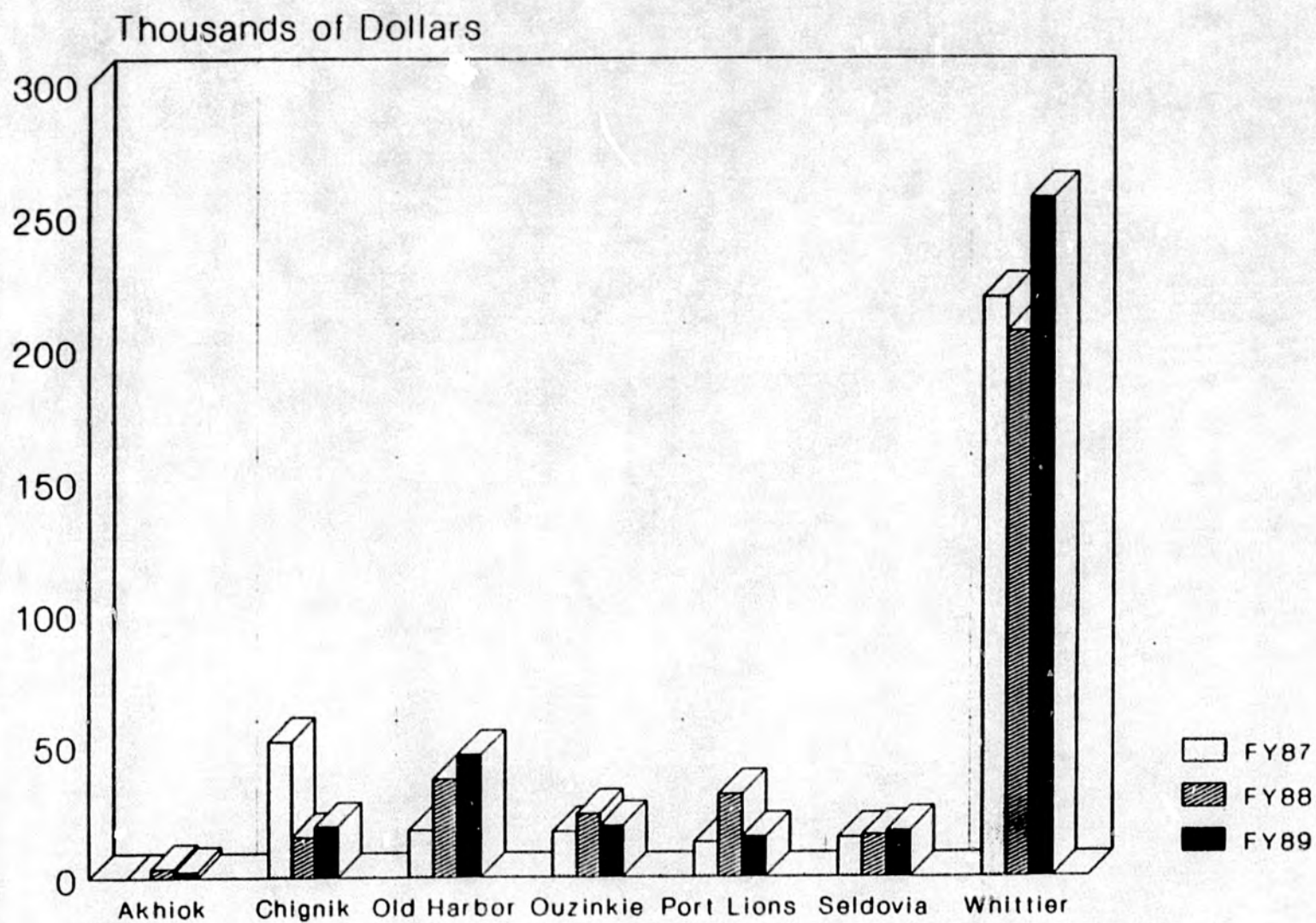


ALASKA LEGISLATURE SPECIAL COMMITTEE / SUBJECT FILE 8672
1963 SCOMM 76: HOUSE SPEC. COMM. EXXON VALDEZ OIL SPILL. 1991-92

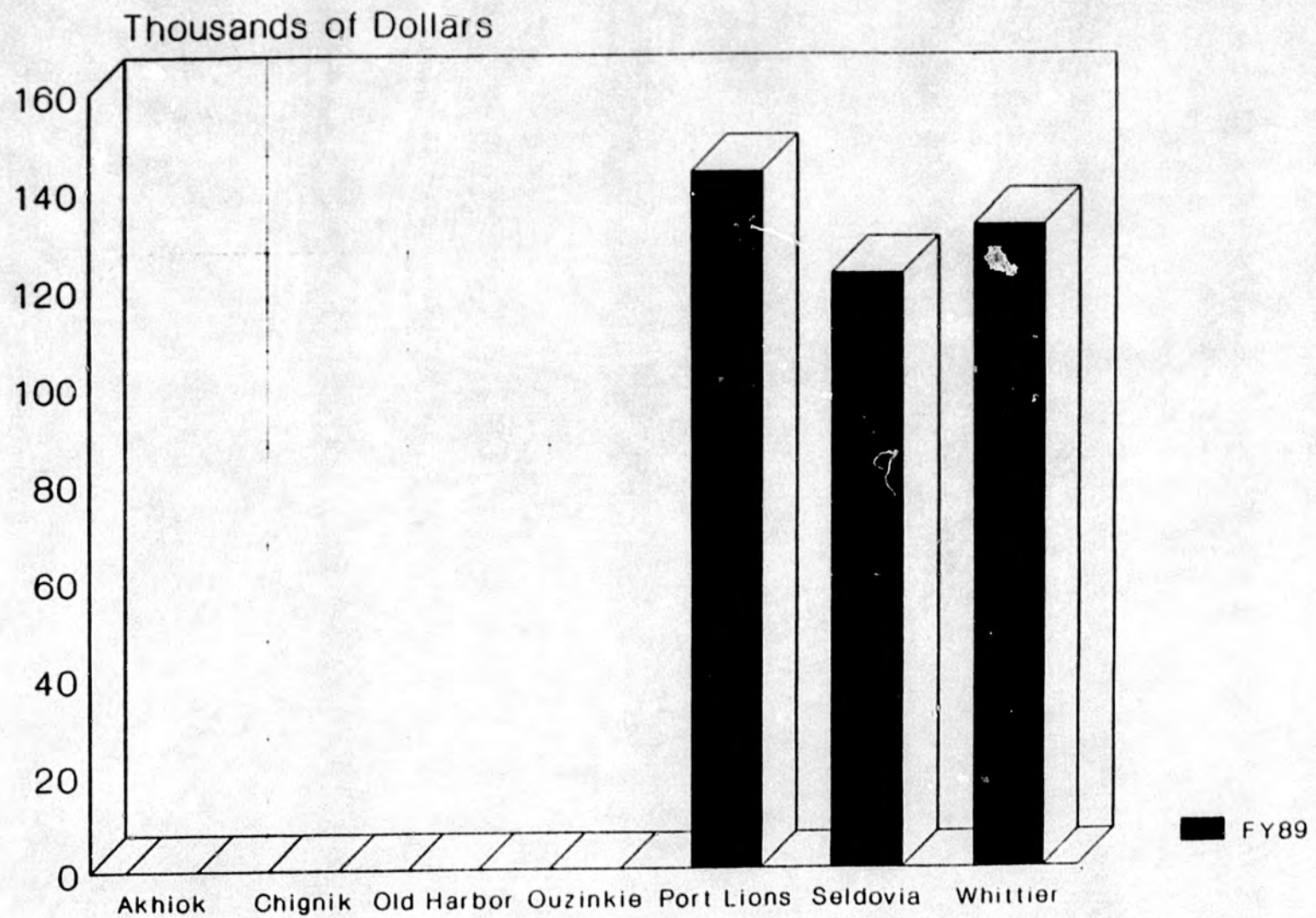
182

Rents & Leases Revenues Group B Communities

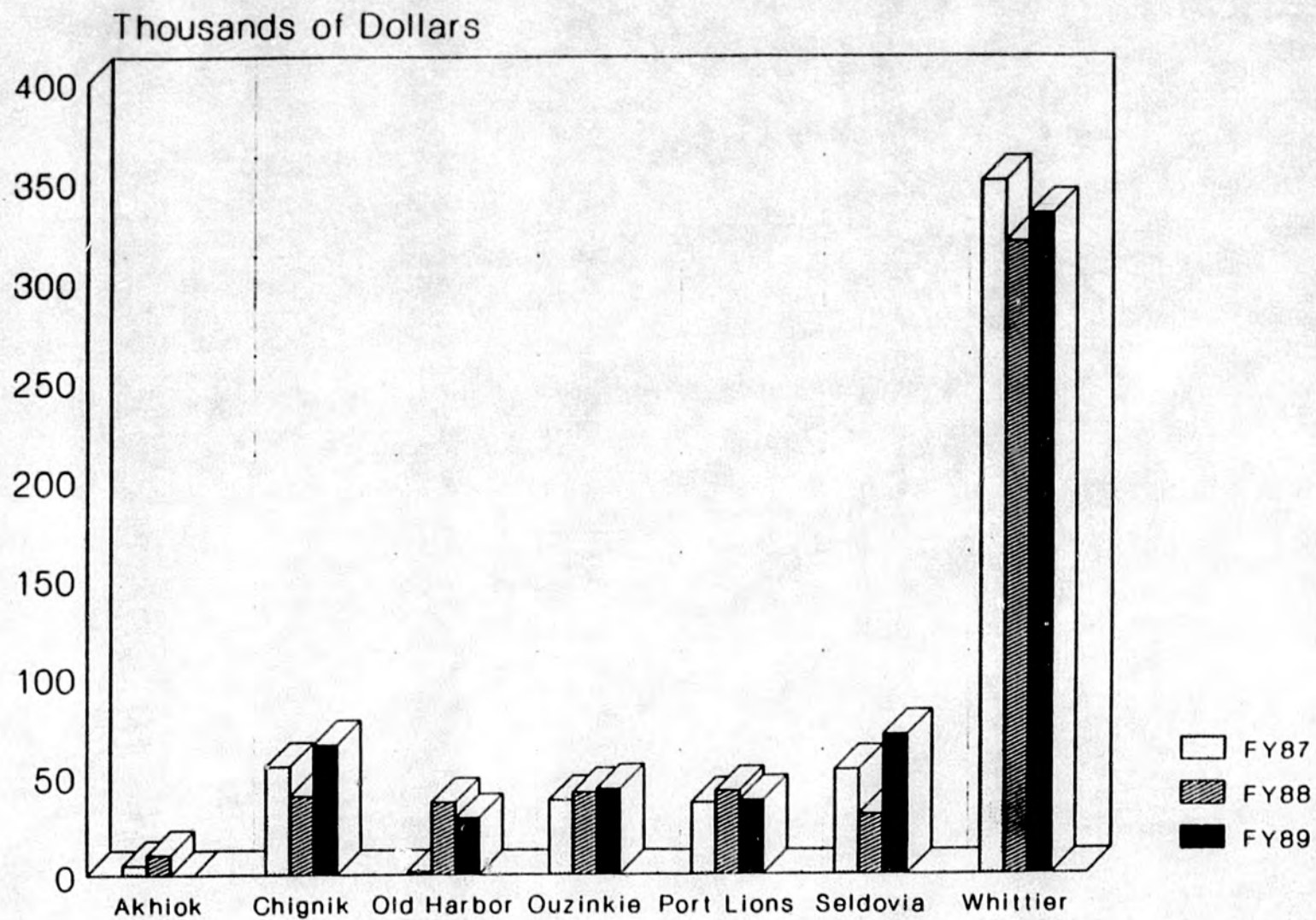


Spill-Related Revenues
Group B Communities

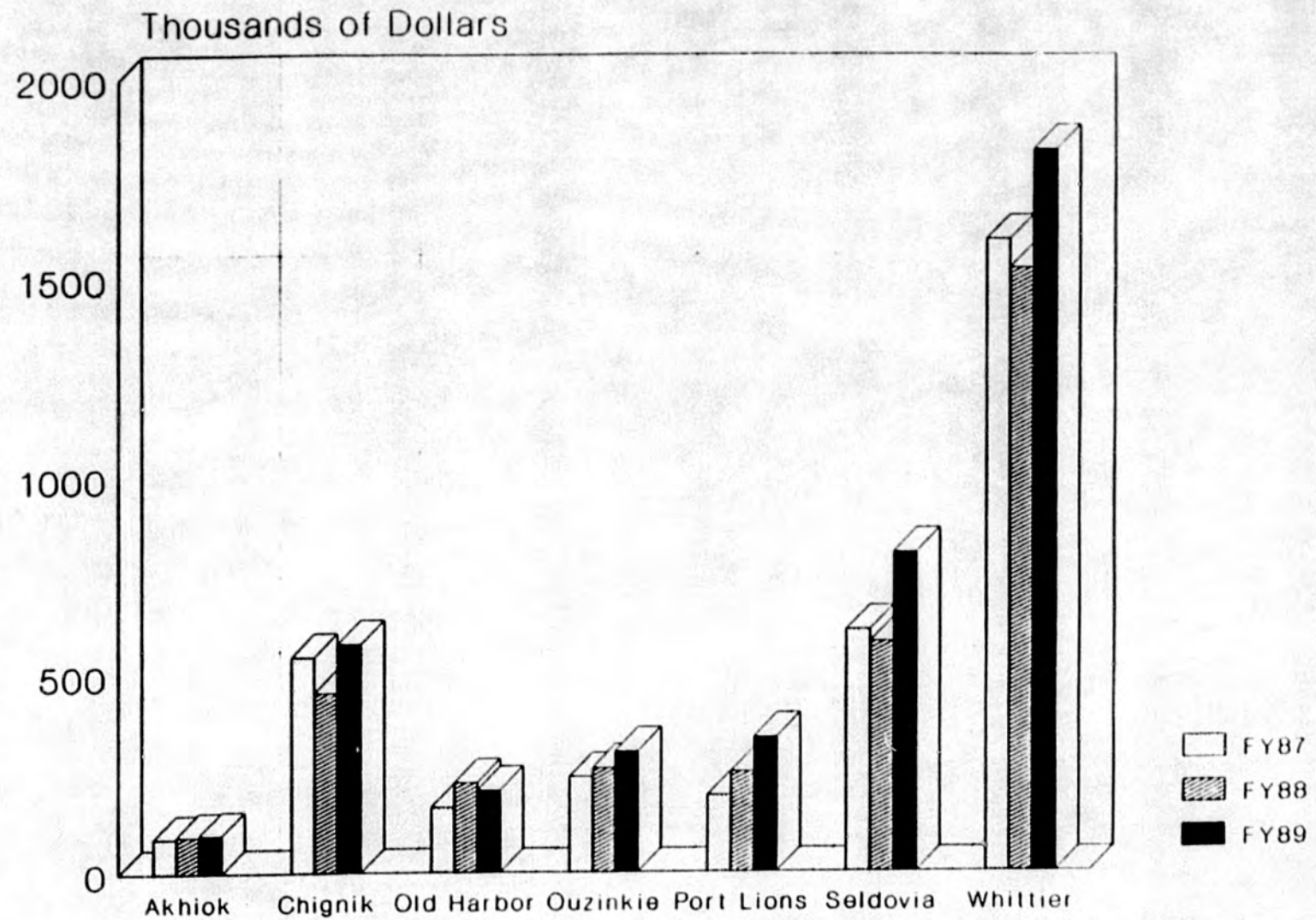
Page C-13



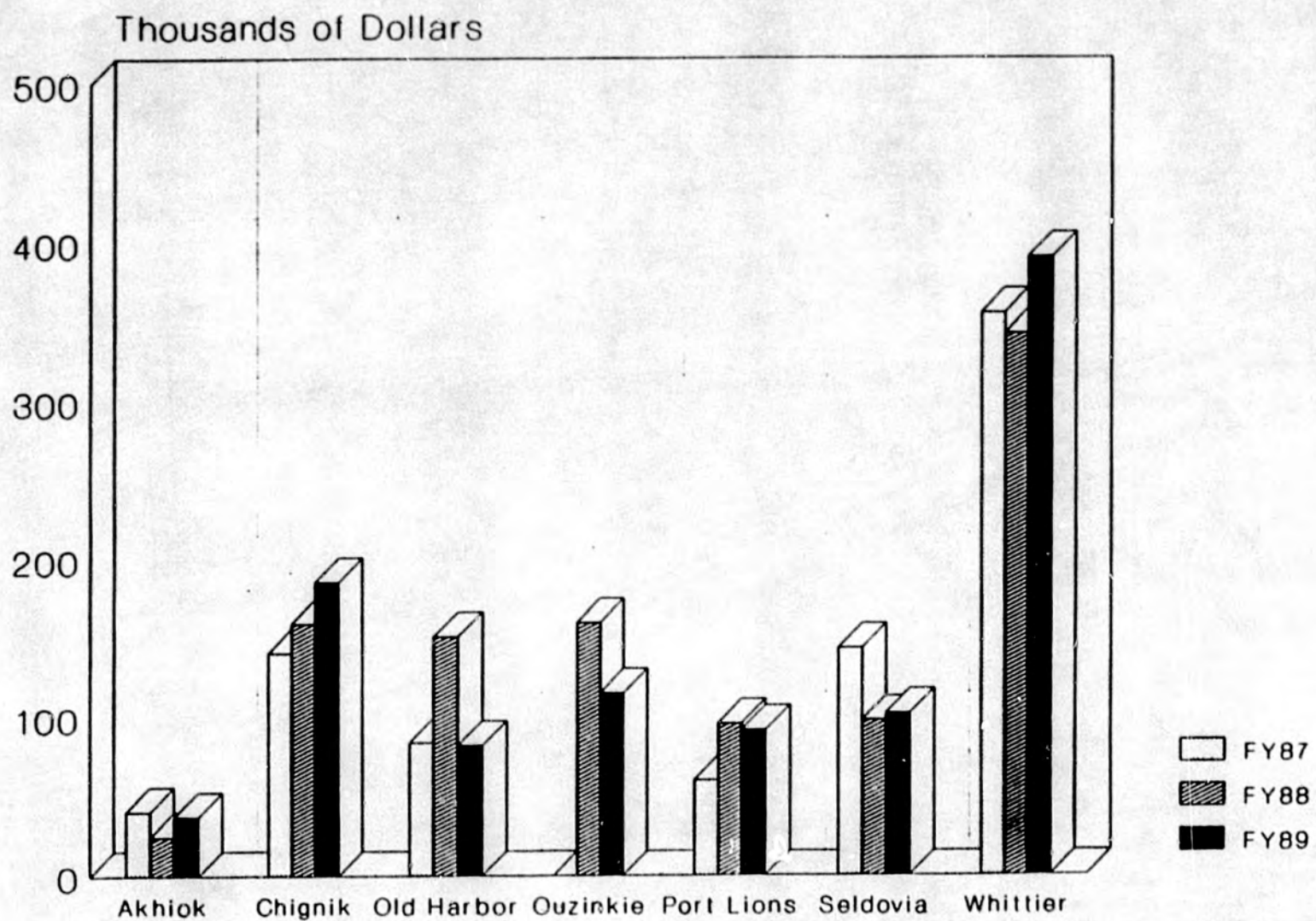
Other Revenues, Excluding Capital
Group B Communities



