

11,13.03

MISC. ITEMS
ARTICLES

Popular prof may lose job

■ **TENURE:** Students praise teaching, but provost faults research.

By ZAZ HOLLANDER
Anchorage Daily News

Engineering students at the University of Alaska Anchorage are rallying behind a popular professor who may lose his job.

As many as 80 students signed a letter addressed to the chancellor in support of Grant Baker, an assistant professor who wants to stay at UAA, where he has taught engineering for the past seven years. A number of engineering faculty members also back him.

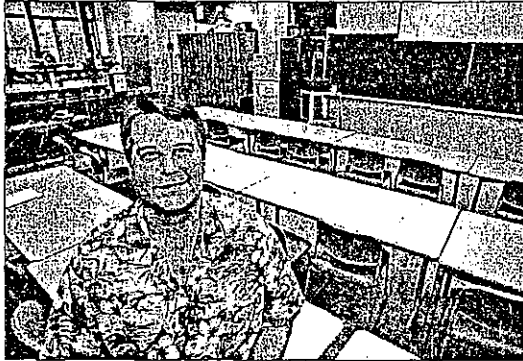
Administration officials say Baker may be a great teacher but he lacks proper research credentials to fulfill university standards for a tenured or permanent position.

Provost Jim Chapman last week denied tenure for Baker. The final decision rests with Chancellor Lee Gorsuch, who has until May 1 to rule on the matter.

If the provost's recommendation holds, Baker will lose his job in another year.

UAA reviews faculty members for tenure after seven years; if denied it, they are terminated. Of about 100 reviews annually, typically six to a dozen deny tenure, university officials say.

Students have mounted a campaign to



BOB HALLINEN / Anchorage Daily News

Students have asked University of Alaska Anchorage officials not to drop engineering professor Grant Baker, who has been denied tenure.

pressure Gorsuch to grant tenure to the professor. Fliers that read "Don't Let Dr. Baker Go" recently appeared in the School of Engineering.

Baker, a commercial fisherman who wears Hawaiian shirts in class, is described by students as a father figure who simplifies otherwise complex lessons in topics like thermodynamics and corrosion engineering.

Former student Sara Stout is headed for medical school in Missouri, a move she called impossible without Baker's encouragement.

"When you've got a professor that actually makes a difference and cares, it's very confusing and frustrating when you see the adminis-

See Page B-7, PROF

PROF: He may lose job

Continued from B-1

tration is getting rid of him," Stout said.

Chapman's decision deviated from the recommendations of lower reviews done by a peer-review panel at the engineering school, the engineering school's director and a university faculty panel.

Each review supported tenure but noted that Baker needed to improve his research output. But each did recommend against promoting him to associate professor, again citing insufficient research.

Also in Baker's favor, the universitywide panel found that the School of Engineering review violated procedure because it lacked adequate faculty input, missed a deadline and didn't give Baker enough time to respond to its findings.

In a letter dated April 2, geomatics department chairman Don Davis told Gorsuch that seconding the provost's decision "would be a terrible mistake."

"I also agreed that there were parts of Dr. Grant's past performance that needed some improvement. ... But I do

not think the weakness is serious enough for termination as a faculty member," Davis wrote.

At the School of Engineering, tenure-track faculty members are expected to balance a workload to include 60 percent teaching, 20 percent research and creative activity, and 20 percent service.

Baker helped secure the establishment of a \$115 million long-term research endowment at UAA using settlement money from the Exxon Valdez oil spill. He argues that that constitutes research, along with several computer workstation projects for which he secured grants.

The provost's decision, Baker said, reflects another faculty member's animosity toward him and an Alaska Supreme Court case he won last year against the University of Alaska Fairbanks.

Chapman wouldn't comment on the specifics of the case but said he was simply following university guidelines.

■ Reach Zaz Hollander at zhollander@adn.com or 257-4591.

B



SUMMER CAMP GUIDE

Planning to send Junior to summer camp? We can help. The Daily News' comprehensive listing of summer camps in Alaska can help you find the perfect fit.

Thursday's Life section

SECTION

ANCHORAGE DAILY NEWS • www.adn.com

MONDAY, APRIL 15, 2002

ALASKA

Sea otter decline alarms experts

■ **STUDY:** Biologists seek explanation for sharp drop in Southwest population.

By DOUG O'HARRA
Anchorage Daily News

Federal scientists have begun a study that could result in listing the Aleutian sea otters under the Endangered Species Act by the end of the year.

Ever since a 2000 survey found that the sea otter population had crashed at least 70 percent along the

Aleutian Chain in just eight years, the fate of the furry, intelligent marine forager has come under increasing scrutiny.

Subsequent surveys have found similar alarming declines in that region, including a 90 percent crash in sea otter numbers along the southern side of the Alaska Peninsula.

"We're going to evaluate all the information and determine whether or not the Southwest sea otters should be listed as threatened or endangered," said biologist Douglas Burn of the U.S. Fish and Wildlife Service.



■ **FOR MORE** information online, check out alaska.fws.gov/ea/sotter/index.html

"We'll be having a lot of public meetings out in Southwestern Alaska, and we'll be doing a lot of public outreach."

With sea otter numbers stable in Prince William Sound, and increasing in Southeast Alaska, biologists say they don't have a good explanation

for the crash to the west. Some scientists have argued that predation by a small number of killer whales or sharks could have caused the decline, but the hypothesis has little hard evidence and remains controversial.

The most recent detailed population data have been released for public review, Burn said. People can view the stock assessments online at www.r7.fws.gov/mmm/sar.

"We want the public to know this is an opportunity for them to look at it and tell us what they think," he said.

About 30 federal and independent biologists met last week in Anchorage to review the data and discuss what should happen next, Burn said.

"From this group, there seemed to be pretty much general acceptance of those survey results — acceptance that there is a really big decline of sea otter in Southwest Alaska," Burn said. "Once you have accepted that fact, the question becomes what can we do about it."

Over the next season, biologists

See Page B-7, SEA OTTERS

SEA OTTERS: *Decline*

Continued from B-1

will continue to perform population surveys from small boats, observe killer whale behavior and work with Native groups to collect genetic data and tissue samples, Burn said.

Before Russian contact in the mid-1700s, an estimated 150,000 to 300,000 sea otters were spread around the rim of the North Pacific, with the largest concentrations likely in Alaska.

Aggressive hunting over the next 150 years practically wiped them out. Fewer than 2,000 remained in 13 isolated colonies when the species was given international protection in 1911.

Over the next eight decades, the sea otter rebounded, then crashed in the 1990s. The agency listed the species as a

candidate for the official protection in 2000 but didn't have the funding to do the analysis, Burn said.

Environmental groups have criticized the agency for its response. In January, the Maine-based Sea Otter Defense Initiative petitioned the agency to immediately list the Southwest sea otters as endangered under an emergency ruling.

"Our position on that is that we do have a real problem here in Southwest Alaska, but we don't think that an emergency listing is warranted," Burn said. "We are proceeding on a proposed rule" on an endangered or threatened listing.

■ Doug O'Hara can be reached at do'hara@adn.com and 257-4334.

Sound science drives Alaska fisheries

By SEN. TED STEVENS
Special to the Mirror

Alaskans know the value and importance of marine research. Kodiak fishermen have discovered entire new fisheries while exploring our waters — such as the scallop beds in the Shelikof Strait. Alaska's expertise in fisheries science supports our constitutionally mandated sustainable management policies. And our insistence on sound science is a healthy check on radical environmental groups who raise money by opposing our way of life.

Detailed knowledge of our environment has never been more needed. Federal judges in Seattle and San Francisco often ask impossible questions about hypothetical interactions between Alaskans who work on the sea and the rest of the marine ecosystem. Though scientists may never know every fact about every animal in the ocean, many Alaskan livelihoods depend on the answers.

Fortunately, there has never been a greater opportunity to expand our knowledge of the marine environment. At the end of 2000, Congress agreed to my request for \$40 million to study the decline of Steller sea lion populations in central and western Alaska. As many Alaskans know, this was part of my response to the Clinton/Gore attempt to shut

down one of Alaska's most important fisheries.

Fishermen throughout Alaska know the threat posed by sham science. In the last Steller sea lion biological opinion, federal scientists indicated the same theory could be, and may still be used to go after Alaska's salmon and herding fisheries next.

President Bush acknowledged the urgency of the sea lion problem when he asked for another \$40 million in his first budget request in 2001, which Congress also approved. It is my hope that this unprecedented attention on a single species will disprove many of the hypotheses that the outside radical environmentalists tried to force on Alaska fishermen at the end of the last administration.

To anticipate and prevent future fisheries conflicts, Congress is funding a fleet of new, state-of-the-art fisheries research vessels. Funding for the first new ship, the Oscar Dyson, was provided in 2000, the Year of the Ocean. The Oscar Dyson will begin its mission in the North Pacific and Bering Sea from its homeport of Kodiak in 2004.

Much of the research carried out on the Oscar Dyson may be selected and funded by the North Pacific Research Board, which, starting this year, will provide \$10 million or more annually for ma-

rine research off Alaska. The 20-member board includes representatives from federal and state governments, Alaska Natives, academia, and marine industries, including Alaska's fishing fleets.

Another important source of marine research funds is controlled by the Exxon Valdez Oil Spill Trustee Council. Sen. Frank Murkowski created this program in 2000 to ensure that at least some of the settlement funds were put towards applied fisheries research directly benefiting Kodiak and Prince William Sound fishermen.

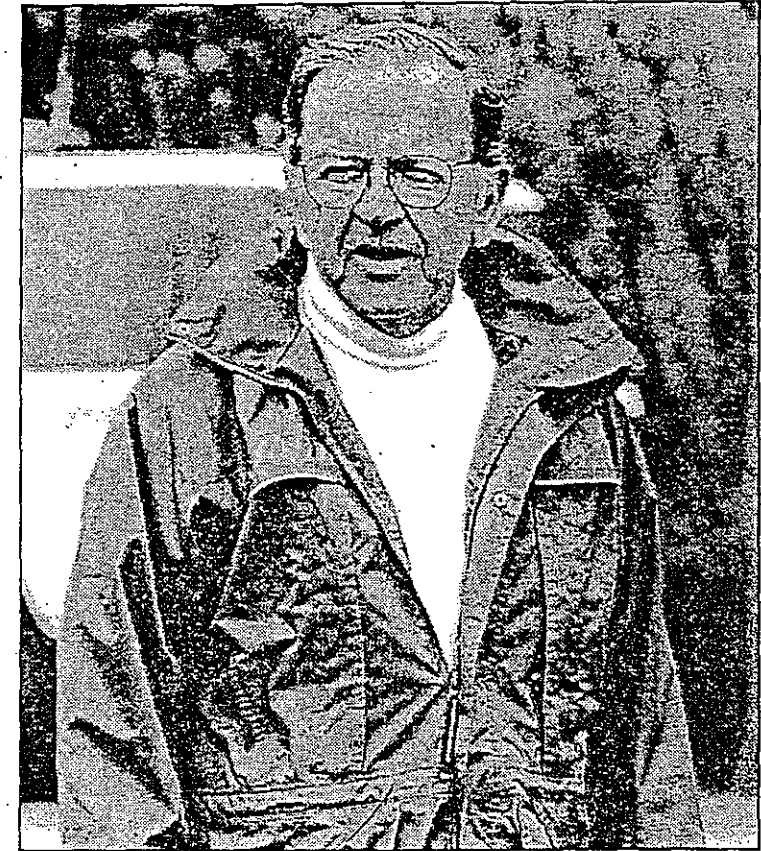
The Year of the Ocean also saw the creation of the Commission on Ocean Policy. I believe this commission is the most important development in ocean policy since the Stratton Commission recommended the creation of the National Oceanic and Atmospheric Administration 30 years ago. The Ocean Commission, as it is commonly known, will reexamine our nation's use of the ocean's resources from a modern perspective. We are very fortunate to have two Alaskans, former National Bank of Alaska president Ed Rasmuson and state Sen. Kim Elton, serving on this important panel.

Many other important research efforts are under way. At my request, \$5 million from the Pacific

Coastal Salmon Recovery Fund will go towards a multi-agency program to study declining salmon runs in western Alaska. Also, the 1999 Pacific Salmon Treaty Agreement requires the United States to fund a \$75 million restoration and research fund supporting salmon fisheries along the Alaska/Canada border, including the transboundary rivers that cross Southeast Alaska.

The National Marine Fisheries Service will break ground on a new fisheries research building this year. The modern facility at Lena Point Facility will replace the outdated Auke Bay Laboratory. The Alaska Sealife Center in Seward continues to establish itself as one of the most important private marine research centers in the North Pacific.

Sound science should always be the foundation of Alaska's fisheries management programs. Despite the challenges from outside, Congress has provided Alaska fishermen with the scientific resources to back up sustainable management policies in the future.



SEN. TED STEVENS

(Erin Harrington photo)

**adn.com**

Anchorage Daily News

Trial may put Exxon Valdez back in Sound**EXXON MOBIL: Vessel has been banned since 1989 oil spill**By Gene Johnson
The Associated Press*(Published: April 4, 2002)*

Seattle -- The company that owns the tanker Exxon Valdez argued before a federal appeals court Wednesday that the ship should be allowed to return to Alaska's Prince William Sound, where it spilled 11 million gallons of oil in 1989.

The Exxon Valdez, which now sails between the Middle East and Asia, has been barred from the Sound since 1990, when Congress passed the Oil Pollution Act. The act prohibited any tanker that has spilled more than 1 million gallons since March 22, 1989, from entering Prince William Sound.

Lawyer E. Edward Bruce, who represents Exxon Mobil Corp. subsidiary SeaRiver Maritime Inc., told a three-judge panel of the 9th U.S. Circuit Court of Appeals that the law is unconstitutional because it singles out SeaRiver for punishment.

It's the job of the courts, not Congress, to impose punishments; thus, the Oil Pollution Act violates the separation of powers assigned to the branches of government, he said.

"This (law) was designed to exclude the Exxon Valdez from Alaska because of the hostility of Alaskans to the vessel," Bruce told the court.

Bruce said Congress clearly wanted to punish the Exxon Valdez when it set the date in the law as March 22, 1989. The ship ran aground the next day.

Justice Department lawyer Mark Stern responded that the law is constitutional. It doesn't single out SeaRiver, he said, but includes any ship that spilled more than 1 million gallons after March 22, 1989.

Around the world, dozens of other tankers have spilled that much oil since then, and none of those would be allowed to enter Prince William Sound under the law, he said.

Congress had every right to set a date that would bar the Exxon Valdez from the Sound, Stern said, as long as it did not limit the ban to that particular ship.

Stern said the law was designed to protect an ecologically sensitive area, not to punish anyone.

"There is nothing constitutionally suspect about it," he said.

The case reached the 9th Circuit on appeal from U.S. District Court in Alaska. That court sided with the government and upheld the law last July; SeaRiver appealed.

The Exxon Valdez spill was the nation's worst. It devastated fish and wildlife and smeared oil across about 1,500 miles of coastline.

Exxon Mobil says it has already paid more than \$3 billion in cleanup costs and compensation. In November, a panel of the 9th Circuit threw out a \$5 billion judgment against the company as excessive.

The appeals court ordered a lower court judge to reduce the amount.

The case is SeaRiver Maritime Financial Holdings Inc., SeaRiver Maritime Inc. and SeaRiver Maritime International vs. Norman Y. Mineta, secretary, U.S. Department of Transportation, and John Ashcroft, attorney general, U.S. Department of Justice; No. 01-35762.

Close Window

Phone Comments generated as a result of full-page ad in the Anchorage Daily News Sunday Edition, March 14, 2002.

3/24 Anonymous

Get on Exxon, make them fork over the money, make them pay.

3/24 Jill

She is an Alaska resident. She was the ad in the Daily News and wanted to comment. PWS isn't cleaned up yet. She wanted to voice her concern. She would like Exxon to have to pay.

3/24 Rick McClain

He is a part of class action against Exxon. They haven't been able to collect yet. Go after Exxon make them pay the 100 million.

3/25 Maxine Strid, 14200 Summit, Anchorage

She thinks Exxon should have to pay the 100 million.

3/25 Lloyd Montgomery, 373-7330, 275 Crestwood, Wasilla

He was a commercial gill net fisherman out of Cordova. He used to make a \$100,000 a year. Now he makes between \$30 and \$50,000. He thinks Exxon should pay.

3/25 Gene Kempf, 907-262-6878, Soldotna

He is a 40 year resident of Alaska. Was a herring spotter in PWS, Cook Inlet, around Kodiak and Togiak. Exxon should pay, the sound has not recovered. You can still see it. He remembers seeing dead barnacles on Knight Island. It takes a lot to kill barnacles.

3/25 Vicki Martin, Kenai

She was a commercial fisherman and Kodiak resident until four years ago. She now lives in Kenai. She was in Kodiak when the spill happened. She is concerned about the safety of the clams there and says the fishing is still declining. She feels Exxon should have to pay.

3/25 John Cole, 376-0138, PO Box 877733, Wasilla - formerly of Valdez

He lived in Valdez when the spill occurred. He worked as a barge foreman and has a map of oiled islands. He feels Exxon should pay for further clean up. Exxon told him to designate beaches as clean when he felt they weren't.

3/29 Bill Erickson - 357-0515

The EVOS situation reminds Mr. Erickson of the Ledo, CO environmental disaster where they mined for lead, created an environmental disaster and then left the country. Exxon should cleanup the backyard before getting another permit in ANWR.

What you see isn't always what you get.

March 24, 2002

Dear President Bush and Governor Knowles,

The time has come to bill Exxon Corporation the additional \$100 million it committed to pay for unknown and unanticipated damages resulting from the Exxon Valdez oil spill.

On March 24, 1989, Exxon spilled more than eleven million gallons of oil into Alaska's waters. Thirteen years after the catastrophe, the waters, shores, communities and economies of Prince William Sound, the Kenai Peninsula and Kodiak have not fully recovered.

The state and federal governments sued Exxon for damages from the spill. As a part of the settlement agreement, Exxon committed to pay an additional \$100 million to fix continuing environmental injuries that were not yet known or anticipated.

Since the settlement, scientists have documented severe and unexpected long-term ecological consequences of the spill. Most fish and wildlife populations injured by Exxon's spill have not recovered. Prince William Sound's herring stock, an essential part of the coastal food chain as well as an important fishery, has unexpectedly collapsed. A group of Prince William Sound killer whales is rapidly going extinct, and crude oil remains on beaches once used for subsistence.

Exxon has fought long and hard to avoid paying Alaska coastal residents for the damages associated with its negligence. We believe Exxon will fight any claim for unanticipated damages by the state and federal governments just as zealously. Based on what is now known about injuries to Alaska's coastal ecosystem, Exxon should be billed for the full \$100 million for ecological damage to public resources on the earliest possible date - June 3, 2002.

We are prepared to support you in the fight to collect what Exxon owes the citizens of Alaska and the United States.

ALASKA CENTER FOR THE ENVIRONMENT
ALASKA COALITION
ALASKA COMMUNITY ACTION ON TOXICS
ALASKA FORUM FOR ENVIRONMENTAL RESPONSIBILITY
ALASKA RAINFOREST CAMPAIGN
ALASKA WILDERNESS RECREATION & TOURISM ASSOCIATION
COASTAL COALITION
COOK INLET KEEPER
DEFENDERS OF WILDLIFE
EARTHJUSTICE
EASTERN KENAI ENVIRONMENTAL ACTION ASSOCIATION
EYAK PRESERVATION COUNCIL
NATIONAL WILDLIFE FEDERATION
NATURAL RESOURCES DEFENSE COUNCIL
SIERRA CLUB ALASKA CHAPTER
SOUTHEAST ALASKA CONSERVATION COUNCIL
THE WILDERNESS SOCIETY
TRUSTEES FOR ALASKA



TOXIC OIL: Still on beaches killing fish & wildlife



KILLER WHALES: some pods close to extinction



HERRING FISHERY: Collapsed



HARLEQUIN DUCK: Not recovered along with

Voice your concerns directly to the Exxon Valdez Oil Spill Trustee Council.
Call: 800-478-7745 (within Alaska) or 800-283-7745 (outside Alaska).
You can also log onto www.PayUpExxon.org to send a message to decision-makers.

LINGERING OIL - LINGERING EFFECTS

"What is the Human Impact?"

March 24, 1989 - Exxon Valdez Oil Spill

March 24, 2002 - Oil is still present

The following is taken from a speech written by Port Graham Elder and Chief, Walter Meganack Sr., who passed away in 1995. He wrote this article for the "Oil Spill Mayors Meeting" in Valdez.

COPING WITH THE TIME WHEN THE WATER DIED

BY WALTER R. MEGANACK SR.

... "Our lives are rooted in the seasons of God's creation. Since time immemorial, the lives of the Native peoples harmonize with the rhythm and the cycles of nature. We are a part of nature. We don't need a calendar or a clock to tell us what time it is. When the days get longer, we get ready. Boots and boats and nets and gear are prepared for the fishing time, the winter beaches are not lonely anymore, because our children and our grownups visit the beaches in the springtime and they gather the abundance of the sea; the shellfish, the snails, the chitons. When the first salmon is caught, our whole village is excited. It is the annual ritual of mouth watering and delight.

