142	12%	51	4%	209	18%	1150	100%

Missing Cases = 190

4.3.4 Changes in Business Plans

The direct costs of the oil spill and cleanup are of obvious concern to affected communities. Less obvious, yet also important, are changes in business plans that can result in further economic impacts. Consequently, the business survey asked a series of questions regarding business managers' plans to change business operations with respect to purchasing and selling equipment or property, capital investment, employment, and other aspects of strategic planning. These questions assessed the relationships of plans and activities to the oil spill and cleanup by comparing aspects of business planning before and after the oil spill. The findings from this section of the survey are complex, but we attempt here to summarize the significant points. Further analysis is needed regarding how changes in business plans may temporarily or permanently alter the economic structure in NGC communities.

As in other sections above, we distinguish between the differences in findings from businesses that did and those that did not participate in the cleanup. This distinction is particularly important in regard to changes in business plans because it is assumed that businesses that participated in the cleanup were operating and making decisions under a different set of circumstances than businesses that did not participate in the cleanup. Of particular interest in this study is how the spill may have influenced business investment.

Following is a summary of survey findings regarding changes in business plans:

- **Before the spill, NGC region-wide net investment of over $80 million was indicated for business property (i.e., land, buildings, equipment, etc.). Post-spill plans for such investment are for slightly less than $3.6 million.**

- Businesses that participated in the cleanup tended to have more plans to buy and sell business property compared to firms that did not participate in the cleanup. For example, 43% of participating respondents indicated that they had pre-spill plans to buy or sell business property. This compares with only 30% for nonparticipating respondents.

- Business respondents that did participate in cleanup accounted for about half the pre-spill planned net investment.

- Commercial fishermen, representing the greatest amount of pre-spill planned net investment regardless of cleanup involvement, cut back their 3- to 5-year plans by about two-fifths after the spill. These changes translate to reduced region-wide business investment of about $42 million over a 3- to 5-year period.

- The distinction between cleanup participation and no participation widens when looking at actual purchases and sales of business property since the spill. Businesses that participated in the cleanup had actual net investment, that is more purchases than sales of business assets, of $16 million. Firms that did not participate in the cleanup sold more business property than they purchased, resulting in a region-wide net disinvestment of $3.6 million.

- Roughly 25% of all respondents indicated plans to hire employees over the next 3 to 5 years. Firms that participated in the cleanup generally carried out these plans, but only about 14% of those that did not participate indicated that they actually hired employees.

In summary, these findings show that businesses that participated in spill cleanup accounted for most of business net capital investment during 1989. Businesses that did not participate in the oil spill cleanup sold more assets than they purchased. Regardless of the degree of cleanup participation among business firms, the value of planned investment in business property and equipment over the medium term was significantly reduced after the spill as compared to pre-spill levels of planned investment. Figure 4.4 presents summary information of respondents net investment in businesses within the study area as broken down by economic sector. Figure 4.5 presents a summary of oil impacts by sector within the study area.

The long-term business outlook may be further clouded to the extent that business participation in spill cleanup (or lack of it) was fortuitous and not tied to business management skills or judgement. For example, new business investment driven largely by cleanup participants may create over-capacity in some industries. Furthermore, increased indebtedness among businesses most hurt by the spill, such as commercial fishermen, may reduce capacity and further jeopardize the long-term prospects for business survival.

Finally, along with direct wealth and profit impacts, the oil spill and cleanup has given rise to potentially unstable redistributions in productive capacity among different sectors and groups. An observed shift toward more conservative business investment practices suggests that the business managers perceive greater uncertainty with respect to the medium-term economic outlook. These factors tend to place the economy in a more vulnerable position in terms of lost opportunity and sensitivity to recessionary forces brought about by related or unrelated events.

Figure 4.4
Respondents' Net Investment in Business Oiled Mayors' Study Area by Sector

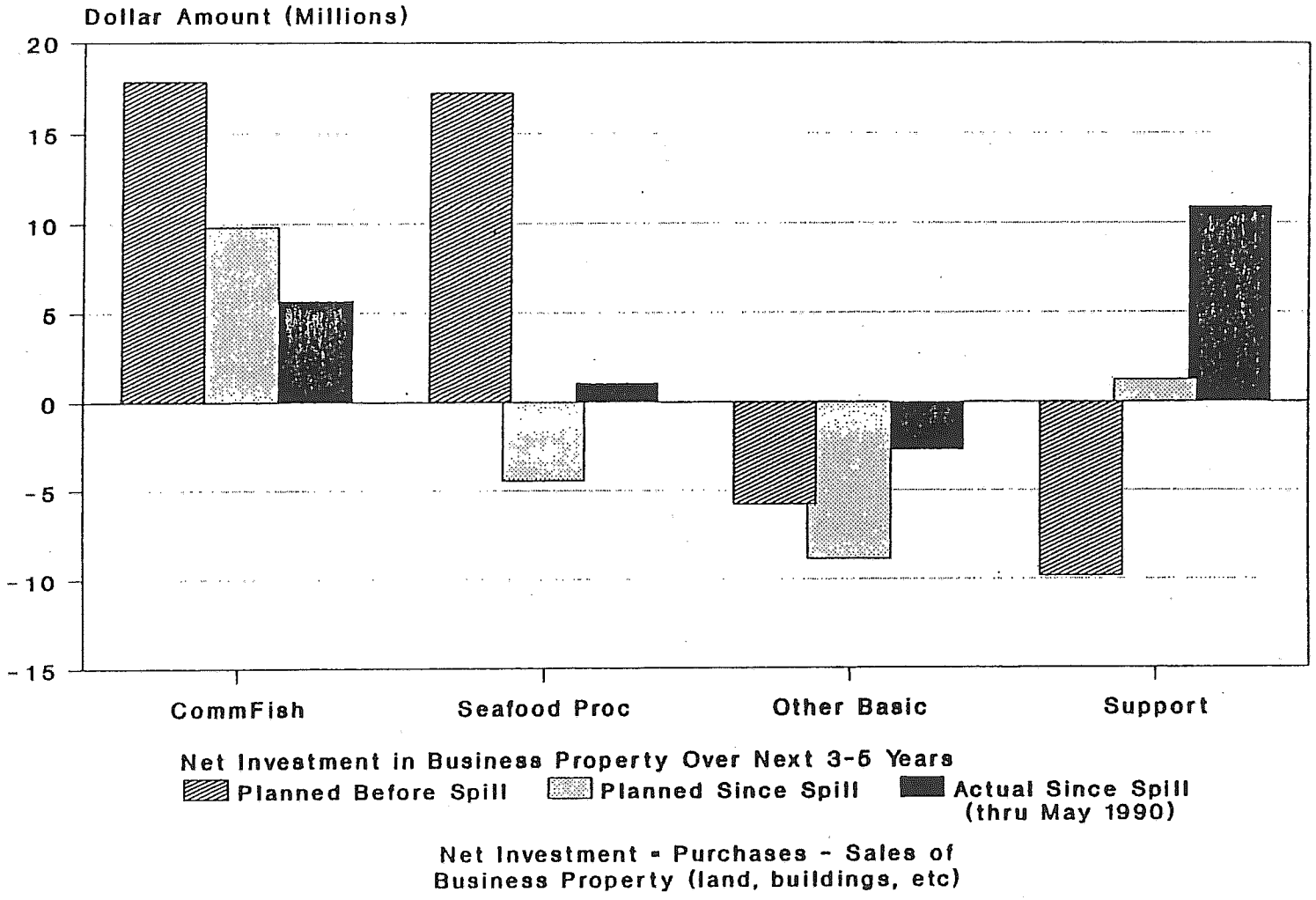
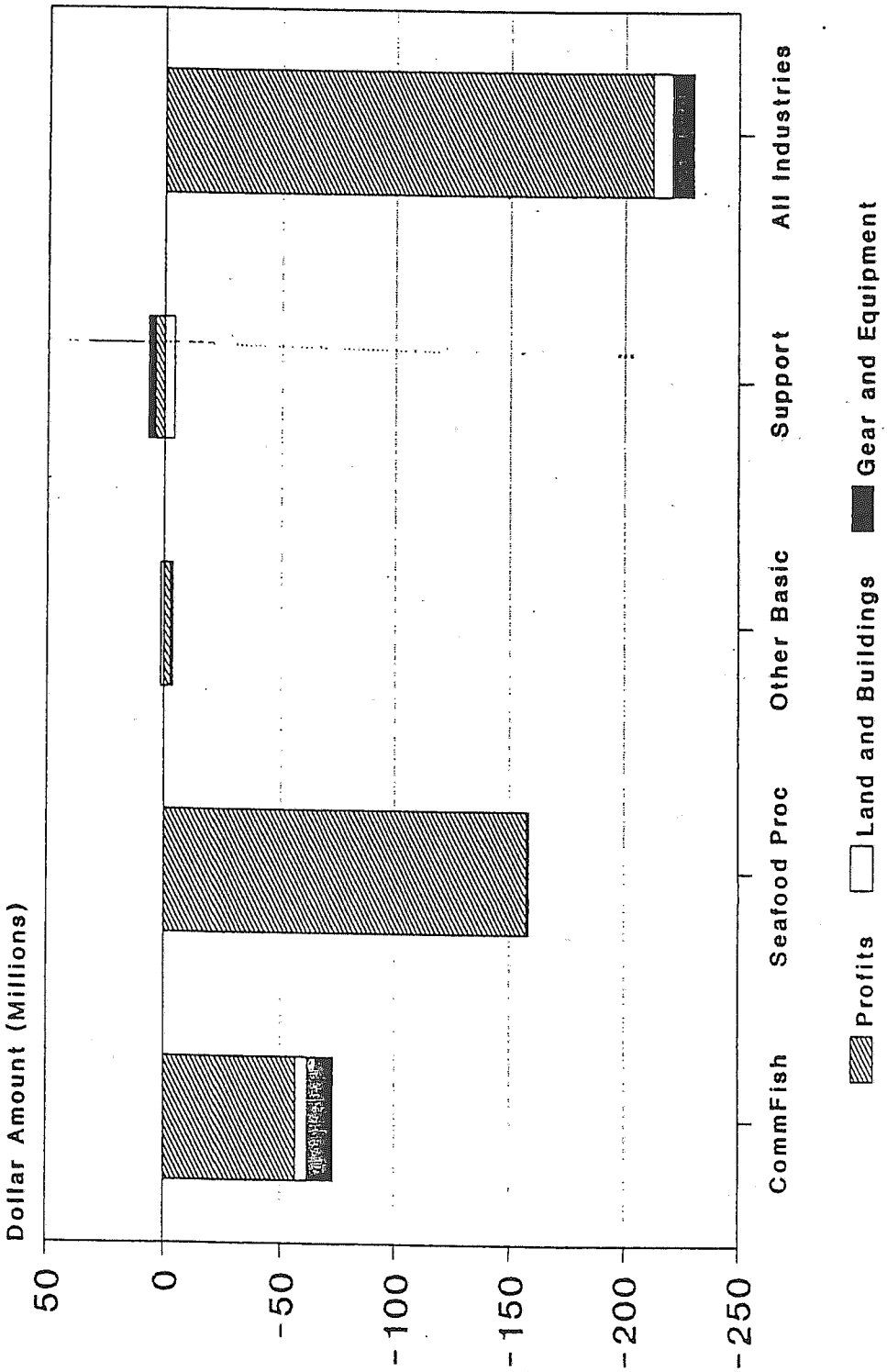