Total Revenues, Excluding Capital
Group B Communities

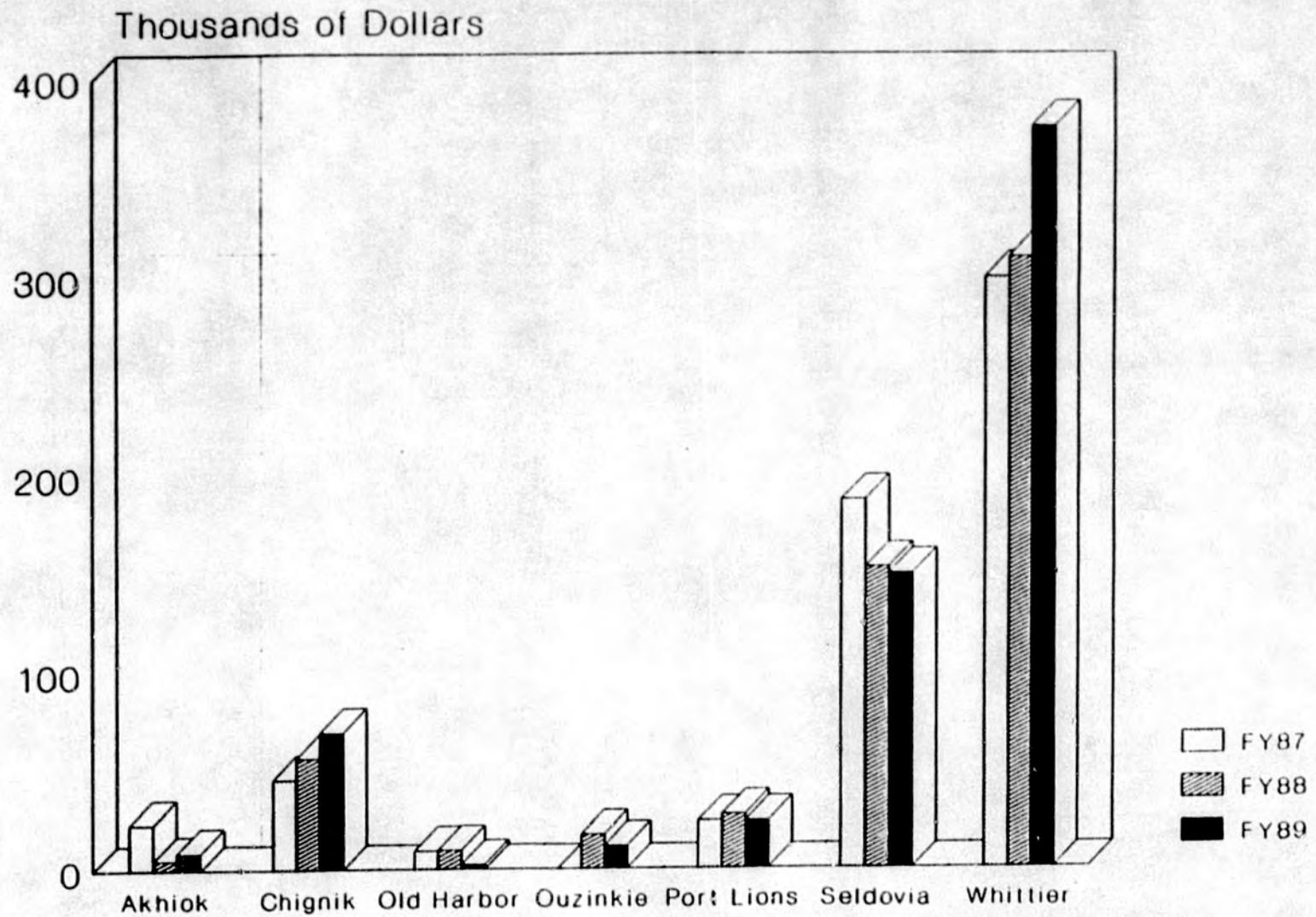


General Government Expenditures
Group B Communities

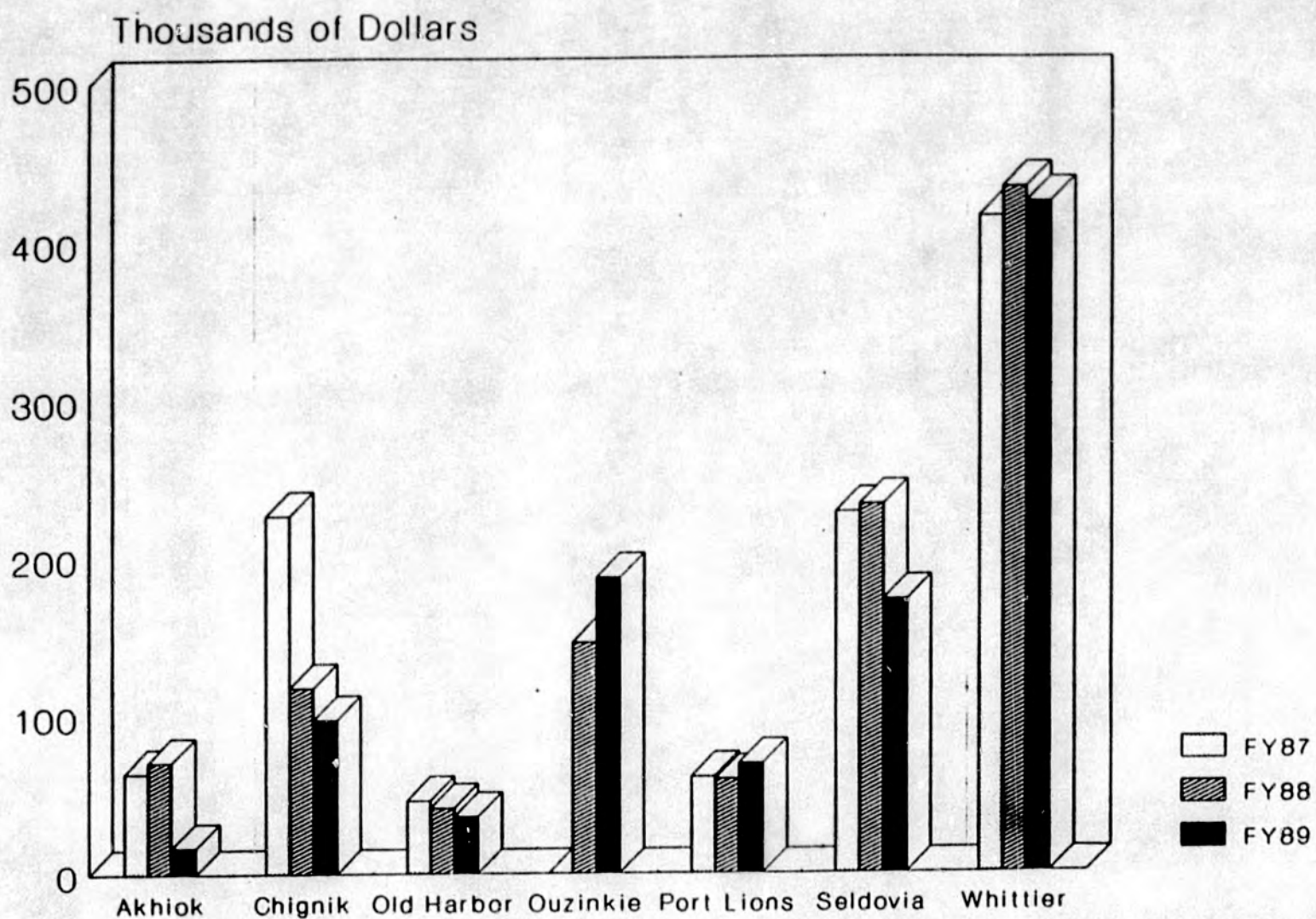


Health & Safety Expenditures
Group B Communities

Page C-17

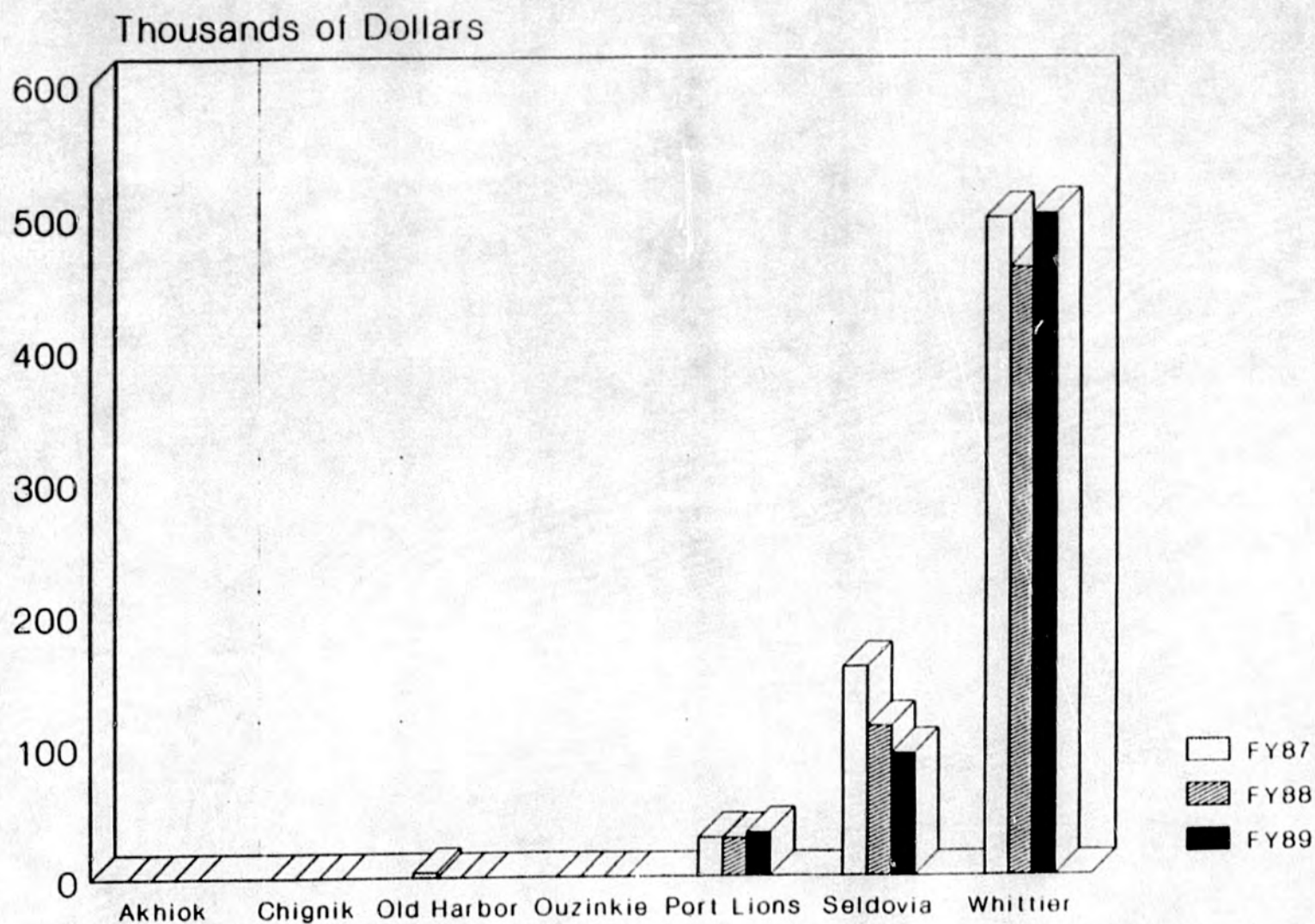


Public Services Expenditures Group B Communities

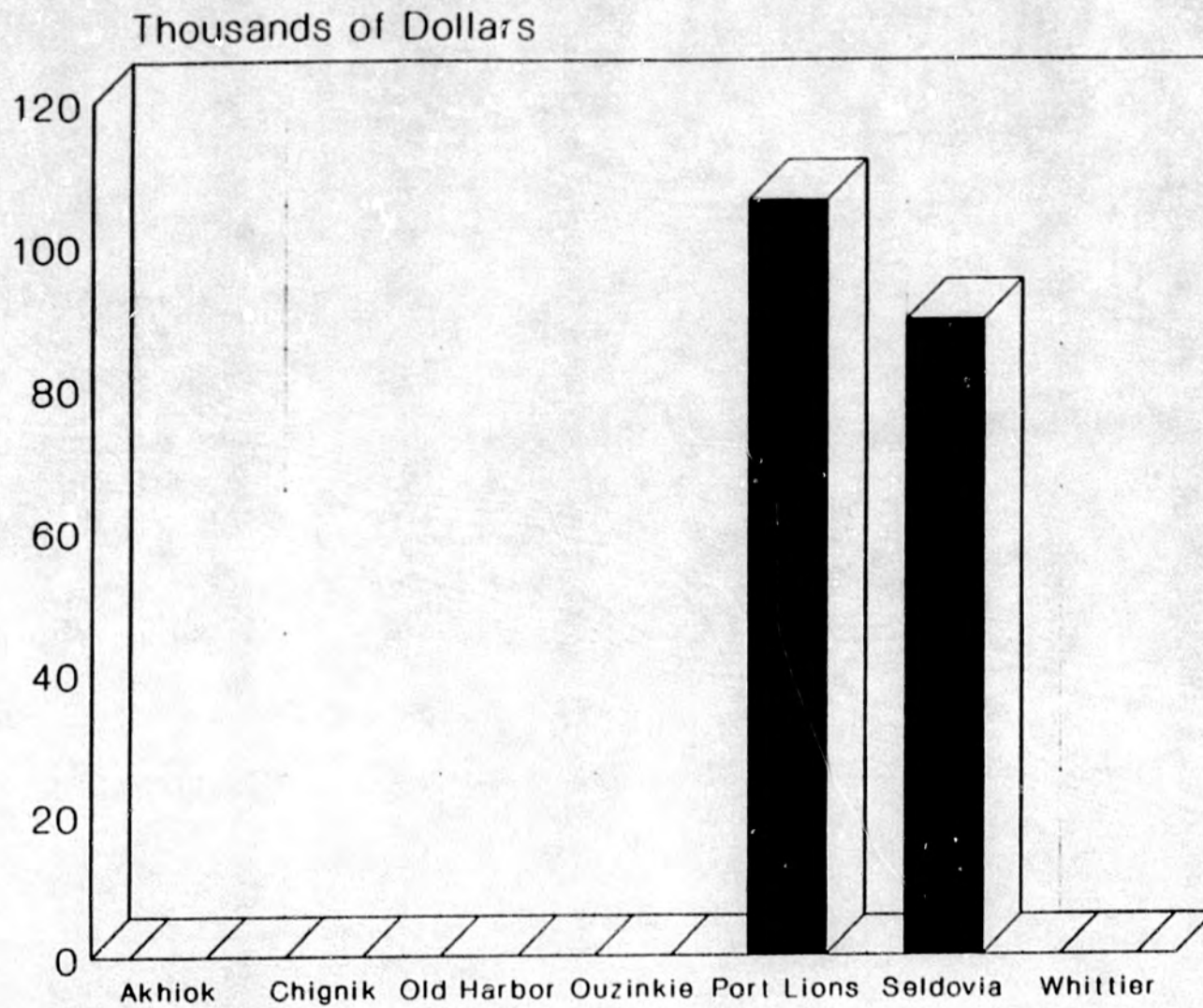


Exlcudes Harbor/Dock

Harbor/Dock Expenditures Group B Communities

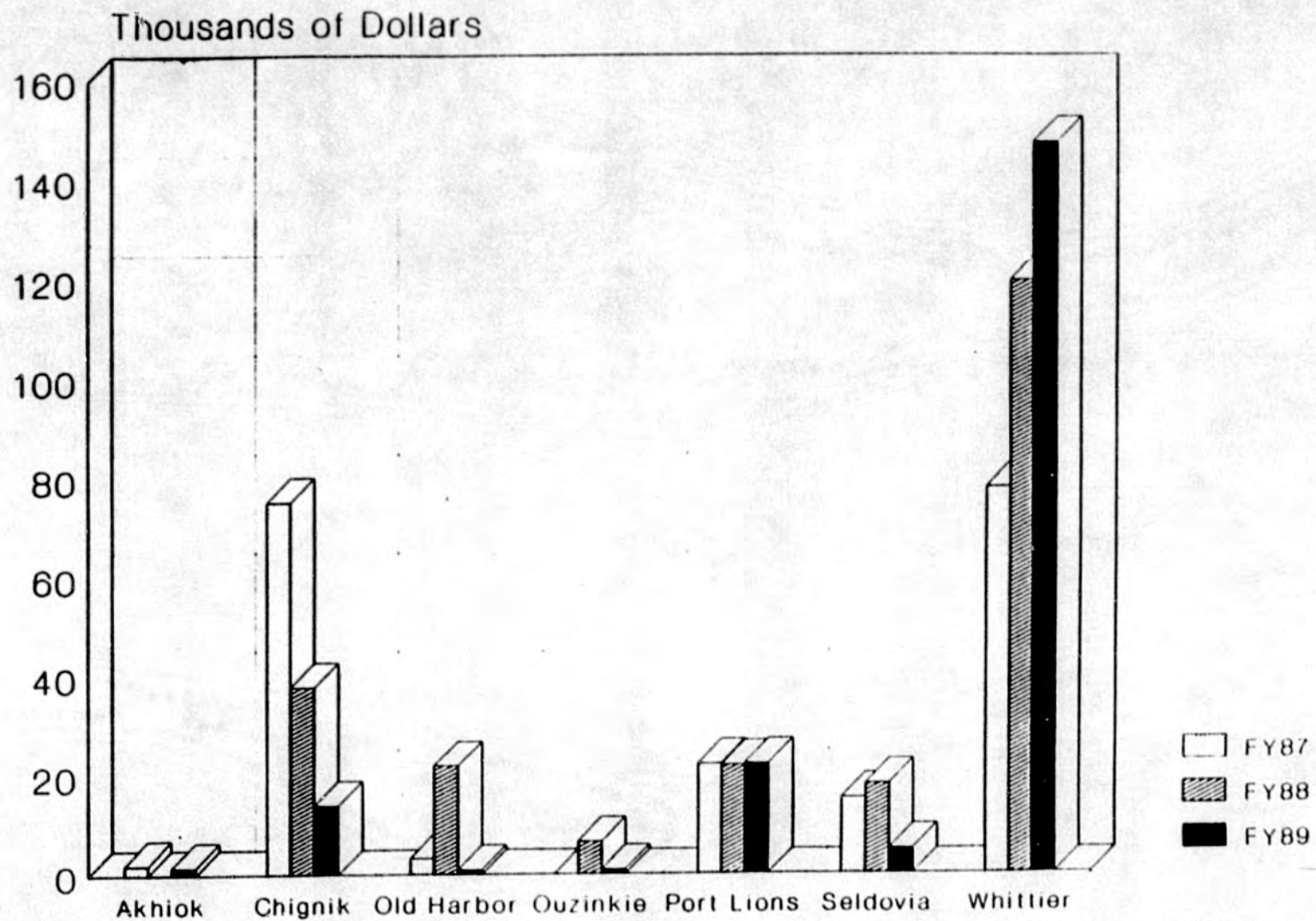


**Oil Spill Cleanup Expenditures
Group B Communities**

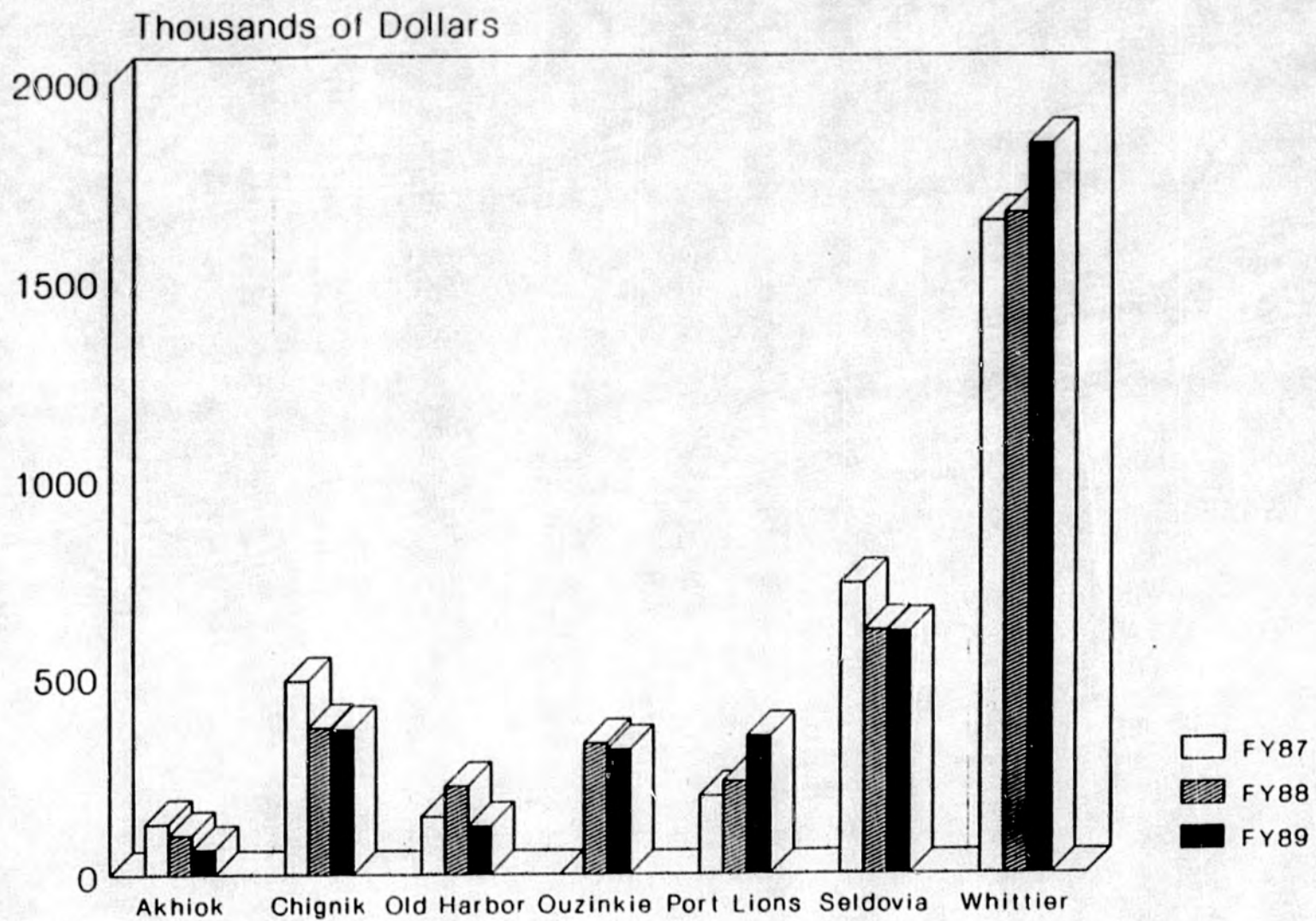


 FY89

Other Expenditures, Excluding Capital
Group B Communities



**Total Expenditures, Excluding Capital
Group B Communities**



APPENDIX D

Group B Communities: Quarterly Revenues and Expenditures by Community and Category for Selected Group B Communities, 1988 and 1989