When our bellies are filled with the fresh new life, then we put up the food for the winter. We dry and smoke and can. Hundreds of fish to feed a family.

Much has happened to our people in recent centuries. We have toilets now and schools.

We have clocks and calendars in our homes. Some of us go to an office in the morning. The children go to school in the morning. But sometimes the office is empty and locked. Sometimes the child is absent from school. Because there are more important things to do like walking the beaches, collecting chitons and watching for the fish.

The land and the water are our sources of life. The water is sacred. The water is like a baptismal fountain, and its abundance is the Holy Communion of our lives. Of all the things we have lost since non-natives came to our land, we have never lost our connection with the water. The water is our source of life. So long as the water is alive, Chugach Natives are alive.

It was early in the springtime. No fish yet. No snails yet. But the signs were with us. The green was starting. Some birds were flying and singing, the excitement of the season had just begun, and then we heard the news. Oil in the water. Lots of oil. Killing lots of water. It is too shocking to understand. Never in the millennium of our tradition have we thought it possible for the water to die. But it is true.

We walk our beaches. But the snails and the barnacles and the chitons are falling off the rocks. Dead. Dead Water. We caught our first fish, the tradition delight of all- but it got sent to the state to be tested for oil. No first fish this year. We walk our beaches. But instead of gathering life, we gather death. Dead birds. Dead otters. Dead seaweed. Before we have a chance to hold each other and share our tears, our sorrow, our loss, we suffer yet another devastation we are invaded by the oil company. Offering jobs, high pay. Lots of money. We are in shock. We need to clean the oil, get it out of our water, bring death back to life. We are intoxicated with desperation. We don't have a choice but to take the jobs, we take the orders, we take the disruption.

We start fighting. We lose trust for each other. We lose control of our daily life. Everybody is pushing everyone. We Native people aren't used to being bossed around. We don't like it. But now our own people are pointing fingers at us. Everyone wants to be boss; we are not working like a team. We lose control of our village.

Our people get sick. Elders and children in the village. Everybody is touchy. Everybody is ready to jump you and blame you. People are angry, afraid and confused. Our elders feel helpless. They cannot work on the cleanup. They cannot do all the activities of gathering food and preparing for winter. And most of all, they cannot teach the young ones the Native Way. How will the children learn the values and the ways if the water is dead?

The oil companies lied about preventing a spill. Now they lie about the cleanup. Our people know what happens on the beaches. Spend all day cleaning one huge rock, and the tide comes in and covers it with oil again. Spend a week wiping and spraying the surface, but pick up a rock and there's four inches of oil underneath. Our people know the water and the beaches. But they get told what to do by ignorant people who should be asking, not telling.

We fight a rich and powerful giant, the oil industry, while at the same time we take orders and a paycheck from it. We are torn in half. Will it end? After five years, maybe we will see some springtime water life again. But will the water and the beaches see us? What will happen to our lives in the next five years? What will happen this fall, when the cleanup stops and the money stops? We have lived through much devastation. Our villages were almost destroyed by chicken pox and tuberculosis. We fight the battles of alcohol and drugs and abuse. And we survive.

But what we see now is death. Death — not of each other, but of the source of life, the water. We will need much help, much listening in order to live through the long barren season of dead water, a longer winter than before.

I am an elder. I am Chief. I will not lose hope. And I will help my people. We have never lived through this kind of death. But we have lived through lots of other kinds of death. We will learn from the past, will learn from each other, and we will live. The water is dead. But we are alive. And where there is life, there is hope. Thank you for listening to the Native Story. God bless you."

A Summit was held to bring our people together to try to make sense of an event that has dramatically affected our culture and lives. As we look to the future we can learn from our beloved elders to "NOT LOSE HOPE."

■ HOPE that promises are kept

■ HOPE that damage to our land, water, and to our people will be resolved

■ HOPE that we will learn and be able to protect ourselves from another senseless tragedy as we strive to live in harmony with an ever changing world

■ HOPE for our future generations to know the "Native Way"

The Chugach Regional Summit on Natural Resources was held on March 23, 2001. Resolution 01-01 was adopted by representatives from the following organizations:

Chugach Heritage Foundation • Chugach Alaska Corp • Chugachmiut • Chugach Regional Resources Commission • North Rim Pacific Housing Authority • Chenega Corp • Eyak Corp • Port Graham Corp • Tatitlek Corp • English Bay Corp • Nanwalek I.R.A. Council • Chenega I.R.A. Council • Port Graham Village Council • Tatitlek I.R.A. Council • Traditional Village of Eyak • Qutekcaq Native Tribe • Valdez Native Tribe

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Take Action! Pay Up Exxon

A promise is a promise. The time has come to bill Exxon Corporation the additional \$100 million it committed to pay for unknown and unanticipated damages resulting from the Exxon Valdez oil spill. [Tell me more](#)

The letter below will be emailed on your behalf

**Subject:**

Last Chance to Restore the Sound

Dear [Decision Maker] ,

(Edit Letter Below)

I am concerned about the ongoing damages caused by the Exxon Valdez Oil Spill. I urge you take one of the few remaining actions available to mitigate these unpredicted, long-term damages and help to restore Alaska's coastline, fish, wildlife and economies.

The legacy from the Exxon Valdez is on-going and severe. This legacy includes the unexpected collapse of the Pacific herring fishery in Prince William Sound, the near extinction of killer whale pods, and crude oil on beaches once used for subsistence. This makes up only a partial list of documented unanticipated, severe and on-going damages. Most fish and wildlife populations injured by Exxon's spill have not recovered.

Please waste no time. Exxon must be billed

Sincerely,
[Your name]
[Your address]

Take Action on this Issue**Email this letter to:**

► [Pay Up Exxon](#)

EMAIL THE LETTER

Complete the following to email this letter to the above individuals and sign-up to receive periodic updates. If you have sent a letter before, just enter your email address:

Email:*

First Name:*

Last Name:*

Address: *

Address 2:

City: *

State: (for U.S. residents only) *

Choose a State

Zip/Postal Code: *

Country: *

United States

Title:

Organization:

Birthday:

Choose a Month

Sex:

☐ Male ☐ Female

EMAIL THE LETTER

* Required Field
[Privacy policy](#)

Maintainer: [Contact Maintainer \(action@inletkeeper.org\)](mailto:action@inletkeeper.org)



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What's At Stake!

Pay Up Exxon

HISTORY:

On March 24, 1989 the Exxon Valdez grounded on Bligh Reef and spilled well over 11 million gallons of Alaska North Slope crude oil into Alaska's Prince William Sound, creating one of the most significant man-made environmental disasters in human history. The spill covered over 10,000 square miles of Alaska's coastal waters, and oiled some 1,500 miles of shoreline including 3 national parks, 4 national wildlife refuges, a national forest, 5 state parks, 4 state critical habitat areas, one state game sanctuary, and many ancestral lands of Alaska Natives.

The spill had immediate and obvious catastrophic consequences for the ecosystem, and the people who depended upon the fish and wildlife for their livelihoods and cultures. What was not immediately obvious or anticipated was the extent of long-term impacts the oil would have on fish, birds and marine mammal reproduction, the demographic effects of the massive oil-induced mortalities, and the persistence of oil in the Sound ecosystem.

PAYING FOR DAMAGES:

The state and federal governments sued Exxon for damages from the spill. As a part of the 1991 settlement agreement, Exxon committed to pay an additional \$100 million to restore continuing environmental injuries that were not yet known or anticipated.

This \$100 million "reopener clause" provision was a key factor in addressing the uncertainty and concerns of the public, the governments, and the U.S. District Court at the time, and in winning final approval of the settlement.

DOCUMENTATION:

Scientists have documented severe and unexpected long-term ecological consequences of the spill. Most fish and wildlife populations injured by Exxon's spill have not recovered.

Prince William Sound's herring stock, an essential part of the coastal food chain as well as an important fishery, has unexpectedly collapsed. A group of Prince William Sound killer whales is rapidly going extinct, and crude oil remains on beaches once used for subsistence. For more specific information: <http://www.oilspill.state.ak.us>

OBLIGATIONS:

The governments of United States and State of Alaska must uphold their trust obligations by doing everything possible to demand Exxon pay the additional \$100 million for natural resource damages unanticipated at the time of the settlement for the Exxon Valdez

disaster. The \$100 million Reopener damages must be pursued, collected, and applied toward the most effective mitigation initiatives possible within the injured ecosystem.

EXXON'S FIGHT:

Exxon has fought long and hard to avoid paying Alaska coastal residents for the damages associated with its negligence. Exxon has continued to challenge the jury award of punitive damages as a result of the Exxon Valdez oil spill. Exxon will likely fight any claim for unanticipated damages by the state and federal governments just as zealously.

2 DAYS OF PROFIT

In 2000, Exxon Corporation posted all-time record after-tax profits of \$17 billion - the largest profit of any corporation in history. This amounts to about \$50 million / day of after-tax profit. Thus, to pay the entire \$100 million Reopener claim due the government from the Exxon Valdez Oil Spill would cost only two days of Exxon's profit. Exxon clearly has the ability to pay the Reopener damages in full.

To receive further information, please e-mail:
payupexxon@akcenter.org

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Maintainer: [Contact Maintainer \(action@inletkeeper.org\)](mailto:action@inletkeeper.org)



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AK Network



Alaska Center for the Environment (ACE), founded in 1971, is the largest grassroots conservation organization in Alaska. Nearly 10,000 Alaskans find expression for their conservation values through membership in ACE - values of balance, common sense, and long-range stewardship in managing our natural resources. ACE also serves as a community center for individuals and groups needing support to promote new ideas and strategies to protect our environment. Feel free to [contact us](#) with any questions or comments.



Cook Inlet Keeper is a private nonprofit organization dedicated to protecting the vast Cook Inlet watershed and the life it sustains. Keeper's programs unite individuals and groups through water quality monitoring, environmental education, and effective advocacy, to give citizens the tools they need to promote clean water in the 47,000 square mile Cook Inlet watershed. Click on our logo to visit our extensive website and for contact information.

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[\(forgot your password?\)](#)

Current Advocacy Campaigns from AK Network



Pay Up Exxon

March 22, 2002

Previous Advocacy Campaigns from AK Network

Citizens Deserve Information Before Industry Drills in Lower Cook Inlet

February 12, 2002

Far North Bicentennial Park Threatened

December 17, 2001

Southern Intertie

November 11, 2001

Keep Our State Parks QUIET and UNPOLLUTED

May 25, 2001

Wilderness Stewardship Policy

April 11, 2001

Denali Backcountry Plan

March 22, 2001

**Say NO to Oil & Gas Development in
Lower Cook Inlet**
September 18, 2001

National Trails Day
June 01, 2001

Chugach National Forest Plan
December 06, 2000



Recent Messages from AK Network

**Welcome to Cook Inlet Keeper's
ActionNetwork!**
February 03, 2000

**Welcome to Cook Inlet Keeper's
ActionNetwork**
February 03, 2000

Maintainer: Contact Maintainer (action@inletkeeper.org)

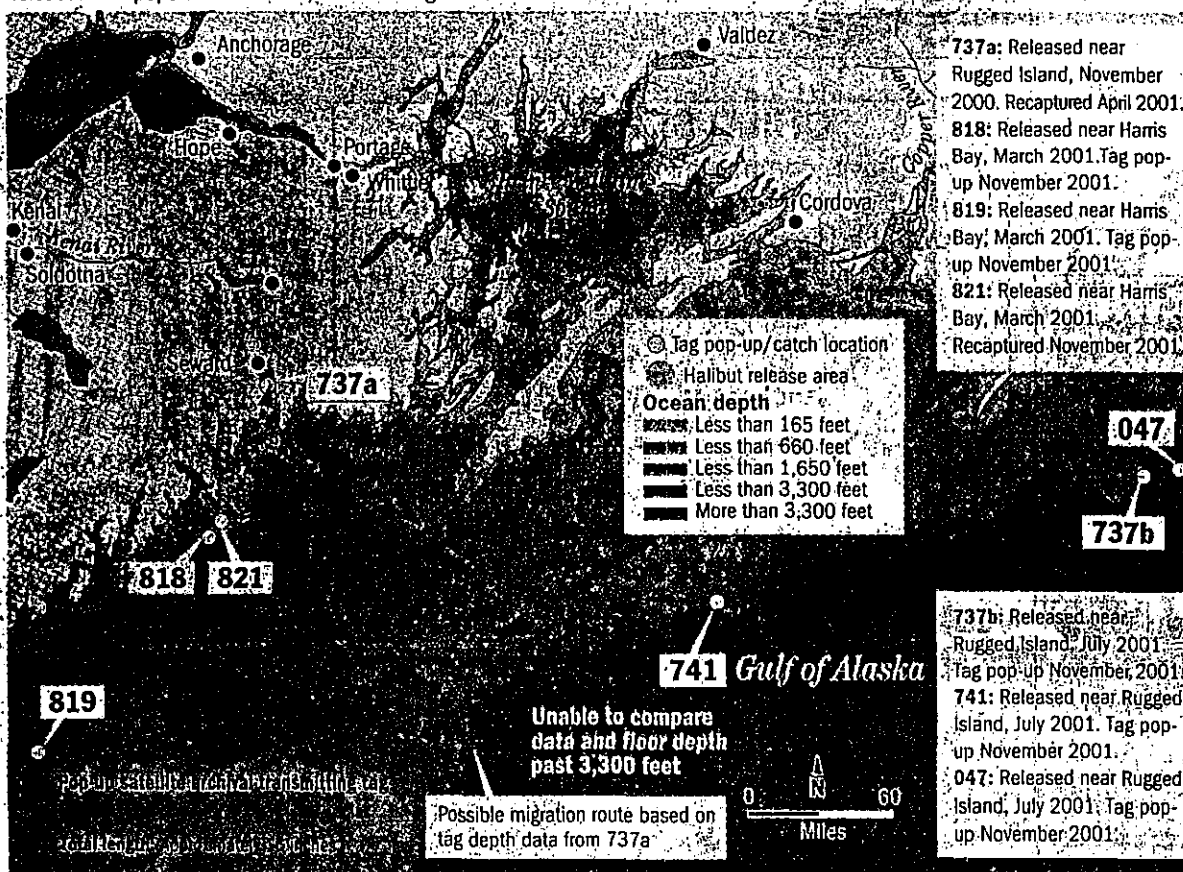


Halibut trails

ADN
3/24/02

Halibut tracking uses new technology

New electronic tags are proving effective providing information about fish activities previously too difficult to track. Halibut were tagged with a data recorder and released off Rugged Island and Harris Bay. Information came from continuously recorded data. This data is retrieved either when the fish is caught or when the wire holding the recorder to the fish releases and pops to the surface, broadcasting to a satellite.



Computer tags help scientists track fish

By DOUG O'HARRA
Anchorage Daily News

For five months, the feisty 60-pound Pacific halibut with the nickname Lip roamed the Gulf of Alaska, its movements monitored by a tiny computer tag anchored below its dorsal fin.

In a project that could revolutionize the study of ocean use by important Alaska species like halibut and salmon, the fish was among half a dozen big flatfish successfully tracked from Resurrection Bay over the past 18 months during a test of new miniature technology.

On its travels to and from deep water, this halibut shifted at the surface and plunged as deep as 1,600 feet. When it traveled farther offshore, it spent whole days swimming hundreds of feet up and down in the water column, followed by days of steady cruising, often about 1,000 feet down.

Then, out in the abyss, it found what passes for halibut bliss.

In what could be the first glimpse of mating by the species, the fish shot straight for the surface on nine occasions, rising 300 to 570 feet in minutes before plunging just as fast to its previous depth.

While no one knows for sure what the halibut was doing, observations of breeding flatfish in the Atlantic Ocean suggest that the fish probably soared in unison with another consenting piscivore, according to biologists from

737a: Released near Rugged Island, November 2000. Recaptured April 2001.
818: Released near Harris Bay, March 2001. Tag pop-up November 2001.
819: Released near Harris Bay, March 2001. Tag pop-up November 2001.
821: Released near Harris Bay, March 2001. Recaptured November 2001.

737b: Released near Rugged Island, July 2001. Tag pop-up November 2001.
741: Released near Rugged Island, July 2001. Tag pop-up November 2001.
047: Released near Rugged Island, July 2001. Tag pop-up November 2001.

TRACKING: *Technology advances fish research*

Continued from B-1

the U.S. Geological Survey in Anchorage.

"It's like a dance," explained Jennifer Nielsen, supervisor of fisheries research for the USGS's local biological resource division. "As a pair, they do like a spiral ascent. It's part of its breeding behavior. Nobody is quite sure why they do it."

"Everyone has known for a long time that (Pacific halibut) go off the shelf in the winter to breed," added Derek Wilson, a fisheries biologist working with Nielsen on the project. "But individual breeding behavior has never been documented before."

The halibut study illustrates how miniature tracking technology and tiny computers have changed field research forever, enabling scientists to gather detailed information about where wild animals go and what they do in environments beyond normal human scrutiny. By attaching the devices to fish, especially salmon, scientists can begin to answer fundamental questions about habitat use in the deep sea, Nielsen said.

"I've been a salmon biologist for 25 years, and one of the biggest questions for the whole 25 years has been the ocean," Nielsen said. "It's been a big black box. It's a big unknown. ... Now the technology has opened the opportunity to begin to ask — at the same level that we look at rivers — what's the ocean use by salmon?"

Funded with a \$77,000 grant from the Exxon Valdez Oil Spill Trustee Council, the halibut project was aimed at testing 14 tiny pop-up satellite tracking tags as a way to identify critical marine habitat for any Alaska fish. Though previously tried on tuna and marlin, the technology had never been used this far north, Nielsen said.

As designed by Seattle-based Wildlife Computers, the 2-inch-long, bobber-shaped devices trailed behind the halibut on a tungsten wire, constantly recording water pressure, temperature and ambient light as the fish swam. Unless recovered first by a fisherman, the device corrodes the wire at a programmed time, floats to the surface and transmits its data to a satellite.

By registering the time of each day's sunrise and sunset, the tags could enable scientists to indirectly calculate the ap-



■ **FOR DETAILS** on tracking halibut with pop-tags:
www.absc.usgs.gov/research/Fisheries/Halibut/popup_tags.htm

■ **FOR DETAILS** on tracking Ship Creek coho salmon:
www.absc.usgs.gov/research/Fisheries/archival_tagging/coho_archivetags.htm

■ **FOR OTHER** fisheries projects by USGS in Anchorage:
www.absc.usgs.gov/research/Fisheries/fish_proj.htm

■ **FOR AN OVERVIEW** of the Alaska Biological Science Center of the USGS:
www.absc.usgs.gov/

proximate latitude and longitude of fish — something not possible with conventional global positioning system satellites. A poster describing preliminary results was published this winter by Nielsen, Wilson, Andy Seitz and Sage Pelot.

But the halibut study is only the beginning. Additional satellite tags will go on halibut this next season in the Gulf and Bering Sea. In separate projects using nonsatellite tags that store data in memory or give off beeps underwater, Nielsen and co-researchers Wilson, Phil Richards and Chris Zimmerman plan to start tracking coho salmon smolts from Ship Creek, as well as steelhead from the Ninilchik River and Deep Creek on the Kenai Peninsula.

"It was always a little weird to me (that scientists) consider salmon a freshwater fish when they spend two-thirds of their time in the ocean," Nielsen said. "There's a gap. ... And that's what we're trying to get at — knowing where they go and why."

Working with Capt. Harold Salve of the fishing vessel Rocinante, Nielsen's team caught the first 11 halibut during two trips off Bear Glacier near the mouth of Resurrection Bay in August 2000. Among the fish was a 50-inch 60-pounder with a torn lip. It soon joined six other survivors at the Alaska SeaLife Center for months of observation.

That fish, named Lip, initially didn't want to eat, said research associate Pam Parker, one of the people who monitored the project at the center. But as its wound healed, it began to feed with enthusiasm.

"It was superaggressive," she said. "It was just an interesting fish."

All of the flatfish adapted fast to captive life and became popular with tourists. They would sleep in a pile on the sandy bottom of the 10-foot-deep tank. When the tank was drained for veterinarian checks, the fish would calmly swim in a foot of water while the vet walked among them, Parker said. The fish even ogled their human keepers.

"They were really curious," Parker said. "The minute we would approach the tank, they would start swimming with their heads out of the water. They would watch us."

More important, when the tags were surgically anchored, the animals recovered fast and ignored one another's tags.