Figure 4.5
Summary of Oil Spill Impacts on
Oiled Mayors' Study Area by Sector



4.3.5 Business Gains and Losses

Exact profits and losses are not the subject of this study, however a qualitative understanding of losses and gains is an important indicator of how the spill affected local economies. Overall findings indicate that losses exceed gains in all three categories assessed (profit, property, equipment) regardless of the respondents industry type and spill cleanup involvement. Total region-wide losses arising from the oil spill, the overwhelming majority of which are accounted for by losses of business profits, exceed spill-induced gains by a three-to-one margin.

In regard to those who did and did not participant in the spill cleanup, several findings are significant:

- Business respondents in support industries and other (nonfishing) basic industries registered net gains in some but not all value categories (i.e. profits, equipment, and business property).

- Commercial fishermen and seafood processors reported losses of profits, equipment, and business property.

- Businesses that participated in the cleanup tended to lose less and gain more, as compared to those that did not participate.

Among the business firms that may have experienced losses as a consequence of the oil spill the following findings are noteworthy:

- About 61% of businesses agreed or strongly agreed with the statement: "My business suffered due to fishing closures caused by oil spill."

- About 55% of the firms that may have experienced losses agreed or strongly agreed with the statement: "Demand for my services or products fell as a result of spill damage to the environment."

- About 36% of these businesses agreed or strongly agreed that "Costs of doing business increased as a result of the oil spill and cleanup."

- The incidence of damage to commercial fishing areas and of commercial fishing closures was highest among fishermen in Cordova, Homer, and Kodiak City.

The following findings emerge about losses and claims for assistance from businesses:

- About 42% of those that may have realized losses submitted claims to Exxon.

- About 68% of all commercial fishermen petitioned Exxon for spill-related losses.

- The incidence of commercial fishing losses was second only to seafood processors, of which 80% petitioned Exxon for claims against losses.

- The overwhelming majority of these losses occurred in the form of negative profits.

- Among those surveyed who submitted claims, the average proportion of claims covered by Exxon was 36% of total losses.

In sum, these findings show that in the first year alone, the value of total losses exceeded gains by a margin of three-to-one. Fewer businesses participated in spill cleanup (i.e., winners) than those that did not directly participate (losers). The occurrence of spill-related losses in terms of 1989 business profits and asset value was highest among commercial fishermen as a group.

4.4 Recommendations

Two straightforward groups of recommendations emerge from this preliminary study of private sector economic impacts:

- Existing losses should be mitigated by programs that aid businesses to recover the losses experienced.
    - Policymakers and business organizations can help to mitigate economic impacts by introducing programs which will aid businesses in recovering losses.
    - Temporary assistance should be provided to businesses that suffered losses by introducing mechanisms that permit debt refinancing, loan forgiveness, and tax relief.
    - Local policymakers could consider programs that shift the immediate burden of losses and compensatory claims away from private businesses to the public sector.
- Additional studies need to be undertaken that can determine the full extent of business losses and the directions of change in the structure and performance of NGC economies.
    - Quantification of the full extent of business losses requires a focused study by economic sector of the actual losses incurred by private businesses.
    - The oil spill and cleanup produced a complex post-spill economic environment in which there were "winners" and "losers" and new forces affecting the structure and performance of local economies. Additional studies need to determine the nature of these changes and their implications for the economic well-being of the affected communities.

5.0 PREPAREDNESS NEEDS FOR THE FUTURE

One of the primary interests of the Oiled Mayors in conducting data gathering following the oil spill and initial cleanup was to learn from the experience in the variety of communities subjected to impacts. This section will address some of the lessons learned from the *Exxon Valdez* spill and cleanup event from the perspective of preparedness needs for the future. Obviously, many of the lessons learned are contained throughout the body of this report. In this section, however, a summary of preparedness issues is intended. These issues can be categorized as follows:

- Complete understanding of the risk factors.
- Organizational structures to assist with response.
- Plans for response.
- Access to resources.
- Information documentation needs.
- Communication.
- Legislation and advocacy.
- Resolution of continuing impacts.

In the section "Complete Understanding of the Risk Factors," the limitations of using the *Exxon Valdez* experience as a guide for the unfolding of events surrounding future disasters of any type are explored. The section on "Organizational Structures to Assist with Response" discusses the experience of some communities with emergency management structures in attempting to respond to the spill. The utility of emergency preparedness plans in responding to the *Exxon Valdez* disaster is discussed under "Plans for Response."

The difficulties of obtaining appropriate tools for spill response are discussed under "Access to Resources," the need to document events is discussed in the section on "Information Documentation Needs," and the importance of communication and the timely dissemination of information is covered under "Communication." The section "Legislation and Advocacy," provides some suggestions on how communities can be proactive in preparing for disaster events in the future, while the final section "Resolution of Continuing Impacts" provides some recommendations for the mitigation of impacts still being experienced.

5.1 Complete Understanding of the Risk Factors

It is important to note that when discussing preparedness needs for the future, using the experience of the *Exxon Valdez* oil spill as a guide will not suffice to give a complete

understanding of risk factors associated with potential oil spills. The following are a number of caveats to consider in using the *Exxon Valdez* spill as a model for future coastal disasters:

- It could have been worse. As large as the *Exxon Valdez* spill was, it is by no means the largest spill possible using the present transportation technology. Indeed, the *Exxon Valdez* spill itself could have been larger if the vessel capsized, sank, or otherwise incurred further cargo loss. It is difficult to anticipate what additional or varied types of qualitative impacts would result from a quantitative difference in the amount of oil spilled.

- It could have been a different spiller/cleanup entity. Another caveat for using the *Exxon Valdez* experience as a benchmark for future spills is that the primary company involved (as both the spiller and the cleanup entity) chose a particular course of action out of many available to it. The shape of exposure to the cleanup process was predicated, to a large extent, on the actions taken by Exxon and its subcontractors. In future accidents other companies (and perhaps even Exxon) may choose a different type of response.

- It could have been a different economic and political context. The *Exxon Valdez* spill occurred in a particular economic and political context. Changes in the regulatory or political environment, which themselves are predicated on events that cannot be anticipated, such as fluctuations in the world economy, will shape responses to accidents which may occur in the future.

