The *Exxon Valdez* Oil Spill

Final Report, State of Alaska Response

Alaska Department of Environmental Conservation June 1993

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Final Report, State of Alaska Response

prepared by Ernest Piper

Anchorage, Alaska

Alaska Department of Environmental Conservation

June 1993 • Walter J. Hickel, Governor • John A. Sandor, Commissioner

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Foreward

The publication of this report comes approximately four and one-half years after the grounding of the Exxon-Valdez on Bligh Reef in Prince William Sound, Alaska, and the consequent spill of eleven million gallons of North Slope crude oil into one of America's most valued and beautiful natural environments. A primary purpose of the report is to glean all the lessons we can from that experience and record them for the future so that we do not forget.

Alaskans are a proud people — a people who are dead serious about our role as stewards of the rare and rich ecosystems that make up Alaska. We work, live and play in close association with nature. We have a deep awareness of the necessity to prosper in nature and also to conserve it for a later day and a coming generation. For us, that later day is the reality of next week as well as the next century, and the coming generation is made up of our children. The environment is not an abstract concept to Alaskans.

Therefore, when the tanker went aground on March 24,1989, all Alaskans felt the shock, profoundly, then rolled up their sleeves and went to work. This report is written from the point of view of Alaska's state government, especially the Department of Environmental Conservation (DEC) and other agencies that faced the formidable task of responding to the spill and protecting Alaskans and their natural resources. But also evident and important to report is that Alaskans of all types, ages and occupations pitched in and did their part. So, one of the lessons learned is that people who are closest to the disaster — in nearby towns and villages, on the fishing grounds, in the local governments and schools — make up one of the most valuable sources of immediate information, local knowledge, and, importantly, motivation to do the spill response and cleanup job right.

It is also important to recognize other Americans and people of foreign nations. Immediately after the spill, and during the whole first year of response and cleanup, the Alaska Governor's Office and other state agencies received thousands of letters and calls from other states and countries. We still receive inquiries on the spill's after-effects and restoration of the environment. This heartfelt outpouring of concern dramatized the significance of Alaska as a planet-wide symbol of majestic natural environment, wildlife, and the last frontier. Our sincere thanks go out to all of those who cared, and along with our thanks, an assurance that we also care.

The writer of the report, Ernie Piper, is uniquely qualified to put the *Exxon Valdez* oil spill in historical perspective. When the spill occurred he was serving as Special Assistant to Governor Steve Cowper, specializing in resource issues relating to local governments; earlier, he was a policy analyst in the division of strategic planning and chief speech writer and researcher for Governor Bill Sheffield. Mr. Piper had been following oil development issues for a number of years, was knowledgeable about the Trans-Alaska Pipeline and the Valdez terminal, and was personally acquainted with many of the key DEC staffers who became members of the spill response team.

In the first two seasons of the spill response, Mr. Piper was the liaison to local governments in the spill-affected area, and one of the Governor's primary strategists and coordinators working with DEC's technical managers and Commissioner Dennis Kelso. Beginning in October of 1990, Ernie Piper became the State's On Scene Coordinator, managing Alaska's state agency and community response programs. He continued in that capacity with the election of Walter Hickel as Governor in December of 1990 and represented the State of Alaska during the final two years of spill response and cleanup. He is therefore a most appropriate author to summarize and analyze Alaska's response to the largest oil spill ever to occur in our state.

This report is intended to focus on the lessons the state learned from America's largest tanker spill. Representatives of state and federal agencies, citizens who live in

the towns and villages near oil development and transportation routes, regulators of oil and gas production in our state, and businesspersons in exploration, production or transportation of oil and gas — all have a responsibility to examine the lessons we gained at a costly price.

I believe one of the most vital lessons is that prevention is the key to the problem of oil spills, and DEC has rededicated itself to the principle that it is much easier, more cost-effective, and environmentally safer to prevent spills than to clean them up. A second essential lesson is the importance of building partnerships among the communities, government agencies, and private enterprises to keep prevention standards high and to stand ready to respond if the need ever arises again. A third lesson is that people and communities as well as natural resources are impacted by oil spills and must be a part of the restoration process. Fortunately, the federal and state governments' litigation against Exxon was resolved in 1992 with a billion-dollar settlement — the largest dollar settlement of its type in United States history. This agreement enabled the restoration process to move forward.

We've made some great strides in these endeavors, as Ernie reports here in the final chapters of this history. Restoration is well underway, but much remains to be done. We need to keep the commitment strong, to keep the communication lines open, to maintain cooperation at all levels so that the resources, people and communities impacted by the *Exxon Valdez* oil spill are restored and that future spills are prevented.

John A. Sandor, Commissioner
Alaska Department of Environmental Conservation
September, 1993

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Acknowledgments

The idea of preparing some kind of final report on the spill response came up early in 1989, but as the response got longer, finality seemed ever more distant. Many people in state government helped make it happen — finally — but a few were truly instrumental and I would like to note their involvement here.

At the Alaska Department of Environmental Conservation, Joe Ferguson refused to let anyone forget that there should be a report, and he kept the idea alive every step of the way. Marti Early was extraordinarily patient while waiting for my revisions, even while juggling the layout and graphics. Ward Lane provided invaluable computer services. David Bruce showed great resourcefulness and tenacity when it came to handling those critical and innumerable administrative details, like contracts and budgeting. Larry Dietrick and Steve Provant provided substantial technical insight and got me back on course at a number of points in this report. L.J. Evans loaned me files (against her better judgment), slogged through the footnotes, and edited much of the text. Support from Mark Brodersen at the Restoration Office was also very much appreciated. Commissioner John Sandor continued his pattern of professionalism in dealing with the *Exxon Valdez* project as a whole; he actively supported independent writing and research for this report.

Other special contributions from sister agencies included those from the Alaska Department of Fish and Game's Mark Kuwada, a careful writer and thoughtful public servant; Jim Fall of the Division of Subsistence, on whose research and writing much of the subsistence section of chapter three depended; Jim Frechione, Judy Bittner, and my many colleagues at the Division of Parks and the Department of Natural Resources. Many thanks to all those other state employees who took the time to write down their experiences and opinions in the record. The Oil Spill Public Information Center from the *Exxon Valdez* Trustee Council provided important access to documents and research assistance.

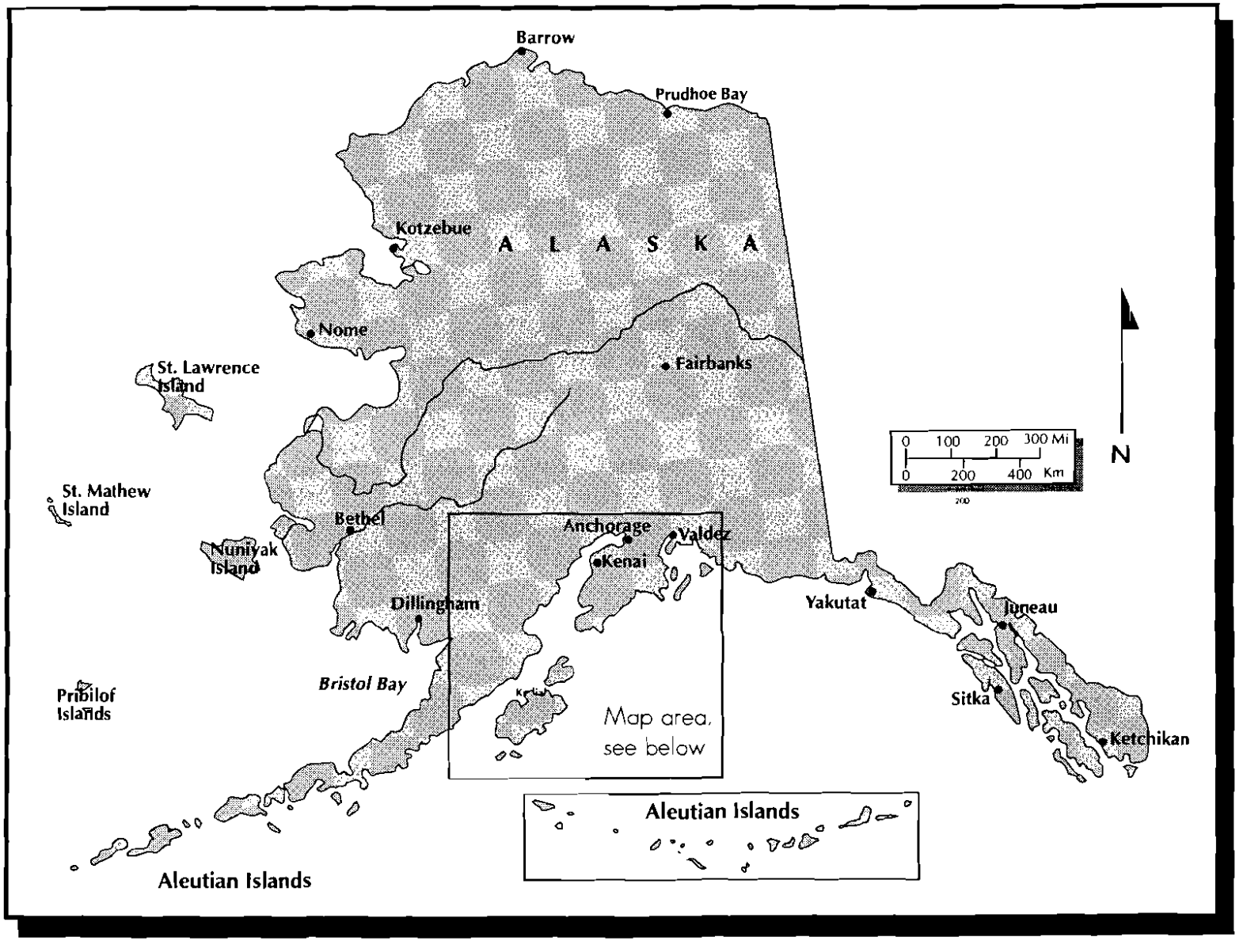
A special acknowledgment and thanks go to former Governor Steve Cowper, former DEC commissioner and good friend Dennis Kelso, and former DEC manager Gary Hayden, all of whom showed the greatest confidence and trust by bringing me into the spill response management at various points and in various ways. They showed tremendous leadership during a tough time, and provided critical access and explanation to me. And I offer special thanks to Commander Ed Page of the U.S. Coast Guard, who didn't agree with me all that much, but who is a good friend, an honest critic, and an outstanding officer.

I also wish to acknowledge the assistance of The Oil Spill Public Information Center, the Alaska Department of Environmental Conservation, the Alaska Department of Fish and Game, the U.S. Coast Guard, and a great number of individuals with state and federal agencies involved with the spill response.

Most of all, I wish to thank the people of the oil spill region, whose thoughts, efforts, emotions, and experience flow strongly and deeply below the surface of this brief government report. Someday, I hope, you will all tell your stories with the same strength, energy and passion you put into this noble fight to protect your communities and our environment.

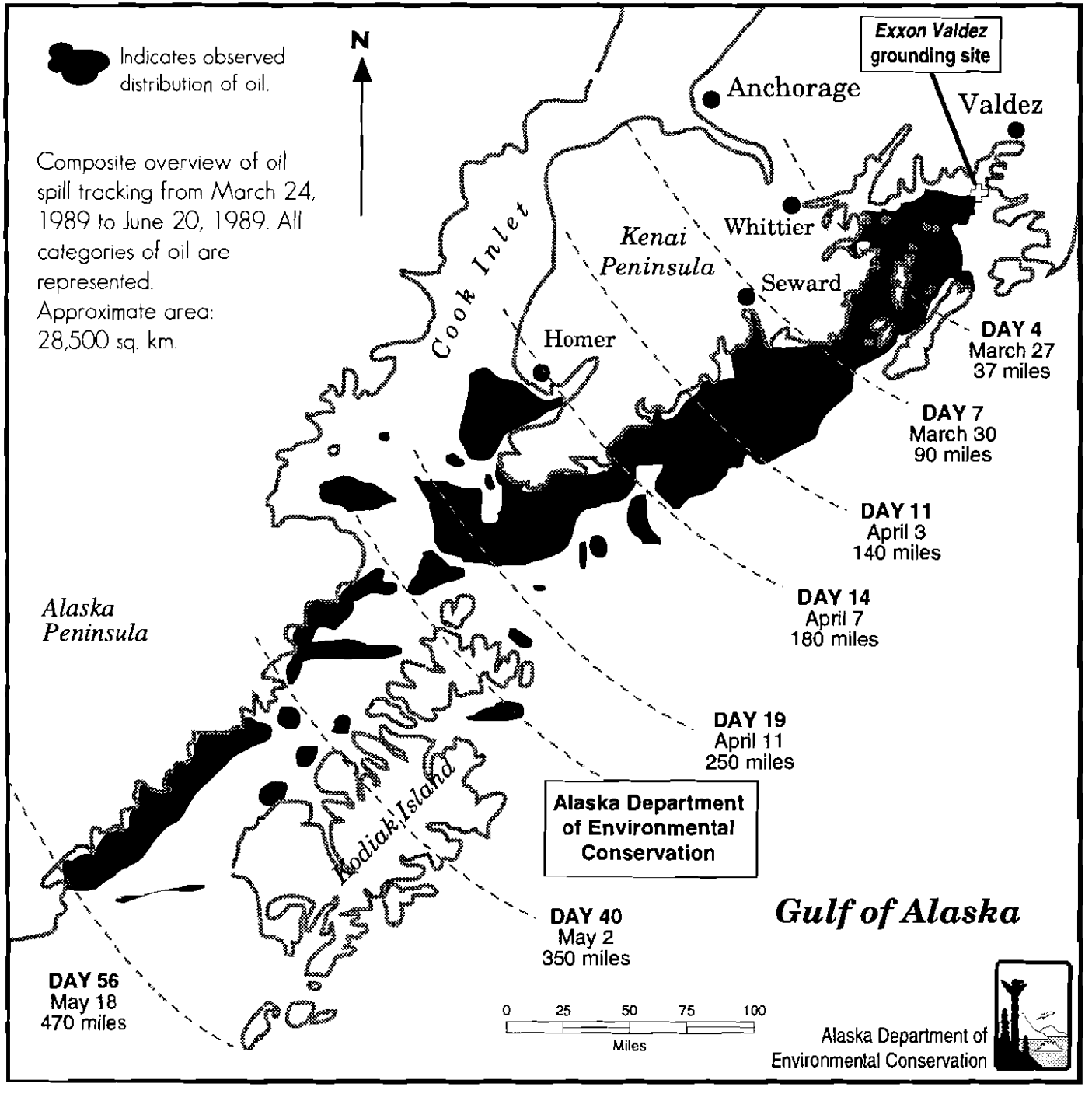
Ernest Piper
Eagle River, Alaska
June 5, 1993

Alaska Map — Oil Spill Location

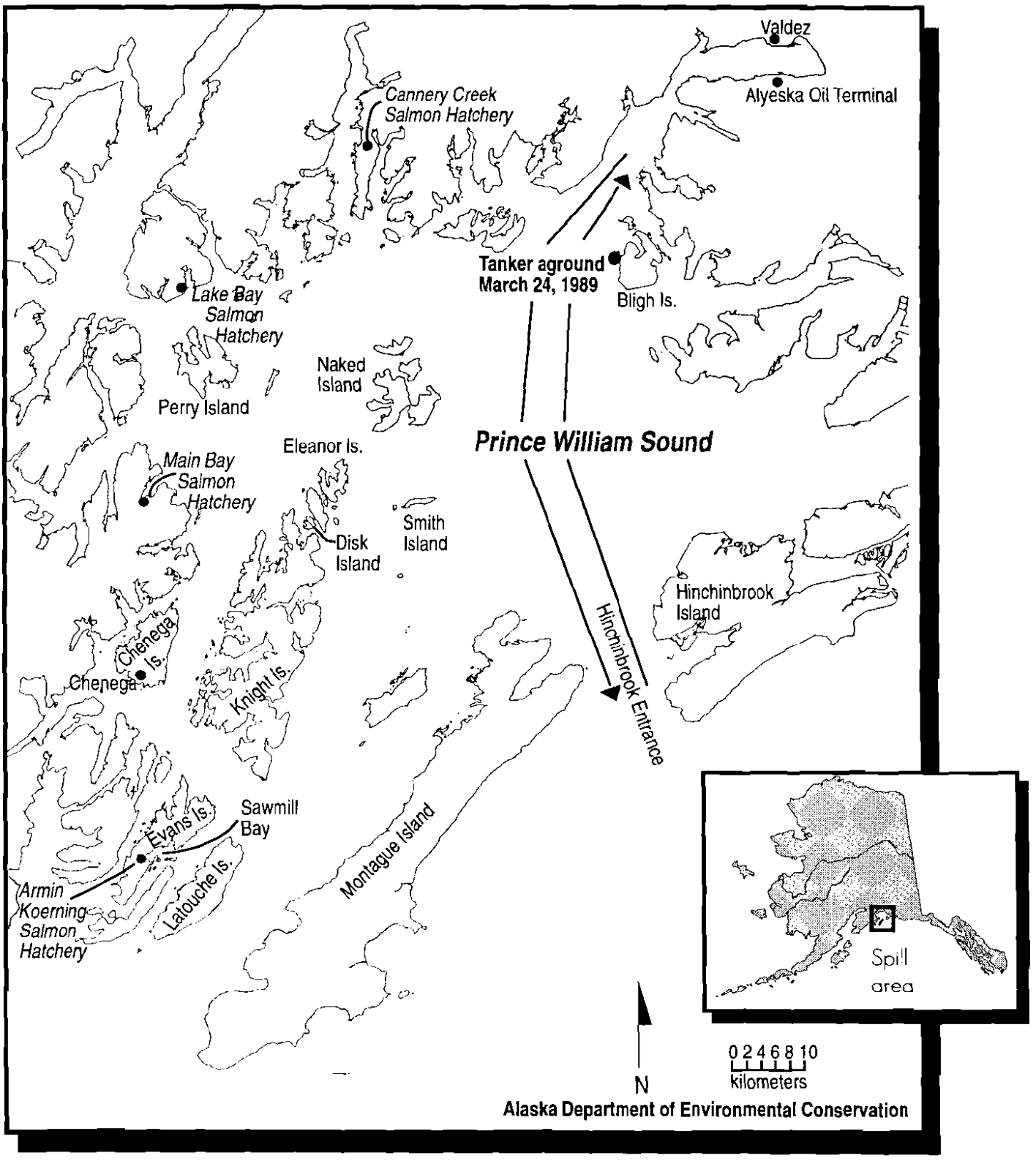


Spread of Oil from the Exxon Valdez Spill

March 24, 1989 to June 20, 1989



Prince William Sound and Tanker Grounding Location

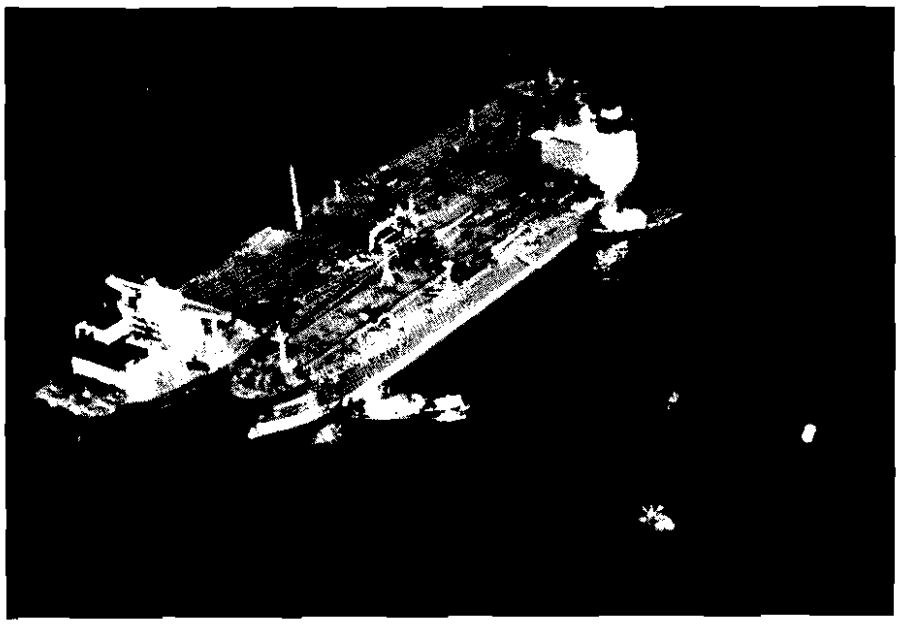


Introduction

The facts of the grounding of the T/V *Exxon Valdez* on March 24, 1989, have been fairly well documented in the official record of government and the unofficial record of journalism, video documentary, television fiction and popular non-fiction.

The tanker ran aground shortly after midnight on a well-charted, well-marked reef about 25 miles from the Trans-Alaska Pipeline terminal at Valdez. The National Transportation Safety Board concluded that the accident was due to a combination of bad seamanship, bad judgment, bad management and bad luck. The Alaska Oil Spill Commission expanded the blame in its 1990 findings, concluding that industry was poorly prepared, government had not pushed hard enough and consistently enough as regulators, and the public and political leadership had grown complacent before the disaster.

The tanker lost about 11 million gallons of North Slope crude oil from its tanks. The state and federal governments agree that the on-the-water response by industry was slow and inadequate. Equipment was unavailable, performed poorly, or was simply not up to the task of responding effectively to a spill of that magnitude. Cleanup on all or part of nearly 1,300 miles of Alaska shoreline continued from 1989 through June 1992.



The *Exxon Valdez* and a lightering vessel after the grounding.
Photo by U. S. Coast Guard

This report does not attempt to recreate the accident or redistribute the blame already spread at the feet of various parties. It does not purport to tell every story from every aspect of the spill, nor is it intended to duplicate or compete with a longer, more extensively researched, federally mandated report prepared by the U.S. Coast Guard. This is an account of the actions taken by the Alaska state government, especially the Alaska Department of Environmental Conservation, during the three years of spill response and cleanup. It is tangent to many other stories — from Alaska Native villages, from the federal government, from the commercial fishing fleets of the area, for example — and it attempts to explain the state government's interaction with those parties. It is beyond the scope of the project and the ability of this author to tell all those stories.

It is arranged by issue, rather than by chronology. A brief overview of the content and organization may help the reader at the outset.

Oil in Alaska

Oil had been flowing through Alaska's modern history long before the tanks of the *Exxon Valdez* ripped open and poured 11 million gallons of grief into Prince William Sound in March of 1989. The social and economic history of the young state has been alternately steered and altered by oil development since the discovery and development of the Kenai and Cook Inlet oil and gas fields in the 1950s and '60s.

The idea of a place called Alaska — from far Southeast to the Arctic and west deep into the North Pacific — is an invention of mapmakers, European governments, and the mind of America. Through the middle of the 20th century, this vast area was made up of regions that were defined by language, geography, culture, economics and politics. Native cultures were very distinct from each other; the arrival of Europeans and Americans did not change this pattern much. Alaska's cities tended to grow up around specific economic interests — Anchorage and the Alaska Railroad; Nome, Fairbanks and Juneau around gold mines or districts. Through the 1950s, the only area of the territory where Americans had developed a more or less integrated economy was the Southeast panhandle. Political life of the territory was centered there as well.

Even after the war and during the subsequent boom in military construction around Anchorage and Fairbanks, the areas outside of Southeast were, economically speaking, really only appendages of various federal government programs and operations: the Alaska Railroad, the Federal Aviation Administration, the Army Signal Corps, the regular Army and Air Force. The retail and service industries (especially construction) were directly and firmly tied to the federal presence. Mining and fishing were seasonal, and any year-round economic activity was limited because of that.

Workers at an oil drilling rig. Photo by Rob Schaeffer

Southeast, of course, had its own federal economic dependencies and seasonal fluctuations, but its fishing and logging industries provided the base for communities that were more like permanent, year-round towns of the Pacific Northwest, and less like the work-camp outposts of Southcentral and the so-called "westward" area of Alaska — i.e., everything west of the Panhandle.

Oil and gas development on the Kenai Peninsula and in the Cook Inlet changed this balance significantly. Throughout the 20th century there had been bursts of mining activity in Alaska: gold in the Interior, copper at Kennecott, coal at various locations. There had even been some limited drilling for oil early in the century near the natural seeps at Katalla, to the east and south of Cordova. But the discovery and development of the Swanson River oil field near Kenai, and subsequent development of gas and oil fields on- and offshore, sparked the first serious, non-government economic activity in Alaska outside of Southeast since World War II.

After statehood, in 1959, oil development also bailed the young state government out of early financial trouble. In 1962 the new, three-year-old State of Alaska had been depending for support largely on transition funds from Washington, D.C. It was not clear where the state would get the funds it needed to provide even basic state services; the population base and gross economic product were simply not large enough to produce significant revenue through usual methods of taxation.

Then, in 1963, the state Department of Natural Resources offered Cook Inlet offshore tracts for oil and gas leasing. The state expected to receive a modest amount in bids, perhaps $15 million; instead, the high bidders put up nearly three times that amount. The high bids were a minor windfall and solved a short-term fiscal crisis.

The emphasis is on "short-term," however. In 1964, the largest earthquake in North American history turned southcentral Alaska upside down, causing massive geological

change, and presenting Alaska with the daunting and expensive prospect of rebuilding virtually all its public infrastructure. Congress eventually authorized more than $350 million in disaster relief, loans, construction funding, and other programs to Alaska.

Ironically, the event that literally tore much of the state apart set the stage for the next major flurry of economic activity in Alaska. The federal infusion of cash was massive — almost a billion dollars at 1990 values — and it was spread around in varying ways: $51 million to rebuild schools and other public buildings, $25 million in urban renewal projects, $5 million in 23 highway reconstruction projects, and $92 million in disaster and small business loans. The federal government also purchased or otherwise financed more than $15 million in bonds that the state had already issued, or planned to issue, to finance previously planned public construction projects.[1] Obviously, much of that wealth and many of the jobs wound up going to Outside[2] concerns. But it is safe to say that in raw economic terms, disaster reconstruction money carried many state government programs, allowed the government to redistribute its own money to other needs, and helped the state generate income from taxation it might not have normally raised.

But like military construction or statehood transition funds, this federally sponsored economic shot in the arm would not sustain state programs and the private economy for very long. "Something else" would have to come along.

The "something else" came along in 1967, when Atlantic Richfield, again, made its first major oil strikes at Prudhoe Bay. This would lead to more than $900 million (about $1.5-$1.8 billion in 1990 dollars) in state lease sale revenues in 1969, authorization and construction of the pipeline in the 1970s, and waves of population and economic growth in the 1980s.

But while the actual effects and benefits of North Slope oil discoveries couldn't be foretold exactly in 1967, it was no accident that the State of Alaska would be a major participant in whatever occurred.

The fear that Alaska would be broke (or nearly so) without federal help was one of the minor themes running through the debate about statehood for Alaska during the 1950s.

Opponents of statehood suggested that Alaska would become little more than a drain on federal resources; proponents of statehood countered that the territory could never achieve real economic growth while under management by "absentee" owners in Washington. Often these arguments were smokescreens for other larger (frequently unspoken) political or economic concerns, but the prospect of a cash-poor state of Alaska was real enough that at statehood, Alaska's land grant was unlike that given to any other Western state. The realization that Alaska would have to support itself from its natural resources and lands was the driving force for this new federal policy.

Alaska not only received the right to select 104 million acres from the public domain, but the state could make its selections in large blocks. Other Western states had usually been granted the right to pick (or to have chosen for them) small blocks of land within larger federal holdings; Alaska, on the other hand, could put together hundreds or thousands of acres in a contiguous block. Instead of choosing a small parcel for a small and particular purpose (eventual sale as a homesite, for example), Alaska could choose massive parcels for large-scale purposes (lease as a mineral development, for example). Alaska also, unlike other states, received title to tideland and submerged lands up to three miles offshore.

This seemingly arcane bit of land management strategy set the stage for a new way of managing public lands in America. Other states had used land disposals as a way to finance government projects. But generally that involved the outright sale of public domain parcels for homes or farms, with the money generated being earmarked to finance the schools (or other public needs) demanded by families moving to the new homes and farms. Ultimate disposal of public domain lands was not just a consequence of this type of policy, it was the goal.

That would not be the case in Alaska. Land in most of Alaska — without roads, without suitable agricultural or grazing conditions — was, in modern economic terms,

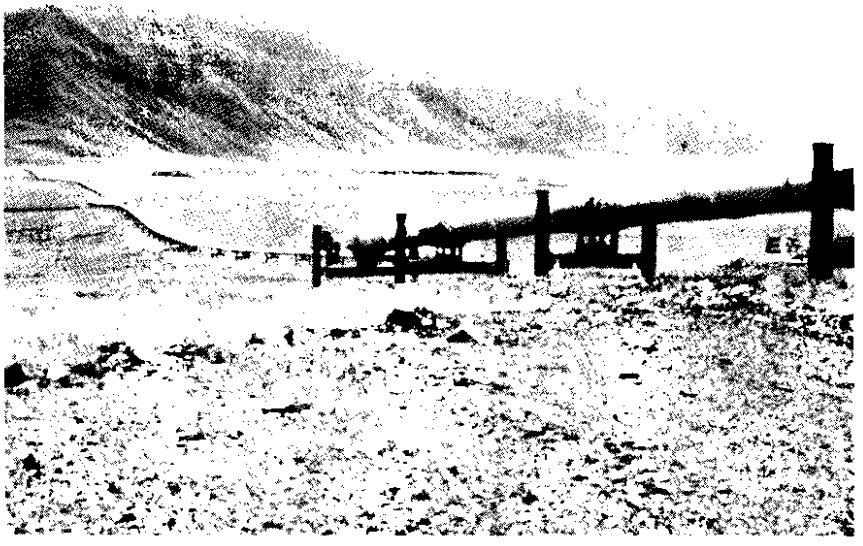
worth little on its own. The resources on and under the land held potentially more value over time — much more value, in fact, than could be realized by a one-time sale that sent the resources and the land into private hands.

This led to a land selection strategy by the state government that concentrated on finding resource-rich lands that could be leased for development, with the state receiving royalties based on production over time. And this, in turn, led the new state planners directly to the North Slope of Alaska. There would be no farms or New England town sites on the tundra, but there might be lucrative resource development — particularly oil development.

Everyone — from local villagers to the U.S. Defense Department to the oil industry to the new state managers — everyone knew that there was oil, in some amount, under the North Slope. There were numerous natural seeps, and even as far back as the 1920s there was a fair amount of technical geological data suggesting large reservoirs of oil. A massive area in the central and western Arctic had been designated a national strategic petroleum reserve three decades before Alaska became a state.

Alaska's land selections would be to the east, in and around Prudhoe Bay, the Sagavanirktok River, Oliktok — essentially, almost everything in between the National Petroleum Reserve-Alaska to the west and the Arctic National Wildlife Refuge to the east.

The 1968 announcement of a large discovery at Prudhoe Bay by Atlantic Richfield confirmed what many people had suspected all along: The North Slope reserves were potentially huge, perhaps 10 billion recoverable barrels, the largest find ever in North America. In June of 1969, the core of what later became a larger consortium of oil companies operating at Prudhoe Bay applied for federal permits to build a pipeline from the North Slope. That fall, Alaska's fourth Prudhoe Bay oil and gas lease sale brought in more than $900 million in high bids to the state. This represented more than seven times the state's budget at the time.



The Trans-Alaska oil pipeline. Photo by Rob Schaeffer

The pipeline was still a long way off. At the federal level, the Nixon Administration supported the project and took several administrative actions to ease the path of the right of way permit. In Alaska, Governor Bill Egan's administration also supported the project.

However, there was substantial opposition to such a project outside Alaska, and some within the state as well. The U.S. Congress moved carefully on various pieces of pipeline legislation. Several lands and right of way issues wound up in federal court. The passage of the landmark National Environmental Policy Act in 1969 raised other, more complicated issues. Alaska Natives pointed out that their historical claims to much of Alaska had not been resolved through the treaties and laws that had dealt with Native American land claims in the Lower 48; they wanted some control, compensation — or both — regarding pipeline construction. A tangle of claims, lawsuits, statutes and proposals from Congress and the state legislature, oil industry negotiations and plans, proposals for Alaskan or Canadian routes — all these combined to form a tightly-woven barrier to construction of the pipeline.

That barrier was unraveled by a combination of events, politics, settlements, and laws: Native claims were settled in the landmark Alaska Native Claims Settlement Act;

Congress exempted much of the pipeline construction and planning from some of the major federal environmental requirements; Alaska negotiated taxation and some regulatory issues directly with the industry; the all-Alaska route was selected. On July 17, 1973, the Trans-Alaska Pipeline Act was approved in the U.S. Senate by a single vote — that of Vice President Spiro T. Agnew, who used his constitutional power to break a 50-50 tie.

Terminus of the Trans-Alaska Pipeline in Valdez, Alaska.
Photo by Rob Schaeffer

Construction started in 1974 and lasted until 1977. On June 20, 1977, the first barrels of oil flooded the pipeline and started downstream to Valdez.

Ultimately, the pipeline project offered its support among Alaska's elected leaders and much of the relatively small population (about 300,000 at the time) because oil development held the promise of jobs, increased prosperity, and revenue to support programs and facilities that could raise the state's standard of living.

At the national level, the pipeline was supposed to lessen the nation's dependence on foreign oil. The control of world oil markets — and pricing — by the Organization of Petroleum Exporting Countries (OPEC) was beginning to squeeze oil-dependent industrial economies in Japan, Europe, and the United States. Here at home, the nation was beginning a decade-long economic slump, exacerbated in part by OPEC's embargoes and the cartel's ability to raise the price of oil to unheard-of levels. An Alaska pipeline was supposed to help protect or strengthen the U.S. economy to some degree. It was also considered in many respects a national security issue — an issue so strong, in fact, that the Congress exempted the pipeline project from many of the emerging environmental requirements in federal law. The first OPEC embargo against the United States had come for political reasons, not market reasons: America's support of Israel in its wars with neighboring Arab states cost the nation its access to Middle East oil.

The promises of Alaska North Slope oil and the pipeline have largely come true. Alaska oil did not solve all the state's problems, but oil revenues, state spending, and associated activity certainly did help raise Alaska's standard of living. Alaskans wisely decided in 1976 to put aside at least a quarter of all oil income in a constitutionally protected savings account; the Alaska Permanent Fund in 1992 contains about $14 billion, and holds the promise of stable government support for programs after the oil runs out. The state has used its oil revenue to improve water and sewer systems, pay for construction and operation of public schools even in the smallest communities, protect and improve its fisheries, build senior citizen centers and community halls, upgrade other public services and amenities — all while its citizens enjoy the lowest rates of overall taxation anywhere in America.

Right now, for good or for ill, Alaska's economy and government are substantially dependent on the revenue generated by oil development at Prudhoe Bay. And at the national level, Alaska oil is critical to America's energy supply, at least at current levels

of consumption. Unfortunately, Alaska oil did not cause America to kick its foreign oil habit; imports as a total percentage of U.S. consumption have continued to rise. However, Alaska oil makes up nearly a quarter of all oil produced in the United States, and the products refined from North Slope crude oil fuel — literally — the automobiles and the giant economy of California and much of the American West: The bulk of the West Coast refining capacity is filled by oil that travels down the Trans-Alaska Pipeline System to Valdez. Many geologists believe there are other untapped oil fields in the Alaska Arctic.

Without Alaska oil, the American economy would not look exactly the same. That is why, in part, there is continuing interest and debate about where, when, how — and if — there will more oil exploration and development in Alaska. Many people have argued that Alaska's valuable oil has come at a dear price to America, not only by changes in the land, but by stalling or allowing America to avoid dealing with long-term questions about conservation and use of alternative fuels. Others contend Alaska oil has helped keep the U.S. economy strong, and that the nation should continue its search for oil in Alaska's frontier areas.

Yet regardless how one feels about Alaska oil development, people from all sides of the debate felt together the shock and anger and initial despair when the news came on March 24, 1989, that a supertanker had run hard aground in Prince William Sound. While the promises of North Slope oil development had come true, so had the major threat.

This is where this report picks up the story. The subsequent sections are arranged as follows:

1.0 The Oil Spill Response Organization — This section explains how the standard institutions functioned within the spill response, but more important, how separate and unique institutions emerged. It looks at how decisions were made, primarily at the state level, but also how state interests and decisions conflicted with, overlapped, or were harmonized with the decisions of other entities involved in the response.

2.0 Technology — This section looks at how oil spill response technology worked on the *Exxon Valdez* oil spill. Perhaps of more general interest is the discussion of how public and private institutions viewed certain technologies, and how they made the decisions to use (or not use) certain types of technology.

3.0 Shoreline Cleanup, 1989-92 — This section is a somewhat sequential look at the shoreline cleanup, which began after the relatively brief on-the-water response phase. It touches on some of the issues from previous sections — institutional interaction, technology assessment, etc. — but applies the analyses of the previous sections to specific incidents and periods. This, I hope, puts the previous discussions into context.

4.0 Legal, Regulatory and Administrative Changes — This section is a brief overview of state and federal law and regulation changes made since the *Exxon Valdez* oil spill.

5.0 Restoration — This section begins with a description of how and why the State of Alaska addressed the principal legal issues raised by the spill. It touches on two early, failed attempts to settle various aspects of the cases, as well as the final civil and criminal settlements of October 1991. It then explains the basic approaches to restoration anticipated by the state and federal government in the early stages (winter, 1992-93) of the restoration process.

Readers wishing more detailed, but relatively brief descriptions of the events leading up to the grounding, the regulatory history of the Alyeska Pipeline Service

Company terminal at Valdez, the first six weeks of the oil spill response, and a complete review of restoration efforts can start with several governments reviews or summaries including: National Transportation Safety Board; the Alaska Oil Spill Commission reports, especially the background sections; the National Response Team report to the President in May 1989; and all the restoration reports to date.

Notes, Introduction

[1]*Ernest Gruening, The State of Alaska (Random House [revised edition] 1968), p. 531.*

[2]*"Outside" may refer to anywhere that is not Alaska, but is used here to refer to the rest of the United States.*

Chapter 1: The Oil Spill Response Organization

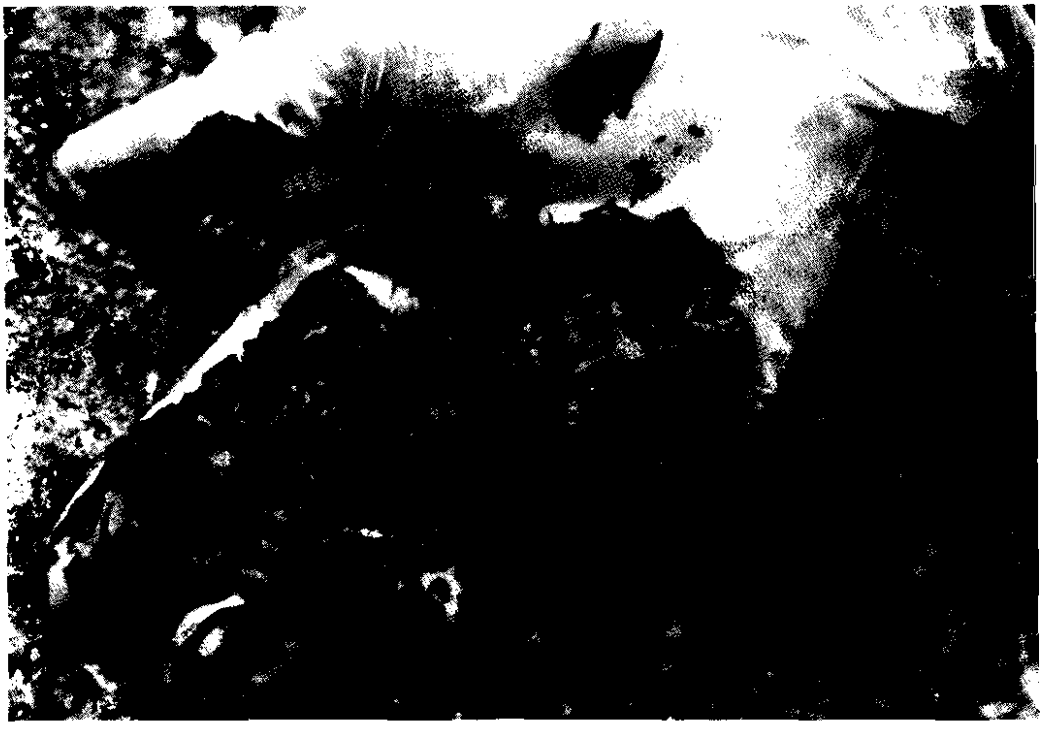
Oil spills occur with surprising frequency in the United States. In 1989 alone, the year the *Exxon Valdez* ran aground, the U.S. Coast Guard logged about 8,000 spills, small and large, in the marine waters of the U.S. Most are relatively small (the average is around a hundred or two hundred gallons). The State of Alaska deals with a variety of spills on water and land, as well. In 1991, for example, the state responded to more than 40 spills of more than 1,000 gallons.

Usually these spills involve leaking tanks and fuel lines, improperly stored product, mishaps in transferring product from one area to another, and other events and mistakes outside the public's general field of vision.

When the pollution is so massive, and the potential effects so critical and threatening, the public and virtually all its institutions find themselves right in the middle of what had been formerly a distant and specialized activity.

Oil spill response on this level is largely a technical and regulatory exercise. The people who appear at the site are generally confined to those in government regulatory agencies and the dozens of pollution control and cleanup contractors who operate in a given area. They speak the same regulatory and scientific language and understand the rules, the hierarchy, and the procedures involved in pollution control. It is, in short, much like any other technical trade: The only people who usually show up at a building site are carpenters, electricians, concrete finishers, building inspectors, and so on. One would not expect a member of the general public to know much more about building codes and rafter framing techniques than he or she knows about oil spill regulations, or the optimal speed for towing containment boom.

But when the pollution is so massive, and the potential effects so critical and threatening, the public and virtually all its institutions find themselves right in the middle of what had been formerly a distant and specialized activity. When they go to the people in charge of this activity to look for answers and reports, the public is given information that has been only partially translated, at best. It is similar to what happens when a speaker of high-school-level French tries to participate in a conversation with



Oily subsurface residue from the *Exxon Valdez* found on Eleanor Island, Prince William Sound.
Photo by Patrick Endres

two native speakers chattering in colloquial terms: The listener picks up a sentence here, a few ideas there, but generally he misses much of it and winds up being a little confused.

In many cases, particularly on the level of a response such as the *Exxon Valdez* operations, the fog of the technical and regulatory details can influence strongly the way the public, the media, and the government itself view the response.

1.1 Who's in charge here?

"The National Oil and Hazardous Substance Response System is a difficult and complicated system which blurs the lines of responsibility and is confusing to many observers," wrote one of the U.S. Coast Guard's chief public information specialists in 1991. The way to counter the confusion, he advised, is to immediately establish an identifiable leader, set attainable goals, and communicate them realistically to the public. The most likely identifiable leader candidate in a large spill is the federal on-scene coordinator, he concluded.[1]

This is not necessarily what happened in the first few hours and days of the spill. Exxon emerged, partly by choice, as the focus of questioning and the principal source of information. The company staged the briefings, supplied the lead spokesman, and held court front and center for the media. While state and federal officials were present and available, Exxon chose to assume the point position in public. This may have been consistent with the established spill response structure, but it also may have sent a confusing message to a public and a media corps used to dealing with government officials during such a crisis.

Federal regulatory structure

Federal law divides authority for pollution containment and cleanup between the U.S. Coast Guard and the U.S. Environmental Protection Agency (EPA). The Coast Guard deals with spills in marine waters (including the Great Lakes), and the EPA deals with oil and hazardous substance spills on inland waters and on land. This is why the EPA was the lead federal agency at the Love Canal and Times Beach chemical cleanups, and the Coast Guard was the lead agency on the *Exxon Valdez* oil spill. Each EPA- or Coast Guard-led cleanup has a federal on-scene coordinator.

Three basic federal documents govern pollution control (oil or chemical spills, essentially) on land and water.

The Clean Water Act of 1973, the sweeping legislation that was designed to both clean up polluted waters and prevent further pollution in years ahead, is the root of the program. The law mandated a national strategy for pollution control and led to the National Oil and Hazardous Substance Response System, guided principally by the National Contingency Plan.[2] The National Contingency Plan, in turn, established a series of regional authorities to oversee operations in areas such as the Gulf of Mexico, Puget Sound, and other principal zones of marine traffic.

More localized planning and oversight organizations can be formed, but all work in descending order under the umbrella of the federal laws and plans mentioned above.

State structure and lead agency

The National Contingency Plan sets the nation's policy for pollution control and response. States may use the federal program alone, or they may add special provisions or regulations on top of it. Simply explained, a state may enact stricter pollution controls than the federal government, but it cannot enact weaker regulations than those

established by Washington, D.C. This strategy, used in many kinds of unrelated federal-state programs, is designed to allow states to tailor regulation to local or state needs.

The state's pollution control laws designate the Alaska Department of Environmental Conservation (DEC) as the lead agency for pollution control within our borders and waters. DEC works with both the Coast Guard and the EPA. In the event of a spill, DEC appoints a state on-scene coordinator to manage state operations, work with federal agencies, and integrate the needs of other state and local agencies in state and federal activities.

DEC is the state's chief representative on the Alaska Regional Response Team, a management and policy oversight group established under the National Contingency Plan. All major policy decisions, and many technical decisions regarding spill response must be considered by the Regional Response Team first. The Regional Response Team is a mix of state and federal agencies that steers response activities and, in some cases, approves or rejects spill response methods. It also coordinates the variety of federal, state, and local contingency plans for spill response in Alaska. During an actual response, the on-scene coordinator has the authority to make the final decision about what actions to implement.

Technically, in all cases, the government is "in charge." In practice, however, on-scene coordination — rather than on-scene command by the government — is a mix of oversight and negotiation and common sense.

The "responsible party"

One of the principal jobs of state and federal regulators in a spill is the need to identify the person, group, or company that is responsible for the spill. Federal and state laws allow the agencies to spend public money on pollution cleanup, but the government is supposed to get that money back. And getting paid back is not just an option: The state law governing how DEC spends its response fund requires the agency to recover its costs whenever possible.

Usually, that means finding the party responsible for the spill and making arrangements not only to pay for the cleanup (along with any applicable fines or penalties), but to arrange the cleanup itself. Under ideal circumstances, an agency finds the responsible party, and the responsible party finds a contractor, arranges the logistics, and pays the bills.

The government's role — and options

The first thing the lay person notices about this structure is that there seems to be a great deal of coordinating going on at the government level, but not a lot of ordering.

Under what might be called the "responsible party" system, both federal and state agencies oversee the cleanup activities and coordinate other agency concerns and requirements in the program. In the case of a small oil field spill of drilling muds or chemicals, the government tells the responsible party to clean up the mess, setting whatever conditions state or federal law require (fish habitat, wildlife protection, public health issues, etc.). The responsible party then hires a contractor, writes a proposed cleanup plan, and submits it to the federal and state on-scene coordinators for approval. If the plan receives the government stamp of approval, the cleanup proceeds. Appropriate government regulators check up on the progress of the cleanup to make sure it meets the requirements of the plan. When the job is done to the governments' satisfaction, the spiller is released and monitoring begins, if necessary.[3]

If the spiller is doing a poor job, or not following the plan, or otherwise refusing to do what the government requires, the on-scene coordinator has the option of taking over the cleanup. In that case, the government — state or federal — would take over the business of hiring and directing a contractor to do the work. A basic rule of thumb in making that kind of a judgment is whether the government is likely to be able to do the job better or faster than the responsible party.

Both federal and state pollution control strategies are a mix of government and

private efforts. They try to keep the polluter involved in the cleanup. Ideally, this allows the cleanup to get going quickly and to proceed efficiently. It also allows the government to concentrate efforts on strong oversight of pollution problems and abatement, without being sidetracked by financial or administrative headaches of the cleanup.

Technically, in all cases, the government is "in charge," since ultimately the government has authority to take over a cleanup (or, more frequently, to threaten takeover) if the public's goals for the cleanup aren't met.

In practice, however, on-scene coordination — rather than on-scene command by the government — is a mix of oversight and negotiation and common sense. The goal of a cleanup is not to punish a spiller or maximize the government's opportunity to collect fines in court. The goal is to protect the public, the public's resources, and to clean up the mess. Frequently, the fastest, most efficient, and least expensive method is to work with the responsible party.

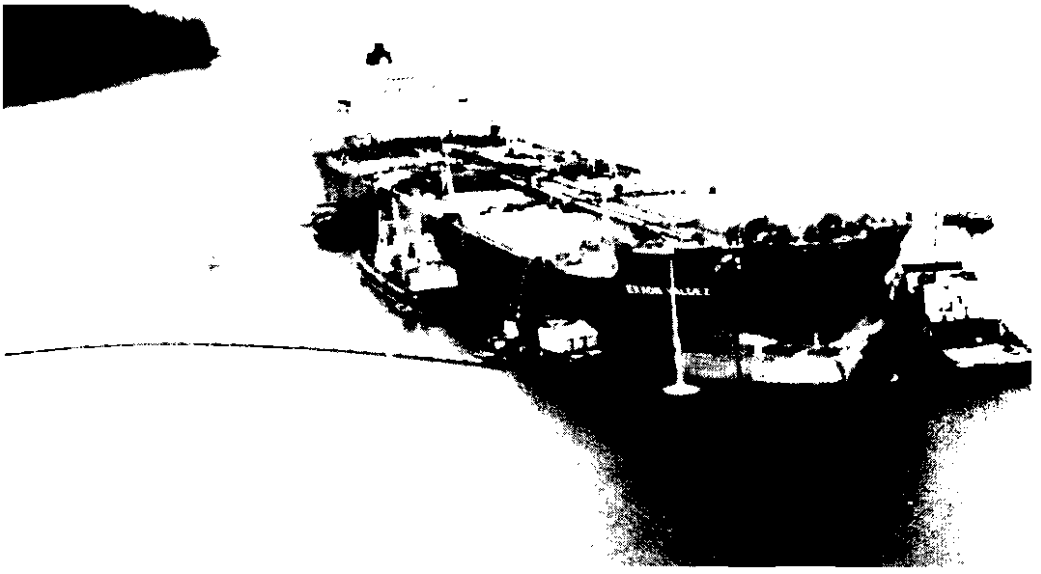
1.2 The *Exxon Valdez* oil spill

It was not long after the *Exxon Valdez* hit the rocks that the public became confused about who was running the response, and why the command and decision-making structure was the way it was.

For matters of both perception and fact, the public expressed little confidence in the spill response structure that was emerging in Alaska. To the public's eye, Exxon was leading and the government was somewhere in the background. Considering the threat to the environment and the local economy, to many people it seemed odd that a private company was running what was, in many respects, a public safety program with broad public policy implications.

Exxon was not a government agency, therefore not responsible to the public; the Coast Guard was the coordinator of the effort, but Exxon managers, not the Coast Guard, told workers where to go and what to do; the state DEC, adopting its usual role as an oversight agency and coordinator for state policies and requirements, couldn't tell the Coast Guard what to do. The federal on-scene coordinator, a vice admiral and, to the public, a military leader, complained in frustration that he was a "coordinator, not a commander."[4]

To someone who knew and understood the national spill response system, the



The disabled tanker Exxon Valdez hours after the grounding. Photo by Dan Lawn

structure made some kind of sense. The response was hardly running smoothly, but the principal officials understood the relationships in spill response and were working within the existing system.

To the public, however, the consistent and troubling question was either, "Who's in charge?", or "Why is Exxon in charge? They spilled the oil in the first place."

The answer — correct under the federal law and the general spill response strategy — was what U.S. Transportation Secretary Samuel Skinner told USA Today in July 1989. Asked if the Coast Guard ought to be in charge — meaning in command — Skinner replied, "They should be in an overall supervisory responsibility [sic]. Where there is an industry player who has the funds, resources, and the response team ready, I do not believe we should supplant that with the Coast Guard."[5]

To someone who knew and understood the national spill response system, the structure made some kind of sense. The response was hardly running smoothly, but the principal officials understood the relationships in spill response and were working within the existing system.

In some respects, this "in charge" issue was not as big a problem as some people perceived it to be. The real problem was that there simply were not sufficient resources available in the area to deal with a spill of that size. Regardless of how the chain of command took shape, if there was nothing to command it didn't really matter.

Yet as the size and the complexity of the disaster grew, upper-level policy makers for all three parties became more directly involved in the decision-making. Alaska Governor Steve Cowper, DEC Commissioner Dennis Kelso, the Alaska Oil Spill Commission, leaders of fishing groups and local governments, members of Congress — all concluded that at a certain point, the national response system, with its blurry lines of responsibility, was not the only way to handle this multidimensional response operation.[6]

While there were a number of institutional procedures unique to the *Exxon Valdez* spill response, the parties generally attempted to operate the response on the model set up in the National Oil and Hazardous Substance Response System, the National Contingency Plan (NCP), and DEC's Alaska statewide contingency plan.[7] Coast Guard historians, however, concluded in a recent memo to DEC that "the NCP model got 'lost' in the process. The President became involved, the military was used in a manner and extent never envisioned by the NCP, cabinet-level officers were involved, and new structures such as the ISCC [Interagency Shoreline Cleanup Committee] were established by the FOSC [federal on-scene coordinator]."[8]

Under these plans, the Coast Guard has the basic responsibility for managing or coordinating spill response in Alaska's coastal waters. The state on-scene coordinator works as an advisor to the federal on-scene coordinator. The state's designated role is to make sure federal authorities know what state resources are available and what state or local needs must be considered or complied with. Both the state and federal coordinators are supposed to make sure that the responsible party is carrying out whatever contingency plan is in place at the time. In March of 1989, everyone was working off the contingency plan negotiated and developed between the state and Alyeska Pipeline Service Company.[9]

The plan had been developed between 1984-87. It spelled out how fast Alyeska was to respond to various spill scenarios, including a potential 200,000 barrel spill. On March 24-25, Alyeska's response did not take shape the way the plan dictated it should. A barge was out-of-service; equipment was buried under several feet of snow; skimmers and other on-the-water response equipment was anywhere from 6-18 hours behind the response schedule in the plan.

Yet despite the slow and inadequate response on the water immediately after the grounding, organizationally, the spill response structure took shape the way it was designed. Alyeska Pipeline Service Company was the designated responder; the Coast Guard assumed its role as chief federal coordinator; DEC took the necessary steps to oversee the response, especially as it affected specific state and local interests.

Alyeska, however, quickly dropped into the background as Exxon assumed complete control as the responsible party. Exxon said this hand-off was consistent with the agreements among Alyeska's parent companies, of which Exxon is one. However, Exxon did not make clear its intentions to follow through with the Alyeska contingency plan.

Under the Prince William Sound Contingency Plan, approved by the DEC, Alyeska was supposed to coordinate and execute the industry response; indeed, that is exactly what Alyeska had done two months earlier during the Thompson Pass spill near the Alyeska terminal. This arrangement insures that when a spill happens, the state and the designated responder know with whom each is supposed to communicate. Exxon's take-over injected a whole new group of managers who, it turned out, were unfamiliar with the contingency plan and unfamiliar with their counterparts from the State of Alaska.

The system was designed so that the state could use the provisions of the contingency plan to help determine if the responder was successfully carrying out the multitude of recovery and habitat protection tasks that had been figured out in advance.

The owner companies' unilateral decision to make the hand-off of responsibility for spill response from Alyeska to Exxon the second day threw several years of planning and expectations to the wind.

The hand-off by Alyeska to Exxon left the state in a difficult position. Exxon's officials said they had their own plan, and did not necessarily intend to use the Alyeska plan the state had approved. Exxon never provided the state with a copy of its plan. According to a federal government report to the President[10], the Exxon Shipping Company Headquarters Casualty Response Plan listed the company's internal structure for managing a marine spill, "but it is not specific to any location." And more important, the Exxon plan had never been reviewed or approved by state or federal officials, or the public at risk from a spill. In other words, the years of planning, negotiation, and public review that had gone into the thick Prince William Sound Contingency Plan were suddenly rendered meaningless. The hand-off left the responders with no commonly accepted plan for action.

It also left the public on the short end of the deal it had made with oil producers. The public agreed to the construction of the Alyeska facility on the premise that Alyeska would provide the best protection possible from damage caused by oil spills. The government-approved contingency plan was designed to show the public specific details about what protection they could expect for their public resources.

At the time of the grounding, the Alyeska contingency plan had detailed discussions about its command structure, which included an oil spill response coordinator designed to be the industry counterpart to the federal and state on-scene coordinators. The plan listed more than 130 sensitive habitat sites that would form the basis for any protective booming or other defensive measures. The plan set target times for initial response under different scenarios. It had lists of officials responsible for various aspects of response.

The point of the plan was that in an emergency, everyone ought to be working from the same, familiar set of instructions and plans. And further, if Alyeska was having trouble following the plan or even refusing to do so, the state would have the ability to objectively gauge the Alyeska effort, and the legal basis for triggering a state take-over or requesting federalization of a spill. The owner companies' unilateral decision to make the hand-off from Alyeska to Exxon the second day threw several years of planning and expectations to the wind.

As a matter of public regulation of the private Alyeska terminal, the industry position was troubling to state officials. Under state law, Alyeska cannot operate the terminal without an oil spill contingency plan reviewed and approved by the state. The "c-plan" was one of the ways that the public could hold the industry accountable for protecting public resources in the Sound. Regardless of who conducted a response for Alyeska — whether it was a contractor or another owner company — the state expected to use the Alyeska contingency plan as a mechanism to insure accountability. The "hand-off," which Exxon and Alyeska said was their plan all along, actually opened up a dangerous loophole in the government's ability to hold the oil companies to their plans and promises.

Perhaps more important than the legal and regulatory issues raised by the hand-off were the expectations of the public. In this case, at least initially, the "public" was defined primarily by the area residents, and the commercial fishing fleet based in Cordova. These people had participated in the development of the Alyeska contin-

gency plan, to some degree or another, through formal and informal meetings, hearings, and comments. They assumed they would be dealing with Alyeska, and the Alyeska plan. When the change came, they were confused and instantly skeptical; to the fishing families of Cordova, the sudden change in command and plan — and the confusion it caused — seemed almost intentional.

The plan had never explicitly stated that dispersants would be the first-line defense. Now, right in the midst of on emergency, the fishing fleet and local residents were being told to accept a major change in the game plan.

And when Exxon's chief executive officer Frank Iarossi stood up in Valdez on Friday, March 24, and announced that Exxon intended to fight the spill with dispersants as a first-line defense, the fishing vessel owners and local residents felt that the industry was changing the response rules without consulting the people and the industry most at risk from the spill. This, coupled with the fact that Alyeska had already failed to carry out its designated duties according to the plan's time and equipment requirements, led many to question whether the plan had been just a convenient fiction. Dispersants were potentially dangerous and extremely controversial, and the plan had never explicitly stated that dispersants would be the first-line defense. Now, right in the midst of an emergency, the fishing fleet and local residents were being told to accept a major change in the game plan — a controversial change even if there had been no emergency.

Under questioning from state and federal attorneys in 1992,[11] Exxon's Iarossi said the company always intended to take over response to a major tanker spill; and further, that dispersant use was the cornerstone of initial response plans for such a spill. Yet Iarossi was not sure what the approval process was for dispersants. At the time of the spill, he did not know that the state had pre-approved dispersant use in some areas, required special permission in others, and excluded a third zone. He did not know that under certain circumstances both Exxon and the federal on-scene coordinator needed concurrence from the Alaska Regional Response Team. He had not read the Alyeska contingency plan. He did not know that the State of Alaska had regulatory oversight, and he did not understand why a DEC official was accompanying the Coast Guard and Exxon on the overflights that would assess the effectiveness of dispersants. In short, he knew less about the prearranged plans and requirements than many of the fishermen and government officials he would tell on March 24 — as if it were common knowledge — that dispersants were the first line of defense.

"When Exxon entered the picture in the first days of the spill, they did not follow the Alyeska plan, and later said they followed their own. Whatever plan they were following, if any, it was not a state-approved plan," said DEC Commissioner Dennis Kelso. Photo by Rob Schaeffer

Much of the disagreement, animosity, and confusion about the decisions to use dispersants can be traced directly to Iarossi's general ignorance of the pre-approved spill response plans in Alaska, the authorities held by specific government agencies, and the role and the interest of the local fishing fleet.

"Well, we were led to believe that we needed a permit from the Coast Guard both to use dispersant and to burn," Iarossi stated during his deposition."[12]And then what the Coast Guard did with it is a mystery to us. But they apparently needed the concurrence from some committee. And it got even more confusing, because depending on where the oil was, they either did or they didn't. And it's not clear to me to this day [Aug. 5, 1992] what the Coast Guard had authority to and not do."

In earlier statements to movie-makers and authors,[13] Iarossi has portrayed the dispersant discussions of the first few days as an exercise in indecision and fear by the governments and the public. Yet the governments were doing exactly what they had agreed to do weeks, and in some cases, years before; Iarossi's perceptions are largely based on the fact that Exxon had a preferred strategy — a controversial, potentially dangerous one — and it had failed to consult with the government and the public about it. What Exxon wanted — full authority to do what the company felt most important — simply was not part of the plan. And when the public was confronted with the matter-of-fact statement that Exxon planned to rely on dispersants, and that it intended to carry out its own plan, the first question from the public to both governments was: Hey, who's in charge here?

Exxon would later claim that the hand-off concept was well understood between Exxon and Alyeska, and that Exxon was proceeding in those early days according to a long-standing company plan. However, Exxon's "plan" was actually a general compendium of available equipment and contractors, and a series of management strategies that applied to setting up command centers and assigning personnel *within Exxon itself.* This plan was not site-specific, nor did it address certain types of spills or specific scenarios.[14] Exxon had, in 1982, notified DEC that the company may take over response to major tanker spills under certain conditions.[15] However, regardless of Exxon's intentions, such a hand-off could not happen under the provisions of the government-approved contingency plan. The Alyeska plan of 1987 states explicitly, "Alyeska will maintain full responsibility and control in the event of an oil spill unless a government agency specifically notifies Alyeska they have assumed responsibility and control."[16]

In testimony before a Congressional committee in 1989 after the spill, DEC commissioner Dennis Kelso summarized the state's position regarding implementation of the Alyeska contingency plan.

"Recently, both Exxon and Alyeska have asserted that the state-approved contingency plan was somehow not really a set of requirements. Under Alaska statutes, it is unquestionably a binding document. Our law states that the company must have a state-approved plan in place as a condition of operating the terminal at Valdez. Failure to do what the plan says is a violation of state law.

"When Exxon entered the picture in the first days of the spill, they did not follow the Alyeska plan, and later said they followed their own. Whatever plan they were following, if any, it was not a state-approved plan."[17]

Exxon's unilateral detour from existing plans fostered skepticism, confusion and anger among the very people Exxon needed most at the time. True, it raised serious regulatory and legal questions for the government's responders who, as part of their jobs, are supposed to collect evidence as well as respond to the emergency. The public interest, in the case of a major oil spill, is not limited to simply responding to the oil on the water. The public interest includes protection of the people's ability to enforce liability requirements on the spiller.

But more important, as a matter of emergency response, any confusion about who should be doing what raised the possibility of a confused and ineffective response. When oil is on the water, there is no time to debate the fine points about whose plan is actually the real one. As a practical matter, the "hand-off" left state regulators with a moving target. It also left the public — especially the area's residents who depended on the commercial and subsistence resources — unclear about who would make good on the promises of protection detailed in the contingency plan. This loophole in the contingency planning process would not be closed off until 1992[18], but in the context of the 1989 response to the *Exxon Valdez,* the immediate alteration of existing strategy was just the first in a series of precedents that raised questions about the state's ability to enforce its environmental standards.

Within a few days, a group of higher-level authorities began meeting to iron out principal differences among parties and to coordinate their plans. Exxon sent its spill response manager, Frank Iarossi, who met with DEC commissioner Dennis Kelso and Rear Admiral Edward Nelson, the commander of the 17th Coast Guard District.

This arrangement was the first tangible evidence that this spill response would be more of a compound public policy operation than a straightforward technical exercise. The federal and state governments gradually took various organizational actions that reflected the magnitude and breadth of the response.

On April 6, the Coast Guard formally elevated all its decisions when it relieved the captain of the port of his duties as on-scene coordinator and installed Rear Admiral Nelson as federal on-scene coordinator. From this point forward, the Coast Guard maintained a flag officer as its on-scene coordinator. In addition, President George Bush charged the Coast Guard's commandant, Admiral Paul Yost, to maintain "personal oversight" of the response, further beefing up the upper-level command structure. As part of the same set of actions, the President also authorized the Department of Defense to provide whatever resources the Coast Guard needed.[19]

On April 5, 1989, frustrated by what he perceived to be Exxon's inability to deliver equipment to the spill area, Cowper called U.S. Coast Guard Admiral Nelson and asked the federal government to take full authority for the spill. However, the federal government did not want to federalize the spill. Photo by Rob Schaeffer

While this significantly elevated decision-making within the federal government and expanded the capabilities for providing federal support for the response, it was not actual "federalization" of the spill. The largest and most expansive spill response action in the nation's history would remain, essentially, under the team management concept described in the National Contingency Plan. This arrangement had both significant strengths and significant weaknesses.

The Coast Guard's official position on federalization was that the spiller, Exxon, was doing about as well as one could reasonably expect given the problem and the conditions. Federal officials informed the President in May, "The [federal on-scene coordinator] deemed it inappropriate to 'federalize' the incident as long as Exxon continued to cooperate with the federal OSC, fund the entire operation, and perform satisfactorily."[20]

To state officials, the situation was not quite so simply assessed. The hand-off by Alyeska to Exxon, Exxon's subsequent refusal to use the Alyeska contingency plan — and the federal government's tacit acceptance of this — left state officials uneasy. Spill response strategy and priorities that had been carefully worked out with Alyeska in previous years were no longer in place, and a new organization was starting somewhat from scratch. Under this scenario, the state would be forced to negotiate with federal and Exxon officials on defensive measures and response priorities, with no guarantee of performance. In fact, given the shortage of manpower and equipment relative to the size of the spill, federal priorities were likely to make first claim on limited resources.

Further, and more important, the state recognized early on that the event was not just a massive pollution control exercise, but that there were massive economic and social problems compounding the response. The kinds of upheaval and displacement caused by the spill and the response were more like those in a natural disaster, and therefore required broader government intervention and aid. Yet, as Governor Steve Cowper later recalled, there was a "substantial question" in the mind of state officials about how to increase government involvement, and whether federal takeover was the best strategy.[21]

On March 26, Governor Cowper declared a state emergency, which officially made available the emergency management expertise of the state Division of Emergency Services. It also allowed the state's responders to use equipment, manpower, and aircraft of the Alaska National Guard. On March 27, the Governor asked the President to declare a national emergency, specifically requesting that an emergency services

coordinator be appointed to work with state and local governments. His goal was to bring more federal resources to the spill and increase the influence of the federal government over Exxon's actions. However, his first inclination was to avoid actual federalization of the spill. "The original plan — which was Cowper's decision — was to try having Exxon, DEC and the Coast Guard to reach 'the appropriate decisions' on a consensus basis," according to Alaska Oil Spill Commission records.[22] So, at least at first, the Governor was willing to give the established management strategy a try.

On April 5, frustrated by what he perceived to be Exxon's inability to deliver equipment to the spill area, Cowper called Rear Admiral Nelson and asked the federal government to take full authority for the spill. Cowper was also influenced by consistent reports from state personnel in the field that many of Exxon's statements about equipment working in the field were either misleading or incorrect, such as reports that equated skimmers "deployed" with skimmers actually recovering oil. Cowper felt that in the interest of effectiveness and accountability, the federal government needed to step in. However, the federal government did not want to federalize the spill.[23] Instead, on April 6-7, the federal government took steps to elevate spill response to a higher level within the Coast Guard, and the President announced his decision to allow greater Department of Defense involvement.

Essentially, the state, the Coast Guard and Exxon agreed on a management system that provided for more federal involvement and direction, but allowed Exxon to write the checks. It was not a perfect arrangement, but it appeared better than the alternatives available at the time.

The state decided not to push the issue of federalization. Admiral Yost, the Coast Guard Commandant, assured the state that a joint response effort would work and that the federal government would make its decisions "in concert and in consonance" with the state and its regulations.[24] In addition, Cowper, Kelso, and the Governor's staff reluctantly agreed that yet another changeover in management — this time from Exxon to the government — could cause delays and confusion. And finally, Exxon's procurement and financial management appeared more efficient than the governments', even under emergency conditions. Essentially, the state, the Coast Guard and Exxon agreed on a management system that provided for more federal involvement and direction, but allowed Exxon to write the checks. It was not a perfect arrangement, but it appeared better than the alternatives available at the time.

Despite the problems this would cause for all parties, in various ways at various times, there were practical reasons for taking this approach. For one thing, Exxon had accepted responsibility for the spill on the second day and already had begun purchasing and transporting equipment, hiring vessels, and putting other contractors in the field. By keeping Exxon involved under the team management idea, the governments were by-passing a chance for tighter authority in exchange for the prospect of putting more resources in the field with a minimum of delays.

Despite the decision to pursue a team management approach, all three entities would guard their legal and operational prerogatives. It was unrealistic to assume that any one of the three would be willing to yield control of its most important interests to the basic response organization, since even at the start policy questions were woven into response issues. To deal with the mix between policy and technical issues, the three parties formed a high-level steering committee, which ostensibly would meet to iron out major policy disputes or agree to basic strategies.

There was a good deal of overlap between the high-level policy group and what might be termed the "basic" response organization headed by the federal and state on-scene coordinators. When first formed, the steering committee included Exxon's Frank Iarossi, DEC's Kelso, and the Coast Guard's Nelson. But when the job of federal on-scene coordinator was bumped up to a flag officer, the federal on-scene coordinator became part of the steering committee, and for most practical purposes, a deputy federal on-scene coordinator assumed the day-to-day technical burden. So, the protocol "equivalency" was generally maintained.

Occasionally, a decision by one or the other governments would be bumped up even higher, to the level of Governor Cowper or Commandant Yost. Governor Cowper maintained a consistent interest in the details of the response, but he left most strategic decisions to Kelso (or in some cases, other members of the Cabinet). The Governor spent most of his oil spill time on issues such as making sure commercial fishing

interests had access to restitution, or that communities could get necessary relief from state funds or resources. He was also consulted when DEC and the Cordova fishing community proposed to conduct independent cleanup, a move that some attorneys suggested could limit Exxon's liability for damages. Cowper quickly approved the action.

All in all, it was more of an *ad hoc* command-level structure than one that could be neatly drawn with boxes on an organizational chart.

This left the Coast Guard completely "in charge" of the effort, but misperceptions about the "in charge" issue would persist throughout the first summer, triggering confusion and frustration among the people of the spill region. It would also come up again in a series of bitter and sometimes acrimonious clashes in 1990 over state and federal jurisdiction.

The obvious problems caused by the blurred lines of authority and control led to numerous calls for changes in national response strategy. "The spiller should not be in charge of a major spill," the Alaska Oil Spill Commission concluded flatly in 1990.

Regardless of Vice Admiral Robbins' firm declaration, "[t]here can only be one boss and I have that responsibility,"[25] his authority and his actual command ability were something less than that of an admiral moving cruisers and destroyers during a naval battle. Exxon still controlled nearly all of the equipment, and Exxon supervisors, not Coast Guard officers, directed actual actions on the "battlefield."

"Exxon is charge of things now," reported DEC's contractor from the field on April 26. "[DEC manager] assures me we are still under contract to ADEC, but for the most part, Exxon is giving me directions as to where to direct skimmers." He later referred to Exxon's control of operations as a "military takeover," and noted that by the end of April he had little control over dispatch and deployment of response vessels in his sector.[26]

These observations would be mirrored by field notes, meeting minutes, and other events throughout the spill, but especially during the first year. The Coast Guard was, indeed, "in charge" of the response, but the "in charge" of a military operation and the "in charge" under the National Contingency Plan were very different.

For state monitors attempting to make sure that Exxon and its contractors did the job according to government and public requirements, the blurry lines of authority caused constant friction and confusion in the field. Exxon's contractors, from the shoreline cleanup company to the geologists hired by the company to work on surveys, naturally put the orders of the people who were paying them over the requests or orders of state monitors. The government, whether Coast Guard or state, was not in command of the response.[27]

The problem for the public was more confusing and in many ways, more acute. Members of the public found themselves directed to Exxon, not the government, when they requested information or some solution to a problem. In Cordova, for example, the spill response drained adults from the usual patterns of home and work, and after a while the town simply ran out of child care. The only licensed child care facility was swamped — first, because more parents were working more uneven schedules, and the demand for child care was up, and second, because there weren't enough child care workers. This was not just a matter of demand; it was also a matter of wages. Like many other small businesses throughout the spill area, the child care center could not pay wages high enough to compete with the $16.69 an hour available for shoreline workers.

The people of Cordova perceived this as a problem needing government intervention of some kind. The government was running a shoreline cleanup, and the shoreline cleanup was not the usual government public works project. It was, rather, a high-stakes environmental battle designed to protect the economic base of the region and the social system around it. This was about people's lives and families and towns — and naturally, the people wanted their public institutions to respond appropriately.

But Coast Guard commanders, however well-intentioned, are not equipped to deal with complex social problems — like meeting child care emergencies, or mental health problems, and so on. The Coast Guard admiral "in charge" of the response could not issue some order or tap some fund to mobilize an agency to help the Cordova child care facility.[28]

The Coast Guard's authority under the National Contingency Plan (NCP) is largely confined to the basics of pollution control (after all, the NCP's full name is the National Oil and Hazardous Substances *Pollution* Contingency Plan). And while the NCP charges the federal government with the task of protecting the public health and welfare in the event of a spill, health and welfare issues are not the Coast Guard's institutional strength. Essentially, the Coast Guard was acting as a pollution control agency, not an agency responsible for Exxon's actions outside of the pollution control operation, and not an agency responsible for solving social and economic problems far outside the chain of causation.

Eventually, the Cordova child care facility's managers found themselves negotiating with Exxon to find a solution to the child care crisis. Like vessel owners, local governments, and many other Alaskans who found themselves in a similar situation over the next few years, they found this arrangement curious and troubling: curious, because social problems caused by natural disasters are not the usual responsibility of private industry, and troubling, because there was no way for these members of the public to enforce accountability. Exxon certainly stretched outside the usual realm of private industry involvement in solving social problems. However, a private corporation is not the same thing as a public institution. In dealing with a public institution, citizens have some leverage through the democratic process of politics and elections; when dealing with Exxon, they had no leverage beyond their own negotiating skills.

It is questionable whether "federalizing" the spill under the laws at the time would have solved all the problems. However, it certainly would have given the state and the Alaska public a more precise and stationary target for negotiation on both the mechanics of pollution control and the solutions to social and economic upheaval caused by the spill and the response.

The obvious problems caused by the blurred lines of authority and control led to numerous calls for changes in national response strategy, from private citizens to Governor Cowper, from the Alaska Oil Spill Commission to the U.S. Congress.

"The spiller should not be in charge of a major spill," the Alaska Oil Spill Commission concluded flatly in 1990. "A spiller should be obligated to respond with all the resources it can summon, but government should command that response."[29]

The idea that "the spiller should not be in charge" of such a complex public action led directly to provisions in the federal Oil Pollution Act of 1990 that would give command authority to the government under circumstances similar to those during the *Exxon Valdez* disaster.[30] However, the federal government's role in directing the *Exxon Valdez* response remained essentially the same from start to finish.

