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Economic Impacts of the S.S. Glacier Bay Oil Spill

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ECONOMIC IMPACTS OF THE S.S. GLACIER BAY OIL SPILL

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U.S. Department of the Interior
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Alaska OCS Environmental Studies Program

Economic Impacts of the S.S. Glacier Bay Oil Spill

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1.0 INTRODUCTION

1.1 Background

The Minerals Management Service (MMS) has responsibility for leasing the Outer Continental Shelf for exploration and development of oil and gas leases. As part of the leasing process, MMS is required to prepare Environmental Impact Statements (EIS) which incorporate an assessment of potential oil spill impacts under low, medium, and worst case scenarios. MMS also has responsibilities in permitting subsequent exploration and development activities on leases they have awarded. Approval of oil spill contingency plans for response to an oil spill are part of the approval of Plans of Operation for activities on leases.

Potential conflicts between oil and gas development and commercial fishing, particularly the concern over impacts from oil spills, are major considerations in offshore oil and gas development. Residents throughout Alaska continually express their concern to MMS about the potential impact of oil spills on commercial fishing, which is often the most important and most volatile economic sector in coastal regions. To date, MMS has been unable to alleviate these concerns or adequately respond to the comments since applicable information on the economic impact of an actual spill was not available.

On July 2, 1987 an oil spill occurred in Cook Inlet when the S.S. Glacier Bay hit a submerged obstacle while enroute to Kenai Pipeline Company facilities to offload oil (See Figures 1-1 and 1-2). The 1987 commercial fishery in Cook Inlet was barely underway when the S.S. Glacier Bay oil spill occurred, and the largest salmon return in history was moving up the Inlet. The sockeye salmon run alone totaled over 12 million, providing a seasonal catch of 9.25 million salmon. The total ex-vessel value of the Cook Inlet commercial salmon harvest was approximately $95 million.

The 1987 sport fishery in Cook Inlet was in mid-season at the time of the spill. The early run king salmon fishery on the Kenai had already taken place as had the early run sockeye fishery on the Russian River. The second run fishery for Kenai kings had just begun and anglers were waiting for the second run of sockeye. The popular sport fishery for razor clams was taking place along the east side beaches from Clam Gulch south to Deep Creek. In other parts of Cook Inlet, subsistence and personal use harvest of salmon resources were occurring.

The S.S. Glacier Bay oil spill represents an opportunity to study the economic impacts of an oil spill event in Alaska, particularly with regard to commercial fishing impacts and the public costs of cleanup. The chronology of the spill and associated response measures

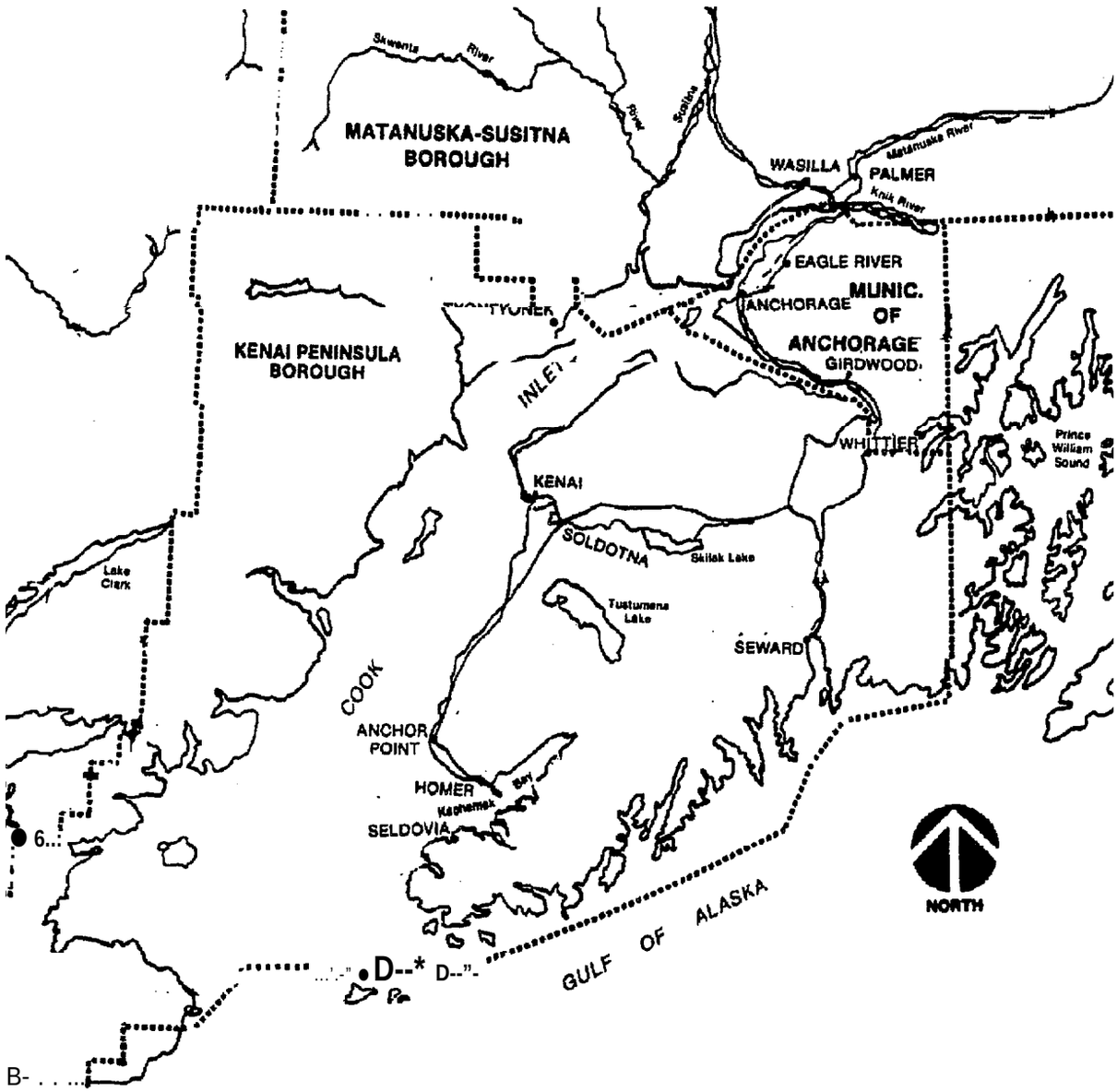


Figure 1-1

SS. Glacier Bay Spill Study Area

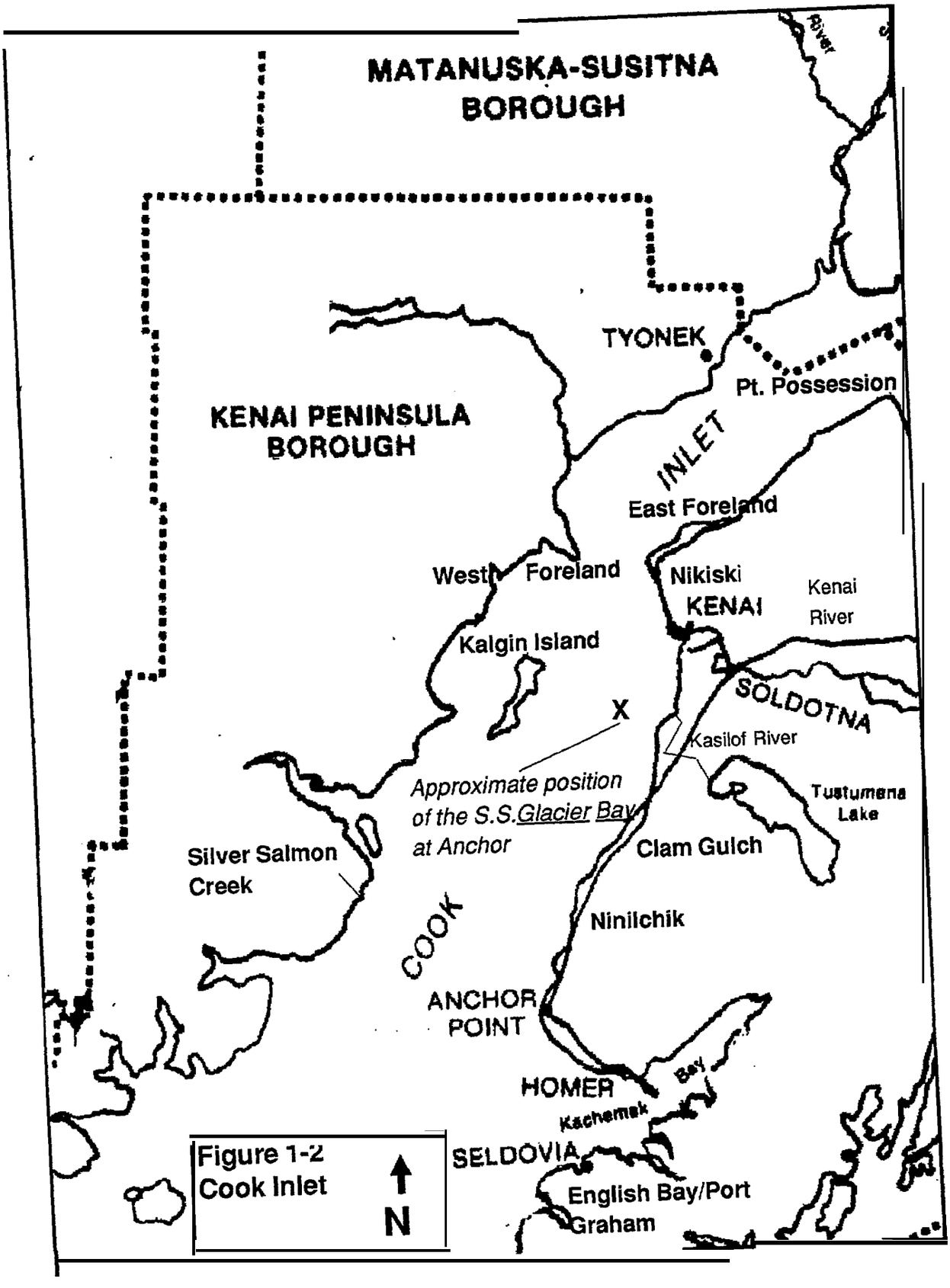


Figure 1-2
Cook Inlet

are contained in a report by the U.S. Coast Guard Federal On-Scene Coordinator (FOSC). Other federal and state agencies kept records of their involvement in the oil spill response, and news coverage was provided by local newspapers and fishing and oil industry magazines as well as newsletters. Agency files and information collected for insurance claims and litigation provide additional sources of data. This report evaluates the existing information on the spill, response measures, and economic impacts, and adds discussions with individuals and groups involved in or affected by the spill to this data base. This report will help MMS develop more accurate forecasts of potential oil spill impacts as part of the lease sale EIS process, and develop more effective . stipulations for permitting post lease sale activities.

1.2 **Study Purpose and Objectives**

The purpose of the S.S. Glacier Bay oil spill study is to develop a methodology and analyze the direct economic effects resulting from the spill which occurred on July 2, 1987. There are three major objectives to the study:

- o provide a thorough documentation and description of events that transpired during the oil spill, response and cleanup efforts, and compensation procedures;

- o estimate the direct economic costs associated with each activity mentioned above; and

- o estimate the costs of the oil spill to other groups, emphasizing the major distributional effects on commercial fishing, recreation, subsistence, government entities, and property values.

The study was completed in three tasks:

- o Task 1: Review Accounts of Oil Spill and Costs;

- 0 Task 2: Identify Types and Sources of Data, Develop Protocol, and Contact Groups and People for Data Collection and Verification; and

- 0 Task 3: Description, Analysis, and Report Preparation of the Economic Effects of the S.S. Glacier Bay Oil Spill.

Following sections of this report provide a chronology of events, a discussion of the data collection procedures and methodology employed to estimate the economic impacts of the spill.

2.0 CHRONOLOGY OF EVENTS AND KEY PARTICIPANTS

2.1 Methodology

2.1.1 Identification of Types of Data Collected

The objectives of this task were to:

- o review the available written accounts of the oil spill and subsequent response, monitoring, cleanup, and compensation efforts; and
- o locate gaps in the existing data prior to further research.

The following categories of information were identified for **review** by the study team in the proposal:

- o A chronology of events associated with the spill, response to the spill, clean-up, and compensation;
- 0 accounts of manpower, vessels, vehicles, equipment, materials and expenditures involved in the spill response, cleanup, and compensation;
- 0 evaluations of economic impacts on commercial fishing and processing activities, subsistence fishing, recreation and tourism activities, property values, and government and industry expenditures on spill response and cleanup activities;
- 0 description of the response, cleanup, and compensation decision making, particularly as it affects economic characteristics and costs; and
- 0 parties involved in the above mentioned events who would be contacted for interviews.

2.1.2 Identification of Sources of Data Collected

Possible written data sources were identified as local newspapers, oil and fishing industry journals and newsletters, and Alaska business community journals and newsletters. In addition, state and federal government agencies responsible for oil spill response and monitoring were identified as likely sources of information.

2.1.3 Data Collection and Review

In order to locate the information outlined above, the study team conducted searches at the Department of Interior Natural Resources Library and at the Loussac Library. These searches included oil and fishing industry journals and newsletters, Alaska business journals and newsletters, and three local newspapers; the Anchorage Daily News, the Anchorage Times, and the Peninsula Clarion. In addition, the study team conducted a computer data base search of the Bibliography of Alaskana at the University of Alaska, Fairbanks.

Based on information collected during the library searches, the study team identified the involved state and federal agencies. The study team contacted these agencies and inquired about their role in the response or cleanup and asked to review file reports and other publicly available documents concerning the spill event. The following state and federal agencies were contacted:

- Alaska Department of Fish and Game (ADF&G), Divisions of Commercial Fisheries, Subsistence, Sport Fisheries, and Habitat;
- Alaska Department of Environmental Conservation (ADEC);
- Alaska Attorney General (AG);
- National Oceanic and Atmospheric Administration (NOAA);
- National Marine Fisheries (NMFS); and
- U.S. Coast Guard (USCG).

The following types of information were collected during the literature review:

- chronological accounts of the spill, spill response, and cleanup;
- chronological accounts of the movement of the oil and impacts to fisheries;
- lists and accounts of manpower, vessels, vehicles, and equipment used during the spill response and cleanup;
- key parties involved in the spill response, cleanup, and commercial fisheries who should be contacted during Task 2 of this project;

- evaluations by state and federal agencies of the effectiveness of various actions taken during the spill response and cleanup;
- itemized lists of costs incurred by ADF&G divisions, ADEC, and U.S. Coast Guard during the spill response and cleanup;
- 1987, 1988 and historical commercial salmon harvest data;
- 1987 emergency order summary and list of commercial salmon fishing periods;
- 1987 and historical personal use salmon fishery harvest data;
- estimates of numbers and pounds of oil-contaminated fish caught during the 1987 commercial salmon season; and
- preliminary information concerning claims for compensation for fouled gear.

2.1.4 Data Gaps and Interview Needs

The following types of information were either not available or were not adequately covered in. the existing literature concerning the S.S. Glacier Bay oil spill. This information was the focus of the protocol development and data collection task:

- economic impacts on commercial fishing and processing activities, and on subsistence and personal use fisheries, including numbers of fish not caught due to oil spill impact;
- economic impacts on recreation and tourism activities;
- effect of the oil spill on property values;
- compensation for lost fishing time, fouled gear and other economic damages;
- accounts of compensation sought and received following the oil spill; and
- remaining government and industry expenditures on spill response and cleanup activities.

Some of this missing information may ultimately be contained in several documents as yet unavailable because of pending litigation. Among these documents is a damage assessment report researched and prepared by the National Oceanic Atmospheric

Administration (NOAA) and unidentified related documents including estimates of costs incurred by NOAA. Also unavailable at this time is a report prepared by the Alaska Attorney General's office. The AG's office has released part of this report and this information was used in preparing estimates of state government costs. Likewise, the NOAA report may become available through the Freedom of Information Act. The study team did not request documents under the Freedom of Information Act during preparation of the report.

2.1.5 Annotated Bibliography

An annotated bibliography was prepared for each data source evaluated during Task 1. The annotation is a summary of the currently available data organized for easy reference by type of data. Each annotation includes a reference to the source and location of the data, key descriptive words, an abstract, and a summary of maps, tables and figures contained in the document.

The following journals were among those searched by the study team (other journals of unrelated subject matter were also searched through the bibliography of Alaskana which indexes over 400 publications):

Air Water Pollution Report
Alaska Bear (a USCG publication)
Alaska Business Monthly
Alaska Business Newsletter
Alaska Construction and Oil
Alaska Court Svstem Newsletter
Alaska Department of Fish and Game, Division of Game: Federal Aid in Wildlife Restoration
Alaska Economic Report
Alaska Economic Trends
Alaska Environment
Alaska Fish and Game
Alaska Fisherman's Journal
Alaska Maaazine
Alaska Native Maaazine
Alaska Quarterly Review
Alaska Review of Social and Economic Conditions
Alaska Update
Amicus Journal
BP Shield International (a publication of British Petroleum]
Bulletin of Alaska Oil and Gas Conservation Commission
Business Week

Center News
Chevron World
Coastal Management
Coastal Zone Management
Conservation Foundation Letter
Ecology
EIS Journal
Energy Exploration Exploitation
Energy Journal
Environment
Exxon USA
Fish and Game Bulletin
Hydrobiologia
Information North
Inside Energy with Federal Lands
Intercom Standard Alaska Production Company
Journal of Energy and Development
Journal of Geotechnical Exploration
Journal of Geotechnical Engineering
Journal of Petroleum Technology
Logistics and Transportation Review
Marine Fisheries Review
Marine Pollution Bulletin
Journal Marine Resource Economics
National Fisherman
National Petroleum News
National Wildlife
Native Press Research Journal
Natural Resources Environment
New Alaskan
New Republic
Newsweek
Northern Line
Oil and Gas Journal
Oilweek
Pacific Northwest Journal
Pacific Northwest Quarterly
Pacific Reporter
Petroleum Economist
Report to Alaskans from U.S. Senator Frank Murkowski
Resource Recovery Report
Resource Review "

Sierra
Soil and Water Conservation News
Time
US News and World Report
Water Resource Bulletin
We Alaskans
Wilderness
World Environment Report

2.2 Key Participants in Oil Spill and Response

Key parties involved and resources committed to the S.S. Glacier Bay oil spill and response are described in the following sections.

2.2.1 Petroleum and Transportation Industries

Alaska Clean Seas cooperative (ACS): a spill response organization which setup a command post with repeater enhanced radio communications. Their activities included establishing a communication network, logistical support, assisting fishermen in replacing fouled nets, and other office related work. ACS had a minor role in some beach cleanup.

Alan Allen of Spiltec: was hired by the Federal On-Scene Coordinator (FOSC) as an oil spill consultant.

Alyeska Pipeline Service Company (APSC): at the request of the USCG, APSC provided a Marco Class V skimmer, 2-21' workboats, and 10 APSC staff from Valdez, plus 100' of containment boom and miscellaneous equipment. The skimmer was deployed on July 9 and worked until July 13. The company was released when the USCG relinquished control of the cleanup to the vessel's representative. The personnel and equipment worked intermittently on an as-needed basis over the following two weeks before demobilizing.

ARCO Alaska, Inc.: FOSC's report states that ARCO provided 50 barrels used to transport recovered oil, but ARCO has no record of such activity nor do employees recall any involvement in the spill.

Besse, Epps, and Potts of Anchorage: contracted by law firm of Bradbury, Bliss, and Riordan to conduct a sonar survey of Cook Inlet in the reported grounding vicinity.

Bradbury, Bliss and Riordan: law firm for the vessel's owner, insurer, and certain charterers. Doug Davis, attorney. Mike Wooden, attorney.

Cook Inlet Pipeline Company: provided personnel, equipment and helicopter support for the Drift River beach cleanup operation; provided approximately 140 barrels used to transport recovered oil.

Cook Inlet Response Organization (CIRO): a spill cooperative of oil companies located in Cook Inlet. CIRO's primary function is to provide spill response training to member companies, maintain an inventory of cleanup equipment and provide contractual support. Member companies are responsible for providing management and field response personnel during an oil spill emergency. They were the first responders to the spill and were hired by FOSC as a subcontractor to assist in cleanup operations after federal takeover of the response effort. Barry Eldrige: CIRO representative.

International Tanker Owners Pollution Federation Limited of Houndsditch, London: Technical advisors to the vessels's owner and insurer. J.A. Nichols: provided pollution response advice.

Kenai Pipeline Company (KPL): shore facility with docks at Nikiski regularly used by tankers to offload oil cargo; original destination of the S.S. Glacier Bay.

Key Leasing Company: owner of S.S. Glacier Bay.

Marathon Oil Company: made available their wasteburner on the west side of Cook Inlet for a test burn of several barrels of oily water.

O'Brien's Oil Pollution Service (OOPS): cleanup consultant hired after owner resumed responsibility for the spill. The firm is no longer in business.

Offshore Systems - Kenai (OSK): provided longshore services and equipment during the cleanup efforts. OSK also operated a boat washing station and maintained a holding pit for oily waste received from cleanup operations.

SGS Control Services: measured the amount of oil on board the S.S. Glacier Bay at the KPL dock on July 3, 1987.

Standard Alaska Production Company (SPC) Shipping: charterer of S.S. Glacier Bay. Captain Andy Santos, charterer. Captain Hawker, master.

Tesoro: recipient of S.S. Glacier Bay oil at KPL facility; owner of storage tanks at KPL.

Trinidad Shipping Company: operator of S.S. Glacier Bay; owned by Apex Oil.

Underwater Construction: contracted by law firm of Bradbury, Bliss, and Riordan to dive and investigate sonar readings provided by Besse, Epps, and Potts.

Unitech of Alaska: oil spill response contractor based in Anchorage hired by the FOSC and by the owner to assist with the response efforts.

Wade Oil Field Service: provided laborers for CIRO's initial response to the spill.

2.2.2 **Government**

Federal agencies

Air National Guard: provided surveillance and logistics support to the FOSC.

Civil Air Patrol: provided surveillance and logistics support to the FOSC.

National Oceanic and Atmospheric Administration (NOAA) and National Marine Fisheries Service: conducted an evaluation of the impacts to natural resources under NOAA's trusteeship in order to determine whether a damage assessment was warranted. The R/V Fairweather also conducted hydrographic survey of the grounding area after the spill.

NOAA's Scientific Support Coordinator (SSC): four SSCS assisted with environmental assessment and the establishment of a consistent monitoring program. Hosted evening meetings to discuss daily response efforts with any interested parties.

USCG Air Station Kodiak: provided surveillance and logistics support to the FOSC; provided three helicopters; coordinated overflights with Civil Air Patrol and short range civilian flights.

USCG Federal On Scene Coordinator (FOSC): The commanding officer of the Marine Safety Office (MSO) in Anchorage was the pre-designated FOSC for oil pollution incidents in Western Alaska. R.N. Roussel, Captain.

USCG Kenai Marine Safety Detachment (MSD): Conducted overflights of the spill area on day one of spill event; FOSC was based at the MSD office in Kenai.

USCG Marine Safety Office (MSO). Barry Roberts: Chief Warrant Officer; monitored vessel following spill. Ed Moreth: Chief Petty Officer. Both individuals are located in Anchorage.

USCG Pacific Strike Team: based in San Francisco; provided seven members to aid in pumping off the S.S. Glacier Bay and to assist with monitoring activities.

U.S. Fish and Wildlife Service: provided field staff for assessment of impacts to fish and wildlife resources. Field staff made several overflights of the spill and shoreline assessments of damage.

State agencies

Alaska Department of Fish and Game (ADF&G): involved in assessing the size, extent and impacts of the spill to commercial and recreational fisheries in the area, and determining when and where fisheries closures should occur.

Alaska Department of Environmental Conservation (ADEC): committed approximately 18 personnel to monitor the spill, provide technical assistance to the spiller and Coast Guard during cleanup activities, document spill impacts and approve the adequacy of cleanup operations. ADEC fielded approximately 12 seafood sanitarians to inspect commercially harvested salmon for possible oil contamination. The state provided three ATVS and a helicopter through ADEC. Jim Hayden: oil spill coordinator.

Alaska Department of Natural Resources (ADNR): Provided 10 personnel to assist in monitoring beaches, assess oil impact, and track the salmon run to determine when and where fish openings should occur.

Local communities

Kenai Peninsula Borough Mayor's office: kept community appraised of spill response measures, but had no formal participation in response and cleanup activities.

2.2.3 **Commercial Fishing Industry**

Kenai Peninsula Fisherman's Cooperative: kept members informed of response measures and location and movement of oil; at request of FOSC located boats and equipment for use in cleanup operations. Tim Keener: President

United Cook Inlet Drift Association (UCIDA): informed members of response measures and location and movement of oil; at request of FOSC located boats and equipment for use in cleanup operations. Theo Mathews, President

Robinson & Beiswenger; Soldotna law firm hired by a group of fishermen, deckhands, tenders, and cannery workers. Peter Ehrhart: attorney

2.2.4 Recreation and Sports Fishing

The following organizations and individuals represent sport fishermen throughout the study area. None of the organizations reported activity related to response and cleanup of the S.S. Glacier Bay oil spill.

Alaska Flyfishermen's Association, Dirk Dirksen, Past President

Alaska Sportfishing Association, Anchorage, Tom Elias, President

Cook Inlet Professional Sportfishing Association, Jeff King, President

Homer Charter Boat Association, Shawn Martin, Past President

Kenai River Sportfishing Association, Tim Stevens, Vice President

South Peninsula Sportfishing Association, Jim Vandersanden, Past President

2.3 Chronology of Events

The S.S. Glacier Bay is a 81,000 deadweight ton tanker, 774 feet in length. At the time of the spill, the S.S. Glacier Bay was transporting 380,000 barrels of North Slope oil from the Valdez terminal of Alyeska Pipeline Service Company to offloading facilities of Kenai Pipeline Company at Nikiski. From there, KPL would transport the oil to Tesoro Petroleum's nearby refinery. While transiting Cook Inlet to the KPL facility, the vessel was under the direction of the master of the vessel and a first Class pilot, both licensed by the U.S. Coast Guard.

Several published accounts of the S.S. Glacier Bay oil spill are available; these include the report of the Federal On-Scene Coordinator from the U.S. Coast Guard and the Alaska Department of Environmental Conservation. It should be noted that representatives of the S.S. Glacier Bay have stated that there are inaccuracies in these published accounts but they are unable to comment further. A chronological comparison of the history of events related to the spill and summary of response actions is presented in Table 2-1, and is based on these published accounts. Several chronological oil spill situation maps, prepared as part of the FOSC report, are included in Appendix B.

The chronological comparison in this report differs from other analyses of the spill in that it attempts to separate out spill events and response measures to facilitate an understanding of how and when actions occurred and what economic costs might have been entailed. In some instances, a spill response measure becomes a spill event in

itself. For example, a Department of Fish and Game decision to close a fishery by emergency order the day before the fishery is scheduled is reported as a response measure on the day of the decision. The actual closure is reported as a spill event on the day of the closure.

TABLE 2-1 CHRONOLOGY OF SPILL EVENTS

SPILL EVENT	RESPONSE MEASURE
July 2, 1987	
- Early in the morning of July 2nd 1987, the S.S. Glacier Bay was enroute to the Kenai Pipeline (KPL) facilities to offload its cargo of North Slope crude oil.	
- At 3:23 AM, the vessel anchored approximately 17 miles southwest of Salmo Rock Buoy, because the KPL dock it was scheduled to moor at was occupied by a tank barge. Shortly after anchoring, the crew experienced a jolt, which is thought to have resulted from striking an uncharted rock (U.S. Coast Guard 1987).	- At 3:30 AM, the master of the S.S. Glacier Bay notified the Coast Guard Marine Safety Office (MSO) in Anchorage of the incident, stating that the vessel was in danger and leaking oil.
Initial estimates of the spill were 3 to 10 barrels, based on visual sightings of leaking oil. After this initial sighting, it appeared that the leaking stopped.	The master of the vessel also reported the spill to the KPL terminal, who in turn notified the Cook Inlet Response Organization (CIRO), the regional oil spill response cooperative for oil companies located in the Cook Inlet region.
	- Tesoro initiated CIRO's response, which started with an overflight of the vessel and Cook Inlet at 5:30 AM. The overflight confirmed the initial spill estimate of 3 to 10 barrels and the observation that leakage of oil had stopped.
- The vessel's crew conducted soundings of the tanks; these indicated a rupture to the bulkhead of starboard cargo tank 4 and oil in the previously empty number 3 starboard segregated water ballast tank. Water was detected in the bottom of these tanks and the vessel's number 3 center cargo tank, which indicated that they may be open to the sea.	- A decision was made by the master of the vessel to transfer the oil from the affected cargo and ballast tanks into intact tanks elsewhere on the vessel.
- While the vessel was transferring oil from the damaged tanks to tanks aft, using the on-board fixed cargo transfer system, the master reported to MSO Anchorage that a second release of oil was observed at 7:12 AM on July 2nd. There was. concern as to whether the on-board fixed cargo transfer system was functioning properly.	- The master was advised not to transfer oil until it was determined that the receiving tanks were intact. Submersible pumps were to be used to continue any future transfer, and would be brought to the vessel by CIRO (when · they arrived, the electrically driven pumps where determined to be unsuitable for use in a flammable atmosphere).
- At 7:56 AM, additional jolts were felt, indicating that the vessel might still be striking a submerged object (later interpreted by the master as possible structural failures).	- After requesting concurrence from the Captain of the Port, the S.S. Glacier Bay weighed anchor, got underway, and re-anchored in deeper water, Arrangements were made for divers to inspect the hull for damage; initial survey failed to locate damage.
- A large, heavy oil slick, 10 miles long and 5 to 15 yards in width, observed moving towards the east shore of Cook Inlet. At 'this point, the spill estimate was upgraded to 100 to 400 barrels (4200-16,800 gallons).	- Coast Guard and Alaska Department of Environmental Conservation (ADEC) conducted an overflight at 9:40 AM.