- There could be a different range of exposures. The *Exxon Valdez* accident should not be taken as a standard for the range of exposure to coastal communities from maritime shipping. Exposure is a function of both the communities that are exposed and the agent of exposure. The communities in the area in which the spill occurred feature a particular mix of economics, demographics, community organization, etc. The particular form of impacts in any one community was predicated upon, among other things, proximity to the spill, facilities and physical features that determined response capabilities, political organization, economic organization, and timing. A different mix of communities exposed to a similar event would result in different patterns of exposure. In addition, the time of year in which exposure occurs (timing in the sense of seasonal patterns of economics and population fluctuation) results in varying patterns of exposure. Agents of exposure also vary between communities. That is to say, for many coastal communities there is a variety of shipping cargoes that pass by in addition to oil. Those cargoes obviously vary in their behavior in seawater; what may make sense in terms of

emergency preparedness for one type of cargo may not for another. An analysis of the types of traffic that pass particular coastlines would perhaps be in order, with an attempt to cross-reference with contingency planning.

5.2 Organizational Structures to Assist with Response

Organizational structures were important to spill response from both the community and Exxon sides of the equation.

- Community organizational structures varied between communities, and the type of structures extant in the communities influenced response abilities. Communities within boroughs, for example, had resources to draw upon that other communities did not. For example, Exxon gave the Kenai Peninsula Borough (KPB) $2 million for oil spill relief. The borough was able to dispense this money to communities within its jurisdiction without prior justification to Exxon. This system proved to be highly beneficial to communities within the KPB for two reasons. First, they did not have to front the money for resources to assist in spill cleanup. Secondly, they did not have to worry about Exxon eventually reimbursing for expenses incurred as a result of the oil spill -- the money was already under the control of the borough, and the borough had the freedom to handle the details of the disbursement after the fact. With the need for immediate justification gone, and dollars at their disposal, incorporated communities within the KPB were more able to direct their full attention to cleanup activities. Consequently, their efficiency in the cleanup was maximized.

  But boroughs were not the only umbrella organizational structure which could prove beneficial to communities. Whether a community was incorporated or unincorporated had implications for its ability to rally resources from boroughs. For example, while located within the KPB, Port Graham and English Bay had more difficulty accessing Exxon-originated cleanup monies from the KPB due to their status as unincorporated communities. While these communities had access to KPB funding in theory (if they worked through the nearest incorporated community which was Seldovia), there were a number of reasons they did not receive any money. Primary among these were cultural differences between the smaller Native communities and the larger, ethnically plural community of Seldovia. In order to receive assistance these communities were forced to go through institutions with whom they have had problematic relations in the past rather than through the regional service delivery entities with whom they had established relations but who

were themselves without resources. Opening the smaller communities to outsiders to intervene in what were considered private affairs was not considered an acceptable option. Consequently, needs were unmet in those communities.

- Exxon's (and its subcontractors') organizational structure also influenced the response in the communities. There were severe limitations on what could and could not be done based on the difficulties surrounding the "who is in charge" problem. When Exxon or VECO representatives were available, they were typically not endowed with authority to make decisions considered key by those in the communities. Organizational difficulties were exacerbated by the fact that Exxon personnel were frequently rotated through the local communities. When one local representative would be "brought up to speed" on local concerns, he or she was replaced by another individual.

While some communities utilized existing structures to manage the increased demands created by the oil spill, other communities either implemented nonstandard, but locally-based, structures or pulled together specialized organizational management structures from outside the community. (It should be noted that were funding available to all communities to do so, some of the organizational problems seen in many communities may have been avoided.)

An example of the uses of such a structure is the MAC group formed in Seward in response to the spill. This group evolved through a series of stages beginning with the city's own Emergency Operations Center. The Emergency Operations Center was the locus of oil spill-related activity for the first week of the spill. It was located in the council chambers and operated on a 24-hour basis. The Emergency Operations Center utilized the organizational principles of an "Incident Command System," an organizational format that is common in emergency services such as fire and law enforcement services. Under the Incident Command System, local officials were assigned predetermined emergency duties outside of their normal day-to-day responsibilities in order to efficiently bring the resources of the city to bear on a particular problem. Under the Seward implementation of the Incident Command System the fire chief, for example, was given the responsibility of overall logistics. In other words, in addition to his duties as fire chief he was responsible for coordinating logistics for the overall city response, regardless of departmental boundaries. *This is the strength of the Incident Command System -- individuals are assigned specific functions and given authority to draw together resources that are normally "compartmentalized" or "departmentalized" in order to facilitate community response.*

It soon became clear, however, that even in its "own backyard," the city of Seward could not effectively coordinate and implement effective response to an event of the scale of the oil spill. From a city-based emergency response, Seward expanded its response resources. Critical in this shift in level of response was the involvement of the National Parks Service representative, located in Seward, in emergency activities. At that stage of the response, the individuals involved realized the potential for assistance on a federal level. Consequently, the Interagency Incident Management Team, a federal emergency response group, came to Seward. The primary function of the Interagency Incident Management Team is to act as an "overhead" team in coordinating large scale, multi-agency responses to large wildfires in Alaska. This team has a cast of coordinators who also operate along the lines of an Incident Command System, with one position allocated for logistics, one for finance, and so on. This team of experts came to Seward and initially managed the response. After a transition period, local representatives of the various governmental agencies in and around Seward were trained to take over the positions filled by members of the Interagency Incident Management Team, so that the experts were able to withdraw. Locally-based Exxon employees were trained by the Interagency Incident Management Team as well. With the transition to local staffing, the emergency response organ that began as the Interagency Incident Management Team became known as the Multi Agency Coordinating (MAC) group. The MAC group met twice daily and set daily cleanup objectives and facilitated and tracked cleanup activities.

What made the MAC group unique was that its leaders decided to include representatives from a multitude of groups and agencies with an interest in the protection of the ecological zone encompassing Seward. There were representatives from the Fish and Wildlife Service, the Chugach Alaska Corporation, Alaska Department of Fish and Game, the Department of Natural Resources, and a representative from a commercial fishermen's group. Each of the representatives sitting on the MAC group had decision-making ability on behalf of the organization they represented. Eventually Exxon agreed to cover any expense the MAC group approved if Exxon could have a representative at the MAC group meetings. In Seward, the MAC group controlled oil spill response. Such an arrangement was unheard of in other affected communities where Exxon and VECO controlled cleanup operations. The "vertical integration" of the MAC group as an organizational structure was also essential to its success. That is to say, it was a local level structure that had the ability to plug into regional, statewide, and federal response structures, eliminating problems of communication, resource allocation, and the like which were found elsewhere.

There are a number of points to be taken from Seward's relatively smooth disaster response.

- First, it is critical for local capabilities within an Incident Command System to be current. Those involved need to train regularly. Whenever there is turnover in personnel, the new employee needs to be trained in the procedures for Incident Command System activation.

- For disasters extending outside the jurisdiction covered by a standing Incident Command System, that is the city itself, there needs to be an awareness of outside resources such as the federal Interagency Incident Command Team. Without an awareness of potential sources of assistance, city officials are wasting valuable time innovating ways to respond to the emergency instead of actually responding. In the case of the *Exxon Valdez* oil spill, most of the communities affected were innovating rather than responding.

- In most communities Exxon and VECO complicated local response efforts by simultaneously imposing their own cleanup plan. Seward was able to maintain local control by integrating local and outside resources.

- Representatives sitting on the MAC group were empowered decision makers who could commit the resources of their various entities. Communities that got various agency representatives together without having those representatives vested with decision-making powers found such multi-agency groups ineffective.

- Despite the differences in jurisdiction, those involved in Seward's emergency management effort ultimately approached the cleanup of the Seward "zone" as one ecologically integrated area.

There were general organizational lessons learned during the spill outside of Seward's experience. These included:

- The value of intercommunity response. For multi-community response beyond existing regional associations such as boroughs, the formation of the Oiled Mayors provided the communities a single voice and hence some political power with the state and with Exxon. The Oiled Mayors group was also a valuable source of information exchange among the communities. Such a structure is valuable either on an ad hoc or more ongoing basis as a force to protect communities in the future.

- The value of organizing early. No matter what the form of various response structures that helped communities respond to the spill, those communities in which there was some organizational structure in place, or soon transferred in, were in a much better position to enact a response than those communities that had no such structure and had to create something anew. Those communities that had to create a response structure found the creation process to be a serious drain on time, energy, effort, etc.

- The value of easing access to resources through direct contact with appropriate agency representatives. It should also be noted that institutions located outside of the communities had the ability to ease the difficulty of accessing resources in the myriad agencies and entities involved. The value of the governor's representatives sent to several of the communities should not be understated. These representatives were a direct channel to state government that, if nothing else, helped to cut through the red tape and sometimes provided a means of problem solving. This was apparent in Cordova especially. While such roving representatives are not a structure per se, their contribution was significant and this experience should be carried forward as a lesson learned: face-to-face communication with the highest levels of state government, and having governor's representatives personally on site in communities touched by a disaster, have a high value in facilitating accurate communication to the state of the type and scope of problems being experienced on the local level. This type of communication goes a long way to easing problem solving in what can be a tangle of state and local bureaucracies.

5.3 Plans for Response

The utility of having emergency preparedness plans in place was obvious from the communities that were able to implement existing plans. It was also apparent that communities that utilized plans that had not been gathering dust on the shelf were more successful than others. According to one emergency service worker, the only way to be prepared for a disaster is to have a disaster. If the kinks of the emergency plans have been worked out through hands-on experience, operations will go much more smoothly.