1.3 State government organization[31]

It was foolish to believe that the Exxon Valdez was just another issue for state government, but Governor Cowper felt it was important not to let the issue eat the government altogether.

The Cowper Administration adapted to the internal management challenges of the oil spill in a variety of ways. The front-line agencies such as the Alaska departments of Environmental Conservation, Natural Resources (DNR), and Fish and Game (ADF&G) all created special oil spill divisions or task forces, with separate staff and budgets. Other agencies, such as the Alaska Department of Labor, which oversaw worker health and safety on the shorelines, added additional temporary workers as needed. The Alaska Department of Law hired private law firms and devoted some in-house staff to oil matters exclusively. The Office of the Governor included an Oil Spill Coordination Office, and the Governor often consulted with an informal oil spill "mini-cabinet."

However, the basic management premise was that state government is designed, institutionally, to deal with concurrent problems, issues, and crises — some foreseen, some not. It was foolish to believe that the *Exxon Valdez* was just another issue for state government, but Governor Cowper felt it was important not to let the issue eat the government altogether. Commissioners were to retain their usual discretion to manage their divisions; department staff retained their usual permitting and management authority. The oil spill coordinator in the Governor's office had no special authority to

direct commissioners or manage agency affairs.

Publicly, DEC was the front-line agency. And although the public nature of the response often put DEC technical staff in front of news media that demanded more than mere technical information, the department's managers protected technical staff from political or policy disputes. Whenever possible, appointed officials, such as the commissioner or a Governor's office representative assigned to the spill, would comment on policy developments or provide the public response to positions or charges made by outside parties. This was done partly to protect the professional integrity of technical staff and ease their working relationships with the Coast Guard and Exxon; relationships were strained enough as it was. But the separation of church and state, so to speak, was also designed to simply let DEC's people do their work with as few distractions as possible — they had enough to do as it was.

DEC duties and management structure

In terms of sheer volume, DEC had more to deal with, from the standpoint of personnel and resource allocation, than its sibling agencies. At the time of the spill, DEC had 296 employees overall. Within a few days, more than 30 regular staff were in Valdez, with dozens more handling various support and administrative tasks at DEC offices around the state. And of course, when someone was pulled off a task unrelated to the oil spill, someone had to cover, which meant yet another task lost staff attention temporarily.

"I could see right away we were going to burn our people out," recalled DEC's first on-scene coordinator, Bill Lamoreux. "We did well because we had everyone in the department working on it 20 hours a day."[32]

Obviously, that couldn't last.

Under normal circumstances, it would not be unusual for DEC to rotate full-time, permanent employees from scheduled tasks to spill response. At the start, that's what the department did with responders, including the state on-scene coordinator. However, as the shoreline cleanup plans started to come together, the exercise was becoming an undertaking of unprecedented proportions. In June, DEC appointed a former Alaskan and EPA official, Steve Provant, to the full-time job of state on-scene coordinator.[33] The department also designated the *Exxon Valdez* Oil Spill Response Center as a separate entity within the department. It remained separate, with a full-time coordinator position staffed from outside the department, until being merged with the department's Pipeline Corridor Regional Office in spring 1992.

By the final spring of shoreline cleanup in 1992, the Oil Spill Response Center had a staff of 12 doing a mix of shoreline monitoring, project close-out, and legal documentation. But just three years before, the operation was among the largest in state government.

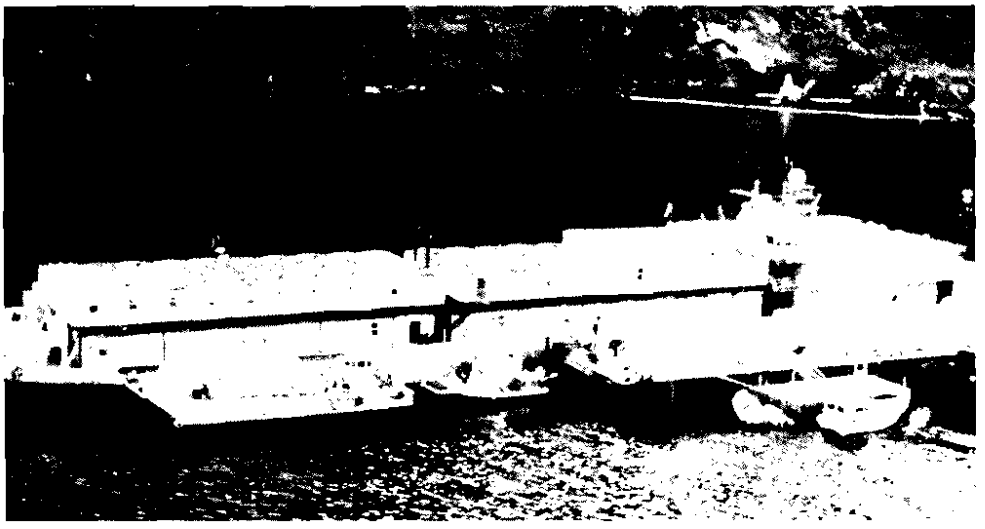
In early May 1989, DEC received authorization to hire temporary employees to fill out its ranks on the oil spill. In raw numbers, more than 150 people were assigned to the oil spill alone during the peak of the response in the summer of 1989, and that number does not take into account an additional 50-60 who worked occasionally or

ADEC staffing statistics for spill response, summer of 1989

Temporary staff	150 persons plus part-time
Shoreline monitoring staff	60 persons
Overseers for oily solid waste handling	6-10 persons
Seafood inspection	12 inspectors
Payroll billings	nearly $6 million

part-time on the project.

The spill response center was based in Valdez, and maintained regional offices in Seward, Homer, and Kodiak. These offices included field monitors, field managers, and clerical support. They also included computer mapping experts and technicians, a group assigned to monitor the storage and disposal of solid oily waste, a small group to work as agency staff or liaisons on dozens of state and federal scientific monitoring programs, a special public information team, and an entire section devoted to finding housing, handling payroll and procurement, and paying bills and billing Exxon.



Quarters for the thousands of spill response workers at remote sites included arrangements such as these trailers atop barges. Photo by Rob Schaeffer

Some of the department's tasks were intuitively obvious, such as carrying out its specified regulatory duty to oversee cleanup operations. As the Exxon shoreline presence grew to several thousand workers and vessel-based support crews,[34] DEC had to expand its shoreline monitoring capabilities. On May 1, there were eight staff assigned to shoreline monitoring; six weeks later, staffing was up to 40, and by August it peaked at 60. These were the people who lived on the crew vessels and walked the beaches, noting whether the work was going as it should and reporting on conditions. Again, this group was a mix of DEC veterans and new, temporary hires. The department (as well as ADF&G and DNR) attempted throughout the spill to maintain continuity in staff assignments, especially on the shorelines.

And with anywhere from 2,500 to 3,000 people living and working on vessels and in remote sites,[35] DEC had to maintain staff to inspect the sanitation systems, cooking and food storage facilities, and drinking water systems for the work crews. The department reviewed almost 150 plans and conducted more than 120 site inspections during the summer of 1989.

DEC was responsible for making sure other departments did their accounting on time and correctly, as well, so that the state could recover its costs from Exxon. DEC was the principal source of cash flow for state oil spill response for nearly the entire three years.

The handling, storage, and transportation of roughly 30,000 tons of oily solid waste generated by the cleanup required the full-time attention of 6-10 workers in 1989, and an additional dozen full-time seafood inspectors stepped up oversight of tenders, processing plants, and product throughout the spill zone.[36] A significant problem was presented by the hundreds of fishing vessels that were working on oil spill response. Many of these vessels left the oil spill navy to work fisheries that were open. DEC required that any vessel making the switch from oil to fish had to undergo hull, gear, and hold inspection; the department conducted 280 such inspections in 1989.

DEC's *Exxon Valdez* employees dropped to 80 at the end of 1990, 30 during the 1991 cleanup season, and 20 during the summer of 1992 (including several who worked full- or part-time on restoration). Throughout the response, there was an effort to rotate permanent, full-time employees through the ranks, and most of the top technical managers were longtime department employees.

Employees were scattered around the spill area, on vessels, shorelines, and in field offices. Much of the communication among workers and supervisors was by hand-held VHF radio, facsimile machines (even aboard vessels), radio telephone, and regular land communication. Paperwork demands increased, rather than decreased, with the emergency, in part because of extensive documentation requirements for purchases and payroll, and the need to keep track of oil spill expenses separate from general

department activities.

The demands of the project, the conditions, the communication systems and the general atmosphere of urgency all combined to cause a variety of management problems. Normal scheduling was difficult; overtime costs were high; financial tracking and property control had gaps.

Administrative staff were constantly struggling to keep up with billings and documentation, since the state was sending invoices to Exxon for reimbursement of state expenses. Payroll alone accounted for nearly $6 million in 1989 billings, and almost $14 million through June 1992.[37] Payroll staff not only had to insure that the wage claims were precisely documented, but they also audited the original payroll requests to make sure overtime, leave time, health benefits, etc. were correct.[38]

DEC was responsible for making sure other departments did their accounting on time and correctly, as well, so that the state could recover its costs from Exxon. DEC wound up with this task because it was the principal source of cash flow for state oil spill response for nearly the entire three years. At first, state agencies responding to the spill paid their workers and purchased supplies from state general fund revenues in the usual agency budget. Then, responding to the growing cash-flow crisis, the state Legislature in late April made a special appropriation of $20 million to the state's Oil and Hazardous Substances Release Response Fund (known in government vernacular as the "470 Fund" because of the number of a legislative bill modifying the fund several years before). DEC used the "470 Fund" as its source for cash flow, as did other agencies,[39] then sought reimbursement from Exxon. This was the basic financial arrangement throughout the spill.[40] It didn't always work smoothly, as both DEC and other departments often had large backlogs of billings for Exxon. Gaps in documentation, or delays due to the crush of the original billings, often slowed the reimbursement system down. Exxon also sent back billings from time to time, requesting more complete documentation or questioning some items. Some billings the company simply refused to reimburse. For example, if passenger manifests for any DEC overflight included a single member of the news media, Exxon would reject the billing.[41]

Response personnel review of part of the 30,000 tons of oily solid waste generated by the cleanup in 1989. Photo by Rob Schaeffer

The state received just under $80 million from Exxon in reimbursements based on state billings during the three years of the response. An additional $27 million in unbilled expenses were repaid to the state treasury out of the $1 billion state-federal claims settlement with Exxon, and at this writing (spring, 1993) roughly $30 million in additional reimbursement is outstanding.

DEC made a number of internal changes to deal with the special demands of the spill response. The department's actions showed how the agency could be flexible, but it also pointed out some things that DEC was not and is not.

For example, there was a strong and insistent public demand for development and testing of oil spill response products. DEC did organize a task force in its Treatment Technology section within the oil spill response center to evaluate many of the proposals that came in. However, this effort did not extend too much beyond evaluation of proposals, or

determining whether the scientific information submitted to the department looked as if it were done to accepted scientific standards. DEC was not designed as a research and development agency, even in what might be called "peacetime." The state government does not have an agency that serves this type of function.[42]

There was also a demand, primarily from within the state-federal-Exxon response organization, for the state to provide basic scientific advice or consultation. Again, DEC did not necessarily have those scientific resources in its organization. DEC is a technical agency, as opposed to a scientific agency. This may seem like a semantic subtlety, but it really is quite important. DEC oversees waste management systems, hazardous site cleanups, air quality, drinking water and sanitation, and so on. This is a job primarily performed by engineers, or specialists with varied scientific or technical training. The department had a lot of professional engineers, but few, if any people with advanced degrees in microbiology. DEC's oil spill office waxed and waned on its commitment of people and resources to science or other research. Ultimately, the state's spill managers decided that its resources and personnel were stretched thinly enough without trying to launch a major new enterprise outside the traditional realm of agency operations and expertise.

The state-federal-Exxon oil spill structure brought together a number of people to work on a given problem, or set of problems, but the technicians didn't always bring the same set of tools to the table. Metaphorically speaking, one might come to the table prepared to discuss the best way to drive a nail, only to discover that the rest of group only had wrenches, and didn't think nails were particularly effective fasteners in the first place. This occasionally led to breakdowns in communication and sharp differences of opinion among the response agencies.[43]

Alaska Departments of Fish and Game and Natural Resources

The Alaska Department of Fish and Game had a smaller, less visible continuing presence than the DEC, but its involvement came at a number of critical levels, and its influence on the response was the most profound, in many ways.

Officially, the department's response organization was split between the Division of Habitat and what later became the Division of Oil Spill Impact Assessment and Restoration (OSIAR).

The OSIAR division was the initial recipient of $10.8 million in 1989[44] to begin independent assessment of the damage caused by the spill. Fish and Game had received some earlier funding for damage assessment study when it appeared that the federal government, the state, and Exxon would conduct damage assessment jointly, with primary funding from Exxon. This arrangement fell apart quickly as litigation loomed larger. The governments and Exxon chose to pursue independent courses of damage assessment.[45]

Dead, oiled ducks mark the high tide line at Puale Bay on the Alaska Peninsula in May of 1989. Photo courtesy of the Exxon Valdez Restoration Office

From the standpoint of response management, the damage assessment program rarely emerged. The governments intended to use the study results to prosecute their natural resource damage claims against Exxon, and therefore data from the studies were held confidential. Access to damage assessment data was extremely restricted, although the state on-scene coordinator was able to receive occasional briefings if he felt damage assessment might aid in making a specific response decision. However, it appeared that despite limited circulation of biological damage assessment to DEC, Fish and Game response personnel had regular access and could provide information to other state responders.[46]

Interaction between federal responders and damage assessment personnel was even less frequent, if it occurred at all. The federal on-scene coordinator in both 1990 and 1991 said many times, in public and private, that not only did he not have any damage assessment information, but furthermore, he did not *want* any.

Despite the heavy investment in Fish and Game's damage assessment, and its status as the sole, detailed government program to figure out how the oil spill might have affected natural resources, it was virtually invisible to the public and barely visible to the response organizations.

So, despite the heavy investment in Fish and Game's damage assessment, and its status as the sole, detailed government program to figure out how the oil spill might have affected natural resources, it was virtually invisible to the public and barely visible to the response organizations.

Fish and Game's public point of contact during the response was primarily the Division of Habitat. Fish and Game biologists played a central role in setting the priorities and schedules for cleanup, particularly in 1989.[47] They also conducted specific monitoring of conditions at anadromous streams throughout the spill, and served as the state's cleanup monitors (often in DEC's stead) at anadromous streams.

Other Fish and Game divisions were the focus of some of the response's most difficult issues, such as the widespread commercial fishing closures of 1989, and the effect of the spill and response on subsistence foods and harvest patterns. However, on most issues, at most times, Fish and Game dealt with the principal state and federal response agencies through the habitat division.

Fish and Game faced the same problems as DEC when it came to committing staff to the oil spill effort.

At the outset, many of the staff dispatched to the oil spill were mid- and upper-level managers. The oil spill was the biggest thing on everyone's plate, but it was open-ended, and the government — at all levels — simply could not put everything else on hold all around the state while key people dealt with oil spill issues in Valdez, Cordova, Homer, Seward and Kodiak. Key managers had to go back to managing the rest of the state's programs. Similarly, as the project geared up, it was obvious that it was going to take a long time and a lot of people; Fish and Game, like DEC, simply could not pull away its permanent staff from all projects for an unlimited period of time.

During the first two or three months, permanent staff originally detailed to the oil spill were "called home." New people were rotated in. This solved one problem and created another — a problem that nearly every organization involved in the spill had to deal with at one time or another.

The new problem was that the new people were coming to a fast-paced and highly charged project. The learning curve was steep and the time was short. The "rotation" problem was slowing down and confusing the response, as new people asked old questions that had been discussed, debated, and resolved before they arrived.

As noted above, DEC undertook a massive temporary hiring program. However, most of the DEC field jobs were basic monitoring positions; they required some technical background, but essentially people had to be able to observe and report, as opposed to interpret and recommend.[48]

Fish and Game would also attempt to solve its staffing problems by hiring temporary employees intended to work solely on the oil spill for the life of the project. However, Fish and Game's role was more immediately technical, which made its staffing problem more difficult to solve. While the department needed some entry-level workers (fisheries technicians), it really needed experienced fisheries biologists who could speak with authority within the growing number of resource assessment teams

and technical advisory organizations.

As the Fish and Game's lead representative on the project explained later, "The state's administrative procedures are designed to provide an objective evaluation process for selecting applicants; they are not designed to facilitate hiring itself."[49] The state's hiring system puts an emphasis on giving every applicant an even break; it does not necessarily give supervisors the ability to hire the best qualified applicant in the shortest amount of time.

The state system does allow an agency to make an emergency hire (and the oil spill unquestionably qualified as an emergency), but the rules say an emergency hire is good for only 30 days[50], after which time the agency must go back and hire off the certified state list of qualified applicants.[51]

DNR monitors either augmented DEC's presence on the shoreline or served as a region's front-line cleanup representative.

Fish and Game had an additional problem: The oil spill created a bull market for biologists as agencies, Exxon, and consultants scrambled to add people to collect samples, undertake studies, and provide expert advice. The same people on Fish and Game's registers were being simultaneously recruited by consultants (many on contract to Exxon), who had more flexibility when it came to negotiating pay and other terms with an employee. It was, at first, difficult to get a commitment from some of these people until they had examined and exhausted other options.

Fish and Game got around these problems, in many cases, by calling former department staff out of retirement. These retirees were frequently biologists with two or more decades of experience in Alaska (one was a former commercial fisheries division director), which provided them with considerable authority. They also knew the state management system and general department policies and procedures, which made it easier to integrate them into the operation. Fish and Game would hire these people on an emergency basis, then, during the next 30 days, get them back on the registers, where they could be legally hired beyond the 30-day emergency limit.

The Department of Natural Resources (DNR) formed a special section within its Division of Land and Water Management (now the Division of Lands) to coordinate with DEC on land uses and cleanup priorities, but the division primarily reassigned permanent staff. In addition, much of the department's presence came from the Division of Parks and Outdoor Recreation, the custodian of a dozen small state park sites in Prince William Sound, the wild and largely unknown Shuyak State Park at the north end of the Kodiak archipelago, and the Kachemak Bay Wilderness State Park, which abuts the Kenai Fjords National Park on the Kenai Peninsula. DNR monitors either augmented DEC's presence on the shoreline or served as a region's front-line cleanup representative. The difference was largely dependent on personalities and land ownership patterns in a given area; in both the Homer and Kodiak cleanup zones, the primary state interests outside of anadromous streams were the state parks. The rangers there served as primary state representatives on regional advisory committees, or worked interchangeably with DEC staff.

The parks division also had one of the least visible — for a reason — roles in cleanup planning. The division's archeologists were in charge of making sure that cleanup activity did not disrupt or destroy archeological sites, and that workers did not take artifacts. They worked directly with their federal government counterparts on a special cultural resources committee, and did not usually interact with DEC, except during budget discussions.

DNR and Fish and Game components of the spill response were the largest outside of DEC throughout the response. Other agencies, such as the Alaska departments of Labor, Administration, and Community and Regional Affairs, would enter the management structure at various points, but generally it was to provide a specific service to the organization, not to claim a separate authority. Funding was for specific and recognizable purposes, easy to track, and in relatively small amounts.[52] Some additional personnel were hired on a temporary basis, but most agency staffing outside of DEC was handled in-house.

The Office of the Governor

The state had a number of projects or responsibilities that were not DEC's job. DEC (and other agencies) had a general responsibility to collect and properly handle information, samples, and other items that could be used in litigation, but the department was not responsible for implementing legal strategy. DEC commissioner Kelso said the state's legal team maintained its distance from DEC and did not ask it to take any specific actions, other than to document events and handle its oil samples in ways that would meet legal standards for submission as evidence in court.[53]

Governor Cowper felt that the oil spill presented several tasks that did not fall neatly into the operational plans of any of the state agencies, and that the executive office should coordinate them. However, he did not want a new level of authority inserted between his commissioners and him.

In early May, the Division of Emergency Services, in the Alaska Department of Military and Veterans Afairs, suggested that it serve as the government's overall coordination arm for executive branch oil spill matters. Cowper did not think that appropriate. Instead, on June 1, he appointed Dr. Robert LeResche, director of the Alaska Energy Authority and a former DNR commissioner, to the job of managing everything that didn't fall under regular agency operations.

LeResche's Office of Oil Spill Coordination had two sets of tasks, one that was sharply defined and one that was more free-form.

LeResche became the project manager for the state's participation in National Transportation Safety Board proceedings on the grounding of the *Exxon Valdez.* LeResche and his immediate staff, working with the attorney general, prepared the state's basic finding of fact about why the accident happened. He was the state's chief representative on the panel that conducted hearings in Anchorage that summer.

LeResche was also responsible for looking at how state agencies were dealing with spill-related issues, from internal management policies to field cooperation and data collection. His staff was to make sure that the state's management actions and response strategies were consistent with each other. This ranged from making suggestions about how departments handled overtime, to what kind of computer software they used to collect information about the spill. Normally, there is no pressing need to make every agency do everything exactly the same way; management or computer procedures that are efficient in the revenue department may be completely wrong for the fish and game department, and so on.

But in the case of the oil spill, it was important that data was collected and presented in a uniform manner. The state was billing Exxon for all its spill-related expenses, and it was important that fish and game's payroll or purchasing information looked the same as the information from the labor department; discrepancies could lead to delays or rejections of reimbursements. Also, maps and field notebooks and photos, all of which might be used in some aspect of legal proceedings, had to be treated and handled the same throughout the government; inconsistencies or discrepancies could cause confusion, or cause some information to be thrown out. And finally, of course, it was important to make sure that departments weren't duplicating each other's efforts. While certain clusters of agencies — the resource agencies, for example — are in frequent contact with each on a routine basis, rarely do so many state agencies wind up working on the same project at the same time; at least 13 of the 16 state departments were involved in some way on the spill response.

LeResche was also the manager of the $35 million special appropriation made by the Legislature to the Office of the Governor. This amount of money was far beyond the Governor's usual budget, and more than many agencies spend in a given year. Governor Cowper wanted to make sure the money was distributed efficiently and accounted for properly.

The second set of responsibilities was less well-defined, falling into a category that could best be described as general trouble-shooting. LeResche took over day-to-day management of Governor's Office personnel who had been in the field since early in

Governor's Office of Oil Spill Coordination duties

- Head state's participation in National Transportation Safety Board proceedings
- Oversee how state agencies dealt with spill-related issues
- Manage the $35 million special appropriation by the Legislature to the Office of the Governor
- Troubleshooting
- Serve as Governor's point of contact with Exxon management for business matters

the spill. These people were supposed to stay somewhat in the background, serving as part observer and part safety valve, helping to break administrative logjams or handling questions that could slow down or distract regular agency personnel. For example, a fish biologist in a field office really wasn't equipped — either in terms of authority or resources — to handle complaints about the child care center funding, or the need for an extra state trooper to deal with trouble among all the transient workers in town. The Governor's office representatives were not in Valdez, Cordova, Homer, Seward and Kodiak to manage the spill operations; they were there to serve as community liaisons and work with the local governments.

LeResche's last major job was to serve as the Governor's point of contact with Exxon management for business matters, as opposed to technical response issues. LeResche worked with Exxon on reimbursement for state expenses. He also helped negotiate some of the preliminary payments by Exxon to Alaska commercial fishermen whose fisheries were shut down because of the oil.

LeResche's office did not coordinate all aspects of the response for the executive branch. Its focus was more on administrative, legal, and fiscal matters, while actual response policy and technical coordination was left to DEC. Agency staff outside of DEC were not always satisfied with DEC's ability or efforts to coordinate response policy for the government as a whole. Fish and Game, in particular, felt that DEC would lapse into a pattern of tending its own institutional needs first, sometimes taking technical positions that were directly contrary to Fish and Game's.[54] Some of these disputes might be considered garden-variety intramural arguments, although others were serious enough to suggest that in a catastrophic spill, the state might consider some modifications to its basic management procedures.

1.4 The joint response

Essentially, Exxon would come up with a proposed cleanup plan, which would be distributed to affected agencies and landowners for review and comment. The state and federal on-scene coordinators would confer and alter the plan, based on the comments, then authorize Exxon to proceed.

The government was in charge of making sure Exxon conducted the cleanup properly. But there was not just one government, of course: Federal, state, and even some local government entities had various authorities over cleanup activities, land use, or resources.

The authority was not always drawn clearly and sharply in the law. The federal and state governments in Alaska have a long-running legal battle over who owns the land underneath rivers and lakes. A series of court decisions has solved a few pieces of the issue, but the matter of who owns the tidelands has not been hashed out. Lawyers from the state and federal governments, working in the context of the *Exxon Valdez* spill, agreed not to argue about this particular issue when it came to pursuing and collecting money from damage claims from Exxon. Thinking practically, they realized that a squabble over tidelands ownership could not only hurt damage cost recovery, but it could certainly slow down disbursement of whatever was collected; the submerged lands cases usually take years of litigation to resolve.

When it came to sorting out authority over cleanup, there was an equally practical reason for putting aside issues of who held ultimate control of which decisions. A joint response, directed by the Coast Guard with high-level assistance from DEC, made more sense. DEC and other state agencies retained their regular statutory authorities — Exxon still needed approval from Fish and Game to work around salmon streams, or from Natural Resources to operate on state lands, or from DEC to burn logs, for example — but basic cleanup orders would be harmonized in a single work order to Exxon from the federal on-scene coordinator. In mid-April, DEC commissioner Kelso met with Coast Guard commandant Yost, who assured the state that Coast Guard decisions would be "in concert and in consonance" with state requests and requirements. In theory, all state agencies funneled their requirements through the state on-scene coordinator, and all federal agencies put theirs through the federal on-scene coordinator.[55] The two coordinators would then work out a common set of priorities.

The legal issue lurking behind this practical agreement concerned "pre-emption" of state law by the federal government. In very broad terms, a state may impose stricter (or simply different) environmental cleanup requirements than those of the federal government, as long as the state rules do not conflict with the federal ones. So theoretically, on the shorelines, the state could hold a crew on a work site to do more work, even if the federal monitor was satisfied.

But wait: If the federal manager decided to move anyway, he might be able to argue that the pressing need for basic federal cleanup at another site might be jeopardized if the crew stayed to do the state-ordered work. A court might agree. Again, in very broad terms, the state probably did not have the authority to unilaterally divert resources from the federal-directed cleanup to a state-directed work order.

Coast Guard on-scene coordinator Rear Admiral Dave E. Ciancaglini speaks to the public and panel, while DEC Commissioner Kelso listens, during an oil spill operations meeting in Anchorage.

Photo courtesy of Oil Spill Information Center

Ultimately, the state had the authority to require Exxon to conduct cleanup to state requirements, but when resources were limited or the timetable tight, federal authority to conduct its cleanup probably superseded the state authority.

While the lines of authority in the cleanup issue might have been in better focus than those in the submerged lands issue, they were still not always crisply or boldly drawn. In the real world of the cleanup, on the beaches, the state and federal monitors were in constant negotiation and consultation about how much Exxon ought to do at a particular site at a particular time.

However, in April of 1989, the emergency was bigger than the jurisdictional questions. On April 20, Vice Admiral Clyde Robbins, the Coast Guard's Pacific Region commander who had taken over as federal on-scene coordinator, announced a spill management structure that would remain largely intact for the duration of the spill response.

Essentially, Exxon would come up with a proposed cleanup plan, which would be distributed to affected agencies and landowners for review and comment. The state and federal on-scene coordinators would confer and alter the plan, based on the comments, then authorize Exxon to proceed. When Exxon had implemented the plan, the state and federal coordinators would assess whether the work was done properly, or whether it needed to be modified. This flow pattern was the same whether the issue was a general, area-wide work plan or a site-specific cleanup order.[56]

The state had several primary concerns. First, the state made sure that all its affected agencies maintained their respective permitting authority. Alaska was agreeing to let the Coast Guard coordinate the massive response, but the state was not giving away its statutory right to review and approve activities on state lands, to regulate air and waste disposal, or to protect fisheries habitat.

If Exxon wanted to burn debris, DEC maintained its authority to review the burn plan and make sure that it met state air quality standards, and that Exxon applied for

and received the proper permit. If Exxon were to work in or around a salmon spawning area, the Fish and Game department maintained its authority to permit and monitor the activity. If Exxon were to work on state-owned lands, Natural Resources retained the right to issue a land use permit.

The permitting authority was the clearest and most effective way for the state to control cleanup activity, and it wound up playing an important role.

The response would be extremely disruptive to the local environment. With the state retaining permitting authorities, the Alaska public had a way to insure that the "fallout" from cleanup activities was acceptable to Alaskans in the area. All the state permits were subject to public comment and review, and in some cases, the preferred course of action by Exxon or the federal government was unacceptable to local residents.[57] The permitting process gave citizens access to important decisions affecting the public lands and resources.

The Interagency Shoreline Cleanup Committee

A second point of entry into the process for the public was the Interagency Shoreline Cleanup Committee (ISCC), formed by order of Vice Admiral Robbins on April 20. Robbins gave formal standing to an ad hoc group of agencies and citizen groups that had come together to help Exxon and the governments plan shoreline cleanup operations. The elevation of the group to advisory status to the federal on-scene coordinator was a departure from normal procedures; usually, the federal on-scene coordinator depends on the scientific support coordinator (currently the National Oceanic and Atmospheric Administration, or NOAA) to advise him on the resource considerations and impacts of cleanup.

The ISCC consisted of state and federal resource agencies, plus representatives from established commercial fishing organizations, the regional Native corporation, and a private conservation organization. Each region (Prince William Sound, Kodiak, Homer and Seward) had an ISCC, and specific membership varied depending on principal land ownership patterns and resource interests. The National Park Service, for example, had a primary federal role in the Kodiak, Seward, and Homer ISCCs because of the Kenai Fjords National Park, and the Katmai National Park and Preserve on the Alaska Peninsula. The U.S. Forest Service had a greater federal role on the Prince William Sound ISCC because much of the land adjoining the Sound is in Chugach National Forest. In all cases, the three state resources agencies — DEC, Fish and Game, and Natural Resources — held seats on the ISCCs.

With the state retaining permitting authorities, the Alaska public had a way to insure that the "fallout" from cleanup activities was acceptable to Alaskans in the area. All the state permits were subject to public comment and review.

These groups reviewed Exxon cleanup plans and government strategies, established priorities for cleanup, commented on what techniques they preferred, and evaluated the results of cleanup. They made specific recommendations to the federal on-scene coordinator about work orders, determined appropriate buffer zones and the timing of work to protect wildlife, and noted specific resources uses at certain areas, such as tourism or recreation. In addition, archeologists from the governments and Alaska Native organizations made recommendations about delicate cleanup of important archeological sites.

Within the ISCC, federal and state authorities for resource management were not too difficult to sort out or synthesize. While specific responsibilities varied — the U.S. Fish and Wildlife Service manages eagles and migratory birds, NOAA manages marine mammals, and Alaska Fish and Game manages salmon and other commercial fish species — the wildlife managers had generally similar concerns and goals. They were able to agree on critical dates for cleanup deadlines (early to mid-May for seal pupping habitat, early to mid-July for Prince William Sound salmon species, for example) and wildlife protection buffers (several hundred yards around eagle nests, up to three miles for some marine mammal haul-outs) and their priorities generally did not compete with each other's. The regional flavor of the ISCCs also meant that federal or state agencies played lesser or greater roles based on a regional consensus about who had

the greatest problems presented by the oil spill. The Seward group, for example, had strong leadership from the local national park superintendent, while in Kodiak the managers of the national wildlife refuge and the state commercial fisheries managers set much of the governments' agenda.

Exxon and the ISCC members formed what became known as the Resource Assessment Teams, or RATs,[58] that spent much of the first several months doing the field work to find out what areas were affected, how badly they were oiled, and how well work crews were doing their jobs. Again, like the ISCC, the assessment teams had basic public and resource agency representation depending on who was available, who owned the uplands, and which kinds of wildlife habitats were being surveyed. Exxon added consultants from various disciplines to the mix, and assessment team and ISCC members tended to coalesce around specific disciplines — fisheries biology, geomorphology, archeology, etc. — rather than agency or institutional interests. Certain agencies had nominal "lead" designations — NOAA as the group's chair, DEC as the lead state agency — but in actual deliberations, the "lead" was frequently determined by consensus, based on the specific issue or site under review. The structure and activities of the ISCC were, as a result, practically fluid and basically democratic.

The members of ISCC viewed their organization like this:

"The **Interagency Shoreline Cleanup Committee was:**

- A participatory, interdisciplinary, interagency resource that included Exxon for planning input on decisions affecting shoreline cleanup;
- A forum for ecological, cultural, and social resource identification;
- A forum for setting resource and work priorities;
- An on-scene planning body;
- A public component of the planning [and] decision-making process;
- A primary advisor to the federal on-scene coordinator;
- A consensus-building group;
- A focus for Prince William Sound shoreline cleanup."[59]

Vice Admiral Robbins gave formal standing to an ad hoc group of agencies and citizen groups that had come together to help Exxon and the governments plan shoreline cleanup operations. Each region (Prince William Sound, Kodiak, Homer and Seward) had an Interagency Shoreline Cleanup Committee.

This is not to imply that the ISCC deliberations, and the relationships among agencies, were a consistent exercise in peace, love, and understanding.

One of the basic problems that took some time to overcome was the fact that many of the people sitting on the ISCC were unfamiliar with the national oil spill response structure, the role of the Regional Response Team and the federal on-scene coordinator, role of state and other federal agencies, etc. The blurry lines of authority that confused the general public occasionally confused ISCC members.

The paper cited above refers somewhat obliquely to other problems with the ISCC structure. It notes that "differing agencies had differing expectations" about cleanup planning and approaches, which is a polite way of saying that some things that concerned some agencies were viewed by others as lower priority, at best, or unimportant or uninformed, at worst. Some of the NOAA personnel assigned to spill management and strategy were openly hostile to state agency suggestions and condescending in dealing with Alaska officials. NOAA's principal field representative went so far as to publicly accuse the state of being "vindictive" in its cleanup recommendations, and questioned whether Alaska was trying to punish Exxon through the cleanup.[60] This attitude did not set the tone for positive discussions and "consensus-building."

The paper also notes a "lack of clarity" on the issue of who actually spoke for his or her agency or government as a whole, and mentions a problem with "maintaining continuity" of agency representatives on the committee. The "lack of clarity" issue was a big one, especially in the view of the Coast Guard coordinators and the federal on-scene coordinator himself. Vice Admiral Robbins frequently expressed frustration at hearing from several state agencies on a single issue, rather than hearing a synthesized State of Alaska position. In addition, some agencies (including the Coast Guard) rotated representatives in and out of areas and jobs; in other cases, weather and staff shortages would require that new agency people stand in for those who spent most of

their time with a given committee or assessment group. A new agency staffer, hearing the details of an issue for the first time, might not arrive at the same position as his or her predecessor who was negotiating an agreement or providing one of the building blocks of consensus on a given issue.

The ISCC system also moved slowly for a variety of reasons. Information did not always move quickly from the field, to the ISCC, through the federal on-scene coordinator and back to the field.

"Coordination with the Resource Assessment Team (RAT) is not what we had hoped it would be," DEC's contractor reported at the end of May. "By the time feedback gets back to the proper channels to the Inter Agency Shoreline people, most of the issues are moot."[61]

The ISCC was an innovative departure from established response planning practices. State of Alaska officials liked the ISCC, and so did the members of the public who attended the meetings. Yet the ISCC system didn't last past the first summer of cleanup.

The meetings were long (often several hours) and frequently were held twice a day. Like any committee with a number of members, there was a great deal of discussion. The meetings were also open to the public, which added another level of discussion and explanation. Agency staff on the committee were working 14 to 16 hours a day;[62] regardless of whether this was a management problem or a simple lack of manpower to deal with a massive number of tasks, the result was that people were tired, not eating properly, and patience frequently ran thin.

Even considering the problems, the ISCC was an innovative departure from established response planning practices. State of Alaska officials liked the ISCC, and so did the members of the public who attended the meetings. The ISCC had a structure that was familiar to government managers and the public at-large. The public's business was being done largely in public, and government agencies with various resource management authorities were hashing out their differences and finding common solutions within the confines of understandable procedures for state and federal government coordination.

Yet the ISCC system didn't last past the first summer of cleanup. In February 1990, at a mid-winter meeting among the response organizations in Newport Beach, California, Exxon proposed a number of structural changes, including some modifications to the way in which information flowed through resource agencies and the public to the Coast Guard.

The ISCC and its support structure (specifically, the resource assessment teams) were the focus of a developing struggle for influence and control over both cleanup policies and their implementation in the field. Two major blocs began to form: the first included Exxon and the Coast Guard, along with NOAA, and to some degree, the U.S. Forest Service; the second included state agencies and public interest groups and local governments.

The state-public bloc in the fall of 1989 proposed that the ISCC's policies and procedures be updated based on 1989 field experience, and advocated that the ISCC's role be clarified and strengthened. State agencies, such as Fish and Game, felt that the ISCC had served as a powerful counterbalance to the federal government and Exxon, and that the ISCC had helped insure that Alaska's interests were best blended with federal goals.

The federal-Exxon bloc did not always share the state-local position. "NOAA, along with the Coast Guard and the U.S. Forest Service, frequently supported Exxon's efforts to dictate policies and procedures," Fish and Game's ISCC representative reported in his summary of the department's involvement in 1989-90.[63] State representatives felt that the ISCC provided a forum in which debate among equals could produce acceptable compromises for all.

"There were times when total agreement on priority or treatment methods could not be reached. In those cases when they could not reach a consensus, the final vote was decided by a simple majority. More often than not, some kind of compromise was worked out," one of DEC's technical representatives reported.[64]

The ISCC would not survive the winter.

The Technical Advisory Group

The Technical Advisory Group (TAG) was not originally intended to eliminate the role of the ISCC or their institutional cousins, the Multi-Agency Committees (MACs)[65] The stated goals for the creation of the TAG were to streamline the decision-making process and focus cleanup recommendations on technical questions, as opposed to policy issues. It probably accomplished one of the goals — streamlining decision-making — but it never was able to fully separate policy considerations from technical points, and it never truly harmonized the principal goals for cleanup.

The TAG was created in February 1990 in Newport Beach, California, where federal, state and Exxon officials met to discuss the principal technical issues facing responders in the coming summer. The two days of meetings dealt with the distribution of oil on shorelines, the chemical composition of the weathered oil, and the use of fertilizers to enhance natural degradation. The group also discussed plans for the spring survey, and how the information from the survey would translate into work orders on the shorelines.

The general public and the press were free to attend the Interagency Shoreline Cleanup Committee meetings. The Technical Advisory Group, however, held meetings closed to the public by the order of the federal on-scene coordinator. The TAG was created in early 1990 and eventually replaced the ISCCs.

Photo courtesy of the Oil Spill Public Information Center

This is where the TAG emerged, although at the time it did not seem as if an entirely new decision-making body was being born. The "cooperative" approach to technical decision-making did not seem to exclude an ISCC review. It did, however, alter the way in which the parties would survey shorelines.

In the fall and early winter of 1989, DEC and other state agency monitors walked literally every mile of affected shoreline, noting oiling distribution and characteristics. The state survey paid special attention to locating and describing oil that had been buried, or been driven, below the beach surface. Exxon proposed that the spring survey be done jointly among state, federal, and Exxon representatives, so that data collected would be in a similar format, and evaluations of conditions would be conducted at the same places at the same times.

There were really two slightly different sets of information on which cleanup decisions were based. The first was an assessment of the resources at risk, and the priority uses of the shorelines; the second was an assessment of what cleanup technique worked the best on a given problem. In 1989, both of these sets passed through the ISCC. The resource assessment teams collected one set, and Exxon's shoreline cleanup assessment teams collected the other. The ISCC looked at both and came up with a recommendation for cleanup to the federal on-scene coordinator.

The Newport Beach proposals for 1990 operations were different. Resource assessment was still an integral part of the decision, but, presumably, that assessment would

not change from year to year; a shoreline segment close to a spawning stream or a nesting area or a subsistence use area had the same attributes in 1990 as in 1989. The change would come in the distribution and composition of the oil stranded on (or under) the shoreline. Therefore, the principal point of discussion for 1990 would be strictly technical, i.e., What are the oiling conditions and what is the best way to treat them?

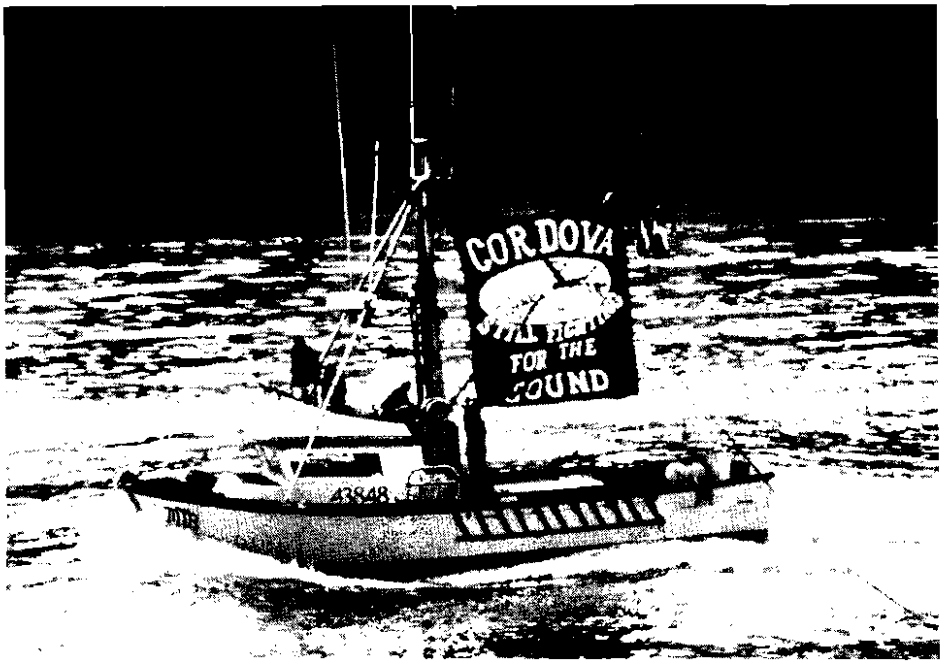
Fish and Game and Natural Resources did not like the fact that they did not have the same access to the decision-making table with the TAG. DEC would, theoretically, serve as Fish and Game's conduit to the federal on-scene coordinator.

And rather than have each agency collect its own technical information, the proposal was to collect it together and work from the same set of observations for each shoreline.

State on-scene coordinator Steve Provant and the DEC staff at the meeting viewed this arrangement as an improvement over the previous year.[66] The joint survey meant that DEC would be there on the shoreline, shoulder to shoulder with both the federal government and Exxon, giving the state more influence over what information went into the reports and how it was described. The ensuing technical discussion would also give the state a more direct line to the federal on-scene coordinator on technical matters. It was, actually, a more active and direct role for DEC than its usual monitoring-oversight responsibilities in a federally directed response.

Members of the ISCC, including other state agencies, would not view this arrangement in quite so positive a light. The ISCC had met in October of 1989 to work out its suggested improvements for 1990. The group planned to rewrite the shoreline cleanup manual it had produced earlier that year, adopt policies on bioremediation and other chemical cleansers, and otherwise tighten the loose bolts on the whole operation. The ISCC assumed that it would retain — or actually enhance — its authority as the principal forum for the government and the public to hash out the details and primary recommendations to guide the response.

But when the group met again on December 1, 1989, something had changed. The Coast Guard questioned the need for rewriting the shoreline manual, and NOAA, Exxon and the U.S. Forest Service agreed. These agencies took the position that the shoreline manual was an "historical document," rather than an active set of policy and technical guidelines in need of refinement.[67] When the group met in February, after the Newport Beach workshop, they were told of the TAG, although both Exxon and NOAA staff assured the ISCC that they still had a role to play. That role, however, was never defined clearly enough for many ISCC members, and it was certainly not the active role the group had played in reviewing operations and making recommendations during the 1989 season.



Cordova fishing boat protesting spill response policies at a demonstration in September, 1989.

Photo by Rob Schaeffer

The state agencies — Fish and Game and Natural Resources — did not like the fact that they did not have the same access to the decision-making table with the TAG. Whether by fact or by perception, DEC was assuming a much more pronounced role as the state's lead agency. DEC would, theoretically, serve as Fish and Game's conduit to the federal on-scene coordinator.

The public, defined primarily as local governments, commercial fishing, and conservation organizations, felt most left out. While they

were free to provide comment either directly to the federal on-scene coordinator or through the state on-scene coordinator, they were no longer at the negotiating and discussion table as they were in the ISCC.

The issue of public access would flare up several times during the spring and early summer of 1990. The ISCC meetings were not conducted as open town meetings, but the general public and the press were free to attend. The TAG, however, was closed by the order of the federal on-scene coordinator, Rear Admiral D.E. Ciancaglini. Rear Admiral Ciancaglini said the TAG was a technical group in which scientists and technical experts had to be free to speak frankly and think out loud, and the admiral did not feel a public forum was conducive to such a discussion. When the new state on-scene coordinator, Randy Bayliss,[68] pressed the issue, Rear Admiral Ciancaglini said open meetings laws did not apply to the TAG, and he steadfastly refused to allow public access.

Where once the major cleanup recommendations were hashed out in public, they now were debated behind closed doors; where the chief advisory group had once been dominated by a diverse group of government agencies and the public, it now was administered by the spiller.

The TAG differed from the ISCC in another important way: Exxon was now the director of the chief advisory group to the federal on-scene coordinator. In the ISCC, Exxon was a kind of adjunct member, a technical advisor to the government and public agencies making the recommendations about the response. But in the TAG, Exxon was installed as administrator by the federal on-scene coordinator. The company's field managers now coordinated a small advisory group consisting of DEC, NOAA, the Coast Guard, and Exxon. Where once the major cleanup recommendations were hashed out in public, they now were debated behind closed doors. Where the chief advisory group had once been dominated by a diverse group of government agencies and the public, it now was administered by the spiller. An advisory group that was developing a multidisciplinary approach to cleanup decisions was replaced by small group looking only at "technical" issues.

The lack of public access and the narrowing of state agency involvement were not necessarily fatal flaws to the process. The decision-making process had indeed been streamlined, and the reduction in participants had the potential to cut down on the number of hours people spent tied up in meetings. Using the Coast Guard and DEC as the choke point for respective federal and state policies reduced confusion and had the potential for forcing each government to come to single, clearly defined positions on issues. And the idea that the advisors would make only "technical" judgments left the policy calls, in theory, to the upper-level policy-makers in both the state and federal governments.

Yet what may have been a well-intentioned effort to cut down on bureaucratic wrangling, streamline decision-making, and climb for the high ground of technical objectivity turned out to be less than a success in the view of the state agencies and the public.

The basic tension in the TAG was the result of two differing points of view about why, where, and how oil pollution should be treated on the Alaska shorelines. The federal position, shared largely by Exxon, was formed by NOAA and implemented by the Coast Guard. The state had a different point of view than its three partners in the TAG. Theoretically, this should not have caused a problem. However, as we will see later, the TAG's structure and its fundamental premise made it difficult to reconcile the two positions. But first, a look at the essential differences in the state and federal positions is useful.

a) State and federal responders did not agree on several key technical points.

NOAA argued that oil should be left in place absent a "compelling reason"[69] to remove it. The assumptions behind this reasoning were that the oil had weathered to a point where it presented little harm, if any, to humans or wildlife,[70] and that disruption of shorelines was unacceptable or ill-advised in most cases. NOAA argued that shorelines disrupted by mechanical treatment would not only cause harm to intertidal creatures, but they would also be destabilized and exposed to unacceptable levels of erosion. A third assumption was that natural weathering and degradation was proceeding fairly rapidly, even at sites with buried oil.

State officials believed that the NOAA assumptions probably held at certain sites and under certain conditions, but the data supporting those assumptions were neither extensive nor overwhelmingly persuasive. Investigation through 1990 and into 1991 would challenge some of the NOAA assumptions, and support the state's arguments that cleanup could proceed at more extensive and more aggressive levels.

State fish and game biologists were concerned that even low levels of weathered hydrocarbons could alter the development of salmon in the early stages of life. In a study that was partly associated with damage assessment, ADF&G researchers noticed that a significant number of salmon emerging from the eggs in oiled streams developed abnormally. The research led state fisheries biologists to doubt the assumption that weathered oil posed little or no threat to the fish.

An associated study looked at whether mature fish of several species were showing evidence that they were continuing to be exposed to unnatural levels of hydrocarbons. The study's preliminary results suggested that fish in the oiled zone were, indeed, subject to some continuing exposure.[71] An additional damage assessment study (to which NOAA's responders did not have access) was also beginning to suggest that leaving oil in place was not as benign as once believed. By 1991, the researchers were strongly convinced that oil was not weathering very quickly at certain kinds of sites — under mussel beds, in particular — based on samples of mussel flesh, shells, and the sediment under the beds. Researchers suspected that there was a link between the oiled mussel beds and continuing mortality and nesting abnormalities among several different species of bird and mammals in the spill zone. The link, they hypothesized, was because mussel beds like those they sampled are a primary or secondary food source for many animals.[72]

Essential differences in the state and federal positions in the Technical Advisory Group

a) State and federal responders did not agree on several key technical points.

- NOAA argued that oil should be left in place absent a "compelling reason" to remove it.
- State officials argued that cleanup could proceed at more extensive and more aggressive levels.

b) The state and the federal-Exxon officials viewed the issue of "more harm than good" in fundamentally different ways.

- The state's definition of harm was very broad, because the state's resource management responsibilities and its social and economic interests were more diverse and more acute than those of either the federal government or Exxon.
- The federal government frequently took the position that active cleanup efforts were not necessary because the oiling was largely non-toxic and resource uses were not significantly disrupted by the presence of the oil.

c) Despite its name, the TAG was not just a "technical" advisory group; it was actually an arbiter of public policy and regulatory issues.

- The TAG was understood and explained by both the federal government and Exxon as a group of technical experts reaching consensus on what was the best treatment for a given shoreline.
- The state was concerned that the TAG was, in a piecemeal fashion, establishing overall State of Alaska policies on subjects wholly within the State of Alaska's authority.

State response officials also did not accept the blanket assumptions that subsurface oil would weather well, or that efforts to remove the subsurface oil would seriously affect the geomorphological stability of most beaches. Again, as various people continued their investigation of oiled sites, the original NOAA assumptions got weaker. Experts from both NOAA, and Exxon's chief consultant on geomorphology, began to conclude that many of the area's beaches were more active (and

active in different ways) than originally assumed, and that subsurface oil did not appear to be changing much at some sites.[73]

State TAG representatives had bits and pieces of these studies over time. Taken together, they were not willing to stipulate to the assumptions that the oil was weathering fast at all sites, that it posed little or no risk to wildlife, and that aggressive treatment (such as tilling with heavy equipment or removing oiled rocks and sediment) was a bad idea.

As a matter of response strategy, it led state officials to two important conclusions that were opposite from the prevailing attitude among federal and Exxon representatives to the TAG in 1990 (and 1991). First, given the uncertainty about the lingering sub-lethal toxicity of subsurface oil (or oil around salmon streams), DEC and ADF&G assigned to weathered oil a higher level of risk than the federal government and Exxon. Second, given that many kinds of beaches were more resilient to aggressive work than previously thought, more extensive and aggressive cleanup could take place.

But as a functioning society, Alaska also was justified in considering whether leaving long stretches of beach with subsurface oil might affect how tourists viewed vacation opportunities, or how consumers viewed the quality and purity or Alaska seafood.

b) The state and the federal-Exxon officials viewed the issue of "more harm than good" in fundamentally different ways.

The issue, at root, was a matter of public policy, not strictly technical analysis. It also leads back to the "compelling reason" test mentioned briefly above. Under state regulations and state resource management responsibilities, Alaska had more "compelling reasons" for cleanup than the federal-Exxon bloc.

The state regulation setting DEC's general limits of pollution cleanup says that cleanup should continue until one has either reached the limits of technology, or until cleanup efforts cause more environmental problems than they solve.[74] The regulation is broad enough that it gives the DEC the latitude to make a decision based on existing conditions and available technology.

The federal government has a variety of regulatory requirements for a variety of pollution control and abatement programs, but basically, federal regulations aren't too different from the principal that the government can require cleanup only to the limits of technology and environmental good sense.

While a "bathtub ring" of weathered oil in a cove might pose little or no immediate environmental problem, it might discourage subsistence users from harvesting shellfish or seaweed there. Photo by Pamela Bergman

So when the federal government and Exxon promoted a TAG policy based on achieving what they termed a "net environmental benefit," it did not seem that it would be difficult to harmonize state and federal cleanup requirements within the TAG.

But there was, of course, a lot more to the shoreline cleanup of the *Exxon Valdez* response. Major cleanup decisions went far beyond a simple assessment of technology and a general look at the environmental health of a site. Had this been a cleanup concentrating on a single site, the questions would have been much easier to answer and the state and federal priorities much easier to harmonize.

But the size of the spill, the area it covered and — most important — the number of ways it affected resources, economies and communities meant that the *Exxon Valdez* cleanup calculus would have many more variables,

many more dimensions, and much more complicated equations than your average contaminated site cleanup.

Under both state and federal pollution control schemes, the on-scene coordinator or the lead cleanup agency is supposed to weigh factors such as economic and social impacts of a spill along with the limits of technology and environmental good sense. But the rules don't say how much weight each factor gets, and they don't spell out a formula for setting priorities. As a general rule, one is always supposed to avoid doing "more harm than good." But who defines harm? What is good? Whose good is harmed more than someone else's good, and who says which good is more important than another?

The state's definition of harm was very broad, because the state's resource management responsibilities and its social and economic interests were more diverse and more acute than those of either the federal government or Exxon. The state viewed the problem, therefore, in different ways and came to different conclusions about what needed to be done.

The TAG was, in a piecemeal fashion, establishing overall State of Alaska policies on subjects wholly within the State of Aloska's authority. And in nearly every case, these *de facto* regulatory interpretotions were something less than state regulators and resource managers felt were acceptable.

The state considered primary issues, such as how oiling might affect the health of fisheries. But as a functioning society, Alaska also was justified in considering whether leaving long stretches of beach with subsurface oil might affect how tourists viewed vacation opportunities, or how consumers viewed the quality and purity or Alaska seafood.

While a "bathtub ring" of weathered oil in a cove might pose little or no immediate environmental problem, it might discourage subsistence users from harvesting shellfish or seaweed there. This "displacement effect" could then have a real effect on a village, as people stopped collecting traditional foods and started relying on store-bought goods.[75]

One might correctly argue that leaving buried oil throughout a series of uninhabited ocean beaches away from commercial or subsistence fisheries posed little threat to the environment. However, if those beaches were in a specially designated state wilderness park — which requires a specific level of management and protection — then the state might perceive the oil as "harm" to state resources.

These are only a few of the kinds of issues that came up in the TAG, and on which state and federal-Exxon representatives differed. NOAA's general policy of "net environmental benefit," adopted by the Coast Guard and Exxon, put more weight on biological factors and less weight on other public policy variables. The federal government frequently took the position that active cleanup efforts were not necessary because the oiling was largely non-toxic and resource uses were not significantly disrupted by the presence of the oil. That is fundamentally different than the state's regulatory requirement for cleanup.

The state does not require cleanup only if the pollution causes a measurable problem; the state can require cleanup simply because pollutants are someplace where they shouldn't be. In the case of Prince William Sound and the Gulf of Alaska shorelines, Alaska consistently held to the position that as a matter of overall state policy, we should remove as much pollution as we can within the boundaries of technology and environmental good sense. NOAA's position was something less strict than that.

"[T]he state argued that removing the oil quickly meant that normal use (and full value) of the areas would return more quickly. The intertidal communities would reestablish themselves fairly quickly, despite initial impacts, and the beach profiles would not be irrevocably changed or damaged," state officials later explained in a management summary of the 1990-91 season.

"The federal government, which did not share the state's responsibility to manage those uses or protect those values, felt that it was acceptable to leave more oil to weather naturally. This was not an invalid position, of course; it simply did not fully reflect the state's needs."[76]

The state's "more harm than good" calculus was a more complex matrix of economic, social and environmental variables that frequently placed significant

weight on intrinsic or intangible values of a resource. Displacement, special land designations, even the simply value of an oiled vs. unoiled site played important roles in many state decisions.

The state did not propose to protect these other values at the expense of the environment; rather, the state was willing to accept certain levels of short-term disruption in exchange for long-term use or preservation of values at a given site or area. NOAA and the Coast Guard, using a different set of variables based on their different perceptions of risk, and on different regulatory authorities, often came up with a different answer to their equations. In the TAG, these different methods of calculating harm and good often clashed.

From a broader perspective, it was especially important for the state that the Exxon Valdez "standards" produced in the TAG be understood for the compromises they were – the best possible compromises, given the existing conditions and availability of resources.

c) ***Despite its name, the TAG was not just a "technical" advisory group; it was actually an arbiter of public policy and regulatory issues.***

The TAG considered many technical issues, as its name implies. But as it developed, it was clear to state officials that the TAG had simply replaced the ISCC. However, where the ISCC was generally acknowledged to be a public policy group, blending resource priorities and public expectations for cleanup, the TAG was billed as a group that took a strictly objective look at what treatment would be best for which shorelines.

This was a noble, if naive, notion. As noted in *b)* above, it was impossible to separate economic, social, and overall environmental policies from discussions about what to do at which sites. These were not merely technical discussions about whether tilling or bioremediation[77] would do a better job of removing oil or minimizing threats to the environment. They were, at root, discussions about how public resources were to be managed and protected.

This presented two very critical problems for the state. First, the TAG was interpreting state regulatory standards and making important management decisions about state resources. Second, the administrative record being developed within the TAG had the potential to delay, thwart, or confuse any supplemental state effort to remove more pollution than the federal government would tolerate.

The TAG was, in a piecemeal fashion, establishing overall State of Alaska policies on subjects wholly within the State of Alaska's authority. The TAG recommendations set state policy about oiling near anadromous streams, acceptable levels of pollution in state parks, and basic levels of residual hydrocarbon pollution allowed by DEC. And in nearly every case, these *de facto* regulatory interpretations were something less than state regulators and resource managers felt were acceptable.

Yet the people with the most direct influence on setting these state policies were not even state resource managers: A private corporation — the company responsible for the pollution — and two federal officials made up an overwhelming majority of the group. State resource managers were daily in a position of negotiating state policy and pollution control standards so that they were acceptable to the spiller and the federal government.

There was plenty of reason to cooperate and communicate, but there was no reason why the State of Alaska had to share its regulatory and management authority with a private company and two federal agencies — which is precisely what was going on in the TAG.

Now, theoretically, the state was not bound by any lower standard for cleanup set by federal managers. If NOAA and the Coast Guard interpreted their regulations such that leaving buried oil was acceptable, or that a 10-year weathering process was better than a one-year removal program, the state was free to step in and set its own standards — as long as its standards were not in direct conflict with federal pollution control requirements. The general rule of thumb is that a state can require more stringent pollution control than the federal government, but it cannot require less.

A second test for stricter state enforcement of pollution cleanup standards would,

of course, be whether any removal action was consistent with state regulations — the applicable state regulation being the one that says the state cannot require cleanup past the limit of technology or to a point where the damage caused by cleanup is worse than the damage from the pollution.

So again, theoretically, if the federal on-scene coordinator ordered Exxon to do something less than full removal, according to state requirements, nothing in federal or state law stood in the way of the state issuing its own work order to Exxon. The state might have to wait until the federal government was through with Exxon, but the federal government couldn't prohibit the state from having its own standard (again, assuming no direct conflict with federal law).

However, the structure (and the administrative record) of the TAG put this theory of state autonomy and independent authority in some jeopardy.

In other words, the official government survey records were produced by the spiller, and, in the TAG, subject to the same negotiation process (and in the state's view, the same policy imbalance) as other cleanup issues.

The TAG was understood and explained by both the federal government and Exxon as a group of technical experts reaching consensus on what was the best treatment for a given shoreline. Therefore, one could argue, any solution different than the one recommended by the TAG was technically unsound.

So, if the state argued in the TAG for removal of sediments, and the other three members of the TAG decided removal would cause "more harm than good," than the state would be in a difficult position if it later ordered Exxon to remove the oiled material. If Exxon chose to challenge the state's more stringent requirement, it could simply argue that the TAG had already considered and rejected the state's position as technically unsound. And if the state's recommendations were, indeed, technically unsound, then it was inconsistent with the state's own regulations concerning cleanup.

The TAG was not a purely objective forum for scientists and engineers. It was a group of people discussing public policy questions with technical aspects. The cleanup decisions in the TAG were no different than those at any other stage in the spill response: Nearly all response actions involve some subjective evaluation of whether the benefits of the action outweigh the negative side effects.

It would not be surprising that different agencies might make different subjective evaluations, and it would be reasonable to expect, for the sake of progress, that each would make concessions or compromises from time to time.

But the administrative record of the TAG did not truly reflect this dynamic. Instead, it portrayed the recommendations of the TAG as the best technical consensus of all parties.

The TAG was administered by Exxon, and dominated by a policy interpretation the state did not share. The "consensus" in the TAG was frequently less than what the state wanted — not surprising, since the cleanup resources were controlled by Exxon and the Coast Guard, and Exxon and the Coast Guard shared a similar philosophy about how much cleanup should be done.

"The state has been isolated in the decision-making process by Exxon, the Coast Guard, and NOAA," the state Fish and Game department reported in June 1990. "There are other federal agencies, local governments, and public interest groups . . . that have a legitimate stake in how decisions are formed."[78]

The challenge for the state was to work within the TAG, since it served as a useful vehicle for finding common ground with other parties in the cleanup — as long as that common ground were not portrayed as the only ground. In agreeing to a given course of action in the "joint" response under federal direction, the state had to make sure that it preserved its own options to enact stricter cleanup standards, if necessary, on its own.

From a broader perspective, it was especially important for the state that the *Exxon Valdez* "standards" produced in the TAG be understood for the compromises they were — the best possible compromises, given the existing conditions and availability of resources. The idea that the TAG recommendations represented the best possible technical solution might limit the state's ability to require more complete cleanup not only on the *Exxon Valdez* spill, but in other spills and other cleanups in years to come.

After the 1990 season, the state clarified its role within the TAG and defined the

ground rules for its involvement in the TAG. For the state, the TAG was "a forum for our agencies to explain what action the spiller should take based on the state's priorities and requirements."[79] The state produced its own work orders based on its specific regulatory authority and requirements, and submitted them to the TAG. Under this plan, the federal government would have the option of accepting the state's policies and requirements, and including them in the federal work order. If the federal government chose not to, the state reserved its right to re-evaluate the situation and issue a supplemental work order later.

The ISCC and the TAG each had their strengths and weaknesses.

The ISCC better reflected the diversity of interests involved, and more directly dealt with cleanup issues as matters of policy. It also put the governments and the spiller in roles that were more immediately understandable to the public. Under the ISCC, the government — and the public it represents — established the policies and Exxon implemented them. The Coast Guard and DEC monitored the cleanup to make sure Exxon implemented the policies properly.

The TAG was less understandable and less accessible. It considered the same issues as the ISCC, only with fewer participants and in private. It was described as a strictly technical group, but its deliberations frequently spilled over into policy. It tipped the balance of influence, giving Exxon better access and control over government deliberations than the public. Because of fundamental misunderstandings among the parties about what was policy and what was technical, the TAG caused significant misunderstandings. It presented potential problems for the state in setting cleanup requirements and standards that fulfilled the statutory and regulatory responsibilities of state resource managers.

State reviewers did not give the TAG high marks. Although the theory might have been good — technical positions only, a single federal agency coordinating all the recommendations of their respective governments — in practice it was not.

By 1991, state agency managers had made enough adjustments in the administrative record to restore some of the eroded authority of the government to regulate and direct spill activities.

"The Exxon chairman said he expected the [Coast Guard] and ADEC reps to coordinate input from other state and federal agencies. In theory this might be okay. In practice it dilutes other agency and community input," a DEC analysis concluded. ". . . If TAG was supposed to provide the federal on-scene coordinator with a combined interagency, land manager/owner, public interest input to treatment decisions, it largely failed."[80]

The state Fish and Game department also felt that the TAG hindered the response rather than helped it. "More overall decision-making authority should be restored to an inter-organizational body like the ISCC and no authority to a TAG-like group. The 1990 TAG should have been restricted to what its name implied: technical advice for analyzing oiling conditions and devising cleanup procedures. The TAG of this year was too influenced by Exxon and the [Coast Guard]."[81]

Fish and Game also felt that its influence as the state's primary wildlife resource manager was blunted in the TAG because Fish and Game had to first pass its recommendations through DEC. While Fish and Game could advocate its position within the state policy-making structure, department representatives were uncomfortable at being kept at arm's length from the actual TAG deliberations.[82]

And, like DEC, Fish and Game questioned the wisdom of letting Exxon control the administrative record, and participate as a full partner in decisions regarding the management of state-owned resources and habitat. The department noted that the information gathered on the "joint" field surveys was accurately recorded, but that it was handled and presented by Exxon in the TAG. It was Exxon's role as the responsible party to propose how they intended to treat a particular shoreline, and it was the governments' role to accept, modify or reject the proposal. Then the company would then sit down and help form the official policies about the resources. "The State should not accede to any other organization or agency deciding what 'net environmental benefit' is or is not concerning our resources. Exxon is a commercial oil company having no legal authority to render management decisions about the status of our wildlife and habitats."[83]

DEC shared its sister agency's concerns about the production and presentation of the baseline TAG data by Exxon. The forms and maps developed during the surveys were drafted largely by Exxon and placed before the TAG for editing and approval. In other words, the official government survey records were produced by the spiller, and, in the TAG, subject to the same negotiation process (and in the state's view, the same policy imbalance) as other cleanup issues. Exxon was able to drive the recording of information it felt was important, even if the government did not. It was also able to control the flow of certain information to its advantage.

In 1990, there were two spring surveys. The first, dubbed the SSAT[84] survey, involved state, federal and Exxon personnel who recorded general oiling conditions and individual shoreline profiles. A second, smaller task force involving ADF&G, a federal government rep, and Exxon concentrated on anadromous streams in the ANADSCAT[85] survey. The ANADSCAT information formed the basis of specialized anadromous stream work orders (called AWOs). These were part of the package considered by the TAG for the basic shoreline work orders that went to the field.

During cleanup in 1990, Fish and Game monitors became concerned that cleanup crews were not fulfilling the intent of the AWOs, and when disputes or questions arose they requested that supervisors refer back to the AWOs. In one case, an Exxon supervisor (who, interestingly, had worked on the ANADSCAT) denied the AWOs existed; in another, Fish and Game reported that the AWOs were closely held and not distributed by a Coast Guard supervisor.[86] The AWO experience is an example of how a state agency, with full statutory authority to protect salmon spawning habitat, had to petition the spiller for release of information that could lead to full enforcement of state cleanup requirements.

"Throughout the spill, Exxon — with extensive manpower, computer and technical resources beyond those of the governments — produced the documents and forms that became part of the official record. Further, as a charter member of the TAG group, the Exxon corporation began to take on a quasi-official, sub-governmental status," state spill managers reported in 1991. "Exxon was making recommendations about the effectiveness and the desirability of treatment techniques; it was offering comment on the health of fisheries, the recovery of the environment, the ability of people to use the areas according to previously established patterns."[87]

These comments and assessments were not included in the official record in the form of an Exxon letter or communication to the government, on Exxon letterhead. They were on the official recording forms, alongside, in equal standing, to those of the government. In fact, in the TAG, the shoreline profile and preliminary recommendation for cleanup came from Exxon. It was then up to the governments (or in many cases, the state government alone), to make a case for cleanup. This seemed to state managers a curious reversal of roles: Instead of the government informing Exxon what it needed to do to meet state and federal pollution standards, Exxon told the governments what was necessary, forcing regulatory agencies to work from Exxon's baseline. While the state was uncomfortable with this arrangement,[88] the federal government was not. In fact, the Coast Guard actively promoted the system and enthusiastically praised its effectiveness.

"The 'cooperative effort' that Exxon and the Coast Guard keep promoting is not in the state's interest since cooperation typically means that the state should go along with any FOSC [federal on-scene coordinator] decision without objecting publicly. Cooperation means that the state legitimizes Exxon's efforts simply through joint participation. Once the state agrees to participate in a project (TAG . . . etc.) Exxon typically assumes control by dedicating inordinate amounts of personnel, equipment, logistics, and administrative services that eventually overwhelm the state.

"Suggest the state modify its cooperation with the Coast Guard and Exxon by promoting performance criteria over process, that is, we state what we want to achieve and then critically review whatever policies or products Exxon develops. If they are unacceptable then the state should be prepared to either implement its own policies, or use public opinion to assist in convincing Exxon to modify its planned program," Fish

and Game's chief response manager argued to other state responders in June 1990.[89]

By 1991, state agency managers had made enough adjustments in the administrative record to restore some of the eroded authority of the government to regulate and direct spill activities. The state wrote its own work orders and conducted supplemental treatment on its own, instead of bringing every issue to the TAG for resolution. Yet within the context of the "joint" response, the state could achieve only limited independent action without support from the federal government.

1.5 Summary

Neither the state nor the federal government had in place a management system that could be implemented quickly or run smoothly during a disaster as complex and as lengthy as the *Exxon Valdez* oil spill. The "joint" response cobbled together with the consent of both governments was a well-intentioned, but unrealistic effort to harmonize state and federal authority.

The public, which normally had access to and influence over its government's actions, was pushed aside by the emergency and never fully returned to the process. The spiller assumed an ambiguous role — part government, part polluter, part contractor — answerable only to government "coordinators" and insulated from public accountability.

Little doubt, then, that the spill and the response have led to changes and new suggestions about how the state and federal governments, and the industry, should prepare for and implement oil spill response.

Notes, Chapter 1

[1] *Meidt, Chief Warrant Officer R. M., 1991. "Public Perceptions in Oil Spill Response," (proceedings of the 1991 Oil Spill Conference), pp. 333-336.*

[2] *The "National Oil and Hazardous Substances Pollution Contingency Plan" is articulated in the Environmental Protection Agency's reglations, 40 CFR, Part 300.*

[3] *The spiller is still liable for criminal penalties beyond actual cleanup costs.*

[4] *Vice Admiral Clyde Robbins made this statement on many occasions, such as to a Multi-Agency Committee meeting in Homer and to a reporter for the Anchorage Daily News.*

[5] *"USA Today." July 5, 1989, p. 9A.*

[6] *A more complete discussion of this issue, and how it related to all aspects of the spill's bureaucratic and decision-making structure, can be found in chapter 3 of this report.*

[7] *The "Alaska Oil and Hazardous Substances Pollution Contingency Plan." Alaska Department of Environmental Conservation, May 26, 1983. The statewide plan has since been revised, although the basic roles of the Coast Guard and DEC remain roughly the same as*

in 1989.

[8] *Captain Dennis Maguire, U.S. Coast Guard, memo to Mr. Craig Tillery, Alaska Department of Law, July 23, 1993.*

[9] *"Oil Spill Contingency Plan, Prince William Sound." Alyeska Pipeline Service Company, January, 1987.*

[10] *National Response Team, "The Exxon Valdez Oil Spill: A Report to the President." May 1989, p. 8.*

[11] *The following statements from Exxon chief executive officer Frank Iarossi all come from his deposition as part of state and private litigation taken August 5, 1992, in Houston, Texas.*

[12] *Ibid., p. 387.*

[13] *See, especially, Davidson, In the Wake of the Exxon Valdez. (San Francisco: Sierra Club Books, 1989), pp. 29-54.*

[14] *This is noted first in the National Response Team's report of May 1989. Iarossi elaborates on the company's general plan in his deposition.*

[15] *Notification came as a single comment in what was otherwise a routine filing of contingency plans for tank vessels owned and operated by Exxon on March 5, 1982.*

[16] *"Oil Spill Contingency Plan, Prince William Sound," Ibid.*

[17] *Kelso, D., Testimony before the House Subcommittee on the Coast Guard and Navigation, July 1989.*

[18] *See Chapter 4. While the state has clarified Alyeska's responsibility to implement the contingency plan, federal regulations remain murky on the question.*

[19] *Although the Coast Guard is, practically speaking, a military organization, its role is primarily civil and its command is in the U.S. Department of Transportation, not at the Pentagon.*

[20] *National Response Team report, p. 21.*

[21] *Author's note: Governor Cowper was interviewed in his office in November 1989, by Larry Persily, a member of the Alaska Oil Spill Commission staff. Persily summarized Cowper's comments in a memorandum to commission director John Havelock dated Nov. 28, 1989. Persily used a newspaper style, reporting on his interview and using quotation marks when using Cowper's remarks verbatim. In the interest of clarity, where Cowper's quote is used along with a citation from Persily's summary, I have used interior quotation marks to mark Cowper's statement; where using one of Cowper's quotes directly, without additional comment from Persily, I have simply used exterior quotation marks.*

[22] *Persily, ibid.*

[23] *Author's note: I have tried to not to rely solely on personal recollections in writing this report, attempting instead to always cite documents or audio-visual sources. However, I had several conversations at the time with Cowper, his chief of staff, his press secretary, and DEC commissioner Dennis Kelso. All of them said that in their meetings with federal officials, including the U.S. Secretary of Transportation, federal policy was to continue a team management approach.*

[24] *D. Kelso, personal communications, 1989, 1990, and 1993. The former DEC commissioner's recollection of this statement is vivid; according to Kelso's account, Yost told him this in a conversation (later reiterating it before a news reporter) during an April meeting with the commandant in Anchorage. In July, Yost told a Congressional subcommittee (July 20, 1989, U.S. Senate Committee on Commerce, Science, and Transportation, Subcommittee on Merchant Marine, Washington, D.C.) that the Coast Guard was making cleanup determinations "in consonance with the Regional Response Team, including the State of Alaska." This was consistent with Kelso's understanding of the Coast Guard's policy.*

In 1990, during a meeting with the new commandant, Admiral William Kime, and the federal on-scene coordinator, Rear Admiral Ciancaglini, state officials who mentioned their recollection of the "concert and consonance" statement were told by both Coast Guard

officers that no such statement had ever been made. In commenting on this report, Commander Dennis Maguire, who coordinated the preparation of the Coast Guard's history of this response, wrote in July 1993: "In conversations with Rear Admiral Ciancaglini, he states Admiral Yost denied making the statement, furthermore our own extensive research has failed to turn up any such quote. More important, however, is the fact that the commandant cannot extend more authority to the State than federal law allows. The NCP [National Contingency Plan] speaks in terms of consultation with the State. This theme was often repeated by Vice Admiral Robbins and Rear Admiral Ciancaglini and was the position taken by the federal government."

The author has no reason to disbelieve either account; it may be that the parties involved misunderstood or misheard each other. However, regardless, the state's understanding of Coast Guard policy in 1989 and 1990 was based on a theme of "concert and consonance." In addition, Kelso' recollection is exceptionally vivid, and the author had a number of conversations with Kelso about it. Indeed , the letter that sparked Kime and Ciancaglini's 1990 statements about the "in consonance" theme was written by the author of this report, working with Kelso and DEC staff, who expressed a similar understanding of Coast Guard policy.