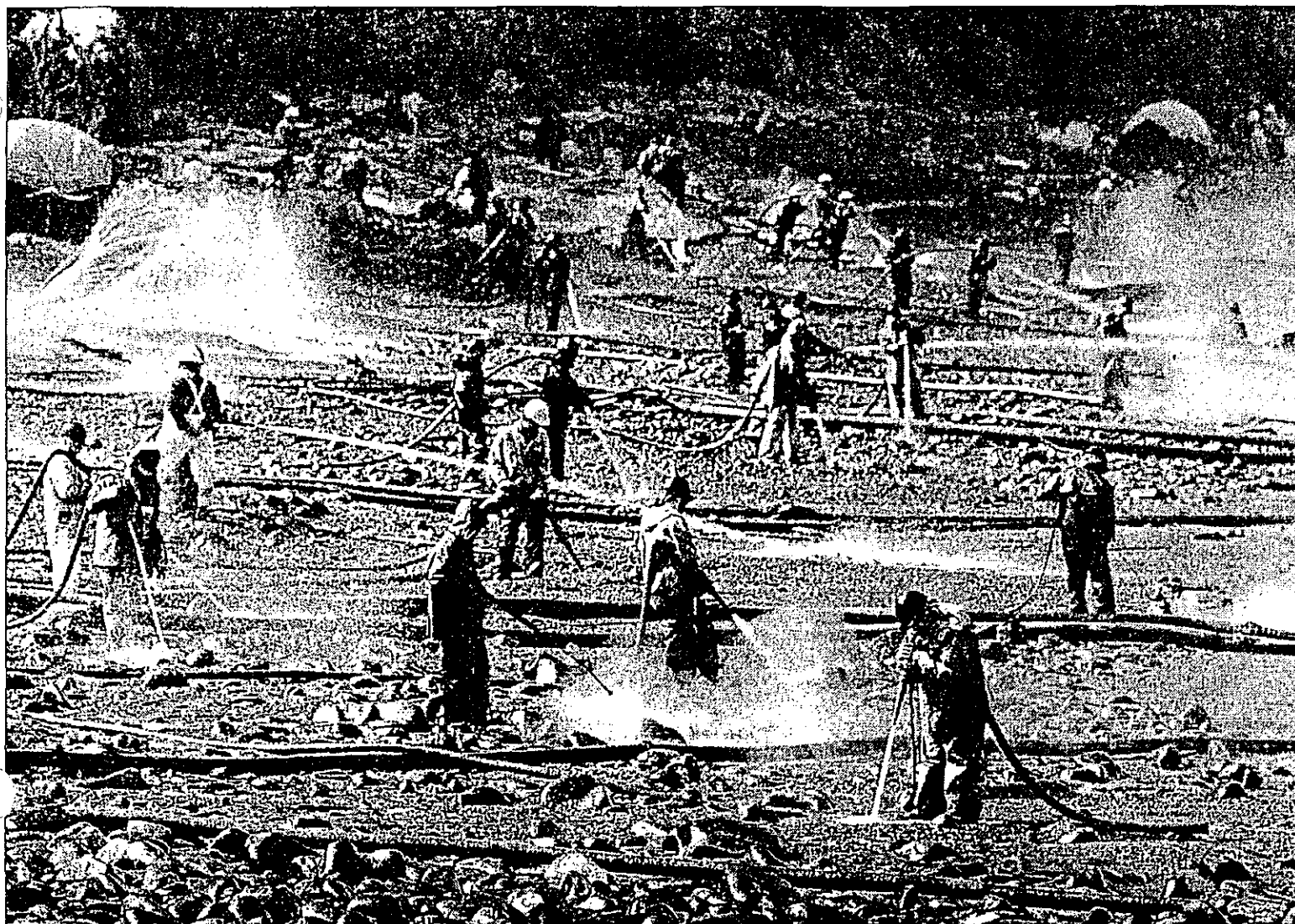
"The bottom line was, that within a week, they were all behaving normally and there were no critical problems with the tags, and that's what we needed to see," Nielsen said.

Over the next year, 14 halibut were equipped with the tags and released off Resurrection Bay. In the end, seven tags succeeded in delivering data to the scientists. (A programming error by the manufacturer set four of the tags to release 41 years in the future, and three tags simply did not respond.)

Two halibut, including the one called Lip, were caught by commercial fishermen, allowing Nielsen to recover all of the data recorded in their tags. The other five tags released on schedule last Nov. 15 and transmitted data to the satellite.

Two halibut had stayed near the Kenai Fjords coast — one swimming only a few miles away and the other moving southwest toward the mouth of Cook Inlet. But three halibut swam much farther out. One had traveled about 120 miles out toward Middleton Island. The other two were in the Gulf south of the Bering Glacier, more than 200 miles from Resurrection Bay.

■ Doug O'Hara can be reached at do'hara@adn.com and 257-4334.



BOB HALLINEN / Daily News file photo

Spill workers use pressure washers to clean oil from a beach on Smith Island in 1989.

At four minutes after midnight on March 24, 1989, the 25th Good Friday after the Great Alaska Earthquake, the oil tanker Exxon Valdez ran aground on Bligh Reef while exiting Valdez Arm in Prince William Sound. The resulting spill of nearly 11 million gallons of oil, one-fifth the tanker's load, was the largest ever in North America.

The ship drafted 56 feet of water; the reef lay 30 feet beneath the ocean surface. The rock tore open 500 linear feet of the tanker's hull. Eight of 11 cargo tanks ruptured on the starboard side, and in the vessel's center.

It was still loaded with more than 40 million gallons.

ALASKA SCRAPBOOK

This week in Alaska history

With oil gushing into the sea and piling up on its surface, there was great danger of explosion and fire. On March 25 workers began to transfer the remaining oil to other tankers, using pumps and hoses. The operation took two weeks; part of the time the workers had to struggle against rain, strong winds and

high seas. Afterward, the ship was moved to Naked Island for emergency repairs to prevent it from breaking up on the trip south to Los Angeles to be patched and refurbished.

Several years ago the State of Alaska refused a request of the Exxon Corp. to allow the rechristened vessel to re-enter Alaska waters.

Exxon Valdez Oil Spill Trustee Council

441 W. 5th Ave., Suite 500 • Anchorage, Alaska 99501-2340 • 907/278-8012 • fax 907/276-7178



MEMORANDUM

TO: Trustee Council Members

FROM: Molly McCammon
Executive Director

DATE: April 18, 2002

RE: Intertidal monitoring follow-up

Two projects for the FY02 Work Plan were deferred last December, pending results from a nearshore workshop sponsored by the Trustee Council in January, 2002:

- Project 02556, Mapping Marine Habitats: The First Step in a Spatially Nested Monitoring Program, \$50.0 (Carl Schoch, ADF&G)
- Project 02681, Placeholder: Nearshore/Intertidal Monitoring, \$50.0 (To Be Determined)

The nearshore workshop was held successfully in January, however, a follow-up session was necessary to better evaluate what preliminary work on the nearshore needed to be done this year. That follow-up session was held earlier this week on Monday, April 15 in Homer.

Discussion at the Homer workshop indicated that there is still much work to be done in developing a comprehensive nearshore monitoring program for the GEM region. However, there was clear consensus that additional shoreline mapping is necessary, no matter how the program develops further. This mapping occurs at two levels: low resolution aerial video imaging and mapping of the coastal zone at extreme low tides, and more intensive, high resolution field mapping of the nearshore habitats, by quantifying the physical attributes that force variability in animal and plant populations. The group recommended that since much of the low resolution mapping for Cook Inlet/Kachemak Bay/Outer Kenai coast was completed or had funding secured, that the high level mapping be started in this region. The group also recommended that the low resolution mapping be started for the Kodiak and Prince William Sound regions.

Project 02556 is a proposal for the high resolution level of mapping for Kachemak Bay. A revised budget is attached, for a total request of \$62.2. Dr. Mundy and I are recommending that this proposal be funded, with the caveat that there is, as yet, no commitment by the GEM Program to the proposed spatially nested nearshore monitoring program as proposed by the Kachemak Bay NERRS. The mapping provides important information, no matter how the nearshore monitoring program develops. A memo should be submitted by the PI acknowledging that funds are for mapping only. In addition, funding is subject to submittal of a final report for Project 01385.

PROPOSED MOTION: Approve \$62.2 in funds to ADF&G for Project 02556, contingent on receipt of a memo acknowledging that the funds are for mapping only, with no commitment at this time by the GEM Program to future nearshore monitoring, and receipt of the final report for Project 01385.

Regarding Project 02681, Placeholder for Nearshore Monitoring, two projects are under consideration for \$120.0 - \$150.0 in total costs. These would be for low resolution mapping in Prince William Sound and Kodiak this summer. A PWS proposal is attached. It has not been peer reviewed, nor circulated for review by the PWS Regional Citizens Advisory Council, state and federal agencies, or others. However, the protocol is the same as the mapping done for the entire state of Washington coastline and the British Columbia coast. Bob Foy with the University of Alaska's Fisheries Industrial Technology Center in Kodiak is taking the lead in developing a proposal for Kodiak mapping.

The Trustee Council has two choices in regard to the PWS and Kodiak mapping. One is to approve a block of funding for the above two projects, with dispersal of funds contingent on final review and approval of detailed project descriptions and budgets by the Executive Director and Science Director. The **PROPOSED MOTION** would be: **Approve \$80.0 in funds to ADF&G for a contract with Coastal & Ocean Resources Inc. for ShoreZone Mapping in Prince William Sound and \$70.0 in funds to ADF&G for a contract with the University of Alaska for low resolution mapping in the Kodiak region.**

The other option is to wait until fully developed and reviewed proposals are finalized and if necessary, hold a special meeting by teleconference. Your next scheduled meeting is June 11, and that may be too late for these projects to happen this summer. This approach would also require additional court notices.

4-15 file

**Project Title: Mapping the Physics and Physical Processes of Marine Habitats:
The First Step in a Spatially Nested Monitoring Program**

Project Number: 02556
Restoration Category: Research and Monitoring
Proposer: Kachemak Bay Research Reserve
Lead Trustee Agency: ADFG
Duration: 1st year, 1 year project
Cost FY02: ~~350,000~~ \$62,200 - revised 4/8/02
Geographic Area: Kachemak Bay/Lower Cook Inlet
Injured Resource/Service: Subtidal and intertidal communities, sediments, mussels, clams, archeological resources

RECEIVED

APR 13 2000

EXXON VALDEZ OIL SPILL
TRUSTEE COUNCIL

ABSTRACT

Groups, individuals, and programs as diverse as natural resource agencies, local governments, researchers, conservation advocates in Cook Inlet and Kachemak Bay, and the EVOS/GEM can benefit from a comprehensive, high resolution database of shoreline and nearshore habitats, and from information on the physical changes seen through time. At present, no such detailed database or monitoring program exists within the Gulf of Alaska. We propose to use a method adopted along the U.S. west coast to gathering such habitat information in a cost-effective yet detailed manner. The method relies on a nested hierarchical nearshore classification based on the physics of the environment to select replicate shore sites for monitoring algal and invertebrate diversity.

Revision 018-02

FY 02 EXXON VALDEZ TRUSTEE COUNCIL PROJECT BUDGET

October 1, 2001 - September 30, 2002

Budget Category:	Authorized FY 2001	Proposed FY 2002							
Personnel		\$43.0							
Travel		\$2.0							
Contractual		\$6.0							
Commodities		\$4.3							
Equipment		\$0.0							
Subtotal	\$0.0	\$55.3	LONG RANGE FUNDING REQUIREMENTS						
General Administration		\$6.9	Estimated FY 2003						
Project Total	\$0.0	\$62.2	\$20.0						
Full-time Equivalents (FTE)		0.8							
Dollar amounts are shown in thousands of dollars.									
Other Resources									
<p>Comments: The KBRR went through a substantial effort to obtain funds and establish partnerships with other organizations to support the proposed research and monitoring effort. These efforts include:</p> <p><i>NOAA/KBRR Support:</i> The proposed EVOS projects (including proposals #02565 and #02569) will meet the required non-federal match for approximately \$274K in NOAA operations funds. Federal funds will be used to operate and expand the Reserve monitoring program. These NOAA funds will support, in part, two research staff, the purchase of ocean sensors and a CTD, Reserve research and support facilities and equipment. Without this match, the KBRR will need to decline all or part of these funds, and likely will not be able to implement and maintain the long-term monitoring program.</p> <p><i>Cook Inlet RCAC</i> - The Cook Inlet RCAC will provide \$30,000 for an aerial video survey of the bay to map geomorphological processes</p> <p><i>NERRS Graduate Research Fellows</i> - KBRR is funding 2 graduate students (\$34,000) who will assist with the summer field work and incorporate the data into their dissertation work.</p>									

FY02

Prepared: 4/12/01

Project Number: 02556

Project Title: Mapping the Physics and Physical Processes of Marine Habitats: the First Step in a Spatially Nested Monitoring Program

Agency: ADFG

FORM 3A
TRUSTEE
AGENCY
SUMMARY

FY 02 EXXON VALDEZ TRUSTEE COUNCIL PROJECT BUDGET

October 1, 2001 - September 30, 2002

Personnel Costs:		GS/Range/ Step	Months Budgeted	Monthly Costs	Overtime	Proposed FY 2002
Name	Position Description					
Steve Baird (Hire in Progress)	GIS Specialist (Research Analyst II)	18A	3.0	4.0		12.0
	Research Assistant (FB-I)	14A	4.0	4.0		16.0
Dr. G. Carl Schoch	PI	18A	3.0	5.0		0.0
						15.0
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
Subtotal			10.0	13.0	0.0	
Personnel Total						\$43.0
Travel Costs:		Ticket Price	Round Trips	Total Days	Daily Per Diem	Proposed FY 2002
Description						
Dr. G. Carl Schoch to attend GEM program development and planning work		0.2	2	8	0.2	0.0
						2.0
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
Travel Total						\$2.0

FY02

Prepared: 4/12/01

Project Number: 02556

Project Title: Mapping the Physics and Physical Processes of Marine Habitats: the First Step in a Spatially Nested Monitoring Program

Agency: ADFG

FORM 3B
Personnel
& Travel
DETAIL

FY 02 EXXON VALDEZ TRUSTEE COUNCIL PROJECT BUDGET
October 1, 2001 - September 30, 2002

Contractual Costs:			Proposed FY 2002
Description			
Fuel for Skiff			6.0
When a non-trustee organization is used, the form 4A is required.			
Contractual Total			\$6.0
Commodities Costs:			Proposed FY 2002
Description			
Misc Supplies and Operating Expenses for Boat			1.5
Software upgrades	1	2.0	2.0
Surveyors rod	1	0.3	0.3
Surveyors level	1	0.4	0.4
Surveyors tape	1	0.1	0.1
Commodities Total			\$4.3

FY02

Prepared: 4/12/01

Project Number: 02556
Project Title: Mapping the Physics and Physical Processes of Marine
Habitats: the First Step in a Spatially Nested Monitoring Program
Agency: ADFG

FORM 3B
Contractual &
Commodities
DETAIL

October 1, 2001 - September 30, 2002

FY02

FORM 3B
Equipment
DETAIL

4 of 4

COASTAL & OCEAN RESOURCES INC.

107 - 9865 W. Saanich Rd
Sidney, BC V8L 5Y8
phone: 250 655 4035
fax: 250 655 1290
email: info@coastalandocean.com
web: www.coastalandoceans.com

18 April, 2002

Ms. Molly McCammon, Executive Director
Dr. Phil Mundy, Science Director
Exxon Valdez Oil Spill Trustee Council
441 W. Fifth, Suite 500
Anchorage, Alaska 99501

RE: Unsolicited Proposal for ShoreZone Mapping in Prince William Sound, 2002

Dear Ms. McCammon and Dr. Mundy,

Following the EVOS/GEM Nearshore meeting in Homer on Monday, I wanted to provide you with a proposal, should GEM be in a position to initiate some 2002 field survey work. I very much appreciate the opportunity to attend the meeting. I was truly surprised and also embarrassed by the many favorable comments we received. The technique is not rocket science, but rather just a lot of hard work and attention to detail. This proposal may help in your consideration of alternatives for 2002.

Approach

The mapping approach would follow the protocols implemented in the Washington ShoreZone mapping program and the Cook Inlet RCAC program. Typical phases of the project are described below.

Planning

Tide windows are identified for the survey area, personnel are scheduled, and flying services are contracted. For a PWS survey, the 2002 possible low-tide flying windows are summarized at right. The highly crenulated shoreline of PWS would require that a helicopter be used as the flying platform; there are permanent helicopter bases in Homer (Maritime Helicopters), Valdez (ERA) and Cordova (Wilderness Helicopters) that could be used. It might prove cost effective to base the team and helicopter within the Sound (e.g., Chenega).

Window	Duration (hr below "0" tide)	Availability
25-30 May	20.0	open
10-15 June	17.8	open
23-28 June	19.0	CIRCAC flights
9-15 July	18.8	possible
22-27 July	16.5	personal conflict
7-12 August	18.5	Olympic Marine Sanctuary

Field Survey

Aerial video imagery is collected of the shore zone at tides less than "zero" elevation, resulting in the entire intertidal zone being imaged. A synchronous narration is provided by a geomorphologist and a marine ecologist on separate audio channels. High resolution still photos are shot by the biologist. DGPS track line data is recorded and also burned synchronously onto the video images. All video imagery is recorded in digital tape format, as well as a back-up tape in Hi8 format. Ground hovers are conducted as required to assist both the biologist and geomorphologist in interpreting features and biota. A flightline manual is produced as part of the field survey with maps of flight tracks and logs of tapes.

In a 6-day tide window, we anticipate covering approximately 2,100 km of shoreline.

Analysis

The shore zone is mapped using a protocol of the Washington ShoreZone mapping project. Maps and databases are produced during this phase and would incorporate all of the Washington ShoreZone features in addition to new features appropriate for Alaska. Geomorphologists and biologists review the imagery and using professional interpretations, classify the shore-zone features. The Washington ShoreZone protocol includes QA/QC procedures.

Products

The primary data products are **ArcInfo map coverages** (ArcExport files) **and associated databases** of shore features (Access97). The dataset includes a summary report and **data dictionary** that describes all data attributes.

VHS videotape copies of the imagery are provided; we typically archive the original digital imagery at our office. We are currently working with CIRCAC to improve accessibility of the imagery and data. The 2001 Cook Inlet aerial video imagery *will* be available on the web within two weeks and we have a commitment from U of A Anchorage to host the 2001 imagery on an ArcIMS web site on a trial basis. We anticipate that all PWS imagery collected in 2002 would also be web-available and have included this in our costs.

We also anticipate that our mapping data could be set up on an ArcIMS web site. This will allow users to access data without using ArcView (users can manipulate data and create their own maps on the web). We have *not* incorporated costs for this component but recognize that our dataset are highly amenable to ArcIMS use. Perhaps the GEM GIS specialist could do this.

Unique Qualifications

At the GEM Nearshore Meeting, I was asked if we were uniquely qualified to conduct the ShoreZone Mapping work and answered that there were probably others. On reflection, I think we are uniquely qualified with respect to the ShoreZone mapping protocol, and the biological mapping technique that is used as part of the system; to my knowledge, there are not any other

McCammon/Mundy Page 3 of 4

firms that have conducted the biological mapping like this, although there are others that have been involved with the physical mapping. We were sole-sourced for all the Washington ShoreZone mapping and all the BC aerial video imaging.

Dr. John Harper has conducted over thirty of these surveys and directed major mapping efforts in Washington, BC, California as well as in Alaska (Chukchi Sea, Cook Inlet). He has extensive experience in Prince William Sound, participating in all multi-agency SCAT programs through 1995.

Our biological mappers have conducted dozens of AVI surveys and have been responsible for all of the biotic mapping in BC and Washington. Mappers are subcontracted from Archipelago Marine Research Ltd. (Mary Morris, Pam Thuringer) and the Friday Harbor Marine Laboratory (Dr. Megan Dethier). I am not aware of any other biomappers that have conducted similar AVI surveys and mapping. All of these individuals have conducted at least 5,000 km of surveys and mapping.

References

Helen Berry
Aquatic Resources Division
Department of Natural Resources
Olympia, Washington
(360) 902 1052
helen.berry@wadnr.gov

Don Howes, Assistant Deputy Minister
Ministry of Sustainable Resource
Management
Victoria, BC
(250) 356 7721
Don.Howes@gems7.gov.bc.ca

Contract Manager for all of the Washington
ShoreZone Mapping Project, 1997 to 2001

Co-ordinator of the ShoreZone Mapping system
(~1980) and contract manager for numerous contracts
related to the mapping of the British Columbia coast.

I would also suggest that you do a web search on "Washington ShoreZone" - I was surprised with the multitude of hits and especially how the NGO's have tailored the ShoreZone map data on their web sites (I especially liked the San Juan Island site: www.sanjuans.org/shorezone.htm).

Estimated Costs

Planning	4,500	
AVI Survey		
Personnel	9,800	
Air Charter	30,000	(6d @ 5hr/day @ \$1,000/hr)
Logistics	4,615	
AVI Manual	3,500	
Web-Posting	8,000	
Mapping	20,000	
Meetings (x1)	3,500	
	83,915	(\$40/km of shoreline)

McCammon/Mundy Page 4 of 4

These costs are about 25% higher than those for Cook Inlet work due to: (a) Sue Saupe was provided free by CIRCAC for the planning and AVI, (b) the use of helicopters for the entire survey (half of the CIRCAC survey could be conducted from fixed wings) and (c) somewhat increased survey complexity (area of interest further from heli bases so more deadhead time). If total cost is a problem the duration of the survey could be reduced; alternatively, the amount of mapping could be reduced (i.e., collect the imagery but don't map everything that is collected).

I do not mean to be presumptuous but thought this information, including costs, would be useful for your planning process. I welcome your questions.