Preparedness level is a function of several factors.

- First is the length of time since the last implementation of the emergency management plans. The more time between review and rehearsal of emergency plans, the less likely it is that personnel will respond as planned.

- Second is the rate of turnover among emergency service workers -- if the last implementation of the emergency plan was more than a "generation" in terms of personnel, that experience is lost.

- A third factor is the rate of turnover and operational changes among outside agencies at the regional, state, and federal levels. If local response agencies do manage to keep levels of preparedness up through either utilization or appropriate training, they must still interact with outside agencies on large responses, and this necessitates knowing the policies and procedures of the outside agencies. Ideally, outside agency personnel are known as well to facilitate interagency interactions.

Kodiak provides an example of an extremely smooth implementation of an emergency plan. Officials credit the strength of the plan to the fact that Kodiak was so hard hit during the Great Earthquake of 1964 and the fact that they have used that experience to their benefit. In the words of one official, Kodiak "knows it can happen here," and as a result the Kodiak Island Borough and the City of Kodiak have identical ordinances that form the Emergency Services Council (see section 3.1.2). The ESC utilizes a common, comprehensive emergency plan. This intergovernmental entity was up and running and accessing response resources within two hours of activation. Individual roles assigned under the emergency plan and designed primarily for earthquake and tsunami response were easily tailored to fit the oil spill context.

An essential component of preparedness, of course, is to know what to be prepared for. Most emergency plans are limited in their treatment of human impacts, concentrating primarily on environmental impacts. Those plans that do deal with human impact issues address housing and care of persons displaced as a result of evacuations or destruction of their homes, or emergency medical care needed as the result of immediate public health risks. From the *Exxon Valdez* and similar experiences, however, it is clear that there is a range of human impacts that need to be addressed outside of immediate and limited needs. It has been shown, for example, that demand for social, psychological, and medical services will increase dramatically, and that these needs will continue for a significant period of time. These needs can and should be anticipated and planned for. (See section 5.7.1 for further discussion of this issue.)

5.4 Access to Resources

In local assessments of response to the oil spill, one of the critical factors in whether or not local efforts were considered effective was the question of access to resources. Communities considered themselves more or less successful in this endeavor. Several factors contributed to a community's success in accessing resources. These included:

- Understanding what resources are useful. Prior to accessing resources, community leaders needed to understand what resources would be useful. This proved problematic at times due to the fact that, for most leaders, the oil spill was a type of event that was unique in their tenure.

- Understanding where those resources are. Once the resources have been identified, there is the problem of knowing where those resources are located. There were problems during the spill, particularly during the early days, of finding resources.

- Understanding how to access resources. Once resources are identified and located, there remains the difficulty of understanding how to go about accessing those resources, whether those resources are under the control of private companies (such as Exxon or a boom construction company) or public entities (such as state agencies).

- Having the ability to access resources. Even in cases where resources were identified, located, and the routes of access were known, it was not always the case that communities were able to access those resources. This was true for a number of reasons. Smaller communities had lesser political clout to access resources than larger communities; communities within boroughs were able to mobilize regional-level support more effectively than communities outside of boroughs. Effectiveness of community leaders and response strategies also varied when it came to accessing resources. Some communities chose to go after resources that Exxon stated were unavailable and obtained them through independent means.

5.5 Information Documentation Needs

Documentation of effects of the spill was critical to cost recovery efforts. The ability to track capital and personnel costs and link those to the oil spill were required by Exxon for spill claims. Some localities were able to initiate more efficient systems for this than others. There were a number of different strategies to effective documentation. These included:

- Creation of a position in the local government structure to put a single individual in charge of oil spill-related tasks. This had the effect of allowing department heads and other administrators to "clear their desks" of oil spill-related work. This concentration of tasks allowed for a coordinated response and improved tracking ability. It helped to ensure systematic followup on spill-related matters with outside entities -- only one person was calling and corresponding with other government entities and Exxon, in effect establishing a "united front," on behalf of the community, for dealing with those entities. This helped to minimize "mixed messages" being sent or received by local governments.

- Creation of a "paper department" was utilized by some municipalities as a means to centralize spill-related expenditure and revenue information. In this case, no personnel were added, but in order to leave the budgetary and expenditure process intact, spill-related expenditures and revenues were flagged with an oil spill department number rather than an existing department number. In this way increased labor expenses in, for example, a public works department that were attributable to the oil spill would be accounted for under the oil spill department rather than under the public works department. This allowed for closer accounting of oil spill expenses, and allowed departments to maintain tracking of resources allocated through normal processes.

5.6 Communication

Communication or transfer of information was critical to response effectiveness during the spill in at least two ways.

- Efficient transfer of information between affected parties greatly influenced the efficacy of interactions between responding agencies. It was apparent that information was not exchanged between entities who agreed later that it would have been beneficial had they done so. Information flow between different arms of the same level of government was not always efficient; information transfer from Exxon and its subcontractors to local governments was not always smooth. ("Organizational structures" influencing information flow are discussed in section 5.2.)

- It was also noted that the efficient transfer of information to the public was one factor in community perception of response efforts. Effective public

dissemination of information was accomplished in a number of ways. These included:

- News conferences that were held daily or twice daily at specified times known in advance. People knew where to go to receive information and there were expectations about the timely receipt of information. News conferences that followed daily or twice-daily response team coordination meetings were seen as informative.

- Local broadcasts were also used as a means of public dissemination of information. Either local radio or television capabilities can be used for public updates daily or twice daily, so that members of the public can know when and how to get current information.

- A single designated spokesperson was used for the dissemination of community information. This person may be the mayor, or a designee, but this person should be recognized as the official source of information, so that other persons are relieved of this responsibility. Channeling information through one individual also lessens the chances for conflicting information being passed along. A number of persons should have direct access, however, to first-hand information gathering to prevent claims of bias on the part of the spokesperson. For example, in Seward a representative of a fisherman's group went on spill area overflights. While this person did not act as a spokesperson for the community as a whole, the fact that different community interests, including fisheries, had a hand in the information gathering process lent credence to the official assessment of the situation.

- The provision of a forum for regular public input through which individuals and groups could feed information back into the response system was regarded as valuable as well. Daily, and then weekly, meetings held in some communities were seen as important in allowing people to feel they had input into the community-level response.

- Continuous access to information through an information center was very important to effective public response. The use of hot lines or information lines that provided a rumor control function were used successfully. In at least one community, an information line was set up with a recorded message that was frequently updated. Individuals could call in and listen to current oil spill information. Local print media was utilized as well: as an example, the "Cordova Fact Sheet"

was of value in keeping the community informed about spill and cleanup issues.

These types of information media centralized information about the spill and cleanup, and relieved the local government of acting as a public information center on spill issues, a function that was a major drain on local government resources at the height of spill-related activity. With one person in charge of an information center, information demands on local officials can be channelled through that person or his or her designees. In other words, once local officials give information to the information center, they do not have to be bothered by repeated demands for the same information by multiple individuals from various institutions, including the media.

The goal of scheduled news conferences, local broadcasts, having a designated spokesperson, providing for public input, and having an information access system is the same. This is to provide rumor control and to have a reliable conduit of accurate information to (and from) the public that is accessible in a timely and predictable manner. In community-wide crisis situations, this is essential, as public reactions based on inaccurate information are counterproductive to any response effort.

5.7 Legislation and Advocacy

Before we begin our discussion of recommended legislative actions, it is important to recognize that much has already been accomplished in the wake of the *Exxon Valdez* disaster to respond to impacts and to ensure the protection of citizens in the event of another spill. Significant state and federal legislation has been passed, improved contingency plans have been developed, a wide range of safety and spill prevention measures have been implemented, new organizations have been formed (e.g., Regional Citizens Advisory Committee , the Oiled Mayors), and a vast array of information on, and understanding of, oil transportation risks is now available. In addition, the general awareness of oil spill response consequences and capabilities, and potential social and economic impacts is extremely high. It is not our objective to restate in this section changes that have already been made but to identify issues still in need of resolution.

5.7.1 The Need for Recognition of Human Impacts

At present, no federal or state government agency officially recognizes documenting the human consequences of an oil spill or other technological accident as its responsibility. However, the representatives of such agencies recognize the existence of such impacts and either tacitly or explicitly acknowledge that protecting the public from such impacts is an inherent concern of their agencies. The lack of official recognition of the economic, social, and psychological impacts of an oil spill meant that it would take nearly eight months following the spill for a major assessment of the human impacts to be undertaken -- and then only as a result of the initiative of the mayors of the affected communities themselves. One of the bureaucratic difficulties in this regard is that no single federal or state agency considered such issues and impacts to fall entirely or exclusively within its purview. The problems encountered in initiating the current study underline the need for changes in applicable federal law and state protections designed to assure that future damage assessments also include the human consequences of an oil spill on directly affected communities. While resolution through the courts is theoretically available, such resolution, if it comes at all, will probably be a decade in the future, and will then only involve some monetary settlement. It will have done nothing to protect the communities during that period from further damages, to mitigate ongoing economic, social, and psychological impacts. Legal resolution of these issues also cannot address those kinds of regulatory changes needed to protect local residents from subsequent oil spills.