Spill Event	Response Measure
July 2 cont.	
	CIRO deployed an offshore supply vessel with a skimmer and containment boom on board to recover spilled oil.
	Additional Coast Guard response personnel from MSO Anchorage and Pacific strike team member present in Anchorage were sent to Kenai to assess size of spill, cause of incident, and monitor clean-up actions; Regional Response Team (RRT) was convened by telephone.
	FOSC arrived in Kenai, overflew S.S. Glacier Bay at 3:30 PM; met with CIRO, S.S. Glacier Bay master, KPL and Tesoro. Discussions centered on whether to allow vessel to dock and offload, continue internal tank transfer at anchor, or depart to sea to continue internal tank transfer.
	At 4:10 PM CIRO requested FOSC authorization to use dispersants; concerns regarding impact on spawning salmon were raised, and after review by state and federal agencies, the request was denied,
	Initial clean-up efforts limited to use of CIRO ODI skimmer, containment booms, small boats, and a spotting aircraft.
- During afternoon of July 2nd, master and charterer of S.S. Glacier Bay made repeated requests for permission to dock at KPL.	- Permission to dock is initially denied by FOSC, who recommends taking vessel out of Cook Inlet to continue internal tank transfer,
- Charterer (SPC) considered the vessel unsafe due to possible cracking and refuses to take vessel out to sea. CIRO argued against docking at KPL and recommended lightering the oil from the tanker to another vessel in Cook I niet. FOSC considered lightering more risky and offloading at the KPL dock more efficient.	- FOSC grants permission for the Glacier Bay to dock at KPL and offload oil.
- FOSC requested the vessel owner transport CIRO Lockheed 3100 skimmer from Anchorage to Kenai for use in cleanup. CIRO objected that skimmer is inappropriate for the conditions, but FOSC prevailed.	- CIRO Lockheed skimmer mobilized to assist with clean up at 10 PM.
	- FOSC activated the Pollution Revolving Fund, and calls in additional Coast Guard personnel from the Pacific Strike team in San Francisco. FOSC confers with ADF&G and ADEC.

Spill Event	Response Measure
July 3	
- Periodic discharges of oil continued from the S.S. Glacier Bay while moored at KPL dock. Oil slick observed in eastern Cook Inlet.	- Attempts were made to secure booms around the vessel at the dock; unsuccessful due to strong currents, winds, " and wave height.
- Skimmers deployed generally fail to retrieve debris laden oil.	- Very limited waterborne recovery efforts initiated by the owner of the vessel, based on inconsistent reports of recoverability of oil, non-availability of adequate skimmers, an initial consensus that oil would flush out of Cook Inlet naturally.
· Additional divers surveys found bottom plate damage to three tanks from an outside impact.	
- Commercial salmon fishery period opened; several East Foreland set net sites report oiled fouled nets.	- Sensitive areas on the east side of Kalgin Island boomed to exclude oil; emphasis placed on beach cleanup and overflights.
	- CIRO refuses to deploy Lockheed skimmer due to excessive wave heights.
July 4	
- Offloading oil from vessel continued.	- Beach surveillance continued; response equipment is stockpiled at rig tenders dock.
- Overflights observed heavy oil slicks.	
- Tidal action continues oil release from oiled beaches.	- Oiled beaches are initially allowed to naturally purge themselves
July 5	
- S.S. Glacier Bay completed unloading and departed for Homer for an inspection of hull plates; temporary repairs made.	- CIRO resources no longer used by the owner of the S.S. Glacier Bay; oil spill equipment kept onhand in Homer during S.S. Glacier Bay visit.
- Oil recovery operations continued using CIRO's ODI skimmer; 8000 gallons of oil and water recovered to date. Emulsification of the spill and both thickening of the oil and clogging with debris made recovery difficult.	- Overflights continue to locate oil and direct response efforts.
	- FOSC briefed fishing industry representatives on the status of cleanup efforts.
July 6	
- Oil came ashore on west side of Cook Inlet at Cannery Creek, additional recoverable oil sighted off Kalgin Island.	- ADEC conducted beach surveys on Kalgin Island; monitored sensitive areas on the west side of Cook Inlet for possible impact.
	- Additional protective booming deployed.
- CIRO advised FOSC that it will no longer be responding to the spill because the discharge was from a non-CIRO member and vessel was no longer at the members facility. Owner of S.S. Glacier Bay continued to employ contractors to help with clean-up.	- Owner, operator, and FOSC move their operation to the Coast Guard MSD Kenai office.

Spill Event	Response Measures
July 7	
- Overflights continued to locate extensive oil slicks; oil reported near Homer but not verified.	-15 man cleanup crew deployed to Drift River to clean up beaches, and beach cleanup operations continued at East Forelands.
- Oil concentrated in tidal rips along with debris, complicating recovery efforts.	- Several thousand feet of coast Guard containment Boom brought in to Kenai; ASI Wallosep Skimmer deployed from fishing vessel, clogged with debris and was ineffective.
July 8	
- S.S. Glacier Bay departed Homer for repairs in Korea.	- Cleanup activities at Drift River recovered 142 barrels of oii and debris with additional cleanup required.
- ADEC estimated that 3100 barrels (129,1 62 gallons) of oil are unaccounted for based on unloading statistics and presumed spilled; spill was upgraded to major oil spill.	- Beach cleanup continued at East Forelands and Kalgin Island.
- At 3:18 PM FOSC ruled that adequate action to recover oil was not being taken by the spiller, and FOSC assumed federal responsibility for the clean up, as provided for in regulations.	- Federal Pollution Revolving fund activated and used to hire Unitech as contractor and CIRO as subcontractor, and to hire additional vessels, response personnel, and procure additional equipment. - Additional Coast Guard and NOAA personnel provided and additional Pacific Strike Team personnel called in to assist.
W	
- Patches of oil sighted at Kalgin Island.	- Oil encircled with containment boom; recovery begun and oil and debris in booms tended by support vesseis until additional recovery resources available,
- Significant amounts of oil sighted in northern sections of Cook Inlet.	- ADF&G canceled July 10 drift net fishery opening north of Redoubt Point, - Arrangements made to establish a fishing vessel cleanup station upon the opening of commercial drift fishing. - Marco Class V skimmer arrives by tug from Valdez. - FOSC briefs RRT assembled in Anchorage,

Spill Event	Response Measure
July 10-11	
· Salmon drift net fishery closed in Central District north of Redoubt Point; set net fishery closed along north shore of Kalgin Island.	- CG Cutter Sedae positioned in Cook Inlet for coordination of open water recovery operations. 1$ commercial vessels are under its control, including landing craft, offshore supply vessels, fishing boats and tenders, self-propelled skimmers and support skiffs.
- Oil recovery operations hampered by strong currents, turbulent sea state and oil disappearing underneath the water surface after being encircled by booms.	open water operations include booming sighted concentrations of oil, and dispatching vessels with backhoes or bailers mounted on them to recover oil and debris. Total response personnel increased to 43 CG, 55 contractor and ADEC and ADFG representatives. 11,800 feet of containment boom staged for deployment.
- Commercial drift net fishery opened south of Redoubt Point on evening of duly 10. Very few reports of oil sightings are made by the 600 vessel fleet.	- One vessel turned in a tote of 100 contaminated fish to the fishing vessel cleanup station.
July 12	
	- ADFG conducted test fishery north of Kalgin Island to determine extent of oil contamination; no oiled nets or fish experienced.
	- ADFG issued emergency order closing commercial salmon fishing with gillnets in Cook Inlet north of the southern tip of Kalgin Island for July 13 due to oil concentrations.
July 13	
- Extreme spring tides and prevailing winds force oil further north away from migrating salmon. Oil observed to disappear under water surface.	- Open water and beach cleanup continued with number of commercial vessels under contract increased to 21. Open water cleanup method modified towards immediate recovery of oil rather than booming for later recovery.
- Salmon drift net fishery closed in Central District north of southern tip of Kalgin Island; Commercial drift net fishery opened south of Point Redoubt, with few sitings of oil and no contaminated fish brought to the vessel cleanup station.	- Broadcasts made to fishing fleet to report sightings of oil or contamination. - ADFG Issued emergency order closing commercial salmon fishing with set gillnets 4.5 miles north of the Kasilof River for July 14.

Spill Event	Response Measure
July 14	
- Increasingly limited amounts of oil recovered from open waters. - Commercial salmon fishing with set gillnets closed 4.5 miles north of the Kasilof River, Salmon openings conducted outside areas of persistence of oil are conducted from 7 AM to 7 PM, with little impact on drift net fleet. - New reports of oiled beaches and nets are received in the evening of July 14. - Owner of S.S. Glacier Bay published TAPS claims procedures in local newspapers; $100 million available.	- FOSC, NOAA, ADEC, ADFG, CGC Sedge, Pacific Strike Team, and contractors and owners representatives made decision to phase down response effort by the Coast Guard.
July 15	
- 35,000 lbs of fish detained by DEC at canneries due to potential contamination. - Drift River cleanup activity completed: 265 barrels of oil and debris collected for disposal.	- Delay in reduction in response activities due to oiling reports from the previous evening. - Beach patrols conducted to locate oil contamination and talk to fishermen about spill impacts. - S.S. Glacier Bay owners agreed to reassume cleanup responsibility starting July 16. Phase down of activities were discussed. - Ail response vessels called into port for cleanup and to implement the phasedown of the spill response. - FOSC, owner representative, and ADFG and ADEC hold public meeting with 100 fishermen to discuss the spill response, phase down and future plans.
July 16	
- Reports of oiled nets continue to be received; 200 nets reported fouled to date. - Commercial drift net fishing opened in area of the initial spill with no problems encountered.	- Commenced cleaning the hulls of response vessels and cleaning booms.

Spill Event	Response Measure
July 17	
-25,000 lbs of contaminated fish collected by ADEC at fish processors and disposed.. . . ...4- of at sea. Six oiled nets and 11 contaminated fish received at fishing vessel cleanup/recovery stations.	- Overflights of impacted areas continued with less and less oil sighted.
- Standard Alaska Production Company, charterer of S.S. Glacier Bay, became member of CIRO.	
July 18	
- Repeated oil fouling north of KPL pier investigated.	- KPL notified and they assume cleanup responsibility for this source.
	- Cleanup crew dispatched to east shore of Cook Inlet; scattered tar balls sighted and recovered; minimal fouling observed.
	· Meeting held with FOSC, owner representatives, and representative of, East Shore Set Net Association to discuss claims procedures and fishermen claims.
July 19	
	- Beach and open water operations secured due to absence of reported oil sightings; aerial and beach reconnaissance were continued to locate any additional oil pollution.
July 20	
- Commercial drift and set net fisheries opened; some oil-fouled nets were reported and contaminated fish were received from 9 vessels.	- Vesseis reporting gear contamination were met by claims adjusters when they arrived at port.
- Beach patrols sighted concentrations of tar bails at Clam Gulch.	- cleanup crews dispatched to the area to effect cleanup.
- Fishermen report a mass detected by electronic fish finders approximately 9 feet below the waters surface.	- NOAA was requested to conduct a survey to locate the submerged mass and determine what it was comprised of.
July 21	
	- NOAA conducts survey for submerged oil by towing a plankton net through the water and taking subsurface water samples; no oil was detected during the survey.
	- NOAA survey vessel Fairweather arrives off Kenai to commence survey for the submerged object reported and allegedly struck by the S.S. Glacier Bay.
- Aerial and beach patrols conducted with no oil located on beaches or the water.	- Remainder of the Pacific Strike Team personnei released from the oil spill response.

Spill Event	Response Action
July 22-24	
- Meeting held between S.S, Glacier Bav owner representatives and Coast Guard to discuss future spill response plans.	- Agreement that open water recovery was no longer effective and future efforts should be directed towards beach cleanup.
	- Response vessels and containment boom cleaned by response contractors as part of demobiiization.
Tar balls reported to be washing ashore at Kalgin island.	- Response crews sent to Kalgin Island to recover tar balls.
	- Overflights continued with no sightings of oii.
July 25-27	
- NOAA survey vessel Fairweather located uncharted large boulder suspected of being the object reported by the S.S. Glacier Bay.	
- Additional beach fouling reported at Ciam Gulch.	- Beach cleanup crews deployed to the Ciam Gulch area.
- Overflights located traces of oil which are deemed unrecoverable.	
	- Recovered oil and debris consolidated at Nikiski for final transportation to a waste staging site.
July 28-August 6	
- Final demobilization of cleanup activities and response equipment effected.	- Meeting heid with S.S. Glacier Bay owner representatives and FOSC to discuss further phasedown of response operations; owners agreed to make several weekiy overflights with a representative of the Coast Guard or ADEC aboard.
	- Response crews decreased in numbers and maintained on standby to respond to reports of pollution.
August 15	
- Response crew released from cleanup duties.	

3.0 DATA COLLECTION,

3.1 Objectives

The objective of the data collection effort was to collect data in a systematic way that ensured as complete a data set as possible. The study team undertook the following steps to fulfill this goal:

- o identified groups (e.g., commercial fishermen) and subgroups (e.g., drift gillnet fishermen) that were affected by the S.S. Glacier Bay oil spill;
- o identified the types of economic impacts the spill had on each group;
- o identified data gaps in the available information for each group;
- o developed key informant protocols for each group to use during subsequent data collection interviews;
- o conducted key informant interviews with representatives of each subgroup.

3.2 Methodology

The study team accomplished the first three tasks listed above through a review of the available literature about the spill. The groups and subgroups affected by the S.S. Glacier Bay oil spill, the types of economic impacts the spill had on each group, and gaps in the available information regarding the spill were all identified through the literature review.

Based on data gaps identified during the literature review, the study team compiled a list of data needed from each group and subgroup affected by the spill. Using this list, key informant interview protocols were developed. (See Appendix C for the list of data needed from each group and subgroup and the protocols for each group and subgroup.)

3.2.1 Petroleum and Transportation Industries

The literature review identified minimal information on direct expenditures and costs incurred by the petroleum industry and related organizations involved in the spill. The FOSC'S report and other public documents did provide information on invoice amounts for cleanup contractors and others directly employed by federal and state agencies. In addition, these documents contained names of organizations and key individuals which provided the starting point for contacting spill participants in this category. Initial telephone calls were made to the persons identified in the documents, or the receptionist was asked for a person who could provide information about the organization's role in the S.S. Glacier Bay spill. Personal interviews were attempted with individuals whose firms had significant roles in the spill or cleanup and response efforts. Telephone interviews were conducted for firms with smaller roles in the event, and for those individuals who did not wish to schedule personal interviews. One firm asked for a written request from MMS. The study team contacted representatives for the vessel owner, four petroleum firms, three pipeline companies, and four cleanup contractors.

3.2.1.1 Cleanup Vessels

The 21 vessels used in the S.S. Glacier Bay pollution incident were listed in the U.S. Coast Guard Federal On Scene Coordinator (FOSC) report. To identify the owners of the vessels, the study team contacted the U.S. Coast Guard Vessel Identification office in Juneau, however the information provided in the FOSC report (vessel name, type, and length) was not sufficient for that office to make a positive identification. The study team then telephoned the Homer harbor master who was able to identify the owners of 15 of the 21 vessels. The Homer harbor master also provided either a telephone number or the city of residence of each of the 15 vessel owners. Ten of the vessel owners were successfully contacted and interviewed by telephone. Of the ten vessel owners successfully contacted, two provided only partial information. The study team was not able to contact the remaining five vessel owners identified by the Homer harbor master. The data base for cleanup vessels consists of eight completed key informant interviews.

3.2.1.2 Other

During the literature review, three companies were identified that were involved in the oil spill and response but did not fit into any of the categories of involvement defined by the study team. All three companies were contacted by telephone, two refused to participate due to pending litigation regarding the spill and the third was unavailable for comment.

3.2.2 Government

The purpose of collecting data from federal, state, and local government agencies was to determine their role in response and clean-up activities associated with the S.S. Glacier Bay spill, and the economic costs that they experienced. A significant amount of information was collected during the literature review from agency publications related to the spill, or gathered during initial contacts with agencies. From these sources, a list of key informants was prepared for the following agencies:

Federal	State	Local
U.S. Coast Guard	Dept. of Environmental Conservation	Kenai Peninsula Borough
National Marine Fisheries Service	Dept. of Fish and Game	
U.S. Fish and Wildlife Service	Dept. of Natural Resources	
Environmental Protection Agency	Attorney General's Office	

Protocols were then developed to help confirm or update the information collected during the literature review, or obtain such information where it was not available in the literature. Representatives from each of the agencies listed above were contacted and interviewed using the protocol. There were four general categories of response from the representatives:

- the information available from the literature review was the most current and accurate information;
- additional or more current information was provided;
- the agency indicated that they were not involved in response to the S.S. Glacier Bay spill and therefore had no expenditures; or
- pending litigation made it difficult to provide information at this time.

3.2.3 **Commercial Fishing**

3.2.3.1 Set Net Fishery

The study team identified potential key informants for the set net fishery through a printout of Cook Inlet setnet fishermen who have shore fishery leases issued by the Alaska Department of Natural Resources. The report lists the names and address of persons holding shore fishery leases and the township and range of lease locations. Using the township and range coordinates, the study team identified the approximate map location of each set net site. Through agency reports and newspaper articles, the

study team identified geographic locations that were likely impacted by the oil spill and began contacting fishermen whose set net sites are at or near those areas. After each key informant interview was completed, an 'X' was marked at the location of the fish site on a 1:250,000 topographical map. When each area previously thought to be impacted by the oil was adequately covered on the map, the study team then focused attention on the remaining areas of Cook Inlet. Interviews were conducted until all of the areas within the possible scope of the oil spill were addressed. The area covered during interviews with set net fishermen reaches approximately from a line between Silver Salmon Creek and Ninilchik, north to a line between Tyonek and Pt. Possession (see Figure 3-l).

Key informant interviews were initially conducted in person after a study team member telephoned and made appointments with individual fishermen. Six interviews were conducted in person with fishermen in Soldotna and 12 by telephone during a three day fieldwork session. During the fieldwork session most fishermen contacted preferred to be interviewed over the telephone rather than make an appointment to meet in person. The study team conducted the remainder of the commercial fishing interviews, which took an average of 15 to 25 minutes to complete, by telephone from Anchorage. In each case, the fisherman was asked if he or she preferred to meet in person or conduct the interview over the telephone. Most interviews were conducted with only one family or crew member, however several required interviews with two or three different people to obtain all of the needed information for one site. A total of 58 set net fishermen were contacted; five of these fishermen refused to participate in the study because of pending litigation concerning the Glacier Bay spill. The data base for the set net fishery is 53 completed key informant interviews.

3.2.3.2 Drift Net Fishery

Key informants for the drift net fishery were identified through an initial list of eight fishermen given to the study team by a UCIDA member. During the interviews with the initial contacts other key informants were identified. The majority of these interviews, which took an average of 15 to 20 minutes to complete, were also conducted over the telephone. All of the interviews were conducted with the captain of the fishing vessel who in most cases was also the owner of the boat. Interviews were conducted with drift net fishermen until distinct patterns emerged in their responses. A total of 29 drift fishermen were contacted; of these three fishermen refused to participate due to pending litigation concerning the Glacier Bay spill. The data base for the drift net fishery is 26 completed key informant interviews. The number of drift fishermen contacted is less than set net fishermen because drift fishermen were generally exposed to similar spill conditions and fewer interviews were required to establish the range of impacts.

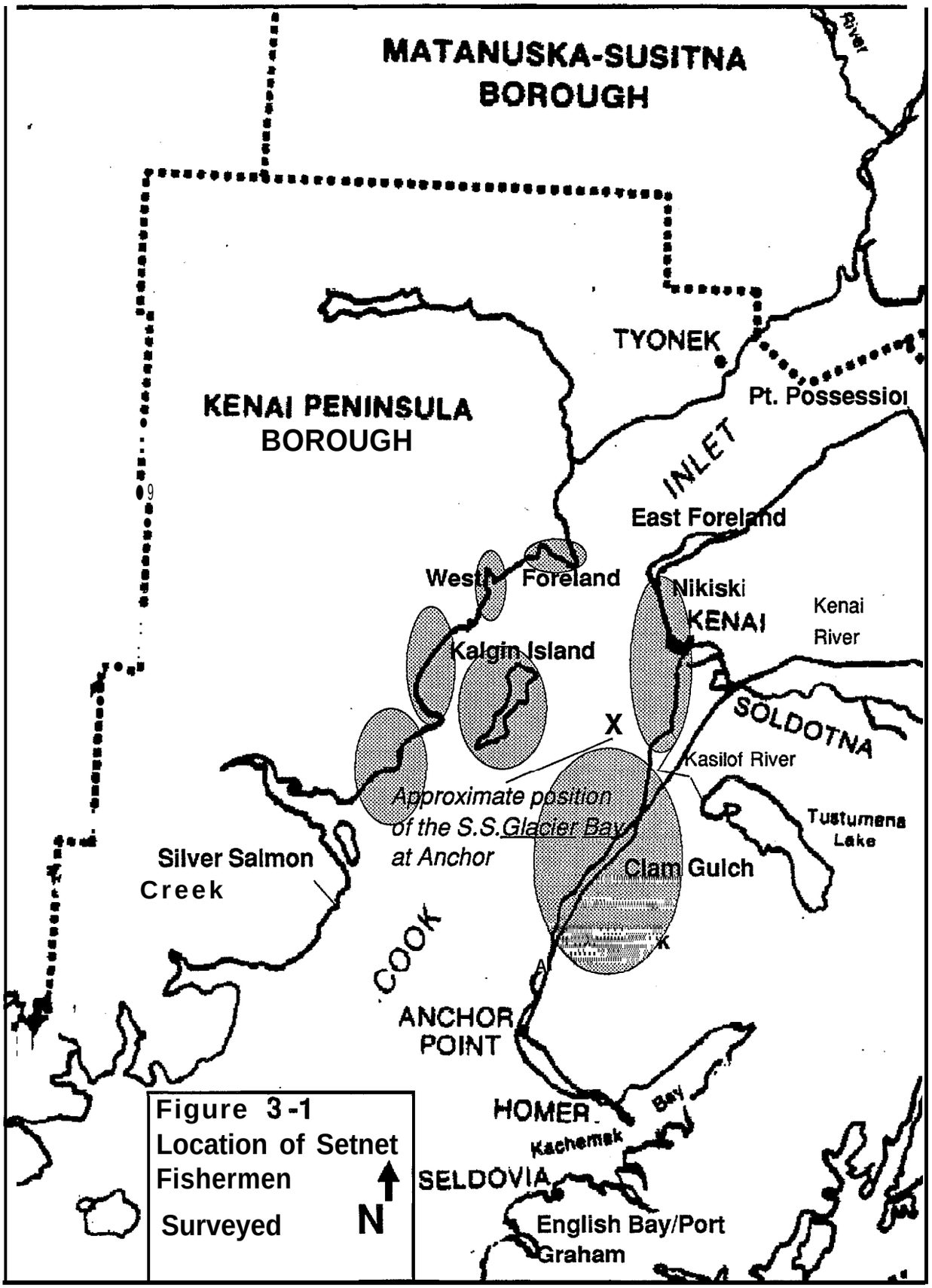


Figure 3-1
Location of Setnet
Fishermen
Surveyed

3.2.3.3 Fish Processors

The study team compiled a list of 15 fish processing companies from ADF&G Intent to Process computer files for 1987, augmented with the study team's local knowledge and key industry contacts. Attempts were made to contact all 15 companies to ensure complete coverage of oil spill impacts on the processing sector. The study team was successful in obtaining information from six. Six other companies have ongoing litigation from the oil spill and were unable to provide information. Two companies were not responsive to attempts to contact them to discuss the spill impacts, and one company was no longer in business.

3.2,4 **Recreation and Sports Fishing**

Initial discussions with the Alaska Department of Fish and Game suggested there were few if any impacts to individual sports fishermen. Resources were not available to attempt contacting the thousands of sports fishermen who participated in 1987 so the study team contacted sport fishing organizations.

The sport fishing organizations contacted typically deal with issues of importance to their members, including fishery habitat, management, and education. Although there are thousands of Southcentral Alaska sport fishermen who do not belong to these organizations, such organizations are useful to assess the importance of impacts from an event having a low incidence of occurrence such as the oil spill because their members tend to be active and concerned about issues and the organizations are kept informed by the membership.

The study team compiled lists and contact individuals for associations that represent sport fishermen, guides and charter boat businesses from the literature review and previous research. Representatives from the different sport fishing associations were contacted in person or by telephone to ask about impacts to their members from the S.S. Glacier Bay spill.

3.2.5 **Subsistence Fisheries**

Through discussions with ADF&G subsistence division personnel, the study team identified the initial key informants for the subsistence fisheries as the village council presidents from the three villages whose subsistence fisheries were potentially affected by the spill: Port Graham, English Bay, and Tyonek. The three village council presidents were first contacted through a letter which introduced the study and asked them to discuss the potential impacts of the S.S. Glacier Bay spill with the active subsistence fishermen in their village. Approximately one month after receipt of the letter, all three village council presidents were successfully contacted by telephone. No other

subsistence fishery key informants were contacted because ADF&G subsistence division personnel, the three village council presidents, and representatives of the North Pacific. Rim, the regional non-profit Native association for Port Graham and English Bay, agreed there were no impacts to the subsistence fishery.

3.2.6 **Personal Use Fishery**

In 1987, four salmon personal use fisheries occurred on the Kenai Peninsula north of Kachemak Bay:

- Set gill net fishery at the mouth of Kasilof River, June 21- 27;
- Kasilof River dipnet fishery, 'July 10 to August 5;
- Kenai River dipnet fishery, July 23 to August 5; and
- set gillnet fishery in the Central and Northern districts (on the east shore from the Kasilof River to Point Possession) during the last three weekends in September.

Of the four fisheries, the latter three were determined potentially vulnerable to impacts from the oil spill due to the date of their occurrence. The set net fishery at the mouth of the Kasilof River was open before the spill occurred.

The spill had some degree of impact on personal use dip net fisheries in the Kenai and Kasilof Rivers. Oil from the S.S. Glacier Bay hit the beaches near and at the mouths of both rivers, causing an emergency closure of the dip net fishery in the Kasilof River for one 24 hour period due to possible oil contamination. The lack of information concerning the impact of the spill on the subsistence and personal use fisheries prompted the study team to ask ADF&G subsistence and sport fish divisions for names of people who were actively involved in those fisheries during the 1987 season. In order to check initial findings, two of these people were contacted. According to both informants the only impact the S.S. Glacier Bay oil spill had on the four personal use fisheries in the area was the one 24 hour emergency closure in the Kasilof River. Neither informant had enough knowledge of the Cook Inlet subsistence fisheries to be able to accurately confirm or refute ADF&G findings.

The September set net fishery was the only one of the three remaining fisheries that required a personal use permit. Participants in the two dipnet fisheries were only required to have a sport fishing permit. Locating the dipnet participants from among the thousands of sport fishing permit holders was not feasible. Therefore, the approach taken to obtain a sample of personal use fishery participants was to target permit holders from the September 1987 east shore personal use fishery. The ADF&G Division of Sport Fisheries in Soldotna randomly selected 100 names from the 300-plus 1987 personal use

permit holders. The study team located phone numbers for as many people on the list as possible and conducted the key informant interviews by telephone. . . . . .

Possible phone numbers were found for approximately 72 of the names on the list of 100. About 45 phone numbers were called, resulting in 17 successful interviews with people who fished their permits in 1987. (The remaining numbers were disconnected, no answer each time tried, not the correct number for the person in question, refusal, or the person obtained a permit but did not participate in any of the 1987 personal use fisheries.) The study team considered the 17 successful interviews adequate and did not attempt additional interviews because responses consistently indicated there were no impacts.

4.0 ECONOMIC IMPACT OF SPILL

4.1 Objectives

As stated previously, the purpose of this study is to document and establish the economic costs and benefits that occurred from the S.S. Glacier Bay oil spill. These costs and benefits can be used by MMS in 1) evaluating the potential effects of oil spills during the preparation of environmental assessments associated with the oil and gas leasing program, and 2) instituting appropriate requirements on permits for exploration and development activities on federal leases, regarding spill prevention, response, and documentation of response activities and costs. This study is not intended to be a definitive analysis of all costs and benefits; rather it is intended to provide MMS with a description of the nature of and general range of costs and benefits associated with the S.S. Glacier Bay spill.

The economic costs evaluated by this study generally tend to be expenditures by various parties participating in spill response or affected by the spill, or losses suffered from the effects of the spill. Although benefits are generally not considered when discussing oil spills, certain expenditures tend to offset losses at the local level. For example, some people may be put out of work because of fishery closures and other actions, but others may gain employment as they and their equipment are hired to work in the cleanup effort. This study defines expenditures made within the Municipality of Anchorage and the Kenai Peninsula Borough as contributions or benefits to the southcentral Alaska economy.

4.2 General Methodology

Several groups were known or anticipated to have been impacted by the S.S. Glacier Bay oil spill. These major categories are defined as:

- Industry
- Government
- Commercial Fishing
- Sport Fishing
- Subsistence

Within each of the groups, the study team anticipated data collection through key informant interviews as well as the collection of information that had been published or accumulated by the various agencies dealing with the spill. Data collected in each of the categories are aggregated and summed within the framework of a spreadsheet model to provide an overview of the impacts.

The general approach to estimating impacts in this report is to monetarily define the amounts spent or received as a measure of impacts. Figure 4-1 shows how costs and benefits are determined in this report. Compensation by the petroleum industry, losses, expenditures internal to the participant, and expenditures outside of the region comprise the cost component of the model. Expenditures within the region that would not have occurred in the absence of the spill represent the benefit side of the model.