[25] *Vice Admiral Robbins, memorandum to state and federal agencies, April 20, 1989.*

[26] *Hull, R., Northwest EnviroService Inc., "Final Report on Exxon Valdez Oil Spill," December, 1990, pp. 30, 33.*

[27] *Alaska Oil Spill Commission, "Spill: The Wreck of the Exxon Valdez," January, 1990, p 40. One of the primary recommendations of the Commission was that, unlike the* Exxon Valdez *cleanup, the spiller should not be in charge of a large spill. A form of this recommendation was included in the Oil Pollution Act of 1990.*

[28] *The state ran into similar problems, and did not necessarily do a substantially better job of solving them. The state's approach is discussed in more detail later.*

[29] *Alaska Oil Spill Commission, op. cit., p 40.*

[30] *See Chapter 3.*

[31] *Although this section makes mention of specific actions or duties taken by various state agencies, it is not intended as a complete recitation of who did what at a given time. rather, it attempts to examine how the government responded to special organizational and management demands caused by the spill response in general.*

[32] *Personal communication, Bill Lamoreux, Sept. 3, 1992.*

[33] *Provant remains with DEC as chief of the team that oversees Alyeska Pipeline Service Company operations and facilities in Valdez.*

[34] *The most frequently quoted number for the 1989 response season was 11,000 workers, however, only about a quarter of that number were in Prince William Sound or the Gulf of Alaska at a time. Crew rotation, shoreside support contractors (caterers, etc.) and shoreside Exxon employees accounted for the rest.*

[35] *To put that number in perspective, the usual year-round population of Valdez itself is about 3,000 people.*

[36] *Not all fisheries were closed because of the spill in 1989. Terminal fisheries for pink salmon, regular halibut openings, and new fisheries (such as Prince William Sound bottomfish) all went on during the spill. The most lucrative, highest visibility, and most important fisheries — mostly red and pink salmon — were frequently closed because they normally take place in nearshore areas, coves, bays, etc. These areas suffered season-long impacts due to "leaking" beaches, floating oiled debris or seaweed, or oil released from shoreline cleaning operations.*

[37] *Exxon reimbursed DEC for $8.2 in oil spill wages before the governments settled their claims with the company.*

[38] *In some cases, they weren't. Errors somewhere in the chain from employee to supervisor to central computer were frequent, especially in 1989. DEC auditors reported that the state*

underpaid workers a total of $145,000, and overpaid others a total of $40,000. The department made back payments to some workers and collected overpayments from the others.

[39] *State agencies lend each other money through an internal system of Reimburseable Services Agreements when one department is carrying out an approved function for another.*

[40] *Also in 1989, the Legislature made an additional special emergency appropriation of $35 million to the Office of the Governor. The Governor was authorized to spend this money at his discretion, as long as the Attorney General reviewed the proposed expense and determined that it met reasonable criteria for reimbursement by Exxon. Most of this money was used for state legal costs and scientific damage assessment, not day-to-day operations. The state expected to recover its legal costs at trial, or in an out-of-court settlement; therefore, the attorney general concluded these costs were technically "reimburseable."*

[41] *At last accounting in late 1991, the billings of this nature came to roughly $300,000.*

[42] *This does not include the University of Alaska system, which, like most universities, has programs and faculty that conduct basic and applied research in a variety of areas.*

[43] *Perhaps the best, and most critical example of this was the "net environmental benefit" debate, detailed in Chapter 3, section 4.*

[44] *This came out of the $35 million special appropriation to the Governor's office.*

[45] *Results of damage assessment studies and their implications for restoration are discussed in Chapter 5, Restoration.*

[46] *In 1991, DEC and Fish and Game were requesting that the federal government pursue more complete cleanup of anadromous stream sites, even though oil was by that time heavily weathered. The National Oceanic and Atmospheric Administration and the Coast Guard maintained that the weathered oil posed a limited threat, if any, to salmon spawning, reproduction, and survival. Fish and Game provided general interpretations of damage assessment data from pink salmon studies that helped buttress state requirements for more complete cleanup. However, this type of interaction between response and damage assessment was the exception rather than the rule.*

[47] *See Chapter 3, section 4 for a more complete discussion of Fish and Game's role in the various committees formed with Exxon and the Coast Guard during the "joint" response period.*

[48] *DEC's field monitors began to assume greater responsibility and authority in 1990 and 1991, as experience on this specific spill response became more important than general technical knowledge.*

[49] *Kuwada, M., unpublished ADF&G summary of department oil spill activities, 1991.*

[50] *This requirement was not always met. DEC's personnel officer said later that the emergency hire provision was frequently ignored, and "emergency" hires were kept in the field and on the payroll.*

[51] *These lists for all state job classes are known as the "registers." They rank applicants according to objective analysis of experience, education, etc. Supervisors must hire from the top several names on the applicable register.*

[52] *Labor's involvement was required by both federal and state occupational safety laws (Alaska administers the federal program here); Community and Regional Affairs administered some small state grants and coordinated community meetings; Administration's telecommunications division set up and maintained the state's remote radio communications system.*

[53] *Personal communication, July 1992. In fact, Kelso and the DEC project staff often complained that the state's legal department was not working closely enough with DEC in its usual way, namely, providing legal support and advice on enforcing cleanup regulations.*

[54] *The problem was not endemic, but it cropped up on major issues from time to time: funding and procurement of equipment to protect hatcheries over the winter of 1989-90, comments on the federal government's proposed cleanup stragey for 1990, DEC's approval of Corexit testing in 1990, development of written standards for cleanup that integrated all agency*

positions, and a few others.

[55] *There were some occasional departures from this flow pattern. In the early stages, it was partly due to confusion; later, it would happen with tacit acceptance by the state and federal coordinators because a certain agency had an overwhelming interest in an issue or the primary presence in a region.*

[56] *This is the Incident Command System approach that is in use in Alaska today.*

[57] *The most controversial example of state permitting of cleanup activity occurred in 1989, when Exxon proposed to burn tens of thousands of tons of oily solid waste in large incinerators. The controversy is discussed in more detail in section 3.0, Cleanup Activities.*

[58] *Terminology differs among agencies. These teams were also called Shoreline Cleanup Assessment Teams, or SCATs, and tasks and focus sometimes varied from place to place. From here on out they are called simply "assessment teams," a term intended to include the various and changing groups that conducted assessments during the entire response.*

[59] *Knorr, J., Lethcoe, N., Teal, A., Christopherson, S., and Whitney, J., "The Interagency Shoreline Cleanup Committee: A Cooperative Approach to Shoreline Cleanup — The* Exxon Valdez *Spill," (Proceedings of the International Oil Spill Conference, San Diego, 1991), pp 191-192.*

[60] *David Kennedy, quoted in the October 31, 1991 issue of Pacific magazine, a Sunday supplement to the Seattle Times.*

[61] *Hull, op. cit., p. 44.*

[62] *Kuwada, M., Alaska Department of Fish and Game, unpublished summary of agency activities, 1991 (updated somewhat in 1992). Payroll records from DEC also show staff, almost uniformly, working extended stretches of 10-18 hour days with irregular time off.*

[63] *Morrison, J., memorandum to Kuwada, M., ADF&G, Sept. 11, 1990. This is a common theme through state summaries, memoranda, field reports, etc. State monitors and contractors frequently expressed frustration about what they perceived to be a coalition made up of Exxon-Coast Guard-NOAA, whose policies and recommendations were often in opposition to the state's.*

[64] *Morris, R., unpublished DEC summary of ISCC and Technical Advisory Group activities, October 1991. The author was a member of the state teams that generated state recommendations for cleanup at specific sites from 1989-92.*

[65] *The MACs were not exactly the same as the ISCC, but they served a similar function. The MAC meetings in Homer and Kodiak and Seward were the principal forums for regional agency staff and the public to address spill issues and communicate with the federal on-scene coordinator. In addition to the MAC in the Kenai Peninsula area, there was a smaller agency group called the RMAC (Resource Multi-Agency Group) that dealt exclusively with resource concerns, as opposed to broader public policy concerns. Kodiak's local spill management was centered in an emergency response committee, which paralleled the Kodiak borough's normal emergency services management plan, and a Kodiak Interagency Shoreline Cleanup Committee.*

[66] *Personal communication, Steve Provant, DEC, September 1992.*

[67] *Morrison memorandum, op. cit.*

[68] *Randy Bayliss served as state on-scene coordinator (SOSC) from April 4 to September 25, 1990, when DEC Commissioner Dennis Kelso appointed Ernie Piper to the post. Piper stepped down March 16, 1992. Commissioner John Sandor then appointed Simon Mawson as SOSC.*

[69] *ADF&G staff notes from the Newport Beach meeting quote NOAA's Dave Kennedy, ADF&G files, February 1990.*

[70] *The primary exception cited by NOAA was the presence of oil in shellfish beds, such as clams.*

[71] *Stegeman, John J. and Bruce R. Woodin. "Cytochrome P450E (P450I) induction in fish from Prince William Sound." Unpublished preliminary report, August 1990. Woods Hole,*

Massachusetts. The Stegeman study and associated ADF&G work used a marker enzyme — cytochrome P450 — to determine if the fish were absorbing hydrocarbons. When this enzyme showed up at a certain level in the livers of the fish, the researchers concluded that the fish were metabolizing hydrocarbons; there was a significant difference in the enzyme level between fish in the oiled zone and those taken from an unoiled area used as a control.

[72] *See generally* Exxon Valdez *Oil Spill Symposium Abstract Book, February 1993, Anchorage, sponsored by the* Exxon Valdez *Oil Spill Trustee Council, University of Alaska Sea Grant Program, and the American Fisheries Society, Alaska Chapter. A Symposium Proeedings is slated to be published in 1994.*

[73] *Throughout the response there were ongoing research projects into the effect of storm berm relocation conducted by Exxon contractor Woodward Clyde, the State of Alaska and also by a NOAA contractor. All of them showed the shorelines were fairly resilient, and they returned readily to the original profile or to a stable profile.*

[74] *The citation is 18 AAC 75.*

[75] *Despite a number of government tests showing that subsistence foods were safe to eat unless they looked, smelled, or tasted oily, many people (especially older Alaska Natives) simply stopped eating certain foods because of the perception of risk. State subsistence official documented this effect in a paper: Fall, James A. "Subsistence After the Spill: Uses of fish and wildlife in Alaska Native villages and the* Exxon Valdez *oil spill." November, 1990, presented at the American Anthropological Association annual meeting, New Orleans, LA.*

[76] *Piper, E., Winter, G., Gibeaut, J., Bauer, J., Kuwada, M., Copland, B., and Frechione, J., "*Exxon Valdez *Oil spill Response — Year Three,"* Exxon Valdez *Oil Spill Response Center, March 1991, p. 8.*

[77] *Bioremediation, in very simple terms, is the process of applying fertilizer to speed up the natural rate of degradation of oil by microbes that break down hydrocarbons.*

[78] *Kuwada, M., notes from presentation to state management meeting, June 19, 1990.*

[79] *Piper, et al., Year Three report, p. 12.*

[80] *Morris, DEC, op. cit.*

[81] *Morrison, ADF&G, op. cit. Other department managers, including Kuwada, the habitat division's chief spill representative, echoed this criticism in similar ways in a variety of other documents and forums.*

[82] *DEC sometimes came to the TAG with Fish and Game concerns, especially when the issue at hand was directly related to fisheries or spawning habitat. In 1991 Fish and Game (and Natural Resources) started attending the TAG meetings regularly, as the state took more of a team concept into the proceedings.*

[83] *Morrison, ADF&G, op. cit.*

[84] *Spring Shoreline Assessment Team.*

[85] *Anadromous Stream Cleanup Assessment Team.*

[86] *Morrison, ADF&G, op. cit.*

[87] *Piper, et al., op. cit.*

[88] *Kelso, D., Commissioner, DEC, letter to Rear Admiral D.E. Ciancaglini, July 18, 1990. This letter was the final piece of a long paper trail within the state agencies about how Alaska's interests were either ignored or diminished by the federal government.*

[89] *Kuwada, notes, op. cit.*

Oil spill response is most effective when oil is on the water, rather than stranded on shorelines. The faster responders act, the better chance they have. The effectiveness of most on-the-water techniques drops substantially as the oil weathers, emulsifies, and large slicks break up.

Oil spill response has more in common with fighting fires than with cleaning up a mess. It is possible to control or extinguish a house fire, but in the end you're still left with a burnt house, and areas that were not damaged by the fire were damaged by water used to put out the fire. In the same way, oil spill response is damage control, not damage elimination. All techniques, to some degree, have adverse side effects. Nearly all response and cleanup decisions are a matter of weighing the negative effects of response and treatment against the negative effects of letting oil go free.

Oil spill response has more in common with fighting fires than with cleaning up a mess. It is possible to control or extinguish a house fire, but in the end you're still left with a burnt house, and areas that were not damaged by the fire were damaged by water used to put out the fire. Photo by Vanessa Vick

Every oil spill is different, and so is every response. The amount of oil spilled is often less important than where it is spilled, whether people or wildlife habitat might be affected, and how weather, wind and water affect the response strategy. However, in nearly all cases, the suite of spill response technologies and techniques is roughly the same. And, as noted above, each technique or technology has limitations; none, by itself, is a solution to spilled oil on the water.

However, almost as soon as the oil from the *Exxon Valdez* was on the water, the new ideas were on the way. The entrepreneurs were calling, faxing and flying to Valdez to try to sell their products. Everyone involved in the response was inundated with requests, offers, and demands from vendors selling everything from reasonably well-known solvents and products to off-beat and untried techniques. One vendor had diatomaceous earth, another had crushed cork, and yet another proposed spreading lemon juice on the oil. Backyard inventors sent hastily drawn schematics of new and as-yet unbuilt skimmers and other machines. People sent home videos and studio-produced efforts. In one of the most memorable homemade video promotions, a vendor stumbled over the slick cobbles of a Prince William Sound shoreline, hawking his product as he spread it on the rocks — all the while cradling a stuffed baby seal.

Surfing on that tidal wave of commercial communications were some outright hucksters, but there were also well-intentioned and thoughtful citizens, some creative-but-unrealistic inventors, and many reputable vendors. If one sorted out the greedy, the dreamers, and the opportunists, most of the suggested products fell into two general classes: absorbents and solvents. One group of products would, in theory, soak up or congeal floating oil; the second would loosen it from rocks or break slicks up on the water. Nearly all suffered from basic technical, chemical, or operational flaws.

First, many of the products were obviously limited in the same ways that burning or chemical dispersants are limited. Fresh oil is the best oil to work with. On weathering oil in cold, subarctic waters, or on oil that was quickly turning tarry and thick, or

on emulsion that was primarily water, many of the suggested techniques just wouldn't work, based on the information provided to Exxon, the Alaska Department of Environmental Conservation (DEC), or the Coast Guard,

Next, the use of any solvent or absorbent usually means there is a by-product. During one test conducted in April on Naked Island, crews spread peat moss on oily rocks. Indeed, the peat moss soaked up free oil and emulsion. But like other absorbents, responders were still left with the problem of collecting the moss-oil mixture and disposing of it properly. Collection, storage, and disposal of oily waste would loom as one of the biggest problems in this massive spill response, and any significant addition to the volume of waste was judged impractical. An addition problem with loose absorbents is that when used on the water, they would likely create a thicker substance that could not be skimmed using existing equipment.

Many innovations for oil cleanup were tested. During this test conducted in April of '89 on Applegate Rocks, crews spread peat moss on oily rocks. The peat moss soaked up free oil and emulsion but left the problem of collecting the moss-oil mixture and disposing of it properly.

Photo by the U. S. Coast Guard

The most common technical problem with hundreds of products, however, was a lack of verified field testing or demonstrated use on other spills. This was not merely a problem with the new products that came across the fax machines and desk of DEC, the Coast Guard and Exxon; it is a basic problem with oil response equipment and products in the United States. Even the dispersants approved for use by the U.S. Environmental Protection Agency (EPA) have had limited actual testing, simply because it is difficult to conduct a properly controlled and monitored test of an oil spill product without spilling some oil. Only a few governments (Norway among them) authorize controlled spills for testing or for response drills, so vendors are dependent on "spills of opportunity" to try their luck — which probably explains, in part, why some vendors offered to do test applications largely at their own expense. Also, the level and scope of testing that a chemical product might require is a time-consuming and expensive proposition. In the United States, this task rests primarily with the private sector, and most, if not all of the small companies or vendors hawking their wares to the *Exxon Valdez* responders did not have the financial or technical capability to have conducted the right kinds of tests.

In addition, what were the "right" tests? At the time of the spill, there were no standard suite of tests and methodologies adopted by the federal or state governments for use in screening the wide variety of products people were selling.[1]

Since the *Exxon Valdez* spill, the state has begun to develop a product screening procedure, however, no large-scale or systematic screening program was in place at either the state or federal level in March of 1989.

In testimony before a Congressional committee on April 19, 1989, Governor Steve Cowper called for a nationwide program of intensive research into oil spill response. "We should not have to use a spill like that in Prince William Sound to find out the best way to contain and clean up oil. We should know in advance."[2]

The Alaska Oil Spill Commission, formed by Governor Steve Cowper to review the incident and make recommendations, found that government and industry had done little to prod development and testing of creative approaches in spill response.

"Despite two decades of rising public concern for the environmental consequences

of oil spills, research on the subject is still in its infancy," the commission reported in 1990. ". . . Spill response technology is untested and underdeveloped. Research investment is low, and institutional commitment to the field is scarce . . . .

"Much of the available cleanup equipment had not been tested in the various circumstances facing cleanup crews. Due to caution or uncertainty, untested techniques were not quickly implemented."[3]

Vice Admiral Clyde E. Robbins, who served as federal on-scene coordinator for the U.S. Coast Guard in 1989, often said that he was shocked to find upon his arrival in Valdez that oil spill response technology was no further advanced than what he had seen 15 years before.

"Despite two decades of rising public concern for the environmental consequences of oil spills, research on the subject is still in its infancy," the Alaska Oil Spill Commission reported in 1990.

The most fundamental problem with essentially all the thousands of offers from vendors was that no one had the time, the people, and the equipment to devote to testing all these products right in the middle of the largest oil tanker spill in North American history. As a practical matter, most agencies were already devoting all available resources to immediate emergency response tasks. Also, state agencies, such as DEC, were not designed to function as research and development centers.[4]

As the response evolved, the DEC set up a Treatment Technology section within the *Exxon Valdez* Oil Spill Response Center. The section evaluated as many as 1,500 offers, requests and ideas over time, but the small section concentrated primarily on evaluating a solvent that Exxon and the Coast Guard wanted to use, and working with the EPA and Exxon on evaluation of fertilizers for bioremediation.

With the exception of the bioremediation project, spill response techniques and technology used in the *Exxon Valdez* response were confined to those in general use at the time of the spill. Most reviewers have pointed out that research and development of alternative response and cleanup techniques has been lacking in the United States.

In addition, most official reviews of the incident point out that planners had not designed the Prince William Sound response system to handle a spill of 240,000 barrels. The Alaska Oil Spill Commission found that the federal government had never properly determined if the industry had the resources to deal with a catastrophic spill.[5] A federal review prepared shortly after the grounding concluded that the regional and State of Alaska-approved contingency plans were similarly flawed.[6]

There was simply not enough of anything in the area to deal with a spill of 240,000 barrels — not enough mechanical equipment, not enough trained manpower, not enough boom, not enough dispersant, not enough gear required for burning. While it is well understood that there was not nearly enough of any of these, it is somewhat less well understood how the equipment and people actually performed, once deployed. A closer look at what worked and what didn't gives us a good idea of both the ingenuity of responders and the limitations of spill response.

2.1 On the water

Efforts to contain and recover spilled oil and mousse[7] on the water continued, at varying levels, throughout the four seasons of the response. However, the principal on-the-water recovery phase began on March 24 and extended through roughly the middle of May, when shoreline cleanup began in earnest.

Boom

A boom works at the water's surface, and just below the surface, and can be used as a barrier, a deflection device, a corral for contained oil, an absorbent, and as a component in some other technique, such as burning. Boom of varying types is the mainstay of most response efforts.

Most containment, or "hard" boom, has a profile above and below the surface of the water. It is stored in containers in large rolls, or something like an accordion, and is played out over the side or stern of a vessel much like fishermen deploy nets. The size

and durability of the boom varies depending on the conditions responders expect in a given area. An area with strong currents and tides, or large seas, needs a larger and more durable boom than one to be deployed in a quiet estuary.

The effectiveness of the boom depends on conditions and on the skill and training of the people deploying it. If boom is being used to corral an oil slick, much like a purse seine net, it must be towed smoothly and steadily at very low speeds — not a simple boat-handling skill, by any means. At a towing speed (or in a current) or anything more than two or three knots, the effectiveness of the boom drops considerably, as oil begins to slosh over the top, or slip underneath the bottom of the moving boom. Tides, wind, waves and current all raise similar problems, and boom anchored to fixed points needs nearly constant attention and maintenance.

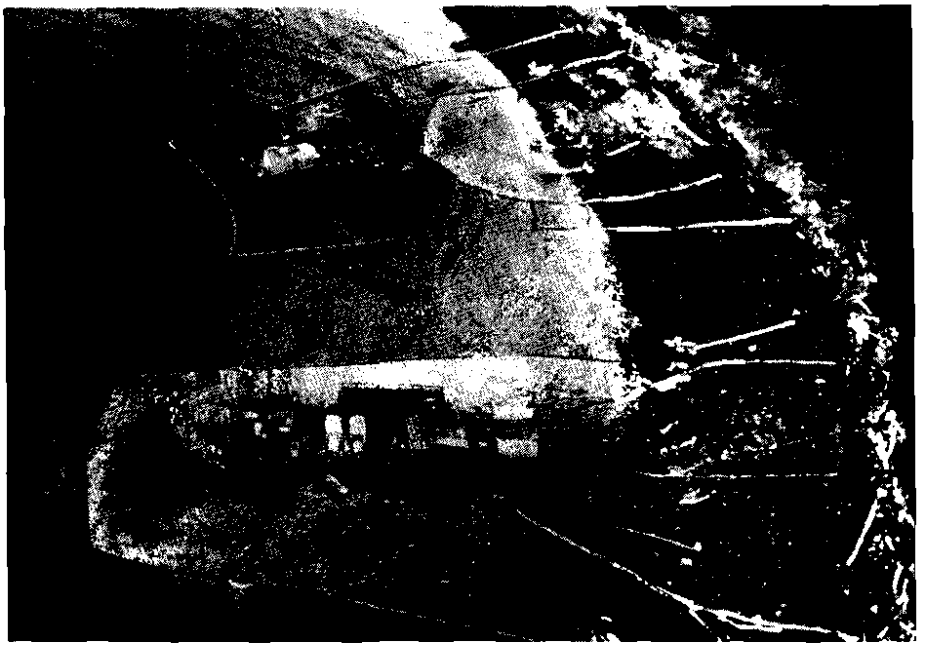
Boom deployed between two boats in an attempt to corral oil from the *Exxon Valdez*. Much like a purse seine net, the boom must be towed smoothly and steadily at very low speeds — not a simple boat-handling skill, by any means.

Photo by Michael Lewis

Responders also may deploy smaller floating booms (many look like long sausages) made of absorbent material.

The effectiveness of booming and skimming operations varied widely from site to site. All operations that combined these basic technologies were affected by the skill of the people assembling and tending the boom, the condition of the oil, the amount of vegetation in the mousse, the tides and currents, the opportunities for cleaning, fixing or resupplying a site with gear, and the quality or ingeniousness of the design.

DEC field reports from the first six weeks of the spill are full of observations, complaints, and frustrations about boom deployment, tending, and maintenance. This was a product of both limited training and difficult conditions. However, local fishing vessel skippers were a tremendous source of skilled labor, since most quickly discovered that towing a boom was very similar to handling a purse seine.



Several layers of boom contain oil washed from the beach until it is picked up by a skimmer.

Photo by Rob Schaeffer

Local residents and state workers also figured out, by trial and error, site-specific methods for maintaining boom "fences." Frequently, this entailed arranging different kinds of boom (absorbent and containment boom of varying sizes) in tiers, so that oil lost by one would be caught by the next one. This was, however, extremely labor intensive, requiring night patrols and other round-the-clock efforts at both tending and maintenance. Boom repair was a constant problem, since anchored boom was roughed up by waves, tide

changes, and rocks. It also needed to be cleaned frequently, since once enough oil soaked into or coated a boom, it started to leak into areas of clean water. A crew of a dozen or so could clean about 1,000 feet of boom per day; however, at the height of the hatchery protection effort at Sawmill Bay, Evans Island, more than 28,000 feet of containment boom was in use.

The bottom line on defensive booming was that it required substantial resources and manpower to maintain even the most basic barriers, such as at the hatchery sites in Prince William Sound. And over time, even with the impressive amount of material coming into the Sound from around the world, defensive booming simply gobbled resources too quickly to be effective on a large or continuing scale. Although during the height of the April response, DEC reported that its local crew at Sawmill Bay (Evans Island) could repair 300 to 400 feet of boom per day, returning the gear to at least serviceable effectiveness, even the most rugged boom had a short life. Exxon estimated that nearly 30 percent of the boom deployed during the course of the 1989 response was damaged beyond repair or proper use.[8]

Also, while "boom" is an interchangeable term, boom types and brand names are not always easily interchangeable. In 1989, as many as 30 brands of containment boom, of various kinds (self-inflatable, foam flotation, etc.) and sizes (18 inches to more than four feet in depth) were in use, and it was generally mixed from site to site. Fittings, connectors, valves, and other hardware were not necessarily compatible and frequently had to be modified so they would work together. And there was no guarantee that the boom delivered on a given day to a given site was compatible with the actual conditions. DEC and Cordova District Fishermen United teams working in Sawmill Bay in early April noted with frustration that the first boom they received was in poor repair and too light to deal with currents that ran as swiftly as seven knots.

As the cleanup moved from on-the-water to shoreline cleanup, various boom combinations and configurations were used in tiers in the nearshore area to close off the cleanup zone from open water. Hard boom and absorbent boom were both used, and improvised boom made from absorbent "pom-poms" were strung throughout the cleanup area.

Conveyor belt style skimmer in use at Point Helen, Knight Island, August of 1989, on oil contained within boom. Photo by Patrick Endres

Skimmers

Most skimmers in use in the United States are shallow draft, small vessels designed to work in protected areas such as inshore or nearshore waters. There are a number of skimming systems, but all operate on a basic principal: Oil is lighter than water, and can therefore be skimmed off the surface, or separated from water in some kind of controlled tank or area.

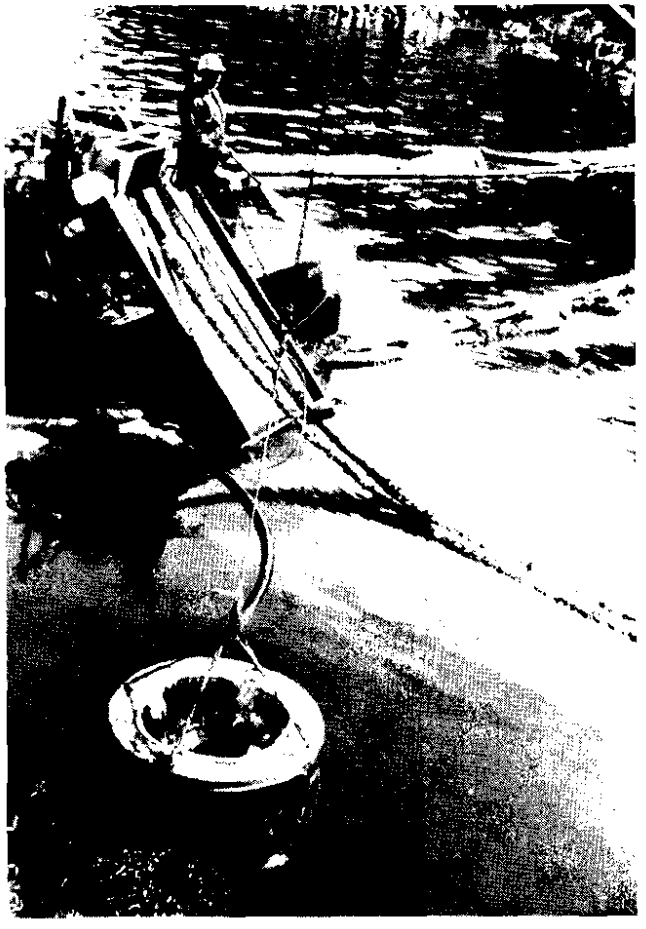
Most skimmers are not designed to handle much of a sea. Their effectiveness also depends directly on the storage capacity available at a given site or in the area. Other factors affecting the effectiveness include the consistency of the oil, the sea state, the amount of debris in the emulsion, the thickness of the slick, etc.

The effectiveness of skimmers cannot be judged solely by the ability of the machines to pick up oil from the water. Skimming is a system, not just a vessel; an effective operation needs good containment,

good maintenance and repair capabilities, and a good transfer and storage capability once the oil is recovered. And most important, skimmers in Prince William Sound needed instructions from the air.

"It's very hard to see the oil from the deck of a boat," DEC's chief contractor reported on April 20, 1989. "Some boats pass within 200-300 feet of a slick and can't see it."[9]

In the early days of the spill, DEC's overflight and mapping information was the principal source of direction for skimming operations. Observations from low-flying, fixed wing aircraft and helicopters were used to track the spill. DEC landed float planes in oil slicks to sample and measure the depth of the oil. DEC's computer services chief, working with a consultant from Arthur D. Little Co., devised a system in which overflight information could be digitized and transferred to computer-generated maps. The first accurate maps of spill size and movement were issued by DEC on March 27.[10]



Two different kinds of skimmers at work: a disc skimmer in the foreground, attached by hose to a vessel, and a stationary rope mop skimmer in the center, which pulls the rope through the oil and around a pulley

Photo courtesy of the Exxon Valdez Restoration Office

However, federal, state, and Exxon reports all note that there was a shortage of aircraft, initially, to provide direction for skimmers. Further, weather was often a problem. Even when weather in the Sound was decent for flying, frequently the airport at Valdez — at the base of the mountains, at the back of a bay nearly surrounded by mountains — was fogged in for long periods. Cold morning air and ample humidity caught within the mountain barrier combined to make flight operations an iffy proposition on many days. Ironically, the problem was most pronounced when the weather was best, with windless mornings after cool and clear nights.

Despite the problems with targeting slicks and directing skimmers, more than 260 skimmers of varying kinds were acquired by various parties, primarily Exxon, in 1989; a limited number worked in 1990.[11] Exxon reports in April frequently mentioned as many as 50 skimmers deployed at a time in the Sound and in the Gulf of Alaska. However, DEC monitors noted that these numbers were misleading.

While a given number of skimmers might be deployed in the spill zone at a given time, it was unlikely that all were actually working at once. Maintenance and repair were one problem; field repairs were not always possible, and some skimmers had to be towed long distances to get shop work in port.[12]

Furthermore, a full skimmer was a useless skimmer.

"There was one major problem that plagued all the skimming efforts and repeatedly brought skimming operations to a halt," wrote one of DEC's chief monitors. "Both the skimmers and the super suckers [a vacuum machine used to transfer oil from skimmers to barges] often sat idle with full tanks of recovered oil due to an insufficient number of support vessels and barges for off-loading the oil. Fishing boats would spend one or two hours gathering oil within booms and then, after waiting for 10 to 12 hours for a super sucker or a skimmer to arrive, the boats would sometimes abandon the boom, allowing the oil to float free."[13] The skimmers themselves had limited practical working time when transfer and storage was a problem. The majority of skimmers in use filled up with water and oil in less than an hour.

An additional, completely non-mechanical problem was that the response team could not immediately put to use skimmers that were flown into Alaska from abroad. U.S. shipping laws make it difficult for foreign-flag vessels to conduct business in U.S. waters, and skimmers built in France, Norway, and other countries had to receive

special clearance from U.S. Customs authorities in order to work. This was especially ironic because the most effective skimmer turned out to be a French-designed and built paddle-belt skimmer called an Egmopol.[14] And the largest skimmer available to work on the spill was in the Soviet Union. With help from the State of Alaska and the federal government, Exxon was able to put the 425-foot Vaydaghupski on contract on April 21. Unfortunately, by the time the vessel arrived, oiling conditions and the state of the oil were rapidly deteriorating for optimal recovery.

Skimmers working on free-floating oil worked fairly well at the start of operations in March and early April, but as oil weathered and emulsified it clogged gear and suction hoses with annoying frequency. Like defensive booming, recovery of free-floating oil with skimmers had a limited window of efficiency, given oil conditions and gear limitations.

Two innovative developments in skimming operations emerged. The U.S. Army Corps of Engineers sent a pair of dredges whose suction gear was designed for use in pulling sand and mud from ship navigation areas. The suction heads normally pointed downwards and pulled material up; response crews figured out that by turning the heads upside down, the suction head pulled viscous oil off the surface. It was a small innovation, but it worked well on weathered oil. Furthermore, the dredges had larger storage holds than the average skimmer, which made them a bit more independent.

The business end of a "supersucker," a hose attached to a vacuum truck on a barge, an innovation from the North Slope oil fields. The operator picks up oil contained by boom.

Photo courtesy of the Exxon Valdez Restoration Office

A second innovation came from the North Slope oil fields. At Prudhoe Bay, DEC contractors located two large vacuum trucks that were normally used to transfer spent drilling muds to disposal sites. The machines, mounted on trucks, had powerful vacuum heads that worked well on the weathered oil and emulsion. The two machines were trucked 800 miles down the Dalton and Richardson Highways in a high-speed trip under Alaska State Trooper escort from the Arctic to southern tidewater — quite an achievement under late winter driving conditions.

The supersuckers were mounted on barges and first used to pump some speed and volume into the tedious and halting job of off-loading full skimmers at Sawmill Bay. After seeing how effective the vacuums worked on weathered oil, DEC moved the barges to Herring and Northwest bays on Knight Island, where oil and mousse were thick enough to vacuum. The DEC recovery operation with supersuckers pulled about 450,000 gallons of mousse and oil from the water between April 3 and the first week of May.

Skimmers were used extensively in shoreline cleanup operations throughout 1989. As oil was washed off shorelines or freed by tilling, the oil floating in the nearshore zone was pushed by fire-hose spray towards a skimmer, which would pick up the mousse and oil. Exxon and the Coast Guard phased out skimmers during 1990 operations over the objections of state monitors and cleanup directors. State monitors frequently recorded that sheens released from cleanup operations were skimmable, while Exxon or Coast Guard monitors disagreed and skimmers were not deployed.

Instead, crews depended on various absorbents, such as boom, pom-poms, and pads. While this may have been an effective alternative to skimmers,[15] it also generated large amounts of solid oily waste. State monitors speculate that Exxon made the choice of sorbents over skimmers, in part, because the solid waste problem was easier to deal with than deployment, maintenance, off-loading and storage problems associated with skimmers. However, the reason given for denial of DEC's suggestion to use skimmers was usually simply that the sheens observed were too light to skim.

Burning

Burning is highly dependent on the freshness of the oil. The gases that ignite and burn most easily evaporate quickly; 12-72 hours immediately following the discharge is the optimal window for attempted burning of North Slope crude oil effectively on the water.

Also, while oil is, indeed, lighter than water, most oil in an oil spill does not settle into a homogenous, unbroken pancake. The thickness of the slick can vary from point to point, areas of water may alternate with patches of oil, wave and wind action may break up the slick, and oil and water emulsions may contain too much water to ignite. It is no easy trick to ignite oil and keep it burning on the water. In addition, burning oil produces a large volume of thick, noxious smoke. Any burn must take into account negative effects downwind for human settlements or possibly wildlife.

On the morning of the second day, Saturday, March 25, equipment needed to conduct a burn (special igniters and fire-resistant boom) was arriving in Valdez. Shortly before noon, the Alaska Regional Response Team (RRT)[16] agreed generally to attempt burning. Although Exxon had not formally applied to conduct the burn, DEC's on-scene coordinator gave a verbal go-ahead, on the general condition that the smoke from a burn did not threaten residents of any area. Exxon got its gear to the burn site late Saturday evening.

The burn reduced to tarry residue about 12,000 to 15,000 gallons of oil.[17]

Yet, as with other conventional response methods, the size of the spill and the variability of conditions showed the limits of even this relatively successful technique. The state, which actively encouraged the burn, gave the go-ahead the next day for Exxon to try burning in other areas. Unfortunately, the wind was rising, breaking up compact slicks and whipping water into the oil. On Sunday, sampling showed that the oil was becoming mousse, with a water content as high as 80 percent of total volume. Attempts to ignite the watery mousse failed. Shortly thereafter, the wind storm of March 26-27 made further burning impractical or impossible.

One of the principal factors in a decision to use dispersants is whether the immediate harm in the immediate vicinity of the slick is better than having the oil go elsewhere to cause more widespread damage.

Dispersants

"Dispersant" is a very general heading for a group of chemicals or formulations designed to break up large concentrations of oil on the surface into smaller and smaller concentrations.

Dispersing an oil spill doesn't make the oil disappear, and dispersants do not necessarily change the oil into something less harmful to the environment. Generally speaking, this class of chemicals disperses the oil into larger volumes of water. In a sense, dispersants dilute an oil slick by taking part of the oil off the surface and distributing it in the upper layers of the water column. Experts generally agree that putting oil into the water column, even in larger dilutions, can have negative effects on fish, plants and smaller animals that live or feed near the surface. One of the principal factors in a decision to use dispersants is whether the immediate harm in the immediate vicinity of the slick is better than having the oil go elsewhere to cause more widespread damage. Dispersants are intended less as a solution and more as a defensive technique.

"[T]he principal biological benefit of dispersant use is prevention of oil stranding

on sensitive shorelines," states a National Academy of Sciences report on the technique.[18] Decision-makers balance the potential harm of using dispersants against the harm of allowing oil to wash up on beaches, in marshes and in estuaries.

The charges and counter-charges [concerning disperants] received so much publicity that it is impossible to separate the technical information and field reports from the high-level, highly public arguments.

The effectiveness of dispersants, like other methods and technologies, depends on how well the chemicals are mixed and applied, what the conditions are at the site, and what the composition of the oil is at the time. Generally speaking, oil is more difficult to disperse as it weathers.

The dispute over the approval and testing of dispersants on the *Exxon Valdez* spill quickly left the realm of technology and science and leaped into the world of politics, popular media, and legal maneuvering.

The charges and counter-charges received so much publicity that it is impossible to separate the technical information and field reports from the high-level, highly public arguments that included the Governor of Alaska, the U.S. Secretary of the Interior, and the chief executive officer of the Exxon Corp.

On April 18, in a speech to the Anchorage Chamber of Commerce, the president of ARCO Alaska, Bill Wade, wondered aloud "Why did it take from 8:30 a.m. Friday to 7 p.m. Sunday evening to get permission to use [dispersants] on a full-scale basis?" Wade's comments pointedly implied that the response "could have been better" had Exxon received permission to spray dispersants earlier.[19] Then, in a national magazine interview appearing less than a week later, Exxon chief executive officer Lawrence Rawl was more direct in his accusations. The federal and state governments — mostly the Alaska DEC — did not let Exxon use dispersants that would have kept 50 percent of the oil from reaching the shorelines, Rawl charged.

"The basic problem we ran into is that we had environmentalists advising the Alaska Department of Environmental Conservation that the dispersant could be toxic," Rawl said.

Dispersant application equipment is tested in a spill drill conducted in March, 1992, in Prince William Sound. Photo by L. J. Evons

And in answer to another question, in which the reporter asked Rawl to state specifically who stopped Exxon from applying dispersants immediately, Rawl added, "It was the state and the Coast Guard that really wouldn't give us the go-ahead to load those planes, fly those sorties, and get on with it. When you get 240,000 barrels of oil on the water, you cannot get it all up. But we could have kept up to 50 percent of the oil from ending up on the beach somewhere."[20]

Just two days later, in an April 26 interview in the newspaper USA Today, U.S. Secretary of the Interior Manuel Lujan echoed and expanded upon Rawl's assertions — taking care to extract the U.S. Coast Guard from Rawl's assignment of blame. The newspaper's interviewer asked Lujan why the Coast Guard wasn't in charge, and why the response seemed so slow. Lujan replied, "The Coast Guard was in charge, very clearly. But when they started doing the things that they were supposed to do, the state of Alaska objected to it."

In answering another question, Lujan added, "The Coast Guard tried burning; Alaska objected. They tried chemical dispersants; Alaska objected. The Coast Guard,

which is the federal cleanup agent, just didn't know what to do."

Lujan did lay some blame at the feet of the Coast Guard, but only "for letting Alaska intimidate them," presumably on burning and dispersant use.[21]

The story that was developing implied that the spill had been controllable — primarily through the use of dispersants — but that the government had blocked use of the chemicals because of pressure from environmentalists, ignorance of spill response, or plain indecision. Exxon and Alyeska would repeatedly claim that the state, in particular, had insisted too hard and too long on mechanical cleanup — booms, skimmers, etc. — a technique that was clearly inadequate for the size of the spill.

There are serious strategic and factual problems with such a claim.

Exxon and Alyeska had neither enough dispersant nor the equipment to deploy it. There was never a case in which loaded dispersant planes were held on the ground because the government couldn't or wouldn't make a decision. Whatever delays occurred came because the right equipment wasn't in Valdez, the equipment failed to work properly, or because the weather prevented the airplanes from getting in the air.

Exxon and Alyeska had neither enough dispersant nor the equipment to deploy it. There was never a case in which loaded dispersant planes were held on the ground because the government couldn't or wouldn't make a decision.

The problem with dispersant applications was essentially the same as the problems that plagued other early efforts to contain and control the oil: The spill was enormous, and the resources to deal with it were not available.

Exxon's upper management ignored these facts and chose, instead, to weave a tale of bungling bureaucrats and scheming environmentalists. It was an easier, perhaps less painful way to explain away a problem that was bigger than any control and containment technique on hand.

This dispersant story, as it unfolded, prompted Governor Steve Cowper to demand some kind of substantiation for these claims from Lawrence Rawl. The Governor called Rawl's statements "demonstrably false."

"I urge you to repudiate the inaccurate statements you and other Exxon officials have made regarding the State's actions on dispersant use," Cowper wrote in a letter to Rawl. "If your company decides instead to cling to its story, I think the public is entitled to see some proof."[22]

In a reply sent by facsimile the same day, Rawl wrote that all he had said was that "officials of the State of Alaska and the Coast Guard were in discussions during the first three days on whether dispersants should be used." He also stated flatly that the dispersants worked "extremely well" in the early tests. He did not repeat the implication from his Fortune comments that "environmentalists" were advising against dispersants because they were toxic. Rawl said proof of all his statements would follow during Congressional hearings the next week.[23]

The exchanges died down after that, and Exxon's position reverted largely to the contention that the dispersants worked and therefore should have received earlier approval. The "proof" became little more than a battle of conflicting opinions, rather than a battle of conflicting facts.

The whole incident generated more heat than light. Putting aside the anger, the rhetoric, the blame-avoidance and the potential legal posturing, the record from the field and from the Regional Response Team (RRT) gives a better picture of the technical problems associated with dispersant use during the first three days.

The story of dispersant use on the *Exxon Valdez* spill begins, actually, before the tanker ever hit the rocks.

Dispersants began to be considered as an first-line defense against spill damage in the 1970s, although the first formulations and applications proved to be extremely harsh, environmentally. By the mid-1980s, dispersants had been somewhat refined, although potential problems with wildlife and plant damage still exist. However, by the late 1980s the state and Alyeska Pipeline Service Company began discussions about how to improve Alyeska's initial response capabilities by adding equipment and stockpiles of dispersant. Alyeska was interested, but insisted that the Alaska RRT adopt guidelines for dispersant use before Alyeska went ahead with the investment in additional resources.

On March 8-9, 1989 — just more than two weeks before the *Exxon Valdez* spill —

the RRT adopted initial guidelines for dispersant use, making Alaska one of the few states in the nation to have a mechanism for pre-approval of dispersant use. The RRT divided a hypothetical response zone — Prince William Sound and the northern Gulf of Alaska — into three zones, adopting guidelines for each.

Zone 1 included the approved traffic lanes for tankers entering and leaving the Sound, along with large areas of deep, open water to the east and west of the lanes. In this area, dispersants were considered acceptable, and the federal or state on-scene coordinators had authority to use chemicals at their discretion.

Zone 2 included the Gulf of Alaska. The RRT considered dispersants acceptable for use in this area, but because of the size of Zone 2 the RRT decided that actual approval would be on a case-by-case basis.

Zone 3 included all of the Sound outside of the traffic lanes. In this area, chemicals were not considered an acceptable option because of the many islands and bays that were critical nesting, rearing, and feeding areas for birds, marine mammals, fish and other wildlife. This designation was consistent with both the prevailing knowledge about the harshness of dispersants and general strategy for using them. Chemicals were pre-approved for use in Zone 1 because it was important to do everything possible to keep oil out of the sensitive Zone 3.

Yet pre-approval did not imply that dispersants presented no potential dangers, even in Zone 1. The RRT, which includes EPA and DEC, knew very well that the scientific literature on oil spill dispersants warned of some potential harm to wildlife from dispersed oil.

Initial Guidelines for Dispersant Use

Adopted March 8-9, 1989, by the Alaska Regional Response Team

for Prince William Sound and the northern Gulf of Alaska:

Zone 1: the approved traffic lanes for tankers entering and leaving the Sound, and large areas of deep open water to the east and west of the lanes.

- Dispersants use acceptable with caution
- Federal or state on-scene coordinators had authority to use chemicals at their discretion.

Zone 2: the Gulf of Alaska.

- Dispersants use acceptable in this area, but
- Actual approval would be on a case-by-case basis because of the zone's size.

Zone 3 all of Prince William Sound outside the traffic lanes.

- Chemicals not considered an acceptable option because of critical nesting, rearing, and feeding areas for birds, marine mammals, fish and other wildlife.

According to a committee looking at the general aspects of dispersant use for the National Academy of Sciences, "In open waters, organisms on the surface will be less affected by dispersed oil than by an oil slick, but organisms in the water column, particularly in the upper layers, will experience greater exposure to oil components if the oil is dispersed."[24]

More specifically, on the particular dispersant Exxon planned to use in 1989, a Canadian federal government report found that in laboratory tests, certain marine animals that live in the water column suffered greater mortality when exposed to dispersant-oil-water concentrations as opposed to the oil-water concentration alone.[25]

On the day of the spill, winds were light and seas were less than two feet; the dispersant was not mixing with the oil well enough to break up the slick.

The RRT action of March 8-9, 1989, also included some extra conditions for Zone 1 use based on whether birds, fish and other animals were present because of seasonal migrations, when they were giving birth or raising their young.

In other words, the RRT recognized the role of dispersants as a potential defensive measure against spill damage, but the state and federal agencies encouraged caution because dispersants were potentially harmful. This action reflected the realities of spill response: Every decision involves balancing the potential harm of the ailment against the side effects caused by the treatment.

A second reality — one that would present itself during the *Exxon Valdez* spill — is that dispersants are neither 100 percent effective nor 100 percent guaranteed. Field tests

of most dispersants are not common, and various monitoring methods to assess effectiveness do not often produce scientific or technical consensus. Therefore, before approving widespread dumping of potentially damaging chemicals on the water, a responder will want to be reasonably certain that the dispersants are going to do some good. Even in the case of Zone 1, where dispersants were pre-authorized for use by the RRT, an on-scene coordinator would be expected to use prudence, discretion, and experience to guide his or her actions before pouring tens of thousands of gallons of chemical into the ocean.

A third point to consider is that no single method of response was likely to solve the problem of 200,000 barrels of oil on the water. The volume of oil was so great, and so concentrated, that dispersing the oil with chemicals was hardly a sure thing.

Despite Exxon's claims of government interference and indecision, dispersant use was shut off by the limitations of the product and the unpredictability and force of Alaska's late winter weather.

"At this early stage of the spill, the oil slick was extremely thick," wrote DEC's technical expert on dispersants in a later analysis of Exxon's claims that dispersants would have effectively eliminated 50 percent of the oil. "Using tables from Exxon's Oil Spill Chemicals Training Seminar handbook, I calculated that a slick of 240,000 bbls. [barrels] volume over 2,500 acres would have had an average thickness of 3.8 mm. This is simply too thick to disperse."[26]

Nonetheless, the first conversation between DEC and Coast Guard officials in the early hours after the grounding was about dispersants. At about 1:15 a.m. on March 24, Dan Lawn of the Valdez DEC office spoke with Commander Steve McCall of the Coast Guard, the captain of the port and the pre-designated federal on-scene coordinator.

"Within 10 minutes of the department being notified we had the discussion about dispersants, and we recognized that if conditions were right we'd use them," Lawn recalled.[27]

At 8:30 a.m. on Friday, March 24, Alyeska Pipeline Service Company made formal request to the federal on-scene coordinator to drop 50,000 gallons of dispersant, beginning that day. At the time of the request, Alyeska had less than 4,000 gallons in Valdez, although an estimated 8,000 gallons were stored in Kenai and another 8,800 gallons in Anchorage. However, Alyeska did not have the equipment or the aircraft to make any drop at all.[28]

The oil slick was in Zone 1, the area of pre-authorization, so Cmdr. McCall at 3 p.m. approved a test application. At 6 p.m., a special arm and bucket that could be hung from a helicopter arrived in Valdez from Kenai. After loading, the helicopter flew to the site of grounding and dropped its load on the thick, compact slick near the tanker.

The Coast Guard and DEC agreed that the dispersant did little good, if any. Dispersants are, in large part, designed to weaken the surface tension of the oil, thereby "breaking" the slick up. However, simply laying the chemical on top of a slick isn't the best way to get results; agitation, whether from wind or seas, is needed for optimal efficiency. Other factors, such as the size of the droplets of chemical, could not be properly controlled using the helicopter and bucket.

In fact, Exxon's consultant, Gordon Lindblom, was dead against the helicopter drop. According to Iarossi's deposition taken in August 1992, he and Lindblom heard about it while the two were in an Exxon jet bound for Valdez from Texas. Iarossi told the attorneys that Lindblom was visibly angered by the prospect of the helicopter drop, saying that it was likely to fail, and make it more difficult to get subsequent agreement to use more dispersant.

Especially when seas are calm and there is little wind. On the day of the spill, winds were light and seas were less than two feet; the dispersant was not mixing with the oil well enough to break up the slick. The Coast Guard and DEC concluded conditions were simply not right for depending on the dispersant because there was insufficient mixing.

The Coast Guard approved another test the following morning, in hopes conditions had changed or that better application might yield better results. It didn't. Once again, the light winds and calm seas did not mix the dispersant properly.

A third test, on Sunday morning, was hampered because the aircraft's deployment

system did not work properly. The fourth, and last test in Zone 1 came on the afternoon of Sunday, March 26, as seas were building and a gale was brewing to the north. Commander McCall of the Coast Guard was satisfied the dispersants had a reasonable chance of working now that the weather had changed, and he approved full use of dispersants in Zone 1 on Sunday evening.

The weather was getting better, relatively speaking, for using dispersants to battle the oil slick. Winds had increased to 15-20 knots, and seas were kicking up. But the building winds and seas also began to break the large pancake of oil into smaller slicks and streamers; the main body of the slick was also moving out of the middle of the Sound and closer to the shore of the islands to the west.

On Monday, as a full-scale storm started to swirl in the Sound, Exxon applied about 5,500 gallons of dispersants in Zone 1, but the weather was driving the slick west-southwest, towards Disk, Eleanor, and Knight Islands — and into Zone 3. More than two weeks earlier, the Alaska RRT had considered the use of dispersants in that sensitive zone and rejected the idea. However, Exxon requested special permission to spray in that zone late Sunday afternoon. To spray there, Exxon would need special clearance from DEC; within an hour of the request, at 5:20 p.m., DEC determined that the water was deep enough and the drop zone was far enough from shore to allow a Zone 3 drop.

It never happened. Monday's gale turned into a 70-mph maelstrom by Tuesday. All aircraft were grounded. And more important, the window for effective use of dispersants had closed.

Despite Exxon's claims of government interference and indecision, dispersant use was shut off by the limitations of the product and the unpredictability and force of Alaska's late winter weather. Equipment problems, uneven application, and a shortage of the chemicals the responders needed exacerbated the problem.

2.2 Shoreline cleanup

Shoreline contamination was a major issue for state authorities and local communities. The rapidly fragmenting "fronts" and the limited recovery and storage capabilities were quickly overwhelming the response effort.

The oil started to wash ashore in large amounts, and over wide areas, beginning in early April. Throughout that month, resources and techniques were targeted mainly on the massive and expanding problem of on-the-water recovery, and on defensive booming. Although oil was weathering, breaking up, and was frequently concentrated at nearshore sites, there was no single or main "oil slick." The battle against the oil was more like a guerrilla war, fought in skirmishes on multiple fronts, rather than a concentrated attack against a massed enemy.

Yet even as on-the-water efforts expanded and Exxon mobilized more and more vessels and equipment, it was becoming clear that shoreline cleanup was about to become perhaps an even bigger priority. Oil was washing ashore at one site, only to be lifted off by the next tide cycle.

"It is discouraging for the crews to see oil come off a beach during a tide change and impact another (sometimes clean) beach," reported DEC's main contractor on April 19. The contractor added, the following day, "All attention is still directed to offshore recovery. Nothing being done to shoreline contamination."[29]

This was a major issue for state authorities and local communities. The rapidly fragmenting "fronts" and the limited recovery and storage capabilities were quickly overwhelming the response effort. Oil was not only heading out of the Sound for the outer Kenai Peninsula and Kodiak archipelago, but it was swirling throughout the Sound and hitting more and more shorelines.

"There is some kind of correlation between the tides and the movement or relocation of free-floating oil," the DEC contractor explained in that April 19 report. "The oil appears to be moving through Northwest Bay in a counter-clockwise direction, up and around Pt. Eleanor in a clockwise direction, down the east side of Knight Island and back to the west through Upper and Lower passages. Then (depending on the tide

stage), when it reaches the west side, it either travels north to Northwest Bay or south to herring Bay."

A week later, on April 26, the report noted, "Lots of oil is being washed from Smith, Little Smith and Seal islands as well as the north east corner of Point Eleanor. These areas were heavily impacted during the major release of oil."[30]

The only way to truly stop the recurring cycle of oiling was to break it onshore, by recovering stranded oil and preventing it from getting loose every six hours when the tide changed.

This scenario, occurring around northern Knight Island and the smaller islands to the east that April, suggested that much of the on-the-water recovery was really becoming an endless — and losing — game of chase with familiar oil concentrations. The only way to truly stop the recurring cycle was to break it onshore, by recovering stranded oil and preventing it from getting loose every six hours when the tide changed. And there was plenty of oil to be washed off: A number of DEC field reports noted pooled oil and stretches of greasy, brown emulsion up to and exceeding two feet deep stranded on shorelines of the area.

The re-oiling problem was starting to move south, as well, as prevailing currents and changes in wind carried oil off the beaches of the Smith Islands, Seal Island, and Green Island. Two of the most heavily oiled areas of 1989 — Point Helen at the southern tip of Knight Island, and at Sleepy Bay at the northern head of Latouche Island — were affected largely by secondary oiling from their northern cousins. These two southern Prince William Sound sites would be the focus of some of the most intense cleanup activity well into 1991, and even 1992.

While there was little activity on the shorelines during the first weeks after the spill, by the second week in April (around the 19th-20th day of the response), the Coast Guard and DEC were putting increasing pressure on Exxon to plan for and execute a full-fledged shoreline cleanup program.

Working off the relative success of vacuum equipment to pick up weathered oil from the water, there was one attempt at Smith Island to use vacuum equipment on the shoreline. The trick was to vacuum oil without pulling up cobbles and fine sediments. Where the oil was deep and the rocks were large, vacuuming actually worked. However, recovery was slow and the areas where it might work were limited.

Exxon made one highly publicized, almost desperate effort to do shoreline cleanup with workers literally wiping rocks by hand with absorbent material. This looked ludicrous on television, and supervisors from all parties thought it useless and impractical almost as soon as they saw it. State monitors reported during 1989 that contractor crews occasionally resorted to hand-wiping when waiting to be re-deployed or when equipment was down, but rock-by-rock cleanup was essentially eliminated as a realistic option after a single attempt.

Washing the beaches was generally regarded as the most practical method, but there were various theories about how to do it. Exxon tried several combinations of manpower and equipment. Under one arrangement, at the "top" of the beach (roughly the high-tide line) workers strung a perforated hose that could carry a high volume of cold sea water, which flooded the sediments at low pressure. Workers "down-beach" agitated the sediments with rakes and other hand tools to release the oil, which was lifted off by the flood and collected in front of booms strung just offshore. This worked fairly well, and DEC monitors reported that the tilling released more oil than flooding alone. However, while hand-tilling passed in and out of fashion throughout the response, it was rarely used with the flooding system after those early tests. Not all shorelines lend themselves to hand-tilling, and the amount of labor necessary for full-scale application was, at the time, a daunting proposition. At that point, there was still no firm plan to house workers, feed them, clean them, and dispose of all the waste they would produce.

A second variation of the header flooding system added workers using moderate- to high-pressure hoses to wash rocks. This released more oil than the flood alone, and it covered more ground at a faster rate than the hand-tilling method. It could also be used on many types of shoreline. This variation was not without some obvious problems. Biologists were concerned about blasting animals and plants off the shorelines. Coastal geologists were concerned that high-pressure blasts would wash away the fine sedi-

ments underneath big rocks and cobbles; that, in turn, might de-stabilize the beach and trigger serious erosion.

The temperature of the water was a problem, too: The nearshore waters in the Sound, even in the summer, rarely rise much above 45-50 degrees Fahrenheit. Lots of cold water tended to make the oil thick and tarry, making it harder to move and harder to recover. This also tended to encourage workers to use higher pressure to blast the tarry oil, which made biologists and geologists more nervous than before. Cold water would not cut the oil.

Little more than six weeks after full-scale hot-water washing became standard shoreline treatment, both the Coast Guard's scientific advisor and independent biologists expressed concern that the hot water was "cooking" the beach life and perhaps doing more harm than good.

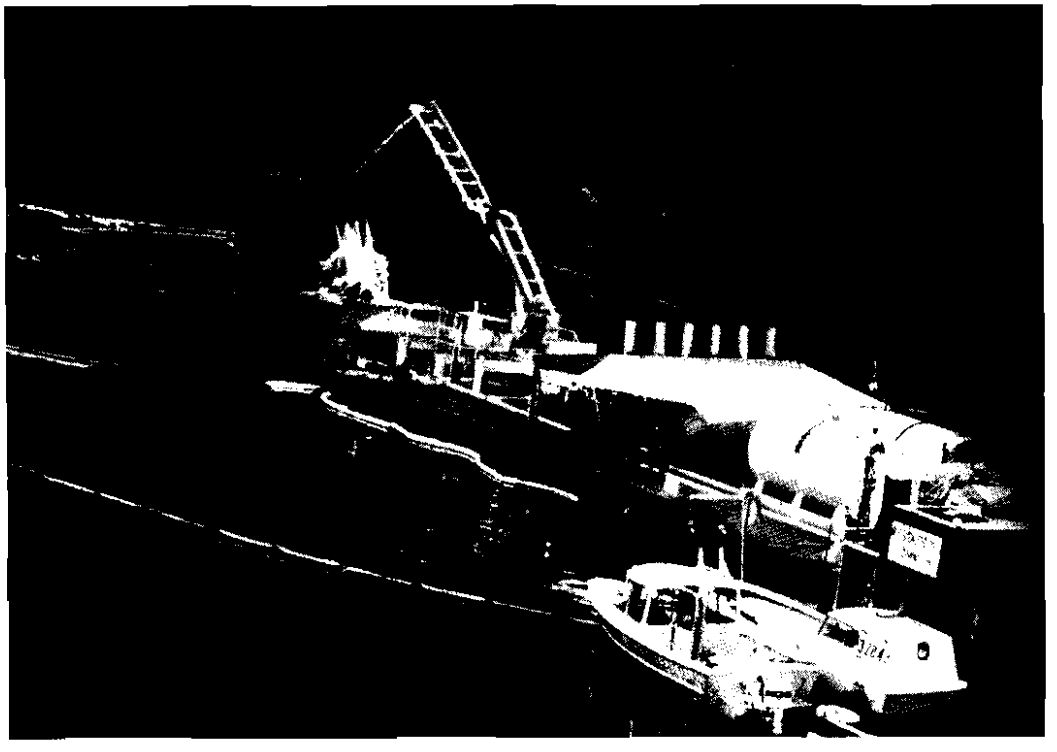
Hot water and high pressure

One of the enduring images of the *Exxon Valdez* cleanup is of workers in hard-hats and yellow rain gear blasting at rocks with high-pressure hoses that fired hot water. Virtually every beach that had significant oiling (moderate to heavy, by DEC definitions) was washed with either hot-water hoses or hot-water mechanical washing devices called "omnisweeps" or "omnibooms." In all, as much as 150 miles of shoreline were probably washed with hot (140-160 degrees Fahrenheit) water in 1989.[31]

In terms of shoreline ecology, hot water hurts. As early in the cleanup as July, 1991, little more than six weeks after full-scale hot-water washing became standard shoreline treatment, both the Coast Guard's scientific advisor and independent biologists expressed concern that the hot water was "cooking" the beach life and perhaps doing more harm than good.[32] This group was not solely concerned with the immediate, acute impacts of the hot water and high pressure. These scientists were also concerned that the plants and animals on the shorelines washed with hot water would actually return to normal *more slowly* than those left alone, or those treated less harshly.

In an article published in 1990, two independent Alaska biologists questioned the wisdom of the hot water wash based on information gathered from a study site they established on Green Island.[33] A second paper expanded on this hypothesis, offering data that, the authors suggested, showed that hot water and high pressure had killed more animals and plants than the oil might have. They took their analysis a step further and suggested that recovery might therefore be slower.

"Complete loss of mussels and rockweed [due to treatment] at these sites has changed or eliminated several ecological niches," the study concluded.[34] Without the cover of the mussels and seaweed, the biologists said, it was hard for the usual array of small intertidal plants and animals to establish themselves and survive; the exposed rock surfaces were too dry, too exposed to predators, and too heavily pounded by wave action. Moreover, the normal progression of



An omnisweep, or omniboom in operation, washing oiled shoreline. Photo by Rob Schaeffer

plant life was likely to be delayed because the exposed surfaces allowed so-called "opportunistic" species, such as various algae, to establish themselves in formidable and overwhelming numbers.

This paper was actually part of a larger study commissioned by the National Oceanic and Atmospheric Administration (NOAA), and financed by the EPA, the Coast Guard, the American Petroleum Institute and Exxon, among others. The NOAA study was much more forceful, and its conclusions more pointed, than the previously published work. NOAA released the paper[35] in April 1991 at a Washington, D.C. press conference. NOAA's top officials not only said hot water washing did more harm than good and set back recovery, but closed by suggesting that "sometimes the best thing to do in an oil spill is nothing."[36]

Having "survivors" of shoreline organisms, in other words, is an important step on the way to full recovery. But in hot-water, high-pressure treatment, there are few survivors, if any; therefore, recovery is likely to take longer.

"It is clear," the study reads, "that the data . . . strongly support the conclusion that hydrocarbon contamination and high-pressure, hot-water treatment each caused major adverse impacts to the intertidal biota of western Prince William Sound, but that the effects of the treatment predominated. Moreover, it appears likely that the treatment, while removing oil from the upper and mid-intertidal zone, where its effects were somewhat restricted to relatively tolerant organisms such as barnacles, rockweed, and mussels, transported the remobilized oil into the lower intertidal and shallow subtidal zones, where the oil was placed into contact with relatively more sensitive and productive organisms such as hard shelled clams and crustaceans."[37]

The authors of the study argue, in short, that a lot of the tougher shoreline organisms might have been killed by the oil, but that a fair number would survive. Therefore, while the overall health of the shoreline might suffer, populations would limp along and gradually re-establish themselves fully. Having "survivors," in other words, is an important step on the way to full recovery. But in hot-water, high-pressure treatment, there are few survivors, if any; therefore, recovery is likely to take longer.

The study also suggests that the high-pressure wash drove oil out of the upper beach, but the hoses also drove oily fine sediments into places below the tide line, thereby oiling places that would have escaped oiling otherwise.

Workers washed oil with hot-water hoses toward the water where skimmers picked up the oil. Photo by Patrick Endres

Before addressing the specific technical and scientific points raised by the NOAA study, it is helpful to look at the study first within the context of the larger technical debate about shoreline cleanup in general, and second, within the context of *Exxon Valdez* spill politics.

There has long been a debate among responders, biologists and policy-makers from industry and government about whether oil spill cleanup should proceed beyond anything more than simple pickup. Indeed, NOAA's introduction to the 1991 report cites several of the best-known references on the subject from the past decade or so. The NOAA report is not necessarily an isolated analysis; rather, the conclusions (and some of the principal authors and directors) of the study are a product of a certain school of thought about oil spill cleanup.

The NOAA Hazardous Materials section, which is the designated scientific support coordinator for the federal on-scene coordinator, leans towards the approach taken by

the school of limited cleanup. John Robinson, who led much of NOAA's work on the *Exxon Valdez* spill, was not generally in favor of aggressive cleanup. He took direct control of the controversial Net Environmental Benefit Analysis study of 1990, which concluded that rock-washing or sediment excavation was ill-advised. It became the federal government's official policy.

Robinson's position was largely based on concern for intertidal communities, and the technical literature has a number of references to support his position. In addition to those cited in the NOAA report, other studies — including one conducted in part by DEC's chief technical consultant (Erich Gundlach, now of the Arthur D. Little Co.) — suggest that most oiled shorelines exposed to wind and weather have a good chance of recovering their biological health within periods often measured in years, not decades.[38] So, given the facts that Prince William Sound's ecosystems were largely not exposed to other external environmental stresses, that the weather is harsh, that ocean conditions are generally high energy, and that there are a lot of nutrients flushing into the marine ecosystems to aid recovery, it would not necessarily be unreasonable to suggest that minimal shoreline cleanup might be better than aggressive cleanup in such a situation.

This raises serious questions about the cleanup: Is the NOAA study accurate in its picture of hot-water, high-pressure washing during the *Exxon Valdez* cleanup? Are the results strong enough to prompt a conclusion that the technique should not have been used in Alaska, and should not be used in the future? These questions address both scientific and strategic issues.

The data collected by the NOAA researchers is thought-provoking, but it suffers from a certain imprecision — no fault of the researchers, really — because of the working conditions on the shorelines in 1989. It is impossible to generalize too broadly about hot-water, high-pressure washing, since that meant different things at different sites, with different heaters, different crew chiefs, different external pressures (meeting goals in scheduling, for example), and differing levels of fidelity to proper procedures. While this might have affected some of the data, this also might affect the general conclusions about washing mentioned by NOAA officials when the report was released.

Some washing crews were careful and some were not. Some basic problems in variability of performance included:

- **Uncoordinated spraying**

  State monitors often observed Exxon crews spraying hoses randomly on the shorelines, rather than working systematically down a beach. This often meant that some people put more hot water and more pressure on a given area than others. Some workers were allowed to point hoses directly into fine sediments, which mobilized oil and sand and allowed it to be transported into the lower intertidal. In short, treatment was uneven, not just from site to site, but within sites themselves.

- **Ignorance or carelessness in application of treatment**

  Everyone agreed that it was important for crews to avoid spraying the so-called "green zone," the rich, lower intertidal area characterized frequently by the presence of filamentous green algae.

  "Generally, a cleanup squad was to wash a beach by following the tidal waters down the beach on the ebb tide and moving back up the shore with the flood tide, stopping intrusive treatment if the green zone were exposed. However, many crews ignored these restrictions, insisting on working the area rather than shutting down or moving to a less sensitive location," the DEC's cleanup monitoring section reported in its 1992 summary.[39]

  Also, once oil was released from the beach into the containment zone for a skimmer to retrieve, workers were supposed to turn down the pressure on their hoses and gently push the floating oil towards the skimmer.

"Unfortunately, despite repeated explanations of this method, crews were often allowed to turn most if not all of their hoses on the oil without reducing the intensity of their spray," DEC's monitors reported.[40] This not only caused a lot of mixing and turbulence, but dumped a good deal of warm water into the nearshore area, which could affect the survival and recovery of the extreme lower intertidal areas.

❒ **Scheduling and reporting of results**

Throughout 1989, DEC pointed out to both federal and Exxon authorities that too much time and effort was being spent on shorelines that were not as heavily oiled as others. Crews were often deployed on moderately oiled shorelines that could be completed quickly, rather than on more heavily oiled shorelines that might take more time, and therefore throw off the crews' scheduled goals, and reports of progress, for shoreline miles treated.

From the standpoint of the NOAA study, this issue raises questions about whether the damage from hot water washing could have been minimized throughout the region by concentrating the harsh technique only on the most heavily oiled sites, using milder techniques on others.

❒ **Poor choices or combinations of equipment**

Shore washing was more effective at releasing oil when hoses and the omnibooms were used in conjunction with a low-pressure beach deluge system (such as the perforated hoses). However, some places used it and some did not, which meant that more work was done with the most powerful equipment. In addition, the omnibooms were originally intended to work primarily on steep, rocky faces and some large boulder beaches. However, Exxon gradually began using them on almost all kinds of beaches, with the exception of low-energy, fine-sediment shorelines.

Hot water and high pressure are harsh treatments, and the data gathered by NOAA give us a better idea of how harsh they might be.

NOAA's data did not, and probably could not, correct for these important variables. The study's model for hot-water washing was based on one actual observed test of the technique; the rest relied on imprecise or incomplete documentation. Records may show that a beach was washed with hot water, but the records used by NOAA did not show where on the beach the hot water and high pressure were applied.[41] There are some ways to reconstruct this,[42] but to DEC's knowledge NOAA did not know about them or chose not to use them. From the standpoint of science, this is a real problem: Data based on imprecise sources weakens the data and the conclusions based on them.

Biologists from the Alaska Department of Fish and Game (ADF&G) remarked, "The NOAA report attempts to circumvent this problem by relying on general segment reports and from observations by 'individuals working in the field (e.g. field bosses for specific locations).' While this may provide additional detail on beach cleanup efforts, one must question the ability of such individuals to recall the exact treatment that occurred (temperature, duration, number of passes, etc.) on a specific location where the NOAA transects were conducted. Where multiple treatments occurred, different individuals were involved."[43]

Hot water and high pressure are harsh treatments, and the data gathered by NOAA give us a better idea of how harsh they might be. However, because of the variability of the treatment from site to site, coupled with the scientific unreliability of some of the sources used, the conclusions NOAA reaches about setbacks to recovery caused by treatment are closer to hypothesis than proof. One year's data based on observations immediately after the spill makes for an incomplete data set, state reviewers suggested; several years of recruitment and recolonization data are needed to reach the kind of conclusions the report's authors suggested.[44]

NOAA was working under difficult circumstances, and it is not surprising that its data would suffer from the weaknesses described above. The state, in reviewing the report and in responding to questions from the press, tried to make clear that it did not

dismiss NOAA's findings out-of-hand.

The state's reviewers agreed generally that the NOAA report's conclusions, especially estimates of rates of recovery, are not fully supported by the study's data. However, it would be imprudent to ignore the general picture the report draws about the harshness of hot water and high pressure on intertidal life. Applying this piece of science to oil spill shoreline cleanup strategy, one might conclude that:

a) Hot water and high pressure can be extremely harsh on intertidal communities.

b) Such treatment probably has implications for recovery as well as initial acute effects.

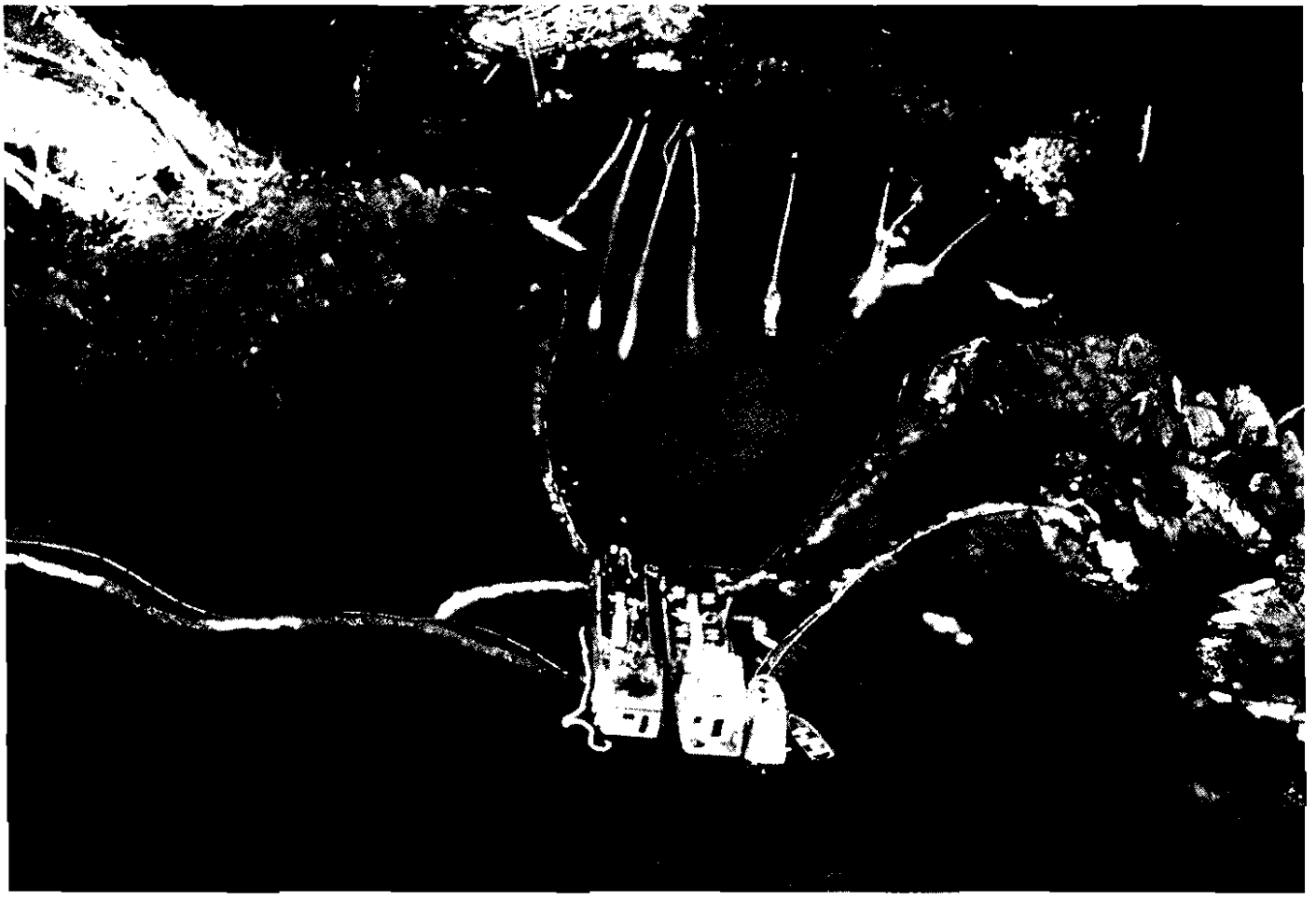
c) Therefore, before choosing such a technique, responders must make sure any damage from the treatment is acceptable based on the potential threat from the oil.

It was well known from the start that hot water and high pressure were a potentially harsh combination for shoreline treatment.