This appendix presents available quarterly data for the Group B communities of Old Harbor, Ouzinkie, Seldovia, and Whittier. The following selected revenue and expenditure categories are presented. In all cases capital grants and expenditures are excluded.

Revenues

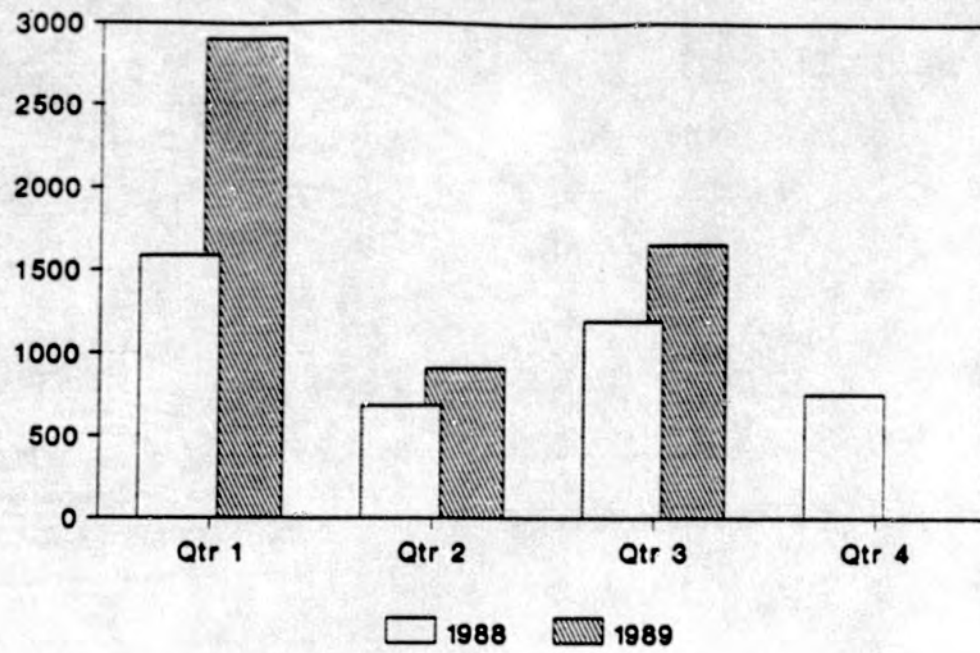
- Sales Taxes
- Health Clinic
- Harbor/Dock Charges
- Public Services Charges
- Rents and Leases
- Oil Spill-Related

Expenditures

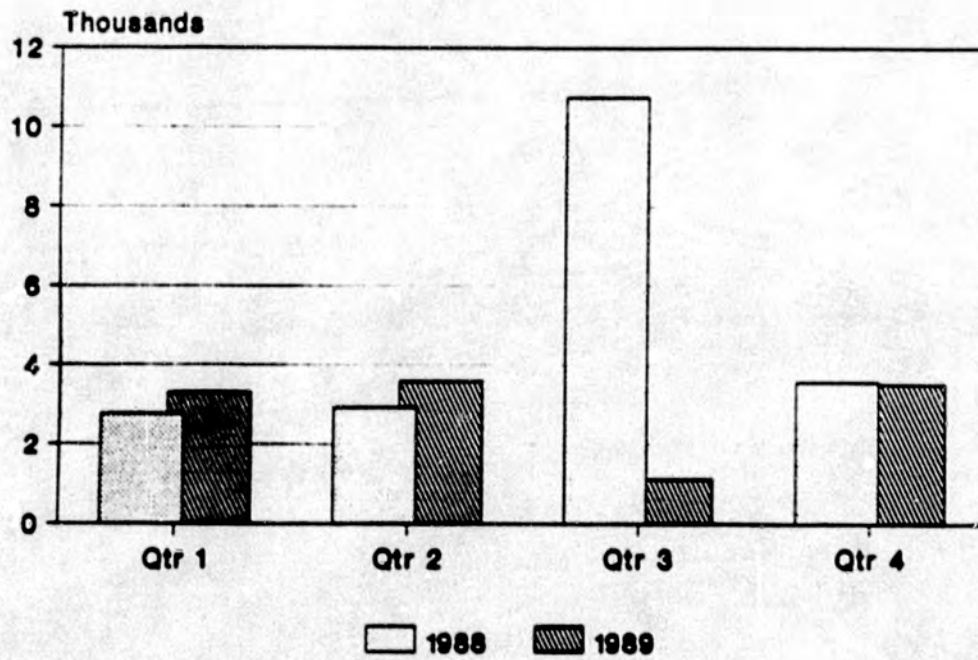
- General Government
- Public Safety
- Health Clinic
- Harbor/Dock
- Public Services
- Oil Spill Cleanup

The appendix is organized separately for revenues and expenditures by community, then by category. **Revenues** for all communities and categories are presented first, followed by expenditures.

Quarterly Sales Tax Revenues Old Harbor

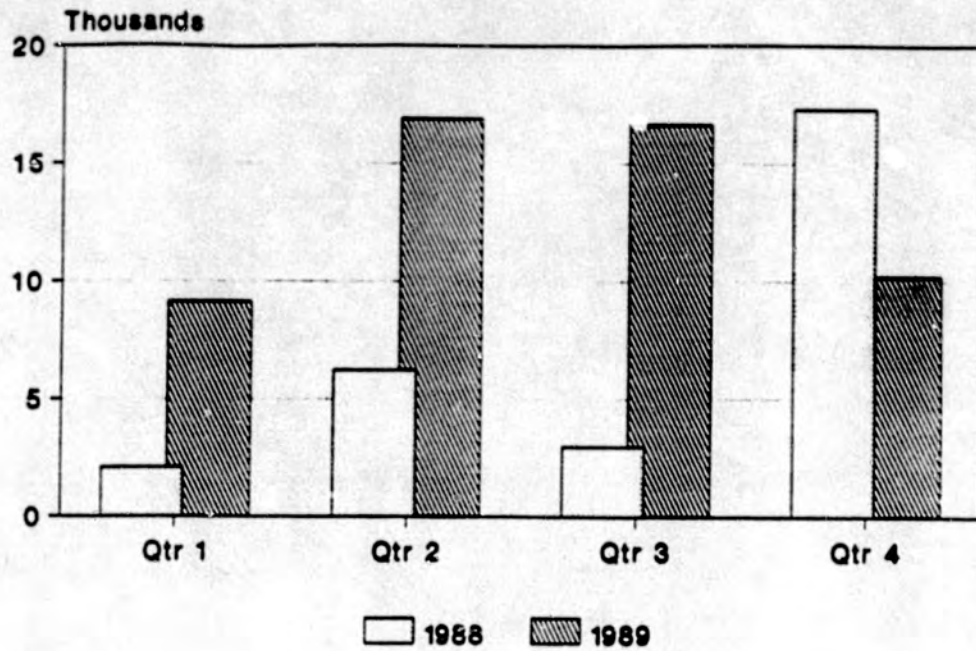


Quarterly Public Services Revenues Old Harbor

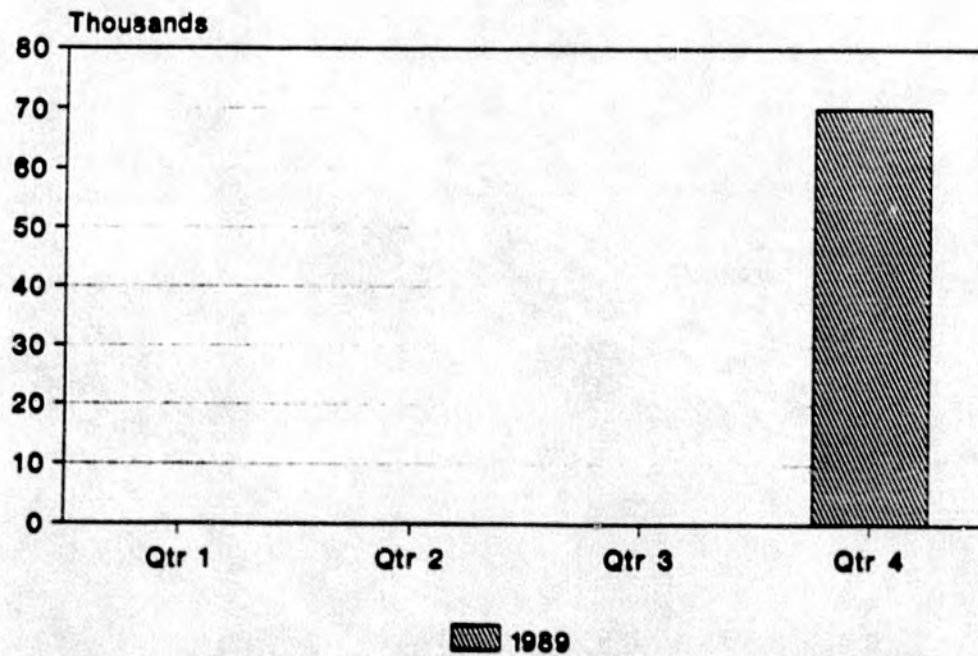


Excludes Harbor/Dock

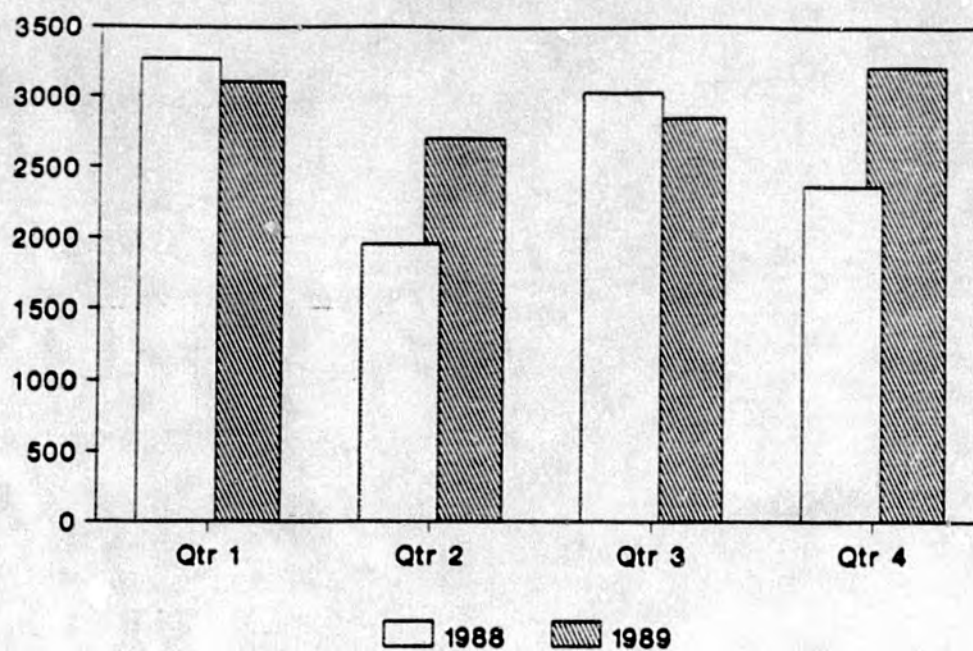
Quarterly Rents & Leases Revenue Old Harbor