The following sections provide recommendations for legislative action which communities can pursue on a federal, state, and industry level. The objective of these actions is to ensure protection and compensation to communities for economic, social, and psychological impacts which can be sustained, as shown in this volume, from an oil spill disaster.

5.7.2 Community Action: Federal Government

Problem

The problem in locating money to address human impacts from the federal government involved complicated undertakings by state agencies. Federal and state agencies became enmeshed in what has become known as the "CERCLA process." CERCLA is the acronym for the federal Comprehensive Environmental Response, Compensation, and Liability Act (42 U.S.C. 9601 et seq.), which, in combination with the Clean Water Act (33 U.S.C. 1321), were the primary driving forces behind the state-federal "Damages Assessment Process." Under these Acts, three federal agencies (the Departments of Agriculture, Commerce, and Interior) and the state share trusteeship for the living and non-living natural resources

affected by the oil spill. The "CERCLA Trustee Council" that evolved consisted of a representative of the Forest Service (Dept. of Agriculture), the Fish and Wildlife Service (DOI), National Marine Fisheries Service (Commerce), and Alaska Department of Fish and Game. Gradually, as this CERCLA process unfolded, federal and state agencies came to officially accept and acknowledge this "Trustee Council" as the controlling authority on all things related to the assessment of damages from the oil spill -- including the human impacts. The first task of this group was to develop a State/Federal Natural Resource Damage Assessment Plan for the *Exxon Valdez* Oil Spill which was disseminated in September 1989, though a final version was not completed for several months. Unfortunately, this damage assessment plan did not provide for consideration of the economic, social, or psychological impacts of the accident on the directly affected human populations.

Recommendation

Local communities should exert concerted effort to have the Alaska Congressional Delegation assure that congressional guidance is provided to CERCLA agencies to insure that local community impacts are taken into consideration in the event of a future accident. This guidance would, in effect, specifically identify the "intrinsic social, and economic values of public natural resources and uses" affected by any future oil spill as suitable for inclusion under the provisions of CERCLA.

5.7.3 Community Action: State Government

Problem

The protections currently afforded to local communities under state of Alaska laws are little improved over those that failed to protect communities with respect to the *Exxon Valdez* spill.

Recommendations

Local communities should exert a concerted effort to assure that their state representatives reflect the concerns of the affected communities with regard to protecting the interests of directly affected communities in the event of a future spill. These actions would include:

- Passage of a bill creating an "oil spill contingency fund" that would be available to local communities to address urgent response requirements.

- Passage of a bill providing direct economic support to individuals and families negatively affected by the direct or indirect effects of the spill or its cleanup.

- Passage of a bill funding the development of community-based contingency plans which address recognized shortfalls in federal, state, and industry contingency plans.

- Provisions in state and industry plans for the inclusion of local community representatives and local experts in critical decision-making organizations.

- Development of criteria for reimbursement of costs from local response to an oil spill should be established by law or defined in regulatory policy. It should not be at the sole discretion of an oil company to decide if, when, and how local communities are to be reimbursed for their expenses in responding to an oil spill. Neither should this decision depend on the vagaries of the prevailing political processes.

- Communities immediately begin, in the event of any future oil spill, documenting all activities, times, places, and incidents requiring the commitment of public or private resources (including time) to meet the exigencies of responding an oil spill. This information should be included (with the standard fiscal and other economic impact data) as a basis for quantification of damages resulting from delayed, deferred, indefinitely postponed, or lost services to the community (i.e., opportunity costs). Quantification of such damages, in turn, should be included as an element of costs incurred as a direct result of the spill or other causal event. Such costs, after the initial crisis management phase, should be submitted on a monthly or quarterly basis as long as the effects continue to be experienced. Failure of the spiller to respond in a timely or affirmative way to these requests for reimbursement should result in an immediate claim against the federal Oil Pollution Act of 1990 fund under Section 1013 of the House version of the bill. (Recourse is not available to current claimants for damages as a result of the *Exxon Valdez* incident; i.e., Section 1013 provides that "no claim by a particular claimant may be approved or certified during the pendency of an action by the claimant in court to recover the costs which are the subject of the claim.") It must be realized that communities, the lowest level of government involved in a widespread emergency, cannot be expected to

shoulder the largest response burden while simultaneously being drawn into emergency response.

5.7.4 Community Action: Industry

Problem: Delays in acquiring needed resources are inevitable in a litigation environment. If litigation is the only means for a community to receive compensation for damages, such delays can seriously hinder a community's recovery from a disaster. Similarly, if a spiller is to fund various local government projects in an emergency, the spiller is in a position of potentially assuming liability for damages addressed by the government through the funding process itself. In other words, if a spiller pays to protect something, in litigation it may be argued that the spiller has admitted to being responsible for damages to that entity or resource.

Recommendation: Make funding of oil spill preparedness a required element of the industry's oil spill contingency planning and implementation process. If the individual, specific funding allocations are then decided by local governments or another level of government, the entity underwriting the fund is not liable for the decisions made by the fund administrator. Local governments can then justify their expenditures from fund sources after the fact, or in "real time" to an independent entity.

5.8 Resolution of Continuing Impacts

An important lesson to carry forward from this event is that continuing impacts need to be addressed as well as preparations for future disasters. In Sections 2 to 4 of this report recommendations are elaborated that address these continuing impacts. This discussion summarizes the recommendations to stress the importance of resolving existing problems.

5.8.1 Social and Psychological Impacts

Continuing social and psychological impacts may be at least partially addressed through the following actions:

- Expanded mental health services to handle increased cases of psychiatric disorder, substance abuse, and domestic violence. These needs are especially acute in Native communities where culturally sensitive interventions need development and implementation.

- Expanded primary health care services to respond to spill-related health problems and additional training for primary health care workers in addressing psychosocial and psychiatric complaints related to the oil spill and cleanup.

- Development of programs to reduce community conflict and restore community integration.

- Additional research about the nature and distribution of psychosocial problems related to the oil spill and cleanup.

5.8.2 Local Government Impacts

Continuing local government impacts may be mitigated through the following actions:

- Restoration of communities to their fiscal and operational integrity to where they were before the oil spill and cleanup.

- To ensure community needs and perspectives are addressed, local governments should be integrated into statewide, regional, and other planning efforts for oil spill and other disaster response.

- Mechanisms need to exist to relieve local governments of the cash flow and other fiscal and operational burdens of disaster response.

- Training of local government and especially smaller Native Village leaders in disaster response plans, structure, and operations.

5.8.3 Private Sector Economic Impacts

Mitigation of private sector economic impacts may be accomplished through the following actions:

- Introduction of programs to aid local businesses to recover spill-related losses.

- Consideration of temporary assistance programs such as debt refinancing, loan forgiveness, and tax relief that can aid businesses that experienced spill-related losses.

- Additional research that can quantify the full extent of losses to private businesses and how these losses will affect the future economic growth and development of the affected communities.

Without attention to the damages to local populations as well as the natural environment, the lessons of the *Exxon Valdez* oil spill have been only partially learned. Without restoring what was damaged, the injuries will only fester and worsen. Without acting to protect their families and communities in the future, the risks only increase. Closing the books on the impacts from *Exxon Valdez* oil spill and cleanup will take resources and extensive effort by local communities, state governments, and other concerned parties.

APPENDIX 1. Household Survey Research Methods

1. Household Survey Sample

A survey of 596 households in 13 communities, 11 in the region directly exposed to the oil spill itself and 2 control communities, was conducted between March 30 and May 15, 1990. Sampling frames were developed in the field from a variety of sources. Not all communities had available comparable sources of household addresses. Thus, the basis of the sampling frame for each community varied, based on availability of materials in each locale. In most instances maps indicating the location of domiciles were used. Included were Census Bureau tract maps, other city maps, or maps developed by interviewers and local experts. In some instances addresses were drawn from electric company billing listings. In each case, however, the number and location of households was verified by a census conducted by each fieldworker. After listing the addresses of all domiciles in the community, numbers were assigned to each household in the sampling frame.

After the sampling frame for each community was completed, random samples of households were drawn at a predetermined ratio using computer-generated tables of random numbers. For communities with more than 650 households (e.g., Valdez, Cordova, Seward, and Kodiak) approximately 7% of the households were selected for interviewing. Smaller communities, such as Tatitlek, Chenega Bay, Chignik, and Akhiok, were intentionally oversampled at a 50% or higher ratio based on the total number of households. Replacement households, necessitated in the case of refusals or unoccupied dwellings, were also selected from the same sampling frame using a table of random numbers.

Once each household was selected, a respondent within the household was randomly selected. The person to be interviewed was selected on the basis of birth date. For all persons within the household who were at least 18 years of age, the one whose birthday was closest to the date of the interview was selected as the respondent. If, for some reason, that person was unable to be interviewed, then the person with the next closest birth date was selected. Interviews were conducted by 15 trained fieldworkers and lasted between 45 and 120 minutes.