"[T]esting done on Block Island by Exxon and the USCG have demonstrated that water flushing and hydro blasting are both effective removal methods," wrote DEC's main contractor on May 3. "The only thing to determine now is the temperature range of the water. Admiral Yost seems to think that a clean, dead beach (using hot water) is better than a live, semi-oiled beach (using cold water)."[45]

In fairness, Yost, the Coast Guard commandant, was not alone in this assessment. The state's spill officials agreed that hot water flush had a role — perhaps a significant one — in shoreline cleanup. State and federal officials agreed that the potential damage of treatment was acceptable based on the potential threat from the oil.

And here is precisely where opinions separate, not just in this instance, but in the



Aerial view of beach cleaning using hot-water washing, skimmmers and boom. Photo by Rob Schaeffer

larger and more common debate about conducting shoreline treatment after an oil spill: Who defines terms such as "threat" and "harm?" What resources, values, economies, and uses are most important and deserve protection — especially when protection for some may have negative results for others?

For the State of Alaska, the bottom line was that cleanup policy was a complex matter of public policy, not merely a scientific consideration. However, science provided the starting point.

First, the spill was enormous, and the shoreline impacts were unprecedented. The 11 million gallons lost from the tanker washed into hundreds of salmon streams, estuaries, bird-nesting areas, marine mammal haulout and rearing zones, and other critical habitat. The oil was not affecting a limited habitat for a single major species; it was coating tremendously large sections of habitat for a number of important species, some of which do not survive in large numbers outside of Alaska. Nothing in the literature gave clear guidance about what might happen to species that suffered widespread disruption due to oil over massive areas that supported them.

The potential harm to limpets and rockweed from hot water seemed acceptable, based on the potential harm to the region's economies and communities, and to higher trophic species such as fish, seals, and seabirds.

Second, the amount of oil that was spilled — and later, it was determined, the amount of oil that was locked underneath rocky shorelines and buried on other beaches — raised serious questions about the potential for sublethal effects due to long-term , low-level exposure to hydrocarbons.

Third, despite the general impression that Alaska is a rich paradise for wild things, it must be remembered that Alaska's subarctic climate puts most species on a razor's edge of survival. A tropical climate with endless summer has more energy, more diversity, better conditions for recovery, generally speaking. Prince William Sound is rich, compared to other areas, largely because it is not subject to the same barrage of environmental insults as other, more populated and industrialized areas.

However in Alaska, any disruption — natural or man-made — has the potential for driving a given animal population below the levels necessary for survival. Cold water, harsh weather, and limited solar energy at high latitudes can all combine to make recovery in such an area less dependable than recovery in a more temperate climate. This spill was so large, and its initial effects so widespread, anything less than a full-scale attempt at cleanup seemed like a biological gamble.

Last, the timing of the spill, in biological terms, was especially critical. Prince William Sound, the Copper River delta, the Kenai Peninsula Coast, the Barren Islands and the Kodiak Archipelago — all these areas were on the verge of the massive migrations of birds, marine mammals, and fish that begin in April and extend through the northern summer. The beaches and islands of the region are primary stops on migration routes, and preferred sites to nest, give birth, and raise young for many species. The oil, quite literally, was in the way, or on its way to vast stretches of critical habitat.

But biology was only part of the decision. The people and the economies of the region depend on the health of resources, the seasonal abundance of game and fish, clean water and wilderness islands. Subsistence, commercial fishing tourism, sport hunting and fishing, and recreation are the foundation of the local economies, and the very reasons the communities of the region exist.

Commercial fishing seasons were on the verge of opening, and the concern was not just over the 1989 season, but the 1990 season as well. Not only was it important to clear spawning beds from oil contamination, but it was just as important to clean beaches that held the potential for leaking oil into the bays and coves where fishermen made their living. Alaska tourism at virtually every level is based on pristine wilderness. Subsistence users demanded that oil be removed from their hunting and fishing areas as best as possible. It was simply not acceptable or practical to put these economies on hold for some period of years while oil degraded naturally.

And as a practical matter, a minimal cleanup raised the distinct possibility that oil being lifted off beaches and moved elsewhere would oil and re-oil many areas that had escaped the initial impacts, as described in field reports and overflights by state and federal agencies.

The threat from the oil extended far beyond the intertidal communities of the

affected shorelines; the potential harm to limpets and rockweed from hot water seemed acceptable, based on the potential harm to the region's economies and communities, and to higher trophic species such as fish, seals, and seabirds. Arguments for limited or light cleanup, based on concerns about immediate intertidal impacts, lacked the perspective of both the broader ecological implications and important public policy considerations.

Did the hot water treatment work? Hot water and high pressure did, indeed, remove relatively large amounts of weathered oil from rocky shorelines. It did, however, suffer from serious drawbacks. It was probably harsh on intertidal creatures and plants that survived the oiling itself, and it probably drove some oil at some sites deeper into the fine sediments. In addition, variability in the way crews conducted the treatment caused secondary problems, some of which the NOAA 1991 study points out.

On balance, state officials were willing to accept some of this damage in exchange for removing the heaviest concentrations of oil from shorelines as much as possible, as fast as possible. The benefits to commercial fishing, tourism, and other human uses of the shorelines outweighed the potential damage and disruption caused by the treatment.

The treatment was most effective, and most acceptable, on shorelines that were heavily oiled. As soon as the heaviest oiling — the so-called "gross contamination" — was removed by the hoses and omnibooms, the balance tipped away from high pressure and hot water. By the middle of 1989, it was obvious that some other method would have to be used if the cleanup was to continue past the initial, rough washing program.

Solvents and chemical cleaners

Exxon's first attempt to get past the limitations of hot water washing (and perhaps, some of its harsh effects), was to propose the use of a chemical cleaner called Corexit 9580M2. This was, essentially, kerosene with most of the aromatics (the most toxic components of petroleum products) removed, plus some detergents. The substance was a modification of the dispersant that Exxon had attempted to apply during initial on-the-water response. Exxon said it looked at 40 potential chemical cleaners from several different manufacturers before settling on Corexit, which is manufactured by Exxon.

Test application in 1989 of a chemical cleaner called Corexit, an Exxon product later rejected for beach cleanup. Photo by Rob Schaeller

Corexit never got past the testing stage, for many of the same reasons that relegated hundreds of other products to the file cabinets during the *Exxon Valdez* response. It had not been tested, scientific data on its toxicity were either thin or incomplete, and it had operational problems. In addition, public acceptance of a new, widespread chemical treatment was lacking. To landowners, fishing groups, and conservation

organizations, the idea of dumping chemicals on hundreds of miles of shorelines that had just been oiled seemed much too risky — especially when there were other alternatives.

Like the earlier public flap over dispersants in April and May, the bitter arguments about Corexit were based, in part, on Exxon's insistence that it had an answer to the oil spill and the government was obstructing progress. A high-ranking Exxon executive bitterly complained to a U.S. Senate subcommittee in July that despite overwhelming evidence of Corexit's effectiveness, the State of Alaska would not allow the chemical to be sprayed. The executive said he wasn't sure Alaska even wanted the spill to be cleaned up quickly,[46] since the DEC wouldn't grant approval to use Corexit.

Again, like the dispersant debate, the issues and facts about Corexit were not as clear and easily defined as any side would have liked.

The public and the governments were uncomfortable with Corexit use because no one could prove that the chemical could be recovered. Crews would have to be retrained, a monitoring program had to be developed and implemented, and a new concern about worker safety would enter the picture.

Exxon's experts stated that the toxicity was low, the cleaning efficiency was high, and their ability to recover the chemical and oil was good. State and federal environmental scientists (including DEC, Fish and Game, and EPA) felt that the toxicity information was limited and incomplete. Both governments agreed that Corexit took oil off the rocks, but neither felt that Corexit was much more efficient or less disruptive than hot water. And most observers had serious questions about the ability of Exxon crews to contain and collect the oil-water-Corexit mixture that washed off the rocks into the water. In most of the 1989 tests, Exxon used more chemical — in at least one case, twice as much chemical — as it could actually recover.

Did Corexit get oil off the rocks? The answer, according to state and federal observers, was yes, although it worked better under dry conditions.[47] Could Exxon recover the mix of water, oil and Corexit once it was in the water? Not so well, the government observers said. "There is little evidence to indicate that an appreciable amount of washed oil (let alone the applied Corexit) was recovered after the test applications," the EPA reported.[48] State and federal observers reported that Corexit tests generated a reddish-brown plume that sneaked outside containment and absorbent booms and was difficult to recover.

Federal and state agency staff, including EPA and the state Department of Fish and Game, were not satisfied with the limited information available on the toxicity of Corexit. The existing tests told regulators something about the acute effects of Corexit, but they were silent on the effects of longer-term exposure — a critical point if Corexit were to be used in large quantities covering hundreds of miles of various wildlife habitat. There was also little firm information about the longer-term effects of a mix of Corexit and oil on wildlife — again, a critical point, considering that Exxon had not demonstrated its ability to contain and recover what it washed off; the elusive reddish-brown plume was troubling.

In short, the public and the governments were uncomfortable with allowing a chemical dispersant to be sprayed throughout hundreds of miles of the spill area because no one could prove that the chemical could be recovered. Crews would have to be retrained, a monitoring program had to be developed and implemented, and a new concern about worker safety would enter the picture.

No one, on either side, could claim that the existing test data in 1989 supported his position without equivocation. But like most major cleanup decisions, this one hinged on more subtle, less technical points. It was part science, part risk assessment, part operational, and part practicality. Test data were just a part of a complicated judgment call.

From the standpoint of operations, Corexit was far from a sure thing. When the chemical-oil-mix came off the beach and went into the water, conventional skimming equipment had difficulty picking it up and absorbent booms didn't necessarily soak it up. On August 28, Exxon applied 73.8 gallons of chemical to a test area and could recover less than 42 gallons of oil-water-Corexit mix; the next day, Exxon applied almost 60 gallons of chemical and could retrieve less than 42 gallons of mix. In both cases, the reddish-brown plume escaped from the testing area, and no one could tell how much of what got free into the ocean was chemical and how much was oil.

"Another disturbing observation was that [Corexit] appeared to carry oil into the water column . . . and we have little assurance about its toxicity and/or knowledge of its ultimate fate in the marine environment," EPA's observers wrote.[49]

And it didn't seem to work well when it was raining — a serious drawback in rainy Prince William Sound.

NOAA maintained that washing with Corexit would be less harmful than washing alone, since the solvent worked at lower water temperatures. It was an interesting theory, but there was nothing in the science that suggested that hitting marine life with a solvent and 100-degree water was significantly less harmful that hitting the animals with 160-degree sea water alone.

And finally, from the standpoint of public policy, allowing a company to introduce many, many thousands of gallons of chemicals over many hundreds of miles of Alaska shorelines — based on limited scientific and public review — seemed irresponsible, especially when there was nothing to suggest the chemicals worked any better than sea water.

The question came down to this: If hot water washing, manual pickup, and other existing methods did an acceptable job of cleaning within an acceptable range of side effects, why gamble the rest of the cleanup on a chemical that hadn't been shown to be much less damaging or much more effective?

Exxon never retreated from its position that Corexit should have been used. The Coast Guard, meanwhile, sent mixed messages. On September 10, 1989, the federal on-scene coordinator told Exxon that he wasn't convinced Corexit was effective,[50] yet within a few months, the Commandant of the Coast Guard would lobby the Alaska Governor directly to approve Corexit in 1990. Federal on-scene coordinator Ciancaglini was also quoted in a March news story urging use of Corexit during 1990 cleanup.[51]

Exxon continued to press its case for using Corexit in 1990. The debate stumbled along on the same legs as before: toxicity and operational efficiency. The toxicity argument against Corexit got somewhat weaker and Exxon's ability to recover the stuff got somewhat stronger.[52] DEC approved limited testing at five sites that summer, with the intent of finding out whether Corexit could be used as a spot washer, rather than a blanket treatment.

The 1990 tests provided little new information to decision-makers. The state's observers of a July 14, 1990 test reported that a Corexit-and-water wash again proved to remove more weathered oil than washing with water alone.

DEC's Judy Kitagawa observed in a memo to her supervisor that "this is the seventh Corexit 9580 demonstration I have observed" since 1989. She reiterated her observations of the chemical's effectiveness in a brief passage that betrays some weariness with the exercise.

"We already learned from the 1989 trials that COREXIT plus hot water removes oil better than hot water alone and that COREXIT/oil mixtures are difficult to contain and collect from water. All agencies agreed with this last year. The demonstrations of spot washing with COREXIT in July, 1990 have reconfirmed this," she wrote.[53]

A second DEC monitor agreed with Kitagawa's evaluation, writing that "Corexit was unquestionably superior in removing oil from the bedrock surface."[54]

But each monitor made additional observations that suggest, once again, that decisions about technology and evaluations of effectiveness in oil spill response are made within the context of conditions and risks existing at a given point in time.

State monitors observed that applying Corexit, followed by a wash with hot water, was certainly a good cleaning combination. However, it took a long time. A Corexit application, followed by a waiting period (the stuff had to soak in to be effective) and a wash, took about 90 minutes; washing alone took 15. Was it worth the wait?

And Kitagawa observed that using Corexit to spot-wash tarry oil took oil off rocks, but it put oil and chemical into the nearshore area — in short, it took a stable environmental problem and made it a mobile environmental problem. Was it worth it, in environmental terms?

There was never much of a doubt that Corexit could remove oil from oiled shore-

lines. There were doubts about whether it could be contained and recovered, and there were doubts about whether it was toxic to marine animals, and if so, to what degree. Given this set of facts, different government observers came to very different conclusions about whether Corexit should be used on the *Exxon Valdez* cleanup.[55]

State agencies shared both operational and ecological concerns. Fish and game officials were wary about introducing the chemical into nearshore areas without a better handle on its short- and long-term effects. DEC had similar concerns, but based its decision primarily on the fact that Exxon used too much chemical to recover too little oil; Corexit didn't appear any better than washing.

Federal government's officials had mixed opinions. The Coast Guard wasn't sure the Corexit was much better than hot water washing, and the EPA was concerned that Exxon's inability to contain Corexit and clean it up could put oil and chemical into the water. NOAA's John Robinson in 1989 vigorously promoted the use of Corexit, which in his judgment would speed up the response. He was concerned that the slow-moving cleanup effort would leave oil to harden and weather over the winter, making it difficult to clean.[56]

In 1989, the public agencies directing the cleanup concluded that Exxon's chemical was not a better alternative than the methods available at the time. In 1990, they reached the same conclusion.

But really, the differing opinions were not really based on whether the chemical was or was not a good cleaner. Rather, each observer was heavily influenced by individual assessments of risks (from the oil as well as the chemical), the range of other choices that were available (hot water and high pressure vs. the chemical), assumptions about time (whether all cleanup would end in September), public accountability (whether the emergency allowed the governments to circumvent their responsibility to consult the public about putting a chemical into the environment), and other public policy issues.

Cleanup decisions have a context beyond science and technology, and the Corexit issue was no different. In 1989, the public agencies directing the cleanup concluded that Exxon's chemical was not a better alternative than the methods available at the time. In 1990, they reached the same conclusion. Nothing in the tests suggested to the state agencies that dousing beaches with a kerosene-based solvent was any better than washing (1989) and mechanical and manual removal (1990). It wasn't any faster, and no one could prove that it was any less harsh than washing. It added something new to the environment, and presented additional containment problems. It raised more questions than it resolved.

Mechanical treatment

Backhoes, tractors, front-end loaders and other small and large mechanized units were used on shorelines primarily in 1990, and to a limited degree in 1991. In most cases, there was nothing especially complicated about the work; it was generally a mechanized magnification of what workers were doing by hand.

Front-end loaders scraped up and removed large tar and asphalt patches (such as at Aialik Glacier Beach on the outer Kenai Peninsula coast); tractors pulled thick, steel tines through concentrations of buried oil to release them (an excellent example was the work at beach segment LA20,[57] in Sleepy Bay, on Latouche Island); backhoes dug up pockets of heavy, buried oil or pulled oiled sediments from high intertidal areas to mid-intertidal areas for either removal or bioremediation (KN405, on Point Helen, on Knight Island and other places).

There was little dispute about the crude effectiveness of mechanical equipment: It moved a lot of material that could not otherwise be moved by hand. The state favored wider use of mechanical equipment based on the risk-benefit analysis that has been discussed throughout this report. The federal government (and to some degree, Exxon) began resisting wider use of mechanical equipment in mid- to late summer of 1990, largely based on the risk-benefit conclusions reached by NOAA.

However, there was some agreement about what the machines could do well, assuming one accepted the short-term disruption the machines caused.

On cobble beaches with moderate slope (such as the LA20 example), a small tractor pulling steel tines of various depths could agitate the sediments and release large amounts of buried oil, particularly if the tilling was done on a rising tide, when water lifted the oil out and made it easier to collect. On beaches dominated by small or mid-size boulders,[58] a backhoe was very effective at pulling back larger rocks so workers could either scoop or shovel mousse into buckets or bags for removal.

Backhoes and other equipment were used to "pull down" oil and oily rocks that were stranded in the high upper intertidal areas where storms and high tides had left berms far up the beach. The method became known as "storm berm relocation," and was generally accepted as a good way to expose oil to weathering or bioremediation [see next section]. The oil had wound up in these upper beach areas largely as a result of high tides and storms that occurred in 1989, when oil was on the water.

Front-end loaders scraped up and removed large tar and asphalt patches; tractors pulled thick, steel tines through concentrations of buried oil to release them; backhoes dug up pockets of heavy, buried oil.

There were ways of increasing the efficiency of a mechanical operation — such as tilling on a rising tide only — but Exxon and the Coast Guard thought this impractical, since staying at a site and waiting for the right tide cycle prevented a crew from moving to a new site. In addition, in some cases, oil was stranded so high on a beach that tilling on a rising tide could only be done during the few times during a month that tides were running higher than average. This, as well, was viewed by Exxon and the Coast Guard as an unacceptable scheduling and logistics problem.

Storm berm relocation, while generally accepted as a legitimate method by all parties, occasionally highlighted differences in approach between the state and federal governments. The state sometimes favored mechanical treatment that removed the oil: As long as one was going to send a piece of heavy equipment to a shoreline, why not make it one that could remove the pollution?

Exxon and the Coast Guard preferred an approach that simply exposed the oiled sediments for limited removal, weathering, bioremediation, or all three. They argued against large-scale removal first because of fears that the removal would promote erosion. When that proved later not to be a problem, they argued against it because it caused logistical and disposal problems they found unacceptable.

And overarching all these operational arguments were the concerns about mobilizing oil into the environment by tilling it with heavy equipment. NOAA, in particular, thought that heavy tilling could take an unacceptable, but relatively stable problem (buried oil stranded below the surface) and turn it into an unacceptable, mobile problem. The concern was that oil could be released into the water where it could, for example, disrupt an area fishery, or cause fine, oily sediments to migrate down into the lower, unoiled intertidal zone.

The state viewed all the counter arguments — logistics, oil mobilization, etc. — as valid concerns, but generally DEC and other state officials felt that quality work and good timing could alleviate some of the more pressing environmental concerns. In some cases, the state and federal government found common ground; in others, it didn't. Generally, everyone viewed mechanical treatment as a high-impact treatment that made sense at some sites based on which risk-benefit conclusion one tended to favor.

Bioremediation[59]

The limitations of large-scale washing and the shortcomings of solvents like Corexit highlighted the emerging fact in 1989 that if an extensive and area-wide cleanup program were to continue, some other technique would be necessary.

The U.S. Environmental Protection Agency (EPA) proposed in May and June of 1989 to try and speed up the natural rate of degradation of the oil by applying fertilizers to rocky shorelines. The general term for this type of cleanup is bioremediation.

The idea of using some kind of artificial stimulus to speed up the natural breakdown of pollutants had been around for some time, although the idea began to have some limited application in the 1960s and early 1970s. In 1967, the famous cruise liner

Queen Mary was permanently moored in Long Beach, California. At the time, it contained about 800,000 gallons of oily waste water in its bilge. Contractors used bioremediation techniques to break down the hydrocarbons in the bilge water, and the owners received approval to discharge the bilge tanks after six weeks of treatment.[60] Other field experiments and trial applications over the course of the next 20 years included efforts to improve the quality of underground water sources and contaminated soils by applying biotechnology.

The *Exxon Valdez* oil spill was hardly the best time to embark on a broad program of research and development of oil spill response technology. However, a targeted program for a specific technique or product was possible.

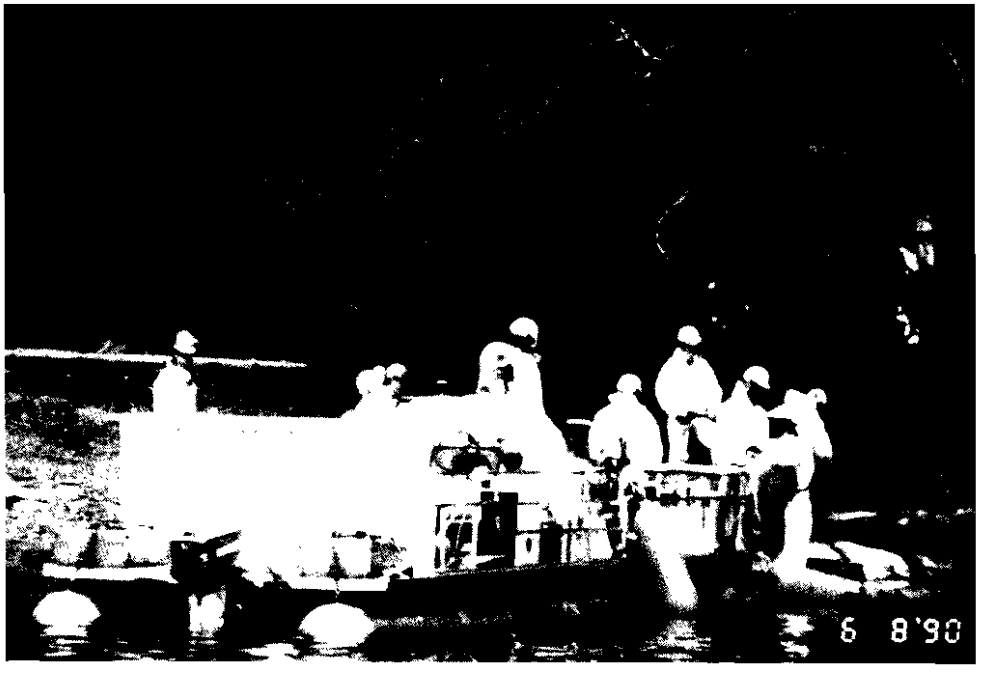
Most of these early efforts had one major thing in common: The work was done largely within the confines of a closed or controlled system. Under those kinds of conditions, a scientist or contractor or engineer could tinker with the variables that optimize the effectiveness of the treatment. Controlling temperature, nutrient levels, and other physical factors can have a tremendous effect on the results.

The *Exxon Valdez* oil spill was a very different matter. Prince William Sound was anything but a controlled system. It was a wild, remote marine environment subject to extreme weather, big seas, 10-foot tidal changes four times a day, and seasonal swings in solar energy, temperature, and nutrient availability. The Alaska Bioremediation Project, as EPA called it, was an unprecedented exercise in applied biotechnological research, even if judged on nothing more than the area that was treated and the amount of fertilizer that was applied.

As noted before, the *Exxon Valdez* oil spill was hardly the best time to embark on a broad program of research and development of oil spill response technology. However, a targeted program for a specific technique or product was possible.

At the EPA's urging, and with funding from Exxon under a special technology development agreement, bioremediation became the focus of the effort.

There is nothing magic about bioremediation, especially in the form it took during the *Exxon Valdez*. Crude oil was a good candidate for bioremediation, primarily because of its chemistry. In terms of volume, about a third of the oil is made up of light, volatile gasses that evaporate fairly quickly; the middle third (or more, in some crudes) is made up hydrocarbons that can be broken down relatively easily by natural forces, and the last third or so is made up of compounds that are more resistant to quick degradation: waxes, asphalts, and so on.



Bioremediation took the form of applying to oiled shorelines fertilizers which added nitrogen and phosphorous, which stimulated the already good population of oil-eating bacteria in Prince William Sound. The compounds were brought in by boat.

Photo by Mike Ebel

Chemically, the oil breaks down naturally for several major reasons. Exposure to sunlight and air causes some degradation, and some is the result of microbial activity. The microbes don't actually "eat" the oil; the image of bugs chewing up chains of molecules and spitting out the leftovers is not quite right. It is more like they make the chains "rust out." The microbes use carbon in various biochemical ways; as they pull carbon out of the chains of molecules that make up the different parts of the oil, the chains fall apart. They break down into their basic elements. So the theory behind bioremediation of crude oil is simple: If you put more microbes to work on this process,

you will get faster degradation.[61]

To test this theory, EPA put up about $5 million, Exxon committed additional funding, and the state threw its staff and support into a high-speed research project.

The project could take one of two basic approaches: a) inoculation, in which vast numbers of oil-degrading bacteria would be introduced into the ecosystem, or b) enhancement, in which the existing microbial population would be boosted by the addition of various nutrients.

The process was neither well-explained nor well-understood, particularly by the public, and particularly at the outset. Most people envisioned a kind of biological warfare, in which new, engineered bacteria would be unleashed on the environment. To the public, this conjured up the image of the Mutant Microbe That Ate Prince William Sound, as out-of-control bacteria overwhelmed an already-stressed environment. Even as late in the spill response as the spring of 1991, a national news reporter would describe the bioremediation effort as a process of spraying millions of oil-eating microbes on the shores of Prince William Sound.[62]

That was not really what was proposed in 1989. Although EPA considered inoculation, researchers rejected the idea primarily because Prince William Sound already seemed to have a good population of oil-eating bacteria. Not all kinds of bacteria are hydrocarbon degraders, but it turned out that Prince William Sound had the right bugs — about five percent of the basic microbial population.[63] This relatively high level of degraders in the "unfertilized" population was there, researchers think, because of natural drips of turpentine-like hydrocarbons coming from the spruce-hemlock evergreen forest of the Sound. It was a fairly good scientific bet that the increase in available carbon — the spilled oil — would cause a jump in the hydrocarbon-degrader population in the area anyway. But if the overall population of bacteria could be multiplied exponentially, then the modest, natural increase in oil-degraders could be turned into a population boom. The EPA-DEC-Exxon project would not use artificial means to put more oil degraders into the existing population. Instead, crews would simply boost the overall bacterial population; five percent of a billion bacteria is much more than five percent of a million.

The alternatives, beyond hot water washing, were limited. The oiling, even after washing, was substantial. Frustration was high, and expectations were low. Suddenly, it appeared someone had found the answer to the problem.

The best way to stimulate microbial growth was to add nitrogen and phosphorus to the available nutrient mix; the best way to put nitrogen and phosphorus out there was to spread fertilizer. The research team narrowed the choices down to Inipol EAP22, a French-manufactured liquid fertilizer, and several kinds of slow-release pellets or briquettes. On July 31, 1989, Exxon began applying fertilizers to oiled beaches at Green Island. By the end of the cleanup season, somewhere between 74 and 110 miles of shoreline had been sprayed or peppered with fertilizers.[64]

The three months from conception to widespread approval and application for a new oil spill cleanup technique was extremely brief — especially one that introduced chemicals and massive doses of additional nutrients to an open environment. EPA started scouting for field test sites in May and conducted lab tests in June. It started a 90-day field test at Snug Harbor, Knight Island, on June 8 — but approval for widespread use of fertilizers came barely halfway through the test to determine whether fertilizers worked.

In fact, when both the state and federal government gave tentative approval to the use of fertilizers, the program stood on a few lab tests, thin field test data, and literature searches that gave only limited evidence about whether the fertilizers were toxic. There was virtually no broader ecological analysis about what the addition of all those nutrients might do. There had been no public hearings and no real opportunities for independent scientific review of the data. On the day Exxon submitted its proposal for area-wide use, there were not even any accepted guidelines for application.

This was an unusual process for approval, to be sure, but the state and federal governments were operating in interesting times. The alternatives, beyond hot water washing, were limited. The oiling, even after washing, was substantial. Frustration was high, and expectations were low. Suddenly, it appeared someone had found the answer to the problem.

In July, after a month or so of treatment at Snug Harbor, the EPA project leaders produced what has become known as the "postage stamp" photo, an aerial shot of a clean rectangle stamped on a black background of oiled beach. While EPA could not conclusively prove that this "striking disappearance" of the oil from the rocks was due to bioremediation, they found 30 to 100 times more microorganisms on the treated plots than on the unfertilized plots.[65]

A second field test was conducted in July at Passage Cove. On July 25, following application of Inipol, EPA toxicologists collected water samples and brought them back to the lab. There, they ran standard acute toxicity tests on several kinds of marine animal larvae (a stage of development at which one would expect animals to be most sensitive to pollution). The preliminary results from the toxicity tests suggested that Inipol could be harmful to small marine animals, but it could be mixed in weaker solutions. So, the conclusion was not that Inipol was "safe," in the broad sense of the word; the conclusion was that one could apply the chemical in solutions weak enough to both accelerate degradation and minimize harm to marine life. In addition, the EPA data suggested the risk to animals would disappear fairly shortly after application — perhaps a day or two. The relative risk was high immediately after application, but dropped off steeply after that.

What decision-makers had, therefore, was another incarnation of the same basic cleanup balancing act: Most methods (including leaving the oil alone) had risks that accompanied the benefits. How badly one wanted or needed results drove one's judgment about how much risk was acceptable.

State and federal scientists on a joint research and development team sat down with Exxon to come up with guidelines for a large-scale field trial of bioremediation. The group decided that fertilizers should be applied only to certain kinds of shorelines, primarily those where beach hydraulics and tidal flush provided a good opportunity for the runoff to be diluted.

The momentum behind bioremediation grew considerably after the 1989 trial application. By January, even without complete reports on 1989 activities, the Coast Guard and NOAA were banking on bioremediation, as was Exxon.

They also made some practical decisions about application methods. The sprinkler system used at Snug Harbor appeared to deliver the best results; the slow, steady, light wetting of the surface by the sprinkler allowed a slow and steady release of nutrients from the solid fertilizers. The group decided, however, that this was impractical on a large scale. They settled on two basic methods. The first was application of Inipol using backpack tanks and spray wands; the second was spreading of Customblen pellets using the kind of hand-held whirler used to spread fertilizer on suburban lawns. These methods would be refined over time, but they stayed basically the same.

The next step was to train supervisors to make sure the Customblen was properly weighed and measured, that Inipol solution was properly mixed and maintained, and that workers knew what they were doing and were properly protected. The Customblen didn't present much of a problem, since the pellets could be easily weighed and workers simply needed to spread the stuff evenly within a specified area (essentially "x" pounds of Customblen over "y" square feet of shoreline). Worker safety was primarily a matter of keeping the pellets from direct contact with the skin, since Customblen, like most garden fertilizers, irritates the skin and can cause a fertilizer "burn."

The Inipol was more of a problem. The solution included more than just a nitrogen- and phosphorus-based fertilizer, because there was more to bioremediation than simply delivering more bugs to the work site. The foundation of the process was the increase in the microbial population, but the additional components of the Inipol were needed to keep the microbes on the oil.[66] These additional components included butoxyethanol, which when fresh can be harmful to both marine life and humans. The butoxyethanol evaporated relatively quickly (within about 24 hours), but it was important to keep wildlife away from it during that period. Workers had to avoid breathing or absorbing the fumes through the skin.

The solution also included the surfactant laurel phosphate, sort of a detergent, that tended to produce a dispersant-like effect if the Inipol were sprayed too heavily or mixed too "rich." When workers applied the Inipol improperly, it would actually wash

oil off the rocks. A telltale sign of this mistake would be clean streaks striping down an otherwise oily rock. During the 1989 trial application program, some poorly trained work crews didn't understand how and why bioremediation was supposed to work, treating the Inipol as a beach cleaner instead of an additive.

Inipol also had to be kept flowing at the right level of viscosity. In the cool climate of Prince William Sound, left to itself the Inipol would get thick. It had to be heated gently and its temperature and mix maintained.

The R&D committee considered these scientific and operational questions, and put the proposal before the Interagency Shoreline Cleanup Committee, the interagency review group that included fishing and conservation public interest groups. The ISCC approved the guidelines, as did the Regional Response Team. Exxon received formal authorization from the Coast Guard to proceed on August 1, although Coast Guard officials had already told Exxon the federal on-scene coordinator would approve bioremediation as quickly as possible.[67]

It is important to note that no one had confirmed that bioremediation was effective on the rocky shorelines of Prince William Sound. Both the state and the federal government expressed their intention to revisit the bioremediation issue in 1990. A decision to put fertilizers "in the toolbox" (to use the response vernacular) would be based on whether the 1989 trial program produced data that supported the hypothesis that fertilizers were both safe and effective. The burden of proof — and the responsibility for collecting the necessary data — would be on Exxon.[68] EPA would also be involved to a large degree, since more complete analysis of the Snug Harbor and Passage Cove studies during the 1989 season would be available over the winter of 1989-90.

However, the momentum behind bioremediation grew considerably after the 1989 trial application. By January, even without complete reports on 1989 activities, the Coast Guard and NOAA were banking on bioremediation, as was Exxon. The materials prepared by all these organizations for the principal winter planning meeting in February, 1990, made strong claims about the effectiveness of bioremediation (Exxon and EPA), dismissed most concerns about the possibility of any adverse ecological effects (Exxon and EPA), or identified bioremediation as the best treatment option because of it was assumed to cause little disruption to shorelines (NOAA).

It was clear that the state and general public had a different understanding than the federal government and Exxon about the status of bioremediation as an approved cleanup technique for widespread use in Prince William Sound.

Exxon's researchers claimed, based on their laboratory studies, that Inipol worked not only on surface oiling, but also on subsurface oiling as deep as one foot into the beach.[69] NOAA recommended that bioremediation be a "primary option" for treatment, especially in sheltered areas that could suffer the most ecological disruption from "overly aggressive" cleanup.[70] Hap Pritchard, one of EPA's lead researchers on the project, concluded from the 1989 field tests that there was only one reason to explain the differences between test plots and (unfertilized) control plots, and the reason was that the added nutrients enhanced degradation.[71] Shortly thereafter, Pritchard and a colleague, Chuck Costa, began a speaking tour of the major communities in the spill area. They expressed their enthusiasm about the 1989 tests and advocated for use of bioremediation in the coming season.

It was clear that the state and general public had a different understanding than the federal government and Exxon about the status of bioremediation as an approved cleanup technique for widespread use in Prince William Sound. The state expected both Exxon and the EPA to produce for review — not only for principal agencies, but also for the Regional Response Team and the public — completed reports on effectiveness and toxicity. At the time that EPA's Pritchard was calling bioremediation "the only reasonable response technique" for the 1990 season,[72] DEC had not received the information it had requested.

This presented a significant communications problem. The public was being presented with bioremediation as a *fait accompli* for 1990, a primary treatment that would be used throughout the spill area. However, DEC insisted that the issue had not yet been resolved. Members of the public, including commercial fishing groups, Alaska Native landowners and subsistence users, local governments, and conservation groups, were confused. Some were outright skeptical. It appeared to them that a decision had

been made with no more information than before, and no consultation with affected resource users.

State agencies became concerned that the bioremediation bandwagon was rolling forward without stopping to properly consider the problems and the questions from 1989.

The state and public concerns about bioremediation could be separated into three categories: procedural problems regarding the approval process, differences in approach to the cleanup, and gaps in the scientific knowledge about bioremediation.

"Whereas NOAA identified bioremediative treatment as a primary option for the 1990 cleanup, the state considers bioremediation as only one option that may be useful and that treatment decisions will have to be made on a site-specific basis," state on-scene coordinator Steve Provant wrote to his federal counterpart on Feb. 15. "NOAA's recommendations should acknowledge that land owners, land managers, resource managers and user groups, including state and federal agencies, do play a legitimate role in making site-specific assessments and decisions on the treatment methods."[73]

The state and public concerns about bioremediation could be separated into three categories: procedural problems regarding the approval process, differences in approach to the cleanup, and gaps in the scientific knowledge about bioremediation.

The state still expected the bioremediation question to come before two important committees: a) the Interagency Shoreline Cleanup Committee, which had reviewed and approved the previous year's bioremediation program, and b) the Alaska Regional Response Team (RRT), which, under the National Contingency Plan, had to be consulted about the use of new technologies by the federal on-scene coordinator. It should also be noted that in the RRT, the state had critical authority regarding the approval and use of chemical cleaners such as dispersants or Inipol, the fertilizer. As plans for the 1990 cleanup season unfolded, the state was concerned that the federal government was, by design or by misunderstanding, going around two critical groups of resource users and owners.

NOAA's recommendation that bioremediation be a "primary treatment" had more to do with the agency's basic approach to cleanup than with any specific claims about the effectiveness of the fertilizers. The agency generally favored a strategy of leaving stranded oil to weather naturally (with some exceptions), but if various parties preferred to go ahead and actively treat a site, the relatively light touch of bioremediation was best. NOAA's 1990 cleanup recommendation specified that fertilizer treatment should cease if it turned out that the boost from fertilizers was no better, or only marginally better, than natural rates of degradation.

This was another example of a basic difference between state and federal responders: Based on its priorities, NOAA felt it acceptable to leave more stranded oil than did the state, based on its priorities.[74]

"It is apparent from this recommendation that NOAA does not support actual oil recovery . . . but instead recommends that oil be merely exposed to microbial degradation or the effects of future storms," the state Fish and Game department wrote in its comments on the NOAA plan. "The state should clearly object to this proposal on the basis that significant quantities of oil still remain, and treatment should continue if technologies exist to allow further recovery without undue harm to the environment."[75]

This position is one of the first hints of what would become a major cleanup disagreement over bioremediation in 1990. The state would insist that bioremediation was a finishing step, the last treatment after all other efforts to *remove* the oil had been exhausted, either because the technology was played out or the removal was becoming too disruptive. By establishing bioremediation as the "primary" treatment throughout the spill area, the spill responders would miss an opportunity to get the pollution out of the environment altogether, the state felt. The state resource agencies agreed unanimously that agreeing to this federal policy would mean agreeing to do less than state regulations required.

As a technical and scientific matter, there were still large gaps in what was known about bioremediation, and major questions that had not been addressed. Both Exxon and EPA said repeatedly that no adverse ecological effects had been "observed," but visual observation was not the same thing as scientific inquiry. Fish and Game noted that the existing data did not even begin to address questions about long-term effects

of dumping thousands of gallons of liquid fertilizer and thousands of pounds of solid fertilizer into the Prince William Sound ecosystem.

Finally, the federal government was assuming approval of bioremediation without considering a detailed set of operational and wildlife protection guidelines. NOAA and Exxon were offering up fertilizers as the treatment of choice, but they hadn't demonstrated that they could get the fertilizers to the oil. The public, particularly commercial fishing groups, were especially concerned about what they considered a high-speed rush to use fertilizers.

Kelso laid out the state's position. No, Alaska did not object to bioremediation; the state merely needed all the available information, it needed time to review it, and it needed to include key public interest groups in the decision.

The state didn't oppose bioremediation, but it certainly favored a more cautious approach. State officials also felt that any major policy choice, such as this one, had to include the fishing groups and subsistence users of the spill area.

Federal officials appeared to construe the state's caution as potential obstruction or opposition. On March 23, Coast Guard Commandant Admiral Paul Yost met with Governor Steve Cowper to press for state approval of both bioremediation and Corexit. Cowper said the state would make its decision by May 1, in time to make plans for the 1990 cleanup.[76]

Misunderstandings had risen to such a level that on March 30, 1990, state and federal officials called a kind of summit meeting in Anchorage to discuss bioremediation policy. The meeting included some of the highest-ranking public officials working on the spill: DEC Commissioner Kelso, Deputy Federal On-scene Coordinator Captain Dave Zawadski, and Dr. John Skinner, deputy assistant EPA administrator. Also present was Jack Lamb, a leader of the Cordova fishermen's union.

Kelso laid out the state's position. No, Alaska did not object to bioremediation; the state merely needed all the available information, it needed time to review it, and it needed to include key public interest groups in the decision.

EPA agreed to provide all its toxicity testing information in time for the state to meet its May 1 decision deadline; one of the most important toxicity analyses was then in progress. Exxon agreed to provide the state with all its study papers; several were not complete at that time. The most important study concerned effectiveness of bioremediation on subsurface oil — a critical piece of the puzzle, since Exxon and the Coast Guard were, at that time, widely assuming that bioremediation would be the treatment of choice for subsurface oiling.[77]

Kelso said that based on what the state knew at that point, he was assuming bioremediation would be in the toolbox for 1990. However, he added, the state would require better operational guidelines — before application started — and it would also require a scientific monitoring program.

During April, DEC, working with the University of Alaska Fairbanks, convened a group of independent reviewers to look at the available information on the Alaska bioremediation project. The reviewers generally felt that the technique was still worth pursuing, and that it could probably go ahead safely with good operational and monitoring controls.

On April 26, Governor Cowper gave the go-ahead for state approval of bioremediation for 1990, but the decision was contingent on the development of the monitoring and operational guidelines DEC had suggested. After six weeks, he said, the state would reassess both the performance of the application teams and any new scientific information that had become available. The state felt this approach balanced the need for new approaches to dealing with the stubborn oiling conditions with the need to assure the public that the product was safe.

At the end of the six-week "conditional" application program, DEC gave approval to continue applications on July 20, 1990. However, the DEC approval was largely a formality, as fertilizers had become a common and accepted part of the treatment program. Bioremediation would, however, remain controversial.

Throughout the 1990 season, state monitors clashed repeatedly with the Coast Guard and Exxon over the issue of when a shoreline was ready for fertilizers. The rule was that bioremediation was primarily a finishing technique, to be applied when conventional removal efforts were complete; the work orders from the federal on-scene

coordinator usually followed that general rule. However, in the field, monitors battled with each other's somewhat subjective assessment of when conventional removal was "complete." This on-going struggle led to higher-level consultations and an aborted effort by the DEC to set a standard that was more scientific and less subjective. The state eventually found a way around this problem, and there were few conflicts about fertilizers in 1991.

But for all the assurances that bioremediation caused no adverse ecological effects, and for all the claims that fertilizers had worked in 1989 and would work on subsurface oil in 1990, both the state and federal governments gave their approvals based on very limited scientific data. It was not until the winter of 1990-91 — nearly two years into the project — that the governments began to assemble more convincing scientific justifications for actions they had already taken.

Fish and Game continued to take a conservative approach to bioremediation near criticol habitat and set up buffer zanes around streams. Treatment could generally be timed to coincide with the narrow windows of time when fish and fry weren't coming or going.

As time went by and more scientific monitoring was done, the toxicity question would be answered fairly definitively. Dr. James Clark of EPA concluded, based on his field tests, that the acute toxicity of the fertilizers (Inipol, particularly) was limited, and that the pulses of ammonia released by the fertilizers, and mixed in the nearshore waters, were well within established EPA water quality standards. Clark's conclusions were backed up by independent reviewers hired by DEC in 1990-91.[78]

However, the state Fish and Game Department still favored a cautious approach to using bioremediation in and around salmon streams, and other fisheries habitat. The toxicity tests and literature search done by Clark gave a general picture of the problems one might expect, however, they did not (and could not, really) draw an accurate picture of how bioremediation might affect eggs, fry, and so on at different critical times in the growth cycle. They also could not take into account the margin of error presented by variabilities in the training of crews, their efficiency and their accuracy during application. For these and other reasons, Fish and Game continued to take a conservative approach to bioremediation near critical habitat and set up buffer zones around streams. Treatment could generally be timed to coincide with the narrow windows of time when fish and fry weren't coming or going. The department preferred to use those windows to get rid of the oil by removing it, rather than simply spreading fertilizers.[79] Actual removal was, theoretically, the best choice, since it removed one potential toxicity problem (oil) and eliminated the possibility of a second one (Inipol and Customblen).

EPA's Science Advisory Board, in reviewing the data from the Alaska bioremediation project in June 1992, came to similar conclusions regarding environmental safety of the project:

"Given the site-specific conditions of this Alaskan ecosystem, the timing of the onset of bioremediation, the limited areas of application and the limited application rates, adequate field information was gathered to conclude that the bioremediation effort would not negatively impact the Prince William Sound ecosystem."[80]

The next question is, of course: Did the stuff work?

The answer is probably yes, based on the assembled science. There is not widespread agreement, however, on whether it worked everywhere equally, whether it worked equally as well from year to year, and whether the rate of degradation achieved through the use of fertilizers was significantly higher than the natural rate of degradation.

First, let's deal with the general question of whether fertilizers worked, the definition of "worked" being determined by whether the addition of fertilizers accelerated degradation beyond naturally-occurring levels.

Everyone agreed that putting fertilizers on a beach caused a population boom for the microbes who already lived on the beach. The University of Alaska Fairbanks scientists doing the microbiology work on the joint research project were satisfied that boosting the overall population also boosted the population of hydrocarbon degraders. So far, so good.

The next part of the analysis was considerably trickier: Now that you had all these microbes, did they attack and break down the oil, according to the hypothesis?

The most convincing answer to this question would lie in an analysis of the changes in the chemical composition of the oil. If one could show that over the same period of time, oil on an unfertilized beach showed less chemical change than oil on a fertilized beach, one might be able to link the change to the microbes.

This was not so easy to do, for several reasons. First, there was a lot of "noise" to deal with, in terms of collecting and analyzing data. This science was being conducted in the middle of a treatment zone, so while scientists tried to start their analysis using oiling conditions that were similar to each other, there was a certain unavoidable imprecision in making that call. Next, while work crews were supposed to stay away from the bioremediation study sites, it isn't certain that they stayed away completely, or that their treatment of one section of beach didn't stray too close to the study sites. And as a practical matter, the control sites and the study sites were close to each other.

The bottom line in this regard is that any analysis of chemical degradation had to assume that the chemical composition (and concentration of oil) in any given of set of samples might not have exactly the same baseline. This is not a fatal flaw by itself, since all scientific studies have to deal with some assumptions of variability. Scientists get around this by taking enough samples that, based on standard statistical formulas, they have neutralized or minimized the chances that one set of samples will throw the whole thing off.

The researchers generally acknowledged in their monitoring study that, given the variables on the shorelines, a statistically bomb-proof result would have required many, many more samples from the study and control sites. This was judged to be physically impractical, especially given the time constraints under which they were working. It is important to note here that the state-federal-Exxon study was not intended as a research project for publication in a professional journal, but rather as a tool to give reasonable guidance to responders working under time and emergency deadlines.

Next, the laboratory techniques for chemical analysis (primarily gas chromatography) could not pin down the changes in the particular hydrocarbon — hopane — that would be the best "marker" of any true chemical changes.[81] Again, not a fatal flaw, since there are other hydrocarbons that can give reasonable indications of what might have been going on.

Researchers in the joint study, as well as the EPA Snug Harbor and Passage Cove studies, looked at other chemical hints that increased degradation might be taking place.[82] For example, they measured the levels of "by-products" of degradation — such as carbon dioxide — and compared results from test and control sites.

The most optimistic supporters of bioremediation on the *Exxon Valdez* response say the fertilizers speeded up the process at least three-to-five times over naturally-occurring levels. The lower-end estimates put the rate at one-to-two times faster.

As time and analysis went on, scientists added up all the different hints from all the different studies and concluded there was a pretty good chance that fertilizers made more microbes and more microbes meant faster breakdown of the oil. Policymakers looked at this information at various stages and, given the fact there weren't a lot of other available options, gave the go-ahead for the program.

The most optimistic supporters of bioremediation on the *Exxon Valdez* response say the fertilizers speeded up the process at least three-to-five times over naturally-occurring levels.[83] The lower-end estimates put the rate at one-to-two times faster.[84] And some reviewers looked at the DEC-EPA-Exxon study and said they could find no statistically significant difference between the data collected at fertilized and unfertilized beaches.[85]

An additional, extremely important question from an operational perspective was whether the rate was constant over time. Microbes take the path of least resistance, so to speak; they work first on those hydrocarbon fractions that are most amenable to degradation. As the chemical composition of the weathered oil begins to be dominated by waxes and asphalts, it is more resistant to degradation. That is not to say that it won't eventually break down. However, it is a reasonable hypothesis that since all fractions of the hydrocarbons do not biodegrade at an equal rate (pretty easy to prove, since the ratio of asphalts to total mass is higher in old, weathered oil than in fresh crude), one should not expect bioremediation of old asphalts to go as quickly as

bioremediation of oil with more medium-weight residues.

The testing and research done on bioremediation should not be viewed as a quest to find the silver bullet for oil spills. If judged by that criterion, it fails. What we found is that bioremediation is a realistic option under certain conditions, and within certain windows of chemical opportunity. It has the best chance to give the best results under controlled circumstances, and on hydrocarbons in their fresher states. Interestingly, the research in Alaska also showed that at least in Prince William Sound, natural degradation rates could be higher than we ever suspected, thanks to the relatively large population of resident hydrocarbon-degraders.[86]

The rush to bioremediation in Alaska was a function of the size of the problem and limited availability of options. The EPA, the Coast Guard, and Exxon tended to overstate the results and benefits of bioremediation from time to time. Yet as time passes and reviewers sit back for less hurried analysis of the situation, a more conservative view of the project is taking shape.

The EPA's Scientific Advisory Board, a group of independent scientists from universities and laboratories around the country, takes a view of the Alaska Bioremediation Project that is roughly consistent with that of the state.

The board points out that the project produced a great deal of new knowledge, and provided some confirmation that bioremediation can work. However, the board cited in its report many of the same gaps identified by the state. Specifically, the review board noted the problems in gathering data during the emergency response, the variability of sites and oiling conditions, and the ability to draw firm and broad conclusions.

"A large amount of useful data was collected by the Alaska Oil Spill Bioremediation Project," the reviewers wrote in 1992. "If these data are to be used to their fullest extent, rigorous interpretation is essential. Only in some of the field studies was convincing evidence of bioremediation obtained, yet many of the summaries and conclusions read the same."[87]

The Science Advisory Board concluded, however, that at least two of the four EPA Alaska studies proved that bioremediation worked to some degree. The board noted that it is difficult to pin down actual rates of degradation because the condition of the oil varied from site to site at the beginning of treatment. In addition, it was weathering all the while, and not necessarily at a rate equal among all sites. The EPA review is a cautious endorsement of the potential for bioremediation to work in marine oil spill shoreline cleanup. However, the results of the study do not necessarily prove that adding fertilizers to oiled shorelines speeded up the cleanup.

"The conclusion that bioremediation reduced cleanup time must be qualified in view of the high variability in oil chemistry at the sites, the fact that some beaches were prewashed and the fact that the oil was continuously aging and weathering during the bioremediation period. Moreover, the specific estimates of cleanup time in this report have considerable statistical uncertainty. Quantification of the effect of bioremediation is difficult because of the limited number of sites that received different treatments and the fact that the sites had different geological characteristics."[88]

The board further speculated that bioremediation has, perhaps, more promise as a treatment for subsurface oiling than for surface oiling conditions.

What all this means is that bioremediation was the subject of intense debate, some study, and probably yielded some results at some sites. It did not turn out to be the silver bullet that many hoped it would be.

[1] *The State of Alaska, through DEC, has been one of the principal participants on an EPA-sponsored task force designed to develop a national strategy for testing and approving a class of oil spill response products falling under the loose heading of "bioremediation." See p. 73, this chapter, for a more complete discussion of this technique and its possible future application.*

[2] *Governor Steve Cowper, Testimony before the U.S. Senate Subcommittee on Environmental Protection, Washington, D.C., April 19, 1989.*

[3] *Alaska Oil Spill Commission, "Spill: The Wreck of the Exxon Valdez," January 1990, p. 56.*

[4] *The Alaska Oil Spill Commission recommended in its report that a state research center be established within the University of Alaska system.*

[5] *Alaska Oil Spill Commission report, p. 5.*

[6] *National Response Team report, The Exxon Valdez Oil Spill: A Report to the President, May 1989, pp. 8-9.*

[7] *Mousse is an emulsion of oil and water, the general consistency and color of its chocolate namesake.*

[8] *Noerager, J.A., and Goodman, R.H., "Oil Tracking, Containment, and Recovery During the Exxon Valdez Response," Proceedings of the 1991 International Oil Spill Conference, at pp. 193-203.*

[9] *Hull, R., Northwest EnviroService Inc., Final report, December 1990, p. 25*

[10] *Bayliss, R., Janssen, J.H., Kegler, A., Kendziorek, M., Lawn, D., and Gundlach, E., "Initial State of Alaska Response to the Exxon Valdez Oil Spill, Proceedings of the 1991 International Oil Spill Conference," pp. 321-323. (Hereafter this paper is referred to as "Bayliss and others.")*

[11] *Various state, Coast Guard and Exxon documents.*

[12] *The National Response Team report of May, 1989, relates as an example that a skimmer with a gear box problem had to be towed for 12 hours to Valdez, where it joined two other skimmers in the shop as mechanics worked all night to repair the vessels.*

[13] *Gardner, D., unpublished DEC internal report on cleanup operations, Exxon Valdez Oil Spill Response Center, 1991. Other DEC reports cite shorter waits for off-loading — sometimes five or six hours — but the problem, from most accounts, was endemic.*

[14] *There is widespread agreement among state and Exxon reports on the effectiveness of the Egmopol skimmer.*

[15] *Various state and Exxon estimates say that pom-poms, the shredded plastic absorbents that look like things cheerleaders use, absorbed anywhere from 5 to 20 times their weight in oil and mousse.*

[16] *The RRT is described in Section 1.1, p. 10 of this report.*

[17] *Estimates such as these are not precise, but when properly computed they can give a reasonably accurate figure. To arrive at a figure like this, one first does a series of calculations to determine the area covered by the slick, the thickness of the slick, and the volume of oil contained in the slick. These calculations are based on observation, sampling, and known characteristics of crude oil. Variables can include the freshness of the oil (a third of a fresh crude's volume can be made up by volatile gasses that evaporate quickly), the percentage of the slick that is watery emulsion, and any other physical factor that might affect the volume, area, or composition of the slick. From there, a simple multiplication exercise produces the estimate.*

[18] *National Research Council, "Using Oil Spill Dispersants on the Sea," National Academy Press, 1989, p. 4.*

[19] *ARCO Alaska's Bill Wade, quoted in the April 18 issue of The Anchorage Times.*

[20] *Lawrence Rawl, interviewed in the May 8, 1989 issue of Fortune magazine, pp. 50-51. The magazine appeared on newsstands on April 24-25.*

[21] *Manuel Lujan, interviewed in the April 26, 1989 issue of USA Today, p. 11A. All quotes above come from that article.*

[22] *Governor Steve Cowper letter to Lawrence Rawl, April 28, 1989.*

[23] *Lawrence Rawl letter to Governor Steve Cowper, April 28, 1989.*

[24] *National Research Council, Committee on Effectiveness of Oil Spill Dispersants, Using Oil Spill Dispersants on the Sea, (Washington, D.C: National Academy Press, 1989), p. 4. More detailed discussion of this issue at pp 81-164.*

[25] *Environment Canada, "Acute Lethal Toxicity of Prudhoe Bay Crude Oil and Corexit 9527 to Arctic Marine Fish and Invertebrates," Report EPS 4-EC-82-3.*

[26] *Hahn, B., memorandum to Commissioner Dennis Kelso, May 1, 1989.*

[27] *Lawn quoted in Bridgman, J., unpublished department draft of DEC response history, Feb. 1990.*

[28] *The figures on available dispersant come partly from the National Response Team report to The President in May 1989, and partly from DEC records. Federal and state records agree that no aircraft or equipment were available in Valdez.*

[29] *Hull, p. 24.*

[30] *Hull, p. 30*

[31] *"Valdez Oil Spill Technology: 1989 Operations," Exxon Production Research Company, 1990.*

[32] *Robinson, J., NOAA scientific support coordinator, to members of the Alaska Regional Response Team, July 21, 1989. Robinson wasn't alone. A number of other coastal biologists were expressing informally that they had concerns about it and were getting this infomation back to the State scientists.*

[33] *Juday, G, and Foster, N.., "A preliminary look at effects of the* Exxon Valdez *oil spill on Green Island Research Natural Area," Argoborealis, University of Alaska Fairbanks, vol. 22, pp. 10-17.*

[34] *Houghton, J., Lees, D., Driskell, W., and Mearns, A., "Impacts of the Exxon Valdez Spill and Subsequent Cleanup on Intertidal Biota — 1 Year Later," Proceedings of the 1991 International Oil Spill Conference, March 1991.*

[35] *Houghton, J., Lees, D., and Ebert, T., "Evaluation of the Condition of Intertidal and Shallow Subtidal Biota in Prince William Sound following the Exxon Valdez Oil Spill and Subsequent Shoreline Treatment," NOAA Report No. HMRB 91-1, March 1991.*

[36] *Anchorage Daily News, April 10, 1991, page B 2, also "Report: Spill cleanup method was harmful," Associated Press report, Anchorage Times, April 10, 1991, page A 10.*

[37] *Houghton, Lees, Ebert, p. ES-5.*

[38] *This is somewhat of a generalization. A lot of factors can affect recovery, such as the relative health of the shorelines before the spill, the amount of oil spilled, the wave and wind action, the weather, and so on. The point, however, is that the extant literature includes a number of reputable sources that suggest an oil spill is not necessarily the ecological equivalent of a nuclear explosion.*

[39] *Gardner, D., and others, "Review of field activities during the Exxon Valdez shoreline treatment operations." Unpublished DEC review, Spring 1992, p. 17. Gardner was the principal author, although all the monitors who worked from 1989 through 1991 provided field notes, observations, and general comments for the review.*

[40] *Gardner and others, p. 18.*

[41] *A massive state-federal coastal habitat damage assessment study ran into the same kinds of problems. In some cases, the researchers on this $19 million study cannot establish whether damage is from oil or oil and treatment together.*

[42] *The most reliable would be the individual field notes of DEC monitors and the Daily Shoreline Assessment reports they filled out.*

[43] *Kuwada, M., Alaska Dept. of Fish and Game Habitat Division, memorandum to Piper, E., Alaska Dept. of Environmental Conservation, Jan. 30, 1991. Kuwada provided his department's comments on a draft of the report reviewed by ADF&G biologists several months before NOAA released the report.*

[44] *Kuwada memorandum, Jan. 30, 1991.*

[45] *Hull, Northwest EnviroServices, p. 35.*

[46] *Testimony of William K. Stevens, Exxon USA president, before the U.S. Senate commerce committee's subcommittee on the environment.*

[47] *Viteri, A., DEC, memorandum to Provant, S., DEC on-scene coordinator, August 12, 1989. Also, Glasser, W. and Gangmark, C., EPA, memorandum to Vice Admiral Clyde Robbins, September 5, 1989.*

[48] *Glasser and Gangmark, ibid.*

[49] *Glasser and Gangmark, Ibid.*

[50] *Vice Admiral Clyde Robbins, letter to Otto Harrison, Exxon, Sept. 10, 1989. Robbins disagreed with the state and other federal agency conclusions that Exxon hadn't shown it could contain and pick up Corexit as it washed off the beach. The language in his letter is interesting because it hints at the way many of these decisions hinged on various thresholds. Robbins wrote that Corexit wasn't a good alternative because, "there are no further heavily oiled beaches in suitable locations" for using the chemical, and that he couldn't tell from the tests whether the chemical was really effective. In other words, under different circumstances — i.e., a more desperate situation of widespread heavy oiling — the uncertainties about Corexit might be outweighed by the magnitude of the problem.*

[51] *Admiral Paul Yost lobbied Governor Cowper in person and in a letter in April 1990. Rear Admiral Ciancaglini was quoted in the Anchorage Daily News, March 31, 1990, supporting use of Corexit, "Beaches May Get Excavated," page A 1.*

[52] *See DEC's June 14, 1990 summary of the issue and discussion of all relevant facets of the debate, signed by state on-scene coordinator Randy Bayliss.*

[53] *Kitagawa, J. memorandum to Kendziorek, M., July 16, 1990.*

[54] *Vincent, J., memorandum to Bauer, J., July 17, 1990.*

[55] *Exxon's position never changed. The company simply maintained that the chemical was safe, that it was effective, and that containment and recovery were not a problem.*

[56] *Robinson, J., memorandum to Vice Admiral Robbins, July 21, 1989.*

[57] *Uniform abbreviations such as this were used for mapping purposes by the participating response agencies. The lengths of beach segments varied but were generally several hundred yards long.*

[58] *For some reason, the accepted unit of measurement for "moderate" boulders was the standard office desk chair.*

[59] *This section looks at bioremediation primarily as it related to critical decisions about the cleanup. Many of the footnotes in this section give the reader some sources of more complete technical analysis of bioremediation.*

[60] *This is a second-hand citation from a federal report on bioremediation: U.S. Congress, Office of Technology Assessment, "Bioremediation for Marine Oil Spills — Back ground Paper," OTA-BP-O-70, Washington, D.C. 1991. p. 2. The original citation comes from Applied Biotreatment Association, "Case History Compendium," November 1989.*

[61] *This is a grossly simplified statement of the theory, but it suffices as a preliminary introduction to the idea.*

[62] *John Enders, Associated Press, in the Anchorage Times, May 15, 1991, page A 1.*

[63] *Dr. Ed Brown and Jon Lindstrom, University of Alaska Water Research Center, personal*

communication.

[64] *It is extremely hard to come up with an exact "number of miles" treated with fertilizers in 1989, primarily because different mapping and recording systems counted a "mile of beach" in different ways. DEC's number is 74, and probably comes closer to the actual distance covered than the Exxon and EPA number of 110 miles. In any case, it was a field trial of unprecedented proportions.*

[65] *EPA Fact Sheet, Alaska Bioremediation Project, July 6, 1989.*

[66] *A more technical description of this process would be "sequestering nutrients at the oil-water interface," but basically it means using various chemical processes to optimize the effectiveness of the microbes once their population has been stimulated. To use a crude metaphor, Inipol is designed not only to create more microbes, but to make sure they keep their food right in front of them.*

[67] *Letter, U.S. Coast Guard Captain Zawadski to Bob Mastracchio of Exxon, dated July 26, 1989.*

[68] *Vice Admiral Clyde Robbins, letter to Otto Harrision, August 1, 1989. See also Viteri, A., and Kitigawa, J., DEC, "The Development of Policy to Review and Approve Bioremediation Enhancement Methods, etc." June 1990.*

[69] *Exxon workshop materials, Newport Beach treatment workshop, February 1-2, 1990.*

[70] *NOAA, "Recommendation to the Federal On-Scene Coordinator for 1990 Cleanup of the Exxon Valdez Oil Spill" January 25, 1990, p. 9.*

[71] *ADF&G notes, Newport Beach meeting, February 1, 1990.*

[72] *Piper, E., memorandum to Governor Steve Cowper, April 26, 1990. Pritchard made this statement at a briefing for state personnel in mid-February at DEC's Anchorage spill response headquarters.*

[73] *S. Provant, DEC, letter to Rear Admiral D.E. Ciancaglini, Feb. 15, 1990.*

[74] *See section 1.4, pages 30-32 of this report for a better idea of the role of the Interagency Shoreline Cleanup Committee on the cleanup, and on the basic differences in cleanup philosophy between the state and federal governments.*

[75] *Kuwada, M., ADF&G, memorandum to Provant, S., DEC, January 29, 1990. This statement from Fish and game is a good example of the different interpretations of pollution cleanup requirements described in Chapter 1.*

[76] *Cowper did not make any commitments about Corexit. Also, Yost may have misunderstood the Governor's promise about bioremediation. On March 30, Yost wrote a letter to Cowper to recap the conversation between the two men. The Commandant thanked Cowper for agreeing to* authorize *bioremediation by May 1, as opposed to the Governor's actual promise to render a decision by that date.*

[77] *EPA did not deliver the toxicity analysis until May 1; by that time the state had gone ahead and made its decision without the promised information. Exxon did not deliver its third, and last, study paper on the topic until April 26, which was actually the day the issue came before Governor Cowper.*

[78] *Clark's basic conclusions were drawn from standard toxicity tests using water samples in the nearshore area of a bioremediation test site in 1989. His secondary conclusions were based largely on literature searches conducted over the winter of 1989-90. These analyses were not exhaustive, nor were they intended to examine the full range of broader ecological questions. However, for purposes of designing a controlled, conditional program of fertilizer use, state and federal officials felt they had enough information to reasonably make a decision. Dr. Judith Capuzzo of Woods Hole Oceanographic Institute reviewed Clark's data (which appeared in a larger, joint EPA-Exxon-DEC study) and came to the same general conclusions. Capuzzo did her review at DEC's request.*

[79] *On those occasions when Fish and Game felt bioremediation was the best option available, they would sometimes allow fertilizers to be applied right up to stream banks, as long as the application occurred during one of the "open" windows for treatment.*

[80] *EPA Science Advisory Board, "Review of the Alaskan Bioremediation Oil Spill Project," Washington D.C., August 11, 1992.*

[81] *Exxon took the data back to the computer in 1992 and produced what company researchers feel is confirmation that the hopane ratio did change significantly at fertilized sites vs. unfertilized sites. But this information was unavailable at the earlier, critical decision points on bioremediation.*

[82] *Exxon also conducted some laboratory studies using various simulations of beach conditions, which lent some support to field data from other studies.*

[83] *Roger Prince of Exxon and Hap Pritchard of the EPA take this position. At times, each has hypothesized that the rate might have been even higher at certain sites, and under certain conditions.*

[84] *Brown and Lindstrom of UA-Fairbanks generally hold to a more conservative estimate than their colleagues at Exxon and EPA. A number of reviewers we consulted at a 1991 EPA symposium in Las Vegas leaned towards more conservative estimates, as well.*

[85] *Dr. Scott Kellogg of the University of Idaho and Dr. John Farrington of Woods Hole, whom DEC asked to review the study, came to somewhat similar conclusions in this regard. They were not asked, however, to review* all *available data and give DEC a recommendation about whether it was a good idea or bad idea to bioremediate. What we wanted from them was a realistic look at the single study, so that the state could keep its conclusions in perspective, and so that the joint study alone was not presented as definitive "proof" of certain rates of degradation.*

[86] *Lindstrom, of UA-Fairbanks, also suggested that the seasonal fluctuations of nutrient levels in the Sound might be a factor in deciding when to bioremediate. In the spring and early summer, when the flush of mountain snowmelt carries high concentrations of organic nutrients into the system, natural degradation rates might be very high. As an operational issue, that may mean it is an excellent time to bioremediate, or it may mean there's no need to bioremediate; it would depend on the oiling conditions and other factors. In the late summer and fall, when nutrients levels drop, fertilizers might provide an important boost, but one might not expect even a fertilizer-aided rate to be very high.*

[87] *U.S. EPA Science Advisory Board, "Review of the Alaskan Bioremediation Oil Spill Project," June 1992.*

[88] *Ibid., p. 3.*

Chapter 3: Cleanup, 1989-92

The T/V *Exxon Valdez* ran aground on Bligh Reef, about 25 miles from the Trans-Alaska Pipeline terminal at Valdez, on March 24, 1989, at 12:03 a.m. Eight of the 11 cargo tanks were ruptured and Alaska North Slope crude oil began gushing from the tanker into the waters of Prince William Sound. The state and federal governments estimate that 250,000 to 260,000 barrels of North Slope crude oil (11 million U.S. gallons) spilled from the tanker.

The state's response effort began with Dan Lawn, the Valdez District Office manager from the Alaska Department of Environmental Conservation (DEC). Lawn was notified of the spill by Alyeska at 1:05 a.m. He then spoke with the Coast Guard captain of the port, CMDR Steve McCall, and made arrangements to accompany the Coast Guard to the site of the grounding. Before setting off for the high-speed trip to the tanker in a Valdez pilot vessel, Lawn triggered (within state government) a chain reaction of notification that called up responders from Anchorage, Wasilla, and Juneau beginning about 4 a.m. Within 24-30 hours, DEC would have more than 30 people in Valdez setting up the aerial surveillance, general monitoring, computer mapping, and other programs that would function in one form or another for the better part of three years.

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Lawn would remain on the tanker for the next 15 hours, using the ship's satellite telephone to call Anchorage and Valdez with regular updates on the amount of oil lost and the stability of the vessel. He also made regular calls to the Alyeska terminal, asking when the equipment and responders required by the Alyeska contingency plan would arrive. Alyeska officials repeatedly assured Lawn that the gear was on the way, when in some cases it was not even loaded on barges or vessels.

Commissioner Dennis Kelso of the DEC got word of the spill about 6 a.m. from his deputy, Amy Kyle, who had been phoned at home by Anchorage DEC staff at approximately 4 a.m. Kyle and the department's environmental quality staff set up some preliminary plans and arranged a full briefing for the Governor and the commissioner at 8:30 a.m., as the magnitude of the spill began to become clear. Governor Steve Cowper had learned of the spill about an hour earlier, from a reporter who was conducting an early-morning interview with the Governor in his hometown of Fairbanks. At the close of the interview, the focus of which was completely unrelated to oil or the environment, the reporter asked Cowper his thoughts on the spill. When Cowper heard the details, he immediately began making arrangements to get to Valdez. After speaking with Cowper by phone from Juneau, Kelso caught a regularly scheduled flight from Juneau to Cordova, on the southeast rim of Prince William Sound. From there, a U.S. Coast Guard helicopter took him to Valdez, where he met the Governor. About 4 p.m., the Governor and Kelso flew by float plane to the *Exxon Valdez*. On board they met Lawn and DEC investigator Joe LeBeau, who pointed out that equipment was overdue, and that what was on-scene was not working very well.

Two skimmers — which were full at the time — were motoring somewhat aimlessly around the massive slick. There was little or no boom deployed, and what was in the water were tiny strings of boom that were neither containing nor deflecting any significant amount of crude. Cowper was incensed by what he would later call a slow and inadequate response. He was also aware of the possible use of dispersants. Kelso and Lawn gave him a quick briefing on the zones of use and the approval process, and Cowper gave no instructions that would alter or affect the preapproved strategy. He understood, correctly, that the system had been designed to make sure that chemical dispersants were used in a controlled and effective manner, and that critical habitats would not be put at risk by bad targeting or misuse of the chemicals.

Back in Valdez, after visiting the tanker, Cowper appeared at a community meeting and press conference at the Valdez civic center. Exxon's chief executive officer Frank Iarossi had spoken to the group earlier, noting that Exxon would be moving quickly to use dispersants on the growing slick. This made the public, especially the

fishing community, somewhat uncomfortable. The implication of Iarossi's statement was that dispersant use was the response of choice, and that Exxon was moving ahead to do it. This was at odds with the plans in place — which the fishing organizations had reviewed — and it implied that Exxon had some authority to take controversial and potentially risky steps to deal with the oil spill that threatened public health and public resources. Fishermen wanted some assurance that someone other than Exxon was at the switch, someone or some entity that was accountable to the public. They were not eager to hand over to a private company the authority to make critical decisions about public resources — resources that were literally the foundation of the area's economy. And from Iarossi's comments, it seemed the decision was all but made.

When Cowper stepped before the group, he was asked about Iarossi's statements. He replied, "There has been a lot of speculation on the use of dispersants. Everybody realized the risk that that poses to marine life . . . . I want to assure everybody that dispersant is not going to be used in anything other than a carefully targeted way. We want to make sure that we check back with the fishing community, that we check with the [Alaska Department of] Fish and Game, and do as little damage as possible. You can't use dispersants without doing damage to marine life. That's clear. But we want if possible to keep the oil off the beaches."[1]

Cowper had crystalized in his comments exactly the type of discussion the Alaska Regional Response Team and state agencies had gone through in developing the preapproval process for dispersants two weeks before the spill. He was merely assuring the people in the Valdez civic center that there was an established mechanism for making these public policy decisions, and that no one had unilateral authority to circumvent the process or change the rules.

At the time Iarossi made his comments, he was not familiar with the process[2] and was, perhaps, assuming more authority than Exxon actually had. Cowper's comments were not some new state policy; the Governor was, instead, letting people know that the government understood the risks and the benefits of dispersants, and that the protection of the fisheries and the local economy was among the government's central concerns.

Aside from the obvious priorities the first three or four days of the spill were dominoted by four principal issues:

- the inadequacy of the Alyeska response;
- the confusing and unauthorized "hand-off" of the spill by Alyeska to Exxon;
- the dispersant disagreement;
- the gross lack of cleanup resources.

Aside from the obvious priorities of public and environmental health and safety raised by the tanker disaster, the first three or four days of the spill were dominated by four principal issues:

a) the inadequacy of the Alyeska response;

b) the confusing and unauthorized "hand-off" of the spill by Alyeska to Exxon;

c) the dispersant disagreement;

d) the gross lack of cleanup resources.

Alyeska's response was slow and weak; it did not meet the requirements of the contingency plan. It is important to keep in mind that the contingency plan was not so much a set of requirements established by the government, but rather a set of response standards that Alyeska had agreed were reasonable and attainable.

The "hand-off" of response authority by Alyeska to Exxon caused confusion and delays. Exxon assumed for itself a role as chief responder, and comments made by Exxon officials sent a message to the public that the governments were not really in charge of making key decisions and protecting public resources and the public interest.

The dispersant issue was discussed in more detail in chapters one (The Oil Spill Response Organization) and two (Treatment Technology). From the standpoint of the progress of the response, Exxon's insistence on following its own preferred strategy — and its reluctance to concentrate on the strategy preferred by the government, even after the technical results of dispersant drops were inconclusive — compounded a botched response by Alyeska.

All of this, however, is tangential to the real issue, which was becoming increasingly clear to the Alaska public: No one was fully prepared to deal with a spill of this magnitude. There wasn't enough equipment, and technology did not provide deep

redundancy or a broad range of options. The mechanical capabilities were overwhelmed, and the chemical possibilities had severe limitations. Burning worked for a little while, but the window of opportunity closed quickly as the oil slick began to have a higher water content. The conditions were marginal for dispersants, regardless of the risks the chemicals presented.

The public was outraged. The fishing community, especially in Cordova, was suddenly and unexpectedly confronted with the fact that industry and government either didn't know or didn't fully explain the fragility of the safety net underneath the Trans-Alaska Oil Pipeline System and the tankers that cruised almost daily through Prince William Sound.

In any case, the weather put a quick end to the initial response. Late on Easter Sunday, March 26, a severe, late-winter storm was approaching the Sound. Between Sunday and early Monday morning, the wind blew gusts up to a maximum of 73 miles per hour (70 mph is considered "hurricane force"). Flight operations were seriously curtailed, although a National Oceanic and Atmopsheric Administration (NOAA) helicopter got into the air before noon Monday. Observers noted that the oil was no longer in a single, compact slick. Breakaway patches and thick windrows of oil and mousse hit shorelines in the vicinity of Smith, Seal and Naked islands. Oil stretched as far as 40 miles south-southwest of the grounding site. Skimmers and other response vessels had retreated into more sheltered areas, away from the oil, to wait out the weather.

By March 30, a week after the spill, various estimates of oil recovery hovered around 5,000 barrels (about two percent of what was spilled).

By afternoon, the winds had fallen somewhat, but were still high. Within Valdez Arm itself — more protected than the relatively open waters between Bligh Reef and the western islands of the Sound — northeast winds were running a steady 30 knots with gusts to 40; seas were four feet within the arm, higher and choppier and sloppier outside.[3] A few surveillance aircraft got into the air that afternoon. Later reports showed that oil and mousse were already on or near the shores of Eleanor and Knight islands.