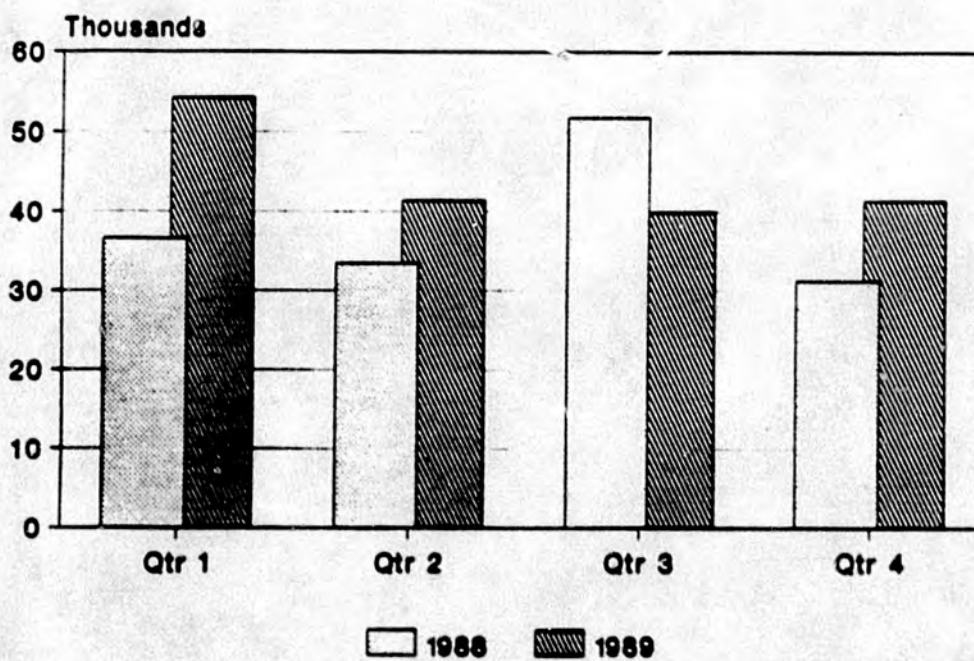
Quarterly Spill-Related Revenue Old Harbor



Quarterly Sales Tax Revenues Ouzinkie

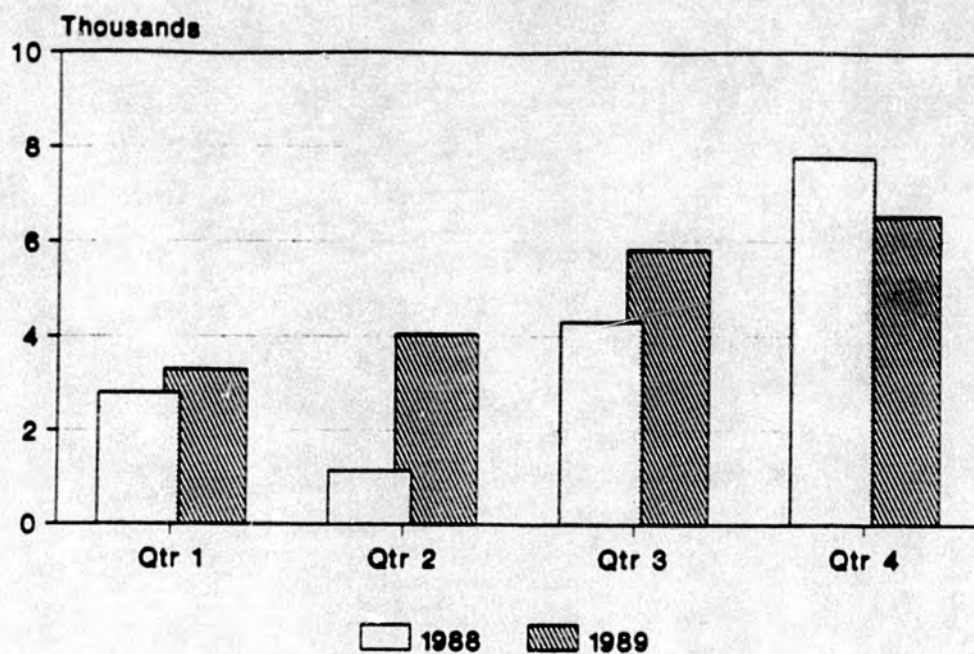


Quarterly Public Services Revenues Ouzinkie

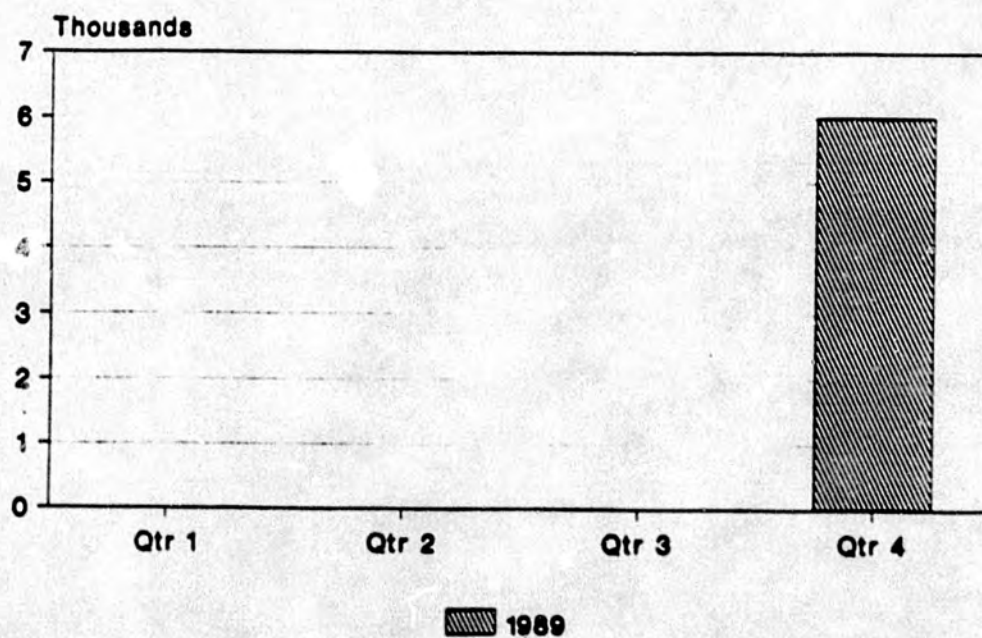


Excludes Harbor/Dock

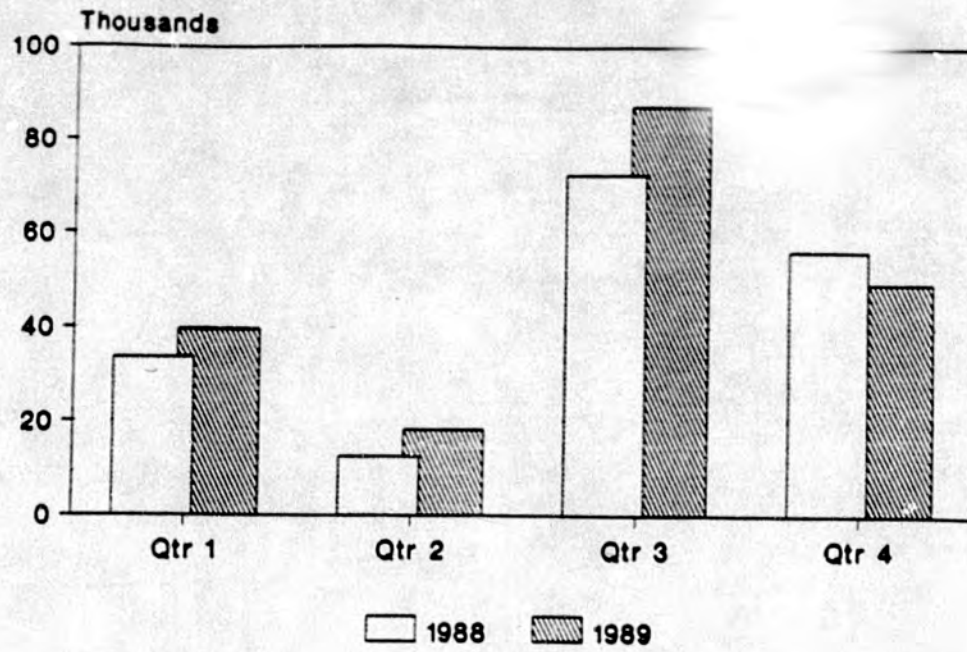
Quarterly Rents & Leases Revenue Ouzinkie



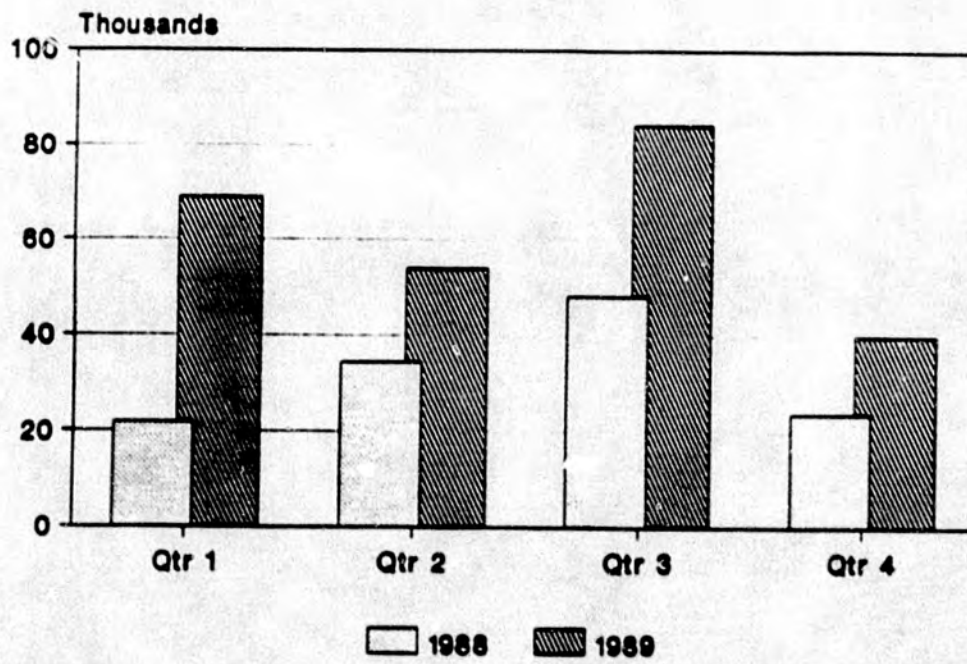
Quarterly Spill-Related Revenues Ouzinkie