With regards,

John R. Harper, Ph.D.
Marine Geologist

enc Washington ShoreZone Mapping Dataset on CD

Exxon Valdez Oil Spill Trustee Council

441 W. 5th Ave., Suite 500 • Anchorage, Alaska 99501-2340 • 907/278-8012 • fax 907/276-7178



MEMORANDUM

TO: Exxon Valdez Oil Spill Trustee Council

FROM: Molly McCammon
Executive Director

RE: Amendment to Project 02423 / Patterns and Processes of Population
Change in Selected Nearshore Vertebrate Predators

DATE: April 16, 2002

Project 02423, which was funded by the Trustee Council in August 2002, included studies on harlequin ducks held in captivity at the Alaska SeaLife Center (ASLC). We were recently informed that these harlequin ducks have contracted a virus that renders them unreleasable to the wild, as originally planned. While this is an unfortunate outcome of Project 02423, the fact that the harlequins will be at the ASLC for their lifespan provides a scientific opportunity to conduct some additional research on them.

Dr. Shannon Atkinson, Science Director at the ASLC, and her colleagues are proposing three small studies, at the end of which the harlequin ducks will be euthanized--a reovirus study, a feeding trial, and a stress assessment. A description of the proposed work, prepared by Dr. Atkinson, is attached.

Dr. Atkinson would be the principal investigator for this new component of the project. The Alaska Department of Fish and Game, as lead agency for the new component, would contract with the ASLC to undertake the project. The ASLC is the most appropriate entity to perform this work, as the harlequins are located there and are currently under the care of the ASLC's veterinary staff.

Recommendation:

Approve \$24,300 for a contract with the Alaska SeaLife Center as an amendment to Project 02423. This brings the total approved for Project 02423 to \$482,700.

Attachment: Description and budget for new project component



Alaska SeaLife Center

w i n d o w s t o t h e s e a

To: Molly McCammon
From: Shannon Atkinson, PhD
Date: April 15, 2002
Re: Harlequin Duck Budget Adjustment

I believe that you are aware that the Harlequin ducks that were part of Dan Esler's project contracted a virus that has rendered them unreleasable. While the source of the virus will probably remain unknown, the situation became one of figuring out what to do with the birds. Dan and his graduate student handled the situation very well, as did the SeaLife Center staff, and the original project was completed successfully about a week ago.

In developing a future plan for these birds, several of us (Dr. Dan Esler, Dr. Pam Tuomi (ASLC senior vet), Dr. Tuula Hollmen (ASLC sea duck biologist and veterinarian) and myself) felt that as long as these birds were not going back to the wild, we ought to get the most information from them as possible. To this extent we have developed a plan that includes 3 small studies, at the end of which, the birds will be euthanized. Three of the worst affected birds have already been euthanized.

The first study is a refined reovirus study that will primarily take place at the National Wildlife Health Center (NWHC) in Wisconsin. Dr. Hollmen will take the lead on this, and 6 to 8 of the birds will be shipped to Wisconsin in May. The costs for the study are proposed to be shared between NWHC, ASLC and EVOS (\$2600 requested for shipping the birds and holding them in WI, plus \$150 for cages and \$1590 for Dr. Hollmen to accompany the birds and initiate the virus study). Dr. Hollmen has also submitted an additional grant to cover the costs of analyses.

The second study is a feeding trial to determine the role of Vitamins K and E in a severe coagulopathy that was observed in 7 of 46 wild caught Harlequin ducks that were part of Dan's studies on the long term effects of crude oil exposure. This coagulopathy was observed in ducks housed at the Alaska SeaLife Center (ASLC) between September 2000 and February 2002 and appeared shortly after their arrival at ASLC. All of the birds will participate in this study. The costs for this study are again proposed to be shared between ASLC and EVOS (\$6100 requested for vitamin analyses and a blood analyzer). Dr. Tuomi has also submitted another proposal to Oiled Wildlife Care Network to help defray the costs.

The third study is assessing stress in Harlequin ducks based on adrenal corticoid output. We are proposing to determine the circadian pattern of corticosterone production as well as assess the response to an ACTH stimulation. This study will be supported by UAF Wildlife Analytical Services (my endocrine lab located at ASLC) and ASLC. No costs have been requested from EVOS.

All of the above studies have undergone IACUC review and the birds will remain under Dan's ADFG and USFWS permits. The total duration is 2 months. We anticipate one publication to come from the reovirus study, with Dr. Hollmen as senior author. We expect another publication on the vitamin study, with Dr. Pam Tuomi serving as the senior author. An additional two publications are anticipated on the endocrine studies. While I will serve as the P.I. on those studies, Mr. Peter Nilsson will be using the data for his Master's thesis at UAF. Mr. Nilsson's research assistantship is being funded by me endocrine lab.

I have attached a budget, which includes the above mentioned costs, but also includes costs to feed (\$1590) and care for the birds (\$2628 personnel, \$1000 lab supplies and health screenings) until the end of May. The costs to fumigate (\$5000) the aviary and lab facilities utilized by Dan's original project and ASLC space rental (\$2000) are also included. The original EVOS bench fees for this project were originally calculated to end on March 31, 2002, and did not include any costs for this unplanned virus.

Please review this situation as you need to and let me know of your decision. The virus was unfortunate and definitely unplanned; however I feel that all involved have gone beyond the call of duty to make the best of a bad turn of events. Thank you for your consideration. I will be available for any questions you may have on April 18, 2002.

FY 03 EXXON VALDEZ TRUSTEE COUNCIL PROJECT BUDGET

October 1, 2002 - September 30, 2003

Budget Category:	Authorized FY 02	Proposed FY 02						
Personnel		\$2,628.0						
Travel		\$1,590.0						
Contractual		\$13,200.0						
Commodities		\$2,590.0						
Equipment		\$2,650.0						
Subtotal	\$0.0	\$22,658.0	LONG RANGE FUNDING REQUIREMENTS					
Indirect			Estimated FY 03					
Project Total	\$0.0	\$22,658.0						
Full-time Equivalents (FTE)								
Dollar amounts are shown in thousands of dollars.								
Other Resources								
Comments:								
NOTE: ADF&G GA of \$1,600 will be added to this project, bringing the total to \$24,300.								

FY02

Prepared: 4/16/02

Project Number: 02423 (amendment)
 Project Title: Patterns & Processes of Population Change in Selected
 Nearshore Vertebrate Predators
 Name: Alaska SeaLife Center

FORM 4A
 Non-Trustee
 SUMMARY

FY 03 EXXON VALDEZ TRUSTEE COUNCIL PROJECT BUDGET

October 1, 2002 - September 30, 2003

Personnel Costs:				Months	Monthly	Overtime	Proposed
	Name	Position Description		Budgeted	Costs		FY 02
	Kelly Fielitz	Research Technician - Personnel		3.0	684.3		2,052.9
	Kelly Fielitz	Research Technician - Fringe benefits		3.0	191.6		574.8
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FY02

Project Number:
Project Title:
Name:

FORM 4B
Personnel
& Travel
DETAIL

Prepared:

FY 03 EXXON VALDEZ TRUSTEE COUNCIL PROJECT BUDGET

October 1, 2002 - September 30, 2003

Contractual Costs:		Proposed
Description		FY 02
Health Certificates/screening 20 @ \$30		600.0
Reovirus Accomodation and Analysis		2,000.0
Vitamin Analysis 48 @ \$75		3,600.0
Fumigation/disinfection		5,000.0
Space Rental - ASLC		2,000.0
Contractual Total		\$13,200.0
Commodities Costs:		Proposed
Description		FY 02
Lab Supplies		400.0
Animal Food (2 months)		1,590.0
Shipping - 3 cages @ \$200/cage		600.0
Commodities Total		\$2,590.0

FY02

Project Number:
Project Title:
Name:

FORM 4B
Contractual &
Commodities
DETAIL

Prepared:

October 1, 2002 - September 30, 2003

FY02

Project Number:	
Project Title:	
Name:	

FORM 4B Equipment DETAIL

4 of 4

2002 TC & PAG MEETING SCHEDULE

<u>Date</u>	<u>Agenda Items</u>	<u>Action Item?</u>
TC Thurs, April 18 2:30 pm (2 hr. teleconf)	STAC appointments Injured Species List Update PAG charter	Action Briefing Action
PAG April 25 10:00 am (2 hr. teleconf)	<i>Injured Species List Update</i>	<i>Briefing</i>
TC Tues, June 11 9:00 am (4 hr. teleconf)	GEM: NRC report, proposed revisions Injured Species List Update Revised operating & report procedures (including liaison & project mgt. recommendation) New data policy	Briefing Action Briefing Briefing
PAG June 20 (full day in person)	<i>Draft Work Plan: Phase I</i> <i>GEM: NRC report</i>	<i>Briefing</i> <i>Briefing</i>
TC Tues, July 9 10:00 am (4 hr. in person)	GEM Program Document Revised operating & report procedures (including liaison & project mgt. recommendation) New data policy	Action Action Action
TC Tues, Aug. 6 9:00 am (2 hr. teleconf)	Approve Phase I projects Habitat grant (expires 9/30/02)	Action Possible action
PAG Aug. /Sept.	<i>Possible field trip</i>	
TC Wed, Nov. 6 Time TBD(in person)	Approve Phase II projects	Action

Exxon Valdez Oil Spill
Trustee Council



Policies and Procedures

**EXXON VALDEZ OIL SPILL TRUSTEE COUNCIL
POLICIES AND PROCEDURES**

TABLE OF CONTENTS

I.	Introduction to Procedures	I-1
II.	General Operating Procedures	II-1
III.	Financial Procedures	III-1
IV.	Data Policy	IV-1
V.	Report Procedures	V-1
VI.	TEK Protocols	VI-1
VII.	Procedures for Destroying Evidence.....	VII-1
VIII.	Collection Policy.....	VIII-1
IX.	Supplementation Criteria.....	IX-1
X.	Investment Policy	X-1
XI.	STAC Process	XI-1

EXXON VALDEZ OIL SPILL TRUSTEE COUNCIL INTRODUCTION TO PROCEDURES

1. *Purpose.* Define the Policies and Procedures of the *Exxon Valdez* Oil Spill Trustee Council (Trustee Council) and provide guidance regarding the authorities and responsibilities of entities that receive funds approved by the Trustee Council.
2. *Supersession.* These procedures supersede the Procedures adopted by the Trustee Council August 3, 2000 and August 29, 1996, the Operating Procedures adopted by the Trustee Council January 10, 1992, and the Financial Operating Procedures adopted by the Trustee Council September 21, 1992.
3. *Relationship.* The Procedures of the Trustee Council augment state and federal procedures. State and federal agencies receiving funds approved by the Trustee Council are responsible for ensuring that the procedures described in this document and the appropriate state or federal procedures are followed.
4. *Amendments.* These procedures may be modified by unanimous agreement of the Trustee Council.
5. *Authority.* The principles and processes stated herein are established pursuant to the Memorandum of Agreement and Consent Decree entered as settlement of United States of America v. State of Alaska, No. A91-081 Civil, U.S. District Court of Alaska. The Joint Trust Fund is comprised of all payments received in settlement of State of Alaska v. Exxon Corporation, et al., No. A91-083 CIV, and United States of America v. Exxon Corporation, et al., No. A91-082 CIV.
6. *Restoration Plan.* The *Exxon Valdez* Restoration Plan provides long-term guidance for restoring the resources and services injured by the 1989 *Exxon Valdez* oil spill. It contains policies for making restoration decisions and describes how restoration activities will be implemented. The Restoration Plan was adopted by the Trustees in November 1994 after completion of the Final Environmental Impact Statement. By unanimous consent, the Trustee Council may change the plan if the Trustee Council determines that the plan is no longer responsive to restoration needs.

EXXON VALDEZ OIL SPILL TRUSTEE COUNCIL GENERAL OPERATING PROCEDURES

TABLE OF CONTENTS

Trustee Council

1. Basic Governing Procedures	II-1
2. Trustee Council Membership	II-1
3. Quorum	II-1
4. Chair	II-1
5. Trustee Council Action	II-1
6. Recusal	II-1
7. Meetings	II-1
8. Executive Sessions	II-2
9. Minutes of Trustee Council Meetings	II-2
10. Emergency Action	II-2

Organizational Structure

1. General	II-2
2. Trustee Council Office	II-2
3. Trustee Agencies	II-2

Proposal Solicitation and Review

1. Invitation	II-3
2. Review	II-3
3. Public Review and Comments	II-3
4. Approval	II-3
5. Multi-Year Projects	II-3

Project Reports

1. Quarterly Project Status Reports	II-3
2. Annual Project Reports	II-3
3. Final Project Reports	II-3

Project Data

1. Metadata and Data	II-4
----------------------------	------

Habitat Protection and Acquisition

1. General	II-4
2. Parcel Nomination	II-4
3. Parcel Evaluation	II-4
4. Terms and Conditions	II-4
5. Title and Management	II-4
6. Public Review and Comment	II-4
7. Application or Notification for Disbursement	II-4

Public Participation

1. GeneralII-4
2. *Exxon Valdez* Oil Spill Public Advisory CommitteeII-5
3. Public Notice.....II-5
4. Access to InformationII-5

EXXON VALDEZ OIL SPILL TRUSTEE COUNCIL GENERAL OPERATING PROCEDURES

TRUSTEE COUNCIL

1. *Basic Governing Procedures.* The current edition of *Roberts Rules of Order* will govern the Trustee Council. All provisions of these rules of order will apply to Trustee Council deliberations unless the Trustee Council unanimously decides to proceed differently.

2. *Trustee Council Membership.* The following officials act on behalf of the public as trustees: the Attorney General of the State of Alaska; the Commissioner of the Alaska Department of Environmental Conservation; the Commissioner of the Alaska Department of Fish and Game; the Secretary of the United States Department of Agriculture; the Secretary of the United States Department of the Interior; and the Administrator of the National Oceanic and Atmospheric Administration, United States Department of Commerce. Each Trustee may designate a representative to serve on the Trustee Council. Any such designation shall be in writing and the designation shall be maintained in the official record. In the event a Trustee Council member is precluded from attending a meeting or must be excused during a meeting, an alternate may exercise voting privileges on behalf of the Trustee Council member. Alternates shall be designated in writing and the designation shall be maintained in the official record or an alternate may be identified at the meeting and so stated for the record.

3. *Quorum.* A quorum of two-thirds (2/3) of the total Trustee Council membership including at least two state members and two federal members shall be required to convene a meeting. All decisions shall be made by unanimous agreement of the six Trustee Council members, their designee or their alternate, except that a quorum may approve the agenda, take public testimony and adjourn a meeting.

4. *Chair.* The Trustee Council shall designate a chair to preside at each meeting. The chair shall alternate meeting-to-meeting between the state and federal trustee members. The chair may participate in discussion and debate at the meetings and shall vote on all questions before the Trustee Council.

5. *Trustee Council Action.* All matters before the Trustee Council which require a vote, make a recommendation, approve or disapprove an item, or otherwise render a decision shall require the unanimous agreement of the six Trustee Council members, their designee or their alternate. All actions by the Trustee Council shall be taken at duly convened meetings except as provided in Section 10, Emergency Action.

6. *Recusal.* In the event a Trustee Council member believes he or she must recuse himself or herself from voting, the Trustee Council member may request the decision be deferred until a designated alternate is available to vote.

7. *Meetings.* Meetings shall be held at times and locations determined by the Trustee Council. The Executive Director shall provide a proposed agenda and appropriate briefing materials to the Trustee Council members in advance of the meeting. The final

agenda for the meeting will be determined by the Trustee Council and shall include a reasonable opportunity for public comment.

8. *Executive Sessions.* Executive sessions shall be kept to a minimum and shall be used only for discussion of matters concerning confidential personnel issues, litigation or legal advice, habitat acquisition negotiations, confidential archaeological information, confidential fisheries information or other matters included under AS 37.14.430, AS 44.62.310 (c) or other applicable State or Federal laws.

9. *Minutes of Trustee Council Meetings.* All meetings shall be recorded electronically or by a court reporter, and said records shall, along with the written, approved meeting notes, constitute the official record of the Trustee Council's actions.

10. *Emergency Action.* In the event of an emergency requiring Trustee Council action before a meeting can be held in accordance with the procedures described herein, the Executive Director shall poll the Trustee Council and take action by unanimous agreement. Any decisions of the Trustee Council shall be reflected in the official record of the Trustee Council along with justification regarding the need to take emergency action. In addition, any emergency action taken shall be ratified at the next meeting of the Trustee Council.

ORGANIZATIONAL STRUCTURE

1. *General.* Pursuant to the agreement between the State of Alaska and the United States, the Trustee Council has created the position of Executive Director to manage the day-to-day administrative functions of the Trustee Council and the overall restoration program.

2. *Trustee Council Office.* Under supervision of the Executive Director, the Trustee Council Office is responsible for: (1) facilitating communication between the federal and state governments, the Trustee Council members, the Scientific and Technical Advisory Committee, and the Public Advisory Committee; (2) maintaining the official record of the Trustee Council's actions; (3) soliciting project proposals and administering the proposal process, including supporting the Scientific and Technical Advisory Committee and any additional subcommittees and working groups that are formed to advise on the scientific development of the program; (4) preparing and analyzing financial and project status information; (5) developing and implementing procedures to achieve the goals and objectives of the Trustee Council; (6) performing and/or overseeing special and ongoing projects; and (7) public outreach and public participation.

3. *Trustee Agencies.* Under supervision of the agency's Trustee Council member, each Trustee agency is responsible for administrative oversight of projects funded to or through their agencies. This oversight shall include (1) ensuring that the procedures described herein, and the appropriate state or federal procedures, are followed, including compliance with the National Environmental Policy Act and (2) ensuring that projects funded meet their stated objectives and schedules, and are accomplished consistent with the funds authorized.

PROPOSAL SOLICITATION AND REVIEW

1. *Invitation.* At least annually the public, private sector, non-profit groups, and government agencies will be invited to submit proposals for funding based on identified restoration priorities and needs.
2. *Review.* Proposals received will be subject to independent scientific review, as well as policy, budget, and legal review. Based on these reviews, the Executive Director shall make a recommendation to the Trustee Council on which proposals should be funded.
3. *Public Review and Comment.* Prior to Trustee Council action, a reasonable period of time shall be provided for the public to review and comment on the project proposals.
4. *Approval.* After expiration of the period for public review and comment, the Trustee Council, in open session and with additional opportunity for public comment, shall review the Executive Director's recommendation on which proposals should be funded. The Trustee Council may make changes to the recommendation or include terms and conditions of funding as the Trustee Council deems appropriate. Upon unanimous approval, the recommendation shall be adopted by the Trustee Council.
5. *Multi-Year Projects.* For multi-year projects, the Executive Director's recommendation shall include the number of years of funding to be provided for each project. The Trustee Council may approve funding a project for a single year or for multiple years.

PROJECT REPORTS

1. *Quarterly Project Status Reports.* Within thirty days following the end of each quarter, the investigator for each project approved by the Trustee Council shall submit a status report to the Executive Director. The report contents, format, and review procedures shall be determined by the Executive Director.
2. *Annual Project Reports.* Annually, the investigator for each continuing project approved by the Trustee Council shall submit a report to the Executive Director. A continuing project is one that was initiated with the expectation that it was multi-year. The report deadline, contents, format, and review procedures shall be determined by the Executive Director. A copy of each report shall be placed in the Trustee Council's official record.
3. *Final Project Reports.* Upon completion of each project approved by the Trustee Council, or a determination by the Trustee Council to no longer fund a project, the investigator shall submit a report to the Executive Director. The report deadline, contents, format, and review procedures shall be determined by the Executive Director. A copy of each report shall be placed in the Trustee Council's official record and at ARLIS (Alaska Resources Library & Information Services).

PROJECT DATA

1. *Metadata and Data.* During the course of the project and at its completion, the investigator shall submit metadata ("data about data") and project data according to Trustee Council approved data policies. The metadata and project data contents, format, and review procedures shall be determined by the Executive Director.

HABITAT PROTECTION AND ACQUISITION

1. *General.* Habitat Protection and Acquisition is an important means of restoring injured resources and the services that are dependent upon those resources. Habitat Protection and Acquisition may include the purchase of lands or interests in land such as conservation easements, mineral rights, or timber rights.

2. *Parcel Nomination.* Only those parcels nominated by a willing seller shall be considered for purchase. The Executive Director shall prepare and maintain written procedures regarding nomination of parcels.

3. *Parcel Evaluation.* Nominated parcels shall be evaluated based on their importance to the conservation and protection of marine and coastal resources, ecosystems, and habitats in order to aid in the overall recovery of, and to enhance the long-term health and viability of, those resources injured by the oil spill and the spill area ecosystem.

4. *Terms and Conditions.* By unanimous agreement of the six Trustees, their designee or their alternate, a resolution shall be adopted authorizing the purchase of land or ownership rights. The resolution shall set forth the terms and conditions appropriate for the identified parcel(s).

5. *Title and Management.* The title of any lands or ownership rights shall be specified in the resolution adopted by the Trustee Council. All land acquired shall be managed in accordance with the terms and conditions of the Trustee Council.

6. *Public Review and Comment.* Prior to final Trustee Council action, reasonable public notice shall be given and the public shall be provided an opportunity to comment.