If the spill was at first overwhelming, it was now out of control. Throughout the rest of March and most of April, various configurations of skimmers and boom and barges would attempt on-the-water cleanup, but actual recovery of oil was extremely low, compared with the size of the problem. By March 30, a week after the spill, various estimates of recovery hovered around 5,000 barrels (about two percent of what was spilled), and even that figure was somewhat misleading, considering that the total estimate of recovery included water and mousse, not just oil. NOAA estimated that an additional 75,000 - 100,000 barrels had probably evaporated, as the lightest fractions of the crude oil turned to gas and dispersed in the atmosphere.

After the Easter storm, the effectiveness of on-the-water recovery could really not be judged in a cumulative sense. Oil patches were spread widely throughout the western Sound and, as the weeks went by, to the Kenai Peninsula and the Kodiak archipelago. Recovery varied from site to site, and success could most realistically be judged against a specific threat to a specific resource or shoreline. As a whole, on-the-water recovery was hampered by weathering oil, long distances, equipment limitations, storage limitations, and spotting capability. By the first week of May, there was no real effort to contain and collect free-floating oil.

The agencies and responders turned to several major tasks: planning and coordination for shoreline cleanup; defensive booming, especially at the Prince William Sound hatcheries; and stabilizing the *Exxon Valdez* and getting the remaining one million barrels of oil off the ship.

3.1 The *Exxon Valdez*

Oil tankers are designed to be full. The stability, seaworthiness, and structural integrity are all based on the assumption that the vessel will be full (or partly so) with

oil or water most of the time. Storage tanks are designed such that the volume and weight of the fluid in the tanks is balanced among various sections of the vessel. The *Exxon Valdez*, hung up on a rock and spilling its guts rapidly into Prince William Sound, was more than a boat with some holes in it; it was an extremely unstable and unbalanced container exposed to abnormal stress and pressure within and without. It was also still full of about one million barrels of oil, and in danger of breaking up and spilling its entire cargo.

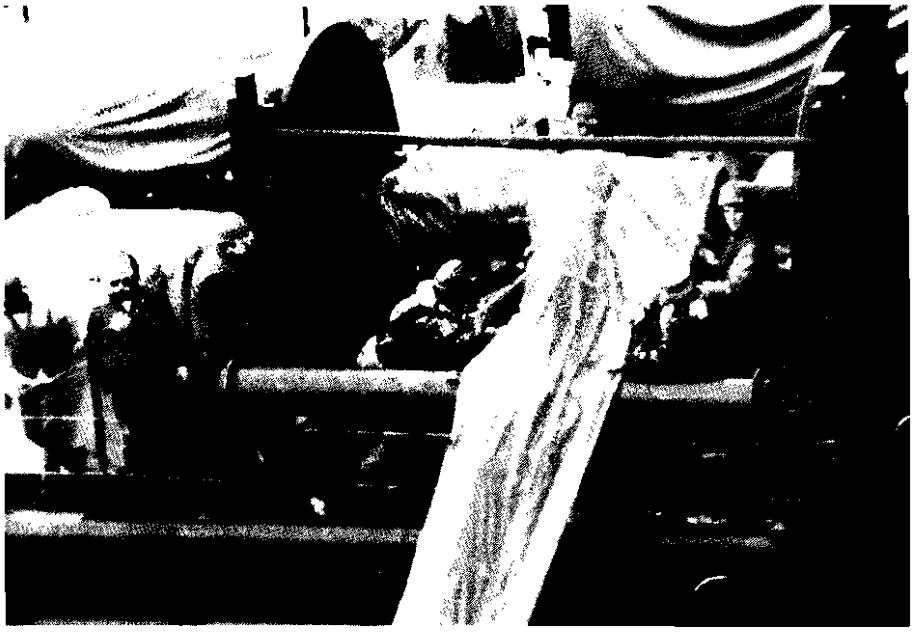
Within a few hours of the grounding, the Coast Guard and DEC authorized an inbound tanker, the Exxon Baton Rouge, to discharge its dirty ballast. The Baton Rouge then steamed for Bligh Reef and its sister ship, and by 9:45 p.m. on March 24 the ships were rafted up. Portable pumps, hoses, line reducers and other equipment were hooked up, and the lightering operation began. It was not a simple matter of pumping oil from one vessel to the next; it would be also a tricky process of maintaining the vessels' stability and balance as oil came off the Valdez and sea water came in.

The first lightering hoses were connected about midnight, and pumping began about 7:30 a.m. on Saturday, March 25. Lightering operations would continue for the next 11 days[4] and include three tankers: the Baton Rouge, the Exxon San Francisco, and the Exxon Baytown. Transfer rates varied from a few thousand to 12,000 gallons per hour. The Baton Rouge took off 460,000 barrels before leaving on March 30; the San Francisco received about 450,000; the Baytown took 120,000 barrels. About 20,000 barrels remained aboard the Valdez at the close of lightering operations April 4. The ship was refloated at high tide on April 5 and moved to an anchorage off Naked Island. The vessel was towed to drydock in San Diego beginning June 20.

Lightering and salvage of the crippled *Exxon Valdez* was one of the few success stories from the first month of the spill response.

3.2 The emergency order

The *Exxon Valdez* oil spill — and the problems with the response — threw into question the entire Valdez-based prevention and response system. Alyeska had shown that even with ideal weather, it could not meet the requirements of the state-approved contingency plan. While the port of Valdez was temporarily closed during the early days of the response, the limited holding capacity at the Valdez terminal meant that at some point — some point relatively soon after the spill — tankers would be again loading oil at Valdez and making the passage through Prince William Sound. The Coast Guard had imposed several emergency restrictions on traffic in and out of the port, but a longer-term and more comprehensive plan was obviously necessary. DEC moved quickly to come up with an order for emergency upgrades in the response capability and the prevention system at the Valdez terminal.



Boom that sits much deeper in the water than that on hand during the initial response to the *Exxon Valdez* spill is now part of Alyeska's response equipment. Alyeska and the 13 oil companies which ship oil from Valdez all have beefed up their reponse equipment, which is deployed in periodic spill drills. Photo by Rob Schoeffer

During the first week of April,

DEC staff began preparing a list of emergency requirements. The list would be presented in the form of an emergency order from DEC that also required a new contingency plan. DEC's director of environmental quality, Larry Dietrick, came up with the list and delivered it to Alyeska on April 7. Dietrick's list had the approval not only of the commissioner, but of the Governor as well.

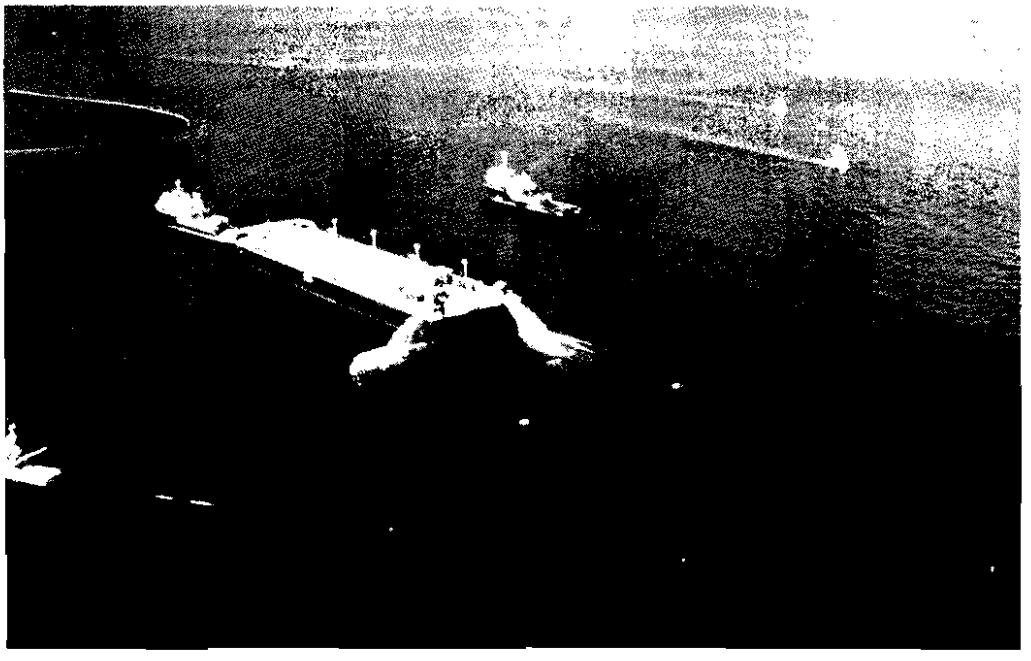
The emergency order requirements included:

- Alyeska had to do a complete inventory of "core" response equipment available *other than what was in use on the Exxon Valdez response.*
- The company must create a fulltime spill response team at the Alyeska terminal.[5]
- At the terminal, tankers were to be boomed immediately upon arrival, with boom inspection to be conducted every hour.
- Outgoing (i.e., loaded) tankers had to have two escort tugs from the terminal to Hinchinbrook Entrance, southeast of Cordova and the Copper River Delta.
- A marine pilot was required to be on the tanker or on the accompanying escort tug all the way to Hinchinbrook; until the *Exxon Valdez* groundings, pilots left the vessel soon after passing through Valdez Narrows and the village of Tatitlek.
- DEC specified a laundry list of new spill response equipment, along with several specific standards for recovering and lightering oil, and new deadlines for deployment of equipment from the Valdez area all the way to Hinchinbrook.
- Alyeska was also required to upgrade both its radio communication capabilities and the procedures for tracking radio messages.

The order included deadlines for compliance, and Governor Cowper said he was ready to shut down the pipeline if the oil companies did not follow through in good faith and in a timely manner.

Alyeska chose not to challenge the order. Instead, in a series of negotiation sessions and meetings with state officials, the government and Alyeska worked out mutually agreeable alternatives to some of the order's provisions. DEC agreed to give Alyeska more time to procure certain equipment, and worked on several solutions to communications problems. Alyeska also outlined a plan that went considerably further than the idea of escort tugs. The company instead committed to the purchase and outfitting of larger escort vessels, which included special dedicated response crews and equipment on board.

This, along with other changes due to the emergency order, became the foundation for Alyeska's upgraded response system and the implementation arm of the new contingency plan. Alyeska now operates the Ship Escort/Response Vessel System (SERVS). The 10-vessel SERVS fleet includes three, 210-foot tanker towing and oil recovery vessels; all outgoing tankers have a two-ship escort.



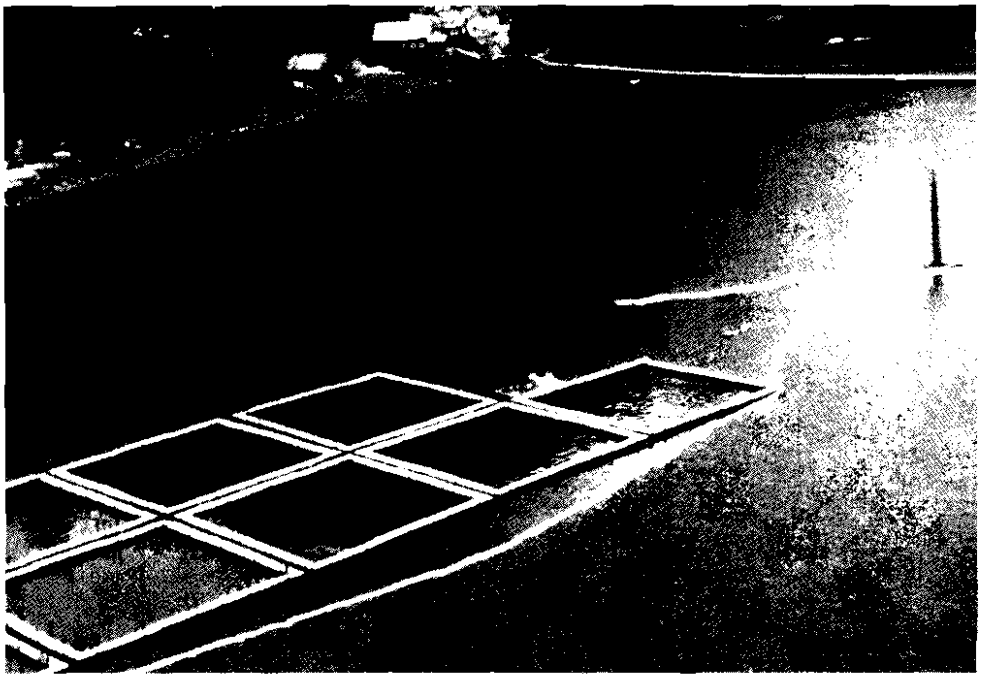
A barge for recovered oil trails two powerful skimmers, cradled by boom and support vessels during a Chevron test of new response equipment in Prince William Sound, March 1992. The equipment is part of Alyeska's new Ship Escort/Response Vessel System.

Photo by Patrick Endres

By Sunday, March 26, state officials had decided to expand the state's usual oversight role. Governor Cowper authorized DEC to do whatever was necessary, regardless of cost and regardless of legal strategy.[6] Frustrated by the size of the problem and the holes in the response, DEC began working with the local fishing fleet, primarily from Cordova, on a series of defensive measures and cleanup actions. The Cordova fleet had been trying, without success, to convince Alyeska to include the local vessels and skippers in the response. DEC Commissioner Kelso and environmental quality director Larry Dietrick made a point of including the fishing community in deliberations, discussions, and plans for action. At 10:30 a.m. Sunday, DEC informed the Coast Guard that the state was taking independent action.

The storm that scattered the spill on Sunday and Monday delayed the arrival of the Cordova seiners in Valdez. Upon arriving at the dock in Valdez, the vessels took on fuel and supplies, as well as DEC and contract staff. On Tuesday, March 28, the seiners headed for Disk Island; when they awoke on Wednesday at Disk, oil was already floating around them.

The principal task facing the Cordova fleet was protection of the handful of salmon hatcheries on the west side of the Sound, especially the Armin F. Koernig hatchery at Sawmill Bay, Evans Island, and the town of Chenega. Based on weather, currents, and information provided by the fishermen themselves, DEC estimated that the main body of the floating oil was three days away from Sawmill Bay. There was one DEC oil spill response veteran and an expert on contract , and they began stringing defenses with the help of Chenega residents, using some boom already at the hatchery.



Salmon-rearing pens at the Armin F. Koernig hatchery near the village of Chenega at Sawmill Bay on April 8, 1989. Photo by Erich Gundlach

The original plan called for deploying three strings of boom, 12,000-15,000 feet each, in layers from the entrance of the bay back towards shore and the hatchery. The group needed heavy duty boom, but all they would have for the first few days were various types of relatively light-duty containment and absorbent boom.

A second cluster of Cordova District Fishermen United (CDFU) seine vessels arrived at Sawmill Bay on March 29-30 and began to help string deflection boom. Flying weather was poor (either due to fog at Valdez or low weather in the Sound), which delayed the delivery of boom by helicopter. However, by midday on Thursday, March 30, Alaska Air National Guard helicopters began dropping absorbent and containment boom into the bay, the seiners and skiff operators picking it up and stockpiling or stringing it. While the first flights allowed the Sawmill Bay responders to begin building defensive lines, the material they had was not well suited to the task.

"The water, moving 7-8 knots or faster through here, is faster than the rated performance of the boom," DEC's field supervisor wrote on March 31. "So far we are

Bags of absorbent and containment boom were dropped into Sawmill Bay by Alaska Air National Guard helicopters. The material was picked up by seiner and skiff operators to be stockpiled or stockpiling or put to use. Photo by Geoffrey Orth ©

experimenting with multiple anchoring systems and radical boom angles. Continuing to use lighter duty boom for additional levels of protection between main containment boom and hatchery ...

"[The main containment boom] is really taking a beating where we have it in a deflection mode, and we are replacing several hundred feet of it per day. This boom is nearly ten years old and has spent much of its life stored on the North Slope, being used maybe once or twice a year for spill drills."[7]

The Cordova fishermen and DEC used various creative configurations of absorbent boom, pom-poms, and containment boom to build defensive lines whose strength was the sum of many improvised parts. Onshore, crews rigged cleaning and repair lines for the many hundreds of feet of damaged and soiled boom. On-the-water patrols improvised repairs and connections to the lines with whatever they could scrounge.

"Since we have many different types of boom (most of which have incompatible end connectors), Bryson [Twidwell, DEC], armed with a battery-powered drill and all the spare nuts and bolts from the hatchery and the village he could find, managed to connect the boom together."[8]

During the two weeks of intense operation at Sawmill Bay, most of the oil skimming was done by fishermen, contract workers, and DEC staff, who used simple tools such as five-gallon plastic buckets.

Meanwhile, back in Valdez, CDFU leaders and DEC officials realized that the Sawmill Bay defenders needed more logistical and vessel support. Several people suggested that the state send one of its ferries. In a 2 a.m. call to Alaska Department of Transportation commissioner Mark Hickey, DEC commissioner Kelso asked if he could "borrow" one of the state ferries. Hickey's immediate reply was simply, "Which one?"[9] Hickey arranged to divert the M/V Bartlett (which normally works the Valdez-Cordova-Whittier route) to Sawmill Bay; the ferry, which would be used primarily for repairs, supplies, housing and storage, arrived April 2. The Bartlett had fresh workers, fresh water, and supplies, including two dozen aluminum skiffs to augment the 16-skiff CDFU workboat fleet.

The Bartlett arrived the same day as the oil. Until April 2, most of the oil that had arrived had come in the form of tendrils or patches spun off the main body of the slick. That Sunday, a big tidal surge brought large slugs of oil and mousse to the brink of the defensive lines. Some oil got through, but most of it was deflected or contained by the booms.

Over the next few days, more vessels and equipment arrived at Sawmill Bay. A larger state ferry, the M/V Aurora, replaced the Bartlett; several large work and holding barges arrived, as well as the first of the "Supersucker" vacuum trucks from the North Slope oilfields. The vacuum trucks had been hauled by road from the slope to Valdez, then mounted on barges. The vacuum barges quickly became critical to the skimming and transfer operations at Sawmill Bay, sucking oil and mousse from

containment boom corrals and transferring it to barges for removal.

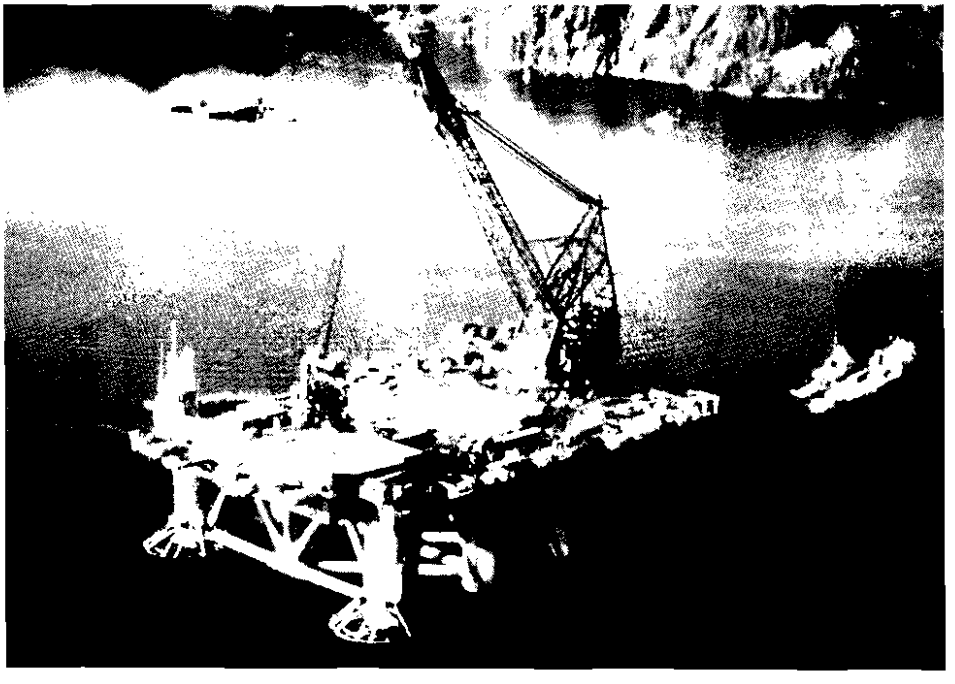
Yet during the two weeks of intense operation at Sawmill Bay most of the oil skimming was done by fishermen, contract workers, and DEC staff, who used simple tools such as five-gallon plastic buckets. Fishermen were literally scooping oil from the surface by hand, yet DEC reported several days in which the so-called "mosquito fleet" recovered more than 1,000 barrels of oil/water mix.

The "Battle of Sawmill Bay" was a successful partnership of private and government efforts. It was the focus of the efforts to protect the three west side hatcheries and the Eshamy Lagoon, site of one of the areas most important wild stock (red) salmon fisheries. These areas are the foundation of the Prince William Sound commercial fisheries, and therefore the foundation of the local economy.

More than 50 Cordova fishermen, the village of Chenega Bay, The Prince William Sound Aquaculture Association, 60 DEC and contract staff, 40 private vessels, two state ferries, the Alaska National Guard and the Alaska State Troopers played central roles in the operation. At a time when oil was swirling throughout the western Sound and fouling beaches, when skimming and containment in other areas was only occasionally successful, the defense of the hatcheries provided both a substantive and psychological lift to the oil spill response. The state worked hard to bring the Cordova fleet into the response as active partners, but it is important to note that much of the initiative for the effort — from mobilizing vessels to finding the North Slope vacuum trucks — started with the fishermen of the Sound.

3.4 Cleanup operations

April was more a month of planning than cleaning in 1989. There was the brief, almost bizarre effort at individual rock wiping at Naked Island the first week of April, as well as some limited efforts to rake and collect oiled seaweed. On April 12, Coast Guard Commandant Admiral Paul Yost arrived in Alaska and told Exxon to produce a shoreline cleanup plan. During the next few days, Yost made it clear that hot water washing was his preferred method of treatment.



A piece of irony in the spill's aftermath, this huge North Sea drilling platform was used for housing of cleanup workers in Lower Herring Bay.

Photo courtesy of the Exxon Valdez Restoration Office

Within two days of Yost's arrival, Exxon submitted a preliminary shoreline cleanup plan, one most government and public agency representatives considered more of an outline than a plan. The 21-page document stated that Exxon would wash about 300 miles of shoreline with cold water, employ about 4,000 workers, and be done September 15.

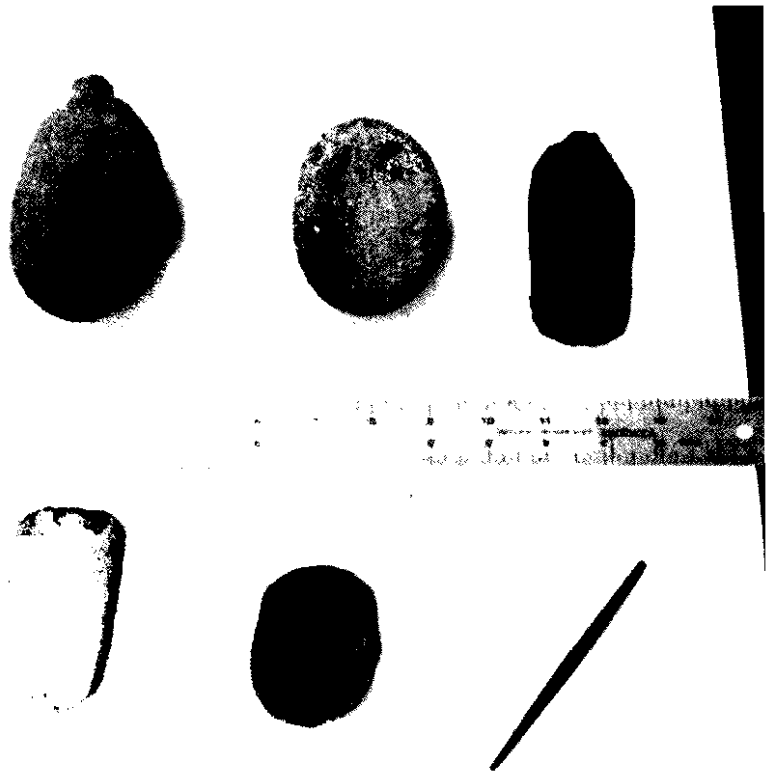
The Interagency Shoreline Cleanup Committee, recently formed, said Exxon was not thinking big enough: Aerial surveys and other information put the total amount of oiled dshoreline inside and outside the Sound at more than 1,400 miles. The Coast Guard gave preliminary approval to the plan, but Admiral Yost and others clearly felt they

needed more information, more complete planning, and better assurance of performance. The DEC and other state agencies mentioned similar concerns, but also insisted that Exxon produce a comprehensive plan that included waste management, additional surveys, and other associated activities.

The state also questioned an early plan to put workers in land-based camps, citing, among other things, the problems with human waste and the impact of the camps on the uplands.

As it would turn out, all workers throughout the response would be based on vessels, barges, and other watercraft. The state ferries that appeared on the scene in early April were just the first — and by no means the largest — vessels that joined the cleanup navy. Real U.S. Navy vessels, Coast Guard cutters, commercial cruise ships, barges with portable trailers, and a huge North Sea drilling platform all came into service in Prince William Sound and the Gulf of Alaska.

The decision to house workers offshore in some ways limited actual cleanup operations; housing and transferring workers from vessels to shore, and shore to vessels, cut down on some of the time spent on the beaches. However, it eliminated or minimized several very importrant potential problems: bear encounters, destruction or disruption of archeological sites, disagreements over land use and land ownership, and others. In April, no one really knew how large the cleanup presence would grow; by August, when thousands of people and support personnel were involved, the decision to base everyone the water seemed, in hindsight, a practical one despite the limitations and challenges it presented. In fact, over time, control of access to shorelines and uplands became a central aspect of the cleanup. Private landowners (almost exclusively Alaska Native corporations) did not want people swarming onto private uplands. Waste disposal and destruction of vegetation were only part of the issue. Protection of archeological or other culturally significant sites was of paramount concern, as was the "discovery" concept. Private landowners were concerned that people would "discover" new areas for hunting, fishing, camping, archeological searches, etc., and return to the sites long after the spill, visits that would amount to trespassing at best, and looting at worst.



Artifacts taken from cleanup bags. Photo by Dave McMahan

In fact, archeological experts for the state noted that archeological disruption in Prince William Sound had been occurring for a number of years before the spill, but it happened primarily on a few established routes.[10] These routes evolved over time and were defined almost exclusively by the fuel tank size of the average recreational or fishing vessel working out of ports such as Whittier, Valdez and Cordova. Because there was no fuel or other service available outside of these ports, most vessels could only go so far, and usually turned around at well-known, common points of reference on the shoreline. A map of sites prone to vandalism or artifact hunting[11] could, until, the *Exxon Valdez*, be drawn entirely within the boundary of an arc defined by one-half a tank of fuel for the average-sized vessel out of a given port. But during the *Exxon Valdez* response, fuel caches were left at various sites around the Sound and Kodiak Island. Vessels could run to the limit of their fuel capability, then refuel far from home. This increased the range of most vessels and

allowed local skippers to "discover" new areas of interest that they otherwise would have never seen.[12]

A second access issue was raised by various wildlife management agencies, primarily the U.S. Fish and Wildlife Service (USFWS) and, to a lesser degree, other state and federal fish and game officials. Federal officials developed, over a few months, special restrictions on shoreline access and activity depending on whether eagles were nesting nearby, or marine mammals regularly hauled out at certain sites, or where shorebirds nested and reared young. The complexity of the ecological system — not to mention the overlapping authorities of government agencies and private landowners — made any long-range planning effort especially difficult. In some cases, special wildlife protection restrictions were established by agencies specifically for the *Exxon Valdez* response, becoming, in a way, *ad hoc* regulations promulgated in response to Exxon cleanup proposals.[13]

The sensitivity of certain kinds of habitats — salmon spawning areas, most often — were part of the cleanup plan from the start. The state fish and game department was one of the primary planners in the resource assessment effort, and salmon streams remained the single most consistent cleanup priority from start to finish. However, the cleanup schedule and habitat concerns were based primarily on timing, rather than topography or vegetation. Cleanup was scheduled at most sites during "windows" that were open when animals were away, and closed when animals showed up to spawn, give birth to young, or nest.

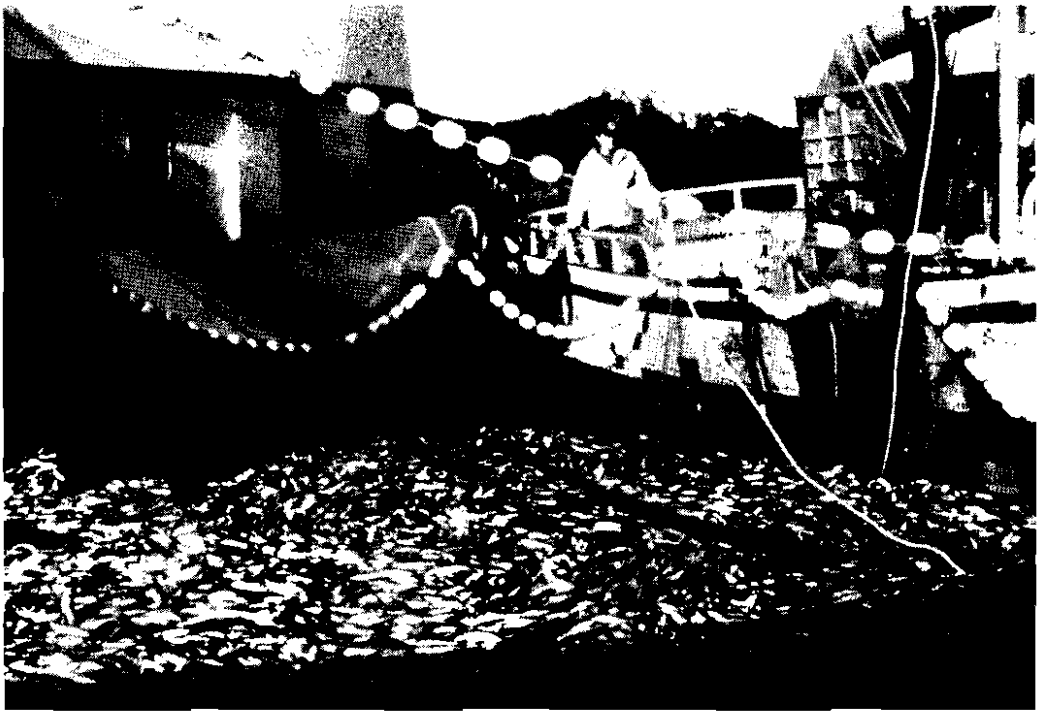
The sensitivity of certain kinds of habitats – salmon spawning areas, most often – were part of the cleanup plan from the start. Cleanup was scheduled at most sites during "windows" that were open when animals were away.

For this very reason, the state and federal governments pushed Exxon to get crews in the field, doing meaningful cleanup, before May 15. This was the date that biologists expected many animals to show up in large numbers; the biggest immediate concern was to clean seal "haulouts," i.e., the rocky sites where seals come ashore to give birth to their pups. In the northwest part of the oiled area, these pinniped haulouts were concentrated in and around Smith, Little Smith, Green and Seal islands, along with Applegate Rocks, a shoal that is exposed at most low tides and awash at high water. It was at Applegate Rocks where crews experimented with peat as an absorbent, spreading the soil on rocks and on pools of oil. Peat was not used elsewhere, however, as officials decided that cleaning was just as difficult as spreading, collecting, and disposing of the peat.

The cleanup window for pinniped haulouts was opened only narrowly, a biological and logistical problem that was never really solved during the cleanup from 1989-92. Little Smith Island, which had seabird restrictions as well as pinniped haulouts, was neither cleaned nor completely surveyed after the spring of 1989. Seal Island, a small, relatively remote and exposed island, was the site of brief cleanups through 1991, but crews never were able to spend enough time there. In May 1991, the state convinced Exxon to send a crew to Seal Island to work on a heavily contaminated shoreline adjacent to a rocky spit used heavily by the seals. The narrow work window was shortened even more by weather delays, crew changes, and other logistical problems, so the few days of work never really approached the solution that was necessary. Several other sites, including Perl and Elizabeth islands, also got limited cleanup due to wildlife windows; they were not even surveyed in 1991 or 1992.

The point here is not that wildlife restrictions hampered the cleanup; rather, it should be understood that the very sensitivity of the Sound's ecology and habitats often prevented adequate, site-specific cleanup. Whether it was as a result of marine mammal restrictions, seabird colony protection, buffers around eagle nests, or other measures designed to protect migratory or resident species, cleanup was often curtailed or eliminated, even if it was technically possible to remove the oil. Schedules for cleanup were determined not so much by sequential logic — i.e., north to south, inshore to offshore, etc. — but by wildlife windows. In the end, at some places the cleanup ran out of time, not out of oil.

This is a lesson that should not be lost on the people preparing contingency plans and risk assessments not only for Alaska, but other rich wildlife areas: Plans should never assume that damage can be mitigated by cleanup, since cleanup may be impossible.



A herring catch, using seine nets. Photo by John Hyde

Commercial fishing

The next major phase of cleanup planning revolved around the openings of salmon seasons and the return of salmon to spawn in their home streams and coves. At first, state biologists and fishermen assumed that some commercial fishing could take place in the Sound, Cook Inlet and Kodiak. During the 1987 T/V Glacier Bay spill in Cook Inlet — occurring near the peak of the red (sockeye) salmon harvest season — fishermen were allowed to work areas that appeared to be free of oiling.

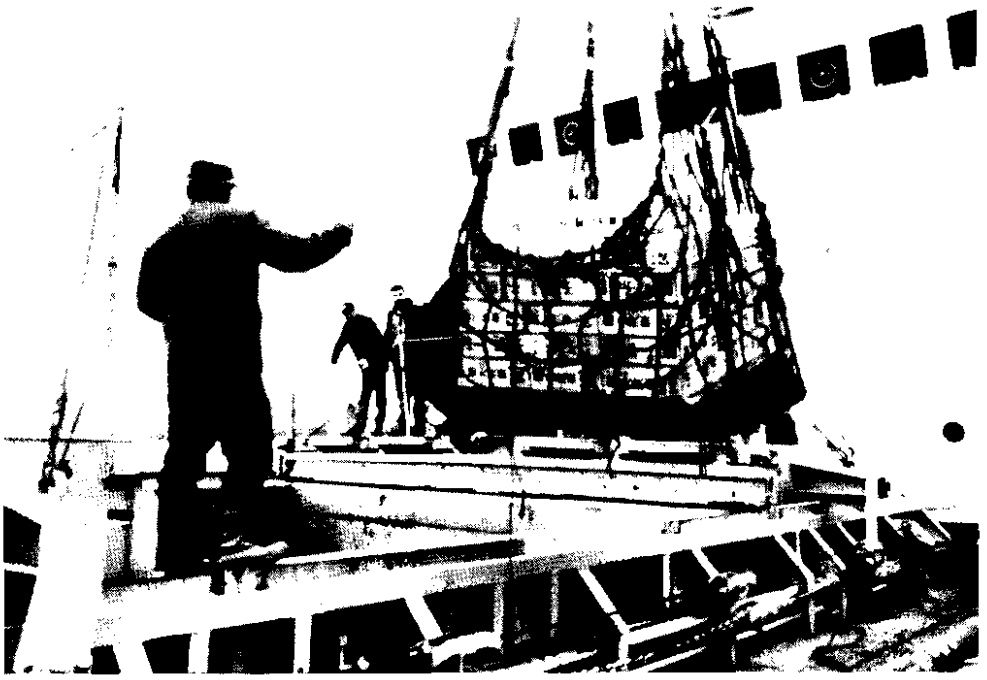
However, the *Exxon Valdez* lost almost 100 times more oil than the Glacier Bay. The oil swirled throughout every fishing district from Prince William Sound to Cook Inlet, Kodiak, and even parts of the Alaska Peninsula. The problem was not with the fish, crab or shrimp — at least not directly. The creatures were below the surface, for the most part, away from the oil and unlikely to be directly tainted.[14]

The oil swirled throughout every fishing district from Prince William Sound to Cook Inlet, Kodiak, and even parts of the Alaska Peninsula.

The problem, instead, lay with the gear and the fishing techniques. Fishermen pulling pots, longlines, nets, and other gear up through the water's surface — and perhaps through oil — raised one potential oiling problem. A second problem could occur on deck or in the holds, if a part of a catch were oiled and stored with unoiled fish in the hold. A third problem could occur in the transfer of fish from the hold of a vessel to a tender (a larger collection vessel), and from the tender to the shoreside processing plant. A fourth potential path for contamination was in the processing plant itself; if any contaminated product inadvertantly moved through the processing line, the machinery and work areas would be fouled for every other fish coming through.

The chain of problems, from net to processing plant, was potentially overwhelming, and the risk was real. Fish and Game considered opening parts and subparts of various districts, but this was judged to be a management nightmare. Managing fisheries cove by cove would have required massive numbers of trained observers working from the air. It also would have required communications and coordination that could shut down a part of an area on a moment's notice, since oil was mobile throughout the fisheries districts.

For the fishermen, the job would be just as difficult. Fishermen were reluctant to gear up their vessels — which requires a substantial, up-front investment in food, gear, fuel, etc. — to show up for a fishery that could be closed on that moment's notice. Further, finding oil from the deck of a vessel was a tricky and frequently imprecise operation. Skimmers, for example, could not properly operate without aerial surveillance support; there was no reason to suspect that fishermen could do better without similar aerial backup.



A South Korean ship loading boxes of herring roe. Photo by Vonessa Vick

And finally, cleanup itself posed problems for commercial fishing. Shoreline cleanup knocked tremendous amounts of oil back into the water, and some crews were sloppy in their recovery efforts and ineffective in setting secondary containment booms at cleanup sites. Areas slated for cleanup were frequently areas that were close to, or "upstream" from, commercial fishery areas. It would have been impossible to conduct cleanup and fisheries at the same time.

Different combinations of these problems forced fisheries closures from Cordova to Chignik Lagoon (on the Alaska Peninsula) in 1989. Alaska officials adopted a "zero tolerance" policy for fishery closures; although regional fish and game department biologists had some latitude in their ability to judge the threat from oiling to a fishery, they were instructed to take a very conservative stance. Alaska's multi-billion dollar commercial fisheries employ more people than any other industry in the state, and Alaska's seafood inspection program is one of the most stringent in the country. Fishery managers, who saw the canned salmon market collapse in 1983 after a (false) botulism scare in Europe,[15] knew well that there was no room for gambling with the freshness and quality of Alaska seafood.

Alaska officials adopted a "zero tolerance" policy for fisheries closures. Alaska's multi-billion dollar commercial fisheries employ more people than any other industry in the state, and Alaska's seafood inspection program is one of the most stringent in the country.

The first closures, for herring fisheries, came April 3, 1989, at the height of the defensive battle for the hatcheries.

The area's herring fishery is for the roe, not the fish themselves. Alaska fishermen from Sitka to Norton Sound sell herring roe to Asian markets, where it is sold salted, pickled, or fresh. It is a very lucrative series of fisheries, but, like many high-value Alaska fisheries, timing is critical and openings are short. For a number of fishermen, the early-season herring roe harvests generate the cash flow that helps them gear up for salmon, halibut, or other fisheries later in the season.

The oil spill occurred almost exactly at the same time herring began spawning in Prince William Sound. Females lay eggs on seaweed, and males release sperm, en masse, in the vicinity. Under certain lighting conditions, the herring spawn on the surface looked like an oil slick.[16] The Sound's vessel-based herring fishermen work with gill and purse seine nets; the roe is eventually sold in its membrane, or sac. Other roe fishermen set floating corrals, or pounds, in which long leaves of kelp hang down; the females lay eggs on the kelp, which is then harvested. Still other fishermen cut wild leaves of kelp, along with the herring eggs. All these types of harvest occur at or near the surface, in nearshore areas, and were therefore most exposed to dangers of oiling —

especially at that point in the spill. The state did not open the fisheries at all in 1989 because of oil on the water.

Other closures followed quickly throughout Prince William Sound: shrimp fisheries (both trawl and pot), king and dungeness crab, and virtually all salmon fisheries, both wild and hatchery-based. Some bottomfish openings were held in the Sound. Halibut opened statewide in June, and there were no reports of oiled gear or fish. Some fishermen who could not work their usual fisheries turned to other deep-water species, such as rockfish; ironically, fish and game reported that rockfish stocks in Prince William Sound may have been seriously overfished in 1989, as more fishermen put more effort into catching a species for which there was little population or harvest data.

The effects of fisheries closures — especially for salmon — reached far beyond individual fishermen and a lost season of fishing income. In Prince William Sound, the closures caused severe financial problems for the non-profit associations that run the hatcheries. The closures also disrupted markets, displaced workers, and (some fishermen argue), drove down prices in subsequent years.

The hatcheries, built in the 1970s and 1980s with state grants and loans, are run by non-profit corporations made up of groups of fishermen. The fishermen pay a tax (about two percent of their gross catch income) to the association to cover costs of operations, and the fishermen then make the bulk of their money on harvests of fish "spawned," reared and released by the association.[17] They concentrate on raising and releasing pink salmon, which is the smallest and least commercially valuable of the five species of the Pacific salmon. However, the pinks spawn and return in two-year cycles, unlike other salmon, which spend anywhere from three to five years at sea before returning to their home streams to spawn. This quick turnover gives fishermen a product they can raise, harvest, and sell in relatively short timeframes. Almost universally, pinks are caught and sold for the canned salmon market, partly because the flesh of the pinks doesn't hold up as well to handling or freezing as does the flesh of other larger, oiler salmon.

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In 1989, this financial and biological cycle was thrown out of whack. The fishermen were obviously closed out by the fisheries shut-downs, and they sought compensation from Exxon. The hatcheries lost their regular source of income (fishermen), so they resorted to "terminal" fisheries — i.e., fisheries close to the hatchery as the fish returned to their "spawning area." Hatcheries hired a handful of local fishermen to fish a tidal wave of returning pink salmon, hoping to sell at least some of the fish to canneries so they could cover their 1989 operating costs.

The terminal fisheries were bizarre for both their abundance and their waste. Fishermen literally dropped their nets into an ocean of fish, and with little or no effort, pulled in the biggest netfuls of pinks anyone had ever seen. But even with fishermen seining as fast as they could, there were too many fish — fish that were scheduled, according to nature's plan, to die immediately after they spawned. The coves in which the hatcheries were located were in danger of being smothered by a putrid and oxygen-burning carpet of pink salmon detritus. Many fish were caught, then hauled farther out to sea, ground up, and dumped overboard.

Meanwhile, the hatchery associations had trouble unloading the fish they intended to sell. All salmon begin to deteriorate physically as they enter their spawning streams and begin the process of reproduction. Because the terminal fisheries caught the fish so close to home, so to speak, the flesh was far past its peak of marketable quality. Buyers were finicky about the quality, and even when the hatchery found a taker for its pinks, the price was down. The associations all ran big losses for 1989, and none could meet its operating costs and debt service without borrowing further or depleting financial reserves.

In addition, the disruption in supply may have triggered changes in the canned salmon market, as buyers turned more to new products and new salmon sources, such as the fish farmers from Canada, Chile, and Norway who raise salmon in nearshore pens. There is some debate about whether the oil spill was a prime or contributing cause to a crash in salmon prices in 1990, and the sharp turn away from canned salmon

as a market staple. Some fisheries economists argue that the change was coming regardless. However, the oil spill certainly accelerated the changes and exacerbated the effects, at least locally. And it is indisputable that local communities and economies were ill-prepared for such a sudden change. In Cordova, for example, the 1989 fisheries closures shut down the three local processing plants for all or part of the season. Instead of the usual 200 - 225 people working in the plants, there were less than 100. Even when fishermen worked other fisheries, such as halibut, the flow of fish to the local processors was sharply reduced, since many fishermen were working on oil spill cleanup rather than fishing. Processors tried to make up their shortfall by flying in fish from other areas of the state, but the extra trip for the fish meant more time between the ocean and the processing plant, with meant a further decline in quality — and price.

Workers in Cordova protest the closure of their cannery. The three local processing plants were closed for all or part of the fishing season in 1989. Photo by Rob Schaeffer

Unfortunately for the local economy, the plants have not reopened, and the salmon markets are not the same. This has caused problems and changes for local workers and fishermen, and it has also affected city tax revenues, services, and rates that local people pay for electricity and city water. The plants were the largest consumers of electricity from the city-owned utility, and therefore the biggest rate-payers. The high volume of revenue coming from the fish plants allowed city managers to charge lower residential rates throughout the city, and the resulting loss of that revenue stream has hit every Cordova rate-payer in the pocketbook.

In Port Graham, a small Alaska Native village on the southern Kenai peninsula, the fisheries closures shut down the local processing plant, which served the local economy as both a market for fishermen and an employer for the village. The plant did not reopen in 1990 for many of the same reasons the Cordova plants stayed closed. Furthermore, the plant was owned by the local village corporation; because the corporation was dealing with relatively small economies and markets, it was, perhaps, more vulnerable to changes and less able to muster the economic and business resources needed to recover.

Lower Cook Inlet (roughly the area around Homer and Kachemak Bay) did have some salmon openings in 1989, but the big-money fishery of Cook Inlet — sockeye salmon harvested by the gillnet fleet in the upper Inlet area — did not. As oil streamed out of Prince William Sound and splattered the outer Kenai coast, tarballs, debris, and weathered oil swung up with the prevailing currents and were sucked into the tiderips of Cook Inlet. The oil was hard to locate and hard to track in the silty, swirling waters whose tides flood to 25 and 30 feet, and whose currents run as fast as many rivers.

The drift gillnet harvest in upper Cook Inlet is the second most important sockeye salmon fishery in Alaska, ranking in run strength and commercial value only behind

the massive Bristol Bay harvest in western Alaska. During the 1980s, the fishery was worth anywhere from $100 million to $200 million at the dock — and this does not count the economic activity generated by the shoreside processing plants and local businesses every year.

Every year, that is, except when there is an oil spill: In 1987, Cook Inlet drifters had their season interrupted by the Glacier Bay spill, which occurred at the peak of the season. Many fishermen were unable to fish their usual areas, and many more lost money as more boats crowding the same areas split the harvest in diminishing shares. Fishermen, like farmers, spend the year betting their debt and capitalization costs against the coming summer's expected cash flow from fish they haven't caught. The 1987 spill disrupted this cycle for much of the Cook Inlet fleet, and the 1989 *Exxon Valdez* closure compounded it. Exxon, unlike the shipping company that owned the Glacier Bay, made partial payments and full settlements with many vessel owners the same season as the spill. However, Cook Inlet fishermen were poorly positioned to absorb another season of lost income or altered cash flow in 1989. Moreover, Cook Inlet fishermen did not have the same options for replacing that income as their counterparts in the Sound and Kodiak. Exxon and its contractors hired fishing vessels to work the cleanup in those areas. But Cook Inlet, where there was little cleanup activity, did not provide the same opportunities.

Finally, Cook Inlet fishermen became more frustrated as attention on improvements to tanker operations and oil spill response were concentrated on Valdez and Prince William Sound. Cook Inlet, unlike the Sound, has more vessel traffic, more older and foreign-flag tankers, more kinds of dangerous products in transit, many oil and fuel pipelines crossing the Inlet, several large tank farms and terminals, more sites where product is transferred, and more than a dozen offshore production platforms handling crude oil or hazardous drilling fluids. Furthermore, the Inlet, unlike the Sound, is a shallow, fast-moving, narrow waterway that presents a number of more difficult challenges to shiphandling and navigation. Taken together, it could be argued that while the risk from a catastrophic spill from a supertanker was lower in Cook Inlet, the risk of smaller, chronic pollution from a variety of sources was much higher than in Prince William Sound. The fishermen and the local borough government lobbied hard for the same kinds of protection DEC had ordered for the Valdez terminal after the *Exxon Valdez* grounding. DEC attempted to meet some of the concerns from Cook Inlet by instituting a task force to work on solutions, but solutions would not be so quickly or easily found.

The number of players in Cook Inlet is much higher than in Prince William Sound. There was no single entity, no major permit holder, to whom DEC could address the kind of sweeping emergency order it issued for Alyeska Pipeline Service Company on April 7. Shipping companies, drilling companies, small oil companies, pipeline consortiums would have to come to the same table. This would take time. It would also take time to build a consensus among them, since different companies were operating on different margins of profit, and Cook Inlet operations meant different things to different companies. On the other hand, the incentive for Alyeska's owner companies to act was powerful — powerful in the companies' own economic terms. Much is made of the fact that the State of Alaska depends on Prudhoe Bay for as much as 80-85 percent of its income. Yet for British Petroleum (BP) and ARCO — the two biggest producers on the North Slope — Alaska reserves and Alaska production are the reason their companies turn the profits they do, and that their stock trades at the prices it does. BP has two big production sites in the world — the North Sea and Alaska's North Slope — and the company would not be the same without one or the other. ARCO's Alaska holdings and production are the envy of other domestic producers. For these companies, the stakes in Alaska are high, and therefore their incentive to make changes in the operation was high.

But perhaps most important, the profits from Prudhoe Bay and Valdez are high. Because the oilfields produce so much cash for the companies, they can afford to invest $150 million up front (the estimated start-up cost of the Ship Escort/Response Vessel

Closures also affected other fisheries: shrimp, king and dungeness crab, shown above.
Photo by Vanessa Vick

System now in place) for new prevention measures, and the state can afford to forgo $10 million a year in extra revenues to help pay for the changes.[18]

Cook Inlet is no longer a high-production, high-profit oil province. Oil production peaked more than a decade ago. Most wells are producing much less oil, and, as in most older fields, the cost of keeping the wells active rises as production goes down. There is less cash available for improvements, and the ratio of benefits to cost — in strict economic terms — is markedly different in Cook Inlet.[19]

By 1992, Cook Inlet would have, like Prince William Sound, a citizen oversight group funded by the industry and a revamped and improved response organization, also funded by the industry. However, the improvements were more incremental than those at Alyeska, and the citizen group has had many more struggles with the industry over funding than its Prince William Sound cousin.

By 1992, Cook Inlet would have, like Prince William Sound, a citizen oversight group funded by the industry and a revamped and improved response organization, also funded by the industry.

For Cook Inlet fishermen, the combined effects of the *Exxon Valdez* oil spill, the fisheries closures, the economic disruption and the frightening realization of the risk the area faces were much more damaging than the sharp and fresh wound in Prince William Sound caused by the spill. This events of 1989 were, to Cook Inlet fishermen, a painful reinjury, another break in a leg that had just started to heal.

Kodiak's fisheries were shut down, with some of the same problems as Cordova and Kenai, but a few different or magnified ones as well. Kodiak, always one of the top three or four U.S. fishing ports, has a fishing economy based not only on local fisheries, but on offshore and remote fisheries as well. A significant portion of the Kodiak fleet works the wild waters of the Aleutians and the Bering Sea for crab and bottomfish, and so, in many respects, a part of the Kodiak economy was insulated from the effects of the closures. However, like Cordova and the changes in the pink salmon markets, Kodiak had its own unrelated problem to deal with: The Bering Sea pollock fishery, which supplied Kodiak's shoreside processors, had been shut down months earlier than anticipated due to overharvest by large processing ships. The row of producers on Kodiak harbor that had invested in new equipment and employed workers on the economic promise of a year-round fishery suddenly found themselves idled. Their secondary, seasonal fisheries — halibut, crab, salmon — were then crippled or curtailed by the *Exxon Valdez* closures. It was a one-two punch that staggered the city's

processors and left hundreds of cannery workers in the unemployment line.

Kodiak's different gear groups for salmon (gillnetters, setnetters, seiners) were largely supportive of the state's decision to close the Kodiak Island salmon fisheries as oil and tarballs hit the archipelago in a shotgun effect. While Prince William Sound fisheries managers had to cope with an ocean of oil, in Kodiak the problem was smaller in volume but almost more difficult to deal with. The oil came in large slugs and isolated windrows; it hit some places hard while leaving other neighboring areas alone; the concept of micromanaging fisheries cove by cove was therefore even tougher to handle. Further, the long distances, open ocean shorelines, and bad weather made any prospect of tight oil-fisheries management a logistical challenge and a question of safety. The salmon season, scheduled to open in the islands June 9, was postponed until June 19, then shut down in nearly every area for the rest of 1989.[20] Some fishermen managed to work herring sac roe fisheries, since 22 of the 56 management areas opened for herring, and some found work on oil spill cleanup. However, oil spill work was not universally available.

Much was written that first year about the fishermen who made money working on the oil spill, and indeed, many people made a lot of money. However, the jobs were not as plentiful nor as equitably spread out as popular folklore would have it.

Much was written that first year about the fishermen who made money working on the oil spill, and indeed, many people made a lot of money. A skiff owner could make $20,000 for the season; large vessel owners could make ten times that. However, the jobs were not as plentiful nor as equitably spread out as popular folklore would have it. Kodiak, like Cordova, was the scene of frustration and competition as local fleets tried to handle the job of assigning vessels and dividing up available work among those who needed it. Roughly 300 Kodiak-based vessels normally work the area's fisheries, and the majority did not work on the spill response.

The claims system set up voluntarily by Exxon produced mixed results. While many fishermen opted for up-front payments or partial settlements from Exxon, getting the payments was not always a simple matter.

There were disagreements about whether those who took oil spill work would forfeit any right to recover damages for lost fishing income. Some fishermen were reluctant or unsure whether to accept response contracts because of those questions.

The uncertainty surrounding possible closures in early June also forced fishermen into potentially risky choices. Exxon was paying claims only to those fishermen who were ready to fish at the time the closures occurred. The state was closing areas one by one, based on the absence or presence of oil. Fishermen literally had to be geared up and standing by, ready to fish, when the fisheries were closed by emergency order — even if it was a forgone conclusion that the fishery would probably be closed. This created a ludicrous situation in which fishermen bought fuel, pulled in the crew, bought groceries, and got ready to fish, even though they knew the fishery would be closed. To make matters worse, from an economic standpoint, going through the motions of gearing up for fishing cut off a number of opportunities to get oil spill response charter work. The result was that those who gambled on getting oil spill work — and got it — made more money than they usually make fishing, while those who gambled on the claims system may not have made as much — or anything at all.

Generally, fishermen were able to settle claims with Exxon as long as they could demonstrate from tax statements, receipts from tenders or processors, or state records that they had worked a given fishery in previous years. This was a relatively simply matter for those who had a consistent record as a skipper or vessel owner. However, if someone had missed a year (due to working another fishery, working as a crewman, other economic reasons, etc.) or more, it caused some delay or raised some questions with claims adjusters about whether the individual was a bona fide fishermen. Some people lease permits, and don't always work the same district. In a few cases, people had just purchased vessels and/or limited entry permits, and the 1989 season was going to be their first in the fishery; they had no record on which to base a claim. In addition, the basis for computing claims was the state's projected catch of 15 million salmon for 1989; in fact, the runs turned out to be about 40 percent stronger. Theoretically, fishermen would have caught more fish, and therefore their settlements should have been adjusted upwards. And, of course, no mathematical formula could properly

In mid-September of 1989, a subsistence user in Chenega prepares salmon to dry. Photo by Vonessa Vick

adjust for the fact some fishermen are more skilled than others and some get luckier than others.

Finally, there were the issues of cash flow, crew payments, debt structure, and other components of the commercial fish business that the claims system could not address, regardless of how well-intentioned it may have been. Skippers frequently pay a variety of expenses for long-time or trusted crew members before the season starts. It is a system in which a skipper has people other than his own family depending on him economically. The uncertainties, the disruption of normal cash flow patterns, and the unavoidable inequities of the situation took a heavy toll on the fleet, both financially and emotionally.

But at least the commercial fishermen had a claims system, and many of them had access to alternatives, such as oil spill cleanup work. Subsistence users of wild fish and game — essentially all the Alaska Native families of the spill region — did not have the same kinds of options open to them.

Subsistence

Commercial fishing is the dominant cash economic activity in the spill region, and it commanded high and immediate concern from policy-makers, reporters, and responders. The fishing fleets of Valdez, Cordova, Kodiak, Homer and Seward, tied up at the docks in the busy ports where response forces mobilized, were visible evidence of one of the interests most at risk from the spill. Fishermen from Cordova were at the press conferences and briefings and meetings in Valdez almost from the start; the organized fishermen's unions and marketing cooperatives had the staff, structure, recognition and experience to deal with government agencies and Exxon; reporters (especially those coming from outside Alaska) immediately understood the threat to fisheries and the role commercial fishing plays in coastal communities.

The disruption in the lives of people in the subsistence-based villages was one of the most drastic and domoging of the entire oil spill. These effects are probably among the most lingering — and measurable — of the spill.

It was not the same for the Alaska Natives of the remote coastal villages, where subsistence harvest of fish and game is the dominant — and defining — social and economic activity. Dealing with the concerns and priorities of subsistence users — and explaining the risks from oil contamination — was one of the most frustrating and least successful exercises of the oil spill. The disruption in the lives of people in the subsistence-based villages was one of the most drastic and damaging of the entire oil spill. These effects are probably among the most lingering — and measurable — of the spill.

Most of the villages learned about the spill on public radio, or from television news. They did not have a well-organized political and economic lobbying group, and were not part of the early discussions among the key organizations planning the response.[21] Subsistence is not only hard to see and touch, but its role in the lives of Alaska Native villages is hard to communicate briefly, forcefully, and completely. It is harder still for people coming from outside Alaska to truly understand quickly.

An example: In May 1989, Vice President Dan Quayle came to Alaska, briefly

visited a beach on Smith Island,[22] then returned to Anchorge's Elmendorf Air Force Base to meet with mayors from the affected communities. A woman representing the village of Eyak, near Cordova, spoke for more than five minutes, concentrating on the meaning of subsistence to her people, the threat they felt from the oil, and the anger and fear among Natives. The vice president listened intently and replied, "All the fishermen will be paid."[23]

His reply missed the point — widely. This was not just a matter of whether the Native community was paid damages, or if they were given money to buy alternative foods. The real fear, especially among village leaders and elders, was that the spill would so damage or disrupt subsistence harvest that yes, a food shortage might result, but more important, that the foundation of the communities would crumble.

Subsistence is part of a rural economy, but it has little or no relation to western views of economic value. Subsistence is about eating, but wild foods can't be simply replaced by a processed substitute. Subsistence is about kinship and social cohesion, but it is not a ritual or ceremony. Subsistence is one of the markers that helps Native people define themselves, but it is neither cosmology nor religion, as western people understand religion and theology.

Subsistence is about eating, but wild foods can't be simply replaced by a processed substitute. Subsistence is about kinship and social cohesion, but it is not a ritual or ceremony.

The Alaska Department of Fish and Game maintains a fulltime Division of Subsistence that collects harvest data, documents subsistence patterns, and serves as a liaison to many subsistence-based communities. Alaska government officials are used to dealing with subsistence issues in the normal course of land and resource management. However, much of the response structure was staffed by people from outside Alaska, or from agencies that do not normally deal with Native peoples. In addition, at least at the outset, Native villages did not have representatives or advocates in the management and planning centers, such as Valdez and Anchorage. Chugach Alaska Corportation, the regional Native corporation, did have some access, but the villages do not consider Chugach the appropriate representative for all Native issues in the region, and Chugach did not attempt to speak for all the villages. Exxon representatives did not visit most of the villages early on, and when they did, they were either consumed with emergency response tasks (at Chenega Bay, for example) or the overtures were clumsy (at Tatitlek).[24] Villagers reported that the managers from Exxon's contractor, VECO, were especially inept at dealing with the cultural differences and methods of communication in Native villages. Rapid turnover of Exxon personnel meant that it was difficult for villagers to build up a rapport or level of trust with the company.[25]

A certain amount of bitterness also developed among village residents as they learned of the millions of dollars being poured by Exxon into wildlife rescue and rehabilitation. Throughout that summer, Alaska Natives — and other locals, for that matter — spoke with cynical humor or resentment about the amount of attention paid to animals, while the human residents of the spill area struggled to get the kind of attention and support they felt they deserved.

Villagers also pointed out what seemed to them a confusing inconsistency in the state's policy about the safety of seafood. All around the Sound and Kodiak, commercial fisheries were being closed, ostensibly because of the threat of contaminated seafood; yet, subsistence users were told that seafood was safe to eat unless it smelled or looked oily. The difference, of course, was that subsistence takes place on a different scale, with different equipment, and subsistence harvest was not really analogous to commercial harvest with drag, seine, or gillnet gear. Remember, for the commercial fisheries, the problem was with oiled gear, not oiled fish. Certainly a lot of people understood this difference, but acceptance of the explanation was not universal, especially among older Natives.

The uncertainies, communication gaps, cultural gaffes, and mixed messages all combined with the basic upheaval caused by the spill. In the villages, during the early weeks of the spill the seeds of doubt and resentment were sown. As these problems grew, the subsistence issue came to be a focus for all the cynicism, anger, and fear. Communication stalled, even as efforts to open lines of communication and spread

information intensified.

Understanding the role of subsistence in the villages of the spill region helps one understand the reaction to the spill in the villages.[26] Area residents harvested and consumed an average of 200 to 600 pounds of wild fish and game in pre-spill years; by contrast, the average family in the American west buys a little more than 200 pounds of meat per year.[27] Village residents of the spill region have reported that 100 percent of the households used subsistence foods in various years before the spill — and they used many different kinds. The mean number of resources used hovers around 20 per household per year, from large marine mammals such as seals and sea lions, to salmon and halibut, deer and ducks, gull eggs, and even tiny marine invertebrates collected on the seashore. Clearly, subsistence harvest is the foundation of most village diets.[28]

Basically, things didn't look right. Villagers noted strange behavior among animals (seals becoming lethargic or unafraid of people), birds didn't show up the places they usually did, shellfish that normally clung tightly to rocks seemed to fall off easily.

In addition, subsistence harvest is just one link in an extended system of food preparation and sharing that is one of the principal social activities of Native peoples.

"Harvesting and processing groups are generally composed of members of extended families, and subsistence foods are often shared with relatives, elders, and others in need. For example, in English Bay, one harbor seal was shared within a family of eight households and 25 people. Such extensive sharing is commonplace in all 15 villages [of the spill region.]"[29]

And finally, the patterns of village life are dominated by seasonal harvests, and seasons themselves are defined and described in terms of animals. People understand their place in the natural world based on the traditional understanding of how the natural world works. Summer is the busiest season, when people catch and preserve salmon for the winter by drying, smoking, pickling, or some other method. Fall is the time for hunting game. Spring — when the spill occurred — is just when people break out of winter and begin the harvest cycle again, going for herring, birds, and other resources.

The spill and the cleanup threw this pattern of life all wildly and frighteningly out of sync.

Basically, things didn't look right. Villagers noted strange behavior among animals (seals becoming lethargic or unafraid of people), birds didn't show up the places they usually did, shellfish that normally clung tightly to rocks seemed to fall off easily. It is hard to make a scientific determination about whether the observations were actually due to the spill, or even if they were entirely out of the ordinary. Researchers noted that people may have been noticing some things that they had never noticed before because the spill had made them more aware or more likely to observe even subtle changes. Yet regardless of whether all or some of the changes were really due to the spill, the cumulative effect was a kind of disorientation, which produced doubt, which magnified fears.

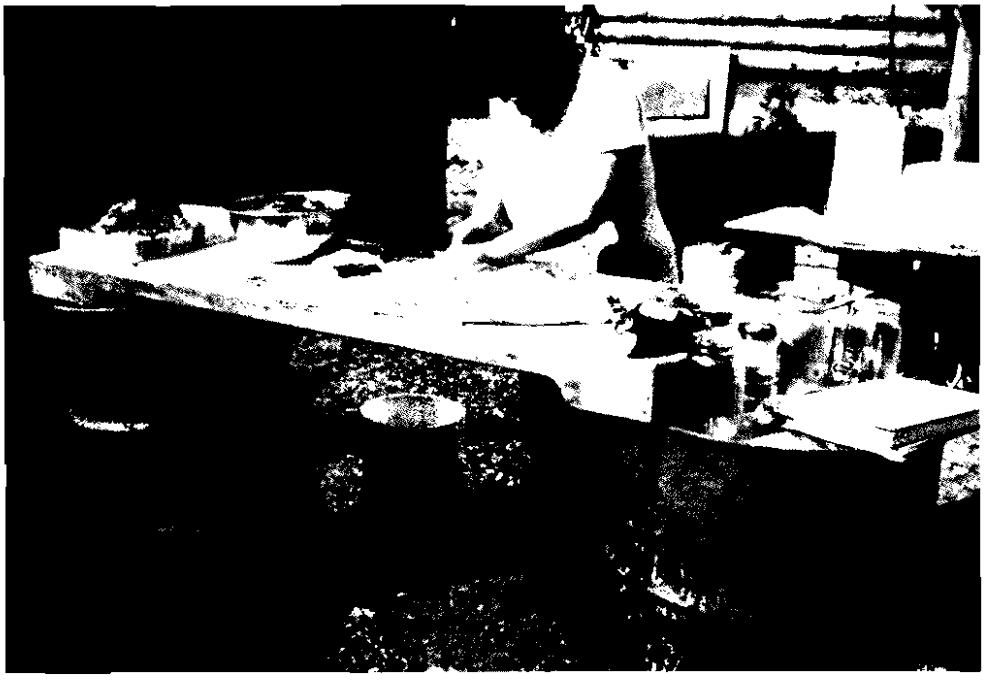
"Clearly, the oil spill had created conditions that were completely unfamiliar to the hunters and fishermen of these villages," the state's Jim Fall wrote. "Their skills in understanding their environment and making informed decisions had been undermined. Consequently, in many cases they discarded traditional foods or refrained from harvesting entirely for fear that the resources had been poisoned."[30]

And refrain, they did. The state's subsistence division researchers collected harvest data from 1989 and compared it to data collected in previous years. They tried, when possible, to compare 1989 against data from two previous years to get a better sense of the difference.

They found that in Chenega Bay and Tatitlek, within Prince William Sound, the total pounds of food collected dropped by more than half. In Chenega, where residents normally collected 300-400 pounds of subsistence foods per capita, the 1989 total was less than 150 pounds; in Tatitlek, where per capita harvest was as high at 650 pounds per year, the total was just a little over 200 pounds in 1989. The Lower Cook Inlet communities of English Bay and Port Graham showed similar declines. In the six Kodiak Island villages, more distant from the spill and where impacts varied more from place to place, average declines ranged from 12 percent in the extreme south (Ahkiok) to 77 percent in the north (Ouzinkie). Yet all showed substantial and aberrant

declines in overall harvest compared with the previous years.[31]

These declines do not represent something like a voluntary avoidance of a few favorite desserts or delicacies. The subsistence division also found that fears caused by the oil spill led area residents to eliminate a large array of foods from their usual and customary diet. Where the subsistence harvest mix usually included about 22 different components in Tatitlek, in 1989 the figure fell to about 11; in Chenega Bay, the mix dropped from 18 sources to eight. Overall, more than 80 percent of the households in Prince William Sound and Lower Cook Inlet reported that the oil spill caused them to limit or avoid subsistence harvest; the figure was about 40 percent on Kodiak Island.[32]



A woman cuts up seal fat in Port Graham. Photo by Ron Stanek

Exxon provided groceries to replace some of the foods, and cash employment on the oil spill cleanup allowed many people to buy food as well. However, this solution was neither long-term nor entirely acceptable. Residents simply had no idea if foods were subtly contaminated, if animals would continue abnormal migration patterns, if populations would be devastated, or if hunting would exacerbate problems caused by the spill.

"As a Tatitlek hunter explained regarding waterfowl, ' When you hear thousands of them are dying every day, it's tough to harvest them. We didn't know what the number would be coming back this year.' "[33]

But more important, store-bought foods did not replace — either by tradition or by nutritional standards — the fresh and preserved local foods. There is no question that in most Native villages around Alaska, the overall family diet includes a mix of processed grocery-store food and wild fish and game.[34] However, in the villages of the spill region, the "Native" foods are what people prefer, and one can expect subsistence foods to be part of most main meals, or the central dish, at least several days a week. Substituting chicken for seal or clams may be acceptable as a stop-gap, but over time, people want to eat what they are used to eating. Asking Alaska Natives to eat western processed foods on a consistent basis would be no more acceptable to them than asking Texans to get rid of their cattle herds and eat squid everyday.

Or octopus, for that matter. Tatitlek villagers identify octopus as an important food during the winter months, but after the spill, they reported that they were having great difficulty finding octopus in the usual places. This led them to question the health and organization — or reorganization, more precisely — of the natural world around them, which in turn increased their fears and frustrations about foods that once made up the bulk of the villagers' diets. If the octopus aren't there anymore, what happened to them? Did the oil kill them? What about the fish, then, or the birds? What about the seals that eat the fish? If it's all screwed up, what do we do?

In very crude ways, one can begin to understand the disorientation and fear by thinking of the shutdown of subsistence harvest as the shutdown of all the steel mills in Pittsburgh, or all the automobile assembly plants in Detroit. In fact, during the 1970s and 1980s, these rust-belt cities experienced something close to that. There was a

massive outmigration from these areas as people looked for work in California or Texas or other southern manufacturing states. Other people tried to retrain for new jobs in health care or other service industries. For the people who moved, the new states and climate might present some cultural and regional changes, but the basic structure of the society — the markers of the physical, economic, and social world — remain essentially the same from one region of America to another.

But people in Tatitlek don't have the option of moving to Anchorage or Seattle or Sacramento, retraining into some new food manufacturing process, and rebuilding their lives and relationships somewhere else. This gets back to the point that subsistence is not simply about eating, and it can't be truly described as an alternative economic system. There's food and there's an economy involved in subsistence, but those things are just the visible products of a subsistence culture. People of the villages viewed the oil spill as much more than a threat to one or two years of food; they feared it was something more dangerous and more lasting, an additional, crippling assault on a culture that had already been faced with rapid economic and social change in the span or a generation or two.

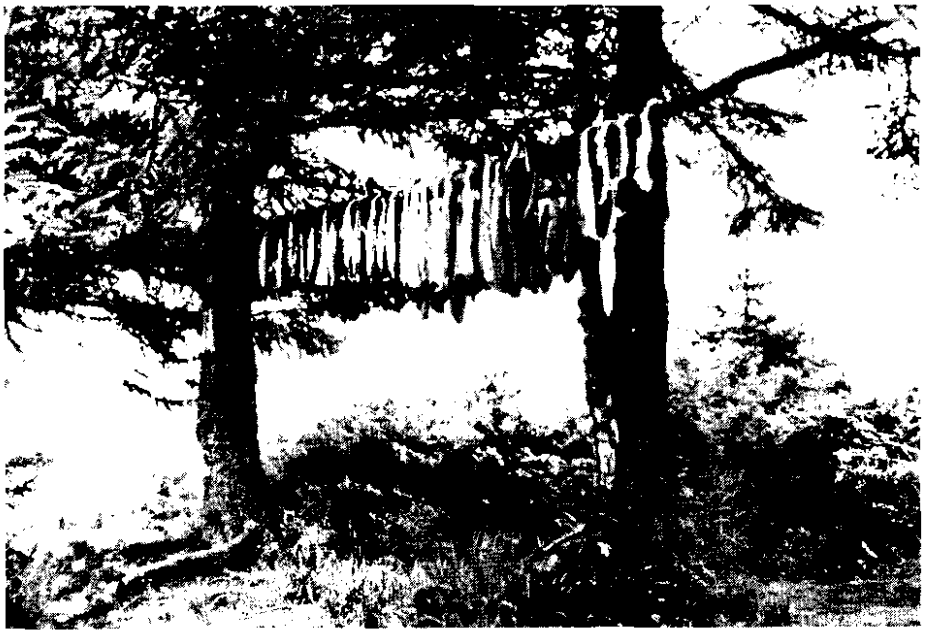
When village residents began asking state officials if seafood were safe to eat, DEC gave the seemingly obvious advice that foods that smelled like oil or looked oily should not be eaten. The technical name for this type of assessment is "organoleptic" testing, and, in fact, it is the basic test employed by state's commercial seafood inspectors. On the whole, it is dependable and rational, especially in the relatively pristine and clean waters of Alaska. A fat, firm-fleshed salmon with bright scales and no fin deterioration[35] is, in Alaska at least, a fresh and safe-to-eat fish. After inspecting a fish visually, an inspector will literally take a good sniff to make sure there is no abnormal odor that indicates the fish has been improperly stored or been out of the water too long. This type of test wouldn't be the perfect and foolproof way to determine the safety of seafood taken from a chronically or heavily polluted waterway, since the organoleptic inspection can't tell you whether the flesh contains abnormal concentrations of heavy metals or other toxins. However, Alaska's oceans are unpolluted and the water is clean.

Village residents tend to eat and use more parts of the animals – livers and other organs, for example – than the overage consumer. They wanted to know if oil was getting into the food chain, and whether it would find its way into their own bodies.

In most cases, that is. In the spring of 1989, there were 11 million gallons of crude oil on the water. Throughout the summer, there was oil on more than 1,200 miles of beach. In the fall, a number of shorelines released sheens when the tide came in. Local residents watched all this. They walked the shorelines, ran through oil slicks in their skiffs, and observed changes in animal behavior. They understood the "organoleptic" test because they used their own observation skills and accumulated knowledge to make decisions about the health and safety of certain foods. But what they wanted to know was whether the food was safe to eat, not just now, but well into the future. This was especially important to them, because fish, shellfish, and marine mammals made up a much larger perecntage of their diet than the average seafood consumer. In addition, village residents tend to eat and use more parts of the animals — livers and other organs, for example — than the average consumer. They wanted to know if oil was getting into the food chain, and whether it would find its way into their own bodies.

Scientists said generally that they doubted the oil was spreading widely through the food chain, especially in the case of salmon and marine mammals. Residents wanted to know how they could be so sure: Had the scientists done tests? Well, no, said the scientists, but we don't think that kind of contamination is likely. The villagers matched these seemingly vague assertions against what they were seeing — and not seeing, in some cases — in the natural world around them. If the oil wasn't affecting seals, why were they acting so strangely? Where are the ducks? Why is the liver of this deer I shot so white and puffy? Why did the liver of this seal just turn runny instead of staying firm, like normal? If there's oil floating all around this island, what makes you so sure these clams from the beach that looks clean are safe? If I eat these things now, based on your comments instead of a real test, are you going to tell me sometime in the future that my kids and I are going to get cancer?

Within a month of the spill, the Oil Spill Health Task Force came together. It included state and federal agencies, the non-profit social service representatives of the Chugach and Kodiak area Native corporations, and Exxon. The recommendations of this task force formed the basis for an endorsement of the organoleptic test as part of a general health advisory on subsistence foods on May 5. However, it was obvious to everyone involved that the villagers wanted more detailed analysis.



Fish drying in English Bay for subsistence use. Photo by Ron Stanek

What they wanted, of course, is what every American living near an industrial site wants to know: Am I safe? Are my kids safe? Isn't there some more definitive way for you to assure me that my family and I are safe?

In May, the Alaska Department of Fish and Game subsistence division started a pilot study, collecting samples of fish and shellfish that would be taken to the state's testing laboratory in Palmer. Exxon, to its credit, began to grasp that the subsistence foods testing issue needed more money and attention, and the company poured substantial money and support resources into additional, expanded collection and testing beginning in June.[36]

In both collection efforts, biologists and technicians consulted with village leaders, taking samples of the animals identified as important by the villagers from areas chosen by the villagers. The samples from the state's pilot study were analyzed by the U.S. Food and Drug Administration; the Exxon-funded tests were conducted by the Northwest Fisheries Center under the direction of a nationally known leader in seafood safety and toxicology. The Exxon-funded study included extremely sensitive (and expensive) measurements that could detect polyaromatic hydrocarbons (PAHs) down to one part per billion.