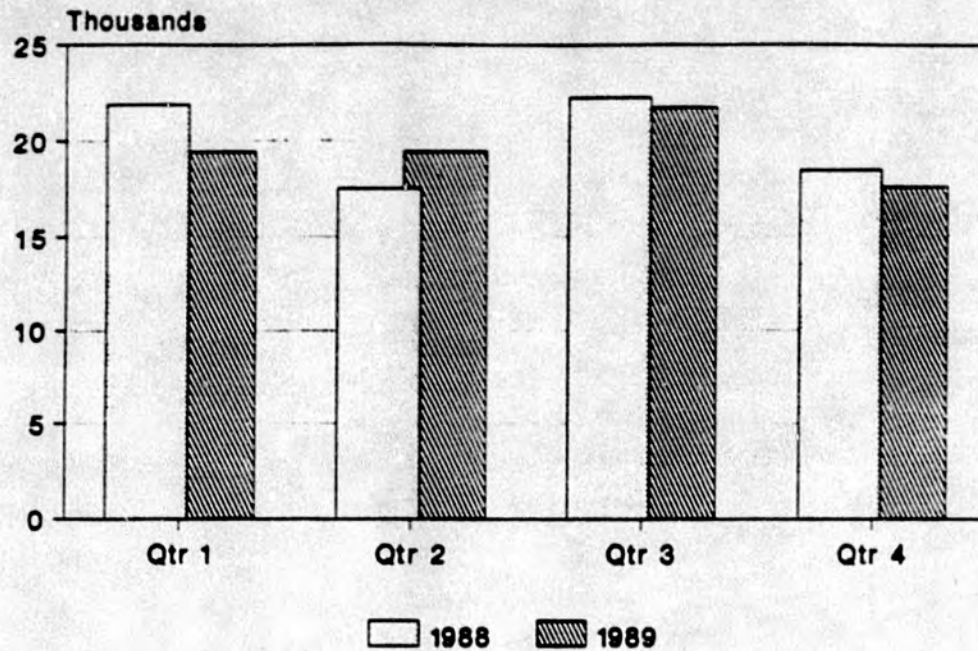
Quarterly Sales Tax Revenues Seldovia



Quarterly Harbor/Dock Revenues Seldovia

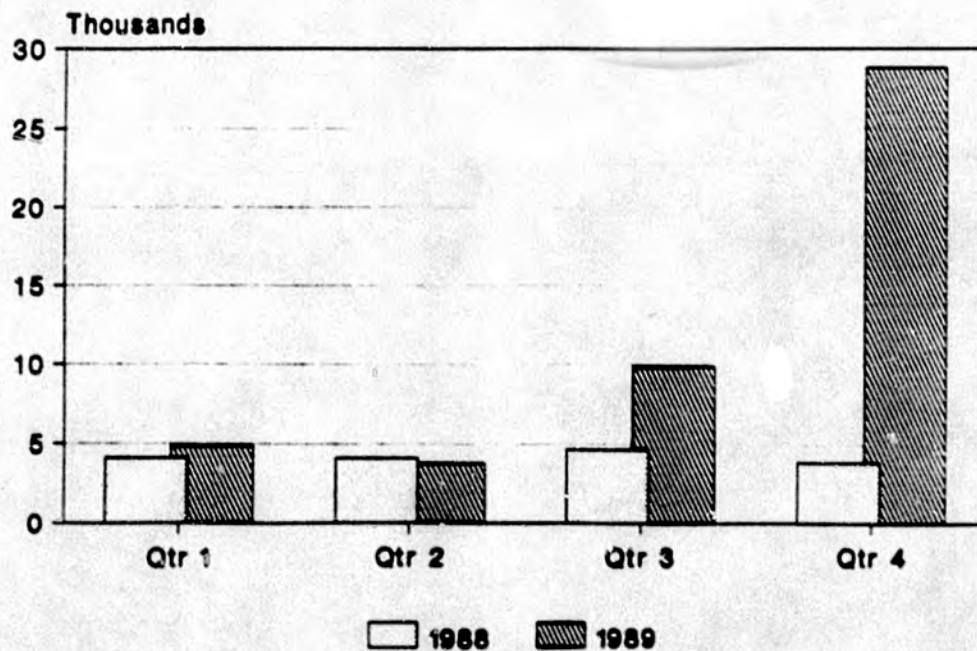


Quarterly Public Services Revenues Seldovia

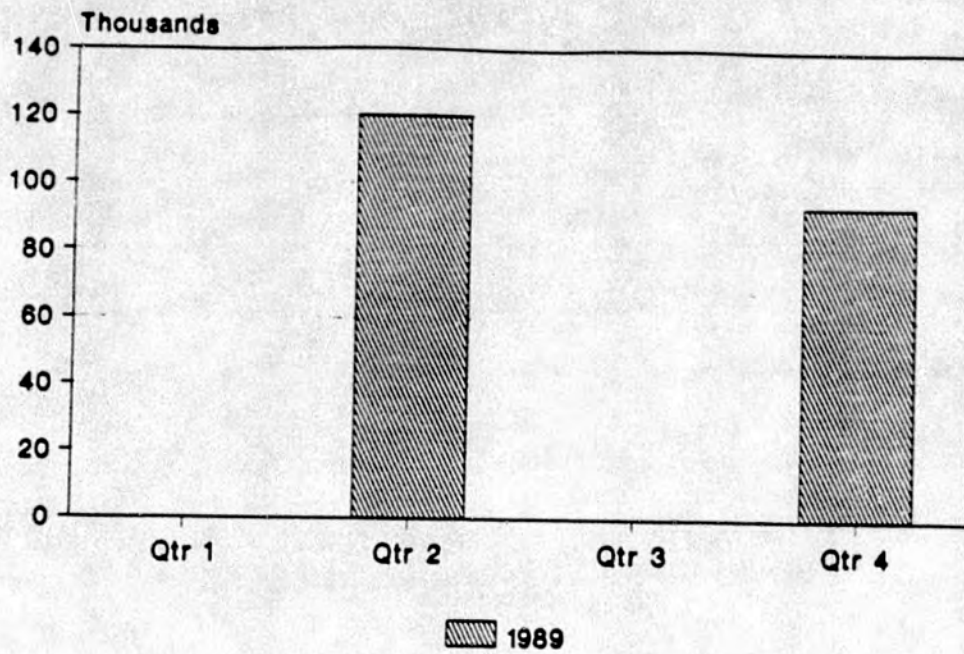


Excludes Harbor/Dock

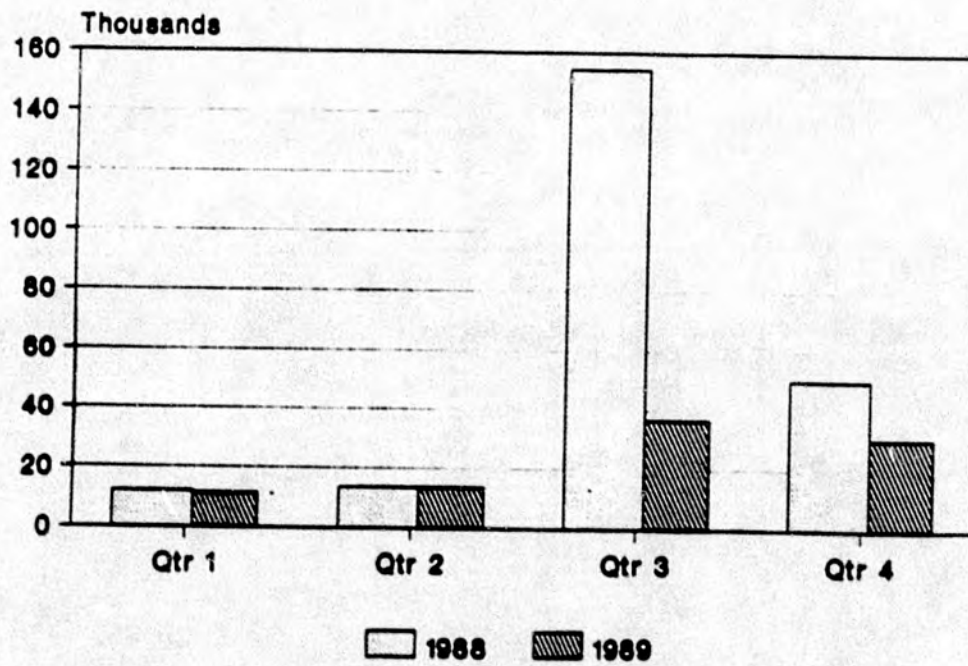
Quarterly Rents & [REDACTED] Seldovia



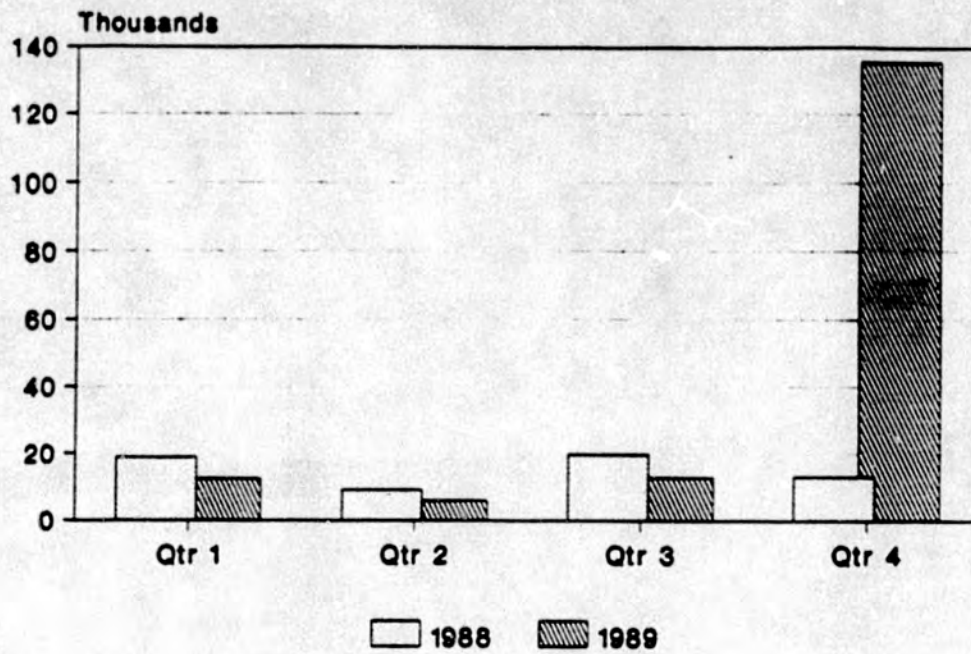
Quarterly Spill-Related Revenue Seldovia



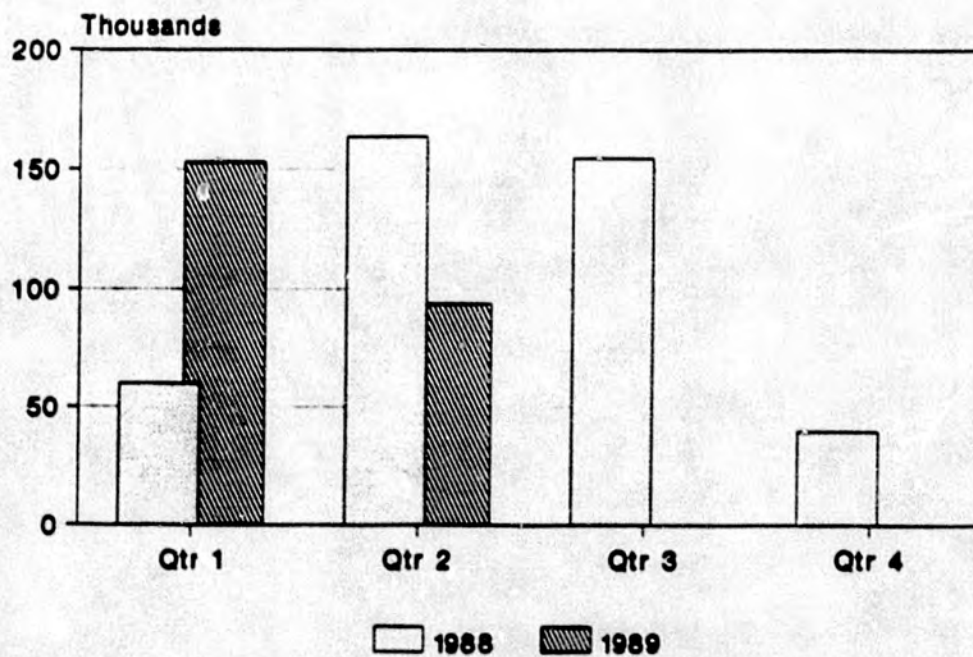
Quarterly Sales Tax Revenues Whittier



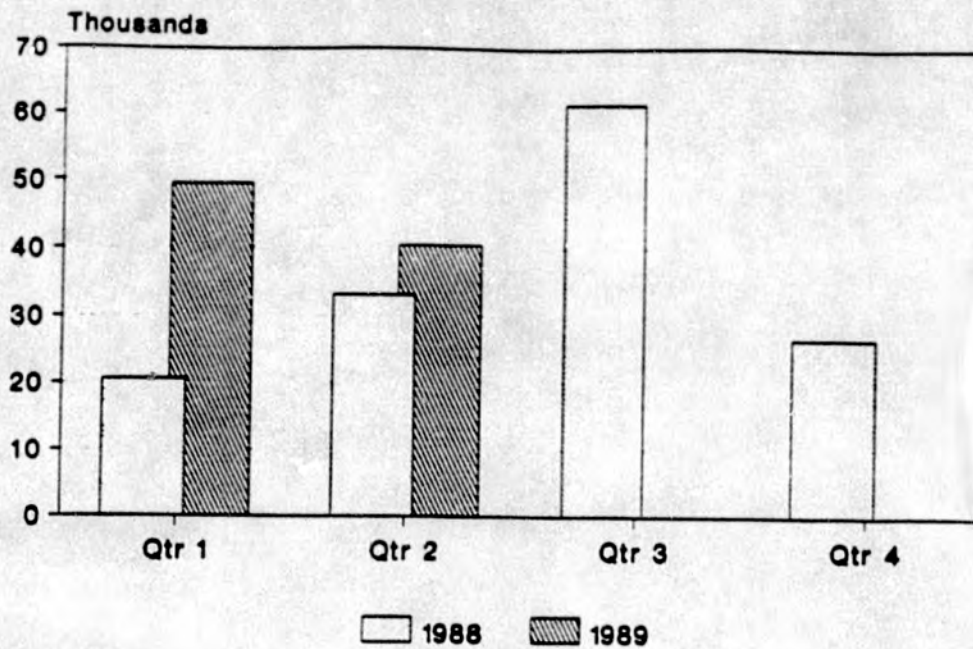
Quarterly Health Clinic Revenues Whittier



Quarterly Harbor/Dock Revenues Whittier

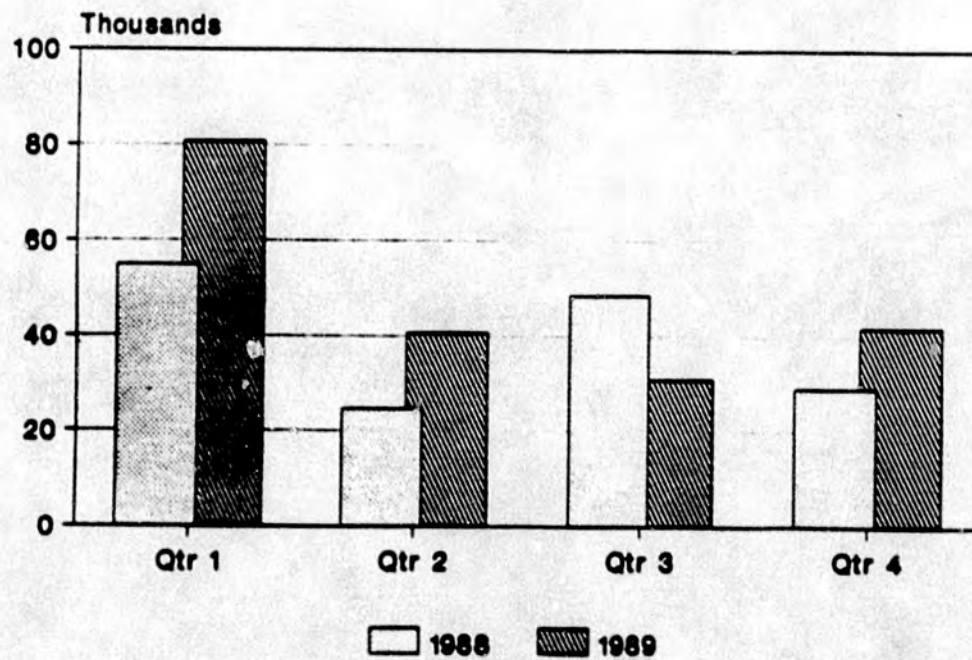


Quarterly Public Services Revenues Whittier

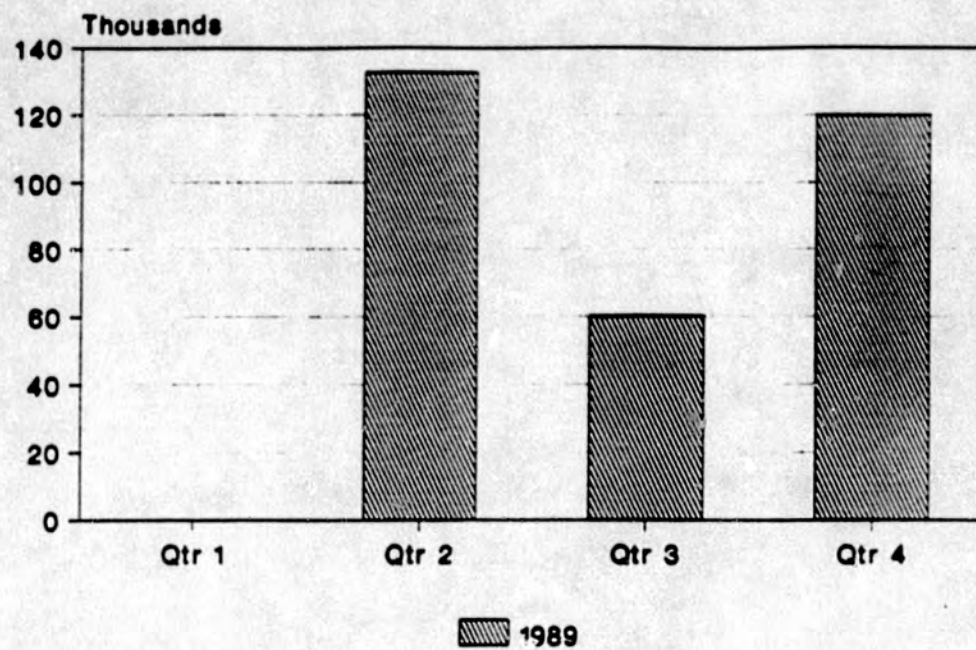


Excludes Clinic and Harbor/Dock

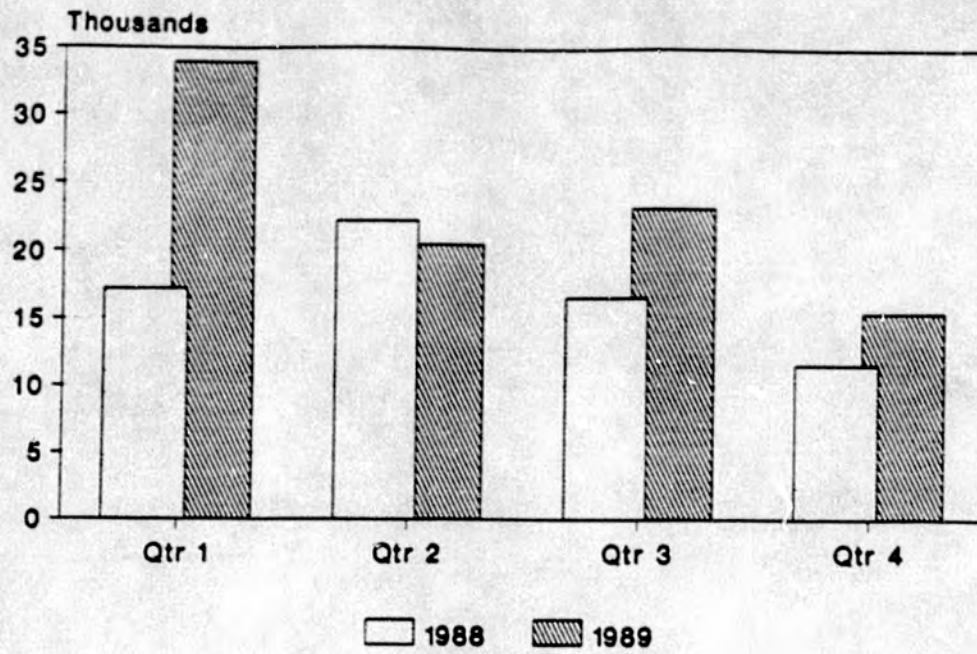
Quarterly Rents & Leases Revenues Whittier



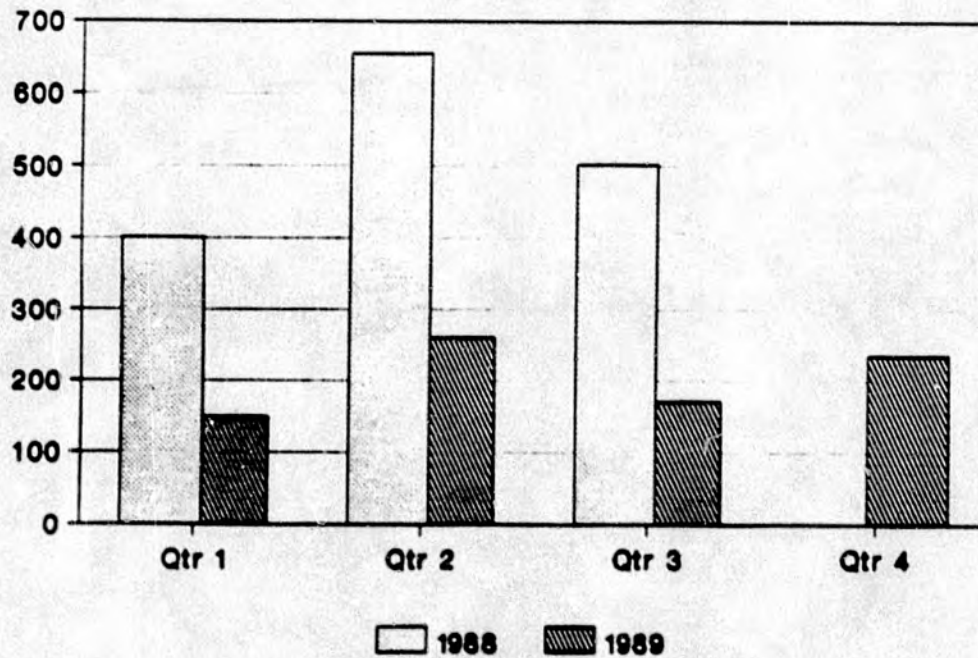
Quarterly Spill-Related Revenues Whittier



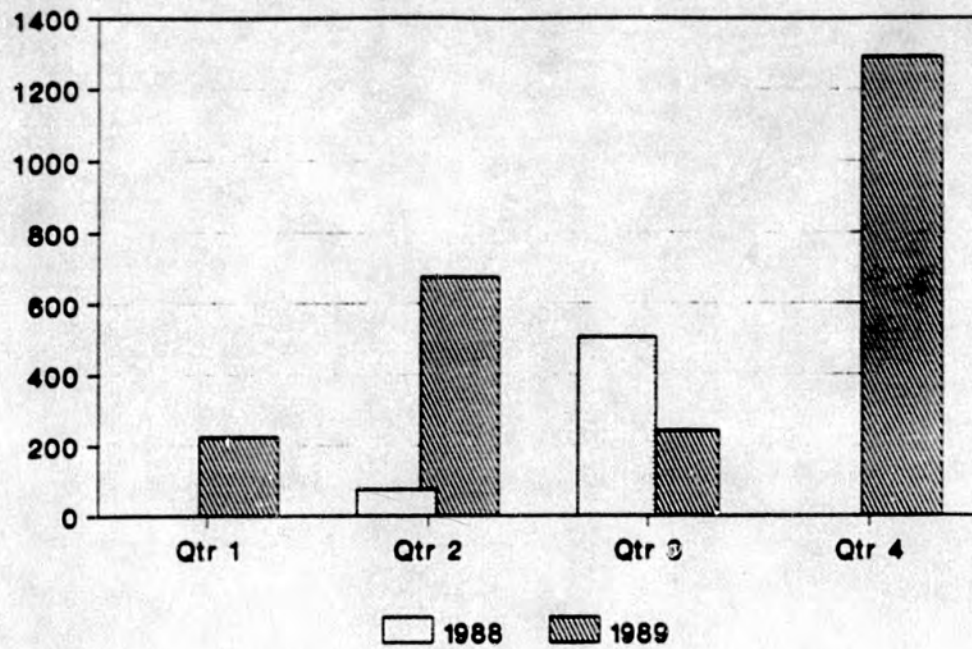
Quarterly General Gov't Expenditures Old Harbor