7. *Application or Notification for Disbursement.* Upon certification from the Executive Director that the terms and conditions set forth in a resolution have been satisfied, the Alaska Department of Law and the United States Department of Justice shall be requested to provide notice to the United States District Court for the District of Alaska regarding the expenditure of funds. Concurrently, as appropriate, the Executive Director shall provide the custodian of the Investment Fund(s) with payment instructions.

PUBLIC PARTICIPATION

1. *General.* The Trustee Council recognizes that public participation in the restoration program is an integral part of the process. To that end, the public is invited to review, comment on and participate in the development and implementation of the restoration program.

2. *Exxon Valdez Oil Spill Public Advisory Committee.* By order of the District Court for the District of Alaska, the Public Advisory Committee is to advise the Trustees, appointed to administer the fund established in settlement of United States v. Exxon Corporation, Civil Action No. A91-082, and State of Alaska v. Exxon Corporation, Civil Action No. 091-083, both in the United States District Court for the District of Alaska, in all matters described in Paragraph V.A.1 of the MOA referenced above. The overall procedures for the Public Advisory Committee are contained in a Charter unanimously approved by the Trustee Council and signed by the Secretary of the United States Department of the Interior. The Public Advisory Committee consists of members recommended by the Trustee Council and appointed by the Secretary of the United States Department of the Interior.

3. *Public Notice.* Reasonable public notice shall be given for all meetings of the Trustee Council. The notice shall include, when possible, publication in one or more newspapers of general circulation in the following communities: Anchorage, Cordova, Homer, Juneau, Kenai, Kodiak, Seward, and Valdez and distribution of the public notice to radio stations broadcasting to these communities as well as in Chenega Bay, Tatitlek, Whittier, Seldovia, Port Graham, Nanwalek, and Kodiak area villages. To the maximum extent possible, reasonable public notice shall also be provided to other communities within the spill area. The public notice shall identify the purpose of the meeting and include a reasonable opportunity for public comment.

4. *Access to Information.* Except where documents are confidential under state or federal law, the public shall have access to the official record of the Trustee Council's actions and information regarding proposed or completed projects or other activities funded by the Trustee Council.

**EXXON VALDEZ OIL SPILL TRUSTEE COUNCIL
FINANCIAL PROCEDURES**

TABLE OF CONTENTS

Settlement Funds

1. Joint Trust Funds	III-1
2. Court Registry Investment System	III-1
3. Investment Fund(s)	III-1
4. CRIS Disbursement	III-1
5. Investment Fund(s) Disbursement	III-1
6. Authority to Spend	III-2
7. Federal Account	III-2
8. State Account	III-2

Investment Fund

1. General	III-2
2. Policies	III-2
3. Asset Allocation	III-2
4. Reporting	III-2

Project Authorization

1. General	III-2
2. Fiscal Year	III-2
3. Adjustments	III-3
4. Revisions	III-3

Project Costs

1. Direct Project Costs	III-3
2. Indirect Project Costs	III-3
3. General Administration Formula	III-3
4. Unallowable Costs	III-3
5. Bonuses	III-4

Accounting

1. General	III-4
2. Source Documentation	III-4
3. Appropriateness	III-4
4. Reasonableness	III-4
5. Segregation	III-4
6. Expended (Outlays)	III-4
7. Obligations (Encumbrances)	III-4
8. Reporting: Quarterly Financial Reports	III-4
9. Reporting: Annual Financial Reports	III-5

Lapse	
1. General	III-5
2. Capital	III-5
3. Close-Out Period.....	III-5
4. Reimbursement for Prior Year Expenses.....	III-5

Equipment	
1. Definition... ..	III-5
2. Title and Use.....	III-5
3. Surplus	III-6
4. Inventory	III-6
5. Repair, Maintenance and Safeguarding	III-6
6. Disposal.....	III-6
7. Reporting.....	III-6

Contracts	
1. General.	III-6
2. Definitions.....	III-6
3. Named Recipient.....	III-7
4. Indirect Rates	III-7
5. Equipment.....	III-7
6. Special Considerations.....	III-7

Grants	
1. General	III-7

Audits	
1. General	III-7
2. Definition	III-7
3. Readiness	III-7
4. Contracts	III-8
5. State and Federal Audits	III-8
6. External Audits	III-8

Appendix A: Federal Internal Procedures

Natural Resource Damage Assessment and Restoration Fund	
1. Segregation	III-9
2. Investments	III-9
3. Reports	III-9

Authorization	
1. General	III-9
2. Budget and Reports.....	III-9
3. Obligation Authority.....	III-9
4. Instructions for Transfer.....	III-9
5. Fund Transfers	III-10
6. Return of Unobligated Balances	III-10

Appendix B: State Internal Procedures

Exxon Valdez Oil Spill Settlement Fund

1. Segregation	III-11
2. Investments	III-11
3. Reports	III-11

Authorization

1. General	III-11
2. Budget and Reports	III-11
3. Legislative Budget and Audit Committee	III-11
4. Expenditure Authority	III-12

Appendix C: Investment Fund

1. General	III-13
2. Segregation	III-13
3. Reports	III-13
4. Investments	III-13
5. Performance	III-13
6. Fees	III-13

EXXON VALDEZ OIL SPILL TRUSTEE COUNCIL FINANCIAL PROCEDURES

SETTLEMENT FUNDS

1. *Joint Trust Funds.* The Joint Trust Funds consist of all payments received or to be received by the United States and the State of Alaska pursuant to the Agreement and Consent Decree issued in United States v. Exxon Corporation, et al. (No. A91-082 CIV) and State of Alaska v. Exxon Corporation, et al. (No. A91-083 CIV), including any interest accrued thereon.
2. *Court Registry Investment System.* Pursuant to Court Order and in accordance with the Terms of the Memorandum of Agreement and Consent Decree, from December 1991 through October 5, 2000, the Joint Trust Funds were placed in an interest-bearing account in the Court Registry Investment System (CRIS) administered through the United States District Court for the Southern District of Texas. The CRIS established two accounts – the *Exxon Valdez Oil Spill Settlement Account* and the *CRIS – Exxon Valdez Reserve Fund* to receive and hold the Joint Trust Funds. Although the Joint Trust Funds were moved in October 2000 from the Court Registry System to the Alaska Department of Revenue, Division of Treasury, the Court Registry Investment System is still an investment option for the Trustee Council.
3. *Investment Fund(s).* The Governments sought and obtained Congressional approval to expand options for investment of the settlement proceeds. Public Law 106-113, the Consolidated Appropriations Act, 2000, was enacted November 29, 1999. Section 350 of H.R. 3423, authorizes deposit of all or a portion of the Joint Trust Funds previously received, or to be received, by the Governments in the Natural Resource Damage Assessment and Restoration Fund or accounts outside the United States Treasury or both. See section on Investment Fund.
4. *CRIS Disbursement.* Upon joint application of counsel for the United States and the State of Alaska, the United States District Court for the District of Alaska orders the disbursement of funds for purposes consistent with the Memorandum of Agreement and Consent Decree. The joint application shall consist of legal documents required by the Court and documentation demonstrating the unanimous agreement of the Trustee Council. When appropriate, interest earned on the federal and state accounts and/or unobligated balances from prior years' Work Plans shall be subtracted from the disbursement.
5. *Investment Fund(s) Disbursement.* Upon unanimous approval of the Trustee Council, the Alaska Department of Law and the United States Department of Justice shall be requested to notify the United States District Court for the District of Alaska. The notification shall consist of legal documents required by the Court and documentation demonstrating the unanimous agreement of the Trustee Council. Concurrently, the Alaska Department of Law and the United States Department of Justice shall be requested to provide the custodian(s) of the Investment Fund(s) with payment instructions. When appropriate, interest earned on the federal and state accounts and/or

unobligated balances from prior years' authorizations shall be subtracted from the disbursement.

6. *Authority to Spend.* No obligations shall be incurred until such time as a Court Order is entered by the United States District Court for the District of Alaska or a notification is filed with the United States District Court for the District of Alaska and any terms and conditions placed on the funding by the Trustee Council have been met.

7. *Federal Account.* In accordance with federal law, funds required for federal project implementation are deposited in the Natural Resource Damage Assessment and Restoration (NRDA&R) Fund managed by the Department of the Interior.

8. *State Account.* In accordance with state law, funds required for state project implementation are deposited in the *Exxon Valdez* Oil Spill Settlement Fund.

INVESTMENT FUND

1. *General.* Under Public Law 106-113 (1999), some or all of the joint trust funds may be deposited in the Natural Resource Damage Assessment and Restoration Fund or accounts outside the United States Treasury, or both. Where the Trustee Council exercises this authority, it is responsible for the prudent investment of the settlement funds in income-producing obligations and other instruments or securities that have been determined by unanimous vote of the Trustee Council to have a high degree of reliability and security.

2. *Policies.* The Trustee Council shall adopt written investment policies to protect and manage an Investment Fund(s).

3. *Asset Allocation.* The Trustee Council recognizes that strategic asset allocation is the single most important policy decision affecting investment return and risk for an Investment Fund. At least annually, the Trustee Council shall evaluate its strategic asset allocation.

4. *Reporting.* Revenues and disbursements associated with the Investment Fund shall be reported to the Trustee Council on a monthly basis. Fees assessed by the Alaska Department of Revenue for the Investment Fund shall be paid on a quarterly basis.

PROJECT AUTHORIZATION

1. *General.* Authorization to expend personal services, travel, contractual, commodities, equipment and general administration funds shall be consistent with the project budgets approved by the Trustee Council.

2. *Fiscal Year.* Unless otherwise approved by the Trustee Council, the fiscal year begins on October 1 and ends on September 30. In the event the Trustee Council approves a project with a different fiscal year, the fiscal year must be clearly stated in the approval motion. In the event the Trustee Council approves a capital project, the designation as a capital project must be clearly stated in the approval motion.

3. *Adjustments.* As long as an adjustment does not alter the underlying scope or objectives of the affected projects, agencies have the authority to move funds into or out of projects up to the cumulative amount of \$10,000 or up to 10% of the authorized level of funding for each affected project, whichever is less. In addition, as long as an adjustment does not alter the underlying scope or objectives of the project, agencies are authorized to move, within a single project, budgeted funds between line items and may change detailed items of expenditure to accommodate circumstances encountered during budget implementation. Justification and supporting documentation as to the reason for all such adjustments (both between projects and line-items) shall be maintained by the agencies. All adjustments between projects shall be reported to the Executive Director in the Quarterly Financial Report. For further information regarding the Quarterly Report, refer to the Accounting section of these procedures.

4. *Revisions.* Trustee Council action is required to move amounts greater than that authorized in section 3 above. Trustee Council action is also required if the revision changes the scope or objectives of a project, establishes a new project, or terminates an approved project during the fiscal year. In the event the proposed revision changes the scope or objectives of a project, establishes a new project, or terminates an approved project during the fiscal year, the public shall be given a reasonable opportunity to review and comment on the proposed change prior to action of the Trustee Council.

PROJECT COSTS

1. *Direct Project Costs.* Direct costs are those costs that can be identified with or linked to a specific project.

2. *Indirect Project Costs.* Indirect costs are those costs that are incurred for common or joint projects and therefore cannot be identified readily and specifically with a specific project. In the case of governmental agencies, indirect costs are covered through a general administration formula. The appropriate indirect rate for contractors shall be approved on a case-by-case basis.

3. *General Administration Formula.* The general administration formula is used to reimburse governmental agencies for indirect project costs incurred in implementing the restoration program. The general administration formula is nine percent of each project's direct costs. General administration funds may be spent at the agency's discretion provided they are spent on indirect costs incurred in implementing activities funded by the Trustee Council. Agencies are entitled to 100% of their budgeted general administration funds regardless of how much of their budgeted direct project funds have been expended.

4. *Unallowable Costs.* Restoration funds shall be used only for costs that directly benefit Trustee Council approved projects with the exception of reimbursement of general administration (i.e., indirect) costs that are calculated in accordance with the general administration formula.

5. *Bonuses.* Bonuses for personnel working on Trustee Council funded activities are allowable costs. Agencies shall follow their standard operating procedures in determining bonus awards. Bonuses shall be considered an indirect project cost and, if awarded, shall be paid with General Administration funds.

ACCOUNTING

1. *General.* It is the responsibility of agency personnel and certifying officers to make certain that all actions are based on sound accounting and budgetary practices.

2. *Source Documentation.* Adequate justification and supporting documentation shall be maintained for each project.

3. *Appropriateness.* Expenditures charged to a project shall be directly attributable to or allocated to the project benefiting from the activity. Salaries and benefits may be charged for the time an individual is working directly on a project, when supported by time sheets and when work performed by such individuals is necessary to the project.

4. *Reasonableness.* Costs attributable to a project shall be necessary and reasonable to achieve the objectives of the project and be consistent with the policies and procedures governing other activities of the agency.

5. *Segregation.* Accounts shall be properly designed and maintained to ensure that funds are expended in accordance with Trustee Council approval.

6. *Expended (Outlays).* The term expended shall be defined as the actual outlay of funds through the issuance of checks or warrants, the disbursement of cash, or the electronic transfer of funds. The term expenditure shall be defined as the act of expending.

7. *Obligations (Encumbrances).* The term obligations shall be defined as a commitment to acquire goods or services during the fiscal year, or to accommodate contracts where the length of time for completion of the service extends into the following fiscal year. An obligation is a commitment to pay and should not be considered an expenditure until the goods or services have been received and the invoice paid. Funds approved for contracts in which the length of time for completion of the service extends into the following fiscal year may be obligated at year end. To be valid, the length of time to complete the service should be identified in the proposal approved by the Trustee Council. As a general rule, agencies shall have one year from the end of a project's approved fiscal year to satisfy all obligations.

8. *Reporting: Quarterly Financial Reports.* Within thirty days following the end of each quarter, agencies shall report expenditures and obligations recorded at the end of the quarter to the Executive Director. The report shall include the total amount authorized for each project, any revisions approved by the Trustee Council, any adjustments between projects, the total expended by project, and the total of any outstanding obligations by project.

9. *Reporting: Annual Financial Reports.* By January 31 of each year, agencies shall report to the Executive Director the total expended for each project, plus any valid obligations relating to the fiscal year just ended. The report shall reflect the total amount authorized by line-item, any revisions approved by the Trustee Council, any adjustments between projects, and any adjustments between line-items.

LAPSE

1. *General.* The unexpended and unobligated balance of a project shall lapse on September 30 of the fiscal year for which the project was approved. However, an undisclosed obligation may be established and/or paid during the Close-Out Period.

2. *Capital.* The unexpended balance of a capital project shall be carried forward for two subsequent fiscal years. At the end of the three year period, the unexpended and unobligated balance shall lapse. Trustee Council action is required to extend the project lapse date beyond the three year period.

3. *Close-Out Period.* During the months of October, November and December (through December 31) agencies may pay from funds from the fiscal year just ended on September 30 an expense that was undisclosed during that fiscal year. In addition, agencies may establish obligations to accommodate an expense that was undisclosed during that fiscal year. By January 31 of each year, agencies shall report to the Executive Director the total expended for each project, plus any valid obligations relating to the fiscal year just ended. For further information regarding the Annual Financial Report, refer to the Accounting section of these procedures.

4. *Reimbursement for Prior Year Expenses.* Expenses discovered after the Close-Out Period (i.e., after December 31) may be charged to the subsequent year's project budget if the project has multiple years of funding and sufficient funds are available. In the event the agency determines that insufficient funds are available to charge the expense to the subsequent year's budget, or the expense relates to a completed project (i.e., there is no subsequent year's budget), authority to adjust a prior year Annual Financial Report is required. During the months of January through June, authority to adjust a prior year Annual Financial Report may be provided by the Executive Director. For expenses discovered after June, authority to adjust a prior year Annual Financial Report may be provided by the Trustee Council.

EQUIPMENT

1. *Definition.* Equipment shall be defined as non-expendable items having an estimated life of more than one year and a unit value greater than \$1,000.

2. *Title and Use.* Equipment shall be used for the project for which it was acquired.

- a. Items with an original per unit cost of under \$5,000 shall belong to the acquiring agency. At the end of a project, if the equipment was purchased

- by a contractor, the agency may, at its discretion and if agency regulations allow, transfer the title to the contractor.
- b. Items with an original per unit cost of \$5,000 and over shall belong to the acquiring agency on behalf of the Trustee Council. At the end of a project that has equipment with an original per unit cost of \$5,000 or more, the Executive Director shall determine if the equipment item shall be used for another Trustee Council project or if the item shall remain with the acquiring agency. If the equipment shall be used for another Trustee Council project administered by an agency other than the acquiring agency, the title for the equipment shall be transferred to the agency administering the new project. If the equipment shall remain with the acquiring agency, and it was purchased by a contractor, the agency may, at its discretion and if agency regulations allow, transfer the title to the contractor.

This section shall apply to all equipment purchased under the restoration program, for projects already in progress or completed as well as for projects funded in the future.

3. *Surplus.* Equipment that belongs to the acquiring agency shall be surplus in accordance with agency procedures.

4. *Inventory.* Property records shall be maintained in accordance with agency procedures.

5. *Repair, Maintenance and Safeguarding.* The repair, maintenance and safeguarding of equipment purchased with joint funds shall be accomplished in accordance with agency procedures.

6. *Disposal.* Equipment that ceases to function shall be disposed of in accordance with agency procedures.

7. *Reporting.* By December 31 of each year, agencies shall report all equipment with an original per unit cost of \$5,000 or more to the Executive Director. The report shall include a description of the equipment (make and model), date the equipment was purchased, the purchase price, where the equipment is located and the condition of the equipment. The report shall also identify the project that is using the equipment.

CONTRACTS

1. *General.* Agencies shall ensure that contracts for professional and non-professional services are accomplished in accordance with the terms, conditions, and specifications of the project approved by the Trustee Council and in accordance with applicable Federal and State laws.

2. *Definitions.* Professional services means contracts for professional, technical, or consultant services that result in the production of a report or the completion of a task, and includes analysis, evaluation, prediction, planning, or developing a recommendation. Non-professional services means contracts for services that are primarily manual in

nature, and includes boat charters, printing, and other. Non-professional services contracts usually provide a service rather than resulting in a product or report.

3. *Named Recipient.* In the event the Trustee Council determines that, in order to carry out its mandate under the Memorandum of Agreement and Consent Decree, a particular person or entity should implement all or a portion of a project through a state Trustee agency, the Trustee Council may, by unanimous vote, name a contract recipient. The approval motion shall include the reason for selecting the contract recipient. If the contracting agency determines that an award to an entity different than that named by the Trustee Council would better serve the program, the basis of that determination shall be stated in writing to the Executive Director and forwarded to the Trustee Council for approval.

4. *Indirect Rates.* The appropriate indirect rate for contractors shall be determined on a project by project basis or through a memorandum of understanding with a contractor that provides for a consistent rate and methodology.

5. *Equipment.* Equipment purchased by the contractor shall remain the property of the contracting agency unless other conditions prevail. See section on Equipment, Title and Use, for specific details.

6. *Special Considerations.* All notes and other data developed by the contractor shall remain the sole property of the contracting agency.

GRANTS

1. *General.* Grants may be used as a procurement mechanism, but only to the extent they are permitted under existing state and federal laws. Federal Trustee agencies were given grant authority specific to the Trustee Council's program under Public Law 106-113 (1999).

AUDITS

1. *General.* The purpose of an audit is to ensure public trust and accountability regarding the use of settlement funds. An audit provides credibility to the information reported by or obtained from management by independently acquiring and evaluating the evidence.

2. *Definition.* The term audit includes both financial and performance audits.

3. *Readiness.* When an agency receives funding from the Trustee Council, the agency assumes certain responsibilities with respect to those funds. These include ensuring that source documentation is organized and available for review, internal controls are documented and individuals knowledgeable about the projects are available to answer questions.

4. *Contracts.* Contractors who receive funding for professional or non-professional

services are not automatically subject to an annual audit. However, this does not preclude the Trustee Council or the agency from making a determination that an audit is required in addition to an agency's review of expenditure documentation and work produced by a contractor.

5. *State and Federal Audits.* Each Federal agency and the State of Alaska have audit functions. In the event an audit is performed on a Trustee Council funded activity, a copy of the audit shall be provided to the Executive Director.

6. *External Audits.* All external audits shall be conducted in accordance with Governmental Auditing Standards. In addition, the firm and the staff assigned to conduct the audit shall be independent of the Trustee Council, the funding agencies, the Alaska Department of Revenue, the Court Registry Investment System, Exxon Corporation, Exxon Shipping Company and Exxon Pipeline Company.

APPENDIX A: FEDERAL INTERNAL PROCEDURES

NATURAL RESOURCE DAMAGE ASSESSMENT AND RESTORATION FUND

1. *Segregation.* All principal and interest shall be accounted for separately by the Department of the Interior, Office of the Secretary. Each disbursement shall be assigned an appropriate account, sub-activity and/or project number when deposited to the aggregate Natural Resource Damage Assessment and Restoration Fund within the Federal Reserve Bank. Confirmation of the deposit shall be provided to the Treasury Department, which reconciles the deposit with the Federal Reserve Bank.