Exxon, to its credit, began to grasp that the subsistence foods testing issue needed more money and attention, and the company poured substantial money and support resources into additional, expanded collection and testing beginning in June.

These tests — and subsequent testing from 1990 and 1991 — backed up the general advice that seafood was safe to eat as long as it didn't look or smell oily. The flesh and organs of fish analyzed in the tests detected neglible levels of PAHs. Some clams showed high levels of contamination, but they had come from areas of obvious oiling. A panel of scientific experts pulled together by the National Oceanic and Atmospheric Administration (NOAA) discussed the results of the tests and came to a unanimous conclusion: In short, subsistence foods were safe to eat, and common sense and observation were the best guide of which areas and animals should be avoided.

There was one principal problem with this whole effort: The results weren't available in preliminary form until August, and the expert panel did not deliver its opinion until September. This was probably unavoidable; the group had enough money and resources to collect samples and get them to labs as quickly as possible. However, science — especially science including very delicate tests that require expert interpretation — does not occur overnight. The results of the fish and shellfish tests were not truly made final until February 1990, and test results from marine mammals, birds and deer did not appear until June 1990[37] — in other words, far into the next season's subsistence harvest cycle.

In practical terms, the fast-track of science was slower-moving than the problem. Throughout the summer, village residents consistently asked if there were some middle ground between organoleptic testing and the lab work being done in Seattle.

On the request of some village leaders, NOAA investigated the use of four different kinds of devices that use fluorescent light and special instrumentation to screen fish for contamination. The Oil Spill Health Task Force concluded that this solution wasn't the one the villages were seeking. For one thing, the testing involved special technical training and analysis, and, like the organoleptic testing, some of the conclusions were based on qualitative assessment. The machines were not necessarily easy to set up and maintain in a village setting, either.

NOAA attempted to use another conventional scientific screen — the literature search — to give villagers some sense of why scientists had come to the preliminary conclusion that oil was probably not contaminating fish and getting into the food chain. Unfortunately, the language of science is tinged with caution; researchers never stretch their conclusions beyond their data, and extrapolation is never off-the-cuff. One of the sources cited in the NOAA literature search noted that eating PAH-contaminated food does not appear to lead to cancer or other diseases. However, it cautioned, "Exceptions to these conclusions may arise in localized areas, as in the case of isolated fishing villages where seafood constitutes a major portion of the annual diet. No data are available, however, for these cases."[38]

By the time more detailed scientific, quantitative information became available in September and October 1989, the main subsistence harvest season was over. Doubts had solidified into firm skepticism.

This was hardly reassuring to these Alaskans who lived in isolated fishing villages where seafood constitutes a major portion of the annual diet. The literature search reinforced more doubts than it relieved.

By the time more detailed scientific, quantitative information became available in September and October 1989, the main subsistence harvest season was over. Doubts had solidified into firm skepticism. The skepticism was magnified by the fact that Exxon played a central and visible role in the operation. The company not only funded the results, but it produced high-quality brochures and sent its company representatives to the villages with the scientists. Exxon can certainly claim credit for a vigorous effort to address the questions of villagers about subsistence foods, but in hindsight, its involvement should have been limited to writing the checks. At town meetings in the fall and early winter of 1989-90, a number of villagers felt that Exxon-sponsored studies were not independent, since the company had a vested interest in positive news about safe seafood.[39]

This skepticism about Exxon's involvement brings us back to a basic structural and management problem that cropped up at nearly every stage of the response: People could not understand why Exxon was running a public health and public safety operation. Exxon was actually paying for it, not necessarily running it, but the perception was that the company was taking charge of the public interest. This, coupled with Exxon's public relations stance that tended to minimize the magnitude of the problem, made people in the villages wary of Exxon's participation.

As with other aspects of the "spiller-running-the-response" issue, this happened largely because of the inadequacies of the various national and state strategies and plans for pollution control: "Since there were no specific provisions in the [National Contingency Plan] for addressing fisheries and human health effects, the issue is not raised automatically and thus tends to be ignored until fishermen, fishery management agencies, or the public calls attention to it," NOAA's health researchers concluded in 1991.[40]

Further, since the issue comes up as a result of public pressure rather than government initiative, the perception is that the government doesn't care, or doesn't understand the scope of the problems. Then, even if the government moves quickly to deal with the problem or fill an information gap, its actions are viewed with some skepticism. Walker and Field of NOAA note that the Food and Drug Administration had no established guidelines for seafood safety based on polyaromatic hydrocarbon contamination at the time of the spill. While the agency eventually produced a risk analysis for PAHs in the summer of 1990, it was too late: People had already established, in their own minds, that any level of contamination was unsafe. The FDA's advisory, however scientifically or statistically valid it may have been, was viewed, in part, as an attempt to play catch-up, to cover up a previous oversight.

All of this — governments without firm information, the public perceiving that its problem was initially overlooked, the involvement of the vested interest (Exxon) — combined to present the Oil Spill Health Task Force with a daunting communications problem. While certain segments of the operation may have been viewed as caring and credible — an individual agency, an individual staff person — as a whole, the public (i.e., Alaska Native villagers) did not have a great deal of confidence in the information they were getting.

The depth of the doubt in the villages can be measured, in part, by the persistence of the disruption in subsistence harvest and consumption patterns into 1991 and 1992 in some of the villages.

The Department of Fish and Game's Jim Fall followed up in 1990 and 1991 on the 1989 surveys done by subsistence division staff. He found, "During the second year [after the spill], subsistence harvests were up for all but Chenega Bay and Tatitlek, but generally remained below pre-spill averages."[41]

While people say their subsistence harvests may have gone up, some said it was *in spite* of their fears, not because their fears had been resolved or alleviated.

Specifically, as in 1989, both the range of resources and the total volume of resources used were lower when compared to years before the spill. While the number of households that participated in subsistence harvest in Chenega Bay in 1990 matched a pre-spill year, the percentage using marine invertebrates and birds remained low. Moreover, although the number of households engaged in subsistance activities had returned to normal, all but one of those households reported that their harvest was still below pre-spill levels. Results from Tatitlek were similar.

As in previous years, the numbers generally went up the further one went from Prince William Sound. However, more than 80 percent of Lower Cook Inlet households said their harvests were still depressed, and half of the Kodiak Island households reported lower harvest levels.

While numbers have been coming up, the attitudes have not changed markedly, according to the state study. People continue to note changes in animal behavior and abundance, and they still express doubt about the long-term safety of eating subsistence foods at their previous levels of consumption. And while people say their subsistence harvests may have gone up, some said it was *in spite* of their fears, not because their fears had been resolved or alleviated. The desire to eat traditional foods and to participate in subsistence activities — bunting, fishing, food preparation, sharing — "outweighed their caution or fears of contamination."[42]

Fall quotes one Tatitlek resident on this subject: "We started craving seal meat. We could only go so long without it. We get tired of eating beef and chicken. We wouldn't touch seal that first year after the spill [1989]. Now subsistence food is on our table at least twice a week."[43]

It is important to note here that a gradual return to subsistence harvests in these villages was probably inevitable, regardless of the absence or presence of oil. One factor, noted above, is that as time passes from the event, the "cravings" for the foods people are used to started to overcome or overwhelm some fears. But more important, these villages have no other realistic option for replacing the foods they gather from the ocean and the shorelines. Cash income for the villages is limited and jobs are nearly non-existent; some people have commercial fisbing permits, but they generally are for lower-value, lower-volume fisheries than the big income generators of Cook Inlet and Kodiak. As in the rest of rural Alaska, so-called "transfer payments" — Social Security, the state old-age pension, the Alaska Permanent Fund dividends, federal nutrition supports, etc. — make up the bulk of the cash that comes into the villages. Putting cultural imperatives and tradition aside for a moment, the basic fact about subsistence in coastal villages is that subsistence is how people eat. Cash income, more likely, goes to buying processed foods that supplement the regular diet — coffee, powdered milk, flour, etc. — as well as clothing, heating oil, gasoline, ammunition, and so on.

When subsistence harvest was threatened and uncertainty about the future was the highest, people in the villages felt remote and occasionally excluded from the process and the people who made the decisions about cleanup. This is why many of the village residents — people with a keen understanding and appreciation for the day-to-day

workings of nature — were embittered when millions of dollars were immediately poured into wildlife rescue, while subsistence users had to work extra hard to get the attention of decision-makers.

Even almost four years after the oil spill, the disruption of the spill and the cleanup persists in the coastal villages of the spill region. Some villages are faring better than others, because people and regions are different, oiling impacts were different, and the ability of local leaders to influence the process differed as well. However, just as subtle changes in wildlife behavior give a clue that nature has not yet readjusted, the lingering problems with subsistence harvest are a clue that villages have not entirely readjusted to the post-spill realities. To many village residents, things still just don't look right.

"For a people whose survival has long relied on their observations of the natural environment, such signs continue to warn of danger," writes Jim Fall. "And people have continued to respond in a culturally appropriate manner — with caution. Our analysis of data about subsistence uses in Alaska Native communities following the *Exxon Valdez* oil spill suggests that while these signs have persisted, certain traditional foods have been avoided by many households. Until such signs disappear and people are able to place confidence in their own abilities to again interpret and understand their environment, recovery from the *Exxon Valdez* disaster will likely remain incomplete."[44]

Trailers and portable housing were rolling into town on trucks; temporary buildings and modifications were going up without safety and building inspections; the mayor and the city council felt they had lost control of their town.

The invasion

The towns and villages of the oil spill region were turned upside down by the staging, logistics, and politics of the response. In the summer of 1989, the regular business of fishing and tourism was completely overwhelmed by the business of oil spill cleanup. Town by town, from Valdez to Kodiak and everywhere in between, normal patterns were either disrupted, interrupted, or completely wiped out. It would be a surreal summer, marked by wide swings in economic and social activity.

Some people made a lot of money. Businesses that supplied gear — everything from groceries to raingear, rakes, and outboard engines — boomed. Hotels were full, all the time. In Valdez, national news organizations rented hotel rooms like apartments, paying the daily rate even when the room was empty, because they would be unable to get a room if they left it. People rented basements, spare bedrooms, garages, tent space — anywhere you could park a visitor for the night.

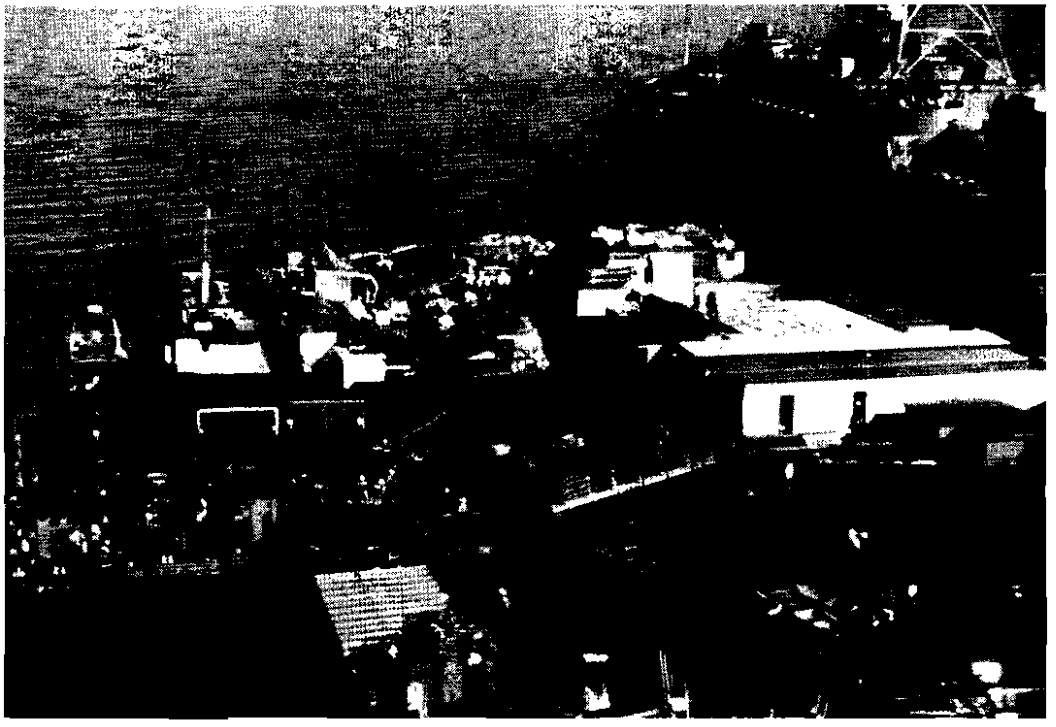
The lines at local restaurants were so long, and housing was in such short supply, that the state began providing meals and housing (both transient and seasonal) for its workers in Valdez. The catered meals (similar to the operations at North Slope oilfield bases) kept nutrition and morale up, while limiting the time wasted by people standing in line.

The Valdez airport, which usually handled no more than 20-30 flights a day, handled hundreds of flights every day, all day, all summer. The Federal Aviation Administration added Valdez tower staff, and for a time, a U.S. Coast Guard cutter served as an air traffic control center in the Sound itself.

Across from the airport in Valdez, Exxon and its contractor brought in portable housing, some of which had last seen duty during the construction of the Trans-Alaska Pipeline more than a decade before. The "man-camp," as it was called, was the dormitory for more than 1,000 people at various times. Outside of the housing centers, transients seeking cleanup jobs parked their cars and pickup trucks and campers in informal camps along the highway leading north out of town. These shanty towns were clustered in gravel pits, on sand bars of the braided glacial rivers that flowed out of the mountains, in the alders and cottonwood groves off the highway, and in the unofficial campground behind the city's softball fields. The presence was so overwhelming, in fact, that Valdez — a city that built a special complex to accommodate its famous softball tournaments attracting teams from around the state and northern

Canada — played no softball that summer of 1989. The season was canceled.

Estimates vary, but even the most conservative figures place Valdez's 1989 summer population at more than 10,000 people. The town has about 2,500 year-round residents, and an influx of summer visitors, cannery workers, and other seasonal traffic usually adds 1,000 or so people to the total. But this was a massive invasion, and it caused everything from a boom in various entrepreneurial circles to a fear of infectious disease spread by uncontrolled human waste dumping and disposal. Trailers and portable housing were rolling into town on trucks; temporary buildings and modifications were going up without safety and building inspections; the mayor and the city council felt they had lost control of their town.[45]



Just a small part of the tremendous influx of supplies, housing units and cleanup equipment.
Photo by Pamela Bergman

The other coastal towns on the highway system — Seward and Homer — had similar experiences, although the influx was generally smaller than in Valdez. The command centers for government were in Valdez, so more people — and more people who wanted to talk to or sell things to those people — gravitated to Valdez. Valdez was also the dateline for most news stories, so people drifting north for work or intrigue tended to wind up in Valdez more than Seward or Homer. Still, Seward's population more than doubled, and Homer — always a magnet in summer for transient fisheries workers and adventurers — was, literally, up all night every night. It was several orders of magnitude above the normal summertime activity.

Kodiak and Cordova fared somewhat better than their highway neighbors, simply because those towns are harder to get to. The transient problem was somewhat reduced, although various cleanup command stations brought a high number of Exxon, VECO (Exxon's cleanup contractor), federal and state government people to towns whose housing, service industries, and government services were not prepared to handle either the increase in demands, or the speed with which the increase happened. Services, tempers, and budgets were stretched to their limits — and, in many cases, they snapped.

However, as Governor Steve Cowper once observed wryly, environmental disaster is a poor economic development strategy.

There were some positive economic aspects to the influx of people and cash. Service companies, such as those that provided catering and other support to the Exxon-VECO offshore cleanup forces, had a prosperous season. Retail sales in all towns were generally high. The state's unemployment rate dropped, and economists generally agree that the mini-boom of the cleanup years (especially 1989-90) provided Alaska with a brief respite from several consecutive years of economic stagnation caused by falling world oil prices.

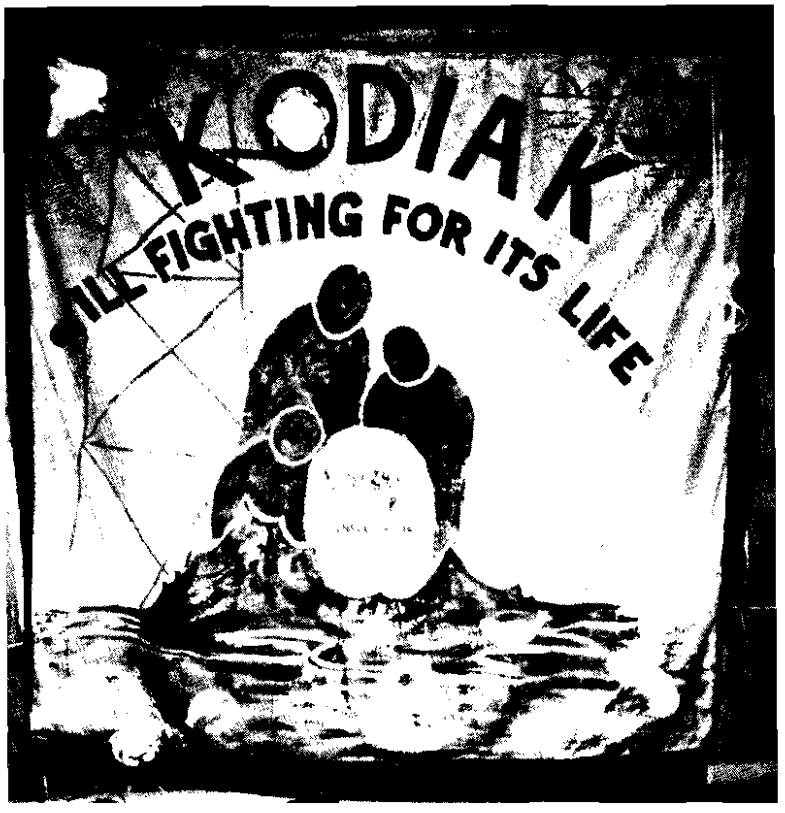
However, as Governor Steve Cowper once observed wryly, environmental disaster is a poor economic development strategy.

The stress levels, the sudden flow of money, the influx of transients with no obligations or connections to the communities, all helped make day-to-day life in the spill towns in 1989 a bizarre, unsettling, and occasionally dangerous experience.

Much of the summer, many small retail businesses were rich on paper, but desperately short of cash flow. A critical problem reported throughout the major towns in June and July was the backlog of unpaid invoives by Exxon and, more commonly, by its contractor, VECO.[46] The system was simply buried in purchase orders, delivery orders, receipts, invoices and bills, and many people were not getting paid. Especially in the smaller towns, retail businesses had limited cash reserves available and could not carry inventory and large amounts in receivables at the same time. One contractor — the computer provider to the Kodiak offices of Exxon and VECO — shut down the system in protest of slow payment; when VECO tried to log on its computers one day, all it got on the screen was a message from the contractor demanding payment. Eventually, payments caught up with bills, but things were in some disarray for several months.

A good deal of Exxon's $2 billion[47] stayed in Alaska, but much of it went outside with people who left the state after the summer jobs ended. The jobs themselves were transient and largely unskilled positions, hardly the kind of jobs that build economic stability. And with the sudden influx of unskilled workers seeking high-wage jobs came the petty crime and social disruption normal to frontier boomtowns.

Fights, thefts, domestic violence and drunkeness all rose substantially in all the towns of the spill area. In Seward the city manager reported that crime went up 100 percent. In one month late in the fall, there were 134 drunken driving cases on the local court calendar; this was, in raw numbers, as if seven percent of the whole town — men, women, schoolkids and babies — were up on DWI charges at the same time.



Protests such as this one in Kodiak mourned the loss of more than sea life – the social disruption made life in many communites chaotic.
Photo by Rob Schaeffer

Mental health suffered, and so did the service providers. In Kodiak, mental health admissions were up 72 percent; in Homer, the increase was 177 percent, with a 200 percent increase in demand for substance abuse treatment; in Cordova, mental health workers handled a 28 percent increase in drug and alcohol abuse referrals; in Valdez, court-ordered substance abuse treatment for convicted drunk drivers rose from an average of five per month to 15 per month that summer.[48] Domestic violence reports on the Kenai Peninsula rose steeply, and the local women's shelters in Kenai-Soldotna and Homer were full.

Child care was a particular problem. For one thing, normal work patterns were completely altered by the spill. Mothers and fathers were gone longer, working odd or inconsistent hours, and worn out when they got home. This caused both a problem in scheduling and a problem in behavior; stress worked on the children as well, making things harder on care-givers. In addition, there was a severe shortage of child care workers and home care-givers. The high wages of oil spill cleanup pulled workers from the traditionally lower paying child care jobs, so there were simply fewer people available to work in the child care centers. All small businesses suffered from a similar problem in the spill area. Grocery stockers, retail clerks, mechanics, and all kinds of wage workers left their regular jobs for oil spill work, leaving the business owners either working continuous shifts, or losing business because of staff and service shortages. But this problem was especially acute for child care centers, since workers must not only be

certified as qualified by the state, but also deemed safe and dependable by the parents. Exxon offered, at one point, to bring in transient workers from Valdez to serve as child care givers in Cordova, a prospect that was not only impossible under state rules, but troubling to parents.

The stress levels, the sudden flow of money, the influx of transients with no obligations or connections to the communities, all helped make day-to-day life in the spill towns in 1989 a bizarre, unsettling, and occasionally dangerous experience.

The smaller towns — Seldovia and the villages — had their own kinds of problems. They, too, had to accommodate a relatively sharp increase in strangers. Native villages tend to be somewhat closed societies. There are few really public spaces, in the American sense. Villages are more a series of private places, and the streets are more like the hallways between the rooms of a private family home. Visitors roaming around at will, using the airstrip, storing materials, or using the community hall or the school without getting full permission or consulting with village leadership, are all viewed as rude or inappropriate behavior.

As in the bigger towns, good mixed with the bad. Employment, in the form of $16.69-per-hour beach cleaning jobs, provided significant floods of cash into towns where money is usually in short supply. People were able to buy all-terrain vehicles, diesel heaters (to supplement wood heaters), and luxuries such as video cassette recorders; there were scattered reports of people investing oil spill earnings into satellite dishes for their televisions. Several of the villages (English Bay and Chenega Bay, for example) rented community-owned facilities such as docks, bunk houses and heavy machinery to Exxon or VECO, giving the local government or village corporation unexpected income.

Like in the bigger towns, however, drug and alcohol abuse rose, sharply in some cases. Alcohol abuse is probably the biggest social and health problem in rural Alaska, and villages struggle with it and against it on a regular basis. Ahkiok, at the southern end of Kodiak Island, had in previous years developed a growing sobriety movement. Where alcoholism had once affected 90 percent of the population, community efforts had nearly reversed that number by 1988, as 85 percent of the population of 100 people were considered sober. Yet by mid-October 1989, after a season of cash employment and a disruption of the local support network, sobriety had dropped to 55 percent. Crime rose with the drinking. The village had to hire a village public safety officer to handle night calls and accidents.[49]

The details of the spill response — where equipment was stored, where transients slept, how garbage and human waste were handled, how local caps dealt with the population explosion — fell to local elected officials, most of whom are volunteers or part-timers.

Local governments found themselves on the front lines more than they wanted to be. The details of the spill response — where equipment was stored, where transients slept, how garbage and human waste were handled, how local cops dealt with the population explosion — fell to local elected officials, most of whom were volunteers or part-timers.[50] City administration in most places was swamped with spill-related work: processing bills, chasing repayment from the state and from Exxon, handling extraordinary payroll and accounting duties, providing staff support to the explosion of official activities — the multi-agency coordinating committees, the "oiled mayors" group, town meetings, etc. City service workers — the police, fire department, parks managers, garbage collectors, road and street maintenance workers, dock managers and harbor masters — were working seven-day weeks. City facilities — landfills, sewage treatment plants or lagoons, community halls, schools, docks — were being filled up, overworked and under-maintained. It sounds a bit petty to stack these problems against the pollution washing up on the beaches and the animals dying, but it was a problem nonetheless. These were the details of the oil spill response system, and if the details weren't handled, the whole thing would have collapsed, stalled, or caused collateral damage.

It cost money. Some governments had good cash flow or cash reserves (Valdez, which gets most of its revenue from property taxes on the Alyeska pipeline terminal), while others did not (Cordova and Kodiak depend on sales taxes, personal property taxes, and raw fish tax shared with the state). Every extra expenditure required some kind of official approval by elected officials, and elected officials were nervous about

the fact that they were authorizing extraordinary expenditures without a guarantee they would be repaid.

Politically also, the mayors and city councils were also right on the front lines. They were, in every case, dealing with an unsettled, angry, and frustrated population with a wide variety of complaints and problems: The business owner who wasn't getting paid by VECO, the property owner complaining about the transients cutting down his trees for wood or defecating in the creek near his house, the local activists demanding more action on the beaches, the vessel owner who wasn't getting called for spill work, the taxpayers wondering who was going to cover the extra response costs if Exxon didn't.

In May, a handful of mayors from the spill-area communities coalesced into a group that came to be known as the Oiled Mayors Committee, which was loosely connected to the Alaska Conference of Mayors. The mayors met frequently throughout the summer of 1989, mostly to exchange notes, information, problems and solutions. The core membership included the mayors of Kodiak (city and borough), Valdez, Cordova, Whittier, Seward and Homer; the Kenai Borough mayor joined the group for key discussions, and some village mayors were gradually included. Attendance was flexible, depending on the issue at hand, the fatigue level of certain mayors, the patience of others, the cash available for travel, and the mood of the applicable city council or electorate in a given town.

The first issue that drew the group together in May and June was money: specifically, repayment for incremental city or borough expenses due to the oil spill response.

Some of the communities had managed to get commitments or cash from Exxon, the state government, or both. The state, through DEC, set up repayment agreements with some of the principal governments — the Kenai borough, Valdez, and Cordova — and eventually nearly all the communities were covered by agreements at one time or another. These repayment agreements were based on a provision of state law that allows the commissioner of the DEC to use the state's response fund to reimburse communities for spill-related expenses. However, the law and its prevailing interpretations at the time defined spill-related expenses fairly technically (or narrowly, as the mayors saw it). DEC, with its specific responsibility for technical aspects of spill response, traditionally paid for things with oil on them, so to speak: money for boom or supplies or wages paid directly for cleaning oil. The mayors were interested in repayment for a broader range of costs, more like emergency disaster funding than oil spill response.

In May, a handful of mayors from the spill-area communities coalesced into a group that came to be known as the Oiled Mayors Committee, which was loosely connected to the Alaska Conference of Mayors.

The mayors turned to Exxon, which had already expressed a willingness to repay out-of-pocket expenses. In some cases, the company had already made up-front payments or made commitments for specific amounts to certain communities.[51] However, the mayors were concerned because there was no equitable distribution or pattern for distributing impact funds or reimbursements. Governments with quick-thinking officials, those who had people in the right place at the right time, or those with the money and people required to travel and get access to the right Exxon officials, were able to secure commitments early. Others were not.

The mayors proposed to develop a standard community agreement that would guarantee repayment to all affected communities under the same terms, schedules, and rates. In late May, they asked Exxon officials to meet with them in the Anchorage office of Governor Steve Cowper.

The meeting went badly. The mayors had sent a draft agreement to Exxon and expected a negotiating session; Exxon sent, instead, two public relations officials who appeared to have neither the authority nor the information necessary for negotiation. The mayors, already frustrated and already under pressure from their constituents to alleviate problems at home, were left empty-handed and angry. Negotiations never got much better. Exxon eventually sent over a proposal that would have turned the cities into Exxon contractors, a prospect the mayors either found politically distasteful or contractually inappropriate. The effort to establish community agreements with Exxon fell apart in a blaze of publicity and bad feelings.

In fact, the agreement the mayors was seeking was little more than a written,

contractual expression of what Exxon was doing already. The company had already told communities it would repay them for legitimate spill-related expenses, and, even without the agreements, it paid almost $10 million in reimbursements to affected local governments in 1989. And according to one of the most influential mayors, Exxon tended to reimburse promptly.[52] The main problems, from the mayors' standpoint, were that the *ad hoc* reimbursement policy favored larger, better-staffed communities over smaller ones (since bigger cities had accounting staff or could hire lawyers and accountants to handle the issue), cities were put in the uncomfortable position of making emergency expenditures without a guarantee Exxon would accept it as legitimate, and cities were spending their own taxpayers money — up front — on a problem the taxpayers didn't cause.

"Some local jurisdictions did have reserves that could accommodate such expenditures, but others did not," a summary report commissioned by the Oiled Mayors' group reads. "There were instances where Exxon advanced funds for expected expenditures. However, there was no consistent policy or mechanism to advance funds to communities. Thus, it was the quality of individual relationships with Exxon officials, chance, political leverage, or the negotiation resources of communities that assisted with getting reimbursement or cash advances."[53]

Government officials burned out. Several moyors did not seek reelection in the fall. The turnover on city councils was unusually high (most of Seldovia's city council just resigned in the middle of the summer). The towns were a mess.

Rebuffed by Exxon in early June, the mayors then turned to the state for relief. The state, while sympathetic, did not have exactly what the cities wanted, either. The rules about use of the state reponse fund were strict; it was not a disaster relief fund, and it would probably be illegal to use those public monies on many of the things for which the cities sought payment (legal fees, for instance). The money the state Legislature had given to the Governor for emergency expenses carried a similar requirement. And in neither case could the state legally give communities up-front grants, for unspecified expenses, from response funds. As long as Exxon was willing to make reimbursements — and it was indeed writing the checks — state officials did not feel it was appropriate or necessary to stretch the rules governing the use of response funds.

All this would be little more than a discussion of intergovernment wrangling and accounting minutiae if it were not a symptom of a larger problem. There were, indeed, legitimate concerns and accounting gaps in the system the cities had to deal with. However, in a larger sense, the apparent inability of local government leaders to make Exxon do what the locals wanted done contributed to the sense of powerlessness and frustration in the towns. Government officials burned out. Several mayors did not seek reelection in the fall. The turnover on city councils was unusually high (most of Seldovia's city council just resigned in the middle of the summer). With a few notable exceptions, local governments were in upheaval. Some local taxpayers were stuck with unpaid bills. The towns were a mess.

When September rolled around and Exxon pulled out of the spill towns for the winter, there was a mix of sadness and relief. People generally didn't feel Exxon had finished the job, but they were happy to be left alone again. The summer of 1989 had presented lots of opportunities for some people to make money, but it came at a high price in the coastal towns. Local governments fell apart, friendships and relationships were stretched and broken, nerves were scraped raw, and normally small towns were confronted with big-city problems and stress.[54]

Miles of beach

The shoreline cleanup of Prince William Sound and the Gulf of Alaska began in early April, as a few work crews comprised of a handful of people each came ashore at Naked and Eleanor islands. What started on April 2 as a cluster of people wiping rocks with absorbent pads would, within six weeks, turn into the largest single private project (in terms of employment) in Alaska since the construction of the trans-Alaska pipeline.

At the height of the summer season, Exxon and its two prime contractors[55] had

more than 10,000 people working on the project. The skippers and crews of contract vessels providing support services and transportation pushed the total of the private workforce over 11,000. Exxon coordinated a military-style flight command center in Valdez that provided helicopters and fixed wing aircraft to all parties, almost on demand.

The principal complaint about the "miles of beach" standard, from the state's viewpoint, was that it had little or nothing to do with the quality of work, or even the state of the shoreline at the close of the work.

Exxon's first attempts at shoreline cleanup were limited to manual wiping and pickup of seaweed and debris, beginning at Naked Island. That project was quickly abandoned as impractical, and by April 15, a consensus had developed on the use of hot- and cold-water flush systems. Exxon and the military began bringing in barges, boilers, hoses, and portable pumps to support beach-cleaning crews, and by the first week of May, shoreline cleanup was the focus of the entire operation.

There was a considerable amount of debate and discussion in the first few weeks about Exxon's cleanup plans, the amount of shoreline targeted for treatment, and the schedules for getting it all done. Exxon would list a number of beaches, often using miles or yards as a measurement; the public and the governments usually said it wasn't enough; Exxon would expand its targets, and the process would begin all over again. The paper trail of cleanup frequently led to Exxon's daily reports, which reported in exquisite detail the number of vessels deployed, number of workers involved, number and types of various skimmers and boilers — and, finally, miles of beach treated per day, per scheduled period, and total.

Aerial view of a stretch of shoreline cleanup.
Photo by Peter Montesano

The miles of beach became the standard measurement of cleanup progress. Not surprisingly, when Exxon's final day of scheduled cleanup came around, crews were reportedly hitting that last 0.7 mile of beach scheduled to be cleaned in 1989. The schedules and numbers became their own, closed reality. If you're counting, Exxon says it treated 1,088 miles of beach in Alaska in the summer of 1989.[56]

There were several basic problems with the "miles of beach" measurement and the way it was generally perceived outside of the actual reality of the shorelines.

First, no one agreed on what constituted a "mile of beach" treated. The state had one measurement, the Coast Guard occasionally had its own, and Exxon had a third measurement that didn't match either of the first two. Shorelines were divided into segments and subdivisions, which were generally defined by natural shoreline features — headland to headland, large outcrop to small bight, and so on. Oiling was not always continuous. State monitors claimed that Exxon would count an entire segment (sometimes they were more than a mile in length), even if only a small part of the segment were actually treated, in an effort to inflate progress

reports. Monitors reported instances in which crews concentrated on working light- or moderately-oiled segments, rather than the heavily oiled spots, because they could cover more "miles of beach" and again, inflate progress reports. Competition among VECO and Exxon workcrews was sometimes intense; state monitors reported that workcrew supervisors were often more interested in meeting their schedule than doing a thorough job because they didn't want to appear to be lagging behind competing crews.

The principal complaint about the "miles of beach" standard, from the state's viewpoint, was that it had little or nothing to do with the quality of work, or even the state of the shoreline at the close of the work. A shoreline segment reported as treated, and rolled into progress figures, could easily be reoiled on a subsequent tide change — but it would not be deleted from the total.

Viewed from a perspective that brings the whole, three-year cleanup effort into the picture, the miles of beach issue becomes almost inconsequential. It disappeared from the oil spill stage after 1989, and cleanup began to be viewed more as a site-by-site operation. However, in 1989, the issue of cleanup progress was central to planning, strategy, perceptions and politics.

Exxon's first cleanup plans listed September 15 as the close of cleanup operations — not the close of operations for the winter, or the close of operations for 1989, but simply, the close of operations. Exxon's top management told its shareholders, meeting in mid-May, that the shoreline cleanup would be complete September 15.

Moreover, the oil was mobile; while Exxon's May 8 shoreline cleanup plan had listed a little more than 350 miles of beach to be treated, by June the official mileage of oiled shoreline had doubled to 700.

There were no guarantees Exxon would continue the work, and no assurances that the Coast Guard would require Exxon to continue work if the state felt it were necessary. State officials did not know if they would be left with oiled shorelines at the end of the summer, and if so, whether anyone else would be there to conduct cleanup.

By mid-summer, Exxon continued to march towards its statistical goal, dutifully adding more "miles of beach" to the cleanup totals each day. Meanwhile, its top officials were pointedly vague on the issue of whether they would continue cleanup if the shorelines needed it — and it was clear to many, especially at the state level, that knocking the surface oil off the beaches was not getting most of the oil at many sites. Moreover, the oil was mobile; while Exxon's May 8 shoreline cleanup plan had listed a little more than 350 miles of beach to be treated, by June the official mileage of oiled shoreline had doubled to 700, including large stretches in the Gulf of Alaska and Kodiak. Exxon was forced to revise its plan to deal with that new reality.

Unfortunately, Exxon was not revising its ultimate target — September 15 — nor was the company altering its position that cleanup would cease on that date. However, the language of the cleanup was changing. Exxon's promise to clean the beaches had been officially downgraded to making beaches "environmentally stable." The operative term became "treating" beaches rather than "cleaning" them.[57] Moreover, the newest problems were those occurring "downstream" from the sound, along the Kenai Peninsula and Kodiak beaches. Yet, Exxon was slow to make commitments for extensive cleanup outside the sound. In the state's eyes that summer of 1989, Exxon appeared to be basing its plans primarily on what the company wanted to do, not on what the state and the public wanted. Instead of altering its overall target to match the changing state of the problem, Exxon was changing the problem to match the original goal. It was also beginning to mount a public relations campaign that portrayed the conditions in Alaska as vastly improved, and the cleanup as an orderly and effective operation. In a pamphlet sent to the company's seven million credit card holders and handed out at Exxon gas stations in June, the company claimed that the oil was "essentially" gone from the water by mid-May, and that the company was following its comprehensive plan for cleaning shorelines "to meet our mid-September target completion date."[58] It did not mention the extent of the shoreline oiling, surface or subsurface, and it made no reference to the fact that shoreline cleaning was a messy and difficult operation in which oil was lost into the water with regularity. To state officials, it appeared Exxon was gearing up for an exit that would allow the company "to declare victory and go home."[59]

On July 15, 1989, DEC commissioner Dennis Kelso wrote a letter to Coast Guard Commandant Paul Yost, requesting that the Coast Guard secure a commitment from Exxon to continue work past September, if necessary. Kelso's letter didn't have much of an effect.

Then, four days later, news reporters obtained a memorandum from Exxon's general manager in Alaska, Otto Harrison, to other key managers in the operation. Harrison informed his staff that the September 15 date was firm, that no one should commit to anything more than a survey in 1990, and, finally, that the pull-out decision was "not negotiable." At a special Congressional hearing less than a week later, Exxon officials again stopped short of committing to continue work in 1990. This further amplified the doubts state officials had about Exxon's willingness to follow through on its earlier promises to bring the project to completion — completion to state and federal standards, that is.

The most common operating problem, reported widely and frequently in daily shoreline assessment reports from state monitors, was poor containment and minimal recovery of oil that was washed off the beaches.

From the state's perspective, all this was troubling news. The state had committed to a cleanup structure in which the spiller controlled the operation, not government, and now the spiller was claiming that the company would take unilateral action regardless of what the government wanted. As a practical matter, a unilateral departure could leave the state and federal government with the unexpected job of taking over the cleanup machinery — procurement and deployment of equipment, hiring people and contractors, collecting and disposing of the tons of waste — or actually rebuilding it from scratch. That posed the obvious threat of delays and more confusion.

Exxon's position also put the "miles of beach" issue in a new and troubling perspective: If Exxon left the cleanup and the state attempted to force the company to return, the effort would probably involve some kind of court order. And if the issue came before a judge, would Exxon contest the state's request by trotting out its charts showing that it had actually treated the requisite number of miles of beach? Was this really a measure of progress or was it part of some legal strategy? For all the company's commitments to follow through and its stated desire to have a cooperative response, Exxon had now made it clear that it felt bound by no requirements other than its own, and that its position was "not negotiable."

In reading through the popular literature surrounding the spill response in 1989, one can tell that Exxon had some doubts of its own. Top Exxon officials speculated that the state was trying to keep the cleanup going because it helped the state's legal position, or because it put jobs in Alaska and money into the economy.[60] These were preposterous assumptions, but clearly they affected how Exxon viewed the situation and expressed its position.

Looking back, this whole tempest can be viewed as occurring in a time of heightened emotions and serious uncertainty about the fate of the environment. In the longer view, the value of discussing this incident lies in its effect on the shoreline operations, not on the relations and debate among public figures.

The state's monitors on the shorelines were watching a cleanup effort that did not match the smiles of the progress reports back at headquarters. Exxon's contractor, VECO, was moving too fast and not getting satisfactory results. Those "miles of beach" showing up on the progress reports were not necessarily cleaned, and the oil coming off the beaches wasn't necessarily being picked up.

The most common operating problem, reported widely and frequently in daily shoreline assessment reports from state monitors, was poor containment and minimal recovery of oil that was washed off the beaches.[61] Among other problems, VECO crews put boom in the wrong places, took boom away before the oil inside was recovered, and left boom "gates" open too long, allowing oil to escape. It was not until July that VECO and Exxon began leaving boom at cleaned sites until adjacent areas had been cleaned; this was designed to prevent cleaned spots from being reoiled by "rogue" slicks, or by oil released because of sloppy containment at nearby areas.

However, oil containment and recovery was not as high a priority as simply washing oil off the beaches. At Snug Harbor (Knight Island) in mid-July, the state's chief contractor reported, "The same basic problems exist. They knock more oil off [the

beaches] than they can either contain or skim." He reported that as oil washed free, away from the boomed areas, "Work boats are racing through the slicks trying to disperse them with propwash."[62]

A week later, DEC monitors observed another crew at Block Island, to the northeast. "We observed a crew set up, blast oil off, pull their boom, and leave, letting all the oil go. There was not even a skimmer in the area. The same thing is happening at Ingot Island."[63]

State monitors would not "sign off" beaches when they felt work was incomplete or new oiling had been found. They were wary of signing off shorelines because they did not want to imply that this particular "mile of beach" was clean.

The skimmers deployed at many work sites were either inefficient, the wrong models, or even inoperative on occasion. One type of skimmer, the rope-mop variety, was so inefficient that Exxon supervisors sometimes refused to use them.[64]

On one occasion, state monitors reported that a cleanup supervisor had ordered skimmers into the water, even though they weren't working, so that observers passing over by air would be fooled: "Since we have gotten good at finding where they stash equipment on barges instead of using them they are now putting some of these things in the water whether they work or not. I've found three mini-skimmers this week that were put in the water even though the crew said they were not operational. They said that the foreman told them to do it because it looked good if someone flew over and everything was out on display."[65]

The real problem with skimming and recovery was that it took time to do it properly. With speed and "miles of beach" as the operating goal, it was easy for some crew chiefs to get lazy and concentrate on washing rather than collecting.

In addition, there was virtually no effort to address the problem of oil beneath the surface of the beach — a problem that had not necessarily been anticipated, and which was becoming increasingly obvious to state monitors. The problems appeared to be running ahead of the plans, and the people making the plans seemed unwilling to acknowledge this fact. When state monitors raised these issues — incomplete work, sloppy containment, an emphasis on speed rather than quality — it led to daily confrontations on the shorelines. Generally, Coast Guard monitors were willing to leave behind more oil than the state monitors. When state monitors refused to certify a beach had been completed — or, "signed off," since the federal-Exxon work order had a spot for the three officials to sign on completion — it led to constant and daily reports of conflict.

Ultimately, the decision to end cleanup of one area and move on came down to two sets of eyes: The Exxon or VECO supervisor, and the Coast Guard monitor on the scene. The state was somewhat isolated, as its status was viewed as diminished in authority to that of the Coast Guard Photo by the U.S. Coast Guard

State monitors would not "sign off" beaches when they felt work was incomplete or new oiling had been found. They were wary of signing off shorelines because they did not want to imply that this particular "mile of beach" was clean, and they didn't want it to show up that way in the official progress reports. They didn't know if Exxon would ever be back, so they did whatever they could to get the VECO crews to get as much oil as possible whenever possible. When they saw crews moved because of schedules, rather than oiling, they saw work delayed or not done unnecessarily.

"Perhaps these delays and deferrals of treatment would not have been so controversial if time had not been a factor as well," one of the state's chief monitors wrote in a

1992 summary of cleanup actions. "Time factored into the situation in two ways. First, there was a limited season in which to accomplish all the cleanup work that was necessary before foul weather and winter storms prohibited further work. Many felt that it made sense to concentrate energy toward treating the more heavily oiled areas as completely as possible rather than spreading out the resources in order to nominally attend to all the areas."[66]

Trying to hit everywhere, rather than hitting heavily oiled beaches and staying there until the work was done, had an effect on recovery rates at the heavily oiled beaches. The longer the oil sat there, the tougher it was to remove, and the more it was able to soak into the beaches. From the perspective of the monitors working the beaches, Exxon or VECO's apparent desire to increase tallies for reporting purposes had a negative effect on the recovery effort at the heavily oiled and damaged beaches.

The deterioration of relationships or the lack of real cooperation should be considered as something more than petty bickering or intergovernment turf battles, or as subjective judgments about who was the good guy and who was the bad guy.

Much of this shoreline trouble can be attributed, perhaps, to differing subjective interpretations of general instructions and goals. The first year's mission was to remove the "gross contamination," and while headquarters tried hard to put some kind of consistent, less subjective standards to that instruction, ultimately, the decision about moving came down to two sets of eyes: the Exxon or VECO supervisor, and the Coast Guard monitor on the scene. The state was somewhat isolated, as its status was viewed as diminished in authority to that of the Coast Guard. If the Coast Guardsman went along with the Exxon man's call, the state monitor either had to use persuasive powers to keep the crew on site, work out some kind of compromise, or make a protest back to the home office.

Additionally, Exxon mounted, for much of the summer, an aggressive campaign to gain approval of its kerosene-based solvent, Corexit.[67] Exxon lobbied for test after test, each time insisting — over the observations of state and federal monitors — that the test was a success. The people in the field, who observed in test after test the inability of crews to contain and recover the solvent mix that washed off the beaches, grew more skeptical of Exxon's motives with each successive, unsuccessful test. It did not help when, during one test, DEC caught Exxon contractors racing around outside the boomed-off test area, using the propwash from their skiffs to break up or disguise any Corexit-oil-water mix that got away.[68] Many DEC staff viewed the Corexit campaign as an attempt by Exxon to take a cheaper, easier cleanup route. The solvent would get oil off the surface and get the pressure off Exxon to really clean all those "miles of beach."

The "miles of beach" figure was a hollow statistic. Monitors in the field saw how hard VECO and Exxon (and, to some degree, the Coast Guard) tried to fulfill quotas, satisfy schedules, and rack up miles, sometimes to the point of putting the quotas above results.

It is hard to ignore the fact that relations among the various representatives on the shoreline were poor more often than they were good. While some crews were better than others, some supervisors were more helpful than others, some Coast Guard monitors were more cooperative than others, and some state monitors were more skillful and better-trained than others, down on the beaches, mistrust and misunderstanding were more common than cooperation and mutual support. It is hard to quantify what effect, if any, this had on the effectiveness of the cleanup, but it certainly led to short nerves and high stress.

State monitors tended to have disagreements with Coast Guard monitors, but the most frequent and most troublesome often included Coast Guard reservists, rather than fulltime active duty officers and non-commissioned officers. The Coast Guard also tended to rotate people in and out after fairly short stints. This meant that every two weeks, there was a new person's personality to gauge, a new bridge of trust that had to be built; any spoken or unspoken agreements with the previous "Coastie" were rendered moot, and any lessons the previous one learned had to be relearned by the next one.

The deterioration of relationships or the lack of real cooperation should be considered as something more than petty bickering or intergovernment turf battles, or as subjective judgments about who was the good guy and who was the bad guy.

First, from an organizational standpoint, entities such as the Interagency Shoreline Cleanup Committee (ISCC) and the Technical Advisory Group (TAG)[69] were fertile ground for misunderstandings. The rules were developed over time, and at times the intent, authority, and the procedures of the joint response were somewhat fluid. There was no commonly developed set of administrative procedures, no manual, and little precedent. Indeed, the roles of Exxon, the public, and some government agencies themselves were alternately unclear, unprecedented, or truncated.

In addition, training of field staff was not consistent or always complete. Definitions used in making decisions were sometimes subjective. Field procedures (such as the "signing off" of treated segments) were not clearly understood or defined, especially in terms of what effect the action would have on future cleanup efforts.

Exxon burned some of the waste from cleanup at an empty gravel pit near Valdez. The waste before separation was a mix of oiled seaweed and debris, oil-soaked absorbent pads, oil-soaked plastic stringers (pom-poms), oil-soaked absorbent boom, rocks, sand, wood, and garbage generated by the cleanup crews.

Photo by Rob Schaeffer

Dispute resolution was not good, especially in the field; it nearly always involved someone losing face or being embarrassed. A DEC monitor could get a Coast Guardsman or VECO or Exxon supervisor overruled, but that meant an appeal to a higher-ranking officer or supervisor at DEC and the Coast Guard and Exxon. Someone was bound to lose — and lose out in the open for everyone to see — under this system. And given the high stress, the pressure, and the importance of the operation, there were frequently poor losers and ungracious winners. This caused more stress and further broke down trust and working relationships. Making up the rules and the structure as one goes along simply will not work in an emergency.[69]

Similarly, the lack of an established procedure for testing, certifying the safety, and approving of new techniques or products — rapidly — also helped exacerbate whatever bad feelings existed. The first real problem was with Corexit, the second was over bioremediation. The state and public felt Exxon and the federal government were pushing the products too hard and too fast; Exxon (and sometimes some federal agencies) felt the state and the public were too cautious or had ulterior motives for opposing the product or requesting more testing.

A third major dispute, this one about waste disposal, flared and subsided several times through September. Exxon wanted to burn most of the tons of oily waste coming back from the work crews. The waste was a mix of oiled seaweed and debris, oil-soaked absorbent pads, oil-soaked plastic stringers (pom-poms), oil-soaked absorbent boom, rocks, sand, wood, and garbage generated by the cleanup crews. The primary storage site was an empty gravel pit at at the base of a mountain off the Dayville Road in Valdez, about halfway between town and the Alyeska terminal. At the site, workers took the waste from plastic bags, separated organics and plastics, rebagged the separated waste and stored it in separate piles building up in lined pits. The main pile was about 100 yards long, a bit smaller across, and by July the waste was more than 30 feet high.[70]

Exxon was burning some of the waste in three small, gas-fired incinerators brought to the site. The company got an air quality permit for the burning from DEC with relative ease. The problem arose when Exxon proposed to bring in one or more larger

incinerators that could handle more volume — and would, most likely, generate much greater air emissions with much greater concentrations of particles, carbon monoxide, and other noxious gases and compounds. The public, alerted in part by an environmental group that warned (somewhat specutively) of emissions of the dangerous carcinogen dioxin, wanted to be included in any decision to consider where the incinertor would go and what levels of emissions were safe. In essence, the public wanted the kind of access to the decision-making process that they are entitled to have under state environmental regulations and public meeting laws.

As noted in chapter one, the state had insisted from the start that regardless of the cleanup command structure, its public agencies would retain their usual authority to consider and issue permits for land use, waste disposal, and so on. The permitting process was, in fact, one of the few points of direct access and control the general public had over the cleanup. In this case, the public wanted to be considered in any decision that could transform shoreline pollution into air pollution.

But ultimately, the problems with the incinerator – like Corexit, like bioremediation, like the shoreline disputes and clashes of authority – were rooted in the fact that people were trying to deal with complex public policy and technical problems under crisis conditions.

Exxon applied for air quality permits in June, even though the incinerator wasn't yet in Alaska, and even though it had not been decided which type of incinerator would be used. There were several options, including at least one device that didn't actually exist yet. The permits went to public hearing.

Anyone who has worked on a siting process for an industrial facility or a landfill would recognize the kinds of questions and issue raised at the meetings. Naturally, no one wants to have an industrial site for a new and unexpected neighbor, and everyone wants full assurance that if the plans go through, that they won't get sick and their kids won't get sick from the emissions. This type of process usually takes a fair amount of time, involving at least two sets of information and interpretation (one from the government, one from the permitee). The resolution of these issues generally has less to do with technical issues than with a general issue of trust: The public will not oppose, or will limit its stipulations to a permit, based largely on whether it trusts the permittee to be careful and it trusts the government to keep an eye on the situation. This always takes time, and it always demands good communication and negotiation skills.

The process is not well-suited to an emergency, especially an emergency that had generated so much fear, uncertainty, and mistrust in the communities. Exxon's first visits to communities in the early days of the spill were difficult, partly because people were angry, partly because Exxon didn't get representatives to a number of places quickly, and partly because they didn't always respond well to the situation once they got there. Generally, people in the communities did not trust Exxon.

In addition, the public was unsure about the state's ability to take control of the situation. They saw Exxon running some things, the Coast Guard running others, and the state without a direct way to make Exxon or the federal government do what the people wanted done. They didn't trust the system to work for them.

Not surprisingly, these attitudes — coupled with the usual and well-documented process involving environmental health permitting — made Exxon's proposal rather unpopular. By August, Exxon had an incinerator, and the site it wanted — a sheltered area of Viekoda Bay on the west side of Kodiak Island. The site was, however, "upstream" from the village of Port Lions, and the people didn't want to have the incinerator emissions blowing into town or passing over the village's drinking water source, a lake in the mountains between the bay and the village. The opposition was exacerbated by the dioxin issue raised by the environmental organization earlier in the summer. The group said that burning seawater-soaked waste would probably cause chemical changes that would create dioxins, which would come out the smokestack. It wasn't a completely solid argument, but it wasn't so far-fetched, either.

However, "dioxin" is synonymous in the public mind with the town of Times Beach, Missouri, the little southern hamlet whose soil and waters were so contaminated with dioxins that the federal government moved everyone out and started a highly publicized, enormously expensive Superfund cleanup. In the public mind, dioxin *plus* people *equals* cancer. Port Lions wanted nothing to do with Exxon's incinerator. The people in the village did not want to be the victims of a second pollution

problem caused by the Exxon spill.

After much debate and public discussion, DEC granted Exxon an air quality permit for the incinerator on August 28. However, the Kodiak Island Borough, citing certain provisions of the federal Coastal Zone Management Act, said the permit was flawed because the state had failed to determine whether the permit was consistent with Kodiak's local coastal management plan. The state did not contest Kodiak's claim, but the issue became suddenly moot on September 9, when Exxon decided to cancel the incinerator plan and ship the waste instead to a hazardous waste disposal site in Oregon. The company was bitter about the whole issue, and sent out a stinging press release, complaining that state roadblocks and bad faith had killed a logical and local solution to the waste disposal problem.[71]

On Sept. 15, the day the Governor announced the state's winter plans, the Coast Guard resolved the issue of whether Exxon would return for cleanup in the spring.

The reality of the situation was considerably short of what Exxon claimed. For one thing, Exxon had a lot of trouble getting the Kodiak incinerator to burn hot enough and completely enough. Mechanical problems plagued the burner, and it was not clear whether the thing would have worked anyway. For another, Viekoda Bay was not Exxon's only option. The company could have tried to take the incinerator to another, more remote site, but the most logical alternatives were primarly in or near national park and preserve lands. Air quality permits in those types of areas carry an additional set of requirements designed to protect the wilderness qualities of the federal parklands. Exxon apparently didn't want to test that system.

But ultimately, the problems with the incinerator — like Corexit, like bioremediation, like the shoreline disputes and clashes of authority — were rooted in the fact that people were trying to deal with complex public policy and technical problems under crisis conditions.

Had the industry done effective research and development on shoreline cleaners such as Corexit years before, there would have been no reason to shoehorn several years of research and regulatory activity into a few weeks or months during an emergency. Had large-scale solid waste disposal been a part of the area's oil spill contingency plan, the battle over the incinerator might not have turned so bitter. Had the governments and industry worked out a better unified command system for spill response before the spill — and drilled it many times — issue management and decision-making might have been smoother and less confrontational. Had the public been presented a more realistic picture of the relative effectiveness of oil spill response during the building of the pipeline, perhaps citizens would not have been so outraged when the response efforts failed so completely, so quickly.

3.5 Transition, 1989-90

The scheduled date for "demobilization" was September 15, but Exxon began scaling back operations on Kodiak and in the Kenai Peninsula zones as early as August 2, citing safety and logistical demands. Exxon's plan was to pull back to Prince William sound's relatively sheltered areas before the onset of fall and winter storms, then phase out the Sound's cleanup by the September 15 deadline.

The Coast Guard had expressed some support for the state's position that Exxon should finish the job, even if it took longer than the 1989 season. But the issue of whether Exxon would return in 1990 remained unanswered right up through the final days of the 1989 season. Exxon had submitted a "winter plan" on August 15, which was limited largely to overflights and some beach monitoring to track changing conditions.

The state felt that there was still time to conduct shoreline cleanup past September 15, using smaller, more mobile crews and sticking to sheltered areas. Exxon flatly disagreed, saying it was unsafe to be on the water during fall and early winter. The Coast Guard remained neutral, although its commanders went along with the Exxon demobilization and gave a stamp of approval to the company's winter monitoring

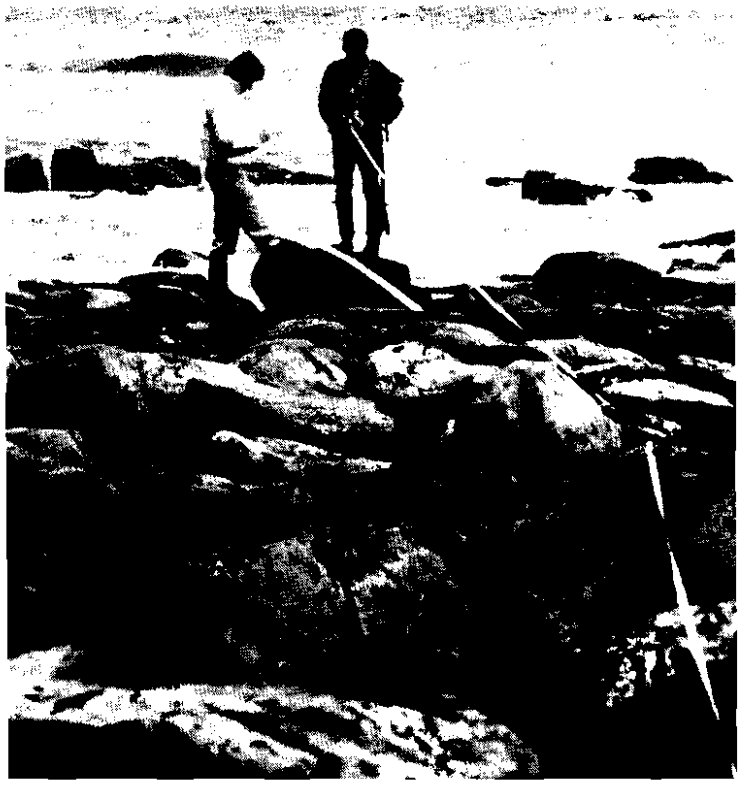
plan.

State officials began preparing the government's own winter plan, a modest, $21 million effort that would include some shoreline monitoring, overflights of some problem areas, scientific analysis of the fate of the spilled oil, and a small cleanup effort conducted by individual communities. The winter plan also included $960,000 in grants to mental health providers in the region who would use the funds for counseling, crisis intervention, and treatment for depression, substance abuse, and domestic violence.

On Sept. 15, the day the Governor announced the state's winter plans, the Coast Guard resolved the issue of whether Exxon would return for cleanup in the spring. Commandant Paul Yost, speaking at one of the many press conferences held in Valdez that day, praised Exxon's effort to put together the cleanup army and navy. However, he added, "They didn't finish the job. There is more work to be done and Exxon will have to come back in the spring to do it." The Coast Guard also added that Exxon had made a commitment to both Yost and U.S. Secretary of Transportation Samuel Skinner that the company would return for cleanup.[72]

That issue settled, each of the main parties to the response settled back to plan for the coming year.

The "walk-a-thon," winter surveys, and evaluation of conditions



DEC employees conducting the first comprehensive shoreline survey at the end of August of 1989, Cape Douglass, Alaskan Peninsula. The survey was conducted on foot and covered what the agency had identified as all oiled areas from Prince William Sound to the Alaska Peninsula Photo by Vanessa Vick

During most of the first season, different entities carried out shoreline and resource surveys, sometimes on their own and sometimes together. The first resource assessment teams included state and federal officials working with Exxon, while the first shoreline cleanup assessment teams were hired and staffed by Exxon.

At the close of the 1989 cleanup season, DEC launched the first comprehensive shoreline survey, covering what the agency had identified as all oiled areas from Prince William Sound to the Alaska Peninsula. Unlike earlier surveys, which sometimes included visual inspection of surface conditions from the air, the DEC "walk-a-thon" covered all areas on foot; cliffs or other steep, exposed rocky faces were inspected at close range from skiffs.

The result of the survey was 1,100 pages of maps and oiling data that DEC staff used to evaluate several important kinds of conditions.[73] The maps described where the oil was, the state of the oil (asphalt, tarmat, mousse, etc.), and the extent of the oiling (heavy, moderate or light). The survey located debris and forgotten caches of used pom-poms and boom, other garbage, and even gear such as hardhats and shovels left behind from the 1989 cleanup season. DEC noted trash or debris at 421 locations in the spill area, and picked up what they could given the limitations of manpower, transportation, and storage.

Teams identified 117 miles of shoreline[74] that remained heavily or moderately oiled. Of that total, more than 30 miles of serious oiling was located in sheltered areas, where wave and weather energy was limited. These were the areas that would rise to

the top of cleanup priority lists, not only because of the oiling conditions, but because the sheltered areas were, naturally, the places animals and people tended to use heavily.

The survey also showed that even shorelines exposed to heavy weather and wave action were holding oil; 85 miles of heavy and moderate oiling were in relatively exposed areas. This was interesting from the standpoint of persistence of oiling, or as a partial judgment of the effectiveness of cleaning over the summer. As a practical matter, these shorelines were not likely to be high-priority cleanup sites six or seven months later; the winter storms and high-energy pounding at exposed sites were expected to reduce the surface oiling considerably. And indeed, that is what happened, for the most part. As early as November, some of the most exposed beaches — Point Helen at Knight Island's southern tip — were already fairly clean-looking on the surface. The pounding of the waves, and the grinding of the large cobbles were scouring even tough, tarry coat off much of the shorelines. Mid-winter surveys in January conducted by state, federal and Exxon teams confirmed that high-energy shorelines were losing surface oiling fairly quickly.

The 1989 DEC "walk-a-thon" shoreline survey discovered 224 locations where subsurface oiling was significant enough to note. In some places, oiling began five or six inches below the surface; in a few places, it was as deep as 28 inches. The problem persists, as shown here during another survey in Northeast Herring Bay in 1991.
Photo by Patrick Endres

The walk-a-thon teams and the mid-winter surveyors also began to confirm known problems and discover some new ones as well. The most frustrating problem was the widespread presence of oil underneath the beach surface.

The DEC walk-a-thon discovered 224 locations where subsurface oiling was significant enough to note. It varied in both depth, character and distribution. In some places, oiling began five or six inches below the surface; in a few places, it was as deep as 28 inches.

Teams identified 117 miles of shoreline that remained heavily or moderately oiled, more than 30 miles of serious oiling was located in sheltered areas, where wave and weather energy was limited.

It got into beach sediments several different ways. In some cases, it was a combination of heavy oiling and slow cleanup progress. Oil sat on the beaches so long that it began to seep down between boulders and cobbles and saturate the fine sediments underlying the rocky "armor" of the surface. In other cases, the oil was pounded into the sediments by wave action, high-pressure hoses, or some combination of the two. And in still other cases, wave energy threw clean cobbles and gravel from one part of a beach on top of oiled gravel, literally burying the problem. This occurred primarily during storms, high tide cycles, or a combination of the two. This particular subsurface oiling problem would be among the most persistent of the entire spill response period, since the oiling was pushed into the uppermost stretch of the beach. This area, generally referred to as the "storm berm," was the least morphologically active zone, and therefore the oiling was not subject to the frequent pounding, grinding, or washing action in the lower, more active beach zones.

In the summer of 1989, oiling was initially described simply as heavy, medium or light.[75] But during the walk-a-thon, oiling characteristics became just as important. Oil

weathered at different rates and took on different forms. Surface oil (especially as weather turned colder) became less mobile, stickier, and tended towards a tarry crust, coat or stain that was hardened on the rocks. In other places with finer sediments near the surface, oil and mousse consolidated with beach material into patches of asphalt and tar, not unlike what happens to a dirt road where oil has been sprayed as a dust control technique. These asphalt patches and tarry mats, where they occurred, were scattered across the beach surfaces like islands, although in some cases the patch could be tens of meters wide and long. In boulder fields, and on beaches with bigger cobbles, tarmats and asphalt formed in the cracks and niches between the rocks.

The subsurface oiling ranged from fine sediments with traces of oil to others that were completely saturated with oil or mousse. Occasionally, where larger cobbles had been buried under layers of clean rocks thrown up by wave action, one could dig and scrape through a foot or more of bigger rocks before reaching the oil-coated layers now deep in the beach.

Figuring out the distribution of the oiling — especially in the subsurface areas — was very difficult, not only in terms of observation but in terms of physical effort. The standard tool used in the analysis was a short-handled clam shovel, which has a longer, thinner blade than the usual garden spade. Survey crews used previous oiling information, practical knowledge of oil movement, strong backs and arms and the clam shovels to dig deliniation pits all over a shoreline segment. Ironically, this process — geomorphological analysis, knowledge of what kinds of sediments or formation tend to hold oil, drilling of discovery and delineation "wells" — was just a manual, small-scale variation of how oil companies look for oil when they are trying to find some to sell. And, as in discoveries of oil in commercial fields, the survey crews found that subsurface oiling was frequently scattered and discontinuous. It was often hard to truly "map" a subsurface deposit because of the amount of physical labor involved. A surveyor might start following a lens or streak of oil-saturated sediment, but he or she might be limited by the amount of gravel that had to be moved, or the amount of time allocated for the survey itself. The result, however, was remarkably useful and fairly dependable, especially considering the level of the technology.

The DEC walk-a-thon was significant for both strategic and technical reasons.

The state's survey became its baseline for analyzing information gathered in subsequent surveys. It also gave some definition to the subsurface oiling problem that had been generally anticipated, but not fully described, during the 1989 cleanup season. The techniques, terms, and operational goals set and achieved by the survey also became, more or less, the basis for a standard survey methodology. There were more exact ways to figure out where the oil was and what it was like — rigid transects and chemical analysis, for example — but for the purposes of figuring out cleanup plans, the survey was the right mix of common sense observation and technical accuracy.

After the log boom construction of Exxon and the hatchery defense of the state and the Cordova fleet, area citizens were largely relegated to the sidelines.

Strategically, the survey was especially important for both the state agencies and the Alaska public. The walk-a-thon was the first and last comprehensive, truly independent government survey conducted on the shorelines. It helped set the agenda for the spring 1990 survey and cleanup process.

However, each subsequent area-wide survey through 1992 would become a "joint" operation, planned by a state-federal-Exxon planning team and orchestrated logistically by Exxon. The areas to be visited, the schedule and timing of the surveys, the description of the problems, the definition of the threat, the setting of cleanup goals based on the survey — all these would become a "joint" process.

There were some obvious benefits to this. The logistical demands of an area-wide survey and the enormous amount of data interpretation that followed would be difficult for a relatively small state organization to handle consistently. Also, there was the issue of duplication of surveys by various organizations, which was neither cost-efficient nor likely to produce consensus. Subsequent surveys were designed such that all the organizations were looking at a given problem at the same moment in time, so the information generated was as close to standard as possible.

However, the "joint" survey system, like the "joint" cleanup command and management structure, had disadvantages for the state. On all subsequent surveys, shoreline crews would debate definitions, argue over scheduling and progress, and disagree about how many pits should be dug or how far they ought to follow a lens of buried oil. The state's fall 1989 walk-a-thon, however, gave state shoreline monitors extensive information and practical experience that would allow them to work within the "joint" system from a position of technical strength and confidence.

In July of 1989, a group of volunteers calling itself the Homer Area Recovery Coalition raised money from private donations and headed for Mars Cove, a heavily oiled area in the Kachemak Bay State Wilderness Park on the Kenai Peninsula.

Photo by Vanessa Vick

Local response

Not surprisingly, the people the of the spill area wanted to be involved in the response. There was a general sense that the oil spill was threatening not just the economy and resources of the year, but the very existence of the coastal communities themselves.

Unfortunately, people weren't sure where they fit in the response system. DEC was largely a technical agency and its primary role was oversight and monitoring, not independent cleanup action. And in any case, no part of state government was prepared to organize and deploy volunteers. The Coast Guard is a military organization; nothing in the National Contingency Plan, which defined the Coast Guard's mission, was aimed at community response. Other federal agencies had specific, resource-based responsibilities — national forest or parklands, marine mammals, etc. — so their focus was away from communities as well. And, of course, there was Exxon, a private corporation building its response plans and organization from the top down, not from the communities up.

DEC and the Cordova fishing fleet did work successfully together on a volunteer response effort at the Sawmill Bay hatchery site, where local Chenega Bay residents also went to work for wages or as volunteers with the state. However, this effort turned out to be unique, and the arrangement short-lived; Exxon took over contracting, planning, and logistics in May.

Exxon did realize that it made sense to include local people in the response, even if it were little more than an expression of good faith or an act of good public relations. The company did put some locals to work in both Kodiak and Homer, where people built improvised booming systems made from felled logs bound together with cable. However, while some log boom made it into the water, far more was left on the docks and in boatyards, and what was used proved only marginally useful. After the log boom construction of Exxon and the hatchery defense of the state and the Cordova fleet, area citizens were largely relegated to the sidelines.

Many found employment as shoreline cleanup workers or rented their vessels and services to Exxon and VECO. In many Native villages, everyone who wanted to work, could work — for VECO or Exxon — but this was not quite the same thing as true

community-based response. The plans were made by the remote response leaders, and the orders came from Exxon or VECO supervisors. People couldn't dictate where the crews went, and couldn't establish cleanup standards for the areas near their towns. They couldn't direct VECO to do something differently and couldn't implement innovations or better ideas about cleanup. In some cases, they couldn't even have the tools they wanted — even something as simple as shovels.[76] Many felt alienated and used rather than involved.[77]

Throughout that first summer, state representatives from DEC and Fish and Game, right up to the Governor's office, reported repeated requests for a state-based response from community activists and leaders. Finally, in July, a group of volunteers calling itself the Homer Area Recovery Coalition (HARC) raised money from private donations and headed for Mars Cove, a heavily oiled area in the Kachemak Bay State Wilderness Park on the Kenai Peninsula. The stated intention was to clean every rock, and to show that community-based cleanup was a real alternative to Exxon's corporate cleanup. HARC's leaders also intended to demonstrate a small rock-washing device developed by local residents.

In March and April of 1990 more than 150 people from Kodiak Island, Cordova, Whittier, Chenega Bay, Valdez, and Chignik picked up 128,000 pounds of oily waste – 15,000 pounds of it oily debris left behind by workers in 1989.

The idea caught on with Governor Cowper, who was sympathetic to the idea of community-based cleanup and a believer in home-grown technological innovation. DEC, with Cowper's approval, came up with a modest grant program designed to provide incentives to organizations that had better ideas about how to conduct shoreline cleanup. HARC received about $40,000 in support from the state, and Kodiak residents got a small grant to help them expand a home-grown testing program that used an absorbent fabric called "geotextile" in several different cleanup configurations. Neither technique got much further than testing and limited application; HARC's Mars Cove project ran through early September, and fell somewhat short of its goal to clean all of the cove's shoreline. If community-based response were to happen on a larger scale, it would require more funding and wider planning and logistical support.

In August, during an annual strategy session between the Governor and his Cabinet, Steve Cowper asked DEC commissioner Kelso to come up with a plan for community-based cleanup. Kelso and DEC management staff used the tools — and the funding — they had at hand: Under the statutes governing the state's response fund, DEC could execute memoranda of agreement with local governments under which communities could undertake response actions on behalf of the state. The statute allows the DEC to reimburse communities for the cost of response actions.

The Governor announced the program on September 15. However, it took six weeks and considerable drafting and redrafting of work plans and agreements before the program firmed up. On October 31, DEC announced that it would spend $6 million on community-based response through the spring of 1990. The bulk of the money was slated for shoreline cleanup, ranging from $2.1 million to the Kodiak Island Borough to $172,000 to the village of Tatitlek. Local coordinators, working under the umbrella of the city or borough government, would hire and train workers and put them in the field.[78] Unfortunately, the workers didn't make it to the shorelines until late winter and early spring of 1990.

The Local Response Program was, at first, plagued by the same kinds of problems experienced by the Oiled Mayors in their search for "impact funding" or some other broadly defined support from the state and/or Exxon.

Ideally, the communities wanted to put crews in the field to do the cleanup they wanted, the way they wanted, without interference from Exxon, the Coast Guard, or, to a certain extent, the state too. Cordova, for example, wanted to use its grant, in part, to implement an idea that had been floating around since the early days of the spill: Locals would put to sea, collect oil, and return it to Cordova where they would be paid a "bounty" based on how much they collected. While that may have worked to some degree had the bounty program been instituted when oil was fresh and on the water, it was less practical in fall and early winter, when the problem was on the shorelines. It raised the question of judging the "worth," for the purposes of a bounty payment, of oil or mousse with varying concentrations of weathered oil and water and sand. It

raised questions about management and liability, handling and disposal of oily waste, safety of people going out for the bounty, and other problems. DEC felt the bounty proposal was less effective than other methods — i.e., conventional manual shoreline cleanup by vessel-based work crews — and not as safe. DEC turned down the Cordova cleanup plan and asked the locals to come up with something else.

Eventually, Cordova came up with a plan that concentrated on picking up spill-related trash and cleaning certain high-priority shoreline, and, in fact, it got good results. But Cordovans didn't like the fact that DEC had, in effect, overruled popular will about cleanup. Similar planning problems occurred in other spill-area communities on the program.

The problems were a result of high expectations on each end: The locals had high expectations about what they could do and how they could do it; the DEC had high expectations about safety of the workers, effectiveness of the program, and accountability for spending public money. If the government were going to pay for a shoreline cleanup program, the government had to make sure that its cleanup crews complied with federal and state labor safety laws, state waste disposal regulations and land use permits, and so on. The DEC also had to make sure that any public money spent on cleanup was spent on something that produced good results for the money invested. More specifically, since the money was coming from the state's response fund, any cleanup had to meet the standards governing how the fund is used. By law, DEC has to try to recover any expenditures from its response fund from a third party — the federal cleanup fund or a spiller, primarily. To certify that local response was recoverable, DEC had to make sure the local cleanup met some basic standards for need and for effectiveness. To make sure of all this, the DEC required that communities submit a work plan, and that they do only work that was approved by DEC. Communities didn't necessarily like this, and the preapproval was one of the stumbling blocks to speedy implementation of the Local Response Program.

A bigger stumbling block, from the local governments' standpoint, was the cost. There were some minor financial and administrative problems — most communities had to buy additional insurance to meet the increased liability of putting workers on remote shorelines, example — but the biggest problem was the reimbursement provision. Under the law governing the state's response fund, the DEC commissioner can *reimburse* communities. But the communities wanted *grants* — money up front. They argued, probably correctly, that most communities didn't have the ability to finance million-dollar cleanup programs — which they hadn't budgeted for — from existing cash flow or cash reserves. They also complained that the reimbursement process would require them to do more paperwork, and that it would take too long to get their money back. The work plan requirement would eventually work itself out, but the financing problems were more fundamental and would take even longer to resolve.

In December, long after everyone had concluded there would be no local response in 1989, the state and the communities each swallowed their concerns and the program went ahead in March and April of 1990. More than 150 people from Kodiak Island, Cordova, Whittier, Chenega Bay, Valdez, and Chignik picked up 128,000 pounds of oily waste — 15,000 pounds of it oily debris left behind by workers in 1989. Communities mounted a similar effort in October 1990, after the close of the Exxon summer cleanup.

The local response model — small crews, small vessels, flexible workplans — was more like what the state thought was appropriate and effective on the cleanup after the big summer of 1989. The crews demonstrated that cleanup did not have to always be on the same large scale mounted by Exxon, and that shoreline cleanup could proceed safely and effectively before and beyond the limits set by Exxon.