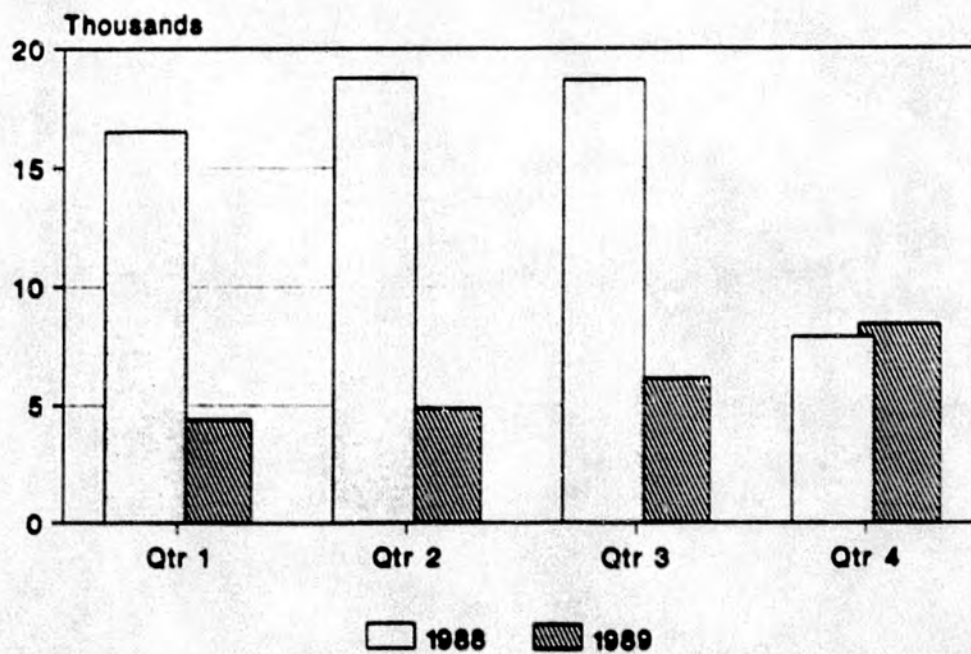
Quarterly Public Safety Expenditures Old Harbor



Quarterly Health Clinic Expenditures Old Harbor

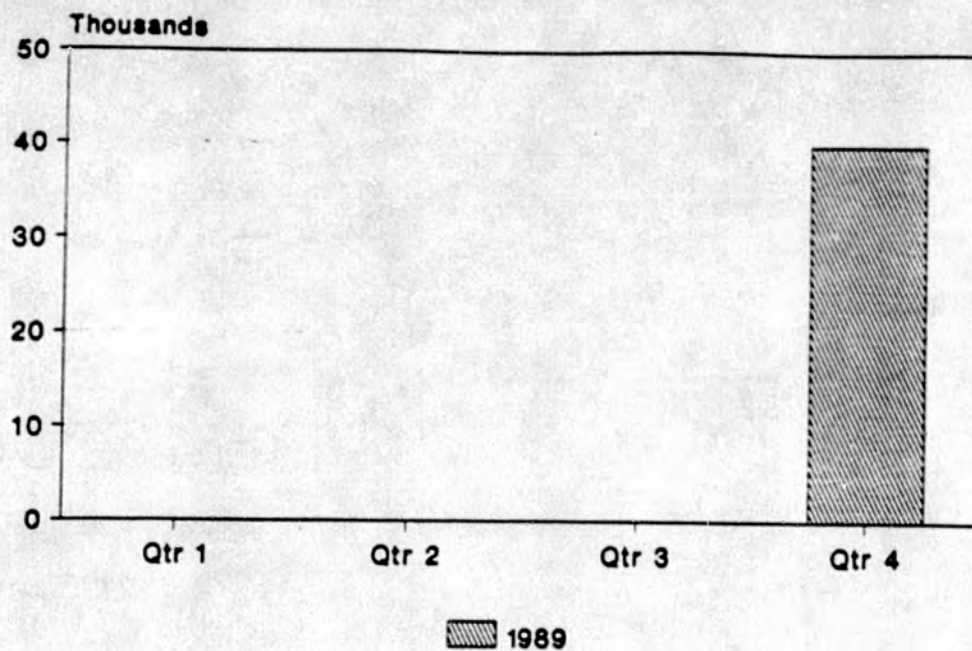


Quarterly Public Services Expenditures Old Harbor

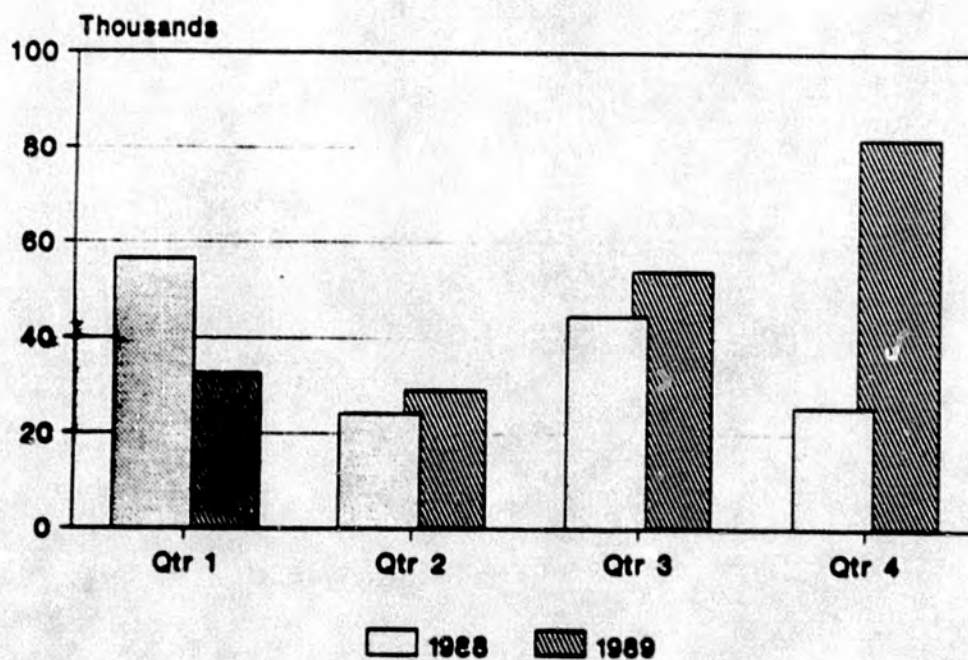


Excludes Clinic & Harbor/Dock

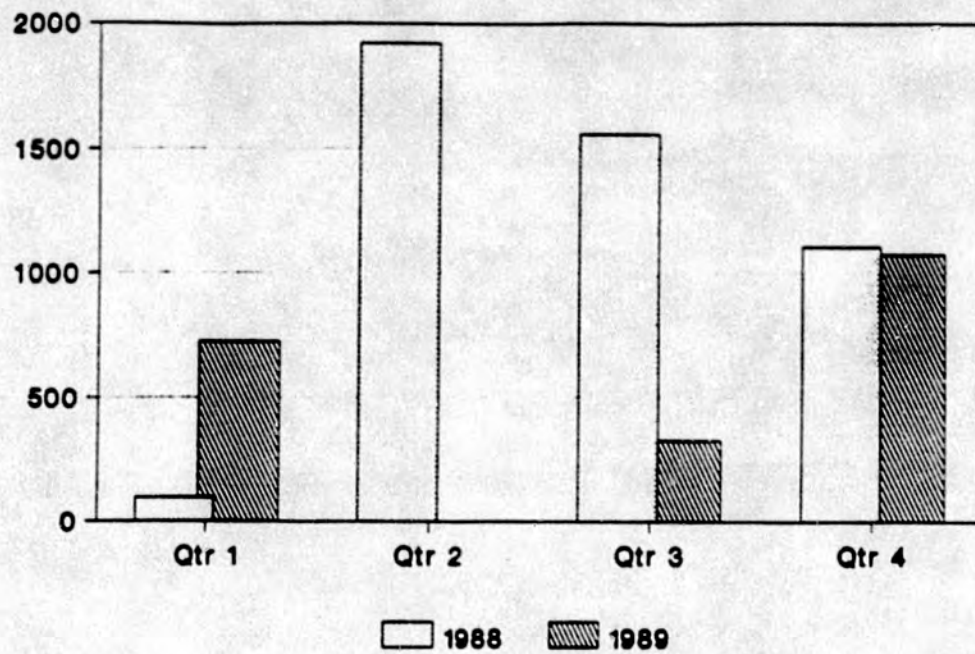
Quarterly Oil Spill Expenditures Old Harbor



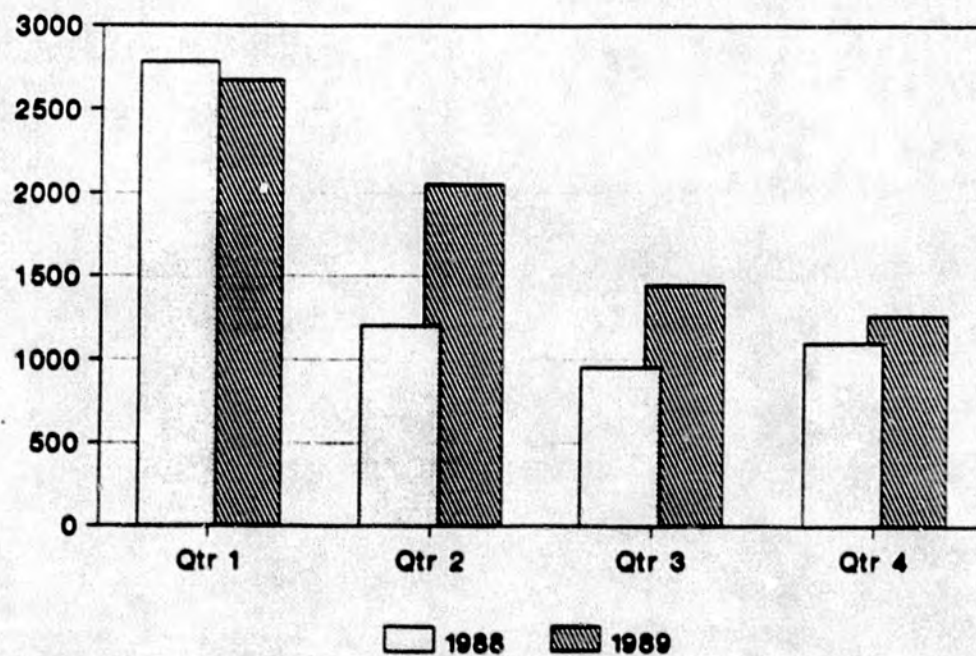
Quarterly General Gov't Expenditures Ouzinkie



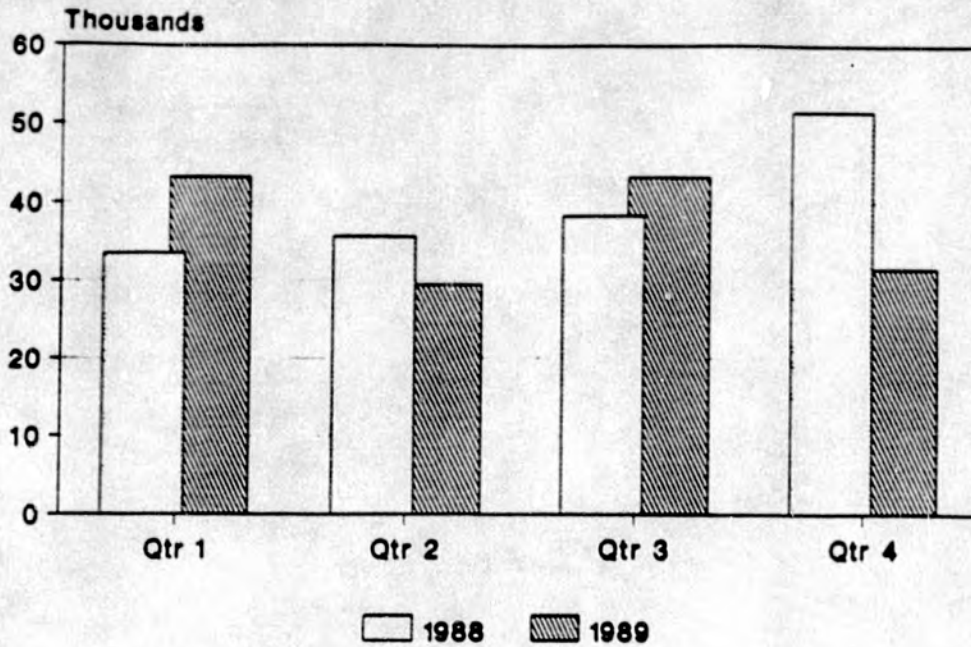
Quarterly Public Safety Expenditures Ouzinkie



Quarterly Health Clinic Expenditures Ouzinkie

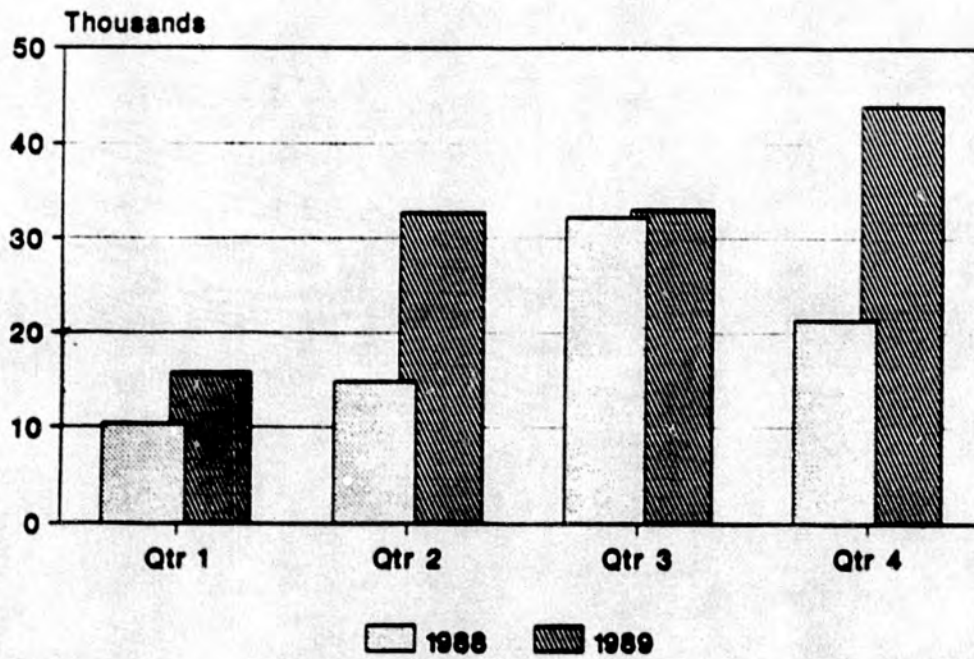


Quarterly Public Services Expenditures Ouzinkie

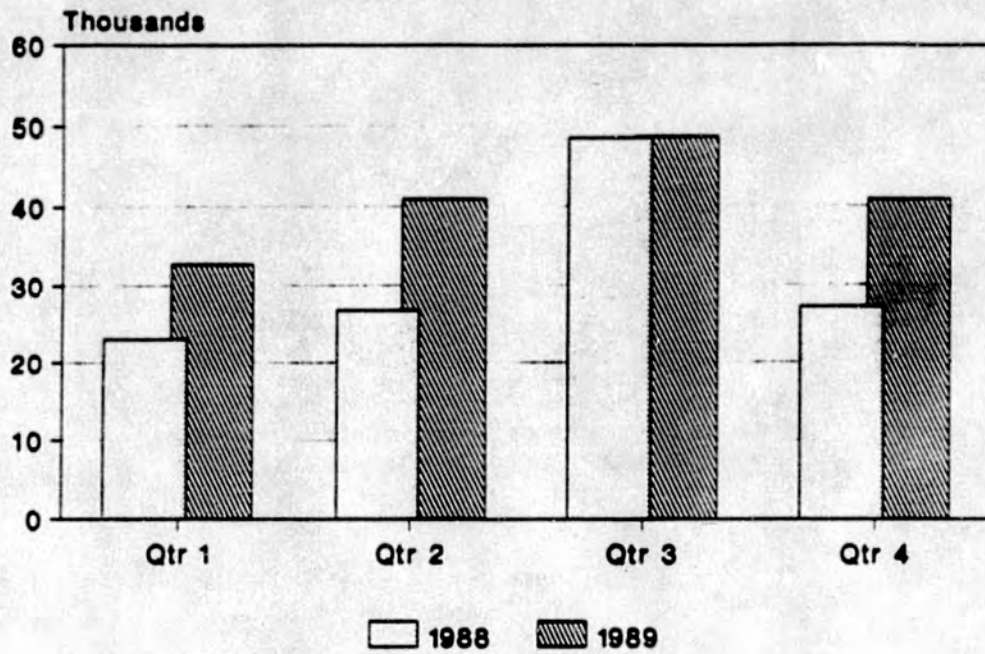


Excludes Harbor/Dock

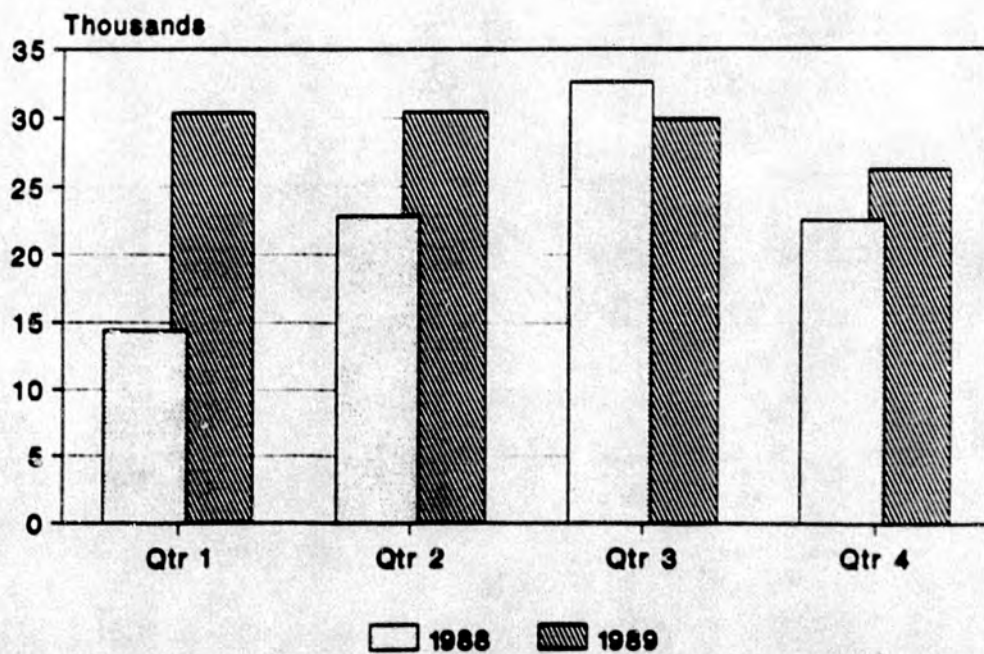
Quarterly General Gov't Expenditures Seldovia