2. *Investments.* By law, the funds may only be invested in Treasury Securities and all ownership is maintained in the name of the Natural Resource Damage Assessment and Restoration Fund. Based on an estimate of cash flow requirements, the Department of the Interior, Office of the Secretary generates instructions for investment and forwards the instructions to the National Business Center. The National Business Center develops and submits an Investment Confirmation Letter that indicates which account investments are being purchased, the scheduled maturity dates and the investment type(s) to the Department of Treasury, which purchases the securities. At maturity, interest income is paid directly to the account.

3. *Reports.* Quarterly, the Department of the Interior shall report interest income to the Executive Director. In addition, all disbursements to the federal agencies shall be reported to the Executive Director. By March 31 of each year, the Department of Interior shall report to the Executive Director all lapsed funds returned to the Natural Resource Damage Assessment and Restoration Fund by the federal agencies.

AUTHORIZATION

1. *General.* Congress permanently appropriated funding approved by the Trustee Council in Section 207 of Public Law 102-227. However, all authorization is subject to compliance with any terms and conditions imposed by the Trustee Council.

2. *Budget and Reports.* Under Section 207, agencies are required to comply with directions published by the Federal Office of Management and Budget. This includes submitting a budget for the upcoming fiscal year and documentation associated with the current and prior fiscal year.

3. *Obligation Authority.* Prior to the obligation of any funds, agencies must first complete the allocation process required by their respective budget offices to establish codes for each project. The allocation process provides the authority, amount of funding and the guidance with which to obligate funds.

4. *Instructions for Transfer.* Federal agencies are required to submit an annual cash flow plan to the United States Department of the Interior, Office of the Secretary, Natural Resource Damage Assessment and Restoration Office, and instructions regarding the transfer of settlement funds. The instructions shall specify the purpose of the transfer,

which account the funds are to be transferred to, and an estimate of cash flow requirements. Unless the transfer represents a one-time payment, the cash flow estimate shall be structured on a quarterly basis. Any change in cash flow requirements that occurs during the fiscal year shall be communicated to the United States Department of the Interior, Office of the Secretary, Natural Resource Damage Assessment and Restoration Office, in writing. A change is defined as a decrease in the cash flow requirement due to an unanticipated delay in a project or an increase in the cash flow requirement due to an unanticipated change in the schedule, or subsequent Trustee Council action.

5. *Fund Transfers.* The vehicle used for transfers is a SF1151, a non-expenditure transfer. The SF1151 is initiated, prepared, and approved by the Natural Resource Damage Assessment & Restoration Office, Office of the Secretary and then sent to Treasury where the funds are transferred within the Treasury system.

6. *Return of Unobligated Balances.* On March 15 of each year, federal agencies shall return to the Natural Resource Damage Assessment and Restoration Fund the unobligated balance for the fiscal year just ended. Concurrently, the agencies shall return any recovery of prior year obligations. Agencies are required to submit to the United States Department of the Interior, Office of the Secretary, Natural Resource Damage Assessment and Restoration Office, a report reflecting the total unobligated balance for the fiscal year just ended and the amount of funding recovered from prior year obligations. The report submitted shall also indicate the date the agency intends to return the funds. The vehicle used for transfers is a SF1151, non-expenditure transfer. The Department of the Interior shall report the total unobligated balance for the fiscal year just ended and the amount of funding recovered from prior year obligations to the Executive Director by March 31 of each year.

APPENDIX B: STATE INTERNAL PROCEDURES

EXXON VALDEZ OIL SPILL SETTLEMENT FUND

1. *Segregation.* All principal and interest shall be accounted for separately by the Alaska Department of Revenue, Division of Treasury. Each disbursement shall be deposited in a Department of Law sub-account, *Exxon Valdez Oil Spill Settlement Fund*. Confirmation of the deposit shall be provided by the bank to the Alaska Department of Revenue.
2. *Investments.* The Alaska Department of Revenue, Division of Treasury shall calculate the daily income amount and provide for daily compounding (including weekends and holidays). The income shall be credited to the fund and posted in the Alaska State Accounting System on a monthly basis.
3. *Reports.* The Alaska Department of Revenue, Division of Treasury shall report income earned to the Executive Director on a monthly basis.

AUTHORIZATION

1. *General.* Pursuant to Alaska Statute 37.14.405(a), a state agency may not expend money received from the trust unless the expenditure is in accordance with an appropriation made by law. However, prior to the expenditure of funds, Trustee Council approval must be obtained, the notice filed, any terms and conditions placed on the funding by the Trustee Council met, and the funds transferred from the Investment Fund to the *Exxon Valdez Oil Spill Settlement Fund*, if necessary.
2. *Budget and Reports.* To meet the requirements of Alaska Statute 37.14.415, agencies are required to comply with directions published by the State Office of Management and Budget, Division of Budget Review. Alaska Statute 37.14.415 states: The state trustees shall
 - a. submit to the governor and the legislature by December 15 of each year a report setting out, for each object or purpose of expenditure, the amounts approved for expenditure from the trust during the preceding fiscal year and the amounts actually expended during the preceding fiscal year;
 - b. prepare and submit, under AS 37.07, a budget for the next fiscal year setting out, for each object or purpose of expenditure, the Trustees' estimate of the amounts that are, during the next fiscal year, to be funded by the trust and expended by state agencies; and
 - c. prepare and submit to the legislature, at the same time the budget for state agency expenditures is submitted under (b) of this section, a proposal setting out, for each object or purpose of expenditure, the trustees' estimate of the amounts that are to be funded by the trust in the next fiscal year and that are not included in the budget submitted under (2) of this section.
3. *Legislative Budget and Audit Committee.* Alaska Statute 37.14.405(b) allows agencies to meet the requirements of an appropriation conditioned on compliance with the program review provisions of AS 37.07.080(h). In accordance with the procedures of

the Alaska Office of Management and Budget (OMB), agencies are required to submit a request to OMB for transmittal to the Legislative Budget and Audit Committee.

4. *Expenditure Authority.* Authorization to receive and expend shall be recorded in the Alaska State Accounting System within the *Exxon Valdez* Oil Spill Settlement Fund. Following legislative action, OMB will record the authorization by approving an Authorized Budget Transaction (AB).

APPENDIX C: INVESTMENT FUND(S)

1. *General.* The Trustee Council, through appropriate state and/or federal agencies, may contract for investment, custodial or depository services on a discretionary or non-discretionary basis, with the State and Federal governments, or with independent investment management firms, banks, financial institutions or trust companies by designation through appointments, contracts or letters of authority.
2. *Segregation.* All principal and interest shall be accounted for separately by the custodian.
3. *Reports.* The custodian shall provide to the Executive Director financial reports on a monthly basis. The monthly report shall reflect all activity associated with the Investment Fund(s) including the date and amount of each transaction, any pending transactions, interest received, purchases, sales and other transactional data on a day-to-day basis. In addition, the custodian shall provide a monthly report which sets forth the opening balance in the Investment Fund(s), associated transactions and a reconciliation to the final balance. The investment manager shall provide to the Executive Director a suite of financial and performance reports on a monthly basis. The monthly financial report shall contain an asset appraisal which sets forth all of the assets held by the Investment Fund(s). The report shall provide detailed information such as cost and market value, current yield and percentage of each investment and sector. In addition, the investment manager shall provide monthly and cumulative performance reports. The performance reports shall include a comparison to the benchmarks approved by the Trustee Council.
4. *Investments.* By unanimous consent, the Trustee Council shall determine the strategic asset allocation and bands. The Executive Director shall have discretion to move assets among asset categories provided that such actions are consistent with movement of the actual asset allocation within the variability bands of the Trustee Council's strategic asset allocation policy. The Executive Director shall make the necessary adjustments to the initial target allocation within 30 calendar days. The Executive Director shall report any asset shifts at the next Trustee Council meeting. Such reports shall include a description of the rationale for the shift.
5. *Performance.* The Trustee Council shall identify benchmarks to evaluate Investment Fund(s) performance. Performance shall be evaluated relative to the identified benchmarks and also relative to an appropriate peer group of competitive alternatives. On a biannual basis, performance shall be presented to the Trustee Council.
6. *Fees.* No fees shall be assessed by the custodian except as approved in advance by the Trustee Council.

EXXON VALDEZ OIL SPILL TRUSTEE COUNCIL

DATA POLICY

Effective October 1, 2002

PURPOSE

The purpose of this policy is to facilitate full and open access to, and confident use of, the data and information used in and produced by programs of the *Exxon Valdez* Oil Spill Trustee Council, including the Gulf of Alaska Ecosystem Monitoring and Research (GEM) Program.

The *Exxon Valdez* Oil Spill Trustee Council/GEM Data Policy has the following objectives, to:

1. Make information from projects available to other scientists and to the general public in a well documented and understood form in a timely manner.
2. Protect the right of investigators who collect data, develop models, or who apply models to generate significant new insight to be cited whenever the data, models or insights are used. Description and interpretation of the results of investigations are the privilege and responsibility of those who collect data or develop and apply models. However, investigators must not unreasonably impede the exchange of information essential to comparative and interdisciplinary research, interpretation, and synthesis.
3. Ensure that data and samples are collected in a manner that will yield accuracy and precision sufficient for the objectives of each project, and for anticipated comparisons and syntheses between projects. It is fundamental to any science-based program that high-quality data be collected. While the primary responsibility for this always belongs to the Principal Investigator, this policy must provide guidance, coordination and monitoring, particularly for situations where the level and type of data management appropriate for an individual project may not be the same as that required by an interdisciplinary program of large geographic and temporal extent.
4. Preserve all data collected under Trustee Council funding (except that specifically exempted by program administration) in an archive accessible to the scientific community in a timely manner. Data to be archived include compilations, analyses and syntheses of previously recorded data, even though the data themselves may be in the public domain. The archive and the means for retrieving data must foster both disciplinary and interdisciplinary data syntheses.
5. Preserve models developed with Trustee Council funding in an archive accessible to the scientific community. The inputs and results of key numerical experiments employing models should also be archived if they have been the basis for publications. Including models in the archive is necessary to realize maximal benefits from the considerable investment anticipated for modeling.

6. Encourage the voluntary release of data and other products of Trustee Council-funded research by Principal Investigators at any time before the deadlines given in this document.

The policy has been developed in accordance with known current guidelines and/or standards for environmental data collection activities. In practice, the data policy must comply with federal and state law and be consistent with that of sponsoring agencies. If any material differences exist between the data policy and federal or state law, or policies of a sponsoring agency, the Principal Investigator must identify the differences to Trustee Council program administration for resolution.

To ensure that these policies will be followed for all projects:

1. All Principal Investigators will agree to follow Trustee Council/GEM data policies as a condition of receiving funding.

2. The Trustee Council Executive Director will be notified of any instances where Trustee Council/GEM data policies are not being followed, and which cannot be resolved by the parties directly involved. The Trustee Council's Executive Director will review the situation and recommend a course of action, which could include notification of parent agencies of principal investigators who have not complied with the data policy and/or preclude funding for future projects.

DATA MANAGEMENT PLAN

Once the Trustee Council approves project funds and the Trustee Council's Executive Director provides spending authorization, the Trustee Council/GEM Data Systems Manager will contact the principal investigator (PI) to establish a Data Management Plan (DMP). The DMP will supplement information in the project proposal developed by the PI. The DMP will include procedures to process, format, document, and migrate all data to archives identified by the Data Systems Manager, and identify a schedule for delivery.

The PI must address the following considerations in describing the methodologies for collection and analysis:

1. Identification of measurements to be made and the anticipated precision and accuracy of each measurement.

2. A description of the sampling equipment sufficient to permit an assessment of the anticipated raw-data quality. Typical descriptions will include where appropriate: navigation, timekeeping, sensor make and model, net opening and mesh size, rate of retrieval, mooring configuration, and similar information appropriate to the types of samples to be collected. Where the data collection equipment is well known or documented in generally available technical reports or the published literature, the need for documentation will be substantially reduced and may be satisfied by identifying the system or referring to the appropriate documentation.

3. A description of the analysis methodology sufficient to permit an assessment of the anticipated analyzed-data quality. Typical descriptions will include where appropriate: filter size and type, sample preservation technique, counting method, numerical algorithm, incubation procedure and similar details as appropriate to the measurements planned.

4. A discussion of the means by which the measurements to be taken could be compared with historical observations or with regions which are thought to have similar ecosystems. Measurement techniques should be consistent with techniques used to collect the existing data unless there is significant scientific justification for change. When new techniques are adopted, methods for relating the new data to existing data should be developed.

DMPs will be updated yearly for continuing projects, and for the year following completion of data acquisition, until all data resulting from the project enters the archive(s).

DATA PROCESSING POLICY

The PI(s) responsible for collecting data must apply approved quality assurance/quality control (QA/QC) protocols to these data sets.

Within 60 days after data or sample collection is completed, the PI must submit to the Data Systems Manager a detailed inventory of measurements made or samples collected. This inventory will include the time and location of each measurement or sample, as well as the nature of the measurement or planned analyses of the sample.

DATA PRESERVATION POLICY

By court order, all samples and documents collected as part of any Trustee Council-sponsored restoration program, including GEM, must be retained. All data normally must be preserved, and requests to destroy samples and documents must follow the Trustee Council's "*Procedures for and Federal State Agencies and Their Contractors for Destroying Documents or Physical Evidence Related to the Exxon Valdez Oil Spill.*" Documents (including written, electronic, photographic and magnetic) or physical evidence (such as tissue samples) must be preserved, unless authorization is given by the Alaska Department of Law and the U.S. Department of Justice to destroy items no longer necessary for restoration or other purposes.

POLICY FOR DATA SUBMISSION TO THE TRUSTEE COUNCIL'S DATA ARCHIVE

Some data from routine monitoring activities will be available to the archive regularly and in real or near-real time. The PI should submit results of measurements that do not

require time-consuming analyses within six (6) months after the completion of data collection. All other measurements should be made within 12 months after field collection, or submitted with the final report for the project, whichever occurs first. Categorization of data and identification of an applicable schedule will be identified in the DMP. The PI will advise the Data Systems Manager if these schedules cannot be met.

No data file, data set, data layer, or database be accepted by or made available via the data archive without appropriate supporting metadata ("data about data"). The metadata format will be compliant with the Federal Geographic Data Committee (FGDC) standards. In coordination with the Data Systems Manager, the PI(s) will include, at a minimum, the following information with each data set archived:

1. collection dates and times (Greenwich Mean Time [GMT]);
2. precise location (decimal degrees longitude and latitude, depth(s))
3. data collection methods;
4. data format (e.g., ASCII, Excel spreadsheet, ARC/INFO coverage, etc.);
5. data collection problems, data processing problems, bad data flags, data dropouts, and other quality control factors identified by the PI(s);
6. instrument descriptions and calibrations;
7. collection site descriptions and conditions; and
8. conditions for use and citation

Data sets may have specific additional guidelines; the PI(s) will accommodate whatever special considerations are necessary. The Data Systems Manager will provide data information sheets to help the PI to encapsulate this information and include it with the data when migrated to the data archive. The PI(s) will be required to submit metadata information to other appropriate data clearinghouse(s) identified by the Data Systems Manager.

The Federal Ocean Data Policy requires that appropriate ocean data and related information collected under federal funding be submitted to and archived by designated national data centers within specified time periods. PI(s) will be required to submit their data sets to appropriate national data center(s) identified by the Data Systems Manager.

DATA MODEL ARCHIVE POLICY

The Trustee Council's data archive will also include data models, and products or results of modeling. Such products will be chosen by the Trustee Council's Scientific and Technical Advisory Committee (STAC) for archiving if they are central to achieving the large-scale goals of a Trustee Council study, and/or if they will be useful to a substantial group of PI's for Trustee Council-funded projects. The products will be identified in the DMP. The DMP will also specify deadlines for submission and the length of the proprietary period. Other models and/or model products can be submitted to the data archive if they are likely to be useful to other investigators and the scientific community.

Archived computer models should include source code in a commonly used scientific language. Documentation, sufficient to allow use of the model by persons having the knowledge and abilities typical of numerical modelers, must be submitted. Model products must include sufficient explanation so that persons having knowledge and abilities typical of Trustee Council-funded investigators can understand them.

DATA DISSEMINATION POLICY

Data collected under Trustee Council funding is considered public information. Data from routine monitoring activities will be available regularly and in real or near-real time. The PI retains exclusive analysis and publication use of the non-routine data and developed models during the first year following data collection or model development. Such information will be available to other Trustee Council-funded investigators after that period. All data will be made available to other users within two (2) years after data collection or model development. However, if data or models are requested pursuant to the Freedom of Information Act or the Alaska Public Records Act, the Trustee Council is required to release this information. The release of data or models to third parties will stipulate that the PI and the Trustee Council program will be fully acknowledged in any subsequent publications in which any part of the data or models are used.

The PI may own a copyright on the publication of the processed data developed or bought under Trustee Council funding. The Trustee Council reserves a royalty-free, nonexclusive, and irrevocable license to reproduce, publish, or otherwise use, and to authorize others to use, for Trustee Council purposes, the copyright in any work developed under an award, or any rights of copyright purchased by the PI with Trustee Council funding. Any such publication will include a notice identifying the award and recognizing the license rights of the Trustee Council program under this clause. This paragraph will have no force and effect for the processed data not published by the PI.

DATA CITATION POLICY

The Trustee Council retains the right to analyze, synthesize and publish summaries of the data. The PI retains the right to be fully credited for having collected and processed the data. Following academic courtesy standards, PI(s) publishing manuscripts in open literature, including refereed scientific journals, or making other public presentations, will acknowledge that the research was conducted with Trustee Council funding.

Persons who acquire data, models, or model products from the Trustee Council's data archive are responsible for communicating with the originating investigator(s). If a substantial use of the data is planned, collaboration and co-authorship with the originating PI(s) is expected for any resulting publications. However, originating PI(s) may not unreasonably impede use or publication of archived data, models, or model applications, provided that they receive due credit for their contribution.

DATA LIABILITY POLICY

The data sets are only as good as the quality assurance and quality control (QA/QC) procedures applied to each project. The user bears all responsibility for its subsequent use or misuse in any further analyses or comparisons. The Trustee Council does not assume liability to the recipient or third persons, nor will the Trustee Council reimburse or indemnify the recipient for its liability due to any losses resulting in any way from the use of this data set.

**EXXON VALDEZ OIL SPILL TRUSTEE COUNCIL
PROCEDURES FOR THE PREPARATION & DISTRIBUTION OF
REPORTS**

Effective July 9, 2002

TABLE OF CONTENTS

INTRODUCTION.....	1
<u>FINAL REPORTS: NRDA, RESTORATION & GEM PROJECTS.....</u>	<u>2</u>
Purpose.....	2
I. Preparation: NRDA, Restoration & GEM Project Final Reports.....	2
1. Format.....	2
A. Report Cover.....	3
B. Title Page.....	3
C. Study History, Abstract, Key Words, Project Data and Citation.....	3
D. Remainder of Report.....	4
2. Technical Format.....	6
A. Word Processing Conventions.....	6
B. Other Conventions.....	6
3. Use of Manuscripts for Final Report Writing.....	7
4. Due Date.....	8
II. Review Process: NRDA & Restoration Project Final Reports.....	8
1. Submission of Draft Final Report for Peer Review.....	8
2. Final Report Peer Review & Acceptance Process.....	9
3. Final Report Review as to Form	9
III. Review Process: GEM Final Reports.....	9
1. Submission of Draft Final Report for Peer Review.....	9
2. Final Report Peer Review & Acceptance Process.....	9
3. Final Report Review as to Form.....	9
IV. Printing and Distribution Process: NRDA, Restoration & GEM Project Final Reports.....	11
1. Reproduction and Number of Copies.....	11
2. Binding.....	11
3. Distribution.....	11
<u>ANNUAL REPORTS: RESTORATION & GEM PROJECTS.....</u>	<u>12</u>
Purpose.....	12
I. Preparation: Annual Reports.....	12
1. Format.....	12
2. Due Date.....	13
II. Review Process: Annual Reports	13
1. Submission of Annual Report for Review.....	13
2. Annual Report Review Process.....	13
III. Distribution Process: Annual Reports.....	13

Attachment A	Example - Final Report Cover Page and Title Page Study History, Abstract, Key Words, Project Data and Citation
Attachment B	Example - Annual Report Form
Attachment C	Distribution List for Final Reports
Appendix 1	Ratti, J. and L. Smith. 1998. Manuscript guidelines for the Journal of Wildlife Management, 62 (1. Supplement), The Wildlife Society

EXXON VALDEZ OIL SPILL TRUSTEE COUNCIL PROCEDURES FOR THE PREPARATION & DISTRIBUTION OF REPORTS

Effective July 9, 2002

INTRODUCTION

These *Procedures for the Preparation and Distribution of Reports* provide instructions regarding the preparation, peer review, printing and distribution of final and annual reports for projects funded by the Exxon Valdez Oil Spill Trustee Council.

Unless otherwise specified by the Trustee Council Office, each project funded by the Trustee Council shall ultimately produce a final report subject to approval through the Trustee Council's peer review process. In the case of multi-year projects, an annual report shall also be prepared each year until the project is completed, at which time a final report shall be prepared. Subject to the approval of the Trustee Council Office, on a project-by-project basis, journal articles or manuscripts may be used to fulfill requirements for the preparation of final reports (see below, page 7).