Newport Beach

The basic strategy for the 1990 summer cleanup was developed and discussed at a

meeting during the first week of February in Newport Beach, California. Exxon sponsored the technology workshop, which was attended by state and federal resource agencies, consultants to both Exxon and the state government, and the Coast Guard. Several follow-up sessions, some held solely among state agencies, were held in Anchorage over the second and third weeks of February.

Bioremediation gained state approval for cleanup in 1990. Mechanical equipment was used much more widely that summer. Tons of oily sediment were actually removed, rather than simply exposed.

These meetings largely determined what techniques would be used in 1990 and what the process would be for making cleanup decisions. In a more indirect way, the participants framed several important policy and technical issues, such as establishing the risk from the remaining oil, and determining in a general way what types of cleanup would prove more harmful than leaving the oil in place.

The first document used for planning purposes was a summary of expected field conditions and draft cleanup recommendations prepared by National Oceanic and Atmospheric Administration (NOAA) staff, who served as science advisors to the federal on-scene coordinator.

NOAA staff suggested that based on experience from other spills in similar environments, high energy beaches would probably be "relatively free of oil." Sheltered areas probably would not have changed much over the winter, NOAA suggested, and subsurface oiling would still be present. The cleanup strategy, the agency felt, should tend towards less activity rather than more, with an emphasis on manual work with hand tools or bioremediation. The exceptions to this general rule would probably occur in sheltered areas covered by large tarmats or asphalt stretches, or where subsurface oiling was very heavy. In those cases, the mechanical equipment would be acceptable, but only under close supervision. Further, NOAA said, tilling should be delayed until fall, when commercial fishing seasons were mostly over. The rationale was that tilling would release oil into the water and could jeopardize fishing activity. Where heavy subsurface oiling threatened shellfish beds, bioremediation should be used to reduce the threat.[79] The Coast Guard staff elaborated slightly on the NOAA draft, adding, in a recommendation to the federal on-scene coordinator, that bioremediation be considered a "primary" treatment.[80]

The state agreed in very general terms with the NOAA strategy; it was, of course, important to be prudent about the use of mechanical equipment, and careful that cleanup not unduly disrupt sheltered environments. Bioremediation would, indeed, be a good way to address these concerns, but only if certain questions about its effectiveness and toxicity were answered — which, at the time of the NOAA draft, they had not. And, of course, protecting commercial fishing openings was, as usual, among the state's highest priorities.

However, the state had several concerns about the NOAA/Coast Guard approach. The first was the assumption that bioremediation was a treatment of choice at that point; it was not. The second was that bioremediation would work well on subsurface oil; the only data to support the assumption came from limited Exxon laboratory tests.

The third, and perhaps most difficult for the state to accept, was the overall implication that oil should only be broken up and exposed to sun and wave action; this apparently ruled out actual removal of oiled sediments, or actually cleaning beaches with water, a rock-washing machine, or some other technique. It also appeared to limit or exclude the possibility that work crews could boom off work sites, as they were supposed to do in 1989. Although there had been serious problems with proper worksite booming by crews the previous summer, there was no reason to believe that the effectiveness could not be improved by better supervision and more care.

"The state should clearly object to this proposal on the basis that significant quantities of oil still remain, and treatment should continue if technologies exist to allow further recovery without undue harm to the environment," the state Department of Fish and Game wrote in its comments on the recommendations.[81]

Also on the table at Newport Beach was discussion of a "decision key," which

was essentially a flow chart that would serve, ostensibly, as a guide to determine which oiling conditions would trigger which cleanup technique. As part of the decision key, the terms describing oiling conditions, which would become standard *Exxon Valdez* lexicon, were introduced formally.

The decision key would be used in the Technical Advisory Group (TAG), a new working group that would prepare site-specific cleanup recommendations for the federal on-scene coordinator's review and approval.

Underlying the standard terms, the decision key, and the TAG was the premise (really a paraphrase of both state and federal cleanup requirements) that cleanup should never do more harm than good, or, as it was later phrased, that it should achieve a "net environmental benefit."

Areas of disagreement over 1990 cleanup plans

- **Throughout 1990, survey crews and work supervisors clashed over definitions of oiling conditions;** one monitor's OP – which triggered more aggressive cleanup – was another organization's HOR – which triggered a less aggressive or easier-to-accomplish technique.
- **Decision-makers and field monitors fought about the decision key**; one organization's "guideline" was another monitor's "requirement." One of the most prominent disputes revolved around the issue of when it was appropriate to go beyond the "least intrusive" technique available.
- **Exxon's role and state authority over cleanup were never properly or satisfactorily defined in the Technical Advisory Group,** which replaced the Interagency Shoreline Cleanup Committee. It was not made entirely clear whether work orders represented the practical limit of cleanup under both state and federal standards. The "sign-off" process was not well understood at all levels and generated disputes on the shorelines.
- **Bioremediation became the goal for Exxon and federal cleanup supervisors, while the state was skeptical of its effectiveness under all conditions,** especially heavier and subsurface oiling. Proper site preparation before bioremediation became a major shoreline issue.
- **Newport Beach proceedings placed a high priority on all parties reaching consensus about cleanup decisions.** As time passed, consensus was treated by both Exxon and the federal government more as an institutional requirement and less as simply a desirable working goal. The state's officials would become increasingly uncomfortable with a system that seemed to place consensus equal to, or even above, the state's authority to enforce its environmental standards.
- **The concept of "net environmental benefit" emerged as a de facto cleanup standard,** with its own sets of definitions and its own administrative procedures. State officials were concerned about the flexibility of the definitions, the vagueness of the standard, and its potential effects on existing state environmental standards and practices.
- **The premise behind the Newport Beach meeting was that it was possible to develop a single, consensus cleanup strategy.** State officials felt it was, indeed, a valid concept, but only if federal and state cleanup goals and requirements were harmonized, and any special state requirements were included in the federal-directed program.

Some of the areas of disagreement worked themselves out because actual conditions in the summer proved different than assumptions made over the previous winter. Bioremediation gained state approval. Mechanical equipment was used much more widely in the summer of 1990 than NOAA suggested; tons of oily sediment were actually removed, rather than simply exposed; worksites were tilled all summer, not just in the fall, and crews did a much better job of booming off work areas. At many sites, nearly everyone was surprised at how much subsurface oil remained, or how much certain beaches "bled" when warm weather liquified oil and mousse. Surveys during the cold weather months of November, January, February, March and April often did not detect or properly gauge the seriousness of some oiling conditions because ice, snow, and cold temperatures obscured or "locked up" oil concentrations.

The disagreements that persisted, however, were over policy and procedural issues, all of which affected decisions

about where, why, and how cleanup should proceed. All of these had their roots in the documents and charts presented at Newport Beach. (See figure on preveious page.)

Yet even within the state's organization, there were few hard and fast policies about how far cleanup should proceed. The state's basic regulation guiding cleanup states simply that cleanup shall continue until the parties reach the limit of the cleanup technology, or until removing the pollution is more environmentally harmful than leaving it in place. This regulation is designed to deal with every possible cleanup, from the fuel tank leak in Quinhagak to the drilling mud disposal pit in Soldotna. There is nothing in the regulations that addresses, in a specific manner, the questions on everyone's minds that winter and spring of 1989-90: How clean is "clean" in Prince William Sound?

Do we leave asphalt to break down slowly? Do we bleach stained rocks? Is subsurface oil acceptable on a beach outside a state park, but unacceptable at a beach inside a park? There was substantial internal debate on this issue among state agencies throughout 1989-90. The state Fish and Game and the Natural Resources departments argued for a written policy that spelled out the details, to the extent it was possible. For example, areas around salmon streams, or in state parks, would carry a more stringent standard than other sites.

DEC argued instead that the existing statute was flexible enough to deal with those considerations, and that being too specific might limit the state's options on a site-by-site basis. State officials wound up sticking with the basic regulatory standard, although they agreed to seek more intensive or complete cleanup at certain high-priority sites. Left unanswered was the question of what to do should the federal government choose not to honor the state's stricter standard. DEC officials told their fellow agency managers that the state could resort to court action to force Exxon to do the cleanup to state requirements, however, there was some question about whether that was an efficient way to go about it, or whether the courts would agree to such an order.[82] While the internal debate continued at various levels and various times over the winter, resolution was difficult because there was much uncertainty — among all parties, not just at the state level — about what conditions would be like in the spring, how effective cleanup techniques might be, or even which cleanup techniques would be approved.

The "how clean is 'clean' " issue went dormant for the rest of the winter, although it would emerge again in the spring after the surveys ended and cleanup started.

FASST and SSAT surveys

Between January 28 and February 18, state-federal-Exxon survey teams began getting a picture of what would confront them when cleanup began in May and June. Six teams of surveyors fanned out, in three stages, to survey selected sites in both the Sound and the Gulf of Alaska during the Fast Assessment Shoreline Survey Team (FASST) program.[83] They found that the scouring of high energy beaches observed by the DEC teams three months before had continued, while sheltered beaches and subsurface oiling did not appear to have changed much. Asphalt and other hardened, tarry residue predominated.

"The vast majority of the free oil left on the shorelines is below the surface and cannot be removed with the techniques used last year," a DEC survey leader concluded.[84]

In late March, 20 more teams launched a more comprehensive shoreline survey, the Spring Shoreline Assessment Team program (SSAT). Indeed, the winter weather had made a substantial impact on the surface oiling conditions. Overall, oiling was reduced by almost 20 percent from October 1989 to May 1990, from 490 miles oiled to 396. And, perhaps more significant, oiling designated as "heavy" had decreased most dramatically. Where 53.3 total miles were described as heavily oiled by DEC in the walkathon of fall '89, only 14.8 miles, nearly all of it in Prince William Sound, were described as "heavily" oiled in spring 1990. This was still a massive pollution problem,

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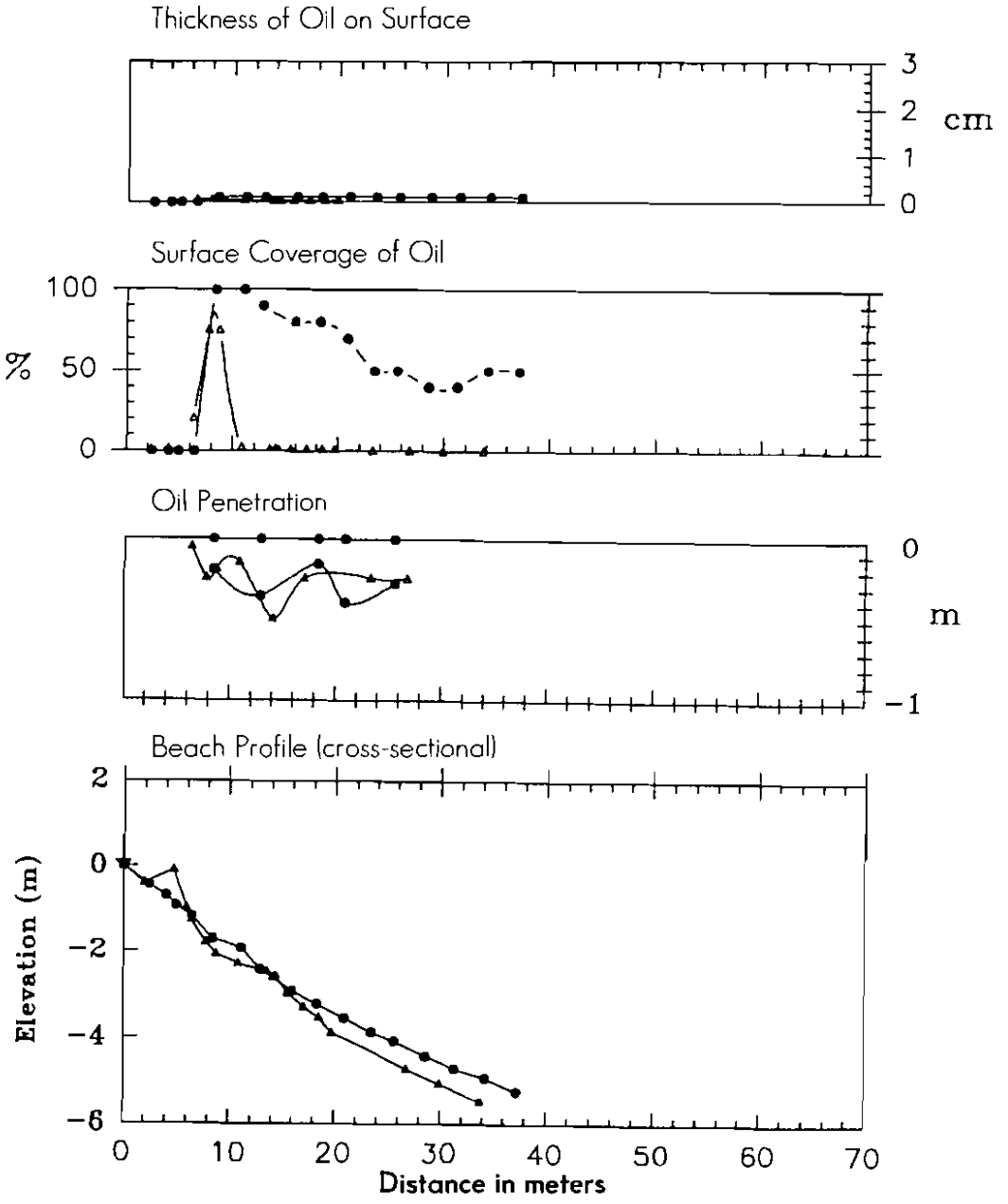
Pre- and Post-Winter Shoreline Oiling

Meares Point, Perry Island, Prince William Sound

Segment PRO16 Station 094

ALASKA DEPARTMENT OF ENVIRONMENTAL CONSERVATION



● December 5, 1989 △ March 20, 1990

A comparison of shoreline oiling before and after the first winter post-*Exxon Valdez* spill. Note in the second table that surface oil is virtually gone after the winter. But the third table shows that oil remains under the surface. The fourth table simply shows the dynamic changes in beach profile due to a combination of factors, including storm berm formation, and beach erosion from storms and/or the washing away of fines during beach cleaning.

of course, but measured against the enormity of March and April of 1989, conditions were substantially improved a year later.[85]

Again, however, such an assessment was merely relative. The SSAT teams surveyed 784 shoreline segments or specific 1989 worksites, and 702 contained some oil. The bulk of it — about 65 percent of the sites — were recorded as "lightly" oiled, a general term that included everything from a patchy pattern of small asphalt mats to hardened mousse around boulders and to stain and crust on large rocks. Although the joint SSAT project did not survey subsurface oiling, state surveyors dug as many delineation pits as they could in search of buried oil. They recorded subsurface oiling conditions at 232 of the 784 SSAT sites. Again, this number covers a wide range of conditions, from thick, saturated sediments at a few sites to the dull gray colored sand that betrayed light or moderate oil residue.

The survey teams sent their results to the Technical Advisory Group members, all of whom had spent considerable time on the shorelines. The TAG was the forum for the negotiated cleanup work orders, some of which represented a clear consensus and some that were merely the best settlement possible for one dissenting agency or another. More often than not, Alaska officials found themselves attempting to convince Exxon and the federal officials that more aggressive techniques — mechanical tilling and/or removal of oiled sediments — undertaken in a short and intense 1990 program, were more practical and more desirable than a passive approach. This was not another visit to the high-pressure, hot-water debate; rather, state wildlife managers and environmental officials felt that it was important to get as much as oil out of the system as possible, as fast as possible. If that meant using a small trackhoe instead of shovels and rakes, that was acceptable to the state. The federal government, however, was wary of such efforts. This fundamental strategic difference ran through negotiations on nearly every issue of the 1990 summer season cleanup.

State officials began to get a hint that the TAG reduced state influence over some key decisions. One of the principal reasons was that in the TAG, the state lacked an important ally: the Alaska and American public. Unlike the deliberations of the Interagency Shoreline Clean Committee, the TAG talks were closed to public scrutiny. The federal on-scene coordinator would not allow the public to observe, let alone participate. This caused a brief confrontation between the new state on-scene coordinator and the Coast Guard admiral serving as federal coordinator in April and May 1990. When state officials pressed the Coast Guard on the issue, the admiral flatly refused to allow public access, arguing that federal law did not require him to open the meetings. The new Coast Guard commandant, Admiral William Kime, backed up his on-scene coordinator when state officials appealed the closed meeting decision.

Public pressure had played a key role in pushing certain cleanup issues in 1989, often those that the state felt were important. The isolation of the TAG, however, meant that state wildlife managers and environmental officials were usually in the minority during TAG deliberations. This caused some friction during the first months of the TAG operation, but as state officials began to get a better sense of the decision-making dynamic, they were able to work out acceptable compromises with their counterparts from Exxon and the federal government, in most cases. The cleanup program laid out by the TAG after the spring survey was generally less aggressive than the state preferred, but the differences were probably measured in degrees rather than by orders of magnitude. Again, as in other cases on the cleanup, the *ad hoc* nature of the *Exxon Valdez* response system probably had a greater effect on working relationships than actual decisions and technical positions.

The impressions of the TAG and the decision-making system formed in those early weeks of the organization's existence in 1990 were the ones that obtained right through to the end of the response in 1992, even though the TAG gradually began to work more smoothly as personal working relationships both lengthened and improved. And for the state, the lasting impressions were of an organization stacked against it: the company and the federal government reps held one position, the state held another, but the

final arbiter of the TAG recommendations was a federal official, the Coast Guard admiral serving as federal on-scene coordinator.[86] Moreover, the public, which had helped the state apply pressure on important points in 1989, was pointedly excluded from the discussions.

3.6 1990 Cleanup

The federal on-scene coordinator approved Exxon's proposed cleanup plan the first week of April. The company's plan detailed a much smaller operation than the army and navy of the previous season; where there had once been several thousand workers on the shorelines, there would probably be no more than 200, total. The high-pressure hoses and omnibooms were gone, and workers would rely mostly on hand tools and fertilizers. The plan leaned away from mechanical treatment, and labeled removal with loaded terms such as "placer mining."

Although the plan had federal approval, it would be another month before fertilizers received approval for use by the state. The federal approval also left unanswered an issue critical to the state: subsurface oiling. The state wanted to know how Exxon

In the 1990 cleanup the high-pressure hoses and omnibooms were gone, and workers relied mostly on hand tools and fertilizers. Exxon's plan detailed a much smaller operation than the army and navy of the previous season; where there had once been several thousand workers on the shorelines, there would probably be no more than 200. Photo by Richard Newman

proposed to deal with subsurface oiling. Specifically, state officials wanted to know if Exxon and the federal government were going to work on development of a rock-washing device of some kind.

Based on the NOAA recommendations of January 1990, federal officials were wary of aggressive cleanup. Exxon did not appear to want to move ahead on rock-washing

technology or excavation of oiled sediments, regardless of the state's wishes, without firm direction from the Coast Guard.

However, the intensive TAG review of the information gathered during the SSAT survey produced a cleanup program that targeted more than 400 specific oiled sites, most of them in Prince William Sound. By far, manual pickup was the most often prescribed treatment, supplemented by fertilizers. The TAG wrote 78 work orders that called for tilling, and 14 more that called for aggressive excavation and removal.

Frequently, a backhoe crew would discover a new lens of buried oil at a worksite, and find that the small lens marked on the survey map and work order was really three times as big as the survey team had thought.

The cleanup began in May. It was a very different kind of operation, from the standpoint of technology, than in 1989. The first summer, cleanup centered on washing relatively mobile oil and mousse into containment pens, where it could be skimmed or absorbed. The second summer, cleanup was more site-specific, with crews targeting specific patches of hardened materials or oil-saturated sediments. Workers used shovels and trowels to scrape mousse from between boulders during what became known as "rock and roll" operations, as crews pulled back the rocky beach armor to get at mousse and asphalt trapped underneath.

Throughout the summer, but especially as weather got warmer and oil began to become more mobile, it became obvious that the spring surveys had not fully discovered or described the extent of the problems.

As crews pulled back beach armor, they began to discover that oiling was frequently more serious than originally thought. Warmer temperatures and ground water moving through beach sediments frequently worked more oil towards the surface. Asphalt patches that were scraped away often exposed more liquid mousse underneath; unless that newly exposed mousse (and the sediments a few centimeters down) were removed, it would simply form another "scab" and create another asphalt mat where the last one was. The firm, tarry residue around the base of large rocks turned out to be just the tip of the problem at many sites. Boulder fields, where surveyors couldn't dig pits to determine the extent of subsurface oiling, often turned out to have more serious hidden oiling than originally thought; no matter how many times workers scraped away the accummulations around the big rocks, more oil seeped out to harden in the same place.

DEC's 1990 surveys included an underwater study. Photo by Sandy Wiley-Echeverria

The tilling and excavation operations often exposed even bigger hidden problems. A backhoe could, of course, dig more, deeper, wider pits than people could using hand tools. Frequently, a backhoe crew would discover a new lens of buried oil at a worksite, and find that the small lens of "OP" (the heaviest, oil-saturated sediments) marked on the survey map and work order was really three times as big as the survey team had thought.

The surveys had missed these problems for a variety of reasons. The winter of 1989-90 was relatively snowy, so when some of the crews hit the beaches in the spring, some of the oiling conditions were hidden below snow and ice crust, especially in shaded and/or north-facing areas. The cold weather kept oil immobile; late winter lighting sometimes obscured telltale

colorations; cold and rainy weather sometimes caused crews to move more quickly. And, because of the demands of the survey schedule, crews simply could not take the time to do the kind of painstaking excavation necessary to "follow" every lens of oil, or roll back large sections of beach armor.

The *Exxon Valdez* cleanup management system was not well suited in early 1990 to dealing with the problem of the oil "discoveries" after the survey. The survey was the basis for the work orders developed by the TAG. Coast Guard and Exxon supervisors were reluctant to do work not specified on the work order, often insisting on a literal and strict interpretation.

"As a result, necessary treatment was sometimes neglected. In the first few weeks [of 1990 cleanup], it was not uncommon to have an area of oiling that matched the description for removal on the work order, but since it was 5 to 10 meters outside the circled area on the map, it was restricted from cleanup work," state monitors wrote in their cleanup summary in 1992.[87]

A secondary, but related problem developed over the use of fertilizers. Bioremediation was not authorized unless the site had been properly prepared, i.e, mobile oil, heavier oiling concentrations, and asphalt scabs were removed. The point, from the state's perspective, was that oiling that could be easily removed should be taken away, not left to slow decomposition. Many of the work order disputes revolved around whether the site had been properly prepared; one side would argue that it hadn't, often because of "discovered" oiling, while the other would say that the site was ready because the work specified on the work order had been completed.

After a particularly acrimonious incident over bioremediation site preparation at the Bay of Isles on Knight Island in May, the *Exxon Valdez* organization created a kind of appeals process.

These disputes were handled one of several ways, some formal, some informal. After a particularly acrimonious incident over bioremediation site preparation at the Bay of Isles on Knight Island in May, the *Exxon Valdez* organization created a kind of appeals process. Under this plan, state monitors could seek an amendment to any work order if new oiling were discovered. Sometimes the amendment was done in the field, either officially, by a Coast Guard area supervisor, or unofficially by agreement of all parties right on the shoreline. If agreement wasn't possible at these lower levels, the dispute could be elevated to the TAG, which would make a site visit and new determination.

As in other disputes over authority and jurisdiction, lines of authority were often blurred and procedures not always well established or well understood. Some Coast Guard shoreline monitors deferred to Exxon, while some insisted on firm control on decisions. Some DEC and Fish and Game monitors went around the Coast Guard and worked directly with Exxon. Depending on the personalities involved, Exxon sometimes did extra work without a work order amendment, or sometimes the Exxon supervisor read the work order like the Bible. Further complicating the situation was the matter of time. Theoretically, a state monitor could appeal every decision, every day; however, tides, weather, and a limited summer season meant that monitors did not have an unlimited amount of time to pursue appeals and amendments.

As June turned to July, state officials became increasingly concerned that the system of "joint" response proposed conceptually in 1989 was turning into a strictly federal response. The state members of the TAG felt that they were forced into endless compromise; state monitors felt that cleanup was falling far short of what was needed and what was possible; bioremediation, they felt, was being misused and overused; the work order system was rigid and the amendment process impractical.

Swirling around just above the field level was a developing jurisdictional dispute over state and federal authority to require cleanup, and over whose standards should apply. The TAG was increasingly being billed by Exxon and the Coast Guard as an arbiter of technical issues, not as a forum in which compromises and consensus developed based on practical considerations. State officials became concerned that Coast Guard and other federal decisions could be portrayed as tacit state approval or agreement with all federal actions. Field monitors were unsure what their signature really meant when they "signed off" a work order: Did it imply agreement with federal actions? Did it imply that the state felt the site was as clean as it could get? Or did it

mean simply that the federal work order was complete, even though there was oil left over?

Federal field monitors weren't always clear on the concept either. They frequently insisted that DEC monitors sign the work order, even if they weren't satisfied with the job; they objected when DEC monitors would make notes on the sign-off sheets about other oiling problems.

There were a lot of hard feelings on the shorelines. However, beyond the personal conflicts and general questions about who was in charge, the evolving *Exxon Valdez* administrative system was raising some potentially serious short- and long-term problems for the State of Alaska.

What did shoreline "sign-off" mean? If the state tried to impose additional cleanup requirements on Exxon at the completion of the Coast Guard-directed effort, did these sign-off sheets imply some agreement, and could Exxon use them in their arguments to avoid further work? Could Exxon use the administrative record of the TAG to argue that the best technical solution for cleanup had already been addressed, and therefore the state's additional requirements lacked technical support? Was the state's participation in the TAG — with its supposedly "consensus" decisions — tacit acceptance of the cleanup standards championed by NOAA or even Exxon?

Whether the issue was bioremediation, "net environmental benefit," or the outhority of the TAG, the state was merely an advisor to the federal government's authorities, with na more standing than Exxon. State afficials found this arrangement dangerous and unacceptable.

In mid-July, DEC commissioner Dennis Kelso and federal on-scene coordinator Rear Admiral D.E. Ciancaglini exchanged various correspondence that attempted to assert, explain, dispute, or define state and federal authorities. They didn't get very far. Ciancaglini took the state's letters to mean that Alaska was attempting to overrule federal authority, a misapprehension that was as preposterous as it was unconstitutional. The state took Ciancaglini's statements to mean that the federal government would accept some state requirements for cleanup, but not necessarily others.

On a technical level, the state's cleanup managers were concerned that bioremediation was being used as an alternative to active removal, even when removal was possible and not any more disruptive than spraying the beach with fertilizers. The fertilizers had been billed as benign and natural cleanup enhancers that protected fragile plants and animals from disruption. This seemingly less "intrusive" approach would better help the cleanup achieve a "net environmental benefit." But in fact, the operation was not quite so low-key. The fertilizer solution included some noxious elements that stressed animals and plants nearly as much, if not more, than physical disruption with hand tools or even a backhoe. And the whole idea of "net environmental benefit" minimized the importance of human uses and values of the shorelines.[87]

Additionally, state monitors frequently reported that Exxon was doing incomplete and/or improper site preparation before applying the fertilizers, and often with the concurrence of the Coast Guard monitor, and over the objections of the state's representative. The emphasis on bioremediation, rather than removal, meant that the federal government's cleanup policy was becoming the *de facto* standard. As mentioned elsewhere in this report, NOAA and the Coast Guard were more tolerant of leaving stranded oil behind to be degraded over time, even when removal was possible and practical. Theoretically, the state could order the material removed under its own authority; of course, it was silly to order removal of material that the federal government had just authorized to be sprayed with fertilizers. But when the fertilizers went on the beach, as a practical matter it meant the end of cleanup for 1990 at the site, especially as July turned to August. Bioremediation was, in the state's view, being used more as a primary cleanup technique and not as the "finishing" or "polishing" technique stipulated in the state's guidelines for using fertilizers. And because determining whether the site was ready for "polishing" often depended on subjective judgments by the Coast Guard or strict readings of an incomplete work order by Exxon, bioremediation was being used more frequently, more extensively, and on types of oiling conditions for which the technique was neither intended nor appropriate.

During this period of high-level jousting in July, the state tried to get a handle on the technical application of fertilizers. DEC technicians calculated roughly how much oil the fertilizers might be able to degrade over the course of a year — about five grams

of oil per kilogram (2.2 pounds) of beach material — and proposed that the figure serve as the trigger for authorizing fertilizers at a given site. Rather than relying on subjective eyeballing of the conditions, selected testing would help calibrate monitors' eyes to a more objective standard.

Rather than helping the debate or the disputes, the 5g/kg number caused the Coast Guard to harden its positions concerning state and federal authority. The Coast Guard interpreted the numbers to mean that DEC was trying to impose a "numerical standard" on the "how clean is clean" question. The Coast Guard doesn't have a numerical standard, the federal on-scene coordinator wrote to Kelso, and the state had no authority to try and impose one on Coast Guard operations.

At its root, this high-level conflict was really about just what the "joint" response was supposed to mean. The state thought that "joint" response meant that the federal government would direct things, as a matter of practicality, but that it would include all relevant state cleanup requirements in its directions to Exxon. The Coast Guard apparently felt the "joint" response meant something different. In all but name only, the *Exxon Valdez* response had become federalized, in the sense that Exxon did what the Coast Guard said and federal direction took precedence over any state actions or requirements. The state was providing "input," as the Coast Guard liked to say, but in fact, the state had no legal standing to impose its own requirements on Exxon through the Coast Guard. Whether this was all a result of a misunderstanding or some active strategy at some higher level, what it meant to the state is that the State of Alaska had limited authority to influence the cleanup of a massive oil spill on the shorelines of the state. Whether the issue was bioremediation, "net environmental benefit," or the authority of the TAG, the state was merely an advisor to the federal government's authorities, with no more standing than Exxon. State officials found this arrangement dangerous and unacceptable.

Under federal law, the state had the right to require more extensive cleanup, as long as its requirements were not in conflict with federal law or its efforts did not impede the federally-directed response. Under the law, the Coast Guard also had the option of including all state requirements in its orders to Exxon.

It was clear, however, that the Coast Guard would not necessarily agree to order Exxon to meet state requirements. Moreover, the *Exxon Valdez* cleanup administrative system — improvised during an emergency and institutionalized over time — gave the state less power than it would normally have, and threatened to shut off options normally available to it. The final straw, for state officials, came in late August 1990, when the federal government allowed Exxon to bulldoze thousands of pounds of heavily saturated sediments into the active tidal zone on Ushagat Island in the Barren Island group, just north of Kodiak and part of a maritime wildlife refuge. The state objected strongly, going so far as to send the Coast Guard a letter signed by all three of the state's resource commissioners. The federal on-scene coordinator went ahead with the order, and within a week high tides pulled the oil into the ocean.

The 1990 cleanup season had been a tedious and frustrating exercise for the State of Alaska. Fertilizers and natural weathering — accelerated by techniques such as plowing oiled sediments into areas where waves and sun could get at them — were gradually taking the place of actual cleanup. The state neither accepted this approach nor felt it appropriate. At the very least, state officials wanted to make sure that Alaska's ability to protect and clean its own shorelines were not washed away as well.

When the Coast Guard commandant announced that Exxon would return for more work in 1991, state managers decided to ride out the season and make their adjustments the following spring.

3.7 The state response plan

State spill managers in late 1990 judged that the problems encountered with Exxon

and the Coast Guard lay in the system, not with individuals or specific organizations. Where there was uncertainty and a lack of clarity, misunderstandings and hard feelings were sure to follow. To be sure, some people just didn't get along, and some people pursued agendas separate from the agenda dictated by a common desire to clean up the shorelines. Turf battles, political intrigue, and hints of legal manuevering surfaced from time to time, as one might expect in a highly charged, highly public, high stakes operation that included two governments and one of the world's largest corporations. However, these machinations were symptoms, not causes in themselves.

At the close of the 1990 season, state managers boiled the situation down to these fundamental questions:

1. How can we make sure that cleanup is completed to state standards?
2. How can we avoid a situation in which other entities — federal or corporate — set *de facto* state standards that may become poor precedents for future cleanups?
3. How can we reduce the stress on the shorelines for all workers, not just ours?
4. How can we better involve the Alaska public in the decision process?

The answers to all the questions came down to two basic points:

1. The state must clarify its positions and explain them more completely before the start-up of 1991 cleanup.
2. The state must make clear that it is ready to exercise its option to conduct or order cleanup on its own.

The result was the 1991 State Response Plan, a relatively brief document that explained what the state wanted done, why it wanted it done, where it wanted it done, how the work was to be done, and where the state got the authority to require that it be done just so. The document concluded with a section that stated plainly that the state would carry out the details of the workplan if the federal government was unable to, or chose not to. Finally, the state spill response office released the document for public comment and held a series of public meetings to further gauge community wishes.[89]

The goal of the plan was to take every vague issue and make it specific. The intent was to remove doubt about state intentions or standards from the minds of Exxon and Coast Guard officials. As a practical matter, the state plan was a way to match up disagreements and personality conflicts with actual issues; as long as people were discussing issues, working from a written set of standards and policies, they were less likely to become sidetracked by personal or procedural disputes.

For the most part, the plan worked. The state set its goals independently, but worked cooperatively. Where the state took independent action, it did so as a supplement to federal-directed activities, not as a challenge or a substitute to federal authority or action. In short, the state did exactly what it was entitled to under the law. The Coast Guard, no longer viewing state actions or requirements as a challenge to its authority, helped the state accomplish its goals more often than not.

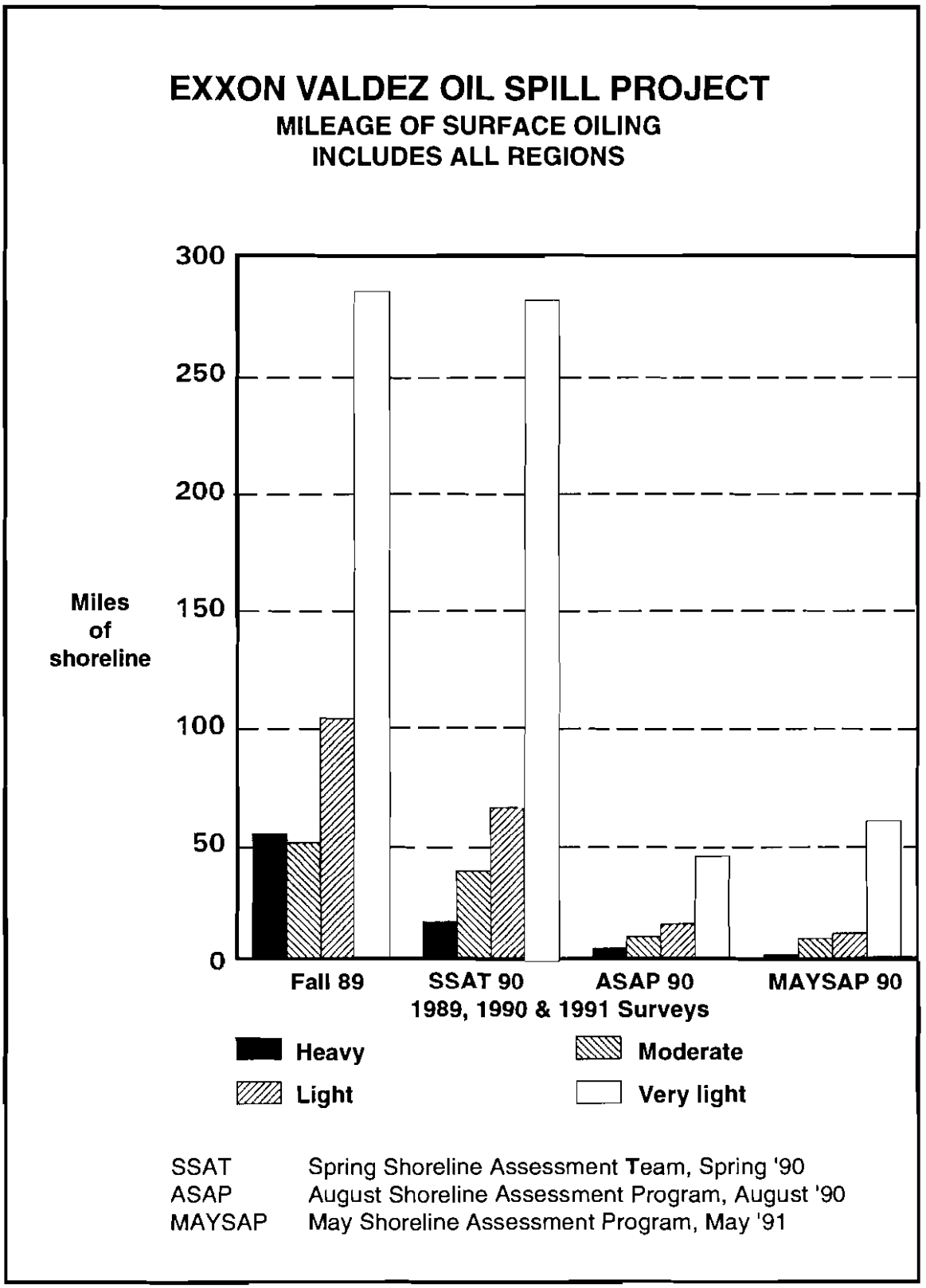
The state plan, released in November 1990, helped set the stage for an efficient and reasonably cooperative effort during the remaining two seasons of cleanup. Ironically, the state plan was little more than a formalized version of what the state attempts to do on every spill: be cooperative, protect state interests, exercise its full range of jurisdictional powers.

3.8 Cleanup, 1991-92

In conjunction with the state response plan of November 1990, state spill managers produced a list of nearly 600 shoreline segments and subdivisions that it intended to survey in the spring of 1991. This list underwent a few additions and a few deletions

during planning meetings with Exxon and the Coast Guard over the winter, but essentially it formed the basis for the spring survey.

The survey, called MAYSAP, or the May Shoreline Assessment Program, started later in the spring than the 1990 survey. The later start was intended to avoid some of



the problems of the previous year, when shorelines and oiling conditions were covered by snow or stiff from the cold. The MAYSAP teams also included one or two laborers, who picked up debris or broke up and removed simple oiling conditions encountered during the beachwalks. The goal was to get a jump on cleanup, or to finish cleanup altogether at sites where oiling was limited; there was no reason to make a separate visit for cleanup later on. The workers picked up debris or oiling at more than 200 sites during the MAYSAP.

Conditions were similar to those encountered during the 1990 survey, only on a smaller scale. As in 1990, oiling tended to be likely at sites that were sheltered from wave energy, or behind large rocks and outcrops. Surface oiling was generally discontinuous and made up of asphalts and tar that were heavily weathered. A few sites that were among the most heavily oiled in 1989 still showed significant patches of surface oiling, as well as thick lenses of subsurface oiling.

In fact, subsurface oiling appeared in a few cases not to have weathered or changed much from 1989 or 1990.

In fact, subsurface oiling appeared in a few cases not to have weathered or changed much from 1989 or 1990. The northern tip of Latouche Island and the southern tip of Knight Island, both of which were deluged with oil in 1989, still showed widespread and chemically fresh subsurface oiling. The state's monitors attempted to get a better handle on the extent of subsurface oiling at the survey sites, and even deployed a separate, state-only vessel that did follow-up work as part of a subsurface mapping project. Although the subsurface survey was not as extensive as the surface survey with Exxon and the Coast Guard, the state found significant subsurface oiling at dozens of sites in the Prince William Sound spill zone. Cumulatively, the disparate patches of buried oil came to more than 17 miles of shoreline. Like all the "miles of beach" figures, this one was statistically weak in terms of precision, however, it did give a sense of how persistent subsurface oiling can be under Alaska conditions.

Of the 588 shoreline subdivisions surveyed in 1991 (most in Prince William Sound), the TAG recommended no treatment at 486. The remaining sites were treated primarily with hand tools such as shovels and rakes. From May through mid-July, cleanup crews removed about 700 tons of oily sediment from the shorelines. A dozen sites, all within the Sound, were treated with mechanical equipment. Backhoes tilled, turned over, or removed oiled sediments at these subdivisions.

State workers did additional cleanup with hand tools at 25-50 sites around the Sound. At 26 sites where the state had decided to conduct cleanup to a stricter standard than the federal government, Exxon eventually went in and did the work. The Coast Guard officially added the state's work orders to the federal program, which made the supplemental state cleanup proceed quickly and in conjunction with federal-directed operations.

At most of the sites (with the execption of fish spawning streams), Exxon added fertilizers when manual cleanup was deemed complete. In addition, the company requested that it be allowed to add fertilizers to more than 50 sites after July 15, which was the end of the 1991 cleanup. Bioremediation played a minor role in the 1991 cleanup operation, largely because the oil had weathered so much that biodegradation could not be enhanced significantly. Based on independent scientific review over the winter of 1990-91, the state decided that it would not allow bioremediation to substitute for the simpler, more definitive technique of removal of oil with hand tools. Alaska did not object to fertilizers, but the state saw no reason to depend on them; most scientists concurred.[90]

Over the winter of 1991-92, state environmental and wildlife officials targeted about 60 sites for observation and survey in the spring. The federal on-scene coordinator decided to participate as well, dubbing the 1992 survey the FINSAP, or Final Shoreline Assessment Program. A handful of state, federal and Exxon cleanup supervisors went into the field in late May and the month of June, wielding shovels and plastic bags. They removed some sediment, but for the most part, the teams broke up or scattered heavily weathered, small patches of asphalt at a few dozen sites. The state and federal coordinators declared the cleanup complete on June 12, 1992.[91]

The decision to end the cleanup was based on federal and state regulations and

guidelines that give managers some parameters for making such a call. Determining the cleanup "complete" does not mean that there was no longer any oil in the area. Much of the spill area was, indeed, free of oil by that time. However, some areas showed persistent oiling — underneath boulder fields, buried in cobble beaches, trapped under the thick mats of "hair" and sediment that underlie mussel beds. The oil that remains is either heavily weathered at or near the surface — literally, like asphalt that goes into making highways — or packed in sediments that get little or no oxygen or sunshine that would help degrade the oil naturally. The large boulders or bedrock outcrops that help make up the rugged coastline also help to deflect wave energy that might also break up or turn over oiled sediments. Based on observation and sampling, most of the persistent oiling at various sites is either mixed heavily with water, creating a mousse, or made up of the asphalt fractions whose molecular construction tend to make these compunds slow to degrade. The asphalts are probably close to inert, biologically, but it is hard to say what toxic fractions remain in the mousse or buried sediments until more sampling and analysis is complete.

The state and federal agencies charged with managing restoration efforts have put a survey operation into the field in 1993 to help get a better sense of the character and extent of persistent oiling conditions in the spill area.

Notes, Chapter 3

[1] *Transcript of Valdez press conference, March 24, 1989.*

[2] *Iarossi, F., Deposition taken August 5, 1992, at various points.*

[3] *From the standpoint of sea conditions and seamanship, wind-driven waves and chop are more difficult to deal with than much larger, open ocean waves; the former is irregular in both wave heighth and rhythmic frequency, while the latter tends to be rolling and more regular. The relatively small vessels (especially shallow-draft skimmers and seine skiffs and barges) involved in the response were at significant risk attempting to operate in such disturbed seas.*

[4] *The storm of March 26-27 interrupted the operation briefly. During that time, the wind was so strong that the* Exxon Valdez *twisted 12 degrees on its perch upon the reef.*

[5] *Actually, this was more of a restoration than creation; Alyeska had maintained spill response crews in the first several years of terminal operations. These crews were phased out in the early 1980s and the personnel reassigned to regular terminal duties as a labor-saving and cost-cutting measure.*

[6] *Governor Steve Cowper, personal communication, May-June 1989. See also Cowper's interview with the Alaska Oil Spill Commission, the summary of which is dated Nov. 28, 1989. Cowper acknowledged that direct state intervention could have some affect on the state's ability to prove full liability for damages against Exxon or Alyeska, but he was not especially concerned about it.*

[7] *Hull, R. Exxon Valdez Report, Northwest EnviroServices, Inc., 1989, p. 6.*

[8] *Ibid., p. 6.*

[9] *Dennis Kelso, personal communication, May 1989.*

[10] *Judy Bittner, State Archeologist, Alaska Department of Natural Resources, Division of Parks and Outdoor Recreation, personal communication, September 1992. Bittner said the problem of looting and disruption was actually more acute in the Kodiak area, partly because of increased access, but primarily because the Kodiak archipelago has a longer history of extensive human habitation and use, and is therefore culturally "richer" than most areas inside Prince William Sound.*

[11] *Artifact hunting and collecting is actually against the law on Alaska public lands, and it is universally banned by Native corporations on their land.*

[12] *This has obvious implications for archeological disruption, but it also has implications for sport hunting, sport fishing, and unauthorized use of private lands.*

[13] *The best example were USFWS restrictions on activities near active (and in some cases, inactive) bald eagle nests. Air traffic, especially by helicopters, was central to nearly every government or Exxon effort; every day, on every approach to a shoreline site, pilots had to consult a specially created map that identified every eagle nest in the Sound. If there were a question of whether a nest were active or inactive, USFWS biologists made a special trip to the site to make a determination. Pilots sometimes had to seek special clearance for a landing at a questioned site, which occasionally involved a radio call from Prince William Sound to Anchorage, then a phone call to USFWS, and finally a call back on the radio to the pilot circling the shoreline. Anyone violating the buffers could have, theoretically, been charged with a violation of federal wildlife protection law. This issue was so sensitive (and its implications so cumbersome on field visits) that the Coast Guard sought and received high-level federal absolution for any accidental disruption — known as a "taking" under the federal terminology — caused because of cleanup activity. And even then, the federal variance only guaranteed that the unintentional offender would not be charged with a crime or other violation; USFWS was stern and clear in its explanation that it was not* authorizing *disruptions, but rather, it was protecting innocent offenders from prosecution or a citation.*

[14] *An exception may be herring, which spawn relatively close to the surface and against certain kinds of shorelines.*

[15] *A Belgian man allegedly died from botulism poisoning after eating Alaska canned salmon. The death, while real enough, turned out to be the result of other causes. However, the canned market — a staple of the Alaska industry, especially for pink salmon — was briefly but devastatingly undermined.*

[16] *The spring bloom of the plankton caused a similar phenomenon. There were several reports of oil that turned out to be plankton.*

[17] *There is some mixing of wild and hatchery-raised stock, but fisheries managers try to keep them separate by strategically opening and closing various fisheries in different areas.*

[18] *Through a variety of complex formulae, the oil companies can deduct costs such as prevention and response investments from the taxes and royalties they pay the State of Alaska. The Alaska Governor's Office estimated in 1990 that the mandated improvements at Alyeska would mean, for the state, a drop of about $10 million a year in expected oil revenue.*

[19] *This theoretical ratio came to economic life in 1990, when a volcanic eruption and the threat of lava and flood loomed over a large tank farm at the Drift River on the west side of Cook Inlet. As the state contemplated an emergency shutdown of the facility, which served as storage for wells just offshore, producers pointed out that closing the terminal would mean shutting in wells. And the wells, they emphasized, weren't so easy to start up again: An extended shutdown would drop the pressure in the reservoir, making start-up problematic at best and impossible at worst. The bottom line — literally — was that the old wells were already marginal producers, and they may not be economical to operate at lowered production levels caused by a shut-in. Ultimately, the threat passed and an extended shutdown of the terminal was not necessary. However, the state, the local government and the industry were faced with a decision, for a time, about the known value of oilfield jobs vs. the unmeasurable threat from an oil spill.*

[20] *A setnet fishery in the Alitak District opened, and 87 fishermen worked a total of 114 days there. A seine fishery also opened in Karluk Lagoon in mid-September; five boats took part and caught less than 5,000 fish, according to the Department of Fish and Game.*

[21] *This is somewhat of a generalization, and applies more to Chenega Bay, Tatitlek, Port Graham, Seldovia and English Bay — the villages of the Sound and Lower Cook Inlet — than to the villages on Kodiak Island. Kodiak had a somewhat different set-up than other areas. The city government of Kodiak could deal with one set of immediate issues, while the borough government — with staff and a strong, established network of village contacts — could put more energy into coordinating island-wide issues. Further, the Kodiak borough had an emergency response network already in place when the spill happened. The system may not have been perfect, but village issues were a regular part of the deliberations of the Kodiak emergency committee.*

[22] *This beach segment, SM005, was immediately dubbed "Quayle Beach," and the name was used interchangeably with its official designation throughout the response.*

[23] *Author's note: The author of this report was at the meeting.*

[24] *DEC officials were in Tatitlek shortly after the spill to meet with villagers. In the middle of the meeting, a helicopter landed in the village, unannounced and unexpected. High-ranking Exxon officials came to the meeting, spoke briefly, did not answer questions, and left quickly. The visit, however well-intentioned, involved very little real communication or interaction, and probably hurt Exxon's outreach effort more than helping it.*

[25] *These problems are cited throughout the staff papers prepared for the Alaska Oil Spill Commission on the effects on the local communities.*

[26] *The ADF&G's subsistence division had, fortunately, a solid pre-spill set of data on subsistence harvest and patterns of use in the spill region. The division has, over the past 15 years, developed and supplemented a region-by-region, village-by-village survey of subsistence use in Alaska.*

[27] *ADF&G, Division of Subsistence, various papers, 1985-92.*

[28] *Division of Subsistence, various papers, 1986-91.*

[29] *Fall, J.A., "Subsistence Uses of Fish and Wildlife and the Exxon Valdez Oil Spill," Arctic Issues Digest, (University of Alaska Fairbanks, October 1991). Fall is the regional manager for the subsistence division of ADF&G in Anchorage. The example of sharing of the harbor seal in English Bay comes from a 1985 paper by Ron Stanek, ADF&G, Division of Subsistence.*

[30] *Fall, ibid.*

[31] *Fall, ibid.*

[32] *Fall, ibid.*

[33] *Fall, ibid.*

[34] *Or, in some cases, processed food products have been integrated into a traditional food. In some western Alaska Yupik villages, sweet leaves or berries that were once served with whipped seal oil are more frequently mixed with Crisco shortening instead. Crisco has not entirely replaced seal oil, of course — residents may drizzle some of the pungent oil on the Crisco mix — but the shortening is an acceptable everyday substitute for seal oil. The point here is that subsistence is not static or ritualistic.*

[35] *Abnormal fin development, frayed or thin fins, etc., are strong visual clues to biologists that a fish is not healthy.*

[36] *It has been noted that Exxon's first overtures to village residents were often clumsy, and in many respects, Exxon's community relations efforts either did not improve much, or were not accepted well throughout the spill. However, the state's subsistence officials interviewed for this report said Exxon, once it realized the magnitude of the issue, was extremely helpful.*

[37] *Fall, op. cit. See also Walker, A., and Field, L., "Subsistence Fisheries and the Exxon Valdez:*

Human Health Concerns," Proceedings of the 1991 International Oil Spill Conference, American Petroleum Institute, March 1991.

[38] *National Research Council, Steering Committee for Petroleum in the Marine Environment Update. "Oil in the Sea: Inputs, Fates and Effects." (National Academy Press, Washington, D.C., 1985.) (Cited in Walker and Field, 1991.)*

[39] *Fall, op. cit.*

[40] *Walker and Field, op. cit.*

[41] *Fall, J., "An Update on Subsistence Uses in Alaska Native Villages following the Exxon Valdez Oil Spill." Alaska Dept. of Fish and Game, Division of Subsistence, Anchorage, March 1992.*

[42] *Fall, 1992 update.*

[43] *Quoted in Fall's 1992 update.*

[44] *Fall, October 1991 article.*

[45] *Minutes of "Oiled Mayors" meeting, June 8, 1989. Seward's city manager also noted that, as in Valdez, VECO and Exxon were setting up operations in town without properly consulting local government authorities or following city permitting requirements.*

[46] *Exxon tended to be a good deal more efficient and timely in its financial dealings than its contractors.*

[47] *The company's estimate of what it spent on the cleanup in 1989.*

[48] *State of Alaska, Office of the Governor, September 1989.*

[49] *Alaska Oil Spill Commission, staff reports, February 1990. It is unclear from the reports whether the original figures citing 90 percent of the people "affected" by alcoholism counted sober children of drinking parents, or whether it meant 9 of every 10 people actually drank. In any case, Ahkiok's struggle with alcohol is not drastically unlike the situation in many Alaska villages. Alaska State Troopers estimate that nearly 100 percent of all rural crime — murder, domestic violence, assaults, etc. — is alcohol-related. Alcohol is also cited as the principal contributing factor in a majority of boating accidents, suicides and other non-criminal death and injury. Communities that are successful in reversing alcoholism problems generally do so by relying on traditional activities, such as subsistence, local tribal government, and community-based support networks, rather than outside law enforcement or treatment programs.*

[50] *It is probably no coincidence that the governments with fulltime, paid mayors often got better results with Exxon and the state and federal governments. These mayors, such as in the Kodiak and Kenai boroughs, had the legitimacy of authority (they were elected)* and *the time and management structure to stay on issues (they were* supposed *to do that, since it was their paid job).*

[51] *The Kenai borough mayor, Don Gilman, successfully lobbied Exxon and got a commitment for $2 million in response funding. Kodiak got a commitment for $500,000.*

[52] *Ernest Piper, field memoranda, 1989.*

[53] *Alaska Conference of Mayors, Oiled Mayors Committee, "Economic, Social, and Psychological Impact Assessment of the Exxon Valdez Oil Spill." November 15, 1990.*

[54] *There is little hard or coordinated data to accurately measure the extent of these social problems and disruptions against pre-spill conditions in the affected communities. The Oiled Mayors used a state grant to commission a broad study of social and economic impacts, but this was one of the few efforts to quantify the problems. Reading the study, it is obvious that the spill created some problems and exacerbated others. However, the survey methods and the lack of a clear baseline in most cases limited the researchers' ability to pinpoint conclusions. They could, for example, compare reports of substance abuse or treatment against pre-spill years, or measure the increase in visits of individuals to mental health facilities. It was easy to conclude that stress increased on children and families and individual adults, but difficult to conclude how much. As general reading, it is a good source of more detailed information about the trends of social disruption in the towns. Also*

see: J. Steven Picou and Duane A. Gill,"Long-term Social Psychological Impacts of the Exxon Valdez Oil Spill," Exxon Valdez *Oil Spill Symposium Abstract Book, February 1993, Anchorage, sponsored by the* Exxon Valdez *Oil Spill Trustee Council, University of Alaska Sea Grant Program, and the American Fisheries Society, Alaska Chapter. See also Symposium Proceedings, slated to be published in 1994. See also other papers by Dr. Picou on this subject.*

[55] *Shoreline cleanup crews were hired and managed by VECO International, an oilfield services and construction company, and Norcon, a VECO affiliate that employed a union labor force. On some of the early beach-cleaning forays, union and non-union crews worked the same stretch of shoreline, separated — literally — by brightly colored ropes laid along the cobbles of the remote beaches.*

[56] *Exxon Daily Report, Sept. 16, 1989.*

[57] *Exxon received a fair amount of criticism, especially from Congress, for using the term "treated" instead of "cleaned." In fact, the state had originally insisted on this change in terminology because DEC felt "cleaned" was misleading, as in " x miles of beach have been cleaned to date." The change in terms was important, the state felt, so that people would understand that the cleanup was not as effective as the verb "to clean" implied.*

[58] *Exxon pamphlet, "The Valdez Cleanup: A Progress Report from Exxon," summer, 1989.*

[59] *Governor Steve Cowper, press release, July 24, 1989.*

[60] *See Art Davidson's In the Wake of the Exxon Valdez, Sierra Club Books, 1989, pp. 211-212. Also, Exxon's W.D. Stevens, appearing before a Senate committee in Washington, D.C. after the Otto Harrison memo appeared, said he doubted whether Dennis Kelso, the state's chief cleanup official, really wanted to make sure the oil was cleaned up.*

[61] *Gardner, D. and others, unpublished DEC review of cleanup activities, June 1992. This report lists improper deployment and maintenance of boom around washing sites as an operating problem listed "more often than any other" in a review of approximately 1,000 instances of operating violations or errors in 1989.*

[62] *Hull, R. Northwest Enviroservices, Exxon Valdez final report, December 1990, p. 54.*

[63] *Hull, ibid, p. 57.*

[64] *Gardner and others, op. cit.*

[65] *Hull, op cit, p. 47. It was not clear whether the foreman was from VECO or Exxon.*

[66] *Gardner and others, op. cit.*

[67] *The technical debate about Corexit is discussed in chapter 2, p. 69.*

[68] *Hull, ibid., pp. 64-65.*

[69] *The roles of the ISCC and the TAG are described in Chapter 1 of this report; see pages 30-43.*

[69] *The disputes continued into 1990, but the adversarial roles were defined a little differently, and were indications of a slightly different problem. This is discussed later in this section.*

[70] *E. Piper, State of Alaska, Office of the Governor, site visit, July 1989.*

[71] *Exxon did use one of its barge-mounted incinerators at Herring Bay on Knight Island from Sept. 11 to Sept. 17, burning about 2 tons of oily waste before shutdown for the season.*

[72] *Yost quoted in the state's "Oil Spill Chronicle" newsletter, vol. 1, no. 11, September 19, 1989. The DEC published this newsletter weekly, then later monthly, from July 1989 through June 1992. It had replaced "Soundings," a newsletter and fact sheet published by a team of public information specialists from the Alaska National Guard. The small group of Guard personnel, on active duty, compiled the fact sheet from various sources and sent it by mail and facsimile machine to villages, news organizations, and other parties every day from May through the middle of July 1989. It was frequently the only daily source of information that went out area-wide. As the summer wore on, more state organizations started preparing their own newsletters and sending them into the facsimile machine network. The Governor's press office consolidated the effort into the Oil Spill Chronicle in an attempt to make sure that information given by the state was cross-referenced with*

others and the positions expressed in the newsletters were consistent throughout state government.

[73] *ADEC, "Impact Maps and Summary Survey of the* Exxon Valdez *Spill Site," September 11- October 19, 1989. Five volumes (2PWS, 1 Seward, 1 Homer, 1 Kodiak).*

[74] *Regardless whether "miles of shoreline" was the most accurate way to describe the extent of oiling, it became the standard unit of measurement. DEC's data report from the 1989 fall survey included a statistical disclaimer acknowledging that even its miles of shoreline number had a wide possible margin of error. However, although it became less symbolically significant than it was in the 1989 season, mappers never got away from using miles of shoreline in one way or another. The Coast Guard actually attempted in 1989 to come up with a better way to describe progress than "miles of beach." Admiral Clyde Robbins toyed with a measurement unit that was based, in part, on what kind of beach was cleaned (heavy oiling, light, etc.) and what kind of results were coming in; his staff dubbed the unit a "clyde." However, it was hard to describe, reporters didn't pick up on it, and it passed unoticed into history.*

[75] *Exxon used the terms "wide, medium and narrow," instead, but that terminology never caught on with the rest of the organizations.*

[76] *Cleanup was classified by Exxon as either Type A — manual pickup and washing — or Type B — which was mechanical or involved removal of beach material. Some areas and crews were designated for Type A cleanup only (especially in the Homer and Kodiak zones); VECO and Exxon would not allow some work crews to have shovels because digging would, in their view, constitute Type B cleanup.*

[77] *See especially the staff reports done for the Alaska Oil Spill Commission about the impacts of the spill on communities. They are contained in appendix N to the commission's final report in February 1990.*

[78] *Most communities also intended to use the state money to pay extra administrative costs associated with spill response, and to maintain staff who handled spill-related planning, questions, and contact with the state, Coast Guard and Exxon.*

[79] *NOAA Recommendation for 1990 Cleanup of the* Exxon Valdez *Oil Spill, Draft, January 4, 1990. This was the draft circulated to state ageneies for comment.*

[80] *Captain D.E. Bodron, memorandum to the Alaska Regional Response Team members, January 2, 1990.*

[81] *Kuwada, M., Alaska Dept. of Fish and Game, memorandum to Steve Provant, DEC, state on-scene coordinator, January 29, 1990.*

[82] *Kuwada, M., ADF&G, notes from Feb. 16, 1990 meeting of state agency cleanup teams.*

[83] *Each of the joint surveys after 1989 carried its own acronym based on the status of the cleanup or the stated goal. The FASST surveys were intended to be a fast snapshot on selected shoreline changes. The SSAT was the Spring Shoreline Assessment Team program in 1990. It was followed by the ASAP, which referred not only to its actual name — the August Shoreline Assessment Program — but to the fact that it was supposed to be done quickly before the weather changed from summer to winter. The spring 1991 survey, done in May, was called MAYSAP, and the last joint survey in 1992 was dubbed FINSAP, or the Final Shoreline Assessment Program. There were a multitude of acronyms for programs, equipment, or institutions, but many were not planned to "read" quite as well as the joint survey designations. One of the most humorous configurations was for the 1989-90 Winter Interagency Monitoring Program, known, of course, as WIMP.*

[84] *Clay Robinson, ADEC, quoted in the state's Oil Spill Chronicle, Vol. 2, No. 7, Feb. 13, 1990.*

[85] *The reader should take these figures, like all other oiling statistics, with a grain or two of salt. The numbers, despite the specificity implied by the presence of decimal points, are somewhat imprecise. For one thing, the total sample changed from year to year: Surveyors did not walk every mile every year, but rather, returned only to to those places where oil was reported during the visit immediately previous (survey or cleanup). So, each data set was based on a sample smaller than, and selected differently from, the data set recorded before*

it. It was a practical approach for targeting cleanup, of course, but the methodology isn't exactly rigorous, from a statistical standpoint. In addition, data reports were significantly affected from year to year by factors such as weather (surveys done in the rain almost always disclosed less oil than surveys done in nice weather), the experience of surveyors (some people were more skillful at finding oil than others), and whose hand was on the pencil recording the data in the field (one person's "heavy" was another person's "moderate." Finally, and most important, the joint survey figures do not include subsurface oiling.

[86] *See Chapter 1 for a more complete examination of this issue and for citations from state documents supporting this general description of the state's perceptions.*

[87] *Gardner, D., and others, unpublished DEC summary of shoreline cleanup titled "Shoreline Treatment/Cleanup Monitoring: Review of Field Activities During the Exxon Valdez Oil Spill Treatment Operation," June, 1992. This problem of disputes about "exceeding the work order" were numerous; some were probably honest differences in interpretation, but other disagreements were over blatant refusal by Exxon or the Coast Guard field monitor to remove obvious oiling. The DEC and Fish and Game monitors began sending in reports of these, which were later compiled in a June 21, 1990 DEC memorandum.*

[88] *See Chapter 1, page 33, on the role of the TAG and the "net environmental benefit" debate. See also Chapter 2, page 73, on bioremediation.*

[89] *State of Alaska, Exxon Valdez Oil Spill Response Center, "1991 State Response Plan: Policies, Requirements, Guidelines," April, 1991.*

[90] *Exxon's did not.*

[91] *Joint U.S. Coast Guard/ADEC Press release, June 12, 1992.*

Chapter 4: Legal, Regulatory and Administrative Changes

The grounding of the *Exxon Valdez* prompted both the state and federal governments to significantly alter the laws, regulations and strategies relating to oil pollution. At the state level, between April 1989 and May 1990 the Alaska Legislature passed a dozen new laws dealing with prevention, response and oversight. Among the most significant was a law boosting the state's emergency oil and hazardous substance response fund to $50 million — 50 times what the fund contained at the time of the Exxon spill. The Legislature also mandated a complete rewrite of the state's oil spill prevention, response, and contingency planning regulations, and increased both liability and penalties for polluters. The fund has since become the state's primary source for spill response planning and development, including funding for a new, special division of the Department of Environmental Conservation (DEC) dedicated solely to oil and hazardous substance spill issues.

The changes at the federal level were rolled together in the Oil Pollution Act (OPA) of 1990, which became law less than 18 months after the initial grounding of the Exxon tanker. This was especially significant, since the legislation that became the foundation of OPA '90 had been languishing in various Congressional committees for nearly 15 years. Like the state measures, the federal act raised liability limits, mandated new prevention measures, and set up a new federal response fund.

Neither the state nor federal measures sailed unimpeded through a newly "greened" political system. It took considerable pressure from a variety of sources to free the federal bill from the House of Representatives subcommittee presided over by the late Walter Jones of North Carolina, who had sided with the wisdom of the shipping industry for a decade and a half. And while there was an initial burst of activity in the Alaska Legislature in the spring of 1989, by 1990 the remaining cluster of oil spill bills were being held in Senate committees almost until the brink of the 120-day session.

In the end, the various legislative factions at both the state and federal government level worked out their differences and produced the new laws that are now the foundation of the spill response planning and prevention system in Alaska and the rest of the nation.

4.1 State legislation

The *Exxon Valdez* hit Bligh Reef on March 24, when there were about 40 days left in the state legislative session. In that short span, the state Legislature and the Governor introduced a brace of new spill bills, and seven were considered and passed in little more than a month. This was a remarkably short time for any group of related bills, but even more remarkable because one of the seven was a major tax bill.

But before the Legislature got to the new tax bill directly related to the spill, it considered an old tax bill that was completely unrelated. This was the extremely controversial measure that proposed to roll back a tax incentive given to Alaska oil producers in 1980. The incentive was known as the Economic Limit Factor (ELF), which was designed to lower severance taxes on oil produced from the so-called "marginal fields," a generic term that included basically everything other than the lucrative and high-production Prudhoe Bay unit.

Oil tax analysts and economists in the administrations of both Governor Bill Sheffield and Governor Steve Cowper argued that by the mid-1980s, the ELF was providing a generous and unintended tax break to producers on what had turned out to be high-production, high-profit fields such as the Kuparuk field next door to Prudhoe. They suggested that the tax code be amended so that fields such as Kuparuk would be taxed at the Prudhoe Bay rate, while the ELF would apply to a number of

smaller fields that had either not been yet developed, or were in the early stages of development. Cowper made repeal of the ELF one of his highest resource management priorities.

The oil industry said that the Cowper tax analysts had it all wrong and that the incentive was working as intended, as oil companies drilled more wells, which in turn helped put more oil field service workers on the job. Oil companies also objected to yet another change — this time a potential flip-flop — to the tax system in less than a decade. Oil exploration and development plans are based on long-term projections, the industry argued, and constant instability hurt their ability to look and plan ahead properly. The industry, along with trade and commerce associations, made the stability of the tax system one of their highest legislative priorities. The vote, whenever it came, would certainly be close.

The vote came shortly after the tanker had run aground, and the ELF was repealed by a narrow vote in the Alaska State Senate. Several legislators who were usually supportive of the industry on key issues voted against this one. It was not an "oil spill bill," but it marked the beginning of a decisive period for the Legislature. In short order, both houses approved in 1989:

- revised contingency plan requirements;
- creation of volunteer response corps in coastal communities;
- an increase in civil penalties for oil spills;
- a sharper definition of liability for oil and hazardous substance spills;
- creation of the Alaska Oil Spill Commission;
- a change in tax law that prevented Alyeska and Exxon from deducting any cleanup costs from state severance taxes; and
- a major revision in the funding and operation of the state response fund.

A second oil tax bill was debated and approved within a few weeks of the ELF repeal in 1989. This was the "nickel-a-barrel" bill that swelled the state's oil spill response fund to a maximum of $50 million.

In the 1990 session, the Legislature followed up with several, more detailed bills that:

- revised or specified response standards;
- strengthened DEC's ability to enforce contingency plans
- gave DEC authority to inspect tankers;
- broadened the Governor's authority to use the spill response fund in a disaster;
- clarified the roles and responsibilities of DEC and the state emergency services division in a declared disaster;
- created the Citizen's Oversight Council on Oil and Other Hazardous Substances; and
- defined and set up penalties for certain environmental crimes.

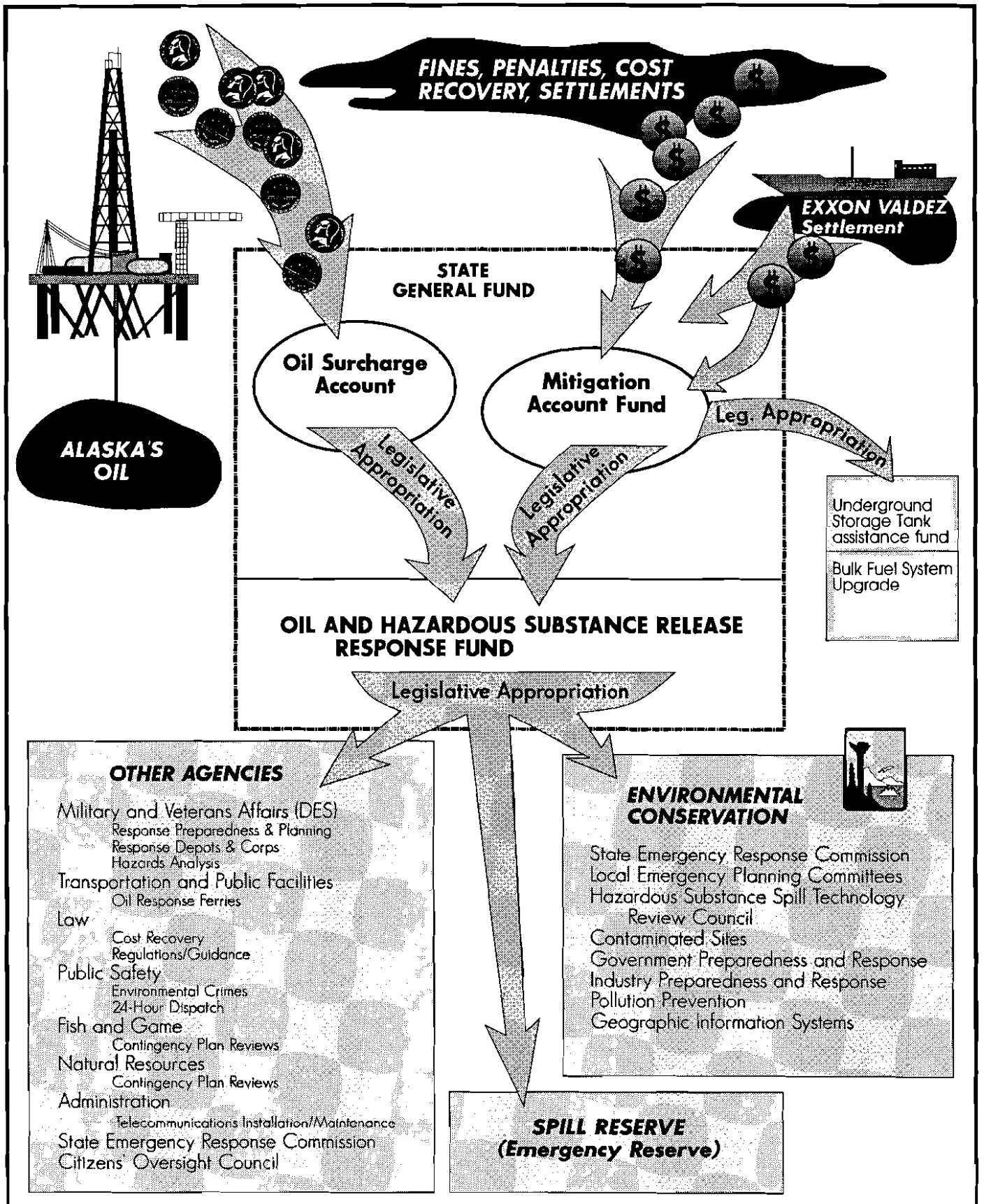
Oil and Hazardous Substances Release Response Fund

It would have been considered unusual for one major tax bill to pass in a session (especially the first year of the two-year session, since historically the legislature deals with its biggest issues in the second year), but a second oil tax bill was debated and approved within a few weeks of the ELF repeal in 1989.

This was the "nickel-a-barrel" bill that swelled the state's oil spill response fund to a maximum of $50 million. Senator. Jay Kerttula sponsored the move to impose a "conservation surcharge" of five cents per barrel on all oil coming down the pipeline. The money would be earmarked for the state Oil and Hazardous Substance Spill Response Fund (known in government vernacular as the "470 Fund," named so because of the number of an earlier piece of legislation dealing with the fund).[1]

The response fund had been around for some time, but it had never contained much more than a million dollars at any one time.

In the case of the Exxon spill, DEC had a responsible party that would reimburse the state for cleanup-related expenses. However, the scale of the response and the extraordinary amounts of money involved were galloping far ahead of conventional spending and reimbursement procedures. Most spills are small enough that out-of-pocket expenses can be covered either by reserves in the response fund, or by borrow-



Alaska's Oil and Hazardous Substance Release Response Fund — Prepared by ADEC 4/93

ing from other parts of the regular budget, a fiscal practice allowed under emergency circumstances. However, the government can only spend what the Legislature gives it. In the case of the *Exxon Valdez* response, the regular agency pockets were not so deep that agencies could keep spending cash on hand without starving other, unrelated operations.[2]

In the case of the *Exxon Valdez* spill, DEC's out-of-pocket expenses for the response were quickly adding up to as much as $1 million per month. Without a source of funding for state response, DEC would quickly run out of legal ways to pay for the work it was supposed to do. In each of the three major seasons of cleanup, DEC's *Exxon Valdez* budget (which included money it passed through to other agencies) ranged from a high of $18 million to about $4 million. Without the cash flow from the beefed-up response fund, paying for state oversight and cleanup activities would have been much more complicated.

Lawmakers modified the response fund rules so that the $50 million account could be used as a source of cash for a wide variety of emergency response expenses during a major oil spill.

The 1989 session also saw an additional change, allowing the state to use the fund to pay for spill planning, prevention and response measures, a landmark change in state fiscal policy. In the past, the Legislature approved a DEC budget in which all programs competed for a piece of a common appropriation. Since the expansion of the response fund, spill planning, prevention and response activities have their own source of funding; theoretically, they do not have to compete with general water quality programs, or solid waste disposal, and so on.

A 1990 law further broadened the allowable uses of the response fund, allowing the Governor to use the response fund as a general disaster relief fund in a declared disaster *related to an oil or hazardous substance spill.* This seemingly minor change in procedure was the focus of a major internal struggle over the roles and responsibilities of the DEC and the state emergency services division within the Department of Military and Veterans Affairs.

The debate really went back to May of 1989, when the initial rush to response was settling into something that could best be described as a sustained emergency. Once the oil was on the shorelines, the job was not really to respond to an emergency, but to manage a large contaminated site cleanup. Until that time, the state Division of Emergency Services (DES) under the Department of Military and Veterans Affairs had played a high-profile, central role in the state response. But in May, when the 30-day disaster declaration bringing DES into the picture expired, the Governor appointed Dr. Robert LeResche as the state's executive branch oil spill coordinator and assigned all other major response duties to DEC.[3] The directors of the emergency services division vigorously opposed this reassignment, and over the next year and a half the division made its case with the Legislature and the Alaska Oil Spill Commission, arguing that the state's emergency management experts needed a stronger role and better access to cash during a catastrophic oil spill.

The oil spill commission and the Legislature agreed, to a certain degree. The spill commission found that DEC had neither the expertise nor authority to handle all aspects of a catastrophic emergency, and recommended a stronger role for DES. Following that recommendation, the Legislature in 1990 turned over the responsibility for the volunteer response corps and depots to DES. In addition, lawmakers modified the response fund rules so that the $50 million account could be used as a source of cash for a wide variety of emergency response expenses during a major oil spill.