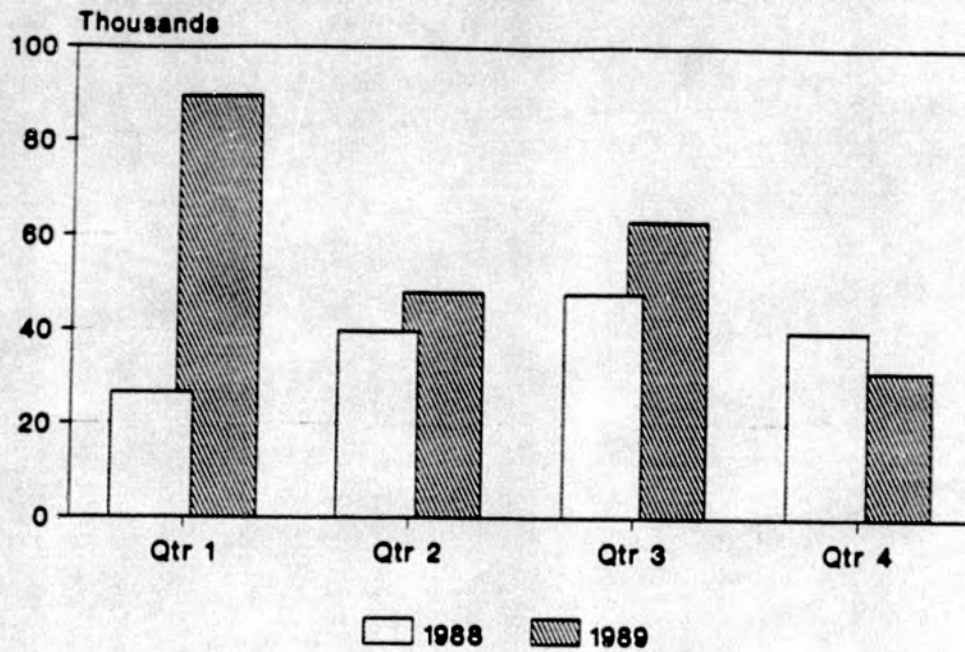
Quarterly Public Safety Expenditures Seldovia



Quarterly Harbor/Dock Expenditures Seldovia

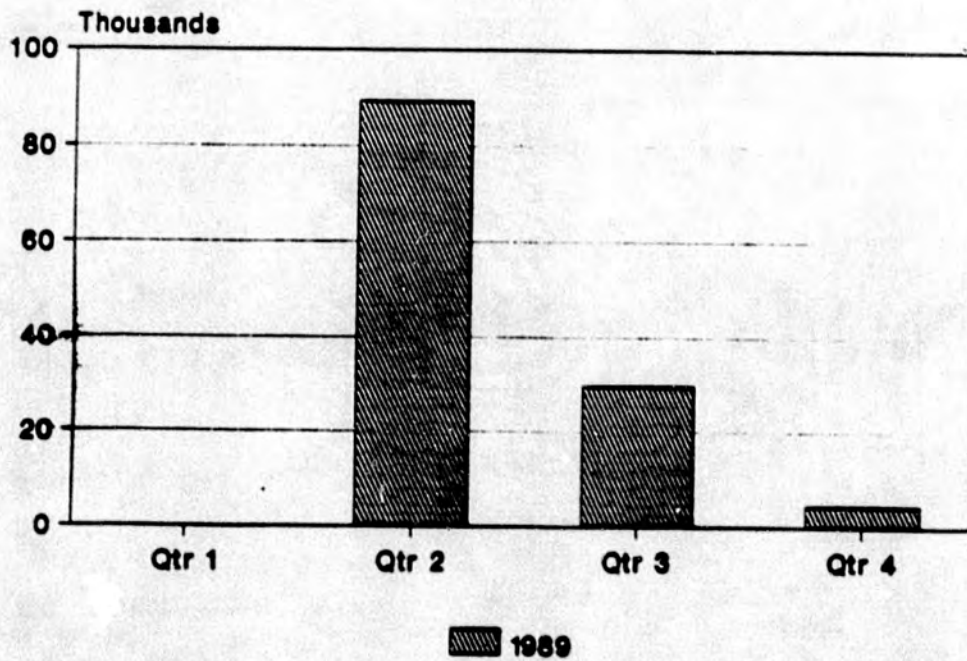


Quarterly Public Services Expenditures Seldovia

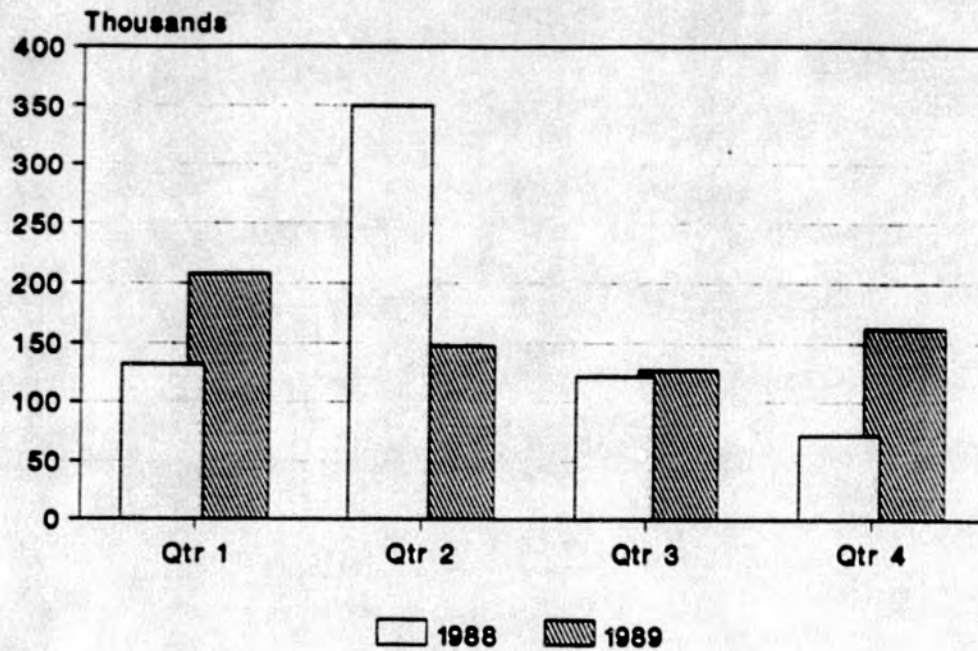


Excludes Harbor/Dock

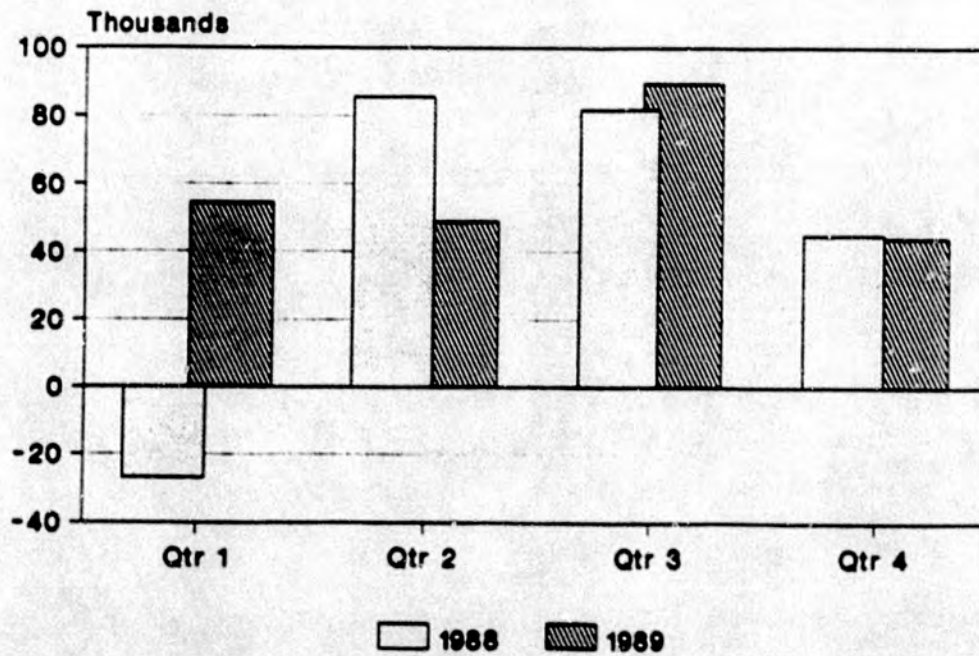
Quarterly Oil Spill Expenditures Seldovia



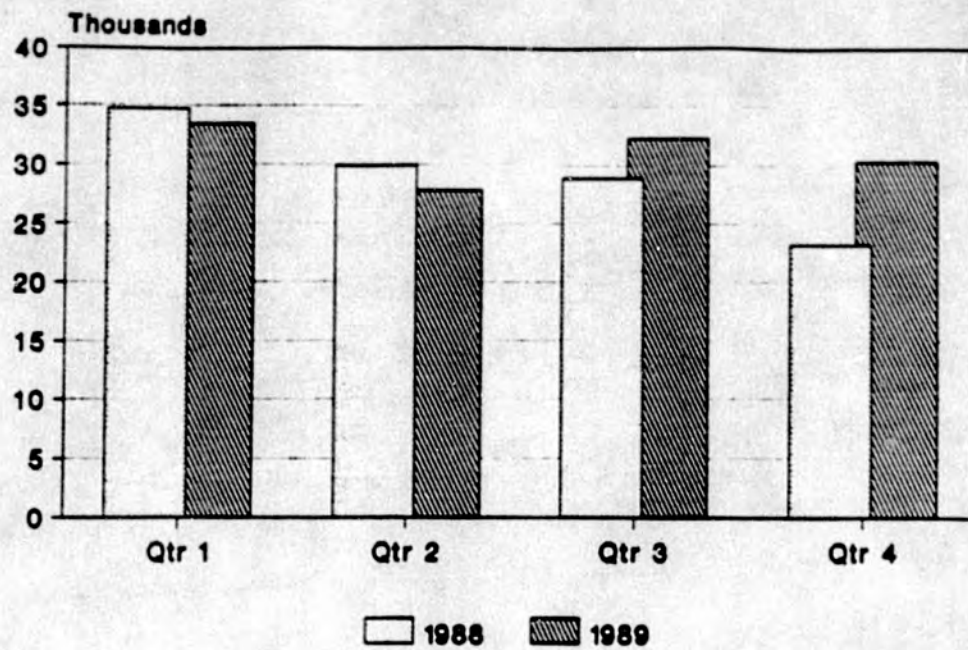
Quarterly General Gov't Expenditures Whittier



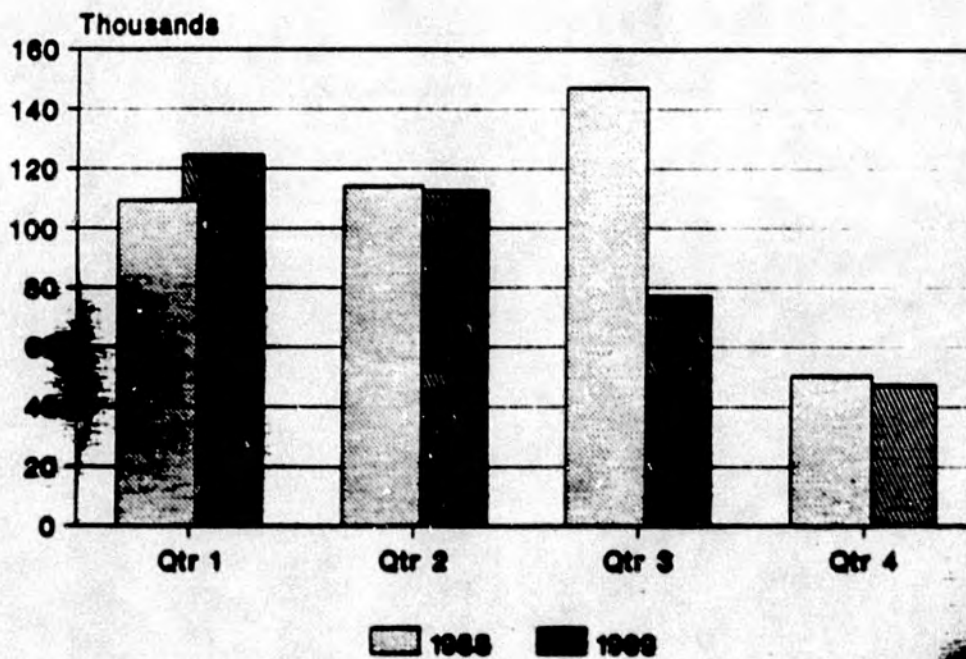
Quarterly Public Safety Expenditures Whittier



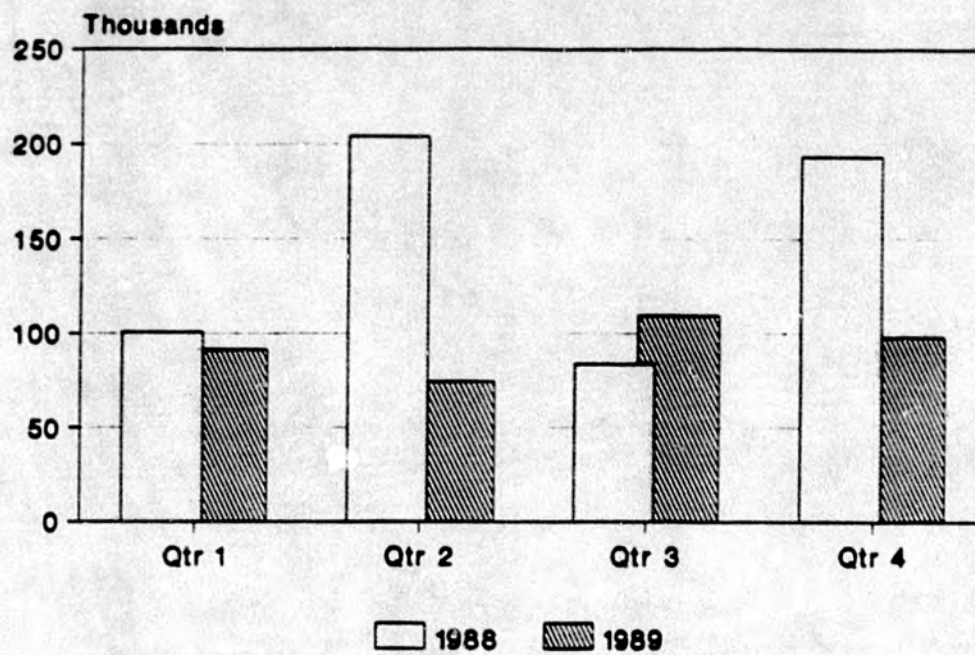
Quarterly Health Clinic Expenditures Whittier



Quarterly Harbor/Dock Expenditures Whittier



Quarterly Public Services Expenditures Whittier



Excludes Harbor/Dock

LIST OF REFERENCES

- Alaska Department of Fish and Game
- 1990 "Chignik Management Area Annual Finfish Management Report." Regional Information Report 4K90-14 Kodiak:ADFG.
- 1990 "Cook Inlet Area Shellfish Management Report to the Alaska Board of Fisheries." Regional Information Report No. 2H90-02 Anchorage:ADFG.
- 1990 "1990 Harvest Projections and Forecasts Historical Harvests Value Statewide Comparisons for Alaska's Major Commercial Fisheries." Kodiak:ADFG.
- 1990 "Preliminary Forecasts and Projections for 1990 Alaska Salmon Fisheries." Regional Information Report No. 5J90-03 Juneau:ADFG.
- 1990 "Preliminary Forecasts of Catch and Stock Abundance for 1990 Alaska Herring Fisheries." Regional Information Report No. 5J90-02 Juneau:ADFG.
- 1990 "Prince William Sound Management Area Shellfish Report to the Alaska Board of Fisheries." Regional Information Report No. 2C90-01 Anchorage:ADFG.
- 1990 "Westward Region Shellfish Report to the Alaska Board of Fisheries." Kodiak:ADFG.
- 1989 "1988 Lower Cook Inlet Area Annual Finfish Management Report." Regional Information Report No. 2H89-02.1 Anchorage:ADFG.
- 1989 "Upper Cook Inlet Commercial Fisheries Annual Management Report, 1988." Regional Information Report No. 2S89-3 Anchorage:ADFG.
- 1988 "Prince William Sound Area Annual Finfish Management Report." Regional Information Report No. 2C90-02 Cordova:ADFG.
- 1987 "Upper Cook Inlet Annual Management Report, 1987." Soldotna:ADFG
- Alaska Department of Labor
- 1987 "Alaska Seafood Industry Employment." Juneau:ADOL.
- 1981 "Alaska Fish Harvesting Employment." Juneau:ADOL
- 80Q1-89Q2 "Alaska Statistical Quarterly." Juneau:ADFG

Commercial Fisheries Entry Commission

1990 "Commercial Fishing Catch Data Aggregated by Alaska Census Division."
Juneau:CFEC.