These *Procedures for the Preparation and Distribution of Reports* update and supersede earlier versions of this document and should be read together with the report writing guidelines published by the *Journal of Wildlife Management* (Ratti, J. and L. Smith, 1998). (Appendix 1) To the extent that there are any inconsistencies between these *Procedures for the Preparation and Distribution of Reports* and the guidance provided by Ratti, J. and L. Smith (1998), the instructions provided in these *Procedures* shall be followed.

The primary changes in these *Procedures*, as compared to the previous version of this document (October 1998), are a new format and review process for annual reports (see page 12) and the addition of review procedures for Gulf Ecosystem Monitoring and Research (GEM) project final reports (see page 10).

NOTE: For purposes of identification, GEM projects each have a six-digit project number preceded by the letter G (e.g., G-030204, G-042362). The letter G signifies GEM; the first two digits identify the fiscal year in which the project was authorized; and the last four digits provide a specific project identifier. Restoration projects each have a five or six-digit project number (e.g., 95225, 034520--those funded before FY 03 have five digits; those funded for FY 03 and after have six digits). The first two digits identify the fiscal year in which the project was authorized; the last three or four digits provide a specific project identifier. Natural Resource Damage Assessment (NRDA) projects are designated by alpha-numeric project numbers (e.g., MM6 for "Marine Mammal Study 6" or FS2 for "Fish/Shellfish Study 2").

FINAL REPORTS: NRDA, RESTORATION & GEM PROJECTS

Purpose. A final report for a project must be a comprehensive report addressing all the objectives identified over the course of the entire study. The final report shall address the original objectives of the study as identified in the approved proposal and account for any changes in the objectives. Final NRDA reports shall be viewed as both the first and last word on the subject for the purpose of damage assessment under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) and its amendments. The principal investigator for a project is responsible for the submission and production of a final report.

I. Preparation: NRDA, Restoration & GEM Project Final Reports

1. **Final Report Format** - Authors shall follow the format set out below to prepare final reports. Reports shall meet normal scientific standards of completeness and detail that shall permit an independent scientific reader to evaluate the reliability and validity of the methods, data and analyses.

A. **Report Cover** – An example of a final report cover is provided. Quality cover stock shall be used and, to ensure consistent appearance, color shall be goldenrod. (Attachment A) A final report cover shall:

- identify the report as either a¹
 - ✓ Natural Resource Damage Assessment final report,
 - ✓ Restoration Project final report, or
 - ✓ Gulf Ecosystem Monitoring and Research Project final report;
- provide the report title;
- include the project identification number;
- identify the author(s) with appropriate affiliation(s);
- include the date (month and year) of publication; and
- include the following non-discrimination statement toward the bottom of the page on the inside front cover:

¹ Include on the Report Cover and the Title Page the following uniform titles. For NRDA reports: *Exxon Valdez Oil Spill State/Federal Natural Resource Damage Assessment Final Report*. For Restoration Project final reports: *Exxon Valdez Oil Spill Restoration Project Final Report*. For GEM Project final reports: *Exxon Valdez Oil Spill Gulf Ecosystem Monitoring and Research Project Final Report*. See Attachment A.

The *Exxon Valdez* Oil Spill Trustee Council administers all programs and activities free from discrimination based on race, color, national origin, age, sex, religion, marital status, pregnancy, parenthood, or disability. The Council administers all programs and activities in compliance with Title VI of the Civil Rights Act of 1964, Section 504 of the Rehabilitation Act of 1973, Title II of the Americans with Disabilities Act of 1990, the Age Discrimination Act of 1975, and Title IX of the Education Amendments of 1972. If you believe you have been discriminated against in any program, activity, or facility, or if you desire further information, please write to: EVOS Trustee Council, 441 West 5th Avenue, Suite 500, Anchorage, Alaska 99501-2340; or O.E.O. U.S. Department of the Interior, Washington D.C. 20240.

- B. **Title Page** - The Title Page of the report shall immediately follow the report cover page on white bond paper and be identical in terms of content and format to the front of the report cover page. (Attachment A)
- C. **Study History, Abstract, Key Words, Project Data and Citation** - Following the Title Page, the report shall include, on not more than two pages: (1) a study history; (2) an abstract; (3) key words; (4) summary of data gathered during the project; and (5) a recommended citation for the final report. (Attachment A)
- **Study History.** A brief study history shall include reference to any prior project numbers; changes in the title of the project or report over time; annual reports or other reports which contributed to the final report; and citation of publications that have preceded publication of the final report.
 - **Abstract.** An abstract, with a maximum length of 200 words,² shall enable readers to quickly identify the basic content of the report, determine its relevance to their interests and thus decide whether to read the document in its entirety. If the final report consists of several chapters or manuscripts (see Use of Manuscripts for Report Writing below, page 7), the abstract shall summarize the entire report. Do not use abbreviations or acronyms in the abstract.
 - **Key Words.** A short list of key words (up to 12 in alphabetical order) shall be provided. Include words from the title and others that identify: (1) common and scientific names of principal organisms, if

² A limit of 200 words is needed so that the abstract can be processed through the National Technical Information Service.

any; (2) geographic area or region; (3) phenomena and entities studied (e.g., behavior, reproduction, etc.); (4) methods (only if the report describes a new or improved method); and (5) other words not covered above but useful for indexing.

- **Project Data.** A summary of the data collected during the project shall be provided in order to preserve the opportunity for other researchers and the public to access this data in the future. The summary shall: (1) *describe* the data; (2) indicate the *format* of the available data collections; (3) identify the *archive* in which the data have been stored or the *custodian* of the data (including contact name, organization, address, phone/fax, e-mail, and web address where data may be acquired); and (4) indicate any *access limitations* placed on the data. Limiting access requires pre-approval by the Trustee Council Office.
- **Citation.** A recommended citation for the final report shall be provided.

D. **Remainder of Report** - After the Study History, Abstract, Key Words, Project Data and Citation, the report shall continue as follows:

- **Table of Contents, including Lists of Tables, Figures and Appendices.**
- **Executive Summary.** The executive summary shall:
 - √ consolidate principal points of the report in one place and provide enough detail for the reader to digest the significance of the report without having to read it in full;
 - √ be written so that it can stand independently of the report (i.e., it must not refer to figures, tables or references contained elsewhere and all acronyms, uncommon symbols, and abbreviations must be spelled out);
 - √ not exceed four single-spaced pages;
 - √ concisely state the objectives, methods, results and conclusions of the report; and
 - √ be organized in the same manner as the report it summarizes.
- **Introduction.** The introduction shall:

- √ present first, with all possible clarity, the nature and scope of the problem investigated, including the general area in which field activities were conducted; and
- √ review pertinent literature, state the method(s) of investigation and briefly state principal results.
- **Objectives.** The statement of objectives shall be the same as the objectives identified in the approved proposal. If the objectives have changed, describe what has changed and why.
- **Methods.** The discussion of methods shall include a clear description of the study area. To the extent the methodology differs from that described in the proposal, explain the reason for the deviation.
- **Results.** The presentation of results shall:
 - √ provide an objective and clear presentation of the data collected; and
 - √ in the case of damage assessment studies, present information in a manner that will make clear to the reader: (1) evidence of injury found, and (2) evidence that the injury found was or was not caused by the *Exxon Valdez* oil spill.
- **Discussion.** The discussion section shall:
 - √ interpret the study results and explore the meaning and significance of the findings, including alternative interpretations of the results;
 - √ discuss whether the study hypotheses were upheld or disproven;
 - √ note where there are unanswered questions; and
 - √ where appropriate, cite relevant findings from other *Exxon Valdez* oil spill restoration studies, including GEM studies, and published literature.
- **Conclusions.** This shall be a brief, clear statement of the conclusions that are apparent from the discussion. Major unanswered questions shall be identified.
- **Acknowledgments.**

- **Literature Cited.**
- **Other References.** If there is a need to list references other than the literature cited (for example, personal communications), these references shall be identified in this section.

2. **Technical Format** - The following guidelines shall help provide consistent formatting:

A. **Word Processing Conventions**

- **Standard Settings.**

Line

Line spacing:	single
Hyphenation:	off (i.e., do not hyphenate at right
Justification:	left (i.e., do not right-justify margins)
Margins:	1 inch at top, bottom
	1 inch left, right
Tabs:	every 0.5"
Widow Protection:	yes

Page

Page numbering:	bottom center
Header:	none

Font

Times:	12 point
Note: If Times is not available, some other serif font shall be used (e.g., Palatino, Bookman or New Century Schoolbook).	

- **Literature Citations.** In the Literature Cited section, start each citation with a hanging indent as shown below:

Byrd, G.V., D. Gibson, and D.L. Johnson. 1974. The birds of Adak Island, Alaska. Condor 76:288-300.

B. **Other Conventions**

- Use italics, rather than underlining, for Latin names and for *Exxon Valdez*.
- Use good quality white paper 8.5 x 11" (215 x 280mm) or metric size A4.

- Do not use dot matrix printers to print the report.
- When referring to the oil spill that occurred because the *Exxon Valdez* ran aground, use *Exxon Valdez* oil spill. After the first mention of the *Exxon Valdez* oil spill, refer to it simply as the spill.
- Clearly define any acronyms. Avoid the use of acronyms completely in the Abstract and Executive Summary.
- Use the terms "damages" and "injury" as defined by CERCLA regulations (see 43 CFR 11.14):

"Damages" means the amount of money sought by the natural resource trustee as compensation for injury, destruction or loss of natural resources.

"Injury" means a measurable adverse change, either long or short-term, in the chemical or physical quality or the viability of a natural resource resulting either directly or indirectly from exposure to a discharge of oil. Injury encompasses the phrases "destruction" and "loss."

"Destruction" means the total and irreversible loss of a natural resource.

"Loss" means a measurable adverse reduction of a chemical or physical quality or viability of a natural resource.

3. Use of Manuscripts for Final Report Writing - The Trustee Council expects principal investigators to publish the results of their work in peer-reviewed journals. Manuscripts or journal articles may be used to help satisfy project final report writing requirements. Principal investigators shall contact the Science Director at the Trustee Council Office to request authority to use a manuscript(s) as the body of a final report.

Because final reports are the primary and permanent record of how Trustee Council funds have been spent and what has been accomplished with those funds, it is necessary that these reports address all of the objectives for which the Trustee Council has provided funds. If all of the project's objectives are completely described within one or more manuscripts being prepared for publication, then a copy of the manuscript(s) may be submitted as the entire body of the report. If a project's objectives are not all described completely within one or more manuscripts, the manuscript(s) may serve as a portion of the report.

For example, if only two of five project objectives are addressed in a manuscript, the report shall include—in addition to the manuscript—information on the three objectives not covered in the manuscript. The two objectives covered by the manuscript shall be referenced in the report as appropriate (e.g., in the Methods and Results sections) and substantially integrated into the Discussion section, where there shall be an overall discussion of the project. In such cases, the combination of the manuscript and additional report material shall present an organized, integrated and complete account of project activities and results.

In addition, every report, regardless of whether it is in the standard format or includes manuscripts, shall adhere to the formatting prescribed for the Report Cover, Title Page, Study History, Abstract, Key Words, Project Data and Citation (see above, Final Report Format, page 2).

Please note that when a manuscript is used to fulfill report writing requirements, it must be in a form that can be duplicated freely. This may require obtaining a release of copyright restrictions.

Investigators seeking to publish the results of Trustee Council sponsored projects shall include the following statement with all manuscripts:

The research described in this paper was supported by the *Exxon Valdez* Oil Spill Trustee Council. However, the findings and conclusions presented by the author(s) are their own and do not necessarily reflect the views or position of the Trustee Council.

Investigators who publish the results of Trustee Council sponsored projects shall provide the Trustee Council Office (attn: Science Director) 3 reprints of any published manuscript. The Trustee Council Office shall provide 1 of the reprints to the Alaska Resources Library and Information Services (ARLIS).

4. **Due Date** - Final reports shall be *submitted for peer review by April 15 of the year following the fiscal year in which project work was completed* unless a different date is specified in the approved proposal or contract. If this due date cannot be met, the principal investigator shall notify the Trustee Council Office in writing. With the approval of the Executive Director, an alternative final report due date may be identified.

II. Review Process: NRDA & Restoration Project Final Reports

See III below (page 10) for review process for GEM final reports.

1. **Submission of Draft Final Report for Peer Review** - The principal investigator shall submit 4 paper copies and 1 electronic copy of the draft final report for peer review, as follows:

- ✓ 3 paper copies and 1 electronic copy of the draft final report to the chairman of the Trustee Council's Lingerin Oil Effects Subcommittee. The electronic copy shall be submitted as a word processing document (Microsoft Word 2000 for Windows or lower or WordPerfect 9.0 or lower) with any figures and tables imbedded; and
- ✓ 1 paper copy of the draft final report to the Trustee Council's Science Director.

Dr. Robert Spies
 Chair, Lingerin Oil Subcommittee
 4749 Bennett Drive, Suite L
 Livermore, California 94550

phone: (925) 373-7142
 fax: (925) 373-7834
spies@amarine.com

Science Director
 Trustee Council Office
 441 W. 5th Ave., Suite 500
 Anchorage, Alaska 99501

phone: (907) 278-8012
 fax: (907) 276-7178
phil_mundy@oilspill.state.ak.us

2. **Final Report Peer Review and Acceptance Process** - Under the guidance of the chairman of the Lingerin Oil Effects Subcommittee, draft final reports shall be peer reviewed by one or more qualified reviewers who provide comments, identify questions and suggest revisions as appropriate.

- Peer review comments shall be provided in writing by the chairman of the Lingerin Oil Effects Subcommittee to the principal investigator(s).
- Final reports shall be revised by the principal investigator to address peer review comments and resubmitted for final acceptance, as above (3 paper copies and 1 electronic copy of the revised final report to the chairman of the Lingerin Oil Effects Subcommittee and 1 paper copy of the revised final report to the Science Director).
- Once the final report is accepted, the chairman of the Lingerin Oil Effects Subcommittee shall notify the principal investigator in writing and send a copy of the letter of acceptance to the Science Director.

3. **Final Report Review as to Form** - Once accepted by the chairman of the Lingerin Oil Effects Subcommittee, the principal investigator shall prepare the final report for publication.

- Within 30 days of the date on which the chairman of the Lingering Oil Effects Subcommittee accepts the final report, the principal investigator shall submit the first several pages of the approved final report to ARLIS for format review (i.e., Cover, Title Page, Study History, Abstract, Key Words, Project Data and Citation). These pages can be mailed, faxed, or e-mailed to ARLIS (attention: Carrie Holba):

Carrie Holba	phone (907) 272-7547
ARLIS	fax (907) 271-4742
3150 C Street, Suite 100	carrie@arlis.org
Anchorage, AK 99503	

- Within 15 days of receipt of the first several pages of the final report, ARLIS staff shall review it for compliance with the report format standards and notify the principal investigator in writing regarding any changes that need to be made.
- To be certain that format revisions are made correctly, the principal investigator shall fax a copy of the corrected version to ARLIS. The principal investigator shall not reproduce the report until format approval is confirmed in writing by ARLIS.

III. Review Process: GEM Project Final Reports

See II above (page 8) for review process for NRDA and Restoration final reports.

1. **Submission of Draft Final Report for Peer Review** - The principal investigator shall submit 3 paper copies and 1 electronic copy of the draft final report to the Science Director for peer review. The electronic copy shall be submitted as a word processing document (Microsoft Word 2000 for Windows or lower or WordPerfect 9.0 or lower) with any figures and tables imbedded. (See address page 8.)

2. **Final Report Peer Review and Acceptance Process** - Under the guidance of the Science Director, draft final reports shall be peer reviewed by one or more qualified reviewers who provide comments, identify questions and suggest revisions as appropriate.

- Peer review comments shall be provided in writing by the Science Director to the principal investigator(s).
- Final reports shall be revised by the principal investigator to address peer review comments and resubmitted for final acceptance, as above (3 paper copies and 1 electronic copy to the Science Director).

- Once the final report is accepted, the Science Director shall notify the principal investigator in writing.

3. **Final Report Review as to Form** - Once accepted by the Science Director, the principal investigator shall prepare the final report for publication.

- Within 30 days of the date on which the Science Director accepts the final report, the principal investigator shall submit the first several pages of the approved final report to ARLIS for format review (i.e., Cover, Title Page, Study History, Abstract, Key Words, Project Data and Citation). These pages can be mailed, faxed, or e-mailed to ARLIS (attention: Carrie Holba; see address page 9).
- Within 15 days of receipt of the first several pages of the final report, ARLIS staff shall review it for compliance with the report format standards and notify the principal investigator in writing regarding any changes that need to be made.
- To be certain that format revisions are made correctly, the principal investigator shall fax a copy of the corrected version to ARLIS. The principal investigator shall not reproduce the report until format approval is confirmed in writing by ARLIS.

IV. Printing and Distribution Process: NRDA, Restoration & GEM Project Final Reports

1. **Reproduction and Number of Copies** - Within 60 days of the date of the written confirmation from ARLIS indicating approval of the final report format, the principal investigator shall remove all references to “draft” from the report and produce final copies as follows:

- **Two-sided Pages.** The body of the report shall be printed in two-sided format to reduce the space needed to store reports.
- **Number of Copies.** The principal investigator shall provide a total of 21 paper copies and 1 electronic copy, as follows:
 - ✓ 1 bound copy of the approved final report to the chairman of the Lingering Oil Effects Subcommittee;
 - ✓ 18 bound copies and 2 camera ready copies of the approved final report to ARLIS, which shall include a copy for the Science

Director and a copy for the Trustee Council's official record. A camera-ready copy is an unbound copy of the report as it will appear in its final format, except that it is single-sided with blank pages inserted as appropriate; and

- √ 1 electronic copy to the Science Director. The electronic copy may be submitted either as an Acrobat Portable Document Format (PDF) file or word processing document (Microsoft Word 2000 for Windows or lower or WordPerfect 9.0 or lower) with all figures and tables imbedded. Acrobat PDF 4.0 or above file format shall be used, preferable in 'formatted text with graphics' (called "PDF normal" under Acrobat PDF 4.0) format. Minimally, "PDF searchable image" (called "PDF original image with hidden text" under Acrobat PDF 4.0) may be used if pre-approved by the Trustee Council Office. In either case, the PDF file shall not be secured or locked from future editing, or contain a digital signature from the principal investigator.

2. **Binding** - Copies of final reports shall be bound using PERFECT binding. Smaller reports may be bound with black tape or comb binding. Very small reports may be bound with staples in three places along the spine, but only when other binding options are not available. Questions regarding binding shall be directed to ARLIS (attention: Carrie Holba; see address page 9).

3. **Distribution of Final Reports** - ARLIS shall distribute the bound and camera-ready copies of final reports to the appropriate individuals and libraries. (Attachment C) Final reports shall be posted on the Trustee Council website at www.oilspill.state.ak.us

ANNUAL REPORTS: RESTORATION & GEM PROJECTS

Purpose. In the case of multi-year projects, an annual report shall be prepared each year until the project is completed, at which time a final report shall be prepared. All NRDA annual reports have been completed, and so are not addressed in this section of the *Procedures*. The principal investigator for a project is responsible for the submission and production of an annual report.

I. Preparation of Annual Reports

1. **Annual Report Format** – Annual reports shall be brief documents (2-3 pages) that include the information listed below. An example of the annual report form, available for downloading from the Trustee Council's web site (www.oilspill.state.ak.us) or from the Trustee Council Office upon request, is provided. (Attachment B)

- **Project Number**
- **Project Title**
- **Principal Investigator's Name(s)**
- **Time Period Covered by the Report**
- **Date of Report**
- **Summary of Work Performed** – This section shall include a brief summary of work performed during the reporting period, including any results available to date and their relationship to the original project objectives. Any deviation from the original project objectives, procedures or statistical methods, study area, or schedule shall be included. Any known problems or unusual developments, and any other significant information pertinent to the project, shall also be described.
- **Summary of Future Work to be Performed** – This brief summary shall describe work to be performed during the upcoming year, if changed from the original proposal. A description of any proposed changes in objectives, procedural or statistical methods, study area, or schedule shall be included.
- **Coordination/Collaboration** – This section shall describe efforts undertaken during the reporting period to achieve the coordination and collaboration provisions of the proposal, if applicable.
- **Community Involvement/TEK and Resource Management Applications** – This section shall describe efforts undertaken during the reporting period to

achieve the community involvement/TEK and resource management application provisions of the proposal, if applicable.

- **Information Transfer** – This section shall list (1) publications produced during the reporting period, (2) conference and workshop presentations and attendance during the reporting period, and (3) data and/or information products developed during the reporting period.
- **Budget** – This section shall explain any differences and/or problems between actual and budgeted expenditures, including any substantial changes in the allocation of funds among line items on the budget form. Any new information regarding matching funds or funds from non-Trustee Council sources for the project shall be included.