This was the last of the major changes to the state's oil spill response fund, which until 1989 had been extremely limited in both funding and application. Before the *Exxon Valdez* spill, the "470 Fund" was strictly a petty cash account that paid for direct DEC cleanup of oil and fuel spills large and small. By 1992, it had, literally, a tax and a budget of its own, and it funded nearly half the activities of a major state agency.[4] The Legislature had a renewed interest in the fund's oversight and appropriations, and other executive branch agencies had managed to get at least a finger on a fund that had always lived entirely at DEC. Where once the fund was solely under the administration of DEC's commissioner, it now was elevated to an emergency response fund to which the Governor had direct access.

Levels of Contingency Planning			
PLAN	**PURPOSE**	**IMPLEMENTOR**	**AUTHORITY**
National Contingency Plan	Details how federal agencies will respond to spills and sets up a mechanism for the federal government to take over and manage response to large spills; state participation through Regional Response Teams	National Response Team chaired by the Environmental Protection Agency and U.S. Coast Guard.	Sect. 105 of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA).
State Emergency Plan	To prevent and minimize injury and damage caused by natural and man-made disasters. State Master Plan is an annex to this plan.	Division of Emergency Services, Alaska Dept. of Military and Veterans Affairs.	Governor of Alaska and A.S. 26.23.040 requires DES to prepare.
State Master Plan (Statewide Mater Oil and Hazardous Substance Discharge Prevention and Contingency Plan)	Provides coordination of state resources during a spill of oil or hazardous substances, and is an annex to the State Emergency Plan.	Alaska Dept. of Environmental Conservation (DEC) in coordination with all state agencies.	In 1989, Senate Bill 261 amended Alaska Statute 46.040.200 to require DEC to prepare and annually review and revise.
Regional Master Plans (Regional Master Oil and Haz. Substance Discharge & Prevention Contingency Plans)	Define the response resources for each of ten regions, local spill notification, local response equipment, and information on the Local Emergency Planning Committees.	Alaska DEC.	A.S. 46.040.200
Local contingency Plans	Local Emergency Planning Committees (LEPCs) must conduct local planning for hazardous materials emergencies.	Local governments and State Emergency Response Commission approve the plans.	SARA Title III (Federal Emergency Planning and Right-to-Know Act) 42 USC 11001-11005
Vessel & Facility Spill Plans (Oil Discharge Prevention and Contingency Plans)	Vessels that transport oil as cargo or certain facilities that store and transfer large quantities of oil must have plans that describe how they will prevent spills and organize and use their resources to contain and cleanup their potential spills.	Operators have primary responsibility to submit plans. DEC has lead responsibility to review and approve or disapprove.	A.S. 46.04.30

Source: Alaska Department of Environmental Conservation

New Standards for Contingency Plans

(Alaska Statute 46.04.030)

OIL TERMINAL FACILITIES:
Must plan to contain or control and clean up a discharge equal to the capacity of the largest tank at the facility within 72 hours

CRUDE OIL TANK VESSELS OR BARGES:

- Vessels smaller than 500,000 barrels of oil storage capacity must plan to contain or control and clean up a 50,000 barrel discharge and have the equipment within the region of operation within 72 hours.
- Vessels with more than 500,000 barrel capacity must plan to contain or control and clean up a 300,000 barrel discharge and have the equipment within the region of operation within 72 hours
- All crude oil tank vessels or barges must demonstrate access to other equipment outside of the region of operation to clean up a realistic maximum discharge, and the ability to have that equipment deployed and operating at the discharge site within 72 hours.

NON-CRUDE TANK VESSELS OR BARGES—

- Must plan to contain or control the greater of 15% of the total oil storage capacity of the vessel or the realistic maximum discharge within 48 hours
- Must clean up the discharge within the shortest possible time consistent with minimizing damage to the environment.

Contingency plans and response standards

Two pieces of legislation, one each of 1989 and 1990, set the stage for a revision of the state's oil spill prevention and response rules, which Alaska officials say in 1992 are the toughest in the United States.

The 1989 legislation was largely aimed at DEC's review and update of contingency plans. The agency is now required to update all regional and statewide plans every year. The 1990 legislation was more sweeping and directed at contingency plan holders. The measure, introduced by Governor Cowper as House Bill 567, wound up setting specific standards for cleanup for various types of products, at various types of facilities and vessels. It elevated contingency plans to a status closer to a requirement than a set of general guidelines. It eliminated some of the blurry lines of responsibility, better pinpointing who was responsible to act and who would be liable for costs. It gave DEC more authority to inspect facilities such as tank farms, vessels, and barges, so the agency could better judge compliance with contingency plans. It also added a "good Samaritan" clause designed to limit the liability of responders who made a mistake while attempting to implement an approved plan.[5]

This bill had a good deal of support, but it also raised a lot of questions. Many businesses, such as remote-site fuel suppliers, argued that the increased cost associated with increased liability and response requirements — typically, insurance or some other bonding — would be prohibitive for smaller businesses. Ultimately, opponents and proponents worked out a series of compromises that led to final passage of the bill. A similar working group helped develop the regulations to implement House Bill (HB) 567 between 1990-92.

The major highlights of HB 567 were the specific response performance criteria and the increased levels of financial responsibility.

Under the new law, smaller tankers (under 500,000 barrels capacity) must be able to contain and clean up a 50,000 barrel spill within 72 hours, while vessels carrying over 500,000 barrels (most of the fleet that calls at the Alyeska terminal), must demonstrate two levels of control and cleanup ability: 1) They must have access within the region to equipment necessary to deal with a 300,000 barrel spill (the *Exxon Valdez* dumped about 240,000-260,000 barrels), and 2) they have to show that they have access to enough equipment elsewhere to control and clean up the maximum realistic discharge, and that they can get that equipment to the site within 72 hours.

The term "realistic maximum discharge" was the focus of considerable debate during both the legislative and regulation-writing periods. Some lawmakers and interest groups argued that the word "realistic" was a loophole, and that facilities and vessel-owners ought to be able to handle what came to be called "the full bucket," i.e., an amount equal to the total capacity. When the legislation passed without the "full bucket" provision, proponents argued during the regulation-writing process that the "realistic maximum discharge" was, in fact, the "full bucket;" they pointed to the reality of the *Exxon Valdez* spill as an example. Opponents of the "full bucket" provisions said the *Exxon Valdez* spill was an anomaly, and that current technology simply was not able to control and clean up a spill of, say, a million barrels within the 72 hours required under the law. Such a provision was an impossible standard, they said.

Based on oil spill histories and risk modeling, DEC concluded that *Exxon Valdez* spills, though devastating, are in the upper one percent of all spills. The regulations on which the department and the working group settled are, the department says, tough enough to require cleanup of 99 percent of all oil

spills within the 72 hour standard. And, DEC argued additionally, even without the "full bucket" provision, the Alaska standards are the highest and most specific of the 50 states.

Liability, penalties, fines

Just as the response structure had not fully recognized what it would take to handle a spill the size of the *Exxon Valdez*, the civil and criminal liabilities and penalties were dwarfed as well. The Governor decided relatively early in 1989 that the state would not even bother to apply the civil and criminal penalties and fines on the Alaska

Proof of Financial Responsibility

(Alaska Statute 46.04.040)

Type of Facility	Before June 1, 1991	After June 1, 1991
OIL TERMINALS		
Oil Terminals/Crude (5,000 barrel (bbl.) and up)	$10 per bbl. of storage capacity or $1,000,000., whichever is greater, $50,000,000 maximum	$50,000,000 per incident
Oil Terminals/Non-Crude (10,000 bbl. and up)	Same as above	$25 per bbl. of storage capacity or $1,000,000., whichever is greater, $50,000,000 maximum
Oil Terminals/Crude and Non-Crude combined	Same as above	If mostly crude - $50,000,000 per incident. If mostly non-crude - $25 per bbl. of total capacity
PIPELINES & EXPLORATION FACILITIES		
Pipelines and Offshore Exploration or Production	$35,000,000 per incident	$50,000,000 per incident
Onshore Production	EXEMPT	$20,000,000 per incident
Onshore Exploration	EXEMPT	$5,000,000 per incident
VESSELS & BARGES		
Tank Vessel & Oil Barge/Crude	Trans-Alaska Pipeline related: $14,000,000. Other tankers: per Clean Water Act or $20,000,000, whichever is greater. Other barges: per or CWA or $1,000,000.	$300 per bbl. per incident storage capacity or $100,000,000, whichever is greater
Tank Vessel & Barge/ Non-Crude	Same as above	$100 per bbl. storage capacity per incident or $1,000,000., whichever is greater, $35,000,000 maximum

books. Part of the reason lay in the fact that most of the possible civil and criminal penalties seemed puny in relation to the event. After the spill both the Governor and the Legislature introduced various measures to put another order of magnitude on the civil and criminal scale.

In the 1989 session, lawmakers concentrated on a measure that raised the maximum civil fine from $100 million to $500 million. It also raised the assessments based on how many gallons were spilled. Now, the fine stands at $8 per gallon for spills under 420,000 gallons and $12.50 per gallon for spills above that. Under both the old and new laws, the fine can be multiplied several times if the spill were intentional, or due to an act of gross negligence. The 1989 law also added an additional, significant definition of negligent behavior that would trigger the multiplier: failure to respond in accordance with an approved oil discharge contingency plan. This clause, coupled with other provisions in other new laws, re-enforced the point — both legally and practically — that contingency plans are performance plans, not just guidelines.

Governor Cowper felt that criminal law at the time of the spill did not sufficiently address the range of criminal responsibility that could be involved in environmental crimes involving corporations. As part of Cowper's oil spill package introduced in 1989, the Governor included two bills that would have:

- Raised the stakes for some environmental crimes — reclassifying several as felony offenses;
- Made corporate officers criminally responsible for environmental crimes;
- Given the state courts the discretion to fine environmental criminals up to twice the amount of the damage caused by the act.

Both bills made it through the Legislature in 1990, although the Legislature dropped or amended several of Cowper's more vigorous provisions. Lawmakers made only one crime a felony (reckless operation of a tanker), dropped the proposal to hold corporate officers criminally responsible for their company's actions, and approved several more modest increases in criminal fines.

Access, enforcement, and oversight

The most controversial of all the oil spill bills was one that did not pass. HB 409 was a measure that would have strengthened the DEC's inspection and administrative authorities.

The most controversial of all the oil spill bills was one that did not pass. HB 409, originally introduced by Rep. Mike Davis (D-Fairbanks), was a measure that would have strengthened the DEC's inspection and administrative authorities. Specifically, Davis sought to give DEC the authority to make unannounced inspections of major facilities, such as the Alyeska terminal. It also would have given the department the authority to assess administrative penalties against violators of environmental laws, and to require environmental "audits" of facilities.

In many ways, DEC would have assumed similar kinds of authorities as the U.S. Environmental Protection Agency (EPA). EPA (and some state environmental regulators around the country) do not need to get a warrant or any special permission to inspect a facility to make sure it is complying with its permits. EPA also has the authority to assess fines of "x" dollars per day against violators who are reluctant or unwilling to bring their operations into compliance. As a practical matter, the threat of the administrative fine is used more than the fine itself; however, Davis and the Cowper administration felt that DEC needed this leverage.

More important, the bill would have given DEC other options for enforcement. Former DEC commissioner Bill Ross, who had presided over the revamping of the Alyeska contingency plan from 1984-86, pointed out to the Alaska Oil Spill Commission that DEC's options in dealing with Alyeska were limited to negotiation, court proceedings, and the "nuclear" weapon of shutting down the pipeline. If Alyeska were out of compliance with its air or water discharge permits, DEC would first suggest a compliance schedule. If Alyeska resisted (which it had repeatedly over the years), DEC had the option of asking the courts to intervene. In either case, the process was likely to

be compromising or time-consuming; meanwhile, the pollution violations would continue. The last option was to shut down the pipeline by emergency order. This, to Ross, seemed like a much bigger hammer than was justified in most situations.

"If there is an enforcement policy that has as its only option the nuclear one, it's not a very good enforcement policy," Ross told commission staff.

HB 409's provisions giving DEC the ability to levy administrative fines through the agency — as opposed to seeking a court order — were an attempt to give the agency an enforcement option that had some weight, could be implemented quickly, and was not so drastic as shutting down the source of a quarter of America's domestic oil production. Not everyone saw HB 409 in this light.

"This bill," reads the department's official summary of legislation," was very controversial." This was a substantial understatement.

The Anchorage Times dubbed the measure "the Gestapo Bill" in one of its editorials. Less colorful opponents of the measure simply said the heavy-handed approach to enforcement was anti-business, and that it put too much environmental policing power into the hands of regulators. Industry officials said the measure did not properly take into account that disagreements over permit provisions are frequently technical in nature and not black-and-white assessments; the administrative penalty provision, they argued, gave the government too much power at the expense of the rights of private companies. It raised the stakes, but also eliminated the chance for facility operators and the government to find a middle ground, they said.

The bill barely passed the House of Representatives and died in the Senate.

In both 1989 and 1990, the Legislature acted to increase the access and oversight of citizens in the regulatory process. In 1989, lawmakers approved creation of the Alaska Oil Spill Commission, which produced a multi-volume report and specific recommendations for action based on the *Exxon Valdez* experience. One of the commission's major recommendations was the creation of a permanent, government-funded citizen's oversight group. Led by the House Resources Committee in 1990, lawmakers created the Citizen's Oversight Council on Oil and Other Hazardous Substances. The five-member council has broad powers to investigate and analyze the transportation, storage, and regulatory systems relating to oil and other hazardous substances.

The council played a significant role in identifying in 1992 gaps in the Prince William Sound and Alyeska terminal spill response system. Partly as a result of the council's report, the Legislature clarified in law the responsibility of Alyeska Pipeline Service Company to respond to oil spills from both the terminal operations as well as tankers calling at the terminal.[6]

4.2 The Oil Pollution Act of 1990

The Oil Pollution Act requires that the federal government "consult" with the state before determining whether a cleanup is complete.

The Oil Pollution Act of 1990 does, at the federal level, the same kinds of things accomplished by the brace of state legislation passed during1989 and 1990. The federal act increases liability and financial responsibility for oil owners and shippers, sets up a new oil pollution response fund that provides money for prevention and research as well, and requires stronger prevention measures for both the government and private parties.

The State of Alaska took an immediate and active interest in the development of the new act, because for the state the stakes were high on several fronts.

First, the state wanted to make sure that federal law cleared up the blurry lines of responsibility that created the confusing "who's in charge" issue that persisted throughout the *Exxon Valdez* spill response. The 1990 federal act did that by strengthening the ability of the Coast Guard to take over a response at any time. Up through the *Exxon Valdez* response, the Coast Guard could not "federalize" a spill unless the spiller was unwilling or unable to perform, and more important, once federalized, the spill response costs came from the federal treasury.

The Oil Pollution Act allows the Coast Guard to actually direct all federal, state, and private party actions when the on-scene coordinator thinks it is time for the Coast Guard to step in. But it also allows the kind of cooperative funding arrangement worked out in the *Exxon Valdez* response (i.e., the Coast Guard directs; spiller writes the checks), without the necessity of the Coast Guard maintaining a passive role.

Further, the Oil Pollution Act requires the Coast Guard to take over direction of the response during what has come to be termed "a spill of national significance.," i.e., a really big and complex spill like the *Exxon Valdez*.

But in calling for the increased federal role, the state's principal concern was to make sure that the new federal law did not preempt any applicable state laws regarding prevention, response, or determination when cleanup is "complete" to state requirements. This was somewhat of a sore point for Alaska, which in 1978 attempted to pass stricter state regulations on tanker safety than those of the federal government. The oil companies sued, claiming successfully that the tanker trade was interstate commerce, and therefore Alaska's stricter tanker rules infringed on the federal government's superior authority to regulate such commerce.

The Oil Pollution Act of 1990 includes a specific disclaimer regarding preemption, one strong enough that it has led states (including Alaska and California) to begin taking steps to insure tanker safety beyond what the federal government requires. Alaska now claims authority to inspect and regulate some safety aspects of tankers operating in state waters. California's comprehensive prevention and response act (also passed in 1990) takes a more aggressive approach to attaching specific state requirements for navigation and other technical safety improvements on tankers. This non-preemption clause is not quite so clear-cut, however; the Congressional conference committee that hashed out the final version of the Oil Pollution Act specifically noted in its statement of intent that the new bill was not meant to address or otherwise alter the 1978 Supreme Court decision that struck down the Alaska tanker rules.

In terms of cleanup, the Oil Pollution Act at several points preserves the rights of states to impose stricter removal requirements than the federal government, as long as those requirements do not conflict with federal law or requirements. The Act requires that the federal government "consult" with the state before determining whether a cleanup is complete; while this does not give the states a veto power over a Coast Guard decision to end a cleanup, it raises the profile of the states in the decision and gives states a bit more public and legal leverage. The act also preserves the right of a state to require the spiller to continue removal to any stricter state requirements after the end of the federal cleanup.[7]

Congress also included in the Oil Pollution Act authorization for two "demonstration" oversight programs in Prince William Sound and Cook Inlet. This led to the creation of the Prince William Sound and Cook Inlet Regional Citizens Advisory Councils, funded through cooperative agreements with oil shippers and storage facility owners in each area.

The Oil Pollution Act also makes available up to $1 billion (per spill) available for response and removal costs. Congress also authorized the Coast Guard to spend up to $50 million a year for planning, preparedness and prevention costs, and makes available up to $27 million a year for oil spill-related research.

Two major sets of new federal regulations are currently being prepared as a result of the Oil Pollution Act. The first is a revision of federal natural resource damage assessment rules, the second is the set of regulations implementing the new prevention and response requirements.

Notes, Chapter 4

[1] *Under the Alaska Constitution, revenues cannot be collected and dedicated to a specific purpose automatically. (The lone exception is the state savings account, the Permanent Fund, which was added by constitutional amendment in 1976.) To get around the constitutional prohibition against dedicated funds, the nickel-a-barrel was technically added to the existing severance taxes, and the Legislature makes a pro forma appropriation to the response fund in an amount equal to whatever the surcharge added up to in a given year.*

[2] *In the early days of the defense at the Sawmill Bay on Evans Island, the Alaska Department of Fish and Game kept asking Exxon to buy more boom for the hatchery. Exxon's field people told Fish and game to buy it themselves and "back-charge" Exxon to recover the costs. However, the response came at the opening of the last quarter of the fiscal year, and Fish and Game — which was coming into its busiest and most cash-consuming seasons of spring and summer - could not buy boom without pulling large amounts of money out of its regular program budget.*

[3] *This was a reflection of Governor Cowper's general view of the response structure. As early as the first week of the spill, Cowper expressed the opinion that although he wanted a stronger federal role in directing the response, he did not think the Federal Emergency Management Agency (DES's federal counterpart) was the right organization to handle the job. Cowper said FEMA was "a logistics outfit" that did not have broad enough authority or expertise to take over this kind of an operation. (Governor Steve Cowper, personal communication, April 1989. Also, Persily, L., interview with Governor Cowper for the Alaska Oil Spill Commission, summarized in a memorandum to Havelock, J., Nov. 28, 1989.)*

[4] *Under the law, the state collects the conservation surcharge until the fund reaches $50 million. As a practical matter, the Legislature's allocation of some response funds to operations and some to unallocated emergency response means that the fund has not, in its first two years, actually ever reached a $50 million balance.*

[5] *Previously, a responder who botched a response, even if acting in good faith, was exposed to a high standard of liability for the mistake. The standard now is that a responder following an approved plan must show gross negligence, as opposed to simply negligence, to be held liable for damages.*

[6] *This provision originally appeared in a different bill introduced by Representative Mike Davis (D-Fairbanks), but was added to Cowper's bill with the consent of the sponsor.*

[7] *This clause deals with a little bomb that was quietly ticking in the corner throughout the Exxon Valdez spill response. Exxon pointedly excluded state requirements from any statements of intent or promises for conducting cleanup, saying only that the company would "do what the* Coast Guard *requires (Editor's emphasis)." The first official acknowledgment that Exxon would follow through on state requirements was in the civil and criminal claims settlement reached between the governments and Exxon in March 1990. Although that settlement fell through, the subsequent agreement of October 8, 1990, contained the same language.*

It was, perhaps, inevitable that the *Exxon Valdez* oil spill would trigger lawsuits and other legal action. However, a fairly large volume of claims never made it as far as court; Exxon and many claimants (commercial fishermen, cannery workers, some local governments) chose to make their accord out of court. Exxon paid about $130 million to commercial fishermen for the loss of the 1989 commercial fishing seasons in the spill area, with the bulk of the payments coming within a few months — or less — of the spill. This form of out-of-court dispute resolution was in sharp contrast to the events following the 1987 *T/V Glacier Bay* spill in Cook Inlet, when most of the fishermen who suffered damages did not collect any compensation until — ironically — long after they had been compensated for *Exxon Valdez* losses. However, a number of private lawsuits remain in the courts and, at this writing in the spring of 1993, are awaiting trial in state Superior Court in the spring of 1994.

The State of Alaska had several options for legal action before it in the spring of 1989. The state tried the master of the *Exxon Valdez*, Joseph Hazelwood, on criminal negligence and several smaller charges; an Anchorage jury eventually acquitted Hazelwood on all but one minor misdemeanor, and the acquittal was reaffirmed on appeal. Governor Steve Cowper considered filing criminal negligence charges against the Exxon Corporation in 1989, but he decided that the maximum penalty under existing law — a $100,000 fine — was not worth the time and effort it would take to prepare and try such a case. Cowper instead instructed his attorney general, Douglas Baily, to concentrate on civil action that would produce compensation for damages. On August 14, 1989, Alaska sued both Exxon and Alyeska Pipeline Service Company, claiming that negligent operations and a botched response caused unspecified damages to the environment; Exxon filed a counter-suit on October 24, claiming that the state interfered with Exxon's ability to do what needed to be done.

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Cowper felt the people of Alaska were owed damages by Exxon, but the Governor did not think a long, drawn-out litigation effort would be productive. He said many times, both publicly and privately, that he expected to settle the case with Exxon, and that he preferred to do it sooner rather than later. Cowper, himself an attorney familiar with maritime law, felt that pursuing protracted litigation extending over many years was bad public policy.[1] Cowper, attorney general Baily, and chief of staff Garrey Peska all contacted Exxon upper management during the summer of 1990 in an effort to move negotiations along.

In August 1990, Baily and Cowper learned that the U.S. Department of Justice, which had filed criminal charges against Exxon, was nearing agreement with the company on a negotiated plea agreement. The state had not been consulted on the matter, and the federal government's plan included provisions that could seriously affect Alaska's ability (and the ability of third-party, private plaintiffs) to pursue their claims against Exxon. Under the proposed deal, the federal government would agree not to press any civil damage claims against Exxon for four years; moreover, the federal government agreed that it would not provide information or assistance to those who had filed civil claims. This, of course, included the State of Alaska. There were other provisions the state found unwise or objectionable; among them were clauses that gave Exxon the right to sue the government if it disagreed with how the federal government spent claims funds, and provided Exxon the opportunity to recover any federal claims money that went unspent over time. But the biggest problem, from the state's perspective, was that the plea agreement would make it more difficult for the state and private plaintiffs to recover damages.

Beyond the fact that Cowper and Baily felt the state should have been consulted, the Governor feared that the plea agreement was raising the chances that the state would become mired in the protracted litigation he wanted to avoid. The state's legal costs were running about $1 million a month at that point, and again, regardless of the

state's likelihood of recovering damages somewhere in the future, Cowper saw years of legal work on the case as a poor use of public funds.

The Governor wanted what was termed a "global" settlement — ideally, a settlement of all public and private claims at one time. His next preferred choice was settlement of all government claims — criminal and civil — at one time. And the reality of the situation was that the state and federal civil damage claims were joined at many critical points.

The state and federal governments were seeking compensation for damage to natural resources owned by the public. However, the specific resources were under a mix of federal and state control: bald eagles and otters under the U.S. Fish and Wildlife Service, spawning salmon under the Alaska Department of Fish and Game, national parkland under the National Park Service, state parkland under the Alaska Department of Natural Resources' parks division, and so on. If the state and federal government were going to pursue their natural resource damage claims separately, each would have to make sure that the right government pressed the individual claims for the right species or resource.

The state and federal governments were seeking compensation for damage to natural resources owned by the public. However, the specific resources were under a mix of federal and state control.

There were several major problems with this kind of approach. Jurisdiction of certain public resources is pretty clear in some cases (otters, for instance), but it isn't so clear in others (tidelands, for instance). The state and federal governments could go ahead with pressing separate claims against Exxon only if they agreed beforehand who owned what. There loomed the possibility that the state and federal governments would first become mired in jurisdictional disputes for some period before any actual damages could be settled with Exxon. Those disputes could almost certainly include litigation between the two governments; Alaska and the United States, even now, have not fully resolved the issue of who owns the land and resources under certain bodies of water. This issue has been addressed piecemeal in one case, then another and another, all of which has taken more than a decade. And considering that the intertidal areas — sometimes submerged, sometimes not — were among the areas of Prince William Sound most affected by the spill, the prospect of tangled state-federal-private litigation over intertidal damage was enough to give everyone a headache. And even if federal and state jurisdictions over management of a given species was initially clear, the *relationships among different resources* might not be clear.

Let's take sea lions and salmon, just as a hypothetical example. The health and welfare of sea lions, as a public resource, falls to the National Marine Fisheries Service under the guidance of the federal Marine Mammals Protection Act of 1973. Salmon fall under the management of the Alaska Department of Fish and Game.[2] Therefore, the U.S. would collect on any damages caused to sea lions, and the State of Alaska gets the check for salmon damage, right?

Not necessarily. Sea lions eat salmon. If the state collected damages on behalf of the salmon, could the United States claim a piece of the salmon compensation because Uncle Sam's sea lions have lost a food source? Government lawyers could argue this one — and others — for some time. That's before they even talked to Exxon's lawyers.

As a practical matter, the state and federal government agreed early on to seek damages jointly, rather than raise the specter of a long, public court battle while the public waited to recover damages to begin restoration of the public resources damaged by the spill. Arguments over resource ownership might have made for interesting law, but the potential delays made for bad public policy. And, as a matter of legal policy, it made more sense to deal with Exxon jointly on the civil claims.[3]

The collapse of the Exxon-federal plea agreement on the criminal charges in the summer of 1990 caused a flurry of media attention (and some hard feelings between the state and the Justice Department), but it helped set the stage for something approaching the "global" state-federal settlement Governor Cowper sought.

Cowper left office at the end of his term in December, 1990.[4] His successor, Governor Walter J. Hickel, made settlement of the *Exxon Valdez* claims one of his most immediate priorities. Within a few weeks of his inauguration, Hickel telephoned Exxon's chief executive officer, Lawrence Rawl, and asked him to come to Juneau for

initial talks. Rawl and Hickel met for about 45 minutes on January 15, 1991, in Hickel's office, the men speaking in general terms.[5] The circle expanded in later meetings in Washington, D.C., with federal and state officials and additional Exxon executives. On March 13, 1991, the governments announced agreements with Exxon on both criminal charges and civil damage claims.

Under the agreements, Exxon was first to pay a $100 million criminal fine to the U.S. government; the federal government would then pass $50 million of the fine to the State of Alaska as restitution. Then, over 10 years, Exxon would pay $900 million into a court-administered fund to be used for restoration projects. A panel of six government officials — three state, three federal — would decide what projects to pursue and how much to spend.

The governments and Exxon each retained escape clauses in the agreement, however. Included in the agreements was a 30-day public comment period. At the end of the 30 days, the governments had 15 additional days to consider the public comments. During that 15-day stretch, each government retained the right to withdraw from the agreements if public comment demonstrated that the agreement was not in the public interest. Exxon retained the right to withdraw if the package was altered by the court.

In an effort to forge some kind of public consensus on the settlement, Governor Hickel put the agreement before the Alaska Legislature for ratification – even though he could have bound the state to the deal without so much as a consultation with the Legislature.

The agreements went to U.S. District Judge H. Russel Holland in Anchorage for review and eventual approval.

In an effort to forge some kind of public consensus on the settlement, Governor Hickel put the agreement before the Alaska Legislature for ratification — even though he could have bound the state to the deal without so much as a consultation with the Legislature. In the public and political arena, the Hickel settlement met with mixed reviews.

Opponents had various, sometimes unrelated problems with the proposed settlement. The first problem was a generic one that tends to crop up whenever the state reaches a large out-of-court settlement.[6] Settlement negotiations are nearly always private, and the public and the Legislature have no way of judging independently whether the state "got a good deal." So, these large settlements are often met initially with some skepticism by members of the public and the Legislature. In this case, the problem was exacerbated by the object of the negotiations. Usually, the state's large out-of-court settlements are based on the arcana of government tax codes, and only a trained legal mind could ascertain whether the state "got a good deal." But the object of settlement in the Exxon case were the publicly owned natural resources. Damage assessment to that time had been kept shielded from public view; members of the public and the Legislature wanted to see the results of the damage studies so that they could judge for themselves whether the $1 billion dollars was a fair sum.

"If someone owed you a bunch of money and you wanted me to negotiate a settlement, wouldn't you want to know what the range of values were?" said Representative Mike Navarre, D-Kenai, during a Alaska House of Representatives hearing on April 16.[7]

However, the attorney general decided that releasing the damage assessment studies was poor legal strategy, both for the state and for the private parties seeking additional damages from Exxon. Releasing the data could, on the one hand, expose the state to liability claims by private parties seeking damages; it also would almost certainly give Exxon an unfair advantage over the private plaintiffs with outstanding claims. If one assumes that the legal issue of damages turned on a judge's or a jury's interpretation of competing sets of damage assessment studies, giving Exxon the government's information in advance would have given the oil company an opportunity to build its defense or its attacks long in advance — without having to divulge the results of its own studies to its opponents.

Regardless of the legal wisdom of this policy decision, there was substantial criticism of the governments — specifically the State of Alaska — because they continued to hold "secret" the results of publicly funded research done to assess damage to publicly owned resources.

On April 8, 1991, the federal government released an 18-page "Summary of Injury" in an attempt to provide some public information on the damage, but the public and lawmakers continued to press for full release of the data. On April 17, Exxon answered by filing with the court — and releasing to the public — 20 company studies that showed, according to Exxon's claim, that "the recovery of Prince William Sound is well on the way - water is clean, fish are abundant and safe to eat, and wildlife is likewise abundant and thriving, and the beaches have been effectively cleaned."[8]

But still, the public did not have the complete picture, and some of the responses sent to Judge Holland connected criticism of the settlement to the lack of full scientific disclosure. Some commenters speculated that government damage studies would show that the damages were far beyond $1 billion.

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A second criticism raised by the public was that the settlement seemed too favorable to Exxon. They argued that the criminal fines were too light, and that the payment schedule for civil damages was too long. Allowing Exxon to stretch payment over a decade was too convenient to be considered a sufficient penalty, they said, and the extended-payment plan for Exxon exposed the state and federal government shares to erosion by inflation.

The state Legislature has its own specific set of criticisms of the settlement. They shared the concerns about lack of information, but the Legislature had serious constitutional problems with the settlement terms as well. Members of the Legislature, led by the House Judiciary Committee, felt that parts of the settlement infringed on their constitutional prerogative to appropriate public funds for specific public purposes. The March '91 settlement — and the October '91 settlement, for that matter — both provide that a group of six executive branch trustees decides how the trust fund money is to be spent. Under the Alaska Constitution, only the Legislature can decide how much money shall be dedicated to a certain public purpose. Lawmakers argued that decisions made by the state-federal trustee council amounted to appropriations, and were therefore subject to Legislative approval.

For this combination of reasons, the March settlement unraveled. On April 24, 1991, Judge Holland threw out the criminal plea agreement, saying in court that the $100 million fine was too low. While the Alaska Legislature never voted as a whole on the settlement, and Exxon ultimately exercised its option to pull out of the civil agreements on May 3, Judge Holland's ruling of April 24 effectively killed the deal reached among Exxon and the two governments.

On October 8, 1991, a new, slightly revised settlement agreement was announced. The total amount remained at $1 billion, but it was divided somewhat differently. The agreements included a larger criminal fine and a provision for formally including the public in the decisions about how to spend civil settlement funds for restoration. After a 60-day period for consideration of any appeals, the settlement was approved by Judge Holland on December 9, 1991.

The civil agreement stipulated that Exxon would pay $900 million to the state and federal governments over a 10-year period to settle civil litigation for natural resource damages brought by the governments which would have been costly and lengthy to prosecute for both sides. This was the largest dollar settlement of its type in U.S. history. Like the previous agreement, this one put the money into a trust held in U.S. District Court. A state-federal Trustee Council would decide how the money should be spent, and the court would then release funds according to the Trustees' plan.

The most significant changes in the settlement came in the criminal plea agreement. As before, Exxon and Exxon Shipping Company pled guilty to violating provisions of the Clean Water Act, the Migratory Bird Treaty Act and the Rivers and Harbors Act. Judge Holland set the criminal fine at $150 million, an increase of $50 million over the March agreement. However, only $25 million of the $150 million criminal fine was actually paid. Of the $25 million, $12 million was paid to the North American Wetlands Conservation Fund, and $13 million into the Victims of Crime Act account. The remaining $125 million was "remitted," or forgiven by the federal government due to Exxon's "cooperation with the governments during the cleanup, timely payment of

Terms of the *Exxon Valdez* Settlement

Total $1 billion

Criminal Penalties

– For violation of provisions of Clean Water Act, Migratory Bird Treaty Act and Rivers and Harbors Act: **Fine $150 million**

Paid: $25 million paid:
$12 millon to North American Wetlonds Conservation Fund
$13 millon to Victimes of Crime Act account

Remitted: by the court due to Exxon's cooperation [$125 million remitted]

– Criminal restitution: **Restitution $100 million**
$50 million to state government
$50 million to federal government

Total paid for criminal libility: $125 million

Civil Penalties

To state and federal governments over 10 years for natural resource domages **Total $900 million**

(The largest dollar settlement of its type in United States history. The money goes into a trust held in U.S. District Court. A state-federal Trustee Council decides how the money is spent, then the court releases funds occordingl to plan.)

Within 10 days of acceptance of settlement terms in 1991	$90 million
December 1, 1992	$150 million
September 1, 1993	$100 million
September 1, 1994	$70 million
September 1, 1995	$70 million
September 1, 1996	$70 million
September 1, 1997	$70 million
September 1, 1998	$70 million
September 1, 1999	$70 million
September 1, 2000	$70 million
September 1, 2001	$70 million

many private claims, and environmental precautions taken since the spill."[9]

While Judge Holland forgave $125 million of the criminal fine, he took back $100 million and placed it in a different criminal category. Under the new agreement, Exxon was to pay $50 million each to the state and federal governments in "criminal restitution." So, putting aside the legal differences between a fine and restitution, Exxon paid a total of $125 million to the state and federal governments for its criminal liability. This represented an increase of $25 million, in actual payments, over the original criminal plea agreement. See chart above for the terms of the civil settlement.

From the initial $90 million in civil penalities paid in December 1991, the state and federal governments repaid themselves for spill-related expenses they had not recovered from Exxon at the time of the settlement. The state recovered $29 million and the

federal government replaced $24.5 million for cleanup monitoring, natural resource damage assessment study costs, and litigation support expenses.

In December 1992, Exxon deducted $39.9 million in expenses for cleanup work undertaken during the 1991 and 1992 cleanup seasons. At the time of the March, 1991 settlement, the cleanup was far from complete. In a provision of the agreement that appeared in the March document and remained unchanged in the final settlement, Exxon was required to continue cleanup until released by both the state and federal governments; however, the company could deduct its expenses for cleanup from its civil claims liability.

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This provision raised a number of issues for the governments. At the time of the March settlement, Exxon and the state and federal on-scene coordinators had — just five days before — made final their plans for the 1991 cleanup. Until the date of the settlement, Exxon was conducting the cleanup under government direction; it didn't matter to the governments how much Exxon was spending, as long as the work was being done. With Exxon able to deduct its cleanup costs from what it owed the government, essentially, the government was paying for the cleanup. And if the government was paying for the cleanup, the government's managers were obligated, as always, to make sure public money was being spent efficiently and effectively.

One option was to take over the cleanup entirely, releasing Exxon and hiring contractors retained through competitive government bidding procedures. The state and federal coordinators considered this option impractical. After two full field seasons of working together, the governments and Exxon had established procedures for logistics, procurement, communications support, and so on; regardless of whether everyone got along all the time, the fact was, everyone knew the system. For reasons of efficiency and safety, the state and federal on-scene coordinators chose not to hire new contractors.[10]

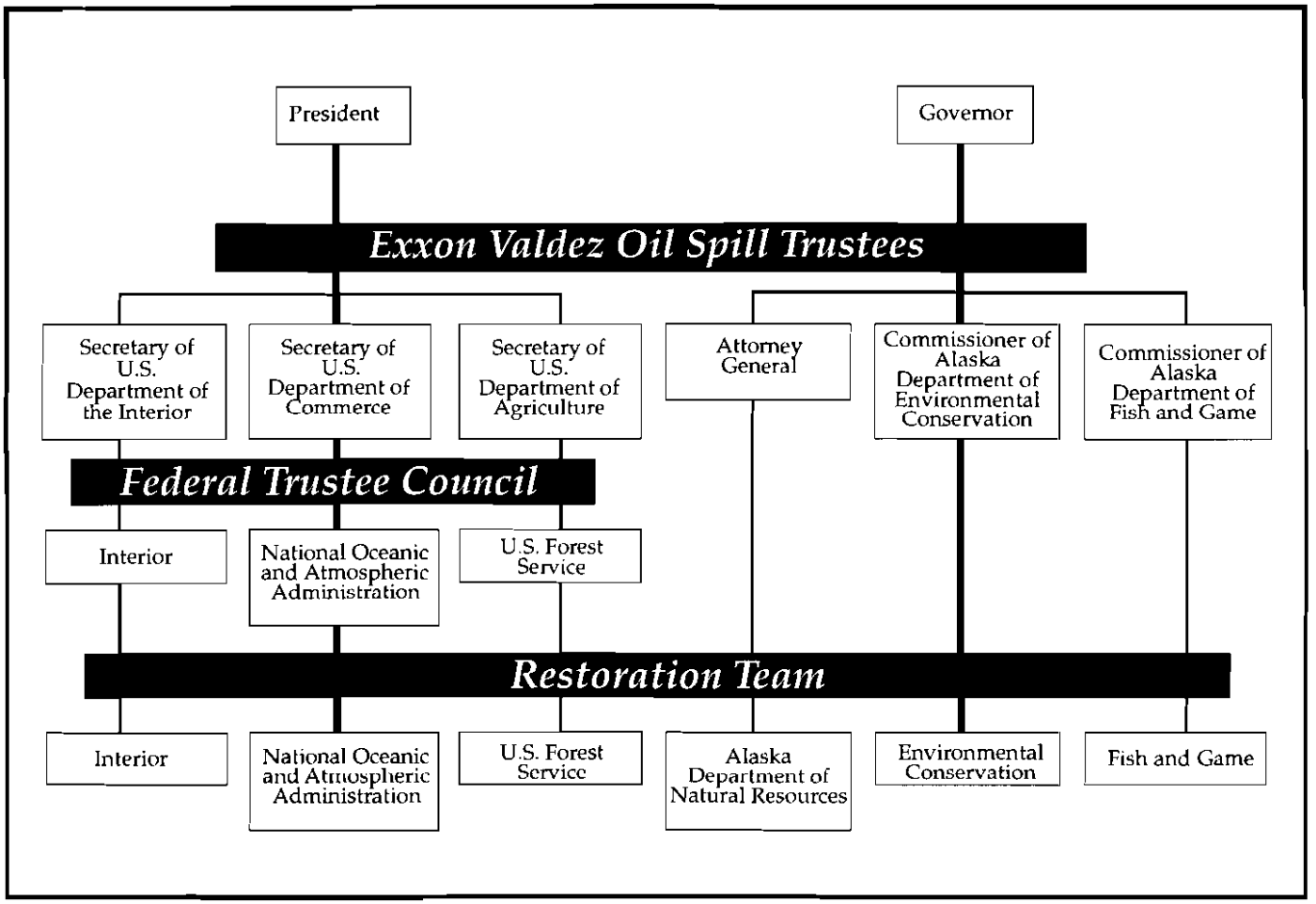
Instead, they set up a system of review and approval of Exxon workplans and cost estimates. The Coast Guard handled the accounting and oversight, and the federal on-scene coordinator retained the prime authority for approving or rejecting Exxon expenditures. Exxon, however, made its cost estimates equally available to both state and federal spill managers. Exxon became, in other words, a sole contractor to the federal and state on-scene coordinators. Expenses in the 1991 field season came to about $40-$45 million,[11] with 1992 expenditures less than half that.[12]

At the close of the 1992 field season in July, 1992, the federal and state on-scene coordinators declared the response phase complete, and Exxon was released from further cleanup responsibility. Any further removal would fall under the general heading of restoration, for reasons based in restoration or damage assessment studies

5.1 Restoration structure and funding

The term "restoration" is defined in both federal law and in the court order approving the settlement. It is important to keep in mind that the agreement between Exxon and the governments was to settle *damages to publicly owned natural resources affected by the spill.* This settlement did not include various claims from private parties, including — and especially — Alaska Natives and Alaska Native corporations, which own nearly all of the private land in the spill area. These private plaintiffs are pressing their own claims in court, as well as with the Trans-Alaska Pipeline Fund, a $100 million, privately-administered fund.

Therefore, the entire state-federal restoration structure is designed to deal exclusively with resources that were damaged by the spill, or damages to services directly dependent on those resources. The settlement court order defines the mission this way: "[R]estoration includes restoration, replacement and enhancement of affected resources, acquisition of equivalent resources and services; and long-term environmental monitoring and research programs directed to the prevention, containment, cleanup



and amelioration of oil spills."

The second major leg of the restoration effort rests on the agreement between the state and federal governments to undertake restoration efforts together. The governments "shall jointly use such monies for purposes of restoring, replacing, enhancing, rehabilitating or acquiring the equivalent of natural resources injured as a result of the *Exxon Valdez* oil spill and the reduced or lost services provided by such resources," according to the state-federal memorandum of understanding. Neither government, in other words, has free access to the restoration fund. In fact, any expenditure or project in the restoration effort must have the unanimous approval of all six trustees.

The third basic leg of the settlement is an agreement that all funds must be spent on projects within Alaska, unless the trustees agree unanimously that a specific task cannot be performed within the state.

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Organization

There are six trustees. The federal trustees are the Secretary of the U.S. Department of the Interior, the Secretary of the U.S. Department of Agriculture, and the Secretary of the U.S. Department of Commerce.[13] The State of Alaska Trustees are the Commissioners of the Department of Environmental Conservation and of the Department of Fish and Game, and the Alaska Attorney General.

Each Trustee has designated a representative to serve on the Restoration Team,[14] a management and administrative group which carries out the programs and projects approved by the Trustees. The Restoration Team has formed a series of working

Allocations of *Exxon Valdez* Civil Settlement Funds

as of June 1993

Civil settlement funds received	$240,000,000
Civil settlement funds allocated and/or expended	$220,308,000
Unxpended balance	$19,692,000
1992 funds budgeted but not expended, to be returned to trust account	$6,500,000*

*Includes $1,500,000 in administrative costs

Categories of Expenditures

Negotiated in the Settlement:

Reimbursements to State and Federal governments $107,500,000
(for cleanup, damage assessment, and litigation costs)
Federal $49,200,000
State $58,300,000

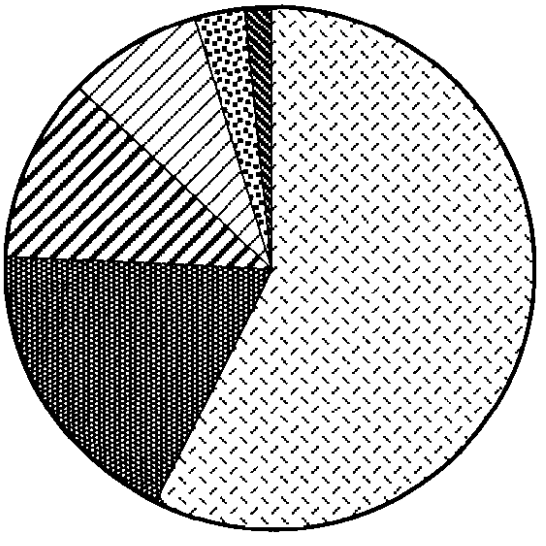
Credits to Exxon for cleanup costs in 1991 and 1992 ..... $39,900,000

1992 and 1993 Work Plan Expenditures Budgeted by Category:

Category	*Budgeted*	*Percent*
Hobitot Protection	$107,500,000*	57.2%
Restoration Projects	$13,464,000	18.7%
Damage Assessment	$8,122,000	11.3%
Administration	$5,841,630	8.1%
Public Participation	$2,204,570	3.1%
Independent Scientific review	$1,165,800	1.6%

*Includes $29,950,000 the Trustee Council has tentatively authorized for ocquisition of Seal Bay.

Work Plan Expenditures by Category



Habitat Protection	57.2%
Restoration Projects	18.7%
Damage Assessment	11.3%
Administration	8.1%
Public Participation	3.1%
Independent Scientific review	1.6%

Note that amount shown here for Public Participation does not include salary allocations for personnel involved in public participation activites except for Oil Spill Public Information Center staff, Public Advisory Group support and the Public Informatian Office.

Source: 1992 and 1993 Trustee Council Budgets

groups to handle planning, implement programs and oversee projects. The working groups presently consist of: Finance, Restoration Planning, Public Participation, Habitat Protection, 1992/93 Work Plan, Budget and Process, Geographic Information System, and Archaeology.

Public Advisory Group

The settlement requires that the Trustee Council ensure the decision-making process includes "meaningful public participation;" the settlement also specifies that there shall be a public advisory group.

After a call for nominations was issued on May 6, the Public Advisory Group (PAG) members were selected at Trustee Council meetings in August and September 1992. The PAG comes under the Federal Advisory Committee Act, and certain federal regulations apply which are designed to keep the PAG in line with similar organizations as far as reporting requirements and authority. PAG members are nominated by the Trustees, but actual appointments must be made by the Secretary of the Interior.

The original charter called for the PAG to consist of 15 official members and two ex-officio members, one each from the Alaska Senate and House of Representatives. The 15 members were to be drawn from a variety of interest groups, including the public at large and these principal interests: aquaculture, commercial fishing, commercial tourism, environmental, conservation, forest products, local government, Native landowners, recreational users, sport hunting and fishing, subsistence, and science/academic.

At their September 14, 1992 meeting, the Trustees revised the PAG charter to allow five representatives for the Public At Large category. Nominations were once again opened, and on September 21 final selections were made. The PAG is formed only to advise the Trustees; in the charter as drawn up by the Trustees they have no power to take action independently.

5.2 Restoration timetable

In April 1992, the trustees released three documents to the public: Restoration Framework, the Draft 1992 Work Plan, and the Response to Public Comment on the 1991 State/Federal Natural Resource Damage Assessment and Restoration Plan for the *Exxon Valdez* Oil Spill.

The Restoration Framework provides information about restoration planning to date, a summary of injuries to natural resources, proposed injury criteria, and proposed criteria for evaluating restoration options and alternatives. It also initiates a process for public input into developing the Restoration Plan and an Environmental Impact Statement. In August a Restoration Framework Supplement on Habitat Protection and Acquisition was released which outlines options the Trustees could pursue to protect habitat injured by the spill. The Supplement contains a description of the process and a discussion of alternative criteria for habitat protection or acquisition.

The 1992 Draft Work Plan details damage assessment and restoration activities proposed for 1992. The Framework is intended to be a scoping document as part of the process required under the National Environmental Policy Act.

The Framework has been reviewed by the public, and the Trustees intend to release an actual restoration plan in 1994 which will be further refined during public review and comment. Once final, this document will guide the restoration process through the year 2002.

Natural resource damage assessment studies began within days of the grounding of the *Exxon Valdez* and continued through 1993. It was the largest and most extensive damage assessment program in U.S. history, with more than $100 million devoted to 164 separate and related studies.[15] The damage assessment efforts were challenged from the start by two major scientific problems, one man-made, and one natural.

Scientists working in Prince William Sound in 1989 were initially challenged by the fact that relatively little was known about the region's ecosystem as a whole. The availability of baseline data for biological communities was determined largely by the forces of commercial interest and the creativity of certain researchers. Biologists knew a lot about commercial fish species (especially pink salmon and herring) relative to other kinds of animals because commercial fisheries management requires constant analysis of fish stocks, migration and spawning patterns, predation, climate, etc. Some other kinds of scientists had information about prevailing ocean currents because they were able to piggy-back research on other, unrelated projects in the past.[16] Some others had pieces of the puzzle, especially regarding intertidal biology, but generally speaking, there had been no comprehensive research effort in Prince William Sound before the spill.

This issue would crop up not just in 1989, but long after the spill, in 1992 and 1993, when scientists proposed various new studies (or extensions of studies) that had more to do with baseline information than active restoration. Researchers have argued that it is impossible to develop an effective restoration program without a better understanding of was injured in the first place. Nearly all of the damage assessment studies we∑re scheduled for "close-out" in the 1992 work plan. However, while scientists know more about Prince William Sound now than in 1988, they still do not have the comprehensive picture of the ecosystem that they would have liked to have before the spill hit.

"The extent of injury to certain species, including loons, cormorants and gulls, will never be known; pre-spill population estimates for these species in the spill area are not available," the restoration team reports.[17]

Natural resource damage assessment studies began within days of the grounding of the *Exxon Valdez* and continued through 1993. It was the largest and most extensive damage assessment program in U.S. history.

A second challenge facing the damage assessment was biological timing. Speaking in seasonal terms, the spill hit on the eve of the most biologically active season in the region. The spring migrations and spawning activities were set to begin as daylight hours increased, nutrients flooded the Sound from snowmelt, and temperatures warmed. Researchers had to put together a detailed program of study overnight.

A third challenge to researchers was legal. Scientists complained throughout the program that lawyers were dictating the direction of some research programs, since the state and federal litigation efforts depended on accurate and compelling damage assessment information. In addition, the scientists were taken out of the mainstream of scientific inquiry and debate; the studies were secret, and therefore were not available for publication or discussion in the usual scientific circles. Researchers depend on the formal and informal open network of peer review and discussion that is the heart of the scientific process.

Summary of injury

The obvious damage to animals that occurred in the first few months of the spill was a result of oiling on the animals themselves. Birds and marine mammals were injured because oil covered their fur or feathers and they could no longer keep warm or dry; some were poisoned or died by ingesting oil as the animals preened or tried to lick the oil off themselves; others died or were poisoned by ingesting oil during feeding.

A second cluster of injuries occurred as a result of residual oiling at feeding sites. Damage assessment scientists believe that several different species — river otters and harlequin ducks, for example — continue to suffer the effects of oiling because of

contaminated food sources. Mussel beds, in particular, were intentionally left alone by cleanup crews on the theory that cleanup would harm the mussels more than it would help them. Researchers in 1991 and 1992 discovered that mussel beds heavily oiled in 1989 still contained significant concentrations of oil, and that animals were foraging and eating in these areas.

Direct oiling of animals injured or killed them through poisoning or ingesting oil or because with oil covering their fur or feathers they could no longer remain warm or dry. This oiled duck was found on Green Island, March 30, 1989.

Photo by John Lough

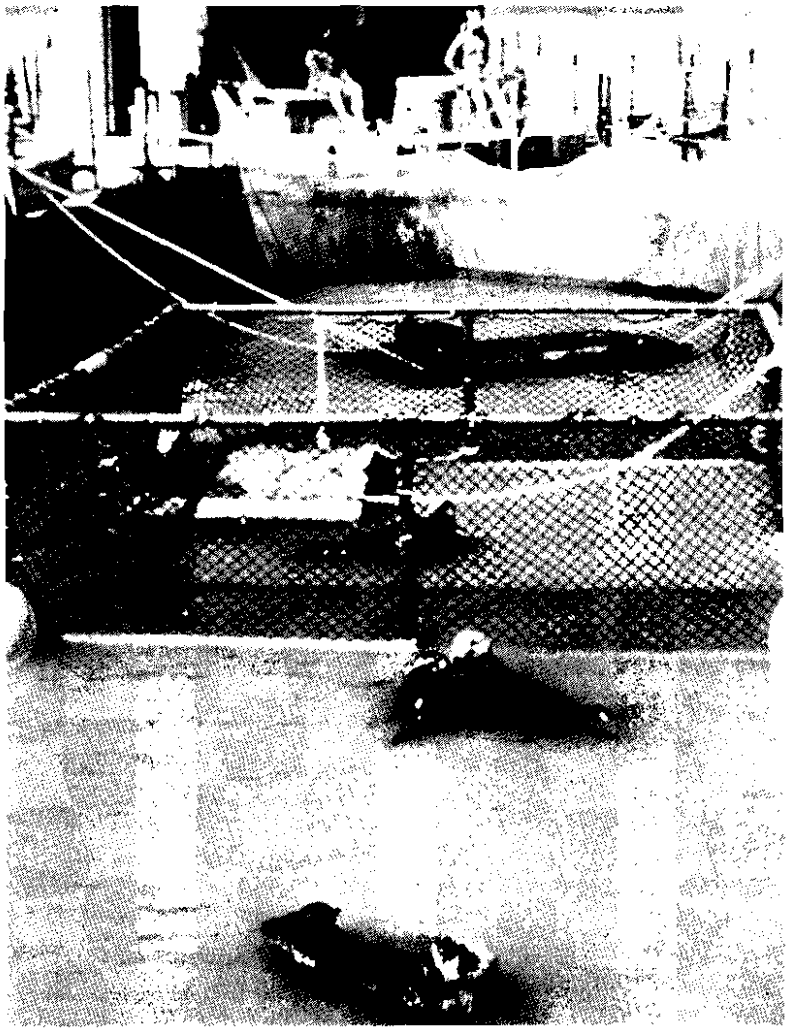
A third class of injury due to displacement by oiling or cleanup activity also enters into the analysis. Scientists have noticed a troubling patterns of mortality among sea otter populations in the Sound since the spill; mature "middle-aged" animals — usually the healthiest and least likely to die — are dying during what should be the prime of their lives. Researchers think the unusual mortality could be tied directly to contaminated food sources (such as the mussel beds), or indirectly due to displacement: The otters may be avoiding usual feeding areas because of oil (or because of activity from cleanup in those areas), which may force them to feed at less desirable sites (less availability of food, or father away), which in turn may lead to lower body weights, thinner fat layers, and less resistance to disease and weather.

Various bird species — marbled murrelets and, again, the harlequin ducks — suffered wholesale reproductive failure during the spill years, which may be directly attributable to oil, or to a combination of oiling and cleanup activity. The spill did not "measurably" affect the Sound's bald eagle populations[18], but researchers noted that nests near heavily and moderately oiled beaches in 1989 suffered a "failure rate" of 85 percent, as opposed to 55 percent at lightly oiled or non-oiled sites. Again, while the injury to bald eagles can be tied to direct and indirect oiling effects, eagles may also have been affected by the heavy and intrusive presence of cleanup crews at the heavily oiled sites in 1989.

Larger marine mammals, such as harbor seals, showed some fairly obvious effects. Crews retrieved the carcasses of 19 dead, oiled harbor seals in 1989, but death counts are open to speculation since seals sink when they die. Other seals in the spill area showed abnormal activity (sluggishness, wariness), and some showed abnormal lesions on their brains. But underlying these obvious problems was the fact that seal populations in the spill area were probably already at a low point, and therefore less able to withstand additional environmental assault or stress.[19] Other marine mammals, such as killer whales, also have some post-spill population fluctuations that researchers suspect are attributable to the oil spill.

Salmon stocks suffered two kinds of damage. The first was at oiled streams, where eggs and fry showed striking patterns of abnormal development or mortality in the spawning cycles immediately following the spill. The problem is not that fish were oiled; fish swim under the surface and it is highly unlikely any suffered significant effects of direct oiling. The problem for Prince William Sound's most abundant salmon

species — pink or humpback salmon — were the conditions at oiled streams. Roughly 75 percent of the wild pinks spawn in the intertidal areas, laying their eggs in the gravel beds of streams that are completely covered by salt water at high tide, but subject to regular fresh stream flows when the tide is out. Oil came in on the waxing tide and settled in the mid-and lower intertidal areas on the ebb. In the oiled streams sampled during damage assessment, egg mortality was as much as 50 percent, compared to the 18 percent of unoiled streams.[20]



A number of oiled sea otters were taken to otter recovery centers in Valdez and Seward to be cleaned. The ones which recovered were released. Otters also suffered through oiling of feeding sites or the necessity of finding other sites. Photo by Rob Schaeffer

Exxon frequently cited record pink harvests, especially in 1990 and 1991, as an indication that salmon stocks were not damaged by the spill. What is not well understood is that those harvests were of fish spawned in hatcheries, which were protected from the oil by booms and skimmers. Moreover, the catch was so far above levels of previous years simply because the hatcheries had just started producing fish; comparing wild harvests from 1988 with hatchery-dominated harvests is useful only from the standpoint of fisheries economics. As a matter of biology, the hatchery fish have nothing to do with the ability of wild fish to spawn — and eggs to survive — in the streambeds.

Other fish species suffered indirectly from the spill. In Prince William Sound, fishermen shut off from commercial salmon harvest due to oil on the water turned to unoiled areas of the Sound, and to different kinds of fish for harvest. Certain bottom fish, such as rockfish, were overfished that year as a formerly incidental commercial fishery turned into a significant one. But by far, the biggest indirect effect of the oil spill on fish occurred in Cook Inlet.

In Cook Inlet, red, or sockeye, salmon plugged the river systems because commercial fisheries in the inlet had been shut down due to oil on the water. The surfeit of salmon was a nightmare, in spawning terms. Reds spawn in lakes, and in 1989, so many reds made it to the lake to spawn that when eggs hatched to fry, there was a population explosion. There simply wasn't enough food to go around, and a massive die-off of fry resulted. Complicating the situation was the fact that over-escapement had been a problem in several of the previous years. So while the 1989 over-escapement might have been an isolated phenomenon of the oil spill, the results of the over-escapement exacerbated a developing problem in the Cook Inlet system.

The biological systems of Prince William Sound and the rest of the spill area were significantly upset by the initial oiling, continuing sublethal effects, and the disruption and displacement caused by cleanup.

And even natural weathering — billed as a passive alternative to cleanup — has its own negative effects. The mussel beds, once again, are the dominant example.

"In 1991 relatively high concentrations of oil were found in mussels and in the dense underlying mat (abyssal substrate) of certain oiled mussel beds. These beds were not cleaned or removed after the spill and are potential sources of fresh oil for harlequin ducks, black oystercatchers, river otters and juvenile sea otters — all of which feed

on mussels and show signs of continuing biological injury," the state and federal scientists reported in 1992.[21]

Researchers collecting soil samples from shallow subtidal areas in the spill area found that even in 1991, hydrocarbons were being mobilized off the beaches and winding up in the sediments. While the sediment samples do not suggest any specific damage to a certain species, the results of the study suggest that hydrocarbons can be moved to, and persist at, places that were not originally oiled. And as a federal study suggested in the spring of 1991, cleanup — especially high-pressure and hot water hoses used in 1989 — caused significant damage to intertidal plants and animals at various sites.[22]

Damage to other resources and services

While the focus of settlement agreements was damage to natural resources, services or activities directly tied to a damaged resource are eligible for restoration projects.

The problem for Prince William Sounds' naturally spawning salmon stocks lay with conditions at oiled streams. Eggs are laid in the gravel of intertidal areas. Damage assessment studies showed egg mortality was very high in oiled streams. Hatchery fish were not affected in the same way.

Photo by John Hyde

The most important activity to the residents of Prince William Sound and the Gulf of Alaska is the subsistence harvest of wild fish, game, and plants and animals that live along the shorelines. While virtually all of Alaska's residents are part of the cash economy, different people and villages participate to varying degrees. Subsistence patterns and habits are not static. They vary from village to village, and even season to season, depending on the availability of wild resources, the weather, commercial fishing success, the cultural cohesiveness of a community, and other factors. However, subsistence harvest and distribution of food remains, throughout the spill area, one of the dominant features of the local economy. From Tatitlek and Chenega Bay within the Sound, Port Graham and English Bay and Seldovia along the Kenai coast, and down to the handful of villages spread widely along the Kodiak Island and Alaska Peninsula coasts, subsistence harvest is an integral part of the diet, economy, and culture of the local residents.

The Alaska Department of Fish and Game's Division of Subsistence documented a substantial decline in both the overall subsistence harvest and the variety of plants and animals harvested in subsistence communities after the oil spill. The oil spill year, 1989, showed the most significant alterations or interruptions of subsistence harvests. However, subsequent surveys showed variances from normal subsistence patterns in 1990 and 1991 as well in some villages; residents continue to avoid certain kinds of foods, such as shellfish and other marine invertebrates.[23]

There has been displacement, as cleanup activities shouldered subsistence activities out of the way. And, of course, damage to intertidal communities, shellfish, and species higher on the trophic scale — harbor seals, for example — have disrupted certain aspects of subsistence harvest as well. However, the lingering damage, in many cases, is based on a perception of risk rather than an actual risk. The disruption in traditional subsistence patterns is a difficult problem to address, in terms of restoration, since a solution does not necessarily depend solely on wildlife or habitat management.

Archeological sites were another non-wildlife resource that suffered both damage and disruption from the spill and the cleanup. The entire spill region has been continu-

ally inhabited by Alaska Native peoples for at least hundreds of years, and probably considerably longer, depending on the specific area. Homesites, burial sites, and traditional camps are located throughout the area, and artifacts such as stone lamps and tools are common on state, federal, and private lands. The damage assessment teams have documented 35 historically significant sites that were damaged by oil,[24] but the greatest collateral damage to archeological resources might have occurred during the cleanup itself.

The disruption in traditional subsistence patterns is a difficult problem to address, in terms of restoration, since a solution does not necessarily depend solely on wildlife or habitat management.

State and federal agencies are extremely protective of archeological sites. In fact, in a departure from Alaska's general statutory policy of open government and availability of records, the commissioner of the Department of Natural Resources is allowed by law to keep archeological information confidential. The goal is to maintain the historical integrity of sites; by keeping site information confidential, looters or casual artifact "hunters" cannot target key sites.

Yet the presence of thousands of "visitors" in the region during the cleanup revealed, unintentionally, the location of many archeological sites. Exxon and the governments took active and preemptive measures to protect archeological sites, but in many cases, workers literally stumbled on archeological sites that had been previously undiscovered. In fact, the vast majority of documented archeological sites on Kodiak Island and the Alaska Peninsula were discovered and recorded due to shoreline cleanup surveys or work details. Like subsistence, some of the damage caused to archeological resources is measured in less tangible ways than damage to fish or birds; at many archeological sites, the damage is actually an increased threat of disruption due to wider public knowledge of the sites. The National Park Service has addressed this problem by adding rangers to oversee activity along the Katmai National Monument and Kenai Fjords National Park shores, but it is unclear if other steps can be taken through the Trustee Council.[25]

The Trustee Council has also identified damage to recreational sites or activities, either due to actual oiling or displacement. A final category of damage assessment involves damage to "intrinsic" values of state and federal lands with special designations, primarily wilderness. Both state and federal law set higher standards for habitat conservation and preservation within wilderness areas, such as Kachemak Bay State Wilderness Park, portions of which adjoin the Kenai Fjords National Park along the outer Kenai Peninsula coast. In addition to obvious sources of damage — residual oiling — the governments argue that the simple presence of cleanup crews within wilderness areas diminished, in some way, the special values society places on wild lands.

5.4 Criteria and restoration options

The Trustee Council has identified six general categories of restoration options:

a) No action;
b) Management of human uses;
c) Manipulation of resources;
d) Habitat protection and acquisition;
e) Acquisition of equivalent resources;
f) Various combinations of all five.

The "no action" option is self-explanatory. The Trustees would allow recovery to take place on its own, and a scientific monitoring program would track the progress over time.

Management of human uses would include actions such as better monitoring of archeological sites, changing harvest regulations for an injured species, keeping tour ships away from key nesting or rearing habitat at critical times of the year, and so on. The goal would be to minimize the usual range of human disruption so the injured resource has a better chance to recover, or so that the resource doesn't suffer further injury.

Manipulation of resources might include site-specific projects such as improving spawning habitat for sea-run trout or salmon, or making a damaged site more amenable to colonization by the kinds of plants removed or damaged by cleanup.

Habitat protection and acquisition could range from purchases of private lands to land management agreements with private parties or other government agencies. The goal, as in the management of human uses option, would be to optimize the chances for target species to recover by leaving their most important habitats undisturbed. Under this option, the purchase or acquisition of the land would be directly related to the recovery of an injured species. This differs from the acquisition of equivalent resources, which would be the simple replacement of a lost of damaged resource with land that provided "substantially similar services as the injured resource."[26]

From "no action" to land or habitat acquisition, the decisions facing the trustees fall partly within the realm of science and partly within the realm of public policy.

The first-year state-federal restoration budget of approximately $19 million was met with frustration from a spill-area public eager for some kind of action.

In some cases, no action may be the preferred option. The decision may be based largely on a scientific projection that shows recovery occurring naturally at a relatively acceptable rate. Or, no action may be the option because the incremental increase in recovery promised by a particular project is out of proportion to the amount of money and effort required to carry it off.[27]

The other four principal options will also be subject to a similar suite of somewhat subjective considerations. Does a project help more than one injured resource? Will a project that helps one resource hurt another? Does the public feel specific targets of restoration are more important than others? Is the remedy for a given injury within the realm of technical feasibility?

In short, the decisions before the trustees are very similar to the kinds of decisions cleanup officials had before them. Science provides the basis for analysis by identifying the injury and its extent, but public policy provides much of the basis for deciding how, when, and if money is spent on restoration. Public policy will also dictate how money is allocated among possible candidates for restoration.

The Trustees have thus far taken a conservative approach to approving expenditures from the trust fund. Much of staff and trustee time in the first few months after the October 1991 settlement was spent in discussion about the fate of continuing studies, and the need to do more or less. The Trustees generally came down on the side of spending less, directing the restoration staff to weed out studies that were not likely to produce strong proposals for action, reduce previously approved or expected budgets, and close out existing damage assessment projects.

Still, the first-year state-federal restoration budget of approximately $19 million was met with frustration from a spill-area public eager for some kind of action. The Trustees received criticism from local governments, Alaska Native residents, conservation groups and others who said the restoration money was being bled into the bureaucracy, or wasted on studies instead of action. Scientists outside the state-federal system complained that government researchers were stacking the program with their own studies, and not allowing fair access to restoration funds.

These criticisms are attributable, at least in part, to the fact the sudden settlement on October 8, 1991, thrust a little-known and somewhat speculative government planning operation into the public eye, and launched the program unexpectedly on the fast track. The schedule for completing damage assessment, to that time, was determined by the sequential progress of the science and the litigation plans of the attorneys. There was no deadline, other than the fact that the work had to be done in time for a court date somewhere in the future.

With the settlement, there was an immediate and intense expectation from the public that restoration was ready to begin. The damage assessment program deadline was now dictated by the expectations of the public and the policy decisions of the six trustees. Regardless of whether the science was progressing too slowly or too quickly, regardless of whether science managed by legal demands was better or worse than science driven by public policy, and regardless of whether the cost of the studies was too high, too low, or just about right — regardless of all this, the program had sud-

denly been presented with new management with new goals, and a new finish deadline set somewhat arbitrarily.

Faced with this new situation, the restoration staff and the Trustees set out a schedule for closing out the $100 million damage assessment program by spending $16.5 million on science in 1991-92, nearly all of it to pay for final reports from principal researchers. The Trustees set aside $1.7 million to pay for administration and planning, and another $700,000 for a public symposium in February, 1993, at which all the damage assessment information would be presented.

The approach of the first anniversary of the settlement in 1992 prompted a small protest outside the restoration offices in Anchorage and a media blast from a national conservation group, which charged the restoration was "mired in a tar pit of bureaucracy."[28] The stated reason for the negative publicity was the perceived unwillingness or reluctance of the Trustees to act on a general restoration strategy dominated by the purchase or acquisition of management rights on private lands within the spill area.

Habitat acquisition of some kind is, by far, the most popular proposal that has come before the Trustees. The Trustees set up o special working group to determine draft criteria for habitat acquisition, target areas for possible action, and so on.

The logic behind such a strategy was that by purchasing the land or the management rights to the land, critical habitats could be best protected. Most of the private land in the spill area had been selected by Alaska Native corporations for potential timber harvest; proponents of the land acquisition program argued that logging the region would slow recovery from the spill.

The proponents of timber rights or land acquisition have made their arguments both to the Trustees and to the state and federal governments directly. The first major set of acquisition proposals was included in House Bill 411, passed by the Alaska Legislature in May 1992. The Legislature proposed to spend the state's $50 million in criminal restitution money on a variety of spill-area projects, including timber buy-backs in Prince William Sound, Kachemak Bay, and Afognak Island, the second largest island in the Kodiak archipelago. Governor Hickel vetoed the bill when it reached his desk on July 15, arguing that some of the projects were not directly related to damage caused by the spill. A similar measure worked its way through the Legislature in 1993, this time including funding for research on oil spill cleanup, habitat acquisition, and other restoration functions. The Governor signed this bill into law.

At the federal level, the proponents of timber buy-backs inserted into federal energy legislation a provision that would have required as much as 80 percent of the $900 million state-federal trust fund to be used for habitat acquisition. That provision was stripped from the bill in conference committee.

Habitat acquisition of some kind is, by far, the most popular proposal that has come before the Trustees. The Trustees set up a special working group to determine draft criteria for habitat acquisition, target areas for possible action, and so on. The team's efforts have resulted by 1993 in two major land purchases, one in Katchemak Bay, the other on Afognak Island in the Kodiak archipelago.

The first purchase was a 20,000-acre private inholding in Kachemak Bay State Park, a wilderness park at the tip of the Kenai Peninsula, and adjacent to Kenai Fjords National Park. The purchase used some settlement trust money and some from the state itself. The bulk of the more than $20 million came from the state's share of the Exxon criminal restitution, and money recovered by the state from Alyeska Pipeline Service Company, which settled its liability case with the state out of court. The Kachemak Bay buy-out had been on the table for more than 15 years, and involved a complex mix of surface rights, subsurface rights, and timber rights spread among two Alaska Native corporations, and a timber company comprised of several Alaska Native village corporations. The purchase ended speculation that large tracts of shoreside timber would be harvested in clear cuts directly across Kachemak Bay from Homer, a major tourism center.

The second major purchase involves nearly $40 million in settlement trust funds and 42,000 acres at Seal Bay and Tonki Cape on Afognak Island. The land, owned by a consortium of Alaska Native corporations, had been scheduled to be logged, as much of the commercial timber had already been at other locations on the island. The sites in question hold considerable intrinsic value, in terms of natural beauty, but the area also

contained high value nesting and rearing habitat for birds and other species that were injured by the oil spill. Purchasing the land is intended to preserve that habitat and allow injured species to recover more quickly, or at least without further major disruptions.

Habitat acquisition may also include conservation easements and other alternative land management agreements that do not necessarily result in fee-simply purchase of private land by the government.

Notes, Chapter 5

[1] *Governor Steve Cowper, personal communication, May-August 1989, June 1990.*

[2] *At least while they're in state waters, but that's another jurisdictional issue entirely.*

[3] *The governments made this approach formal on Aug. 28, 1991, in the Memorandum of Agreement and Consent Decree, filed in the US. District Court. The MOA settled claims the governments had against each other, and they agreed to act as "co-trustees in the collection and joint use of all natural resource damage recoveries resulting from the Exxon Valdez oil spill."*

[4] *Interestingly he announced publicly his intention not to seek a second term just minutes before he learned of the Exxon Valdez oil spill. Cowper was in Fairbanks on the morning of March 24, 1989, and shortly after 7 a.m. he told a reporter of his plans. It was then that the reporter asked him his thoughts about the oil spill. Cowper left almost immediately for Valdez.*

[5] *Deposition of Lawrence Rawl, June, 1992.*

[6] *The state has been involved in litigation with oil companies for more than a decade on a number of oil tax and transportation tariff disputes. These settle from time to time, such as the $72 million Trans-Alaska Pipeline tariff settlement of 1985 and a $243 million tax settlement with Arco Alaska in 1986. Because of the amount of money involved, these cases usually attract a good deal of public attention.*

[7] *Quoted in The Anchorage Times, April 17, 1991.*

[8] *Exxon press release, April 17, 1991.*

[9] *Exxon Valdez Oil Spill Trustees, "Restoration Framework," April 1992, p. 5.*

[10] *Regardless of the changes in funding for the cleanup dictated by the settlement, the "old "(i.e., pre-Oil Spill Pollution Act) system of response management still obtained: Exxon was the responsible party, working under federal and state oversight. Technically, the only way the federal government could release Exxon was if the federal on-scene coordinator determined Exxon was unwilling or unable to respond any further. This would have resulted in federalizing the spill, a move for which the federal on-scene coordinator saw little need or justification. The state was less concerned with this legal consideration, but saw no reason to make an issue of it at that point in the response.*

[11] *Piper, E., DEC, memorandum to Tillery, C., Alaska Dept. of Law, November 21, 1991. For a more complete discussion of the development and execution of this arrangement with Exxon, see Piper, and others, "Third Year Report," DEC, February 15, 1992.*

[12] *Precise figures for either year will not be available until Exxon actually submits its December 1992 payment, with full supporting documentation. The 1992 field estimate comes from the U.S. Coast Guard deputy on-scene coordinator in September 1992.*

[13] *The federal trustees have designated representatives, based in Alaska, who preside in their stead. The Alaska Regional Forester for the U.S. Forest Service represents Agriculture, a special assistant to the secretary represents Interior, and the Regional Director of the*

National Marine Fisheries Service represents the Department of Commerce.

[14] *The state attorney general sits on the Trustee Council, but staff work on the restoration team has been delegated to the Alaska Department of Natural Resources.*

[15] *Exxon Valdez Oil Spill Trustees, 1992 Draft Work Plan, April 1992 p.4.*

[16] *Some of what turned out to be the most beneficial and accurate predictions of oil movement after the spill were provided by a University of Alaska Fairbanks scientist who had been studying ocean currents in the Sound off and on over the years. He obtained much of his data through weather and perseverance: Whenever the university's research vessel was driven by weather into the Sound while on unrelated research, this scientists would turn the trip into an added research opportunity and collect data while waiting out the storm.*

[17] *Exxon Valdez Oil Spill Trustees, Restoration Framework, April 1992, p. 30.*

[18] *Ibid, p. 27.*

[19] *And underlying any of these points is the fact that seals are one of the species for which baseline population data was thin before the spill. The first full count of harbor seals in the area was done in 1991, two years after the spill.*

[20] *Trustees, Framework, p. 31.*

[21] *Ibid., p. 35.*

[22] *See Chapter 2, p. 63, Hot Water and High Pressure*

[23] *Fall, J. "The Exxon Valdez Oil Spill: Impacts on Subsistence Uses of Fish and Wildlife," Arctic Issues Digest, University of Alaska Fairbanks, October 1991. Fall and the subsistence division have updated some of this data in a draft paper of March 27, 1992.*

[24] *Trustees, Framework, p. 37.*

[25] *The extra rangers were funded through the federal Archeological Preservation Act, not through the Exxon Valdez restoration trust fund.*

[26] *Federal Register, March 1, 1991.*

[27] *The Framework document cautions that this is not intended to be "a straight cost-benefit analysis," but cost clearly can be a consideration.*

[28] *Sierra Club, press release, October 8, 1992, Washington, D.C.*

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