It is important to recognize that this expenditures approach does not provide an exact estimate of impacts or statistically valid measures. This is beyond the required scope of work and can not be obtained by key informant interviews. In addition, concerns with ongoing litigation inhibited participation by major spill participants which affect the accuracy of the results.

4.3 Assumptions and Limitations

A number of assumptions and limitations are employed in this economic analysis. These are:

- costs include those associated with the spill event, response actions taken, and losses from the spill; it does not evaluate costs associated with litigation;

- the period of costs and benefits covered by this analysis generally extends from the date of the spill on July 2, 1987 through cessation of clean-up activities on August 15, 1987;

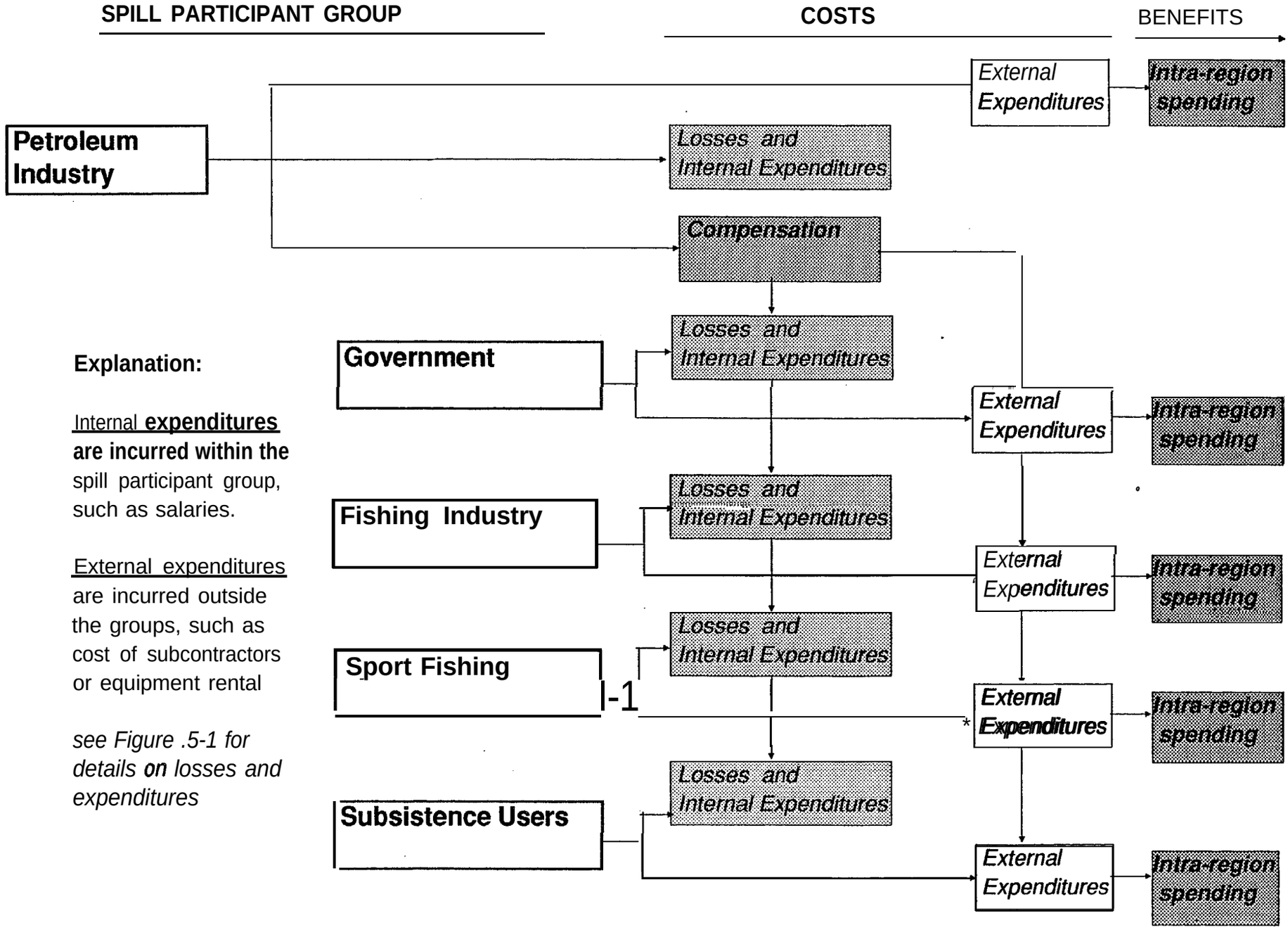
- When widely varying impact estimates are provided by several sources a range of costs and benefits is presented;

- ongoing litigation has had a significant effect on the willingness of several key parties to share information on expenditures and losses; as a result many portions of the economic analysis are incomplete;

- budget and scope limit the amount of detail on evaluating costs and benefits; the intent is to provide a range of costs; and

- oil spills are unique, and the results of this analysis will have limits in application to other spills (e.g., the location, timing and volume of the spill resulted in limited impacts to recreational and subsistence resources which could be significant impacts in other spill events).

Figure 4-1 Relationship of Spill Costs Benefits, and Compensation



Explanation:

Internal **expenditures** **are incurred within the** spill participant group, such as salaries.

External expenditures are incurred outside the groups, such as cost of subcontractors or equipment rental

see Figure .5-1 for details on losses and expenditures

There are a number of other factors this report does not address. The scope of work stated that the study is not to address the value of subsistence products and recreation goods lost or foregone because of the complexity and lack of agreement about the value of subsistence products and recreation visitor day. This report also does not address potential losses under Natural Resource Damage Assessment rules (Section 301 [c] of the Comprehensive Environmental Response, Compensation, and Liability Act [CERCLA]).

In addition, the report does not address liability of any party for costs of the oil spill or legal costs incurred. It also does not identify parties to ongoing litigation. Parties may be liable under litigation rules but if they were not major participants in the spill event or response and cleanup efforts they are not discussed in this study.

4.4 Petroleum Industry

The petroleum industry has operated in Cook Inlet since discovery of the Swanson River oil field on the Kenai Peninsula in 1957. Subsequent exploration activities led to development of several onshore gas fields on the Kenai Peninsula, and offshore fields (predominantly oil) in Cook Inlet.

Development of these fields led to construction of the Chevron refinery at Nikiski in 1962, the first refinery in the State of Alaska, and construction of three other petroleum related plants at Nikiski in 1969. These latter facilities included the Tesoro refinery, the Phillips-Marathon liquefied natural gas (LNG) plant, and the Union Chemical ammonia-urea plant. Other facilities were built at Drift River and other locations on the west side of Cook Inlet. The petroleum industry became the industrial base for growth in a number of related industrial sectors. Petroleum related businesses are an important part of the present economic base on the Kenai Peninsula.

The refineries were built to supply products to markets within the state although some specialty products and residual oils are shipped by tanker from Nikiski to the lower 48 or foreign countries. Product from the LNG plant is exported to Japan and product from the ammonia-urea plant is exported to the lower 48 and foreign countries.

Production from Cook Inlet oil fields declined substantially by the late 1970s and in 1981 Chevron modified their equipment to handle North Slope crude in order to maintain production levels. Tesoro followed with expansion and modification of their refinery in 1985. North Slope crude is shipped via tankers from Valdez to Nikiski to supply both refineries.

Shipment of petroleum in Cook Inlet has increased since 1981 when the refineries became destinations for crude oil in addition to their previous role as originators of refined product movements. Competitive pressures in the southcentral Alaska market from newer refineries in Interior Alaska (MAPCO and Petro Star) have resulted in Tesoro substantially increasing its exports from Nikiski to western and southeast Alaska. MAPCO also entered this market in 1987 with barge shipments from Anchorage to western Alaska.

The S.S. Glacier Bay was one of many tankers and petroleum barges which annually transited Cook Inlet enroute to Nikiski, Drift River, or Anchorage. The vessel is a 81,000 deadweight ton tanker, 774 feet in length. At the time of the spill, the vessel was under charter to SPC Shipping (a subsidiary of Standard Oil Company of Ohio) and was transporting 380,000 barrels of North Slope crude oil from the Valdez terminal of Alyeska Pipeline Company to offloading facilities of Kenai Pipeline Company (KPL) at Nikiski. From there, KPL would ship the oil to Tesoro Alaska Petroleum Company's nearby refinery. Early in the morning of July 2, 1987 another vessel was occupying the berth where the S.S. Glacier Bay was to unload so it anchored on the east side of Cook Inlet. Shortly after anchoring at 3:23 A.M. the crew experienced a jolt, and the master of the vessel notified the U.S. Coast Guard at 3:30 A.M. that the vessel was in danger and leaking oil.

With these events began the response and cleanup efforts for the first major oil spill in Cook Inlet. The event was also the largest crude oil spill in the state until the S.S. Exxon Valdez spill in 1989.

4.4.1 **Contacts**

The S.S. Glacier Bay oil spill has resulted in a number of law suits involving most of the key participants. As a result, many organizations are reluctant to discuss any aspect of the spill for fear it may adversely affect their position regarding ongoing litigation. In addition, other firms are reticent to discuss the spill since comments may adversely affect existing or potential clients, and jeopardize business relationships.

Table 4.1 shows the oil and transportation industry firms contacted for this study, and the current status of information requests. Some firms provided part of the requested information but declined to answer all of the questions due to litigation surrounding the spill. These firms are classified as responding to the information request.

Table 4.1: Petroleum Companies and Related Organizations Contacted

Firm	Information Received?
Alaska Clean Seas	Yes
Alyeska Pipeline Service Company	Yes
ARCO Alaska, Inc.	Yes
Besse, Epps, and Potts	No
BP Exploration (Alaska), Inc. (as representative for Standard Alaska Production Company and SPC Shipping)	No
Bradbury, Bliss and Riordan (as representative for S.S. Glacier Bay and related firms, and their insurers)	Yes
Cook Inlet Pipeline Company	Yes
Cook Inlet Response Organization	Yes
Marathon Oil Company	No
SGS Control Services	No
Spiltech, Inc.	No
Tesoro Alaska Petroleum Company (and as representative for Kenai Pipeline Company)	No
Underwater Construction Company	No
Unitech of Alaska	Yes
Wade Oil Field Service	Yes

4.4.2 **Methodology**

The methodology used for petroleum companies and related organizations is relatively simple in approach and assumes that summation of expenditures and employment during the July 2, 1987 through August 15, 1987 time period portray the direct economic effects of the S.S. Glacier Bay oil spill. Final expenditures made within the study area (the Kenai Peninsula Borough and the Municipality of Anchorage) represent benefits to the study area economy and the balance of the expenditures represent costs. This methodology follows the approach shown in Figure 4-1. More specific information on calculating losses, expenditures, and compensation for the petroleum industry is shown in Figure 4-2.

Figure 4-2 Model Of Oil Spill Expenditures, Estimation And Records

Industry/expenditure-loss Category	Basis for Estimating/Record Requirements
Petroleum Industry	
Losses .value of oil spilled	Losses .*volume of oil lost X $ price of oil*
Expenditures Internal: .employee wages External: . response clean-up contractors . supply/equipment purchase .vessel/aircraft/equipment rental	Expenditures .*wage X hours worked/ timesheets* . *sum of direct costs/invoices* . *sum of direct costs/invoices* .*sum of direct costs/invoices*
Compensation .Fishing Industry - gear replacement . Fishing Industry- contaminated fish . Fishing Industry- lost fishing time .Government- Salaries . Government- Subcontractors .Government- equipment purchase .Government - equipment rental . Sport fishing - gear replacement . Sport fishing - contaminated fish . Sport fishing - lost fishing time . Subsistence - gear replacement .Subsistence-contaminated harvest	Compensation . *Fishing Industry - input from summary of losses and expenditures from fishing industry model* . *Government - input from summary of losses and expenditures from government model* . *Sport Fishing - input from summary o losses and expenditures from sport fishing model* . *Subsistence - input from summary of losses and expenditures from subsistence model*

Information on the amount and location of expenditures and employment obtained in the data'collection effort is presented in the text and summarized in a table for each category of spill participants. The expenditures are listed as those available from Task 1 data collection or other public information which has become available since that time and those obtained from discussions with the participant or other organizations involved in the spill event.

4.4.3 Costs and Benefits

4.4.3.1 S. S. Glacier Bay and Related Firms

As described in Section 2.2, there area number of corporate linkages regarding ownership and operation of the S.S. Glacier Bay. This report does not attempt to discern the monetary flows between the corporate related entities, or the insurance companies since such detail is not necessary to evaluate the effects of the spill. Expenditures referenced in this subsection as made for or by the vessel may have been made by or on behalf of one of the related firms, or their insurers, but no distinction is made here.

Costs incurred by the S.S. Glacier Bay primarily involved those of (1) repairing the damage done while grounding in eastern Cook Inlet, (2) lost revenues while being repaired, (3) payments or claims for damages due to the oil spill, and (4) costs for cleanup and response activities originated by the vessel and related firms.

No public information is available on the cost of temporary or permanent repairs, or on lost charter revenues during the repair period.

The vessel and related firms incurred costs for cleanup and response efforts. Information provided by Bradbury, Bliss & Riordan, representatives for the S.S. Glacier Bay , related firms, and certain insurers, states that Trinidad spent $615,661 on oil spill cleanup activities. Trinidad also paid $1,492,298 to fishermen for contaminated nets and gear, and $173,913 to fishermen and processors for contaminated fish (Wooden, 1990).

The U.S. Coast Guard (USCG) and other federal and state agencies have submitted claims to the vessel for cleanup activities and response efforts during the time the U.S. Coast Guard managed the cleanup. These amounts are the subject of litigation and the actual amount which will be paid by the vessel is uncertain. However, existing data (U.S. Bankruptcy Court, 1990) show the USCG has filed a claim against Apex Oil in the amount of $1.9 million for costs of cleanup, and Trinidad acknowledges a claim for $1,936,020 (Woodell, *1990).* The vessel's insurer has agreed to pay $1.5 million. The remainder may be the subject of litigation. Details on the amount claimed by the USCG are provided in section 4.5.

The U.S. Departments of Commerce and Interior also submitted claims in the amount of $399,000 for costs incurred in cleaning up the spill. Underwater Construction, Inc. also has a claim against Glacier Bay Transportation Company for $22,650.54 (U.S. Bankruptcy Court, 1990). These amounts are not shown as expenditures since the vessel and related firms have not paid the claim or agreed to do so. They are included as expenditures for the claimant organizations.

SPC Shipping is listed as a creditor in the amount of $18,390 for Glacier Bay Transportation Company, but the bankruptcy court document does not indicate the nature of the claim. The document also lists claims against Apex Oil Company of $137,135.93 by Marathon Petroleum Company, $110,561.31 by Marathon Pipe Line Company, and $3,325 by Standard Oil Production Company. These companies operate in Cook Inlet but it is not known if these claims are related to the S.S. Glacier Bay oil spill.

Table 4-2: Expenditures, Costs, & Benefits for S.S. Glacier Bay & Related Firms

Organization	Expenditures: Public Data	Expenditures: Other Sources	costs	Benefits
S.S. Glacier Bay and related firms	$1,500,000	$4,217,892a	b	b

a) Includes $1.5 million shown in public data.
b) Distribution unknown.

4.4.3.2 Petroleum Companies

Standard Alaska Production Company and SPC Shipping

At the time of the spill, the S.S. Glacier Bay was under long-term charter to SPC Shipping, a subsidiary of Standard Oil Company of Ohio (SOHIO). The Bankruptcy court claim of $18,390 against the Glacier Bay Transportation Company by SPC Shipping and a claim in the amount of $3,325 by Standard Oil Production Company are assumed to be an expenditure or cost incurred related to the spill.

Tesoro Alaska Petroleum Company

The crude oil being transported by the S.S. Glacier Bay was owned by Tesoro Alaska Petroleum Company. Costs incurred by Tesoro include the crude oil that leaked from

the vessel, and costs associated with the firm's role as the CIRO member initiating the response effort. Expenditures related to cleanup activities are unknown.

The FOSC'S report provides several estimates for the volume of crude oil lost from the vessel. These estimates range from 3,780 to 4,942 barrels. According to Alaska Department of Revenue (ADOR) publications (Alaska Department of Revenue, 1990) and information from ADOR staff (Rogers, 1990), the 1987 average annual price of crude oil at Valdez was $14.81 per barrel. The cost of tanker transportation from Valdez to Nikiski under long term charter is unknown, but would likely range from one-third to one-half of the cost for transport to the west coast of the U.S. This would indicate a delivered price in Nikiski of $15.26 to $15.56 per barrel in 1987. This price is assumed to be representative of the cost of the crude oil purchased by Tesoro. Applying these price estimates to the lost volume of oil results in costs of $57,683 to $76,898.

Table 4-3 shows expenditures and the distribution between costs and benefits for those expenditures made by petroleum companies involved in the S.S. Glacier Bay oil spill. information has not been received from Tesoro Alaska Petroleum Company, Kenai Pipeline Company, or Marathon Oil Company.

Table 4-3: Expenditures, Costs, & Benefits for Petroleum Companies

	Expenditures			
Organization	Public Data	Other Sources	costs	Benefits
Standard Alaska Prod. Co.	$3,325	a	b	b
SPC Shipping	$18,390	a	b	b
Tesoro Alaska Petrol. Co.	$57,683-$76,898	a	$57,683-$76,898	a
ARCO Alaska, Inc.	$0	$0	$0	$0
Marathon Oil Co.	$0	a	a	a
TOTAL	$79,398-$92,288		$57,683-$76,898	

a) Information not received.
b) Distribution unknown.

4.4.3.3 Cleanup Contractors

Several cleanup contractors involved in the spill cleanup have described a situation where decisions were quickly made and actions undertaken in response to the changing dimensions of the spill and pressures from the public for cleanup. In many instances these actions were undertaken by contractors at the verbal direction of the S.S. Glacier Bay representatives or federal agencies, and were beyond the events anticipated in signed purchase orders or contracts. In some cases, changes were made to the documents, or new documents issued to cover costs incurred by the contractors. In other cases, equipment, supplies, and labor costs incurred by contractors to accomplish these verbal directives were not reimbursed. Non-reimbursed expenses ranged from 20 to 30 percent of the total invoice amounts submitted for some organizations. In addition to these losses, contractors also incurred legal fees, and expended substantial management time in attempting to obtain complete payment for their services.

The published information on costs incurred by contractors to the USCG covers only the period from July 8 to July 16, 1987 when the USCG controlled cleanup activities. Information on costs incurred by contractors to the S.S. Glacier Bay and related firms before and after these dates are unknown, although total cleanup expenditures were discussed in Section 4.4.3.1.

Cook Inlet Response Organization

Cook Inlet Response Organization (CIRO) was the first organization to respond to the oil spill, and did so at the request of Tesoro Alaska Petroleum Company, one of CIRO's member firms.

CIRO has two employees, both of whom were involved in the spill. All other CIRO related cleanup workers were supplied by or contracted by member companies. CIRO provided equipment for use by its member firms but did not purchase or rent any additional equipment for the cleanup.

Unitech of Alaska

Unitech of Alaska was the prime contractor to the U.S. Coast Guard for cleanup of the S.S. Glacier Bay spill. The job was acquired as a result of a Basic Ordering Agreement which Unitech had filed with the agency at an earlier date to provide oil spill cleanup services. The company was also employed by Bradbury, Bliss & Riordan before the USCG took over and by O'Brien Oil Pollution Service after the vessel owner resumed cleanup responsibilities.

The company is no longer involved in providing oil spill cleanup services. After the spill, management of the firm elected to focus efforts on sales and distribution of oil and hazardous waste cleanup products and equipment. Management closed the service

business, which was later sold to Martech. As a result of selling the cleanup service business, moving offices several times in the interim, ongoing litigation with various parties, and the effect of the passage of time on memory recall, only general information is available on their role.

The firm employed about 100 people on the cleanup although the numbers employed at any given time are unknown. Four management/office staff were assigned from Anchorage to Kenai for the project, and the balance were local Kenai Peninsula residents, hired principally as field workers, although some temporary clerical staff were employed for periods of time. Wages paid to workers is unknown.

The FOSC's report shows an amount of $934,113.16 for services performed by Unitech. Unitech representatives did not disclose total billings for these services, but did acknowledge there was a difference in the amount billed to the USCG and amount received.

Information was not available on other firms subcontracted to Unitech for spill cleanup, or firms providing supplies and other materials. Recollection of the source of supplies and services was limited to most personnel support supplies and materials (e.g., food and safety equipment) coming from Anchorage, while cleanup supplies and equipment were split between Kenai and Anchorage. Most of the "hardware" came from Anchorage while transportation services (i.e., aircraft, boats, and vehicles) were primarily from Kenai.

Alaska Clean Sea Cooperative (ACSC)
This organization was hired by representatives of the S.S. Glacier Bay after the USCG relinquished control of the cleanup efforts on July 16, 1987, and was released prior to the end of the cleanup effort.

Offshore Systems - Kenai (OSK)
OSK provided various services and equipment during the cleanup effort. The firm was hired on July 7 and provided an average of 14 persons until cleanup ended.

Spiltech, Inc.
This firm was retained by the FOSC as a consultant in the oil spill cleanup efforts. Spiltech did not respond to the information request.

Wade Oilfield Services
Wade Oilfield Services provided 3 supervisors and 9 tol 1 roustabouts on the project from July 4, 1987 until completion of the cleanup efforts. A front-end loader and a crane were rented from the company for the entire time period, and a second front-end loader was rented for part of the cleanup period.

Table 4-4 shows expenditures and distribution between costs, and benefits for cleanup contractors discussed above. One firm provided detailed information on its role in the oil spill with the understanding that this proprietary data would not be disclosed. Information from other firms was less detailed although certain topics were discussed in depth. None of the other firms provided enough detail to estimate total expenditures, or even consider distribution of costs and benefits. To honor the confidentiality request, Table 4-5 aggregates the information from all of the contractors. The total from other sources shown in the table represents information from only one contractor.

Table 4-4: Expenditures, Costs, & Benefits for Cleanup Contractors

	Expenditures			
Organization	Public Data	Other Sources	costs	Benefits
CIRO	$0	a	b	b
Unitech	$934,113	a	b	b
Alaska Clean Seas	$0	a	b	b
Offshore Systems - Kenai	$1,284	a	b	b
Spiltech, Inc.	$9,383	a	b	b
Wade Oilfield Services	$0	a	b	b
TOTAL	$944,780	$137,500	$5,300	$132,200

a) Not available or unknown.
b) Distribution unknown.

4.4.3.4 Cleanup Vessels

M/V Fox River

The M/V Fox River, a 120 foot landing craft, was hired by the U.S. Coast Guard through one of their contractors a few days after the spill. The vessel was responsible for picking up oily cleanup materials from beach crews and for washing oil off other vessels involved in the spill response. During most of the 21 days the M/V Fox River worked on the spill response it was anchored in one place. There were three boat crew members and four cleanup personnel onboard the M/V Fox River.

F/V Cheryl Ann

The F/V Cheryl Ann is a 34 foot fishing vessel that was hired by Unitec approximately two weeks after the spill. The F/V Cheryl Ann worked for four or five days pulling booms around central Cook Inlet.

M/V Miss Piggy

The M/V Miss Piagy is a 52 foot landing craft that was hired the day after the spill by the U.S. Coast Guard through Unitec. The vessel was responsible for hauling oil-soaked debris from beaches and for pulling booms. There were two boat crew members and one or two cleanup personnel onboard. The M/V Miss Piggy worked a total of 10 days.

M/V Pegasus

The M/V Pegasus is a 56 foot landing craft that was hired by the U.S. Coast Guard . through Unitec a few days after the spill. Steamers, tankers and buckets were placed on the vessel and were used to clean oily fishing boats. In addition, the M/V Peaasus was responsible for picking up oil-fouled nets and fish from fishermen. There were three boat crew members and five to seven cleanup personnel onboard. The M/V Pegasus worked a total of 14 days on the response.

M/V Monarch

The M/V Monarch is a 180 foot motor vessel hired by Unitec to carry a backhoe and dumpsters to scoop oil and debris out of the tidal rips. The vessel operated with its regular crew of five plus a backhoe operator provided by Unitech.

M/V Glacier

The M/V Glacier was hired by Unitech a few days after the spill to collect oil and debris out of tidal rips using a backhoe and dumpsters. The M/V Glacier had five crew members plus a backhoe operator hired by Unitech. The vessel was hired four or five days after the spill and worked for three weeks.

M/V Ria Enaineer

The M/V Ria Engineer worked for the U. S. Coast Guard from July 11, 1987 to July 20, 1987. “A crew of six persons operated the M/V Rig Enaineer. No other persons were on board.

F/V North Beach

The F/V North Beach is a 37 foot aluminum crabbing vessel hired by Unitech through the USCG to work on the spill. The vessel had a contract for 10 days and primarily towed booms to trap oil. The vessel operated with two crew members plus two Unitech employees.

M/V Maritime Maid

The M/V Maritime Maid was contracted by Unitech for 5.5 days to house and feed cleanup workers. The vessel operated with four crew members during this period.

Eight of the nine vessels listed above provided useful expenditure data. Several respondents asked that the information be kept confidential. As a result, the data for the vessels are summed and presented in Table 4-5. Most informants were able to recall the total value or daily charter rate, but recall of expenditures for fuel, food, supplies, and crew wages were less clear. All of the vessels were hired from within the study area and, except for the one respondent that did not provide useful data, all crew members resided in local communities. Informants also indicated that supplies were purchased locally. Subsequently, all income received by the vessels is allocated to benefits.

Table 4-5: Expenditures, Costs, & Benefits for Cleanup Vessels

	Expenditures			
Vessel	Public Data	Other Sources	costs	Benefits
M/V Fox River	$0	a	a	a
F/V Cheryl Ann	$0	a	a	a
M/V Miss Piggy	$0	a	a	a
M/V Pegasus	$0	a	a	a
M/V Monarch	$0	a	a	a
M/V Glacier	$0	a	a	a
M/V Rig Engineer	$0	a	a	a
F/V North Beach	$0	a	a	a
M/V Maritime Maid	$0	a	a	a
TOTAL	$271,870-$277,670			$271,870 $277,670

a) Not" disclosed.

4.4.3.5 Other

Cook Inlet Pipeline Company

This company provided six persons, absorbents, barrels, and helicopter support under contract to Unitech for the Drift River beach cleanup operation. They also provided approximately 140 barrels used to transport recovered oil. The company was reimbursed $14,570 by Unitech for this effort. with $12,145 of this amount going to Alaska Helicopters which provided the helicopters, and most of the balance going to local contract employees and temporary hires. Unitech replaced the absorbents and empty lidded barrels.

Alyeska Pipeline Service Company (APSC)

APSC provided a skimmer with attendant work boats and 10 personnel to operate this equipment. The FOSC's report shows an invoice in the amount of $78,534 for APSC. Information is not available on expenditures during the time period APSC worked for the vessel representatives or other parties.

Table 4-6: Expenditures, Costs, & Benefits for Other Participants

Organization	Expenditures Public Data	Expenditures Other Sources	costs	Benefits
Cook Inlet Pipeline Co.	$0	$14,570	$280	$14,290
Alyeska Pipeline Svc. Co.	$78,534	a	a	a

a) Not available or unknown.

4.4.4 **Summary**

Table 4-7 is a summary of expenditures, costs and benefits for each category. Totals are not provided because expenditures by the vessel owners include the amounts shown for the other categories of participants.

Table 4-7: Summary of Expenditures, Costs, & Benefits for Each Category of Participants

Organization	Expenditures: Public Data	Expenditures: Other Sources	costs	Benefits
S.S. Glacier Bay and Related Firms	$1,500,000	$4,217,892	a	a
Petroleum Companies	.$79,398 - $92,288	b	$57,683[a] - $76,898	a
Cleanup Contractors	$944,780	$137,500	$5,300[a]	$132,200[a]
Cleanup Vessels	$271,870- $277,670	b		$271,870- $277,670
Other Participants	$78,534	$14,570	$280a	$14,290[a]

a) Distribution unknown, or unknown for certain expenditures.
b) Not available or unknown.

4.5 Government

4.5.1 Methodology

There are several aspects of the roles and responsibilities of government agencies during an oil spill event that effect how this study measures economic impact of a spill. Most are based on regulatory requirements which determine agency response regarding spills of oil and hazardous materials, or maintaining navigation safety. Government costs associated with this category include manpower (both permanent employees and temporary hire), travel and per diem, hiring contractors, and purchasing services and supplies. To the extent that such information was publicly available, pertinent information on this category was included for all federal and state agencies that participated in regulating or responding to the S.S. Glacier Bay spill. Other aspects of assessing economic impact pertain to government's role as the "trustee" of resources of state and federal concern, particularly fish and wildlife resources. Costs associated with this role involve estimates of loss of or damage to such resources; these can be potentially recovered from the party responsible for the spill. The process of estimating these costs are subject to specific guidelines. Damage assessments for the S.S. Glacier Bay spill were prepared by the U.S. Departments of Commerce and Interior. A third cost category includes lost revenues resulting from the spill, such as raw fish tax losses

from contaminated fish. These three cost categories either 1) require reimbursement from the spiller, or 2) may be recovered through litigation. The last category of government economic costs evaluated by this study are associated with voluntary participation in spill response. In this particular case, they are associated with local government involvement. Because the Kenai Peninsula Borough did not have local oil spill regulations in place at the time of the spill, it had no legally mandated role in the spill that could provide a basis for reimbursement or litigation.

All agency salary costs and other other expenditures such as travel and per diem, hiring contractors, and purchasing services and supplies, associated with regulation of or response to the spill event are included in this study as economic costs. These costs are included at face value as reported by state and federal agencies. Figure 4-3 shows the approach used in calculating losses and expenditures for the government sector, and associated data requirements.

Economic costs associated with trustee damage assessments were excluded from this analysis. Agency expenditures associated with litigation of the S.S. Glacier Bay oil spill have not been included among the expenditures listed in this study.