1986 "Employment and Gross Earnings in Alaska's Commercial Fisheries: Estimates
for all Participants and Residents of Alaska, Washington, Oregon, and
California 1983-1984." Juneau:CFEC.

North Pacific Marine Fisheries Commission

1989 "NPFMC Groundfish Reports (Alaska)." Pacific Coast Fisheries Information
Network Portland:NPFMC.

Institute of Social and Economic Research

1980 "Measuring the Socioeconomic Impacts of Alaska's Fisheries."
Anchorage:ISER.

LIST OF REFERENCES

- Alaska Department of Fish and Game
- 1990 "Chignik Management Area Annual Finfish Management Report." Regional Information Report 4K90-14 Kodiak:ADFG.
- 1990 "Cook Inlet Area Shellfish Management Report to the Alaska Board of Fisheries." Regional Informational Report No. 2H90-02 Anchorage:ADFG.
- 1990 "1990 Harvest Projections and Forecasts Historical Harvests Value Statewide Comparisons for Alaska's Major Commercial Fisheries." Kodiak:ADFG.
- 1990 "Preliminary Forecasts and Projections for 1990 Alaska Salmon Fisheries." Regional Information Report No. 5J90-03 Juneau:ADFG.
- 1990 "Preliminary Forecasts of Catch and Stock Abundance for 1990 Alaska Herring Fisheries." Regional Information Report No. 5J90-02 Juneau:ADFG.
- 1990 "Prince William Sound Management Area Shellfish Report to the Alaska Board of Fisheries." Regional Informational Report No. 2C90-01 Anchorage:ADFG.
- 1990 "Westward Region Shellfish Report to the Alaska Board of Fisheries." Kodiak:ADFG.
- 1989 "1988 Lower Cook Inlet Area Annual Finfish Management Report." Regional Information Report No. 2H89-02.1 Anchorage:ADFG.
- 1989 "Upper Cook Inlet Commercial Fisheries Annual Management Report, 1988." Regional Information Report No. 2S89-3 Anchorage:ADFG.
- 1988 "Prince William Sound Area Annual Finfish Management Report." Regional Information Report No. 2C90-02 Cordova:ADFG.
- 1987 "Upper Cook Inlet Annual Management Report, 1987." Soldotna:ADFG
- Alaska Department of Labor
- 1987 "Alaska Seafood Industry Employment." Juneau:ADOL.
- 1981 "Alaska Fish Harvesting Employment." Juneau:ADOL.
- 80Q1-89Q2 "Alaska Statistical Quarterly." Juneau:ADFO.

SCOMM

76.32

FINAL REPORT

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

Prepared for:

**Oiled Mayors Subcommittee
Alaska Conference of Mayors**

Prepared by:

Impact Assessment, Inc.

2160 Avenida de la Playa, Suite A
La Jolla, California 92037

911 West 8th Avenue, Suite 402
Anchorage, Alaska 99501

November 15, 1990

FINAL REPORT

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

Prepared for:

**Oiled Mayors Subcommittee
Alaska Conference of Mayors**

Prepared by:

Impact Assessment, Inc.

2160 Avenida de la Playa, Suite A
La Jolla, California 92037

911 West 8th Avenue, Suite 402
Anchorage, Alaska 99501

November 15, 1990

Table of Contents

List of Tables	v
List of Figures	vii
List of Acronyms	viii
SUMMARY	x
1.0 THE <i>EXXON VALDEZ</i> AS HUMAN DISASTER: THE PURPOSE OF THE STUDY AND ORGANIZATION OF THE REPORT	1
1.1 The <i>Exxon Valdez</i> Oil Spill Was a Human as well as an Environmental Disaster	1
1.2 The Importance of Human Impacts	2
1.3 The Organization of the Study	3
1.3.1 Characteristics of the <i>Exxon Valdez</i> Oil Spill as Technological Disaster	4
1.3.2 The Structure of the Study Was Dictated by Needs for Immediate Information	5
1.4 Purpose and Organization of the Report	6
1.5 Definitions of Impacts	7
2.0 AN OVERVIEW OF SOCIAL AND PSYCHOLOGICAL IMPACTS	10
2.1 Individuals and Communities Were Harmed by the Oil Spill and Cleanup	10
2.2 Sources of Exposure to Social and Psychological Impacts from the <i>Exxon Valdez</i> Event	12
2.3 Types of Social and Psychological Impacts	15
2.4 Methodology for Determining Social and Psychological Impacts	16
2.5 Psychological Impacts	18
2.5.1 Psychiatric Disorders	18
General Anxiety Disorder	18
Post-traumatic stress disorder	19
Depression	19
Findings	19
2.5.2 Substance Abuse and Domestic Violence	27
2.5.3 Health Status	29
2.5.4 Utilization of Mental Health Services	33

2.6 Social Impacts	38
2.6.1 Community Social Relations	39
2.6.2 Household Relations	44
2.6.3 Children	45
2.6.4 Subsistence Activities	50
2.6.5 Public Safety Activity as an Indicator of Social Impact	60
2.6.6 Risk Perceptions and Threat of Recurrence	65
2.7 Recommendations	66
2.7.1 Increase Mental Health Services	66
2.7.2 Increase Primary Care Services	68
2.7.3 Increase Economic Assistance to Affected Communities	69
2.7.4 Increase Contingency Planning Efforts	69
2.7.5 Increase Information Dissemination Capabilities	70
2.7.6 Increase Community Involvement in Disaster Response	70
2.7.7 Additional Research	71
3.0 AN OVERVIEW OF OPERATIONAL AND FISCAL IMPACTS TO LOCAL GOVERNMENTS	73
3.1 Operations Impacts to Local Governments	74
3.1.1 Constraints on Effective Functioning	74
Excessive Demands	75
Demands on Municipal Governments	75
Demands on Regional Native Service Provision Organizations	81
Lack of Communication	83
Leadership Style	84
3.1.2 Changes in Political Context	85
Factionalism	85
Creation/Utilization of New/Unusual Entities	86
3.1.3 Interactions with Extracommunity Institutions	87
Behavior in Communities	87
Corporate Versus Municipal Authority: Privatization of the Cleanup	88
Differential Treatment of Communities	90
3.2 Fiscal Impacts to Local Governments	91
3.2.1 The Study Approach and Its Constraints	91
The Study Approach	91
Constraints on Data Interpretation	94
The Data Collection Process	94
Privatization of the Cleanup	94

3.2.2 Overview of Revenue and Expenditure/Cost Impacts	
Experienced	96
Revenue Impacts	97
Sales Tax	97
Transient Occupancy Tax	97
Raw Fish Tax	97
Harbor Revenues	98
Rents and Leases	98
Expenditure and Cost Impacts (Unreimbursed)	98
Deferred Maintenance	99
Administrative Costs	99
Opportunity Costs	100
Increased Audit Fees	100
Increases in Insurance Costs	100
Bond Ratings	100
Attorney Fees	100
Unreimbursed Direct Oil Spill Expenses	101
Hidden Costs	101
Cash Reserve and Budgetary Disruptions	102
3.2.3 Overview of Ongoing Revenue and Expenditure/Cost Impacts	104
Continuing Fiscal Impacts	104
Restoration and Recovery	105
3.3 Recommendations to Avoid or Ameliorate Impacts to Local Governments	105
3.3.1 Recommendations to Avoid or Ameliorate Impacts to Local Government Operations	106
Constraints on Effective Functioning	106
Changes in Political Context	108
Interactions with Extracommunity Institutions	109
3.3.2 Recommendations to Avoid or Ameliorate Fiscal Impacts to Local Governments	110
3.3.3 Linking Operational and Fiscal Impact Avoidance	111
4.0 AN OVERVIEW OF PRIVATE SECTOR ECONOMIC IMPACTS	113
4.1 Introduction	113
4.2 Methodology for Determining Private Sector Economic Impacts	114
4.3.1 Industry Composition	115
4.3.2 Participation in the Oil Spill Cleanup	121

4.3.3 Overall Business Performance	124
Gross Business Income	124
Changes in Business Performance	125
Changes in Business Conditions	125
Workforce Impacts	126
4.3.4 Changes in Business Plans	129
4.3.5 Business Gains and Losses	133
4.4 Recommendations	135
5.0 PREPAREDNESS NEEDS FOR THE FUTURE	136
5.1 Complete Understanding of the Risk Factors	136
5.2 Organizational Structures to Assist with Response	138
5.3 Plans for Response	142
5.4 Access to Resources	144
5.5 Information Documentation Needs	144
5.6 Communication	145
5.7 Legislation and Advocacy	147
5.7.1 The Need for Recognition of Human Impacts	148
5.7.2 Community Action: Federal Government	148
Problem	148
Recommendation	149
5.7.3 Community Action: State Government	149
Problem	149
Recommendations	149
5.7.4 Community Action: Industry	151
5.8 Resolution of Continuing Impacts	151
5.8.1 Social and Psychological Impacts	151
5.8.2 Local Government Impacts	152
5.8.3 Private Sector Economic Impacts	152
APPENDIX 1. Household Survey Research Methods	154
1. Household Survey Sample	154
2. Measures	155
Demographic Variables	155
Exposure	155
Family Relations	159
Social Relations	159
Traditional Subsistence Activities	159
Depression	159
Anxiety	160
Post-Traumatic Stress Disorder	161
Substance Abuse and Domestic Violence	161
Health Status	162
3. Statistical Analysis	162

APPENDIX 2. Methodology and Implementation of Business Survey	163
1. Introduction	163
2. Questionnaire Design	163
3. Sample Frame	165
4. Implementation	167
REFERENCES	170

List of Tables

Table 2.1	Household Survey Study Communities by Region and Affected Status ..	17
Table 2.2	Problems with Alcohol, Drug Abuse, and Domestic Violence by Exposure Status	28
Table 2.3	Prevalence of Medical Conditions	30
Table 2.4	Physical Health Status by Exposure Status	31
Table 2.5	Changes in Traditional Social Relations by Exposure Status	41
Table 2.6	Changes in Traditional Subsistence Activities by Exposure Status, 1988 and 1989 Compared	51
Table 2.7	Valdez Police Department Crime and Officer Statistics, 1976, 1988, and 1989 Compared	64
Table 2.8	Whittier Police Department Crime Statistics 1988 and 1989 Compared ..	64
Table 3.1	Groupings of Study Communities by Type	93
Table 3.2	Major Areas of Revenue and Expenditure Impacts	96
Table 3.3	Spill-Related Expenditures for Selected Communities	103
Table 4.1	Industry and Business Sectors Included in the Survey	116
Table 4.2	Summary of Business Survey Response Rates by Sector and Community	120
Table 4.3	Percentage of Businesses Participating in Spill Cleanup by Industry and Type of Cleanup Activity	122
Table 4.4	Business Participation by Sector in 1989	123
Table 4.5	Business Participation by Community in 1989	123
Table 4.6	Change in Business Performance 1988 - 1989	127
Table 4.7	Changes in Workforce Availability by Sector in 1989	128
Table A1.1	Exposure Status by Subregion and Community	157
Table A1.2	Demographic Characteristics of Respondents by Exposure Status	158
Table A2.1	Characteristics of Commercial Fishery Operators, Business Survey Sample	166

List of Figures

Figure 2.1: Lifetime Prevalence of GAD and PTSD by Exposure Status	22
Figure 2.2: Post-Spill Prevalence of GAD, PTSD, and Depression by Exposure Status	23
Figure 2.3: Post-Spill Prevalence of Psychiatric Disorders by Gender	24
Figure 2.4: Post-Spill Prevalence of Psychiatric Disorders by Ethnicity	25
Figure 2.5: Post-Spill Prevalence of Psychiatric Disorders by Age	26
Figure 2.6: Emergency Medical Services Calls, City of Valdez, 1988 and 1989	32
Figure 2.7: Client Contacts by Month, Seward Life Action Council, July - December, 1988 and 1989	36
Figure 2.8: Outpatient Contacts by Month, Seward Life Action Council, July - December, 1988 - 1989	37
Figure 2.9: Average Daily Attendance, Valdez Day Care, 1987 - 1989	47
Figure 2.10: Hunting, Fishing, and Gathering Activity, Time Normally Spent Since the Oil Spill, Native Communities	54
Figure 2.11: Hunting, Fishing, and Gathering Activity, Time Normally Spent Since the Oil Spill, Non-Native Communities	55
Figure 2.12: Hunting, Fishing, and Gathering Activity, Amount of Shared Subsistence Foods, Native Communities	56
Figure 2.13: Hunting, Fishing, and Gathering Activity, Amount of Shared Subsistence Foods, Non-Native Communities	57
Figure 2.14: Total Police Officer Responses, City of Valdez, 1988 and 1989	61
Figure 2.15: Police Officer DWI Responses, City of Valdez, 1988 and 1989	62
Figure 2.16: Number of Misdemeanors, Valdez Superior Court, 1986 - 1989	63
Figure 4.1: Location of North Gulf Coast Industries, Number of Business Firms by Community	117
Figure 4.2: Industry Composition of Oiled Mayor's Study Area	118
Figure 4.3: Industry Composition, Business Survey Responses by Community	119
Figure 4.4: Respondent's Net Investment in Business, Oiled Mayors' Study Area by Sector	131
Figure 4.5: Summary of Oil Spill Impacts on Oiled Mayors' Study Area by Economic Sector	132
Figure A2.1: Summary of Total Responses to Business Survey by Community ...	168

LIST OF ACRONYMS

AANHHS	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-III-R	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-à-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

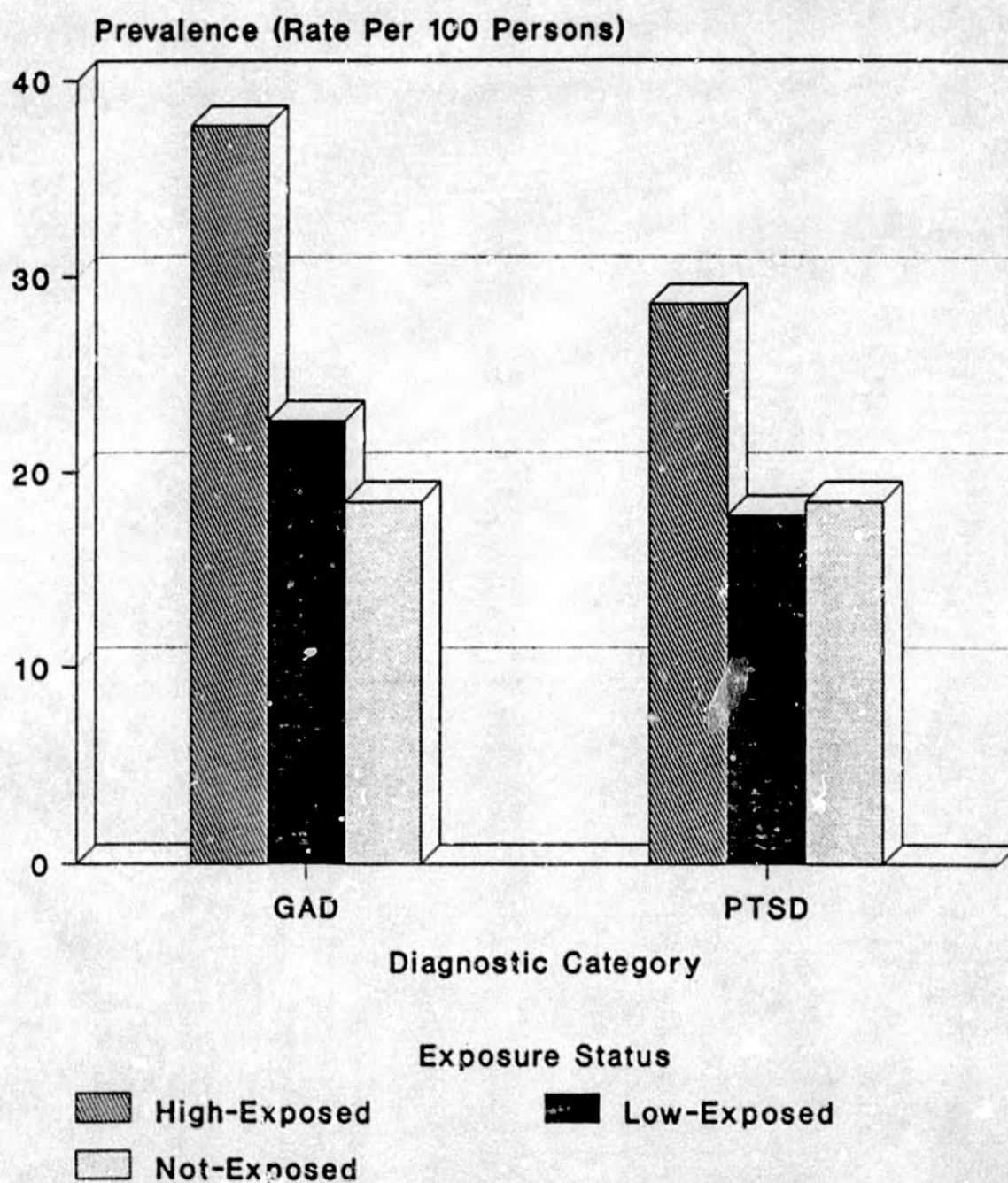


Figure 2.2
Post-Spill Prevalence of
GAD, PTSD, and Depression
by Exposure Status