Incomplete information resulted in the elimination of two respondents, leaving a total sample size of 594. Approximately 78% of all randomly selected subjects agreed to participate. The sociodemographic characteristics of the sample were compared to those reported for each community in the most recent local census available. A high degree of correspondence was found, indicating that overall the sample was representative of the population of each community.

2. Measures

Demographic Variables

Demographic variables examined included age, gender, ethnicity, education, total household income in 1988, and marital status. Age was measured in years and grouped into five categories: 18-24 years, 25-44 years, 45-64 years, and 65+ years old. Ethnicity was measured using a 12-item variable including: white/Caucasian, Koniag/Aleut/Sugpiaq, Eyak, Athapaskan, Yup'ik/Inupiaq, Other Alaskan Native, Filipino, Hispanic, Asian/Oriental, Black, American Indian, and Other. These categories were further classified into Alaskan Native and non-Native groups. Education was measured using an 8-item variable ranging from less than sixth grade to a graduate degree and further classified into two groups on the basis of graduation from high school. Household income for 1988 was measured using a 13-item variable ranging from less than $5,000 to more than $150,000 and further classified on the basis of a median income of $40,000 into two groups. Marital status include married, never married, not married but living together, widowed, divorced, and separated.

Exposure

Exposure to the oil spill and subsequent events was assessed on the basis of responses by residents of the affected communities to six different questions: (1) Did you or anyone in your household use, before the spill, areas along the coast that were affected by the spill; (2) Did you work on any of the shoreline or water cleanup activities of the oil spill; (3) Are there any other ways that you came into contact with the oil spill or cleanup activities, such as during recreation, hunting, fishing, or gathering activities; (4) Did you have any property that was lost or damaged because of the oil spill or cleanup; (5) Did the oil spill cause any damage to the areas you or other household members fish; and (6) Has the oil spill directly affected the hunting, fishing, or gathering activities of any members of this household? Each response was coded 0 for a no response and 1 for a yes. The responses were then summed to provide a continuous measure of exposure with a range of 0 to 6. The exposure index was found to have an inter-item reliability (Cronbach's alpha) of .73 for this population. On a scale from 0 (no exposure) to 6 (high exposure), the mean exposure score for residents in the affected communities was 2.54 (standard deviation = 1.69).

Subjects were classified into three groups on the basis of maximum level of exposure. Residents in the affected communities were classified as being either high-exposed or low-exposed, depending on whether their exposure index score fell above or below the group median. Residents living in the two control communities were classified as being not-exposed.

The distribution of subjects by exposure status within each of the 13 communities and five subregions is provided in Table A1.1. The Kenai Peninsula subregion had the highest percentage of residents in the high-exposed category, followed by the Kodiak Island and Chignik subregions. In general, small, predominately Native communities like English Bay, Tatitlek, Chenega Bay, and Larsen Bay had a larger percentage of residents in the high-exposed category than large, predominately non-Native communities like Valdez and Seward.

A description of the characteristics of the study subjects by exposure status is provided in Table A1.2. Exposure groups differed from one another only with respect to ethnicity and marital status. Natives were slightly overrepresented in the high-exposed category and slightly underrepresented in the low-exposed category. The percentage of adults who were separated or divorced was also significantly higher in the low-exposed group. Otherwise, the three exposure status groups were fairly well matched with respect to distribution of age, sex, and socioeconomic status groups.

Table A1.1
Exposure Status by Subregion and Community

Subregion or Community	Number of Subjects	Exposure Status		
		% High Exposed	% Low Exposed	% Not Exposed
Prince William Sound	156	46.8	53.2	0.0
Chenega Bay	11	81.8	18.2	0.0
Cordova	66	50.0	50.0	0.0
Tatitlek	14	85.7	14.3	0.0
Valdez	65	29.2	70.8	0.0
Kenai Peninsula Subregion	84	57.1	42.9	0.0
English Bay	24	95.8	4.2	0.0
Seward	60	41.7	58.3	0.0
Kodiak Island Subregion	163	53.4	46.6	0.0
Akhiok	11	54.5	45.5	0.0
Karluk	11	54.5	45.5	0.0
Kodiak	119	48.7	51.3	0.0
Larsen Bay	22	77.3	22.7	0.0
Chignik Subregion	29	51.7	48.3	0.0
Chignik Bay	29	51.7	48.3	0.0
Southeast Subregion	162	0.0	0.0	100.0
Angoon	60	0.0	0.0	100.0
Petersburg	102	0.0	0.0	100.0
Total Region	594	37.6	35.1	27.2

Table A1.2
Demographic Characteristics of Respondents by Exposure Status

Demographic Characteristic	Exposure Status		
	% High-Exposed (n=224)	% Low-Exposed (n=209)	% Not-Exposed (n=162)
Sex and Age			
Males	52.9	51.0	45.1
18-24	6.0	4.7	1.4
25-44	66.7	56.6	57.5
45-64	22.2	26.4	32.9
65+	5.1	12.3	8.2
Females	47.1	49.0	54.9
18-24	13.5	10.8	5.6
25-44	59.6	60.8	67.4
45-64	19.2	19.6	15.7
65+	7.7	8.8	11.2
Ethnicity			
Native	41.2	21.7	32.3
Non-Native	58.8	78.3	67.7
Education			
< 12 years	49.5	51.5	49.4
H.S. Grad	50.5	48.5	50.6
Income			
< $40,000	47.5	58.2	53.2
≥ $40,000	52.5	41.8	46.8
Marital Status			
Married	70.0	65.2	75.1
Single	14.5	9.2	11.2
Separated/Divorced	10.0	19.3	6.8
Widowed	5.5	6.3	6.8

Family Relations

The oil spill's impact on the family was examined using two separate measures. The first was a series of 11 questions relating to the behavior of children in the household. Responses to these questions ranged from 1 (strongly disagree) to 5 (strongly agree). These responses were coded and summed to comprise a child dysfunctional behavior index. The inter-item reliability (Cronbach's alpha) of this scale was .65. A similar measure was developed to assess the degree of perceived family support. This 11-item family support scale had an internal reliability of .88 in this population.

Social Relations

The oil spill's impact of social relations was examined by asking respondents if relations with spouse or partner, children living at home, other relatives, neighbors and friends, people from other communities, and coworkers had improved, stayed the same, or declined since the spill. Respondents were also asked whether they had experienced any problems with outsiders or with friends since the spill.

Traditional Subsistence Activities

The oil spill's impact on traditional subsistence production and distribution activities was assessed by asking respondents about time normally spent hunting, fishing, and gathering; time spent with people from other households on these activities; the amount of harvested resource foods shared with others and with elders; the amount of harvest resource foods received from other families; the number of household members participating in subsistence production activities; and the opportunities for children to learn subsistence production skills. Respondents were asked whether participation in these activities increased, stayed the same, or decreased since the spill compared with the same time in 1988.

Depression

Depressive symptoms were measured using the Center for Epidemiologic Studies Depression scale (CES-D; Radloff 1977). This scale has been used extensively in community studies of the prevalence of depressive symptoms. The scale has been shown to have high inter-item and test-retest reliability as well as sufficient convergent and discriminant validity for use as a measure of the level of depressive symptomatology in general populations (Radloff 1977; Weissman et al. 1977). In this population, the CES-D was found to have an inter-item reliability (Cronbach's alpha) of .88; among Native respondents, the reliability was .90 and

among non-Native respondents the reliability was .86. This compares with coefficient alphas of .84, .85, and .90 reported by Radloff (1977) in her CES-D field trial data.

Respondents described their mood over the past week by rating each of 20 items on a scale from 0 (rarely or none [less than 1 day]) to 3 (most or all [5-7 days]). A depression score was calculated for each respondent by summing the ratings, after first reversing the ratings of four reverse-worded items. If a respondent had completed 85% or more of the CES-D items but less than 100% (n=10), responses to missing items were imputed by using the mean of that person's answers to the nonmissing items.

Respondents with scores of 16 or above were classified as being depressed for the purpose of calculating post-spill prevalence rates. A number of studies have documented the validity of this cut-point in distinguishing groups with high depressive symptomatology from those with low depressive symptomatology. However, the use of this cut-point does not provide an accurate enough measure to ascertain rates of clinical depression as defined by the Diagnostic and Statistical Manual of Mental Disorders, Version III-R (DSM-IIIR), criteria in the general population. Nevertheless, the extensive use of this scale in other community studies of the prevalence of depression enables us to compare observed results with similar findings in other segments of the U.S. general population.

The 16.6% prevalence of CES-D scores of 16 or greater reported in this study is much higher than the six-month prevalence rates of DSM-III depressive disorders (ranging from 0.1 to 1.6% for major depressive episodes and from 0.5 to 3.1% for dysthymia) found in the general U.S. population (Myers et al. 1984). However, comparison between the results of this study and those of other studies are limited by differences in study criteria (depressive symptoms versus DSM-III diagnoses) and measurement (CES-D versus Diagnostic Interview Schedule protocol). The CES-D was selected for use in this study because of its ability to describe that type of depressive symptomatology that would impact on all aspects of the health care system and not merely on mental health services.