Federal, state and local government expenditures are shown, by agency, in the remainder of this section. Expenditures are further broken down into costs and benefits to the local economy. The purpose of this breakdown is primarily to identify certain government expenditures associated with the S.S. Glacier Bay oil spill that can be categorized as resulting in benefits to the local economy. For the purposes of this analysis, these include the hiring of local oil spill subcontractors and experts, and the purchase of local services (e.g., air charters or diving) and supplies. Government employment costs are not considered as a benefit in this study, except where temporary hires are noted, because the spill takes existing staff away from other assignments rather than creating new income.

Finally, concerns regarding pending litigation over the oil spill have affected the availability of detailed information on agency expenditures in response to the spill. In some cases, published information was available and was supplemented in discussions with agency staff. In other instances, aggregated data was available from other sources, such as claims against the owner of the S.S. Glacier Bay.

Figure 4-3 Model Of Oil Spill Expenditures, Estimation And Records

Industry/expenditure-loss Category	Basis for Estimating/Record Requirements
Government	
Losses • value of fish tax revenue from: - contaminated fish discarded - fish not caught due to closures, down time, presence of oil slowing catch	Losses • *input from commercial fishing model for contaminated and lost fish X state raw fish tax rate* . *input from commercial fishig model for contaminated and lost fish X local sales tax rate*
Expenditures • staff salaries associated with oil spill response and clean-up - permanent staff - temporary staff • travel and per diem associated with spill repose and clean-up • response/cleanup subcontractors • supply and equipment purchase • vessel and equipment rental/charter	Expenditures . *wage X hours worked/ timesheets* . *sum of direct costs/invoices or receipts* •*sum of direct costs fin voices or receipts* •*sum of direct costs/invoices or receipts* •*sum of direct costs/invoices or receipts*

4.5.2 Federal Government

4.5.2.1 Contacts

Table 4-8 shows the federal agencies contacted for this study. Information on costs and expenditures for some of the federal agencies was provided in the FOSC report (U.S. Coast Guard, 1988); phone contacts confirmed that this was the most current information. Because the S.S. Glacier Bay oil spill has resulted in a number of lawsuits, some agencies are reluctant to discuss aspects of the spill for fear it may adversely affect their position regarding ongoing litigation. Contacts were made with both NOAA and Department of Interior, but information was not obtained at the time of releasing the draft report. Some information is available on federal agency claims filed against the owner of the S.S. Glacier Bay for reimbursement of expenses in responding to the oil spill. This aggregated information has been used to provide an indication of levels of expenditures. Contacts with others, such as the Environmental Protection Agency, confirmed that they were not involved in spill response and therefore incurred no costs.

Table 4-8: Federal Government Agencies Contacted

Agency	Information Received?
U. S. Coast Guard	yes
National Marine Fisheries Service	no
Environmental Protection Agency	yesa
U.S. Fish and Wildlife Agency	yes

a. Contact confirmed lack of participation in spill response

4.5.2.2 Costs and Benefits

U.S. Coast Guard

The U.S. Coast Guard was the primary federal agency in charge of response to the S.S. Glacier Bay oil spill event. Costs and expenditure are well documented in the FOSC report on the spill, and are shown in detail in Appendix D. Table 4-9 summarizes these costs. Nearly 60% of $1,722,859,95 in spill costs came from hiring the spill response contractor (Unitech) and lease of equipment from Alyeska Pipeline Service Company. The second highest category was costs of USCG equipment (31.5%). Benefits to the

local economy were defined as expenditures for the spill response contractor, and purchase of supplies and services, which accounted for 70% of expenditures.

Table 4-9: S.S. Glacier Bay Spill Expenditures, Costs and Benefits
U.S. Coast Guard

Category	Expenditures Public Other Data Sources	% of Expen-. ditures	costs	Benefits	Notes
Salaries	$46,363	2 . 7 %	$46,363		
Travel/per diem	$41,926.	2.4%	$20,963	$20,963	(1)
USCG Equipment					
Aircraft	$397,178	23.l%	$397,178		
Vessels	$132,638	7.7%	$132,638		
Spill response	$12,480	0.7%	$12,480		
Other	$292	0.0'%	$292		
Purchase orders	$76,327	4.4%		$76,327	(2)
Spill response contractors	$1,012,647	58.8%	$78,534	$934,113	(3)
State, federal agency expenses	**$3,007**	0.2%	**$3,007**		
Total	$1,722,860	100.0%	$712,419	$1,010,440	

(1) Travel and per diem is estimated at 50 percent local expenditures.
(2) Equipment and services required during response; expenditures accrue within study area.
(3) $934,113 paid to contractor within study area; remainder reimbursement of Alyeska Pipeline Service company for equipment use.

NOAA, National Marine Fisheries Service

The National Marine Fisheries Service played three major roles in response to the S.S. Glacier Bay oil spill event:

- o conducted a pre-assessment evaluation of the effects of the natural resources under NOAA's trusteeship in order to determine whether a damage assessment was warranted;

- o R/V Fairweather conducted hydrographic survey; and
- o four Scientific Support Coordinators (SSC) assisted with environmental assessment and the establishment of a consistent monitoring program.

At the time of this final report, information has been requested but not received from NOAA. Aggregated costs from claims by the Departments of Interior and Commerce against Apex Oil, the owner of the S.S. Glacier Bay, are used in Table 4-10. These costs totaled $399,000. It is assumed that they do not include costs associated with surveys conducted by the R/V Fairweather to locate uncharted rocks in the area where the S.S. Glacier Bay struck an unidentified object since most of the survey effort would not be considered an economic cost of the oil spill or response efforts. NOAA is also designated as a federal trustee of marine resources in the event of an oil spill and has prepared an assessment of damage to marine resources affected by the SS. Glacier Bay spill. At this time, the costs compiled by that damage assessment are not available to the study team.

Table 4-10: S.S. Glacier Bay Spill Expenditures, Costs, and Benefits
National Oceanic and Atmospheric Administration

Category	Expenditures Public Data	Expenditures Other Sources	% of Expen-. ditures	costs	Benefits	Notes
Salaries						
Travel/per diem						
NOAA Equipment						
Purchase orders						
Spill response contractors						
Aggregated Expenditures		$399,000				
Total		$399,000[a]				

a. Source is aggregated data from claims against Apex Oil, and includes costs from Department of interior.

U.S. Fish and Wildlife Service

At the time of this final report, information has been requested but not received from the Department of Interior. Aggregated costs from claims by the Departments of Interior and Commerce against Apex Oil, the owner of the S.S. Glacier Bay, are used in Table 4-11.

These costs total $399,000. Categories of costs are assumed to be similar to those documented for the U.S. Coast Guard: e.g.. salary expenses, travel and per diem, purchasing services and supplies, and office expenses. Key informants confirmed that staff was involved in field investigations of oil spill damage to fish and wildlife resources.

Table 4-11: S.S. Glacier Bay Spill Expenditures, Costs, and Benefits
Department of Interior

Category	Expenditures Public Data	Expenditures Other Sources	% of Expen-. ditures	costs	Benefits	Notes
Salaries						
Travel/per diem						
DOI Equipment						
Purchase orders						
Spill response contractors						
Aggregated Expenditures		$399,000				
Total		$399,000[a]				

a. Source is aggregated data from claims against Apex Oil, and includes costs from Department of Commerce (NOAA)..

4.5.3 **State Government**

4.5.3.1 Contacts

Table 4-12 shows the state agencies contacted for this study. Information on costs and expenditures for the state agencies was provided in late 1989 by the Attorney General's office.

Table 4-12: State Government Agencies Contacted

Agency	Information Received?
Attorney General	yes
Alaska Dept. of Fish and Game	yes
Alaska Dept. of Environmental Conservation	yesa
Alaska Department of Natural Resources	yesb

a Referred study team to Attorney General.
b Contact confirmed lack of participation in spill response.

4.5.3.2 Costs and Benefits

The primary source of information on state agency costs and expenditures was the Attorney General's office, which has compiled such information in support of litigation associated with the S.S. Glacier Bay oil spill.

Alaska Department of Fish and Game
The Alaska Department of Fish and Game (ADF&G) had several responsibilities associated with spill response:

- o assessing the size, extent and impacts of the spill to commercial fisheries in the area, and making appropriate managerial decisions;
- 0 assessing the size, extent and impacts of the spill to recreational fisheries in the area, and making appropriate managerial decisions; and
- 0 assessing impacts of the spill on fish and game resources and habitats.

Five groups within the agency participated in activities associated with spill response: the Office of the Commissioner, the Commercial Fisheries Division, the Game Division, the Habitat Division, and the Sport Fish Division. Table 4-13 summarizes the costs for the Alaska Department of Fish and Game. A detailed breakdown by division is shown in Appendix E. As can be seen from the table, the majority of costs (46.3%) are salary related expenses. A special test fishery, conducted to determine oil contamination of fish and the need to adjust fisheries openings and closures, was the second largest expenditure category (37.4%). Expenditures which could be counted as benefiting the local economy, purchase of supplies and services, was slightly over 1 percent.

Table 4-13: S.S. Glacier Bay Spill Expenditures, Costs, and Benefits .
Alaska Department of Fish & Game

Category	Expenditures Public Data	Other Sources	% of Expen-. ditures	costs	Benefits	Notes
Salaries	$29,085		46.3%	$29,085		
Temporary staff	$1,169		1.9%		$1,169	
Travel/per diem	$3,147		5.0%	$1,574	$1,574[a]	
AFDG equipment	$4,465		7.1%	$4,465		
Office costs	$720		1.1%	$720		
"Purchase orders	$684		1.I%		$684[b]	
Special Test Fishery	$23,500		37.4%	$23,500		
Total	$62,770		100.0%	$59,344	$3,427	

a. Travel and per diem are estimated at 50 percent local expenditures.
b. Equipment and services required during response; expenditures accrue within study area.

Alaska Department of Environmental Conservation

The Alaska Department of Environmental Conservation (DEC) provided 30 personnel, including 12 seafood sanitarians, was the primary state agency providing direction on spill response, and took the following actions:

- o monitor the spill;
- o provide technical assistance to the spiller and Coast Guard during cleanup activities;
- o document spill impacts;
- o approve the adequacy of cleanup operations; and
- o inspect commercially harvested salmon for possible oil contamination.

DEC costs were not broken down by Division, as was done by ADF&G. Table 4-14 summarizes the costs for the Alaska Department of Environmental Conservation. A detailed breakdown is shown in. Appendix E. As can be seen from the table, the majority of costs (67.7%) are salary related expenses. Purchase of supplies and services, including aircraft charter, was the next largest category at 14 percent, followed by travel and per diem (10.6Yo). DEC also spent approximately. $2,600 purchasing samples from

fish processors to test for contamination. Several categories of expenditures could be counted as benefiting the local economy: purchase of supplies and services, hiring of spill response contractors, and test sample purchase from processors. These benefits accounted for slightly over 25 percent of expenditures.

Table 4-14: S.S. Glacier Bay Spill Expenditures, Costs, and Benefits
Alaska Department of Environmental Conservation

Category	Expenditures Public Data	Other Sources	% of Expen-. ditures	costs	Benefits
Salaries	$180,570		67.7%	$180,570a	
Temporary staff	$605		0.2%		$605
Travel/per diem	$28,380b		10.6%	$14,190	$14,190
Office costs	$4,041		1.5%	$4,041	
Purchase orders					
Vessels	$500		0.2%		$500
Aircraft	$23,755		8.9%		$23,755
Vehicles	$4,638		1.7%		$4,638
Other	$8,570		3.2%		$8,570
Spill response contractors	$12,942		4.9%	$	$12,942c
Processor samples	$2,595		1.0%		$2,595d
Total	$$266,596.00		100.0%	$198,801	$68,155

a. Includes overtime pay.
b. Travel and per diem are estimated at 50 percent local expenditures.
c. Assumes expenditures accrue to contractors within study area.
d. Accrues as benefits to local fish processors.

Attornev General

The Alaska Attorney General's office (AG) has been responsible for aggregating state costs associated with the S.S. Glacier Bay oil spill and pursuing litigation to recovering those costs. Because AG staff time on the spill is primarily associated with litigation, salary expenditures are not considered an economic cost for this study. In addition to collecting spill-related expenditures by state agencies, the AG has estimated the loss of state raw fish tax revenue from contaminated fish. This figure is $11,197 and is shown in Table 4-15. The AG has not yet calculated the loss of state raw fish tax revenue resulting from spill related closures of fisheries and displacement of fishing effort.

Table 4-15: State Raw Fish Tax Losses from Contaminated Fish

Contaminated Salmon Destroyed	Price per Pound	Value of Salmon	Raw Fish Tax Rate	Raw Fish Tax Lost
261 ,000a	$1 .43[b]	$373,230	3%	$11,197

a. Based on 200,000 lbs. destroyed by the processing companies, 61,000 lbs. destroyed by fishermen.
b. Based on a mix of **90%** sockeye and 10% other.

The State of Alaska has discussed the possiblilty of an additional damage claim for future salmon losses arising from effects of the S.S. Glacier Bav spill. The State has not yet made an amendment to such a claim, but it could be added at some point in the future (Gowans, 1990).

In 1987, 1.4 million sockeye spawned in the Kenai, the largest number on record.. From this parent year, ADF&G estimates about 37 million juvenile sockeye were produced (Tarbox and Browning, 1990). ADF&G biologists theorize that less food was available per fry which resulted in slow growth rates and many fry not attaining smelt size by the spring of 1989. Many of the juvenile sockeye produced from the 1987 run held over in rearing areas (primarily Kenai and Skilak Lakes). When fry from the 1988 parent year arrived in the lakes, they were unable to effectively compete for food supplies with the older fry holding over. ADF&G estimates that 11 million of a total 25 million juvenile sockeye rearing in the fall of 1989 were from 1987 spawners. Consequently, only 14 million juvenile sockeye were from the 1988 parent run. This is the second lowest estimate of juvenile production measured during a four year study period (Tarbox and Browning, 1990). Due to increased mortality on juveniles from the 1988 run, the potential number of returning adults is reduced.

As stated above, a claim for this loss has yet been filed. Further research may provide more quantifiable assessments of futures losses.

Alaska Department of Natural Resources

Original reports indicated that the Alaska Department of Natural Resources (DNR) staff were involved in beach monitoring assessment of impact, and monitoring the salmon run

and fishing openings. Contacts with representatives of DNR and the Attorney General's office have confirmed that DNR was not involved in spill response and incurred no costs.

4.5.4 **Local Government**

4.5.4.1 Contacts

Kenai Peninsula Borough
Unlike the more recent oil spill from the S.S. Exxon Valdez, local government participation in this oil spill response was minimal. Interviews with key informants indicate that the Kenai Peninsula Borough Mayor's office was the primary local government contact during the spill.

4.5.4.2 Costs and Benefits

The Borough did not keep track of hours expended by the mayor's office related to the S.S. Glacier Bay spill. No other costs were incurred by the Borough.

4.5.5 **Summary**

Table 4-16 summarizes expenditures, costs, and benefits for government participants in the S.S. Glacier Bay oil spill.

4.6 **Commercial Fishing**

The analysis of commercial fishing impacts was divided into two main sections: processing and harvesting. The harvesting section was further divided into two components based on the two main gear types utilized in Cook Inlet salmon fisheries: drift gillnet and set gillnet. The intent of the analysis was to determine costs and benefits resulting from the S.S. Glacier Bay spill,

The basic approach was to contact representatives of the affected parties in person or by telephone and discuss their respective impacts.

4.6,1 Contacts

4.6.1.1 Processing Companies

A listing was compiled of processing companies that operate in Cook Inlet. The list is derived from an "intent to process" list from the Alaska Department of Fish & Game and accumulated knowledge of study team members and key contacts. With a relatively small number of companies, attempts were made to obtain information from each of the

companies. A listing of the companies and a summary of the results of the interviews is shown in Table 4-17.

Table 4-16: S.S. Glacier Bay Spill Expenditures, Costs, and Benefits
Total Government

Category	Expenditures Public Data	Expenditures Other Sources	% of Expen-. ditures	costs	Benefits
Salaries	$256,018		10.4%	$256,018	
Temporary staff	$1,774		0.1 %		$1,774
Travel/per diem	.$73,453		3.0'%0	$36,727	$36,727
Equipment	$547,053		22.2%	$547,053	
Office, agency costs	$7,768		**0.3%**	$7,768	"
Purchase orders	$114,474		**4.6%**		$114,474
Spill response contractors	-$1,025,589		41.6%	$78,534	$947,055
Lost taxes	$11,197		0.5%	$11,197	
Other	$26,095		1.1%	$23,500	$2,595
Aggregated expenditures	$399,000		16.2%	**$399,000**	
Total	$2,462,421		100.0%	$1,359,797	$1,102,625

A large proportion of processors contacted were not willing to discuss the oil spill. In most cases, those who did not provide information indicated that ongoing litigation prevented them from providing information to the study team. In a few cases, the interviewers were unable to contact company representatives even after repeated calls and messages. In general, companies that experienced little impact from the spill provided information and those that experienced losses did not. Therefore, it is not possible to assume that the results obtained from the companies that provided information provide a good proxy for non-respondents. Some of the companies that did not experience impacts primarily receive deliveries from areas outside of Cook Inlet.

However, even the companies that did not wish to disclose specific quantitative data because of ongoing litigation were willing to discuss the types of impacts that occurred

in general terms. This information helps to provide a more comprehensive understanding of impacts to Cook Inlet processing companies.

4.6.1.2 Fishermen

It was initially anticipated that several organizations representing fishermen would be able to provide the study team with information on spill impacts to their members. This was not a correct assumption. The Kenai Peninsula Fishermen's Cooperative (representing central district setnet fishermen) and the United Cook Inlet Drift Association (representing drift gillnet fishermen) were interviewed. While representatives of these associations were willing to discuss events and general impacts, they did not have quantitative information on the magnitude of losses for their members.

Therefore, the study team went directly to fishermen, via direct meetings or telephone interviews. The method of selection for fishermen to be interviewed was discussed in' section 3.2.3.

Table 4-17: Cook Inlet Processing Companies Contacted

Company	Provided Information
American Salmon Co.	yes
Anpac, Inc.	yes
Columbia Ward Fisheries	yes
Cook Inlet Processing, Inc.	no
Dragnet Fisheries	no
Ed's Kasilof Seafoods	no
Inlet Fisheries, Inc.	no
International Seafoods	yes
Kenai Packers	yes
Keener Packing	yes
Salamatof Seafoods	no
Seafoods from Alaska	no
Seward Fisheries	no
Western Alaska Fisheries	no
Whitney Seafoods	no

4.6.2 Methodology

Figure 4-4 shows the expenditure and loss categories used to calculate impacts to the commercial fishing sector, and specific methods and data requirements to estimate losses and expenditures.

4.6.3 Costs and Benefits

4.6.3.1 Processing Sector

Processor interviews do not provide sufficient information to estimate financial losses from the spill. However, they do serve to provide a good understanding of the types of impacts the companies experienced and what actions they took to deal with the impacts as they occurred. These can be discussed individually.

Losses from contaminated salmon

Many processing companies, particularly those that are currently litigating claims encountered contaminated salmon. They acknowledged that the total volume of fish actually found to be contaminated was relatively small (Department of Environmental Conservation indicated 261,000 pounds had to be destroyed). Several representatives emphasized that the additional work and expense caused by the need to find, isolate and discard contaminated salmon made the financial impact of contaminated salmon far greater than the value of the salmon that were discarded. It was repeatedly emphasized that the oil was apt to appear anywhere. Beaches that had no oil one day were oiled the next and the oil moved around the drift fishing areas randomly so that no area could be assumed to be “safe”. Oiled fish were characterized as having small flecks of oil on the scales that appeared similar to sand until they were rolled between the fingers when it became apparent that it was oil.

The approximate value of documented salmon that processing companies discarded was $373,230 according to the Attorney General’s office. However, based upon the interviews with processing company representatives, the actual loss experienced was considerably larger, although sufficient data are not available to estimate the actual loss. One representative indicated that the company was quickly reimbursed for contaminated fish through insurance, but the other components of the contamination costs remained unresolved.

contacted will not release information on losses until litigation is settled. A summary of the results obtained from interviews is presented in Table 4-18

Processing company representatives did not indicate any estimated benefits associated with the S.S. Glacier Bay spill although the additional labor costs represent benefits to the regional economy if the firms are ultimately compensated for the additional cost.

4.6.3.2 Harvesting Sector

Drift Net Fishery

The study team interviewed 26 drift gillnet fishermen, either in person or by telephone, The responses from fishermen provided relatively similar information. This was partially due to the shared common experience. The fleet uses the same gear and methods and fishes in the same areas. However, part of the similarity in responses maybe attributable to outstanding litigation. Most of the fishermen interviewed currently had a claim for damages and were awaiting the outcome of litigation for compensation. The names of the same legal firms were cited repeatedly when questions of impacts were asked. As was the case for the processing sector, the fact that litigation was ongoing made most of the fishermen less candid than they would have been otherwise.

The summary of responses from field interviews with drift gillnet fishermen is shown in Table 4-19. The interviews provided a great deal of information which is difficult to summarize in a tabular form. Responses to each of the categories of impact will be presented to provide a more complete overview of the impacts.

Loss of Fishing Periods or Areas.

This issue was mentioned by each fisherman interviewed. It was generally accepted that loss of fish which could have been caught if areas would have been opened accounted for the major component of total losses to the drift fleet. Responses indicated that the fleet would definitely have fished in the restricted areas had they not been oiled, since that is where the fish were. One interviewee estimated loss from the restricted openings to be an additional 25 percent of the ex-vessel value of the catch for each day restricted areas were in effect.

Gear Loss/Damage.

Fifteen of the 26 fishermen interviewed experienced oil fouled gear losses. Typically, nets were fouled and had to be discarded. Other losses included rain gear and gloves. Thirteen of the 26 interviewed were compensated for their nets and gear. Most indicated that the compensation was " very fair" and that nets were replaced with the best gear available. However, several fishermen indicated that in some of the later occurrences of

Table 4-18: Summary of Impact to Processing Companies

	provided information	processed in '87	contaminated fish destroyed	gear loss/damage	additional labor costs	long term impacts
Company #1	yes	yes	no	no	no	no
Company #2	yes	"not much"	no	no	no	no
Company #3	yes	(1)	no	no	no	no
Company #4	yes	yes	perhaps (2)	no	yes	no
Company #5	yes	yes(3)	no	no	no	no
Company #6	no(4)	yes				
Company #7	no(5)	yes				
Company #8	no(4)	yes				
Company #9	no(5)	yes				
Company #10	yes	yes	yes	yes	yes	no
Company #11	no(5)	yes				
Company #12	no(5)	yes				
Company #13	no(5)	yes				
Company #14	no(6)	yes				
Company #15	no(5)	yes				

Source: Study Team interviews

(1) Did not operate at all in the study area and were not affected
(2) $50,000 worth of salmon 'questionable', but may have been from loss of quality due to processing delays rather than direct contamination
(3) Sent tenders into Cook Inlet from Kodiak
(4) 'busy' when contacted several times and did not return calls
(5) company in litigation, not willing to provide information
(6) company no longer in operation

Figure 4-4 Model Of Oil Spill Expenditures, Estimation And Records

Industry/expenditure-loss Category	Basis for Estimating/Record Requirements
Commercial Fishing Industry	
Losses	Losses
• value of gear damaged or replaced	• *replacement cost/receipt*
• value of contaminated fish discarded - fishermen - processors	• *#of fish X lbs./fish X price/lb.*
• value of fish not caught due to: - closures - **presence of oil** in fishing areas - down time from gear fouling	• *direct: estimate #of fishermen affected X average # of fish lost (average loss from interviews)X lbs./fish X price/lb.* *indirect: calculate historic daily catch minus all related catch equals lost catch [# of fish X lbs./fish X price/lb.]*
• value of reduction in fish price - fishermen - processors	• *reduction in price/lb. [estimated by statistical regression] X # of lbs. harvested*
Expenditures	Expenditures
• additional processor employee wages due to contaminated fish or changes in fish delivery patterns	• *wage X hours worked/ timesheets for additional staff*
• cleaning of gear and vessels for fishermen; equipment and facilities for processors	• *actual cost/receipt*

(1) losses include only direct material loss to the fisherman, and do not address social, cultural, and psycho-logical impacts ,

Another company indicated that the loss from contamination did not cease at the end of the season. After the season, they had to go through further inspections of fish already processed and frozen before the fish could be cleared for sale. The extra handling added a significant cost to the product, although the actual cost was not disclosed.

Losses due to Closures.

Responses from representatives of processing companies indicated that the management closures did not cause a problem with loss of fish. It was a record year, and most of the companies were operating at full capacity. A problem reiterated by several representatives was that time and area closures resulting from the spill caused a change in the flow of fish to the companies. After a closure, the processing companies received a large harvest of fish that they were unable to handle as efficiently. Had fishing proceeded as normal, processors would have experienced lower peak harvests. These large catches of salmon exacerbated capacity problems in plants and was further stymied by the extra requirements for inspection of fish for oil contamination.

Damage to Oiled Gear of Equipment.

This category of loss was of relatively minor importance to the processing companies, based on interview information. One company listed a loss of $1000 from oiled totes, and other companies probably experienced similar losses.

Costs for Additional Staffing.

This was an important cost category for all companies that received oiled fish because they had to employ extra workers on the processing line to detect oil and handle salmon. One representative indicated that his company spent an additional $15,000 to $20,000 on extra staff to check fish. Another processor estimated that between the additional costs of staff to handle and process salmon, and the reduced quality that occurred as a result of large peaks in the number of salmon to be processed, company costs increased between $.25 to $.30 per pound for more than two million pounds of salmon, a total cost of approximately $750,000.

Long Term Impacts.

Many of the company representatives expressed concern for long term impacts on markets for Cook Inlet salmon. The S.S. Glacier Bay represents only one of several spills that have occurred in the area. Companies are concerned that customer's perception of Cook Inlet salmon may be degraded if the area is continually associated with oil spills. However, no concerns were expressed by companies about negative impacts to the biological health of the salmon resource in the area.

One major processing company in the area affected by the spill stated their loss was $750,000. Without more quantifiable data from other companies who did not respond, an overall estimate of loss cannot be determined. Most of the company representatives

Table 4-19: Summary of Interviews with Drift Gillnet Fishermen

fisherman	loss of fishing periods or areas	gear loss/damage	oiled vessel	salmon discarded	reduced price	areas avoided	estimated loss	compensation received	long-term loss
#1	yes	yes	yes	no	yes	yes	$110,000	$10,000	no
#2	yes	no	no	no	yes	yes	$84,000	$0	no
#3	yes	yes	yes	no	yes	yes	n/a	$2,000	yes
#4	yes	no	no	no	yes	yes	n/a		yes
#5	yes	no	no	no	no	yes	n/a	$0	no
#6	yes	yes	no	no	n/a	yes	nla	$2,000	yes
#7	yes	no	no	no	yes	yes	$90,000	$0	yes
#8	yes	yes	yes	n/a	n/a	yes	$85,000	$6,000	yes
#9	yes	no	no	no	yes	yes	$77,500	$0	yes
#lo	yes	no	no	no	yes	yes	$75,000	$0	yes
#11	yes	yes	no	yes	n/a	yes	$180,000	$1,000	yes
#12	yes	yes	yes	no	yes	yes	$75,000	$1,500	yes
#13	yes	no	no	no	no	yes	$50,000	$0	no
#14	yes	no	no	no	yes	yes	$50,000	$0	no
#15	yes	no	no	no	yes	yes	$17,500	$0	no
#16	yes	yes	yes	no	yes	yes	$35,000	$3,000	yes
#17	yes	yes	yes	yes	yes	yes	$55,000	$900	yes
#18	yes	no	no	no	yes	yes	$77,500	$0	yes
#19	yes	yes	yes	yes	yes	yes	$110,000	$3,000	no
#20	yes	yes	yes	yes	n/a	yes	$65,000	$2,000	yes
#21	yes	yes	no	yes	yes	yes	$55,000	$9,000	yes
#22	yes	no	no	no	no	yes	$22,500	$0	no
#23	yes	yes	yes	no	yes	yes	$50,000	$2,000	no
#24	yes	yes	yes	no	no	yes	$81,000	$2,000	yes
#25	yes	yes	no	no	no	yes	$30,000	$0	yes
#26	yes	yes	yes	yes	no	yes	$50,000	$0	yes

Source: Study team interviews with Cook Inlet drift gillnet fishermen

fouling, nets were not available immediately for replacement. Several fishermen had gear lightly oiled and were able to clean it themselves with no loss of fishing time. Fishermen responded that they eventually ran out of gear.

Oiled Vessels.

Oiled vessels were slightly less prevalent than oiled gear. Eleven of those interviewed experienced oil fouling. In most instances, fishermen were able to clean the vessels themselves. A few had badly fouled vessels and lost fishing time. Several fishermen mentioned that they took extreme care to avoid oiling their vessel because they were concerned that their fish would be rejected.

Salmon Discarded.

Only six of those interviewed had to discard contaminated salmon. One fisherman related having discarded his catch three times when nets came up with 20, 30 and 60 fish that were fouled with oil from the net. The fish were discarded without compensation since the fish were not inspected by a processor. The highest loss to fishermen was approximately 3,000 pounds refused by the processor due to oil contamination.
One fishermen advised us to be suspicious of those listing oil fouled nets and vessels but not indicating any contaminated fish.

Reduced Price.

Almost all of those interviewed felt that the spill was responsible for a lower price for fish delivered. They cited the typical pattern for prices to increase during the season, which did not happen in 1987. Ex-vessel prices went as high as $1.73 per pound for sockeye July 13 but dropped to $1.40 by July 19, 1987. One fisherman stated, “The price drop was a short term impact of the spill. The canneries blamed it on a glut of fish, but that was caused directly by oil spill restrictions”.

The study team does not have sufficient data to determine if the price to fishermen was negatively affected by the spill. The causal relationship is difficult to establish. Price data time series are imprecise, making it difficult to model accurately enough to ascribe shifts to a single factor. It is likely that the glut of salmon received by processors was a major cause of the soft prices. However, it is not certain how this large run would have altered prices in the absence of the spill.

Areas Avoided

All of the fishermen said that they had to avoid the rips to keep from fouling their vessels and gear. Yet, the rips are where they usually find fish. The fishing pattern tended to be very cautious. One fisherman stated, “1 was very careful to avoid the oil and pulled nets

whenever near known areas of oil, but still got caught once when it wasn't visible. The oil kept sinking and resurfacing; it was unpredictable and therefore hard to avoid."

Estimated Losses.

For the 22 fishermen interviewed that provided an estimate of economic losses from the spill, the average was $69,318, or approximately $41.6 million for the drift gillnet fleet. The estimates for average losses ranged from a lowof$17,500 ($10.6 million total) to a high of $180,000 ($108.0 million). Calculation of losses based upon historic average daily catch and ADF&G's indicator fishery suggest that the losses are at the lower end of this range. Figure 4-5 shows the 1987 daily sockeye harvest compared with historic harvest by date. The difference between the 1987 harvest and historic harvest on July 14 is apparent. Additional losses can be calculated due to the closure of a drift fleet opening on July 15, 1987 which ADF&G was planning.

Figure 4-5: Drift Gillnet Fleet Sockeye Harvest by Date "

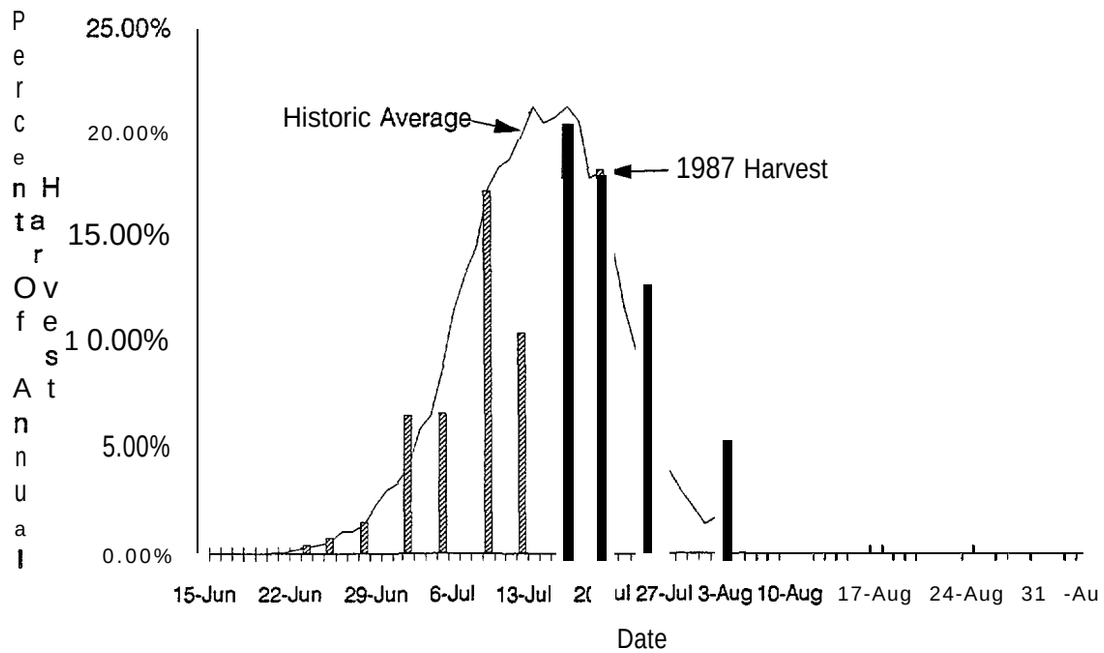
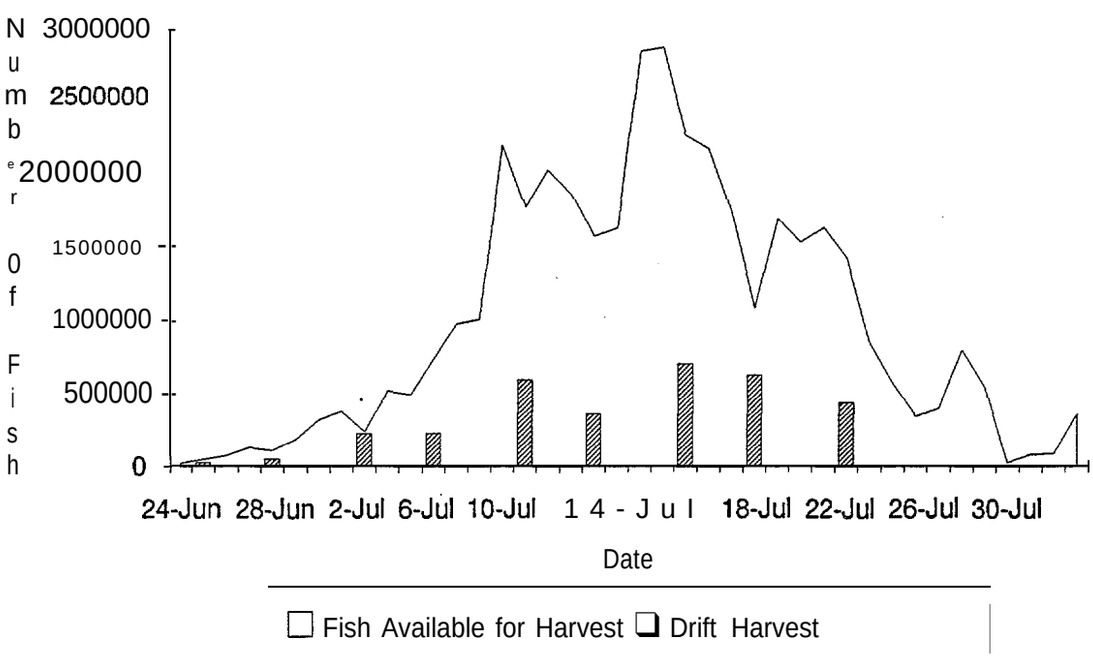


Figure 4-6 shows a relationship between the daily number of sockeye available to the fishery in the central subdistrict in 1987 and the daily harvest. The number of sockeye available to the fishery is based upon a daily test fishery that ADF&G conducts between Anchor Point and Chinitna Bay to monitor run size, and subtracting fish harvested and

escapement. This method is subject to wide variances but does suggest that the lower catch on July 14 was due at least partly to fewer fish being available to the drift fleet. Calculations by the study team using these methods result in estimates of $12.9 to $17.7 million for drift gillnet fishermen. Initial settlements by some drift gillnet fishermen are reportedly about $17,000, with larger claims not yet settled. At $17,000 per drift gillnet fisherman, total losses would be about $10.2 million.

It was clear from the interviews that the task of estimating loss would have been more straightforward if litigation had not been an issue. Most of the estimates received were based on formulas used by attorney's representing the fishermen. The lowest figures came from the fishermen's response, not the amount claimed. Several fishermen provided two figures, one was a higher figure according to the 'formula' and the other was a lower estimate, based on what an individual fishermen would use as his best guess. One example of such a difference was a claim for $75,000 with a personal best guess of losses of $40,000. One fisherman attributed the difference to the attorney's including things that fishermen had not taken into account.

Figure 4-6:1987 Sockeye Harvest Compared With Available Sockeye



Long Term Losses

Several fishermen felt that the demand for replacement gear due to fouling caused gear prices to increase markedly. They also indicated that prices have not returned to pre-spill levels. Another concern, mentioned by many interviewed was the long term detrimental effects on market acceptance of Cook Inlet salmon when there are continual oil spills. Two respondents indicated there was more oil in the inlet in 1988 than 1987. This concern was not shared by regulatory agencies.

Several fishermen expressed concern for the long term biological health of the salmon resource. According to these respondents, salmon can not withstand the cumulative effects of oil contamination each year without damage. Other comments were more difficult to define, but referred to the spill and impacts associated with it as changing the "mood" of the fishery, Some fishermen felt that the S.S. Glacier Bay spill marked the beginning of an uncertain future about their fishery.

A final concern was the likely imposition of new regulations on small fishing vessels as a result of the accidents caused by captains of larger vessels.

Other Comments

Most other comments related to the lack of a coordinated response and cleanup capability. An example of received comments are:

> "The response and cleanup capabilities that CIRO had in place amounted to nil. There is a need to have equipment on hand because we cannot afford the time loss and red tape of finding equipment after the fact. The tide doesn't wait for anyone. Their lack of response is inexcusable.
>
> "High tides and weather were used as an excuse, but we know now that when it happened the tide was low and the weather was calm. They had ideal conditions to clean it up, but they were unprepared. They lied and made excuses."

Set Net Fishery

The study team interviewed a total of 58 setnet fishermen to discuss impacts that their group received as a result of the oil spill. The interviews were conducted in person and by telephone. As previously discussed, responses from drift gillnet fishermen were relatively similar, but responses from setnet fishermen were widely divergent. Some setnet fishermen reported no losses or impacts, where others reported major incidence of oil fouling and losses of income. The variance can be attributed to the differences in location. Setnet fishermen are fixed to their chosen site, at least for the short run. With random and unpredictable oil fouling of the beach areas where setnet fishermen operate, their sites were subject to the variability of the wind and tide.

Some setnet fishermen currently have claims for damages and are awaiting the outcome of litigation for compensation. The names of the same legal firms were cited repeatedly when questions of impacts were asked. It seemed that a minority of setnet fishermen are involved in litigation but this is difficult to confirm.

The summary of responses from the field interviews with set gillnet fishermen is shown in Table 4-20. The interviews provided a great deal of information which is difficult to squeeze into a single table. Responses to each of the categories of impact are presented to provide a more complete overview of the impacts.

Loss of Fishing Periods or Areas

With few exceptions, most setnet fishermen felt they suffered from lost fishing opportunity due to management closures associated with the spill. Loss of fish which could have been caught accounted for the major component of estimated losses to setnet fishermen.

Gear Loss/Damage

Of the 58 fishermen interviewed, 29 experienced oil fouled gear losses. The extent of gear damage varied widely. Most fishermen reported relatively minor fouling, some that they were able to clean themselves, other instances required replacement of gear. Twelve fishermen reported compensation for lost gear, varying in amount from $920 to $19,000.

Several fishermen indicated that compensation for gear was “very fair" and some even indicated that fishermen were overpaid for gear losses, i.e. “felt that all Cook Inlet fishermen were overpaid for damaged or lost gear . . . ..was paid twice what the gear was worth”. Setnet fishermen experienced difficulties in obtaining replacement nets in season and in finding workers available to hang nets.

Oiled Vessels

Most setnet fishermen fish with skiffs, which were apparently easier to clean than larger vessels. Most fishermen indicated that if their skiff was oiled, they were able to handle clean-up themselves with little fishing time lost. A few mentioned badly and continuously oiled skiffs that did result in lost fishing time. Several mentioned that they took extreme care to avoid oiling their vessel to keep processing companies from refusing their fish.

Salmon Discarded

Twelve of the fishermen interviewed had occasion to discard oiled fish or had it refused by the processing companies. Again, the degree of damage varied widely. Several instances mentioned were: “100 fish discarded”, “39,500 pounds refused by the processor - ended up as fertilizer”, “200 fish lost”, “1000 pounds refused”.

Table 4-20: Summary of Interviews with Setnet Fishermen
(page one of three)

fisherman	loss of fishing periods or areas	gear loss/damage	oiled vessel	salmon discarded	reduced price	estimated loss	compensation received	long-term loss
#1	yes	no	no	no	yes	$100,000	$0	no
#2	yes	no	no	no	yes	n/a	$0	yes
#3	yes	yes	yes	no	yes	n/a	$0	yes
#4	yes	yes	yes	no	maybe	n/a	$0	yes
#5	no	no	no	no	no	$0	$0	no
#6	no	no	no	no	no	$0	$0	no
#7	yes	yes	no	no	unknown	n/a	yes	no
#8	yes	no	no	no	unknown	$0	$0	no
#9	yes	yes	no	n/a	n/a	n/a	n/a	n/a
#1 0	yes	no	no	no	no	$0	$0	no
#11 “	yes	no	no	no	n/a	$3,000	$0	no
#12	yes	yes	yes	yes	yes	$225,000	$920	yes
#13	yes	yes	yes	no	yes	$25,000	$25,000	no
# 1 4	yes	no	no	no	yes	$2,700	$0	no
#15	yes	no	no	no	yes	n/a	$0	yes
#16	yes	yes	yes	no	yes	$41,000	$0	yes
#17	no	no	no	no	yes	$9,375	$0	yes
#18	yes	yes	yes	no	yes	$50,000	$9,000	yes
#19	yes	yes	yes	no	yes	$3,500	yes	no
#20	no	no	no	no	no	$0	$0	no
#21	yes	yes	yes	yes	yes	$60,000	$10,000	yes
#22	yes	yes	yes	no	yes	n/a	$6,000	yes
#23	yes	n/a	n/a	n/a	n/a	n/a	n/a	n/a
#24	yes	yes	no	no	partly	$11,000	$9,000	unknown
#25	yes	yes	no	no	n/a	$18,000	$0	no

Source: Study team interviews with Cook Inlet drift gillnet fishermen

Table 4-20: summary of interviews with Setnet Fishermen
(page two of three)

fisherman	loss of fishing periods or areas	gear loss/damage	oiled vessel	salmon discarded	reduced price	estimated loss	compensation received	long-term loss
#26	yes	yes	yes	no	yes	$30,000	$1,800	yes
#27	yes	yes	no	no	yes	$13,500	n/a	yes
#28	yes	yes	yes	yes	yes	$70,000	n/a	yes
#29	yes	no	no	no	maybe	$7,500	$0	no
#30	no	no	no	no	no	$0	$0	no
#31	no	no	no	no	yes	$0	$0	no
#32	yes	yes	yes	yes	yes	$26,500	n/a	no
#33	yes	yes	no	no	yes	unknown	$2,700	unknown
#34	yes	yes	yes	yes	, yes	$50,000	$19,000	yes
#35	yes	yes	ues	yes	unknown	n/a	n/a	yes
#36	yes	yes	yes	yes	partly	$100,000	$4,000	yes
#37	yes	yes	yes	yes	yes	n/a	n/a	yes
#38	yes	yes	no	no	unknown	n/a	$3,500	no
#39	no	no	no	no	n/a	n/a	n/a	n/a
#40	yes	yes	yes	yes	yes	$200,000	$9,350	unknown
#41	no	no	no	no	no	$0	$0	no
#42	no	n/a	n/a	n/a	n/a	n/a	n/a	n/a
# 4 3	yes	yes	yes	no	unknown	n/a	$0	no
#44	yes	n/a	n/a	n/a	n/a	n/a	n/a	n/a
#45	no	no	no	no	no	$0	$0	no
#46	no	no	no	no	no	$0	$0	no
#47	no	no	no	no	unknown	$0	$0	no
#48	no	no	no	no	no	$0	$0	no
#49	no	no	no	no	no	$0	$0	no
#50	no	no	no	no	no	$0	$0	no

Source: Study team interviews with Cook Inlet drift gillnet fishermen

Table 4-20: Summary of Interviews with Setnet Fishermen
(page three of three)

fisherman	loss of fishing periods or areas	gear loss/damage	oiled vessel	salmon discarded	reduced price	estimated loss	compensation received	long-term loss
#51	no	no	no	no	no	$0	$0	no
#52	yes	yes	yes	yes	n/a	$60,000	$0	no
#53	yes	yes	yes	yes	unknown	n/a	$0	no
#54	yes	yes	yes	yes	partly	$66,000	n/a	no
#55	yes	n/a	n/a	n/a	n/a	n/a	n/a	n/a
#56	no	no	no	no	no	$0	$0	no
#57	yes	yes	no	no	unknown	$20,000	$2,000	no
#58	no	no	no	no	no	$0	$0	no

Source: Study team interviews with Cook Inlet drift gillnet fishermen

There were indications that more fish were oiled but not refused by the processing companies. Examples of comments include:

> "...had fish that had some oil on them from being in the lily skiffs, but they were not refused by the processors. ....alarmed that the fish passed inspection and think that maybe they paid for them and then claimed losses. Treatment of oily fish varied from processor to processor."

> "...cannery accepted all of the fish, even though some of them were oiled. What the cannery did with them I don't know what they did with the fish I don't know."

Reduced Price

Most of those interviewed felt that the spill was responsible for a lower price for fish delivered. However, many felt that the glut of salmon flooding into the processing companies and disrupting normal flows was as much a factor as reduced demand from buyers.

Estimated Losses

Forty of the 58 fishermen interviewed provided an estimate of economic losses from the spill or indicated that they had zero losses. The average losses for those 40 setnet fishermen was $33,050 ($1 2.1 million total), ranging from zero to $225,000 ($82.1 million total). Historic daily catch data result in an estimate of total losses of approximately $514,000 for the set gillnet fishery for the closure on July 14, 1987 (See Figure **4-7).** Estimating damages to the setnet fleet would be greatly simplified if litigation were not an issue. Several of the fishermen indicated that they could not disclose information on their impacts on the advice of their attorney.

Lena Term Losses

The major long term concern involved potential adverse biological impacts on the salmon resource. Strong concern was also expressed over long term detrimental effects on market acceptance of Cook Inlet salmon with continual oil spills. Several respondents indicated that there was more oil in the inlet in 1988 and 1989 than in 1987. "

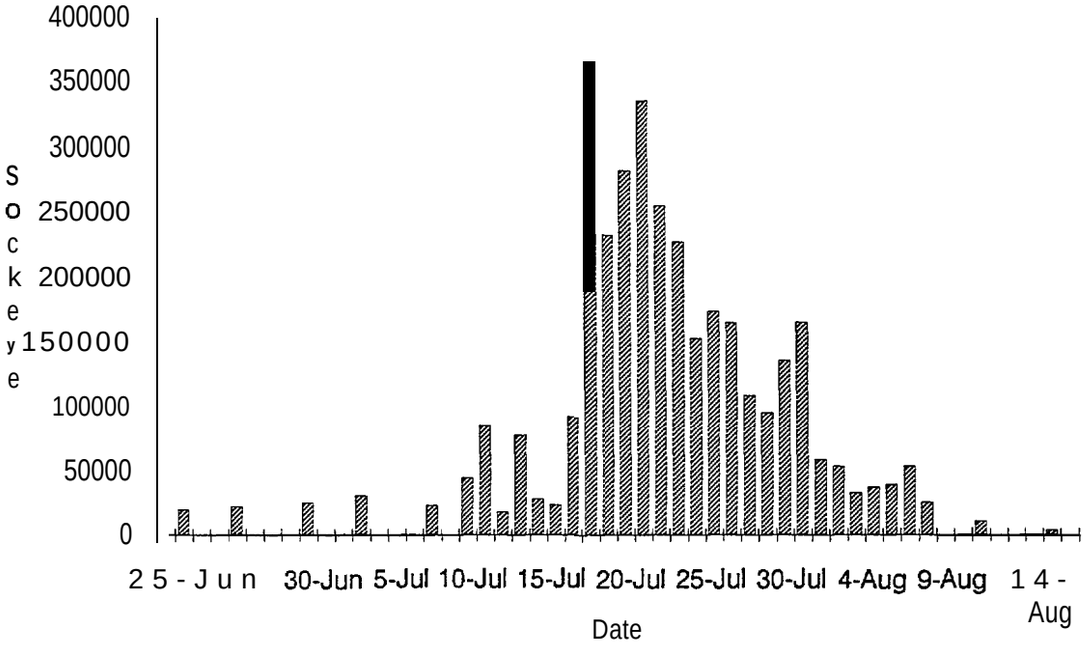
Other Comments

Most other comments related to the lack of a coordinated response and cleanup capability. Examples are:

> "Throughout the spill event, the state and federal agencies and industry tried to hide information from the public. No one was prepared to take responsibility for the spill or for various aspects of the response so they instead tried to cover up their mistakes. Both the Coast Guard and the DEC did a poor job. Trinidad and

CIRO did a horrendous job; their contingency plan might as well have not existed, they had no equipment available to deal with the spill."

Figure 4-7:1987 Harvest of Sockeye by Upper Subdistrict Set Net Fishermen



"The response to the oil spill was lousy and non-existent. The DEC and the Coast Guard were equally ineffective. The Coast Guard brought in outside commanders and 'specialists' who didn't know anything about the area, and the fishermen ended up giving them directions. They were not able to give any helpful information. We would have helped them but there was no way to do so because they weren't doing anything."

"There was a lack of response to the spill for the first several days. The fishermen were mislead to believe it was still only a few barrel spill because it was the 4th of July weekend and they were not prepared to respond. The few barrel scenario was used to cover up what was really going on because they were not sure who was responsible to do what. CIRO's logic was that if we keep telling everyone that it is only a few barrels, then we don't have to act right away, we can buy time."

4.7 Recreation and Sport Fishing

The waters of Cook Inlet, Kachemak Bay and the rivers and streams flowing into Cook Inlet account for a large proportion of the total sport fishing effort for the entire state. In 1987, total statewide angler effort equalled 1,212,704 angler days. Of this total, 56 percent was expended in the Cook Inlet area (Alaska Department of Fish & Game, 1988).

Several of the sport fishing areas on the Kenai Peninsula are world famous, drawing anglers from the 'lower 48' and other countries to fish for king salmon, sockeye salmon and other species. Perhaps the most renowned fishery is that of the Kenai kings. However, the charter boat halibut fishery, operating out of Homer, is fast approaching the king fishery for popularity.

The most popular fisheries include: the Kenai River (early and late run king salmon, sockeye and silver salmon), Russian River (sockeye fishery), lower Kenai Peninsula stream fisheries (king and silver salmon), the Kasilof River (king salmon), Homer Spit and Kachemak Bay (king, silver and pink salmon, halibut, crab and shrimp) and the lower peninsula saltwater recreational fishery that takes place off the beaches from Ninilchik to Homer.

As of July 2, the time of the spill, several popular sport fisheries had already taken place. The early run of Kenai king salmon was over as was the early run sockeye fishery on the Russian River. The king fishery on the Kasilof River occurs mainly in May and June, so it was receiving less activity by the time of the spill. The lower peninsula king salmon fisheries (Deep Creek, Ninilchik Cree, Anchor. River, Homer Spit, Halibut Lagoon) had already taken place. However, the most popular fisheries overall were just beginning. The halibut charter boat fishery receives the largest number of clients during July and August. The second run Kenai fishery was just beginning, with activity constant throughout the month of July. The silver salmon fisheries on all rivers and streams on the Kenai peninsula does not begin until the latter part of July and runs through September (and later).

Potential impacts to the sport fishing public include:

- o limitation of opportunities due to time or area closures to avoid oiled areas;
- o loss of contaminated fish;
- o loss or damage to gear; and
- o time and/or equipment used for voluntary spill cleanup.

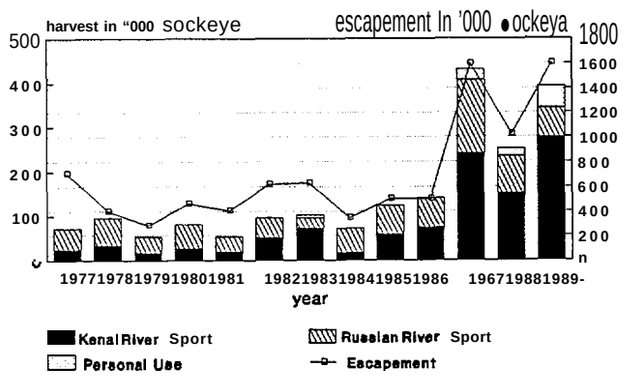
There was, however, a very important yet inadvertent benefit to sport fishermen and personal use fishermen as a result of the S.S. Glacier Bay spill. This benefit was the result of access to a larger portion of the sockeye run in the Kenai River.

The current sockeye escapement goal for the Kenai River is a range of 400,000 to 700,000 fish. Sport fishermen direct their efforts to the number of sockeye that make it into the river as escapement. Personal use fishermen are only allocated fishing time if the escapement is projected to be above 700,000.

Sport fish and personal use harvests for the Kenai River from 1977 through 1988 are shown in Figure 4-8. What these show is the relationship between escapement of sockeye and sport and personal use harvest. This was a result of the combination of the largest run in history and whatever disruptive effects the S.S. Glacier Bay oil spill had on the commercial fishery. The figures for 1989 show a similar experience given the affects of the S.S. Exxon Valdez.

A direct causal relationship between spill-related disruption in the commercial fishery and the increased escapement levels to the Kenai River cannot be assumed. The results could be attributed to the effects of other factors, most prominently the largest sockeye run in history. However, in their claims for damages from the S.S. Glacier Bay spill, both commercial fishermen and processing companies included the increased sport catch as part of their loss.

Figure 4-8: Sportfish/Personal Use Sockeye Harvest for the Kenai River, 1977-1989



data from ADF&G, compiled by ResourcEcon

4.7.1 Methodology

In evaluating losses to the sport fishing public and to the guide/charter service businesses, several assumptions were made in collecting data for analysis. First, representatives of both components of the sport fishing sector would be knowledgeable of loss or contamination, and be able to assess the type and value of loss that occurred. Based on the results of the field interviews, this assumption appeared true, with one qualification. In some cases, interviewed representatives of associations involved with sport fishing were not thoroughly briefed on the impact since they had only been recently appointed or elected to their posts. This problem was addressed by contacting past presidents or representatives who dealt with events of importance to the members during the time of the oil spill. Figure 4-9 shows the model and data requirements for estimating losses to sport fishing.

Another assumption was that these associations would be aware of impacts associated with their members. This was also true. Field interviews with individual fishermen, guide and charter boat businesses matched the information obtained from the associations.

4.7.2 Contacts

Table 4-21 shows the groups and associations contacted for this study. Representatives from each group were contacted in person or by telephone to ask what were the impacts on their members from the S.S. Glacier Bay spill. Association representatives were asked for the names of other key contacts in order to ensure full coverage of users. In addition, individual fishermen from Homer, Kenai, Soldotna (selected at random during several fisheries management meetings in November through April) were also personally interviewed to discuss their impacts from the spill.

4.7.3 Costs and Benefits

With little exception, response from sport fishing representatives indicated they did not experience negative impacts from the S.S. Glacier Bay spill.

They did not experience losses due to oil fouled boats or gear, from loss of fishing opportunity, or from harvest of oil fouled fish that had to be discarded (with one exception below). None of the sport fishing groups contacted had legal claims for damages resulting from the spill.

Figure 4-9 Model Of Oil Spill Expenditures, Estimation And Records

Industrv/expenditure-!oss Category	Basis for Estimating/Record Requirements
Sport Fishing	
Losses	Losses
• value of 'gear damaged or replaced	• *replacement cost/receipt*
• number of contaminated fish discarded	• *#of fish discarded*
• lost fishing opportunity due to: - closures - presence of oil in fishing areas - down time from gear fouling	• *#of lost angler days (#of anglers X # of days lost)*
• value of lost charters and business from actual or rumored presence of oil	• *#of **cancelled** trips X revenue per trip*
Expenditures	Expenditures
•gear and vessel cleaning	. *actual **cost/receipt***

(1) losses include only direct material loss to the harvester, and do not address losses associated with **social** and psychological impacts

Table 4-21: Sport Fishing Organizations Contacted

Group	Information Received?
Alaska Flyfishermen's Association	yes
Alaska Sportfishing Association, Anchorage	yes
Cook Inlet Professional Sportfishing Association	yes
Homer Charter Boat Association	yes
Kenai River Sportfishing Association	yes
South Peninsula Sportfishing Association	yes

Prior to interviews, the study team anticipated that a group likely to be impacted was the halibut charter boat fleet that operates out of Homer. However, the 1987 President of the Homer Charterboat Association responded that the fleet was not impacted. They were not subject to time/area closures, their boats and gear were not fouled by oil, fish caught by their customers were not fouled and businesses did not receive cancellations of customers concerned about impacts from the S.S. Glacier Bay spill. Their impression was that clients associated the oil spill impacts with salmon in the central district of Cook inlet, and did not evidence concerns over halibut in the lower areas of Cook Inlet.

Several individual charter boat businesses gave the same response when asked about the impacts on their businesses. Halibut charters do not typically fish the rip areas where the oil seemed to accumulate. There was no fouling of their boats or gear. One operator from Ninilchik reported no impacts, but stated that they had to avoid oil to keep it off the boats.

One of the sportfish associations did report an incidence of oil contamination on sockeye caught in the Kenai River. Several fish placed in a cooler were found to have patches of oil on their heads that caused flesh to "sluff off' of the areas oiled. This effect was also reported by some commercial fishermen. The person reporting the contamination had heard of other sport caught fish that had been contaminated, but was unable to estimate the amount. In general, however, the impression of the sportfishing public and guides was that the sport fishery takes place in fresh water and the problems of oil fouling did not occur.

With limited information on negative sportfishing impacts, they are thought to be negligible.

4.8 Subsistence and Personal Use Fisheries

Figure 4-10 presents the model developed to estimate economic impacts to the subsistence and personal use fisheries. The scope of work for the project did not entail evaluating other losses although such losses may represent substantial impacts to affected parties.

4.8.1 Subsistence Fishery

In 1987 there were three subsistence fisheries in Cook Inlet, at Port Graham, English Bay, and Tyonek. Key informants for the subsistence fisheries included the village council presidents of each community, ADF&G subsistence division personnel, and a representative of the North Pacific Rim, the regional non-profit corporation for Port Graham and English Bay. All key informants reported no impacts to any of the subsistence fisheries from the S.S. Glacier Bay oil spill. Reportedly, no oil was sited at any of the villages, however the English Bay village council president stated that a flock of oily ducks landed on beaches near the village after the spill event. The ducks could not fly away and all eventually died. All key informants indicated that the subsistence fisheries were not disrupted by the spill because all three are located outside the geographic range of the spill.