Anxiety

Unlike the diagnosis of depression, the diagnostic criteria for generalized anxiety disorder (GAD) were based on a DSM-III criteria and therefore reflect a clinical diagnosis. Respondents first had to acknowledge anxiety (i.e., have you ever had a time when for a month or more most of the time you felt worried or anxious, perhaps afraid that something bad was going to happen either to you or someone that you cared about?). In addition, respondents had to acknowledge at least three additional symptoms of anxiety. These included one or more symptoms of motor tension (i.e., muscle tension, restlessness, and easy fatigability), one or more symptoms of autonomic hyperactivity, and one or more symptoms

of vigilance and scanning (i.e., feeling keyed up or on edge, difficulty concentrating, trouble falling or staying asleep, and irritability).

Because disasters are known to lead to new cases of a psychiatric disorder as well as exacerbate an existing disorder, we asked respondents when was the last time they experienced these symptoms. All GAD symptoms were used to calculate a lifetime prevalence rate and all symptoms reported within the past year were used to calculate a post-spill prevalence rate. If a respondent indicated that the first time they were worried or anxious or afraid most of the time for at least a month occurred within the past year, they were defined as a new case and used this to calculate a post-spill incidence rate. In contrast, prevalence refers to the total number of cases (both new cases and cases which may have existed prior to the spill) within a specified period of time (throughout the individual's lifetime and since the spill).

Post-Traumatic Stress Disorder

The diagnostic criteria for post-traumatic stress disorder (PTSD) were based on DSM-IIIR criteria. A respondent was diagnosed with PTSD if he or she experienced three or more of the following: persistent unpleasant memories, repeated bad dreams or nightmares, disturbing memories, feeling worse when in a situation that reminded you of a past event, flashback; three or more of the following: loss of interest in previously important activities, trying hard not to think of something that happened to you, stop caring about previously important activities, avoidance of places or activities that reminded you of something that had happened, avoidance of feelings about past event, avoidance of other people, loss of feeling or reduction in emotion, change in future plans, and inability to remember part of past; and two of the following: trouble concentrating, vigilance, insomnia, startled by noise, feeling panicky, fearful, or anxious, irritability, and autonomic hyperactivity (sweating, breathing heavily, heart pounding).

As with anxiety, we asked respondents when was the last time they experienced these symptoms. All PTSD symptoms were used to calculate a lifetime prevalence rate and all symptoms reported within the past year used to calculate a post-spill prevalence rate.

Substance Abuse and Domestic Violence

Because of the cultural sensitivity in rural Alaskan communities over the issues of alcohol and drug abuse and domestic violence, respondents were not asked about changes in their own patterns of drinking or drug usage or their involvement in episodes of domestic violence. It was felt that such questions would not lead to useful response rates or

meaningful results. Instead, respondents were asked if they thought people in their particular community and their close friends and family were drinking, using drugs, and fighting more than before, about the same, or less than before the spill. They were also asked if the amount of drinking, drug use, and domestic violence is leading to problems that weren't there before the spill.

Health Status

Although none of the residents in the sample incurred injuries as a result of direct exposure to the oil spill, the stressful nature of the events might be expected to have affected various aspects of their physical health. To explore this possibility, subjects were asked whether they had experienced a number of chronic conditions since the spill and whether or not these conditions had been verified by a physician. Chronic conditions verified by a physician were summed to provide a measure of illness. Self-perceptions of health status before and after the spill also were assessed by asking respondents to rate their pre-spill and current health status as excellent, very good, good, fair, or poor. These indicators were then compared by exposure status.

3. Statistical Analysis

Prevalence rates of depression, generalized anxiety disorder, and post-traumatic stress disorder were calculated on the basis of percentage of respondents or groups of respondents meeting the criteria for these conditions. Comparison of prevalence rates and proportional distributions across the three exposure categories were based on a chi-square test for trend in proportions (Fleiss 1981). Prevalence rates were further adjusted to account for differences in the distribution of residents by ethnicity and marital status across the three exposure groups, using the Mantel-Haeszel chi-square procedure. Comparisons of mean scores were performed using an analysis of variance procedure. Nonparametric tests (Wilcoxen) were used to compare changes in perceived health status before and after the spill in each exposure group.

APPENDIX 2. Methodology and Implementation of Business Survey

1. Introduction

The overview of private sector economic impacts in section 4.0 relies on findings from the Oiled Mayors' Business Survey. Presented below is a detailed discussion of the methods used to develop and implement this survey for determining some order of magnitude of economic impacts. One objective of this project was to ascertain information about oil spill impacts that was not available in regular published secondary data sources. The kind of information targeted in the business survey questionnaire includes (1) how business plans were affected by the spill with specific reference to oil spill induced shifts in actual and planned business investment, and (2) the type of gains and losses brought about as a consequence of the *Exxon Valdez* oil spill.

The approach used to obtain this information was to conduct a mail survey to over 7,000 business firms representing the universe of business operators in the 24-community Oiled Mayors' study area. The methods employed to administer this study closely follow those prescribed in Mail and Telephone Surveys: The Complete Approach, by Don Dillman of Washington State University (1976).

The methods used to develop and implement the Oiled Mayors' Business Survey consist of three principal elements:

- Questionnaire design
- Sample Frame
- Implementation

2. Questionnaire Design

The questions contained in the survey instrument are organized around five major themes all related to the question: What happened to North Gulf Coast businesses as a consequence of the oil spill? These themes are:

- Industry composition
- Direct participation in spill cleanup
- General business performance
- Business plans before and after the spill
- Gains and losses from the spill.

Industry composition pertains mainly to factual information about the size, type, structure, and location of NGC businesses. Information on industry composition is essential to understanding where impacts may be concentrated. In this analysis, business firms are organized around major economic sectors: commercial fishing, other (nonfish) basic industries, and support industries.

Direct participation in spill cleanup refers to the many facets of business involvement in spill cleanup operations. Four survey questions addressed this issue. The definition of spill cleanup participation was fairly specific. Business firms that were indirectly effected, such as tourist operators that experienced increases (or cutbacks), fishermen (due to closures), stores, and hotels were counted as direct only if their participation met strict criteria. A following set of six questions dealt with general business performance. These questions covered changes in gross business income, in number of employees, and in a series of factors pertaining to business operations from 1988 to 1990 (expected). Several questions in this section addressed business conditions without specific reference to oil spill impacts.

Topics covered under business plans investigated how business plans for buying and selling business assets over the next three-to-five years changed as a consequence of the spill. A series of questions covered business plans to purchase and sell assets before and after the spill and actual purchase and sale of business assets since the spill were addressed in 13 separate questions. In addition to planned or actual amounts purchased and sold, several questions probed more general changes in business operations.

The subject of spill-related gains and losses was also addressed. In one question, all respondents were asked to indicate the extent (dollar value) that the oil spill produced increases or decreases in business profits, as well as in the value of business assets and property. For completeness, business respondents also were asked to indicate if they experienced no change in business profits or asset value. The nature of business losses were probed more deeply. Business respondents that accrued spill-related losses were asked to indicate if compensatory claims were made and, if so, the proportion of their claim covered.

A key feature in questionnaire and database design is the ability to cross-reference one aspect of the database with another. For example, the results to questions pertaining to business performance may be compared for business respondents that directly participated in spill cleanup activities with findings for businesses that did not participate. Furthermore, survey results may be summarized for different industry groups (i.e., fishermen versus service industries) for different types of businesses (corporations versus sole proprietorships), and for businesses having different tenure and so on.

The survey instrument was designed as a small booklet containing 40 questions to be administered as a mail questionnaire. Thus face-to-face and telephone survey strategies were not employed. The form of the questionnaire was designed to attract and keep the attention of the potential respondent. An introductory letter from city of Kodiak Mayor Bob Brodie was placed at the beginning of the booklet. Skip patterns were kept to a minimum, response categories were provided for most questions, and a self-addressed, stamped return envelope was furnished in each booklet. Several short-answer, open-ended questions were included to give the respondent every opportunity to express an opinion not addressed elsewhere.

3. Sample Frame

The sample frame refers to the universe of cases from which to sample and for which the analysis is geared. The sample frame for the Oiled Mayors' Business Survey includes business license holders and commercial fishing permit holders in the 24-community Oiled Mayors' study area.

The Alaska Department of Commerce and Economic Development (ADCED) administers a list of business license holders based on business license applications. The October 1989 business license list was obtained initially on nine-inch reel-to-reel computer tape. It was converted to PC floppy disk and reconfigured for this study using Q&A relational database software. The list was organized by zip code (i.e., community) and contains business and owner names and addresses plus an array of attributes included on the Alaska business license application form. Most important of these were the standard industrial category codes, business tenure, resident status, and type of business organization (sole proprietor, partnership, domestic, and foreign corporation).

This business license listing originally contained about 5,400 firms for the 24-community study area. It represents the foundation of the business survey sample frame.