4.8.2 Personal Use Fishery

In 1987, four personal use salmon fisheries occurred on the Kenai Peninsula north of Kachemak Bay:

- set gill net fishery at the mouth of the Kasilof River, June 21 -27;
- Kasilof River dipnet fishery, July 10 to August 5;
- Kenai River dipnet fishery, July 23 to August 5;and
- set gillnet fishery in the Central and Northern districts (on the east shore from the Kasilof River to Point Possession) during the last three weekends in September.

The oil spill had some impact on the personal use dip net fisheries in the Kenai and Kasilof Rivers. Oil from the S.S. Glacier Bay hit the beaches near and at the mouths of both rivers, causing an emergency closure of the dip net fishery in the Kasilof River for one 24 hour period due to possible oil contamination.

As explained in the methodology, potential personal use key informants were selected from a list of persons holding permits for the September personal use set net fishery. For this reason, the sample consists mainly of people who fished the September opening and therefore may under represent participants in the two dip net fisheries.

Figure 4-10 Model Of Oil Spill Expenditures, Estimation And Records

Industry/expenditure-loss Category	Basis for Estimating/Record Requirements
Subsistence	
Losses (1) • value of gear damaged or replaced • value of contaminated fish and wildlife discarded • value of fish and wildlife not harvested due to: - harvest closures - presence of oil in harvest areas (2) - down time from gear fouling	Losses • *replacement cost/receipt* • *#of fish and wildlife X lbs. X local price/lb. of replacement purchased foods* • *direct: estimate #of harvesters affected X average # of fish and wildlife lost (average loss from interviews) X lbs./fish and wildlife X local replacement price/lb.* *indirect: calculate historic daily catch minus spill related catch equals lost catch [# of fish and wildlife X lbs./fish and*
Expenditures • harvest gear and vessel cleaning	Expenditures . *wage X bouts worked or actual cost/receipt*

(1) losses include only direct material loss to the harvester, and do not address losses associated with social, cultural, and psychological impacts

(2) uncertainty regarding contamination of fish and wildlife resources may be a significant impact

Seventeen fishermen who held personal use permits for the September fishery were interviewed about their participation in any of the three personal use fisheries that occurred after 2 July 1987 (see Methodology). Of the 17 personal use fishermen interviewed, 15 reported they experienced no impacts and saw no oil from the S.S. Glacier Bay spill, and one fisherman did not recall if he was impacted. One personal use fisherman reported she did not participate in either of the dipnet fisheries because she feared the fish were contaminated with oil, but that she did fish the September set net opening without experiencing oil impacts. This fishermen also said she knew of several others who did not fish the dipnet openings due to fear of oil contamination. The 15 fishermen who stated they were not impacted by the spill all reported they did not know of any other personal use fishermen who were impacted. All of the fishermen interviewed, including the person who did not fish the two dipnet openings because she feared oil contamination and the person who could not recall if he was impacted, reported that the size of their harvests during the 1987 personal use season were the same or better than most seasons.

Most of the fishermen interviewed stated that they thought the personal use fisheries were not impacted by the spill because the two set net openings happened before the spill (June) and after the oil had dissipated (September). Several of the personal use fishermen interviewed were also commercial set net fishermen who reported their commercial set net sites were impacted by oil during July and August, but that they fished the same site during the September personal use fishery and were not impacted by oil.

5.0 SUMMARY

This summary addresses the implications of the data collection effort, the overall economic impact of the spill, and the utility of this study in forecasting oil spill impacts and permitting exploration and development activities.

The major objective of this study is to identify costs and benefits associated with the S.S. Glacier Bay oil spill to aid MMS in:

- evaluating the potential effects of oil spills during the preparation of environmental assessments associated with the oil and gas leasing program; and

- instituting appropriate permit requirements for exploration and development activities on federal leases, regarding spill prevention and response.

This study is not intended to be a definitive analysis of all costs and benefits; rather it is intended to provide MMS with a description of the general range of costs and benefits. In addition, this study has no association with or intent to influence ongoing litigation regarding the S.S. Glacier Bay spill.

5.1 Data Collection

Based on the published accounts of the spill and conversations with key informants during the literature review phase of the project, the team was successful in identifying the types of data to be collected and the key informants to be contacted. A thorough and systematic attempt to collect spill related information was made through the use of interview protocols and interviews with key informants.

However, the success in obtaining information from key informants and the validity of information obtained varied significantly between the different groups affected by the spill and response activities. Two major factors came into play:

- The length of time between the spill event and the study. The lapse of almost three years between the S.S. Glacier Bay oil spill and this study made it difficult to obtain data from some sources. Personnel changed, some records were already archived, memories faded, and the occurrence of the S.S. Exxon Valdez oil spill and its demands on agency and industry staff made it difficult to obtain data in some instances.

- Litigation. The involvement by all major parties in litigation over the spill affected both the willingness of some individuals to provide information and the form in

which the information was provided. Parties in all major sectors did not want to provide information for fear that this study would have an impact on litigation. Even when information was provided, litigous considerations slowed the process of obtaining information. There were also instances where figures provided by key informants on costs, expenditures, or losses were prepared under the guidelines of attorneys seeking maximum compensation for their clients, making the basis for such figures difficult to ascertain.

5.2 Economic Impact from the S.S. Glacier Bay Spill

Using the information obtained, a summary of costs is presented in Table 5-1. The expenditures for the petroleum industry and the other categories can not be summed to arrive at a total because expenditures by other groups may have been compensated by the petroleum industry. Information is not yet available to reliably trace the flow of funds between organizations.

As previously discussed, lack of response from major participants due to pending litigation critically hampers estimation of impacts for the petroleum industry and commercial fishing. The government sector has the most complete information on costs and benefits although data are lacking for some federal agencies. Processing companies that experienced major losses did not provide data.

Table 5-1: Summary of Economic Impacts to Date

Category	Expenditures	costs	Benefits
Petroleum Industry	$4,217,892	insufficient data	
Government	$2,462,421	$1,359,797	$1,102,625
Commercial Fishing			
Processing Sectors	$391,000	$391,000	
Drift Gillnet Fishermen		$10.2 to $41.6 million	
Set Gillnet Fishermen		$514,000 to $82.1million	
Sport Fishing		no measurable impacts	
Subsistence		no measurable impacts	

a. Includes contaminated salmon losses only. Insufficient data to calculate other costs for gear loss and extra labor.

One observation reinforced by this study is that each spill event has unique characteristics influencing its economic costs. By the nature of timing, location, and amount of oil spilled, there were no measurable impacts to subsistence fisheries and recreation/personal use fisheries. Similarly, there was minimal oiling of shoreline and little long term damage that could effect use of property and shoreline values. Because there was no statutory role or suitable opportunity for involvement of local government, there were no appreciable local government costs associated with the spill. The unpredictability of oil movement and appearance in Cook Inlet made commercial fishermen more cautious about how they fished and most likely increased their overall economic costs. If a "zero tolerance" decision regarding oil contamination had been issued for this spill, the impacts would have been much greater.

5.3 Utility for Estimating Spill Impacts

There have been few, if any, studies of Alaska oil spills that attempt to evaluate the economic impacts that result. Despite the difficulties experienced in obtaining economic cost data and the effect of data gaps on assembling an accurate picture of total economic impacts, the S.S. Glacier Bay oil spill report should be useful to those undertaking similar assessments in the future.

Development of the chronology was a minor element of the study but it helps in understanding the type of problems that occurred, particularly those concerning responsibility for decision making and spill response and cleanup actions. The affect of these problems on mounting an effective response, and impacts on economic costs of the spill should be useful in planning for potential spills in the future, and reviewing requirements for oil spill contingency plans. For example, the large number of parties involved in the spill resulted in lack of initial coordination and ineffective response measures. Concerns over liability and the lack of a formal set of agreements between industry participants and response resources regarding what to do in the event of a spill of this nature were significant factors. It also appeared that available spill response equipment was not able to effectively exclude or recover oil in the conditions "encountered in Cook Inlet. A great deal of time was expended discovering that equipment was not working and in making arrangements for obtaining additional equipment. All of these problems should have been anticipated or been taken care of prior to a spill event, through measures such as cooperative spill response agreements, and trials or drills involving deployment of equipment in Cook Inlet under less than optimum conditions.

The models developed for this study and shown in Section 4 describe losses and expenditures associated with coastal spills in Alaska, the data required to estimate these losses, and a general form of the calculations to arrive at an estimate of economic losses. It is important to observe and document the economic impacts of a spill while it

is in progress, and follow-up with participants immediately after completion of response actions in order to avoid the data availability problems encountered in this study. Identifying the major participants and the categories of participants is important to accomplish early because different data are required for estimating the economic impact to each group. Certain data requirements will be unique for each spill but the models provide generic data requirements for each group.

The value of subsistence products and recreational goods lost or foregone are not discussed in this model because of the difficulty in estimating such values and the lack of agreement within economics about the value of such products or visitor days.

6.0 REFERENCES

Alaska Attorney General's Office, 1987. Alaska Department of Environmental Conservation Costs and Expenses, RE: Tanker Glacier Bay Oil Spill, Cook Inlet, July 1987.

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Alaska Magazine, 1987. "The Alaska Sportsman; Crude Oil Fouls Fishing Grounds." Vol. 53, No. 11, November, pp 67-73.

Alaska State Legislature - House of Representatives Research Agency, 1987. Memorandum to Representative C.E. Swackhammer from Mary Jennings, Legislative Analyst, Alaska State Legislature / House of Representatives Research Agency. Re: State Role in Oil Spill Cleanup; Research Request 88.083; Attachment: Memorandum to Claire T. Dedrick, Executive Officer, California State Lands from James P. Trout, Assistant Executive Officer, California State Lands Commission. Re: S.S. Glacier Bay Oil Spill, Cook Inlet Alaska -2 July, 1987

also describes management strategies (such as test fisheries) and decision processes used to insure maximum fish harvest with minimum oil contamination. The movement of the oil and resultant management decisions are described chronologically. The annual management report also covers two of the four subsistence and personal use fisheries that took place in Upper Cook Inlet in 1987; the Tyonek subsistence salmon fishery and the Kasilof personal use gill net fishery which occurred during June and September, respectively. This report will be of particular use in evaluating the impacts of the oil spill on the commercial fishery.

TABLES CONTAINING OIL SPILL RELATED INFORMATION:

Table 14: Emergency order summary, Upper Cook Inlet commercial salmon fishery, 1987

Table 15: Commercial salmon fishing periods, Upper Cook Inlet, 1987

Table 16: Aerial survey set gill net counts by subdistrict, Upper Cook Inlet, 1987

Table 20: Buyers and processors of Upper Cook Inlet fishery products, 1987

OTHER MAPS / TABLES/ FIGURES: Numerous tables and figures showing: 1987 and historical commercial catch information by subdistrict, period, species and gear type; Sockeye salmon escapement estimates by river and year; Daily sockeye and coho salmon weir counts by location, 1987; Buyers and processors of Upper Cook Inlet fishery products, 1987; Personal Use harvest data by location and date, 1987; Seldovia district tide tables; Upper Cook Inlet salmon districts, subdistricts and statistical areas; Daily sockeye counts by river, 1987; Average price paid for commercially harvested salmon, Upper Cook Inlet, 1969-1 987; 1987 and historical subsistence and personal use salmon harvest, Upper Cook Inlet by fishery and species; Commercial harvest data for razor clams and herring.

DOCUMENT: Memorandum to Representative C.E. Swackhammer from Mary Jennings, Legislative Analyst, Alaska State Legislature / House of Representatives Research Agency Re: State Role in Oil Spill Cleanup; Research Request 88.083

DATE: December 30, 1987

AITACHMENT:Memorandum to Claire T. Dedrick, Executive Officer, California State Lands Commission from James P. Trout, Assistant Executive Officer, California State Lands Commission Re: S.S. Glacier Bay Oil Spill, Cook Inlet Alaska -2 July, 1987-August 12, 1987

SOURCE/LOCATION: Alaska State Legislature - House of Representatives Research Agency

KEYWORDS: Federal responsibility, State responsibility, Contingency plans, Industry response organizations, AK/CA comparison of oil spill response

ABSTRACT: This memorandum presents the results of research conducted to determine the following: 1) state and federal roles in an oil spill; 2) the State's relationship with response organizations; 3) how Alaska and California compare with

respect to oil spill response; and 4) whether or not the Cook Inlet Response Organization (CIRO) has worked with the University of Washington on research concerning the effect of oil dispersants on fish. The document contains a discussion of each of the four points and includes discussions on contingency plans and the S.S. Glacier Bay oil spill cleanup. Attached to this report is a report on the S.S. Glacier Bay oil spill response by the Assistant Executive Officer of the California State Lands Commission. The report to the California State Lands Commission focuses on problems experienced during the spill response based on observations of clean-up efforts. Aside from the brief reviews of the spill' and cleanup events these two reports contain little information relevant to the study.
MAPS/TABLES/FIGURES: None.

DOCUMENT: Tanker Officers Charaed In Wake of Cook Inlet Spill by Joel Gay
SOURCE: Alaska Fisherman's Journal Vol. 11, No. 2, February, 1988 pp **18-19.**
KEYWORDS: Class action lawsuit, Impacts to fishery
ABSTRACT: This article reports that the U.S. Coast Guard filed charges of negligence against the captain and pilot of the S.S. Glacier Bay relating to the July, 1987 oil spill, and that a group of Cook Inlet fishermen, processors and cannery workers filed a $10 million class action law suit against the owners of the vessel. The events of the spill and cleanup are briefly discussed. Of particular interest is an account of the impact of the spill on the commercial fishery. This account states that approximately 300 fishermen filed claims for lost gear and that fishermen are seeking payment for lost fishing time, lost value when the price for sockeye dropped to $1.40 a pound, and for the disruption in their season which created a glut of fish late in the season and caused processors to stop buying. Estimates of the total value of the 1987 sockeye harvest and of the average gross of the drift fleet are given.
MAPS/TABLES/FIGURES: Three photographs of fouled gear and contaminated fish accompany this article.

DOCUMENT: The Alaska Sportsman; Crude Oil Fouls Fishing Grounds edited **by** Jim Rearden
SOURCE: Alaska Magazine Vol. 53, No. 11, November 1987, pp 67-73
KEYWORDS: Chronology, Impacts to fishery,
ABSTRACT: This chronological narrative offers a thorough review of the spill movement and cleanup effort including it's effects on the commercial fishery. The difficult task of estimating costs to the commercial fishing industry is discussed, however no estimates are given. Law suits filed against the owners of the vessels as a result of the spill are briefly discussed. This article concludes with an account of lessons of ill-preparedness and inadequacies learned from the spill.
MAPS/TABLES/FIGURES: None.

APPENDIX A:
Annotated Bibliography
S.S. Glacier Bay Oil Spill Study

DOCUMENT: A Report on the Tanker Glacier Bay Spill In Cook Inlet, Alaska - July 2, 1987
DATE: May 1988
SOURCE/LOCATION: Alaska Department of Environmental Conservation, Anchorage
KEYWORDS: ADEC involvement, problems/recommendations, contingency plans, CIRO involvement, Chronology
ABSTRACT: The Alaska Department of Environmental Conservation report presents a brief overview of the department's involvement in the events following the S.S. Glacier Bay oil spill. The bulk of this report identifies operational problems and spill response deficiencies that occurred during the event and makes recommendations on actions that " may be taken by the oil industry, state, and federal agencies to correct the deficiencies and strengthen oil spill contingency plans. The involvement of the Cook Inlet Response Organization (CIRO) is also reported in relative detail. An appendix to the report, a chronology of the spill and cleanup, is included under a separate cover. This chronology is adapted from the Coast Guard Pollution Reports (POLREPS) which are contained in the USCG - FOSC report. The information provided in both chronologies is essentially the same. Of the information presented in this report, the overview of the spill and cleanup events (including the chronology) and the discussion of the decisions involving the cleanup are the most relevant to the current study.
MAPS/TABLES/FIGURES: None

DOCUMENT: Federal On-Scene Coordinator's Report Major Oil Spill M/V Glacier Bay Cook Inlet, Alaska 2 July to 3 August 1987
DATE: January 11, 1988
SOURCE/LOCATION: U.S. Coast Guard Marine Safety Office Anchorage, Alaska
KEYWORDS: Chronology, Cause, Cleanup, USCG involvement,
ABSTRACT: The report of the Federal On-Scene Coordinator (FOSC) provides detailed descriptions of the daily events pertaining to the spill and cleanup including cause of grounding, efforts to identify and then obtain a response from the responsible party, parties and equipment involved, area impacted, impacts to fisheries, and costs incurred while the cleanup was under the direction of the federal government. The report also addresses the effectiveness of the various cleanup efforts, decisions made pertaining to the cleanup, and the technical and logistical problems that were encountered during the cleanup. Enclosures included with this report provide further detailed information. Among the enclosures are: the Cook Inlet chart and U.S. Coast Pilot No. 9 with cautions; the NOAA Cook Inlet Survey; the MSO Anchorage Investigative Report; lists of vessels and boats used during cleanup and problems encountered with skimmers; the FOSC'S

Cost Report (11 Jan 1988); USCG Sedge and other USCG Pollution Message Reports; AD F&G Cook Inlet Fisheries Summary (3 Sept. 1987); SGS Control Services report to Tesoro; SGS Ship's Tanks Ullage Report for S.S. Glacier Bay before and after discharge; Caleb Brett Ullage Report for S.S. Glacier Bay (7 July 1987 and 30 June 1987); Air Station Kodiak Deployment Summary; ADF&G emergency closures due to the oil spill and a list of commercial salmon fishing periods for 1987; Seakem Oceanography Limited report (8 Dec 1987); Coast Guard Marine Safety Information System computer readouts on the S.S. Glacier Bay incident; a copy of the telephone log of the Coast Guard Command Post compiled during the S.S. Glacier Bay incident; and various news releases and correspondence pertaining to the spill. Of particular interest to the study this document contains a detailed chronology of the spill and cleanup events, detailed information on costs incurred by the federal government, and an account of resources and manpower committed and parties involved during the cleanup. This is the most comprehensive of all the reports on the S.S. Glacier Bay spill currently available.

MAPS: Summary of spill events and oiled beaches as of 6 July
Observations for 10 July and observations for 13 July
Nautical Chart of Cook Inlet, Eastern Portion
Nautical Charts of Cook Inlet
Eastern Portion including findings of NOAA hydrographic survey
Maps of Cook Inlet showing ADF&G emergency closure lines;

TABLES: List of Vessels Used in Glacier Bay Pollution Incident
Ship's Tanks Ullage Report before loading
Ship's Tanks Ullage Report after loading
Caleb Brett Vessels Ullage/Sounding & Capacity Report
Commercial salmon fishing periods, Upper Cook Inlet, 1987

FIGURES: S.S. Glacier Bay Tank Configuration and Damage Location
Photographs of S.S. Glacier Bay Incident
Upper Cook Inlet commercial salmon harvest by species 1954-1987
Commercial salmon catch by area and gear Upper Cook Inlet, 1987
Average Percent of Sockeye Harvest By Gear
1987 Percent of Sockeye Harvest By Gear "
Upper Cook Inlet Sockeye Salmon Harvest 1954-1987

DOCUMENT: Alaska Department of Fish and Game Division of Commercial Fisheries - Upper Cook Inlet Annual Management Report, 1987

SOURCE/LOCATION: ADF&G Division of Commercial Fisheries

KEYWORDS: Effects of oil spill on fisheries management, Emergency closures,

ABSTRACT: The S.S. Glacier Bay oil spill had a direct effect on the management of the commercial and personal use fisheries in Upper Cook Inlet during the 1987 season. The ADF&G annual management report provides a detailed description of the 1987 commercial fishery, and offers a brief description of the spill event and the subsequent behavior and movement of the oil. Of particular interest to the study the ADF&G report

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Mouser, H. R., 1990. Manager, Cook Inlet Pipe Line Company. Personal Correspondence. June,11.

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____, 1987, "$10 Million Law Suit Filed Over Cook Inlet Oil Spill." Vol. 33, No. 29, 7-22-87.

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Rogers, Phyllis, 1990. Economist. Alaska Department of Revenue. Personal Communication. February 22.

Tarbox, Ken and James Browning, 1990. An Estimte of Juvenile Fish Densities in Skilak and Kenai Lakes, Alaska Through the Use of Dual Beam Hydroacoustic Techniques in 1989. Regional Information Report No. 2S90-1, Alaska Department of Fish and Game.

U.S. Bankruptcy Court, 1990. Disclosure Statement Information Regarding the Debtor's First Amended Joint Partially Consolidating Plan of Reorganization Dated February 8, 1990 Apex Oil Company, Inc. U.S. Bankruptcy court, Eastern District of Missouri, Eastern Division. Case Number 87-03804-BKC-BSS.

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DOCUMENT: Tanker Spills Oil in Cook Inlet
SOURCE: Petroleum Information Alaska Report, Vol. 33, No. 27,7-8-87

DOCUMENT: Cook Inlet Spill Halts Commercial Fishing
SOURCE: Petroleum Information Alaska Report, Vol. 33, No. 28,7-15-87

DOCUMENT: $10 Million Law Suit Filed Over Cook Inlet Oil Spill
SOURCE: Petroleum Information Alaska Report, Vol. 33, No. 29, 7-22-87

DOCUMENT: Rock May be Culprit in Oil Spill
SOURCE: Petroleum Information Alaska Report, Vol. 33, No. 30,7-29-87
KEYWORDS: Chronology, Cleanup, Law suit, NOAA survey
ABSTRACT: This series of articles report on the events of the spill and cleanup as they occurred. The articles are brief and offer only general information.
MAPS / TABLES / FIGURES: None,

DOCUMENT: Newspaper articles
SOURCE: Anchorage Times, Anchorage Daily News, Peninsula Clarion
KEYWORDS: Chronology, Interviews with cleanup parties and fishermen, Impacts to fishery,
ABSTRACT: All aspects of the S.S. Glacier Bay oil spill were given thorough coverage by the Anchorage Times, the Anchorage Daily News, and the Peninsula Clarion. Newspaper articles provide a chronological history of the event and identify many of the key players involved in the spill cleanup. Also identified by newspaper articles are many commercial fishermen who's gear was fouled by oil or who caught contaminated fish. Likewise impacted fish processors are identified. **The** articles also contain valuable information about the management of the commercial and personal use fisheries with respect to the spilled oil and about the numbers of contaminated fish caught during each opening. Articles pertaining to the S.S. Glacier Bay oil spill appeared in the Anchorage Times, Anchorage Daily News, and the Peninsula Clarion on close to a daily basis between July 3 and July 29, 1987.
MAPS / TABLES/ FIGURES: Newspaper articles include a variety of photographs of cleanup operations and impacted fishery. Several maps depicting the movement and presence of oil are found in each of the three papers.

DOCUMENT: "Elusive oil hinders cleanup" by PAC Ed Moreth
SOURCE: Alaska Bear (a publication of the U.S. Coast Guard), July-September 1987, pp 1-3.
KEYWORDS: Disappearing oil, Cleanup problems
ABSTRACT: This brief journal article focuses on problems experienced during cleanup due to inaccurate scientific predictions and dynamic inlet riptides. The author likens the cleanup operation to a cat and mouse game where the oil would disappear between

tides and beneath booms. This article contains valuable summary information including the estimated amount of oil collected and the estimated cost of the cleanup to the Coast Guard.
MAPS / TABLES / FIGURES: Two photographs of the cleanup operation accompany this article.

DOCUMENT: Alaska Department of Fish and Game Annual Kenai Peninsula Sportfish Management Report, 1987
SOURCE: Alaska Department of Fish and Game, Sport Fish Division, Soldotna
KEYWORDS: Kasilof River personal use dip net fishery, Kenai River personal use dip net fishery
ABSTRACT: This report provides the background and regulations for both personal use fisheries and summarizes the 1987 season. The summaries state when the fisheries opened and closed and report the total estimated harvest for each fishery. The Kasilof River fishery was closed for a 24 hour period as a precautionary measure due to possible oil contamination from the S.S. Glacier Bay spill. The Kenai River fishery did not experience any closures due to the oil spill.
MAPS: Map of the Kasilof River showing the area open to personal use dip net fishing, 1986.
TABLES: Kasilof River Personal Use Dip Net Fishery Summary, 1981-1987.

DOCUMENT: Alaska Department of Environmental Conservation Costs and Expenses, RE: Tanker Glacier Bay Oil Spill, Cook Inlet, July 1987
Alaska Department of Fish and Game Costs and Expenses, RE: Tanker Glacier Bay Oil Spill, Cook inlet, July 1987
SOURCE: State of Alaska Attorney General's Office, Anchorage
KEYWORDS: Costs and expenses incurred by agencies
ABSTRACT: Complete itemized lists of costs and expenses incurred by DEC and ADF&G have been made available to the study team by the Attorney General's Office in Anchorage. The expense list is separated by division.

APPENDIX B: .

Maps

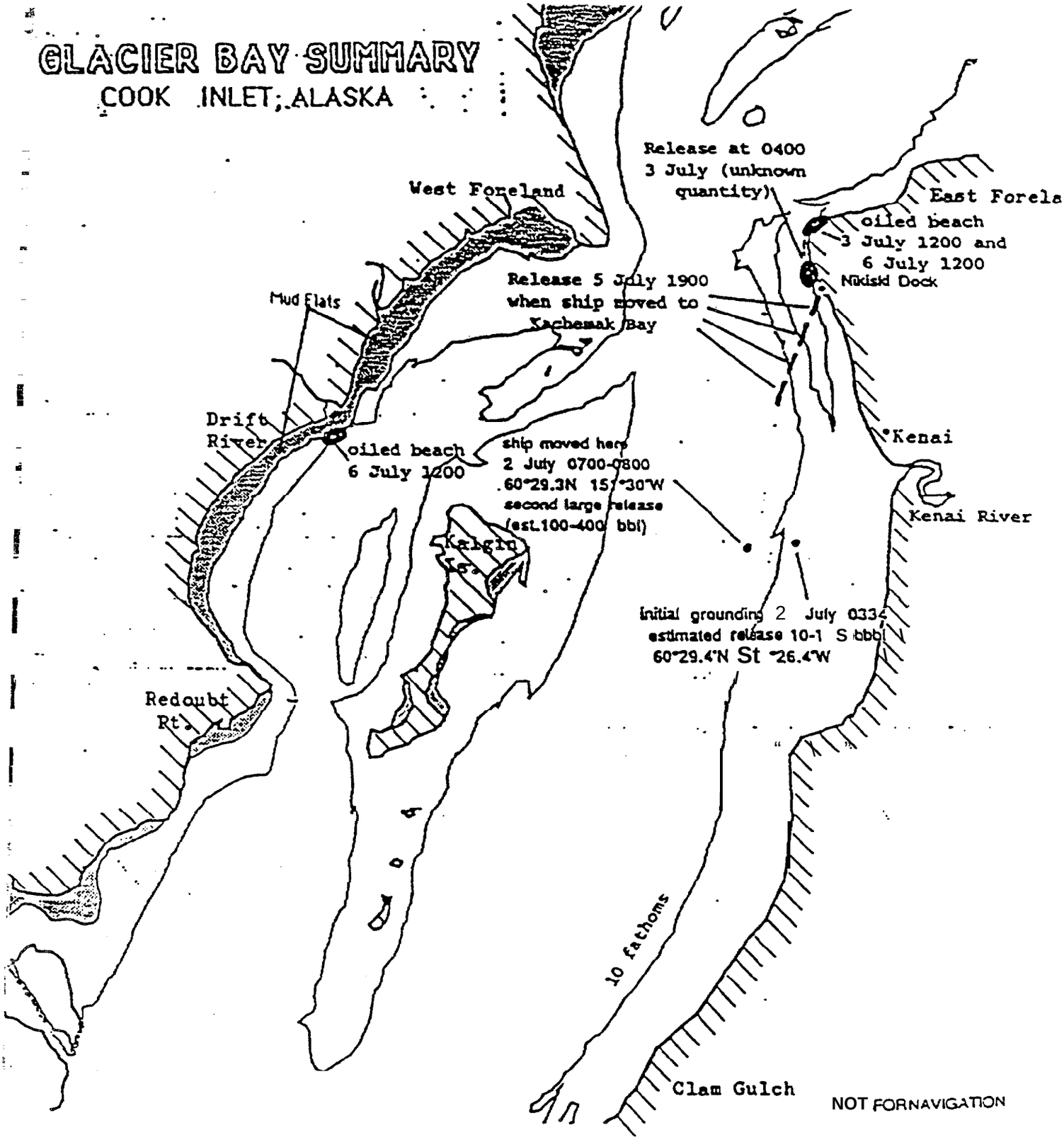

FIGURE 1:
GLACIER BAY SUMMARY

Source: U.S. Coast Guard, 1988.

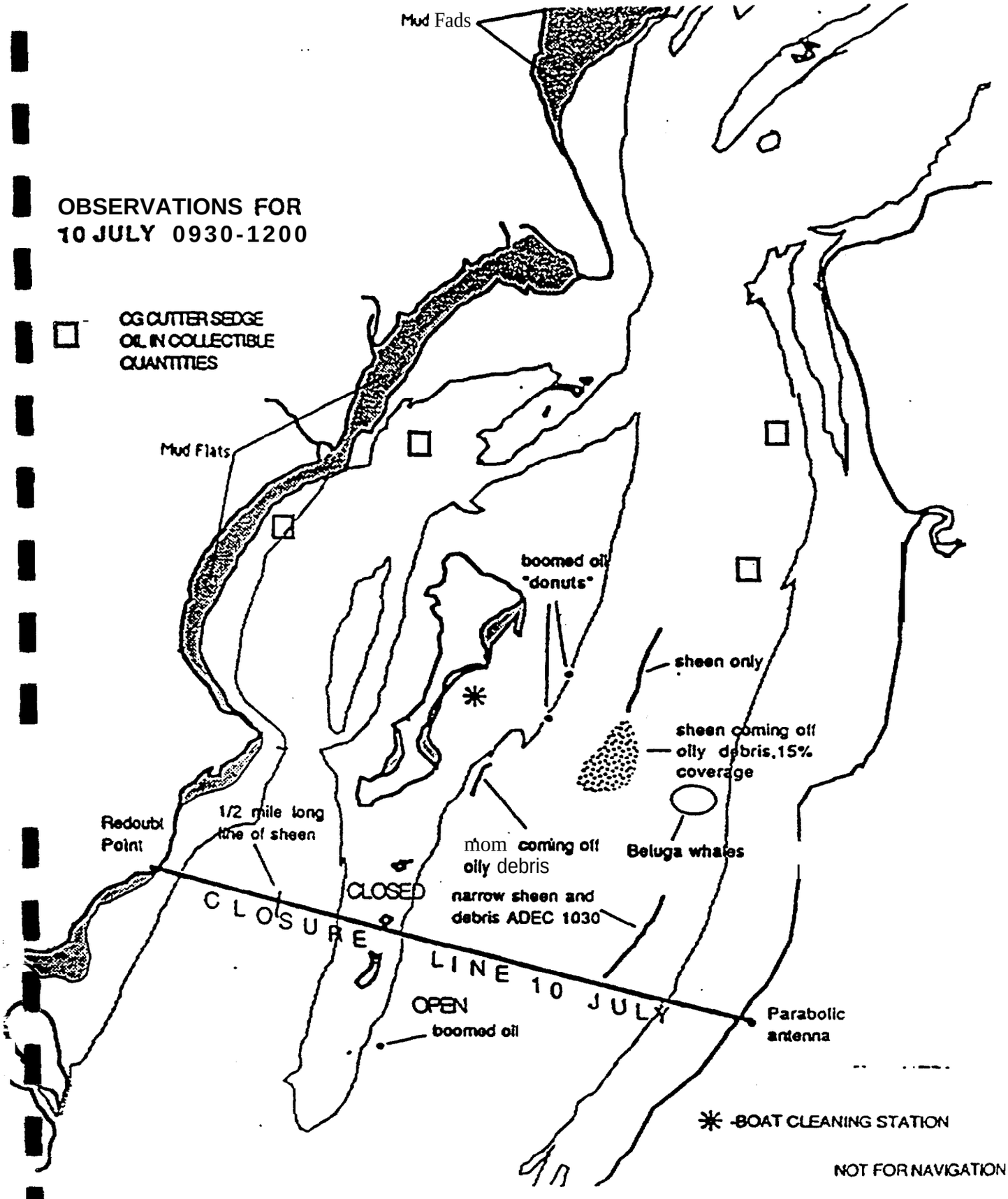

FIGURE 2:
OBSERVATIONS FOR 10 JULY

Source: U.S. Coast Guard, 1988.

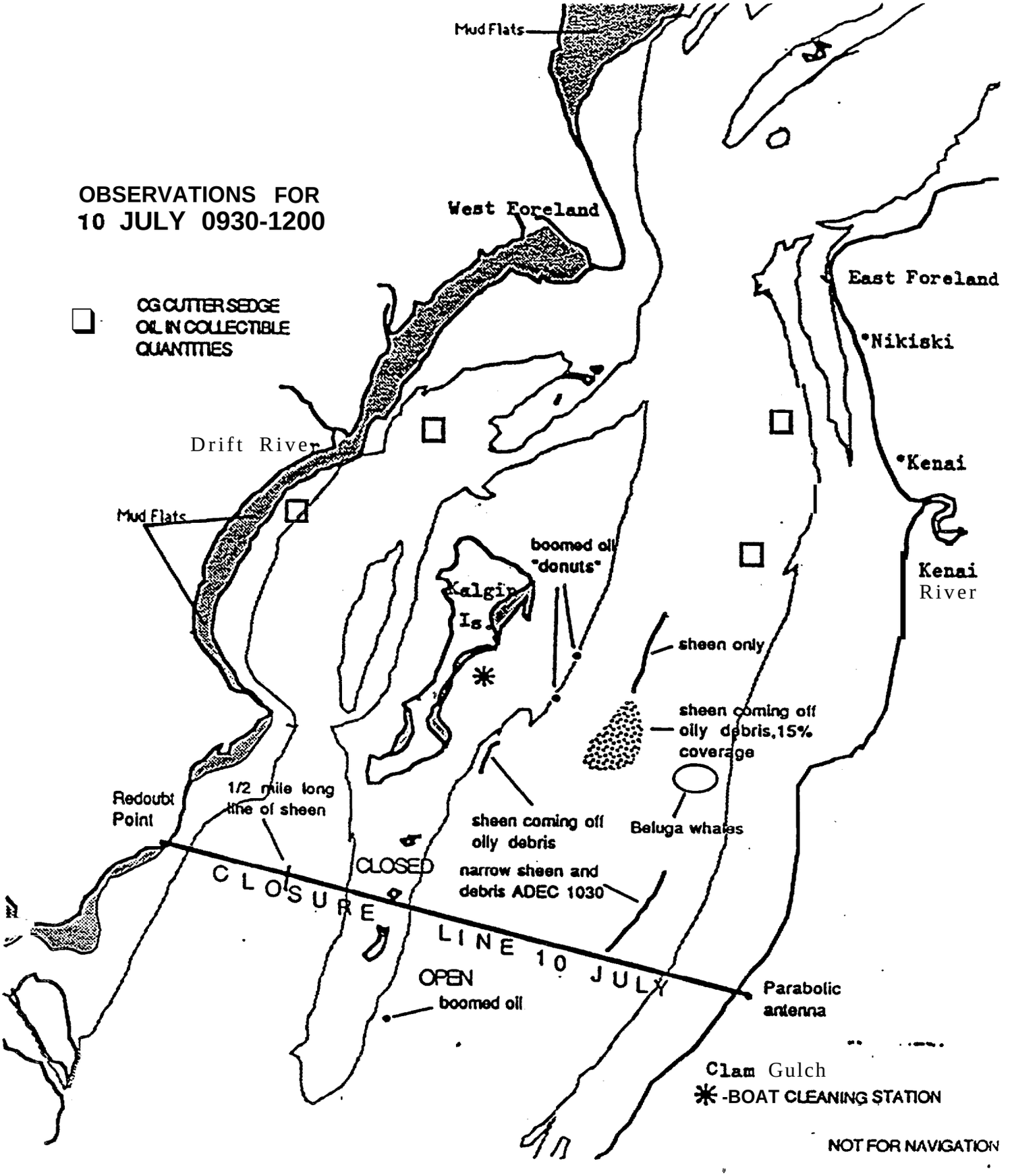

FIGURE 3:
OBSERVATIONS FOR 10 JULY

Source: U.S. Coast Guard, 1988.

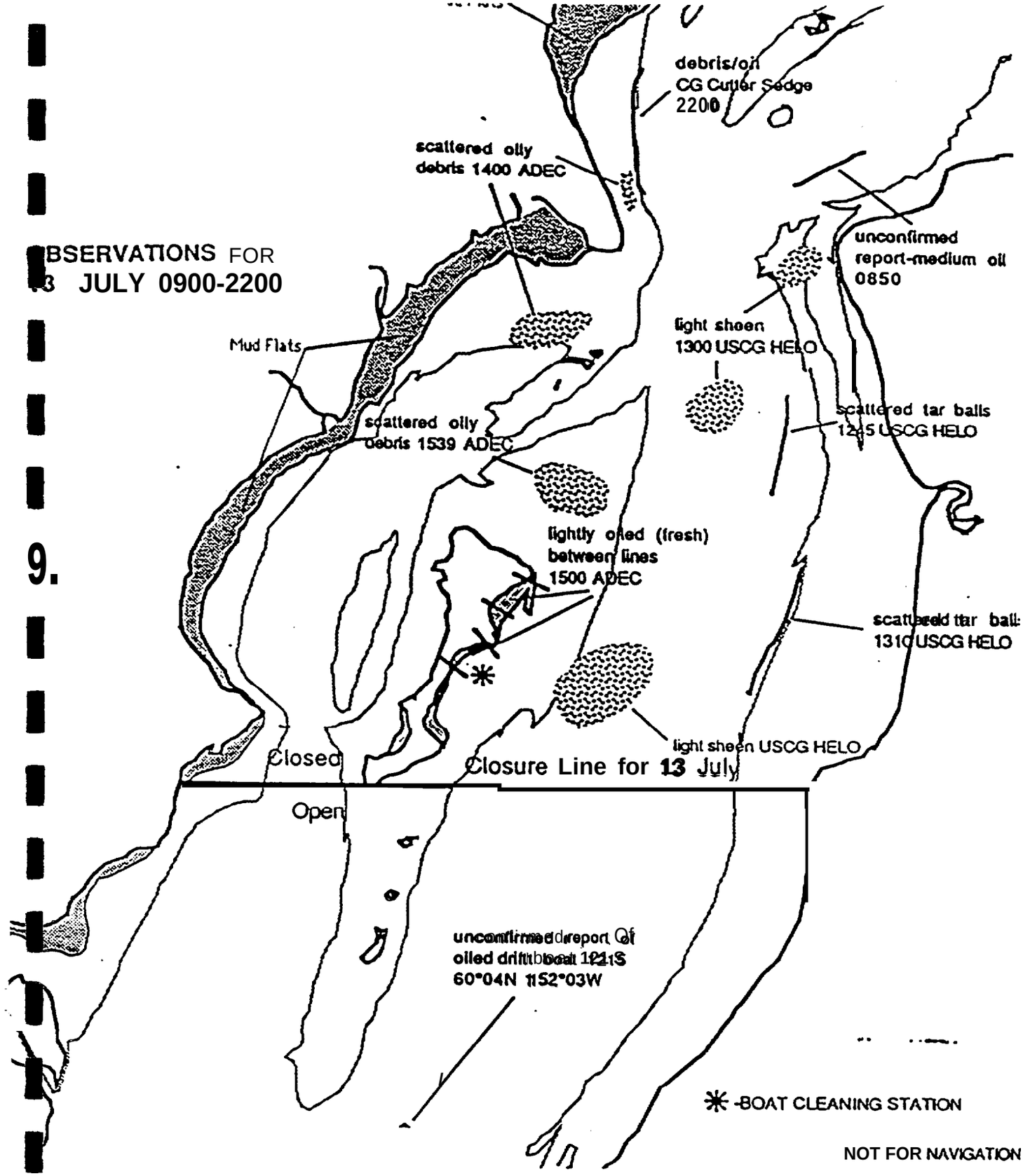

FIGURE 4:
OBSERVATIONS FOR 13 JULY

Source: U.S. Coast Guard, 1988.

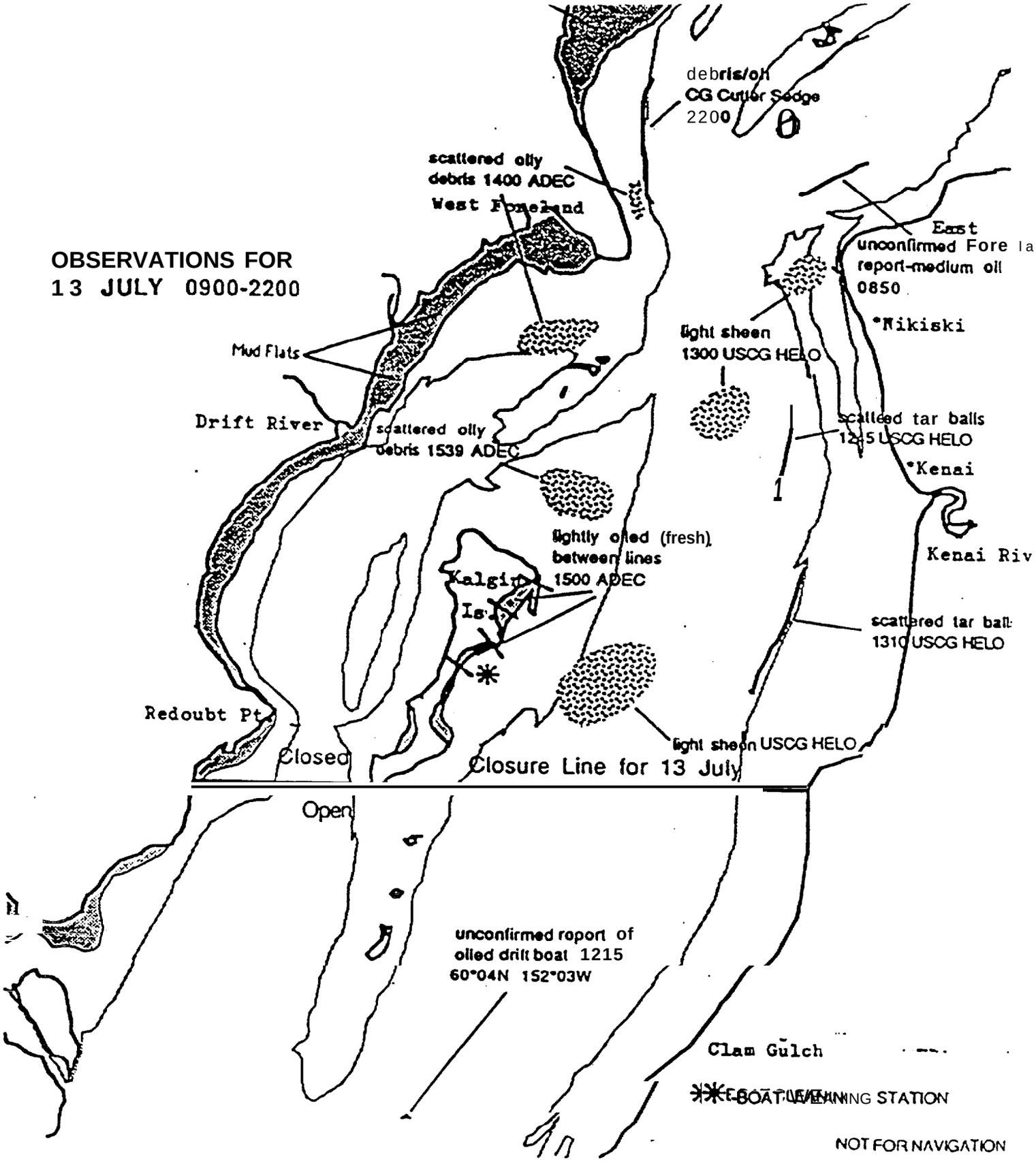

FIGURE 5:
OBSERVATIONS FOR 13 JULY

Source: U.S. Coast Guard, 1988.

APPENDIX C:
Key Informant Protocols for the S.S. Glacier Bay Oil Spill

The following table lists each general group affected by the spill (e.g., the commercial fishing industry), subgroups within each general group (e. g., individual drift and set net fishermen), and the type of data the study team determined needed to be gathered from each group and subgroup based on gaps in the available literature:

INVOLVED GROUP: TYPE OF DATA TO BE COLLECTED:

Commercial Fishing Industry

- Individual drift and set net fishermen:
  - gear damage" estimates, type of gear and value;
  - amount of compensation received (from whom) for damaged gear;
  - amount of paid employment on spill response and cleanup;
  - dollar amount received for" vessel or equipment leasing for spill response and cleanup;
  - number of voluntary manhours spent on spill response and cleanup;
  - amount of time vessels or equipment were donated for spill response and cleanup;
  - estimates of amount and value of contaminated fish caught;
  - dollar amount of compensation received (from whom) for contaminated fish;
  - estimates of harvest and income lost due to closures.
- Kenai Peninsula Fisherman's Cooperative:
- United Cook Inlet Drift Association (UCIDA):
- Northern District Set Net Association:
- Cook Inlet Fisherman's Fund:
- North Pacific Fisheries Association:
  - location and movement of oil during spill/response;
  - number of members affected by the spill, and their names (possible key informants);
  - estimates of overall gear damage, including names of members whose gear was fouled;
  - record of association members, boats and equipment located to help in cleanup operations;
  - changes in fish prices and other trends during spill event;
  - estimates of harvests and income "lost due to closures.
- Commercial fish processors:
  - estimates of amount and value of contaminated fish received (from whom);

INVOLVED GROUP:	TYPE OF DATA TO BE COLLECTED:
Commercial fishing industry (continued	
	o estimates of income lost due to closures of fisheries or contaminated fish received;
	0 records of prices paid for product during and after spill event;
	0 market perceptions of fish products during and after spill event.
0 Cannery Workers	
	o loss of processing employment due to closure of fisheries.
Subsistence and Personal Use Fisheries Groups	
o Individual subsistence and personal use fishermen:	
	o geographic extent of oil and effects on participation in fisheries;
	0 amount of time fishery affected (i.e. that fishermen did not fish or caught contaminated fish);
	0 paid employment and leasing of vessels/equipment for spill response and cleanup;
	0 voluntary manhour and vessel/ equipment use for response and cleanup;
	0 gear damage estimates, type and value;
	0 amount of compensation received (from whom) for damaged gear;
	0 estimates of harvest lost due to 1) closure of fisheries or 2) real or perceived oil contamination;
	0 estimates of dollar amount spent on substitute foods.
Local. state, and federal government agencies	
o Coast Guard divisions:	
	o description of each division's responsibilities and involvement in spill response, monitoring and cleanup;
	0 changes in assessment of economic impact to the agency including associated expenditures and manhours since FOSC report was published;
	0 length of time each response measure was in place, including how long specific vessels and work crews were retained or employed;
	0 geographic extent and duration of specific response measures;
	0 detailed record of changing geographic distribution of oil throughout spill event;
	0 location, date and size of unconfirmed reports of oil.

INVOLVED GROUP: TYPE OF DATA TO RECOLLECTED:

Local, state, and federal government agencies (continued)

- o National Marine Fisheries:
  - 0 description of agency's responsibilities and involvement in spill response, monitoring and cleanup;
  - o assessment of economic impact to the agency including associated expenditures and manhours.

- o Environmental Protection Agency:
  - o description of each agency's responsibilities and involvement in spill response, monitoring and cleanup;
  - o assessment of economic impact to the agency including associated expenditures and manhours.

- o Alaska Department of Fish & Game:
  - o record of changing geographic distribution of oil throughout spill event, including how long specific fishing areas were affected (for commercial, personal use, subsistence, and recreational areas).

- o Alaska Department of Environmental Conservation:
  - o description of each division's responsibilities and involvement in spill response, monitoring and cleanup;
  - 0 assessment of economic impact to the agency including associated expenditures and manhours.
  - 0 record of changing geographic distribution of oil throughout spill event;
  - 0 numbers of contaminated fish collected at inspection stations and canneries each day.

- o Local governments (including Kenai, Kasilof, Nikiski, Homer, Tyonek, English Bay, and Port Graham):
  - o records of damage to property or impacts on private citizens.

Oil and transportation industry groups

- o All involved oil and transportation industry groups:
  - o Expenditures associated with the spill, response, and cleanup including:
    - o wages (including employees and contract labor)
    - 0 supplies and equipment purchased;
    - 0 vessels/equipment leasing and operating expenses (including contracted vessels/equipment);
    - 0 expenditures for damaged gear (replacement, repair, cleaning);
    - 0 compensation paid to affected parties.

INVOLVED GROUP: TYPE OF DATA TO BE COLLECTED:
Recreational fishermen. and etc. (continued

Recreational fishermen, guide and charter businesses, tourism industry

- o Individual recreational fishermen:
  - o number of days and location where fishing was prohibited or limited due to real or perceived contamination.

- 0 Fishing guide services/charter businesses:
  - o number of days and location where fishing was prohibited or limited due to real or perceived contamination;
  - 0 estimated dollar loss due to cancellations or lack of business during spill event;
  - 0 paid employment and leasing of vessels/equipment for spill response and cleanup;
  - 0 voluntary manhours and vessels/equipment used for spill response and cleanup.

- o Alaska Sportfishing Association:
- 0 Kenai River Sportfishing Association:
- 0 Cook Inlet Professional Sportfishing Association (CIPSA):
- 0 Alaska Fly fisherman's Association:
- 0 South Peninsula Sportfishing Association:
- 0 Homer Charter Boat Association:
  - o number of days and location where fishing was prohibited or limited due to real or perceived contamination;
  - o members affected - possible key informants.

- o Tourism industry:
  - o estimated dollar loss due to cancellations or lack of business during spill event.

Fishing Organizations

Discuss the organization's role in response to the S.S. Glacier Bay oil spill

Probe for estimated value of losses to fishermen from:
- o loss of fishing periods or restricted fishing areas
- o oil fouled fishing gear
- o oil fouled vessels
- o refusal of catch by processors due to oil contamination
- o reduction in price due to oil contamination
- o pulling gear or leaving preferred fishing areas to avoid oil

Discuss member compensation for any losses caused by the spill

Address the long term impacts on fishermen as a result of the spill

Based on the key informant's observations during the oil spill response and cleanup, discuss factors influencing costs related to the spill damage and response

Discuss the geographic extent of the oil impact

Probe for additional comments that would be useful to this study

Individual Commercial Fishermen

Discuss the losses to the fishing operation (due to the spill) and the estimated value of:

- o loss of fishing periods or restricted fishing areas
- o oil fouled fishing gear
- o oil fouled vessels
- o refusal of catch by processors due to oil contamination
- o reduction in price due to oil contamination
- o pulling gear or leaving preferred fishing areas to avoid oil

Other than the ADF&G fishery closures or restrictions, probe for where and when they were unable to fish

Address compensation for losses caused by the spill

Discuss the long term impacts on Cook Inlet fishermen as a result of the S.S. Glacier Bay spill

Probe for any comments or additional information that would be useful to this study

Fish Processing Companies

Discuss losses and the estimated value of those losses resulting from the S.S. Glacier Bay spill

- o losses due to receipt of contaminated fish
- o estimates of lost income due to closures associated with avoidance of the oiled areas on the fishing grounds
- o damage from oiled gear or equipment
- o additional costs for increased staffing to ensure quality

Address market perceptions of Cook Inlet fish as a result of real or perceived oil impacts in 1987

Probe for estimated losses to processing workers due to the oil spill

Discuss which fishermen were most affected by the spill . ..drift gillnet fishermen or setnet fishermen

Address the long term impacts as a result of the S.S. Glacier Bay spill

Based on the key informant's observations during the oil spill response and cleanup, discuss factors that influenced the spill damage and response related costs

Probe for any comments or additional information that would be useful to this study

Subsistence/Personal Use Fisherv Participants

Discuss how the S.S. Glacier Bav oil spill affected subsistence or personal use fishing activities

Probe for knowledge of others whose subsistence or personal use fishing activities were affected by the oil spill

Discuss estimates of harvest lost because fishermen were unable to fish due to closures or fear of oil contamination
- o determine dates or lengths of time and where fishermen were unable to fish

Discuss fouling of fishing gear by oil and probe for:
- o what gear was fouled (cleaned or replaced)
- o cost of cleaning or replacing gear
- o compensation for damaged gear (who and how much)

Discuss contaminated fish caught after the July 2, 1987 spill; probe for:
- o number, when, and where

Discuss whether or not fisher was employed by someone or volunteered labor, boats, or equipment to help respond to or clean up the oil spill; probe for:
- o length of time employed, volunteered, or leased or loaned boats or equipment

Discuss whether food that would not have otherwise been needed was purchased in order to replace contaminated fish or to compensate for fish fishermen were unable to catch
- o probe for quantity of food purchased and approximate cost

Discuss the geographic extent of the oil impact in area

Probe for comments or additional information that would be useful to this study

U.S. Coast Guard

Discuss whether or not changes occurred in the assessment of the economic impact of the S.S. Glacier Bay oil spill since the Federal On-Scene Coordinator's Report was published in 1987

Get updated information on the following categories of economic impact:

- USCG manhours expended, and associated salary costs, in response to the spill
- USCG aircraft and vessels utilized, and associated costs, in response to the spill
- subcontractors utilized, and associated costs, in response to the spill
- equipment and supplies purchased, and associated costs, in response to the spill
- estimates of commercial fishing gear damaged, and associated costs, during the oil spill
- other

Address legal costs incurred related to the spill or subsequent litigation

Identify the process used to track and compile information on costs and other economic impacts incurred in responding to the oil spill

Find out what costs incurred by the agency have been charged to the parties responsible for the spill; probe for:

- amount reimbursed to date

Discuss key factors that influenced the extent of spill damage and costs related to spill response; address:

- decision making structure for response actions
- ability to predict or track movement and location of oil
- ability to predict behavior of oil due to water, tide, and current characteristics
- availability of equipment and applicability of oil spill cleanup techniques to the situation in Cook Inlet

Probe for recommendations to improve oil spill response in Cook Inlet and comments or additional information that would be useful to this study

National Marine Fisheries Service

Discuss the role NMFS played in response to the S.S. Glacier Bay oil spill
- o find out what the statutory authority was for NMFS involvement
- o address NMFS' involvement in making decisions regardingagencyand industry action on oil spill response

Addresses economic impacts experienced by NMFS resulting from the S.S. Glacier Bay oil spill
- o NMFS manhours expended, and associated salary costs
- o NMFS aircraft and vessels utilized, and associated costs
- o subcontractors utilized, and associated costs
- o equipment and supplies purchased, and associated costs
- o legal costs incurred related to the spill or subsequent litigation

Identify what process was used to track and compile information on costs and other economic impacts incurred in responding to the S.S. Glacier Bay oil spill

Find out what amount of the costs incurred by the agency have been charged to the parties responsible for the spill; probe for:
- o amount reimbursed to date

Discuss key factors that influenced the extent of spill damage and costs related to spill response; address:
- 0 decision making structure for response actions
- o ability to predict or track movement and location of oil
- o ability to predict behavior of oil due to water, tide, and current characteristics
- o availability of equipment and applicability of oil spill cleanup techniques to the situation in Cook Inlet

Probe for recommendations to improve oil spill response in Cook Inlet and for comments or additional information that would be useful to this study

Environmental Protection Agency

Discuss EPA's role in response to the S.S. Glacier Bay oil spill
- o find out what the statutory authority was for EPA involvement
- o address EPA's involvement in making decisions regarding agency and industry action on oil spill response

Address economic impacts experienced by the EPA resulting from the S.S. Glacier Bay oil spill
- o EPA manhours expended, and associated salary costs
- o subcontractors utilized, and associated costs
- o equipment and supplies purchased, and associated costs
- o legal costs incurred related to the spill or subsequent litigation

Identify the process used to track and compile information on costs and other economic impacts incurred in responding to the S.S. Glacier Bay oil spill

Find out the amount of the costs incurred by the agency that were charged to the parties responsible for the spill; probe for:
- o amount reimbursed to date

Discuss key factors that influenced the extent of spill damage and costs related to spill response
- o decision-making structure for response actions -
- 0 ability to predict or track movement and location of oil
- o ability to predict behavior of oil due to water, tide, and current characteristics
- o availability of equipment and applicability of oil spill cleanup techniques to the situation in Cook Inlet

Probe for recommendations to improve oil spill response in Cook Inlet and for comments or additional information that would be useful to this study

Alaska Department of Environmental Conservation

Discuss the role ADEC played in response to the S.S. Glacier Bay oil spill
- o find out what the statutory authority was for ADEC involvement
- o address ADEC's involvement in making decisions regarding agency and industry action on oil spill response

Find out if there have been any changes in the assessment of the economic impact of the S.S. Glacier Bay oil spill other than the information on ADEC costs that have been compiled by the Alaska Attorney General

Get updated information on the following categories of economic impact:
- o ADEC manhours expended, and associated salary costs
- o ADEC aircraft and vessels utilized, and associated costs
- o subcontractors utilized, and associated' costs
- o equipment and supplies purchased, and associated costs
- o estimates of commercial fishing gear damaged, and associated costs, during the oil spill
- o legal costs incurred related to the spill or subsequent litigation

Identify the process used to track and compile information on costs and other economic impacts incurred in responding to the S.S. Glacier Bay oil spill

Address what costs incurred by the agency were charged to the parties responsible for the spill; probe for:
- o amount reimbursed to date

Discuss key factors that influenced the extent of spill damage and costs related to spill response; address:
- o decision-making structure for response actions
- o ability to predict or track movement and location of oil
- o ability to predict behavior of oil due to water, tide, and current characteristics
- o availability of equipment and applicability of oil spill cleanup techniques to the situation in Cook Inlet

Probe for recommendations to improve oil spill response in Cook Inlet and for comments or additional information that would be useful to this study

Alaska Department of Fish and Game

Discuss the role ADF&G played in response to the S.S. Glacier Bay oil spill
- o find out the statutory authority for ADF&G involvement
- o address ADF&G's involvement in making decisions regarding agency and industry action on oil spill response

Find out if there have been any changes in the assessment of the economic impact of the S.S. Glacier Bav oil spill other than the information on ADF&G costs that have been compiled by the Alaska Attorney General

Get updated information on the following categories of economic impact:
- o ADG&G manhours expended, and associated salary costs
- o ADF&G aircraft and vessels utilized, and associated costs
- o subcontractors utilized, and associated costs
- o equipment and supplies purchased, and associated costs
- o estimates of commercial fishing gear damaged, and associated costs, during the oil spill
- o legal costs incurred related to the spill or subsequent litigation

Identify the process used to track and compile information on costs and other economic impacts incurred in responding to the S.S. Glacier Bay oil spill

Address what costs incurred by the agency have been charged to the parties responsible for the spill; probe for:
- o amount reimbursed to date

Discuss key factors that influenced the extent of spill damage and costs related to spill response; address:
- o decision-making structure for response actions
- o ability to predict or track movement and location of oil
- o ability to predict behavior of oil due to water, tide, and current characteristics
- o availability of equipment and applicability of oil spill cleanup techniques to the situation in Cook Inlet

Probe for recommendations to improve oil spill response in Cook Inlet

Find out if there are any restrictions, limitations or other losses to sport fishermen as a result of the S.S. Glacier Bav oil spill
- o address east side clam fishery; lower peninsula saltwater salmon fishery; freshwater salmon fisheries
- o find out how many anglers were affected, and over how many days the restrictions or losses occurred