The Alaska Commercial Fisheries Entry Commission (ACFEC) administers a statewide database containing attributes of commercial fishing permit holders for all state-regulated commercial fisheries. Approximately 1,600 resident permit holders were selected by zip code for Oiled Mayors study communities. The ACFEC list of permit holders included name and address information as well as attributes on management area, species, and gear type. Several steps were taken to avoid double counting two permit records using the same vessel.

The summary characteristics of commercial fishing operators selected for the business survey sample are presented in Table A2.1.

Table A2.1
Characteristics of Commercial Fishery Operators
Business Survey Sample

Species	PWS	Cook Inlet	Kodiak	Other*	Total
Herring	55	63	129	13	260
Salmon	363	464	325	82	1,234
Shrimp	32	2	0	0	34
Other	106	0	30	1	137
Total	556	529	484	96	1,665

* Includes: Chignik, Peninsula-Aleutians, and Security Cove.

This sampling frame excludes major fisheries in Southeast Alaska, Bristol Bay, and the statewide halibut fishery. These exclusions are based on two sampling guidelines: first, to focus on fishermen that live and fish in the study region. Second, to focus on fishermen that do not have the option to fish in other areas. The statewide halibut fishery is an open-water, bottom fishery. It is managed by the International Pacific Halibut Commission (IPHC) because most fishing occurs beyond the three-mile jurisdiction for state waters. The IPHC concluded that the *Exxon Valdez* oil spill has not seriously affected the Alaska North Gulf Coast halibut fishery, based on the results of catch surveys conducted by the IPHC during the 1989 post-spill fishing season. In summary, our decision to exclude statewide halibut permit holders from the business sampling frame was based on (1) characteristics of the statewide halibut fishery, and (2) the observed limited nature of spill impacts on this fishery.

The statewide list of shore-based seafood processors was obtained from the Alaska Department of Environmental Conservation. According to this list, the Oiled Mayors' study area contains a total of 54 seafood processors, mostly in the larger Group A communities.

The list of seafood processors and the list of resident commercial fishing permit holders were merged with the business license list to form the universe of over 7,000 business firms in the Oiled Mayors' study area. As with commercial fishing permit holders, steps were taken to eliminate the potential for double counting seafood processors.

In order to ensure representation of large business firms that may have been headquartered outside of the study area proper, lists of the ten largest businesses were obtained from the

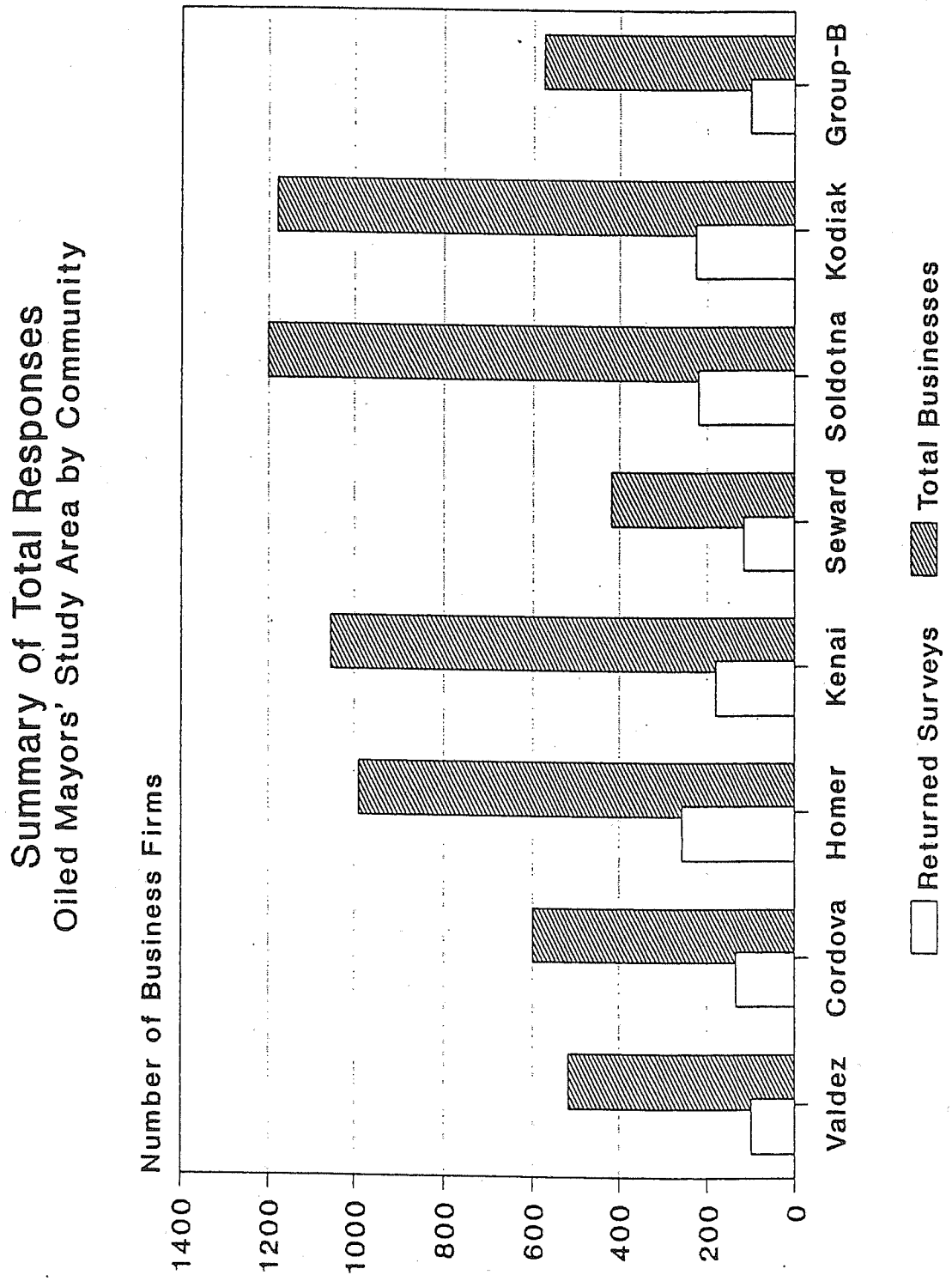
Chambers of Commerce in all Group A communities. These business names were cross-checked with those listed above and added to the sample frame where appropriate.

4. Implementation

The business survey questionnaire mail was conducted in several stages. The first comprehensive mailout was conducted on April 18. On that date, 7,031 questionnaire booklets were submitted to the U.S. Postal Service Bulk Mail Office for mailing to business firms in 24 NGC communities. Mailing labels were generated from the Q&A database by IAI staff and attached to questionnaire booklets. Five days later on April 23, an equal number of postcards with identical attached mailing labels were submitted to the Bulk Mail Office. The postcards served as a reminder for potential respondents to complete the questionnaire. Also, the postcard provided a contact phone number for directing questions about the survey to IAI staff. In addition, businesses with new addresses and businesses for which the Postal Service could not determine a destination were returned to IAI with appropriate forwarding information where available. This provided IAI staff with vital information concerning the final disposition of study area business firms.

Business firms were assigned unique study numbers to enable IAI staff to maintain accurate records of survey responses without direct reference to business and owner names. IAI staff maintained daily computer records of completed questionnaire booklets returned to IAI. About 100 phone inquiries from potential respondents were received. Many respondents called to request another replacement booklet. A number of respondents called to indicate that their business was not affected by the spill. In such cases respondents were asked to complete and return their questionnaires, regardless of their specific impacts. Several respondents called to indicate that they were not in business at the time of the spill. These firms were removed from the sample frame along with those for which the Postal Service was unable to find a destination.

On May 7, a second bulk mailout of questionnaire booklets was administered to all business firms for which completed questionnaires had not yet been returned to IAI and for which no address change information had been received from the Post Office. This second mailout consisted of approximately 6,200 booklets. During the eight-week period, from mid-April to mid-June, 1,381 questionnaires were returned to the IAI Alaska office. Of these, 1,321 were logged as official, completed questionnaires. By July 31, twenty additional completed questionnaires were returned and logged. Figure A2.1 presents summary return information compared with total businesses.


Summary of Total Responses
Oiled Mayors' Study Area by Community
Number of Business Firms
1400
1200
1000
800
600
400
200
0
Valdez
Cordova
Homer
Kenai
Seward
Soldotna
Kodiak
Group-B
Returned Surveys
Total Businesses

The information contained in the completed questionnaire booklets was entered into a special computer database designed by IAI staff specifically for this survey. The database was constructed using the SPSS Data Entry Option software. Using the data entry software, a computer form was created that replicated the form and content of the questionnaire booklet. This provided data entry technicians with a framework that reduced the potential for errors at the data entry stage. Furthermore, the SPSS data entry form contained built in "skip-fill" rules that paralleled skip patterns in the questionnaire booklet and accepted only response entries that fell within pre-set guidelines specific to each question.

Completed questionnaires were reviewed by a single editor to ensure that responses were properly and consistently recorded, thus shifting the burden of content accuracy to the editor and away from data entry technicians. A complete data entry verification pass was conducted to ensure accuracy.

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