Discuss whether there were any long term resource impacts that resulted from the spill that will affect sport fishermen in the future

Discuss restrictions, limitations or other losses to commercial fishermen as a result of the oil spill
- o address drift gillnet fishery and set gillnet fishery
- o find out how many fishermen were affected, and over how many days the restrictions or losses occurred

Alaska Department of Fish and Game (continued)

Discuss whether there were any long term resource impacts that resulted from the spill that will affect commercial fishermen' in the future

Discuss restrictions, limitations or other losses to subsistence or personal use fishermen as a result of the oil spill

- o identify which fisheries were affected in what way
- o find out how many fishermen were affected, and over how many days the restrictions or losses occurred

Discuss whether there were any long term resource impacts that resulted from the S.S. Glacier Bay spill that will affect subsistence or personal use fishermen in the future

Probe for comments or additional information that would be useful to this study

Alaska Attorney General's Office

Discuss the role the Alaska Attorney General's (AG) office played in response to the S.S. Glacier Bay oil spill

- o find out what the statutory authority was for the AG's involvement
- o address AG's involvement in making decisions regarding agency and industry action on oil spill response

Identify economic impacts experienced by the AG's office resulting from the S.S. Glacier Bay oil spill; probe for:

- o AG manhours expended, and associated salary costs
- o subcontractors utilized, and associated costs
- o equipment and supplies purchased, and associated costs
- o legal costs incurred related to the spill or subsequent litigation

Address the process used to track and compile information on costs and other economic impacts incurred by the AG's office and other state agencies in responding to the S.S. Glacier Bay oil spill

Identify what costs incurred by the agency have been charged to the parties responsible for the spill; probe for:

- o amount reimbursed to date

Local Government

Discuss the role of the municipal government in response to the S.S. Glacier Bay oil spill

- o address involvement in making decisions regarding agency and industry action on oil spill response

Identify the economic impacts experienced by the municipal government resulting from the S.S. Glacier Bay oil spill; probe for:

- o manhours expended, and associated salary costs
- o subcontractors utilized, and associated costs
- o equipment and supplies purchased, and associated costs
- o legal costs incurred related to the spill or subsequent litigation

Discuss the process used to track and compile information on costs and other economic impacts incurred in responding to the S.S. Glacier Bay oil spill

Identify what costs incurred have been charged to the parties responsible for the spill; probe for:

- o amount reimbursed to date

Oil and Gas Companies

Discuss the firm's involvement in any oil spill response or cleanup activities associated with the S.S. Glacier Bay oil spill

- o Identify how the firm's role changed as the oil spill progressed
- o Discuss the major factors that affected the firm's role in the spill or its decision-making process

Find out how many persons were employed in each response or cleanup activity; probe for:

- o length of employment in these activities
- o percentage of these persons who were employees of the company
- o amount of wages (including benefits and overhead) paid to these employees during this activity
- o percent of these employees resided in:
  - · the Kenai Peninsula, Anchorage, elsewhere in Alaska
- o percent of the total number of persons who were contract or subcontract employees
- o cost for wages or labor paid to contract or subcontract employees or firms

Discuss supplies or equipment purchased by the firm for response or cleanup

- o get the total amount spent for supplies and equipment .
- o get the percent of these expenditures made in the Kenai Peninsula, Anchorage, or elsewhere in Alaska

Identify the type and value of supplies or equipment used from existing inventory for response or cleanup

Find out if vessels, aircraft, or other equipment were rented, leased, or chartered by the firm: probe for:

- o types 'and length of time rented, leased, or chartered
- 0 total amount spent by the firm for this equipment
- 0 percent of this equipment provided from the Kenai Peninsula, Anchorage, or elsewhere in Alaska

Find out if the firm made payments to any parties for damages or compensation from the oil spill event; probe for:

- o specific damages or compensation the payments were for
- 0 amount paid for each damage or compensation category
- 0 percent of these payments made to persons or entities in the Kenai Peninsula, Anchorage, or elsewhere in Alaska

Find out if there were other costs or expenditures incurred by the firm which have not yet been addressed (For example, use of company owned capital equipment during the oil spill which was not rented, chartered, or leased to another party)

- o probe for description of what these expenditures were for
- o get the amount of each expenditure
- o get the percent of these expenditures made to persons or entities in the Kenai Peninsula, Anchorage, or elsewhere in Alaska

Probe for comments or other information that would be useful to this study

Transportation Companies

Discuss the company's involvement in response and cleanup of the S.S. Glacier Bay oil spill in Cook Inlet in 1987.

Address how the firm's role changed as the oil spill progressed

Identify the major factors that affected the firm's role in the spill or the decision-making process

Find out how many persons were involved in each response or cleanup activity; probe for:
- o length of time engaged in these activities
- o percent of these persons who were employees of the company
- o percent of these employees residing in the Kenai Peninsula, Anchorage, or elsewhere in Alaska
- o amount of wages paid to these employees during this activity
- 0 percent of the total number of persons who were contract or subcontract employees
- o cost for wages or labor paid to contract or subcontract employees or firms

Discuss types of supplies or equipment purchased by the firm for response or cleanup; probe for:
- o total amount spent for supplies and equipment
- o percent of these expenditures made in the Kenai Peninsula, Anchorage, or elsewhere in Alaska

Discuss types and value of supplies or equipment used from the existing inventory for response or cleanup

Discuss types of vessels, aircraft, or other equipment rented, leased, or chartered by the firm; probe for:
- o length of time rented, leased, or chartered
- o total amount spent by the firm for this equipment
- 0 percent of this equipment provided from the Kenai Peninsula, Anchorage, or elsewhere in Alaska

Identify other persons or businesses retained or contracted by the firm for response, cleanup, or compensation activities; probe for:
- o total expenditures made to these other firms
- 0 percent of these expenditures made to persons or entities in the Kenai Peninsula, Anchorage, or elsewhere in Alaska

Find out if the firm made payments to any parties for damages or compensation from the oil spill event; probe for:
- o specific damages or compensation the payments were for
- 0 amount paid for each damage or compensation category
- 0 percent of these payments made to persons or entities in the Kenai Peninsula, Anchorage, or elsewhere in Alaska

Transportation Companies (continued)

Address other costs or expenditures incurred by the firm which have not been addressed in the previous questions (For example use of company owned capital equipment during the oil spill event which was not rented, chartered, or leased to another party)

- o probe for a description of what these expenditures were for
- o get the amount of each expenditure
- o get the percent of these expenditures made to persons or entities in the Kenai Peninsula, Anchorage, or elsewhere in Alaska

Probe for any comments or other information that would be useful to this study

Cleanup Organizations

Discuss the company's involvement in response and cleanup of the S.S. Glacier Bay oil spill in Cook Inlet in 1987

Address how the firm's role changed as the oil spill progressed

Identify organizations the firm was contracted to during the spill and for what periods of time

Find out the total billings to each organization

Probe for major factors that affected the firm's role in the spill or the decision making process

Identify the number of persons involved in each response or cleanup activity; probe for:

- o length of time engaged in these "activities
- o percent of these persons who were employees of the company
- o percent of these employees resided in the Kenai Peninsula, Anchorage, or elsewhere in Alaska
- o amount of wages paid to these employees during this activity
- o percent of the total number of persons who were contract or subcontract employees
- o cost for wages or labor paid to contract or subcontract employees or firms

Discuss types of supplies . or equipment purchased by the firm for response or cleanup; probe for:

- o total amount spent for supplies and equipment
- o percent of these expenditures. made in the Kenai Peninsula, Anchorage, or elsewhere in Alaska

Address types and value of supplies or equipment used from existing inventory for response or cleanup

Find out what types of vessels, aircraft, or other equipment were rented, leased, or chartered by the firm; probe for:

- o length of time rented, leased, or chartered
- o total amount spent by the firm for this equipment
- o percent of this equipment provided from the Kenai Peninsula, Anchorage, or elsewhere in Alaska

Identify other persons or businesses retained or contracted by the firm for response or cleanup activities; -probe for:

- o total expenditures made to these other firms
- 0 percent of these expenditures made to persons or entities in the Kenai Peninsula, Anchorage, or elsewhere in Alaska

Find out if the firm made payments to any parties for damages or compensation from the oil spill event; probe for:

- o specific damages or compensation the payments were for
- 0 amount paid for each damage or compensation category "

Cleanup Organizations (continued)

- o percent of these payments made to persons or entities in the Kenai Peninsula, Anchorage, or elsewhere in Alaska

Discuss other costs or expenditures incurred by the firm which have not, been addressed previously (For example use of company owned capital equipment during the oil spill event "which was not rented, chartered, or leased to another party)

Probe for:

- o description of what these expenditures were for
- o amount of each expenditure
- o percent of these expenditures made to persons or entities in the Kenai Peninsula, Anchorage, or elsewhere in Alaska

Find out if the firm can provide information (e.g., daily work logs) on the location and duration of specific response measures during the cleanup activities

Probe for any comments or other information that would be useful to this study

Legal and Insurance Organizations

Discuss the firm's involvement in response, cleanup, and compensation of the S.S. Glacier Bay oil spill in Cook Inlet in 1987.

- 0 address how the firm's role changed as the oil spill progressed
- o identify the major factors that affected the firm's role in the spill and its (or the clients') decision making process

Find out how many persons were involved in each activity; probe for:

- o length of time engaged in these activities
- o Percent of these persons who were employees of the firm
- o percent of these employees resided in the Kenai Peninsula, Anchorage, or elsewhere in Alaska
- o amount of wages (plus benefits and overhead) paid to these employees during this activity
- o percent of the persons who were contract or subcontract employees
- o cost for wages or labor paid to contract or subcontract employees or firms

Discuss types of supplies or equipment purchased by the firm for response, cleanup, or compensation activities; probe for:

- o total amount spent for supplies and equipment
- o percent of these expenditures made in the Kenai Peninsula, Anchorage, or elsewhere in Alaska.

Address types of vessels, aircraft, or other equipment rented, leased, or chartered by the firm; probe for:

- o length of time rented, leased, or chartered
- o total amount spent by the firm for this equipment
- o percent of this equipment provided from the Kenai Peninsula, Anchorage, or elsewhere in Alaska

Identify other persons or businesses retained or contracted by the firm for response, cleanup, or compensation activities; probe for:

- o total expenditures made to these firms
- 0 percent of these expenditures made to persons or entities in the Kenai Peninsula, Anchorage, or elsewhere in Alaska

Find out if the firm made payments to any parties for damages or compensation from the oil spill event; probe for:

- o specific damages or compensation the payments were for
- 0 amount paid for each damage or compensation category
- 0 percent of these payments made to persons or entities in the Kenai Peninsula, Anchorage, or elsewhere in Alaska

Discuss other costs or expenditures incurred by the firm which have not been addressed previously (For example travel expenses for staff)

- o probe for a description of what these expenditures were for
- o get the amount of-each expenditure
- 0 get the percent of these expenditures made to persons or entities in the Kenai Peninsula, Anchorage, or elsewhere in Alaska

Probe for any comments or other information that would be useful to this study

Vessels and Aircraft

Discuss the firm's involvement in response, cleanup, and compensation activities of the S.S. Glacier Bay oil spill in Cook Inlet in 1987.

Find out how many persons were involved in each activity; probe for:
- o length of time engaged in these activities
- 0 percent of these persons who were employees of the company
- 0 percent of these employees resided in the Kenai Peninsula, Anchorage, or elsewhere in Alaska
- 'o amount of wages paid to these employees during this activity
- o percent of the total number of persons who were contract or subcontract employees
- 0 cost for wages or labor paid to contract or subcontract employees or firms

Address types of supplies or equipment purchased by the firm for response, cleanup, or compensation activities; probe for:
- o total amount spent for supplies and equipment
- o percent of these expenditures made in the Kenai Peninsula, Anchorage, or elsewhere in Alaska

Identify what organizations were the major users of the firm's services and equipment

Discuss types of vessels, aircraft, or other equipment rented, leased, or chartered by the firm; probe for:
- o length of time rented, leased, or chartered
- o total amount received by the firm for this equipment
- o percent of this equipment provided from the Kenai Peninsula, Anchorage, or elsewhere in Alaska

Address other major costs or expenditures incurred by the firm which have not been addressed previously; probe for:
- o description of what these expenditures were for
- 0 amount of each expenditure
- 0 percent of these expenditures made to persons or entities in the Kenai Peninsula, Anchorage, or elsewhere in Alaska

Probe for any comments or other information that would be useful to this study

Other

Discuss the firm's involvement in response, cleanup, and compensation activities of the S.S. Glacier Bay oil spill in Cook Inlet in 1987

Find out how many persons were involved in each activity; probe for:
- o length of time engaged in these activities
- 0 percent of these persons who were employees of the company
- 0 percent of these employees resided in the Kenai Peninsula, Anchorage, or elsewhere in Alaska
- 0 amount of wages paid to these employees during this activity
- 0 percent of the total number of persons who were contract or subcontract employees
- 0" cost for wages or labor paid to contract or subcontract employees or firms

Address types of supplies or equipment purchased by the firm for response, cleanup, or compensation activities; probe for:
- o total amount spent for supplies and equipment
- o percent of these expenditures made in the Kenai Peninsula, Anchorage, or elsewhere in Alaska

Identify organizations that employed the firm's services or equipment during the oil spill event

Discuss types of vessels, aircraft, or other equipment rented, leased, or chartered by the firm; probe for:
- o length of time rented, leased, or chartered
- o total amount received by the firm for this equipment
- o percent of this equipment provided from the Kenai Peninsula, Anchorage, or elsewhere in Alaska

Address other costs or expenditures incurred by the firm which have not been addressed previously; probe for:
- o description of what these expenditures were for
- o amount of each expenditure
- o percent of these expenditures made to persons or entities in the Kenai Peninsula, Anchorage, or elsewhere in Alaska

Probe for any comments or other information that would be useful to this study

Charter/Guide Sportfishing Businesses

Discuss any losses due to the S.S. Glacier Bay oil spill in 1987; probe for:

- oil fouled fishing boats and gear
- loss of fishing opportunity due to the spill-where and when unable to fish
- cancellations by clients due to the oil spill
- harvest of oil fouled fish that had to be discarded
- dollar amount the business lost as a result of the spill (by category)

Find out if the business was compensated for any losses as a result of the spill; probe for:

- amount and type of loss

Address any long term losses to the business as a result of the S.S. Glacier Bay spill

Probe for any comments or other information that would be useful to this study

Individual Sport Fishermen

Discuss any losses as a sportfisherman due to the S.S. Glacier Bay oil spill in 1987 .“ :.-”. ,,,.

Address types of losses experienced; probe for:
- o oil fouled fishing boats and gear
- o loss of fishing opportunity due to the spill - where and when unable to fish
- o harvest of oil fouled fish that had to be discarded

Find out how many times the business experienced these problems and get an estimate of the dollar value of the losses or damage (by category)

Identify compensation for any losses as a result of the spill; probe for:
- o amout of compensation and types of losses

Discuss any long term losses to the business as a result of the S.S. Glacier Bay spill

Probe for any comments or other information that would be useful to this study

APPENDIX D

FOSC Report - Cost Summary

COST SUMMARY: T/V GLACIER BAY, FEDERAL PROJECT NO. 1700 0
· MOD NO. 10144-87

The following is a summary of the costs incurred during the federal removal action initiated by the Coast Guard Marine Safety Office Anchorage, Alaska in response to the grounding of the T/V GLACIER BAY and subsequent discharge of approximately 1 25,000 gal lons of crude oil into Cook inlet on 2 July 1987. Initial response and cleanup was conducted by the owner, Trinidad Shipping Co. of St. Louis, Mo. who at 1518 on 8 July 1987 relinquished cleanup efforts to the Coast Guard. The owner again assumed responsibility for cleanup at 0800 on 16 July 1987. Expenses totalling an est imated $1,727,147.95 are reimbursable to the Pollution Fund. Approximately $1,133,908.59 was paid from the Pollution Fund to finance the response. These expenses are noted by an asterisk. Approximately $261.17 was paid from MSO Anchorage's 06-30 fund. These expenses are noted by **. Services were received for expenses totalling $176 1.S4 where documental ion is unavailable to determine the source of funding. These expenses are noted by ***. .

1. Access Control. - None

2 USCG Equipment Expenses. - The fol lowing expenses were incurred by Air Stat ion Kodiak, the USCGC Sedge, USCGC Mustang, MSO Anchorage, MSD Kenai, and the Pacific Strike Team in responding to the crude 01 l discharge from the T/V GLACIER BAY. These costs reflect operations involving the staging of pol lut ion response equipment on scene, transportation of response personnel to and from the scene of the incident, overf l ights of the affected area, and beach patrols to ascertain the extent of oi l damage to the shore area.

Aircraft.

HC-130	21.4 hrs @ $3373.00	$72,182.20
HH-52A	44.7 hrs @ $1674.00	$74.827.80
H-3	28.0 hrs @ $3367.00	$94.276.00
H-3	46.3 hrs @ $3367 .00	$ 155,892.10
TOTAL		$397, 178.10

Vessels

USCGC SEDGE	172 hrs @ $743.00	$ 127,796.00
USCGC MUSTANG.,	18 hrs @ $269.00	$4842.00
TOTAL		$ 132,638.00

ENCLOSURE (6)

Vehicles

Pickup Lic# 16518.....8 clays @ $7.00.....$56 .00
640 miles @ $.17 .....$ 108.80
Pickup Lic# 10796 ..... 8 days@ $7.00.....$56.00
400 miles @ $.17.....$68.00
CG Suzuki Quad 4x4(= I)
96mi @ 75 mi/gal @ $1.10/ gal $1.40

CG Suzuk I Quad 4x4 (#2)
120 mi @ 75 mi/gal @ $1.10/gal $1.76

CG Honda Quad 4x4
20 mi @ 7S mi/gal @ $1.10/gal .....$.30

TOTAL.....$292.26

011 Pollution Response Equipment

12 July - 15 July

I I 00" Inflatable Boom (USCG)
200' Kempner Sea Curtain (USCGC Sedge)

$4000 per hour per pallet (400' per pallet)
3.25 pallets @ $40=$ 130.00/hr
$130.00 x 96 hrs

TOTAL.....$12,480.00

TOTAL USCG EQUIPMENT EXPENSES.....$542,588.36

3. Personnel Expenses - The fol lowing expenses were incurred in employing personnel from MSO Anchorage, MSD Kenai, MSD Kodiak, MSO Juneau, MSO Valdez, Seventeenth Coast Guard District, the Pacific Strike Team, and the Anchorage Reserve Unit to monitor and supervise federal act ion taken in response to the oil discharge from the T/V GLACIER BAY.

ENCLOSURE (6)
2 of 9

REGULAR

CAPT ROUSSEL	78 hrs @ $48.00	$3744.00
CDR THOMPSON	19 hrs @ $48.00	$912.00
LCDR PAGE	32 hrs @ $33.00	1056.00
LCDR BLAB S	102.5 hrs @ $33.00	$3382.50
LT COLLIER	82 hrs @ $33.00	$2706.00
LT BROMLEY	98 hrs @ $33.00	$3234.00
CWO DERBY	10 hrs @ $33.00	$ 330.00
SK 1 CATTLEMAN	80 hrs @ $22.00	$ 1760.00
DC 1 TINDER	94 hrs @ $22.00	$2068.00
YN2 GEBHARDT	91.5 hrs @ $16.00	$1464.00
BM2 DERWEY	86.5 hrs @ $16,00	$ 138400
DC2 BERGEN	97 hrs @ $ 16.00	$1552.00
PA2 ROBINSON	22 hrs @ $16.00	$ 352.00
MST2 McNUTT	12 hrs @ $ 16.00	$192.00
MST3 BOYKO	101.5 hrs @ $ 16.00	$ 1624.00
Sub Total		$25,760.50

PACIFIC STRIKE TEAM

CWO SHOEMAKER	114.5 hrs @ $3300	$3778.50
BM1 BAUMANN	109 hrs @ $22.00	$2398.00
BM DIAMOND	116 hrs @ $22.00	$2552.00
DC1 CAMPBELL	117 hrs @ $22.00	$2574.00
BM1 HEMKER	114 hrs @ $22.00	$2508.00
MK2 CUCINELLO	112.5 hrs @ $ 16.00	$ 1800.00
SK3 CARROLL	176 hrs @ $16.00	$2816.00
Sub Total		$ 18,426.50

RESERVE TEMAC

PS3 SHEEDY	62 hrs @ $16.00	$992.00
BM3 PELTIER	58 hrs @ $16.00	$928.00
SK3 BATES	16 hrs @ $16.00	$256.00
Sub Total		$2,176.00

TOTAL PERSONNEL EXPENSES $46,363.00

B

ENCLOSURE (6)

4. Travel and per diem expenses - The following expenses were incurred by personnel from MSO Anchorage, MSD Kenai, MSD Kodiak, MSO Juneau, PISO Valdez, AIRSTA Kodiak, Seventeenth Coast Guard District, Pacific Strike Team, Anchorage Reserve Unit, Ft. Richardson pay off ice, and USCGC SEDGE who were depioyed from their home units to supervise, administer or actively participate in the federal response efforts associated with the T/V GLACIER BAY oilspill.

Date	Name	TONO	Amount
7/8-7/9	HAINES	36193	$586.57
7/8-7/15	ROUSSEL	37695	$125808
7/13-7/14	THOMPSON	37699	$13914
7/ 10-7/Is	PAGE	37698	$847.00
7/8-7/15	BLAIS	37693	$832.00
7/8-7/15	BROMLEY	37694	$832.00
7/8-7/9	CAREY	37181	$206.00
7/8-7/15	SHOEMAKER	36213	$1595.00
7/8-7/15	MORETH	62200	$1550.38
7/8-7/15	CASTLEMAN "	63707	$1031.19
7/8-7/15	GEBHARDT	63702	$882.80
7/8-7/15	BOYKO	63708	$832.00
7/8-7/ 15	WHITE	63709	$783.44
7/15	McNUTT	62205	$836.65
7/8-7/15	SHOEMAKER	36212	$1911.00
7/8-7/15	BAUMANN	62216	$1548.00
7/9-7/15	CAMPBELL	62212	$1755.92
7/9-7/15	DIMOND	62209	$1509.92
7/9-7/15	HEMKER	62228	$1491.92
7/8-7/15	CUCINIELLO	62229	$1298.00
7/9-7/24	CARROLL	62225	$1562.92
7/15	DARBY	736194	$2043.94
7/9-7/15	ROBINSON	6220 I	$601.52
7/I 0-7/ 12	PIPER	637 I I	$255,40
7/I 0-7/ 12	PI PER	63712	$189.80
7/15	STOHLMAN	63714	$86.00
7/8 - 7/15	BROMLEY	37692B	$80.00
7/14 - 7/15	HAGLUND	63710	$160.49

AIRSTA KODIAK Per Diem 7/8 - 7/15

Name	TONO	cost
ELMER	80328-1	$108.90
STENBAK	80328-2	$108.60
SWIFT	80328-3	$101.08
HARRIS	80328-4	$101.08
SEWELL	80328-5	$101.08
CUNNINGHAM	80328-6	$101.08
DIXON	80328-7	$101.08
HUGHES	3947 I	$419.50
STOTT	39472	$590.95
MOORE	39478	$662,00
STROTHER	39482	$784.93
GUNDERSON	39497	$662.00
WILLIAMS	39498	$627.06
JACZINSKI	39499	$871.39
LEIDNER	3950 I	$212.60
BUCHANAN	39502	$430.60
BEATTY	39503	$223.00
WILLIAMS	39504	$223.00
SCOTT	67053	$466.15
AYERS	67057 "	$495.60
NORTON	67072	$1145.41
ANDERSON	67073	$367.52
KENYON	6.7074	$886.51
HOOVER	67075	$734.05
HAYNES	67076	$646.23
SMITH	67077	$646.23
GREEN	67079	$614.05
GREENWAY	67082	$610.83
WAGNER	67083	$484.80
CAMPBELL	67084	$484.80
FRIDAY	67085	'$188.9[
GILSON	67089	$306.19
MANFREDI	67098	$306.19
HECKERMAN	67099	$40482

TOTAL TRAVEL & PER DIEM EXPENSES.....0.. $41,926.30*

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5. Purchase Orders - The following expenses were incurred purchasing equipment and services required during the response to the oil spill from the T/V GLACIER BAY. Purchases were certified by the OSC as being necessary for response operations for the pollution incident.

Document #	Vendor	Item	cost
44-061.87	U-HAUL	Trailer	$41.00**
44-062-87	Bailey's	Forklift	$197.86
44-087-87	Randy's Ramada	ATV Lube	$15.22**
44-088-87	South Central Air	ATV Keys	$11.00**
44-089-87,	South Central Air	Tape to Anchorage	$11.00
44-090-87	South Central Air	Charts	$11.00
PR-4023-87	Dan's TV	Video Camera	$397.90
44-063-87	Stolt's	Video Rent	$105.00**
44-702-87	Randy's Glass	Plexiglass	$153.50***
GBL R-0434-737	Air Land Trans	Boom	$326.51
44-064-87	Bailey's	Forklift	$199.29
44-065-87	Office Place	Supplies	$30.66
GBL R-0434-738	Carlile Ent	Boom (Kenai)	$1710.00
GBL R-0434-741	ERA Air	Video cassette	$26.25
GBL R-0434-739	ERA Air	Supplies	$22.17
'9684	Servmart	Mag board	$99.54***
PR-4026-87	VECO	4x4 trucks	$1825.20
PR-4028-87	Kenai Merit Inn	CO's room	$490.00
PR-4027-87	Borealis	Radios	$3033.95
PR-4025-87	Alyeska	Tires	$707.56
PR-4024-87	Peninsula Honda	ATV	$5424.80
44-626-87	Alyeska	Tires	$173.10
44-066-87	Parts Inc	Trailer ball	$10.64
44-628-87	Spenard Builders	Shed	$862.76
44-629-87	Mizeras	Janitor	$791.25
44-630-87	Randy's Ramada	Oil	$39.00
44-627-87	Wildwood Chevron	Trailer	$252.00

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Document #	Vendor	Item	cost
PR-4029-87	McCaw	Pagers	$937.00***
GBL R-0434-743	ERA Airl ines	Photos	$63.OO
PONO t3PA 22054	Photowright	Pictures	$832.00
44-630-87	Randy's Ramada	RepaiiATV	$713.47
44-631 -87	AK Automotive	Trailer Lts	$88.95**
GBL L 11369 15	D&S	Boxes to Kenai	-$3.000.00
PR-4033-87	Sunshine Chemical	Sample bottles	$296.09
PR-4039-87	TCC Cabinets	Explosive Box	$6 14.00
GBL R-0434 -744	Ace Parcel	Strike Team Gear Movement	$571 .50-
SPILTEC DTCG35-87-P- 16418 PR-4031 -87	Consultant		$9383. 18
Puget Sound Tug & Barge (Invoice*42109)			$3 1,86 I .48
Offshore Systems, Inc. (Boom storage & movement, Kenai to Kodiak)(Invoice*I 1015,11016,11017,1 1030)			$684.8l
Ought Too Truck ing(Boom movement, Kenai to Kodiak)			$1655.50
PR-40 14-8	Peninsula Flooring	Carpeting for OSC Center Command Post	$ 1806.12
CP-91	Wilbur'sInc		$11.00
CP-92	South Central Air		$11.00
CP-93	South Central Air		$ 11.00
CP-94	South Central Air		$11.00
CP-100	DOI-USGS		$31.50
CP-1OI	Office Place		$17.60
CP- I 02	Omni Foods		$83.99
10 14487/00004737	GTE Seward		$29.48
1014487/13570187	Pay-Peltier & Sheedy		$1635.86
1014487/000046 I 1	GTE Seward		$30.35
1710 128/0 II 369 15	D&S		$2508.25
1707 138/00434739	ERA Air		$500.00
1014487/00004725	GTE Kenai		$1 073.13
1604688	King Oscar Motel		$298.00

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Offshore Systems, Inc.
(Storage of sorbents -
Invoice No. 2037).....$600.00

TOTAL PURCHASE ORDERS.....$76,327.42

$74,304.7 1*
$261.17
$176 1.54*

6. Contract costs - The following costs were incurred by contractors, under contract to the Coast Guard, conducting oil removal operations associated with the spill from the T/V GLACIER BAY. Documentation to support these costs include contracts, contractor invoices, daily work sheets, and other associated documents.

Firm/Contract *	**Invoice received, certified, and forwarded to District 17**
Unitech of Alaska DTCG35-87-C-70002B	Total cost: $934, 1 1 3.16
Alyeska Pipeline Co. DTCG89-87-C-7-T050	Total cost: $78,534.33

TOTAL CONTRACT COSTS.....$1.017.647. 40*

7. State/Federal Agency Expenses - The following costs were incurred by the Alaska Wing Headquarters of the Civil Air Patrol for services provided in response to the oil spill from the T/V GLACIER BAY. Overflights were conducted by CAP personnel to assist the OSC in determining the location of the oil spilled in Cook Inlet and to assess the damage to the beach areas resulting from oil washup onto the shore.

Alaska Wing Headquarters,
Civil Air Patrol Total Cost: $3007.47

TOTAL STATE/FEDERAL AGENCY EXPENSES.....$3007.47*

8 Pollution Removal Damage Claims- NONE

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As the Nation's principal conservation agency, the Department of the Interior has responsibility for most of our nationally owned public lands and natural resources. This includes fostering the wisest use of our land and water resources, protecting our fish and wildlife, preserving the environmental and cultural values of our national parks and historical places, and providing for the enjoyment of life through outdoor recreation. The Department assesses our energy and mineral resources and works to assure that their development is in the best interest of all our people. The Department also has a major responsibility for American Indian reservation communities and for people who live in Island Territories under U.S. Administration.