2. **Due Date** – Annual reports shall be *submitted by September 1 of each fiscal year for which a project receives funding*, with the exception of the final funding year in which a final report shall be prepared. The information in the annual reports shall be a key component in the Trustee Council's annual decision to continue funding a project. Failure to submit an annual report by September 1 of each year, or unsatisfactory review of an annual report, will result in withholding of additional project funds, and may result in cancellation of the project or denial of funding for future projects.

II. Review Process: Annual Reports

1. **Submission of Annual Report for Review** – The principal investigator shall electronically submit the annual report to the Science Director, care of katharine_miller@oilspill.state.ak.us. The subject line of the e-mail transmitting the report must include the project number and the words "annual report" (e.g., "035620 Annual Report"). Electronic reports shall be submitted either as an Acrobat Portable Document Format (PDF) file or word processing document (Microsoft Word 2000 for Windows or lower or WordPerfect 9.0 or lower) with any figures and tables imbedded. Acrobat PDF 4.0 or above file format shall be used, preferably in 'formatted text with graphics' (called "PDF normal" under Acrobat PDF 4.0) format. Minimally, "PDF searchable image" (called "PDF original image with hidden text" under Acrobat PDF 4.0) may be used if pre-approved by the Trustee Council Office. In either case, the PDF file shall not be secured or locked from future editing, or contain a digital signature from the principal investigator.

2. **Annual Report Review Process** – Annual reports shall be reviewed by the Science Director. Under the guidance of the Science Director, annual reports may also be reviewed by qualified outside peer reviewers. The review process shall be used to determine whether continued funding of the project is warranted and to guide further work on the project. Any written comments on annual reports shall be provided to the principal investigator and kept on file at the Trustee Council Office, available upon request.

III. Distribution of Annual Reports

Annual reports shall be kept on file as public documents at the Trustee Council Office, available upon request. Annual reports shall also be posted on the Trustee Council's website at www.oilspill.state.ak.us.

Exxon Valdez Oil Spill
Restoration Project Final Report

Responses of River Otters to Oil Contamination:
A Controlled Study of Biological Markers

Restoration Project 99348
Final Report

**NOTE: The Report
Cover must be
quality cover stock,
goldenrod in color.**

Merav Ben-David
R. Terry Bowyer
Lawrence K. Duffy

Institute of Arctic Biology
311 Irving Building
University of Alaska Fairbanks
Fairbanks, Alaska 99775

for:

Alaska Department of Fish and Game
Habitat and Restoration Division
333 Raspberry Road
Anchorage, Alaska 99518

September 1999

**NOTE: The statement
below must be printed
on the back of the
goldenrod Report Cover.**

The *Exxon Valdez* Oil Spill Trustee Council administers all programs and activities free from discrimination based on race, color, national origin, age, sex, religion, marital status, pregnancy, parenthood, or disability. The Council administers all programs and activities in compliance with Title VI of the Civil Rights Act of 1964, Section 504 of the Rehabilitation Act of 1973, Title II of the Americans with Disabilities Action of 1990, the Age Discrimination Act of 1975, and Title IX of the Education Amendments of 1972. If you believe you have been discriminated against in any program, activity, or facility, or if you desire further information, please write to: EVOS Trustee Council, 441 West 5th Avenue, Suite 500, Anchorage, Alaska 99501-2340; or O.E.O. U.S. Department of the Interior, Washington, D.C. 20240.

Exxon Valdez Oil Spill
Restoration Project Final Report

Responses of River Otters to Oil Contamination:
A Controlled Study of Biological Markers

Restoration Project 99348
Final Report

**NOTE: The Title
Page must be on
white bond
paper.**

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Alaska Department of Fish and Game
Habitat and Restoration Division
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September 1999

Responses of River Otters to Oil Contamination:
A Controlled Study of Biological Stress Markers

Restoration Project 99348
Final Report

Study History: Project 99348 originated from the need to better understand the effects of contamination by crude oil on biomarkers in river otters (*Lontra canadensis*). Previous studies demonstrated elevated levels of biomarkers in river otters from oiled areas compared with those from non-oiled areas throughout Prince William Sound, Alaska, shortly following the *Exxon Valdez* oil spill (EVOS). Although the data collected to date strongly indicated a correlation between oil contamination and physiological stress in river otters, this evidence required verification through controlled experiments as identified by the EVOS Trustee Council review process (1997). This 2-year project was conducted at the Alaska SeaLife Center in Seward, Alaska, USA, between April 1998 and March 1999. Additional funding was provided by the Council for completion of 3 manuscripts in FY 2000 for publication in a peer-reviewed journal.

Abstract: In this study, we experimentally determined the effects of oil contamination on river otters. Fifteen wild-caught male river otters were exposed to 2 levels of weathered crude oil (i.e., control, 5 ppm/day/kg body mass, and 50 ppm/day/kg body mass) under controlled conditions in captivity at the Alaska SeaLife Center in Seward, Alaska. Responses of captive river otters to oil ingestion provided mixed results in relation to biomarkers. Although hemoglobin, white blood cells, alkaline phosphatase, and possibly interleukin-6 immunoreactive responded in the expected manner, other parameters did not. Aspartate Aminotransferase Alanine Aminotransferase haptoglobin did not increase in response to oiling or decrease during rehabilitation. In addition, although expression of P450-1A increased in captive river otters during oiling, several inconsistencies in the data complicated data interpretation. Nonetheless, we were able to establish that reduction in hemoglobin led to increase in energetic costs of terrestrial locomotion, decrease in aerobic dive limit, and potential increase in foraging time due to a decrease in total length of submergence during each foraging bout. We offer a theoretical physiological model to describe interactions between the different biomarkers and advocate the exploration and development of other biomarkers that will be independent of the heme cycle.

Key Words: Aerobic dive limit, Alaska, captivity, CYP1A, crude oil, hemoglobin, immuno-histochemistry, liver enzymes, *Lontra canadensis*, lymphocytes, oxygen consumption, quantitative RT-PCR.

Project Data: *Description of data* – data was collected from live animals held in captivity at the Alaska SeaLife Center. Blood and other tissues were sampled and processed in different laboratories. Additional samples are archived at the Institute of Arctic Biology, UAF. *Format* – All data were entered as Excel spreadsheets. *Custodian* – contact Merav Ben-David, Institute of Arctic Biology, 311 Irving Building, University of Alaska Fairbanks, Fairbanks, Alaska 99775.

Citation:

Ben-David, M., R.T. Bowyer, and L.K. Duffy. 1999. Responses of river otters to oil contamination: A controlled study of biological stress markers, *Exxon Valdez* Oil Spill Restoration Project Final Report (Restoration Project 99348), Alaska Department of Fish and Game, Habitat and Restoration Division, Anchorage, Alaska.

EVOS ANNUAL PROJECT REPORT

All recipients of funds from the *Exxon Valdez* Oil Spill Trustee Council must submit an annual project report in the following format by September 1 of each fiscal year for which project funding is received, with the exception of the final funding year in which a final report must be submitted. Satisfactory review of the annual report is necessary for continuation of multi-year projects. Failure to submit an annual report by September 1 of each year, or unsatisfactory review of an annual report, will result in withholding of additional project funds and may result in cancellation of the project or denial of funding for future projects.

PLEASE NOTE: Significant changes in a project's objectives, methods, schedule, or budget require submittal of a new proposal that will be subject to the standard process of proposal submittal, technical review, and Trustee Council approval.

Project Number:

Project Title:

PI Name:

Time Period Covered by Report:

Date of Report:

1. **Work Performed:** Summarize work performed during the reporting period, including any results available to date and their relationship to the original project objectives. Describe and explain any deviation from the original project objectives, procedural or statistical methods, study area, or schedule. Also describe any known problems or unusual developments, and whether and how they have been or can be overcome. Include any other significant information pertinent to the project.

2. **Future Work:** Summarize work to be performed during the upcoming year, if changed from the original proposal. Describe any proposed changes in objectives, procedural or statistical methods, study area, or schedule. **[PLEASE NOTE:** Significant changes in a project's objectives, methods, schedule, or budget require submittal of a new proposal that will be subject to the standard process of proposal submittal, technical review, and Trustee Council approval.]

3. **Coordination/Collaboration:** Describe efforts undertaken during the reporting period to achieve the coordination and collaboration provisions of the proposal, if applicable.

4. **Community Involvement/TEK & Resource Management Applications:** Describe efforts undertaken during the reporting period to achieve the community involvement/TEK and resource management application provisions of the proposal, if applicable.

5. **Information Transfer:** List (a) publications produced during the reporting period, (b) conference and workshop presentations and attendance during the reporting period, and (c) data and/or information products developed during the reporting period.

[PLEASE NOTE: Lack of compliance with the Trustee Council's data policy and/or the project's data management plan will result in withholding of additional project funds, cancellation of the project, or denial of funding for future projects.]

6. **Budget:** Explain any differences and/or problems between actual and budgeted expenditures, including any substantial changes in the allocation of funds among line items on the budget form. Also provide any new information regarding matching funds or funds from non-EVOS sources for the project. [PLEASE NOTE: Any request for an increased or supplemental budget must be submitted as a new proposal that will be subject to the standard process of proposal submittal, technical review, and Trustee Council approval.]

Signature of PI:

Project Web Site Address:

SUBMIT ANNUAL REPORTS ELECTRONICALLY TO katharine_miller@oilspill.state.ak.us. THE REPORTS WILL BE POSTED ON THE TRUSTEE COUNCIL'S WEB SITE AND SHOULD ALSO BE POSTED ON THE PI'S WEB SITE. The subject line of the e-mail transmitting the report must include the project number and the words "annual report" (e.g., "035620 Annual Report"). Electronic reports must be submitted either as an Acrobat Portable Document Format (PDF) file or word processing document (Microsoft Word 2000 for Windows or lower or WordPerfect 9.0 or lower) with any figures and tables imbedded. Acrobat PDF 4.0 or above file format must be used, preferably in 'formatted text with graphics' (called "PDF normal" under Acrobat PDF 4.0) format. Minimally, "PDF searchable image" (called "PDF original image with hidden text" under Acrobat PDF 4.0) may be used if pre-approved by the Trustee Council Office. In either case, the PDF file must not be secured or locked from future editing, or contain a digital signature from the principal investigator.

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The Alaska Resources Library and Information Services (ARLIS) receives and distributes 18 bound copies and 2 camera-ready copies of the final reports as follows:

- ARLIS collection (6 bound and 1 camera-ready copy)*
- Alaska State Library (4 bound copies)**
- Holmes Johnson Library (Kodiak) (1 bound copy)
- National Marine Fisheries Service Auke Bay Laboratory (1 bound copy)
- National Library of Canada (Ottawa) (1 bound copy)
- National Technical Information Service (1 bound copy and 1 camera-copy for reproduction upon request)
- University of Alaska Anchorage (1 bound copy)
- University of Alaska Southeast (Juneau) (1 bound copy)
- University of Washington Library (1 bound copy)
- Valdez Consortium Library (1 bound copy)

The chairman of the Lingering Oil Effects Subcommittee receives 1 bound copy of each final report.

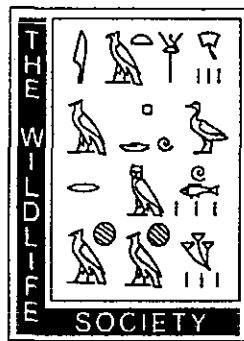
*ARLIS distributes its 6 bound copies as follows:

- 1 to the Trustee Council's Science Director
- 1 to the Trustee Council's official record
- 4 to the ARLIS permanent collection

** The Alaska State Library distributes its 4 copies as follows:

- Alaska State Library
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- E. E. Rasmuson Library (University of Alaska Fairbanks)
- Library of Congress

MANUSCRIPT GUIDELINES FOR THE *JOURNAL OF WILDLIFE MANAGEMENT*



By

John T. Ratti and Loren M. Smith

1998 *Journal of Wildlife Management* 62 (1, Supplement)

The Wildlife Society, Inc., Bethesda, Maryland

Note: Making photocopies for personal and educational purposes is permitted and encouraged.

1 September 1997
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RH: *JWM* Manuscript Guidelines • *Ratti and Smith*

MANUSCRIPT GUIDELINES FOR THE *JOURNAL OF WILDLIFE MANAGEMENT*

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Texas Tech University, Lubbock, TX 79409, USA

Abstract: This guide provides information for preparing manuscripts submitted to the *Journal of Wildlife Management (JWM)* for publication consideration. Authors should submit manuscripts in the format and style presented in these guidelines, i.e., your manuscript format should be identical to this example. Proper preparation increases the probability and speed of acceptance.

JOURNAL OF WILDLIFE MANAGEMENT 00(0):000-000

Key words: author, format, guidelines, instructions, manuscript, style, *Journal of Wildlife Management*.

These guidelines update Gill and Healy (1980), Ratti and Ratti (1988), and those on the back cover of some issues of *JWM*. This update was prepared to make the guidelines more available to authors, to include basic format and style changes, and to provide additional examples. Authors should review a recent issue of the *JWM* but should understand there are

¹Present address: (Use this format to give present address of an author if it differs from the address during the time research was conducted).

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differences between articles in final printed form and correct format of submitted manuscripts (e.g., key words, text columns, placement of tables and figures, line spacing). Check recent *JWM* issues for instructions that may supersede these guidelines, and for the name and address of the current Editor in Chief. Papers that clearly deviate from *JWM* format and style may be returned for correction before review.

HIGHLIGHTS OF GUIDELINES CHANGES

For those authors with experience and knowledge of *JWM* Guidelines, it may be helpful to identify and review significant changes in this manuscript. Fundamental changes include (1) most abbreviations have been eliminated from the LITERATURE CITED section; (2) spell out country names at the end of author and publisher addresses, except for United States use "USA;" (3) no use of underlined words to indicate italic type, i.e., use italic fonts where appropriate; and (4) ACKNOWLEDGMENTS are a separate section preceding LITERATURE CITED. Please review this document for additional changes.

POLICY

Referees and editors judge each submitted manuscript on data originality, concepts, interpretations, accuracy, conciseness, clarity, appropriate subject matter, and contribution to existing literature. Prior publication or concurrent submission to other refereed journals precludes review or publication in *JWM* (additional information in section on Transmittal Letter and Submission). The *JWM*, *Wildlife Society Bulletin*, and *Wildlife Monographs* have similar quality standards. Fisheries manuscripts are discouraged unless information is part of an account that mainly concerns terrestrial vertebrates.

PAGE CHARGES AND COPYRIGHTS

Current policies regarding page charges offer alternatives and are explained to authors after manuscripts are submitted, and when they are accepted for publication. Page charges may change annually; for members of The Wildlife Society in 1997, they were \$65/page for the first 8 pages

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plus \$125 for each succeeding page (for nonmembers the rate was \$125/page for all pages). Authors pay for alterations to page proofs (in 1997, \$3.25/reset line), except for typesetting errors and editorial errors. If a manuscript not in the public domain is accepted for publication, authors or their employers must transfer copyright to The Wildlife Society. Publications authored by federal-government employees are in the public domain. Manuscript submission implies entrusting copyright (or equivalent trust in public-domain work) to the Editor in Chief until the manuscript is either rejected, withdrawn, or accepted for publication. If accepted, The Wildlife Society retains copyright.

COPY

Use quality white paper, 215 x 280 mm (8.5 x 11 inches) or metric size A4. Do not hyphenate words at the right margin, and do not right-justify text. Manuscripts produced on dot matrix printers are not acceptable.

Margins should be 3 cm (1 3/16 inches) on all sides. Do not violate margin boundaries to begin a new paragraph or the LITERATURE CITED at the top of a new page; i.e., do not leave >3 cm of space at the bottom of a page (except to prevent a widow heading). Type the senior author's last name (upper left) and page numbers (upper right) on pages 2 through the LITERATURE CITED, on tables and figure title pages, but not on the first page, figures, or illustrations. Do not underline words or use bold or italic font in the text to indicate emphasis. Scientific names should be in italic font. Keep the original manuscript and submit 4 quality copies. Submit a transmittal letter (see below) with your manuscript.

RUNNING HEAD, TITLE, AND AUTHORS

Page 1 of the manuscript should begin with the date (update with each revision), corresponding author's name, address, and telephone, FAX, and E-mail numbers (if available), single-spaced in the upper left corner. Thereafter, all text is double-spaced, including tables.

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The running head (RH) is the first line following the correspondent's address. The RH is limited to 45 characters, left-justified, and typed in upper- and lower-case letters followed by a dot (or raised period) and the last name(s) of ≤ 2 authors. For ≥ 3 authors, use the name of the first author followed by "et al." Type the author's name(s) in italic font. The RH is used in final printed form as an abbreviated title at the top of each page following the title page.

The title follows the RH, is also left-justified in bold font, all upper-case letters, should not include abbreviations, acronyms, punctuations, and should not exceed 10 words (unless doing so forces awkward construction). In such cases, use ≤ 13 words. The title identifies manuscript content. Do not use scientific names in the title except for organisms that do not have, or are easily confused by, common names. Do not use numbers in titles or the RH.

Author's names are left-justified in upper-case letters followed by affiliation and address in upper- and lower-case letters (usually where the author was employed during the study). The second and third lines of the author's address are indented 5 spaces. Use available U.S. Postal Service (USPS) abbreviations (Appendix A), zip codes, and the country abbreviation (e.g., USA), in each address. Write out words like Street, Avenue, and Boulevard but abbreviate directions (e.g., N. and N.W.). For multiple authors with the same address, repeat the address after each author's name.

FOOTNOTES

Footnotes appear at the bottom of the first page to reference present address of an author when it differs from the by-line address, and for E-mail address of the corresponding author. Footnotes also may be used to indicate a deceased author. The footnote appears immediately below a left-justified solid line of 10 characters, and each footnote is indented 5 spaces and starts with a numerical superscript; subsequent lines are left-justified. The footnote origin corresponds to the superscript number following the author's name. Endorsement disclaimers and pesticide warnings should be incorporated in the text. For table footnotes, see the TABLES section.

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ABSTRACT

Begin with the word "Abstract" in italic and bold fonts followed by a colon, and left-justified. The Abstract text begins after the colon on the same line, and should be a single paragraph not exceeding 1 line/page of text, including LITERATURE CITED. The Abstract should include:

Problem Studied or Hypothesis Tested.--Identify the problem or hypothesis and explain why it was important. Indicate new data, concepts, or interpretations directly or indirectly used to manage wildlife.

Results.--Emphasize the most important results, positive or negative, but keep the methods brief unless a new or much-improved method is reported.

Utility of Results.--Explain how, when, where, and by whom data or interpretations can be applied to wildlife problems or contribute to knowledge of wildlife science.

On the line following the Abstract, type "*JOURNAL OF WILDLIFE MANAGEMENT 00(0):000-000*" right-justified and in capital letters, bold font, and italics (see page 1 of this manuscript).

KEY WORDS

Key words follow the Abstract. The phrase "Key words" is typed in italic and bold fonts followed by a colon, left-justified, and followed by 10-12 key words in alphabetical order. Include some words from the title and others that identify (1) common and scientific names of principal organisms in the manuscript; (2) geographic area, usually the state, province, or equivalent, or region if its name is well known; (3) phenomena and entities studied (e.g., behavior, populations, radiotelemetry, habitat, nutrition, density estimation, reproduction); (4) methods--only if the manuscript describes a new or improved method; and (5) other words not covered above but useful for indexing. Type a solid line from the left to the right margin beneath the key words; begin the text below this line.

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HEADINGS AND MAJOR SECTIONS

Headings

Three levels of headings may be used and examples of each appear in this manuscript. First-level headings are in upper-case letters, are left-justified, and in bold type. Second-level headings also are bold type and left-justified, but only the first letter of each word (except articles, conjunctions, and prepositions) is upper-case. Third-level headings have the first letter of each word upper-case, but are indented 5 spaces, italicized, and followed by a period and 2 hyphens. Although short papers (≤ 4 pages) may not require any headings, most require at least first-level headings. Under a first-level heading, use only third-level headings if all subsections are short (≤ 2 paragraphs; e.g., see Abstract section of this manuscript). Avoid repeating exact wording of the heading with second- and third-level headings. Do not leave first- or second-level headings standing alone on the last line of a page (i.e., as a “widow line”), and avoid 1-sentence paragraphs.

Major Sections

The introduction (no heading) starts below the line under key words and is a concise synthesis of literature specific to the manuscript’s main topic. The latter part of this section states objectives or hypotheses tested.

Most *JWM* manuscripts have 8 major sections: introduction, STUDY AREA, METHODS, RESULTS, DISCUSSION, MANAGEMENT IMPLICATIONS, ACKNOWLEDGMENTS, and LITERATURE CITED. It is permissible to combine STUDY AREA and METHODS, but do not combine RESULTS and DISCUSSION. Merging these sections so that results can be interpreted when first presented leads to superfluous wording, unnecessary discussion, and confusion.

Most study-area descriptions should be presented in past tense; e.g., “average annual precipitation was 46 cm,” “habitat was primarily grass.” Exceptions include geological formations that have been present for centuries. Methods should be brief and include dates,

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sampling schemes, duration, research or experimental design, and data analyses. Previously published methods should be cited without explanation. New or modified methods should be identified as such and explained in detail. Many research projects require animal-welfare protocols, and these should be cited here. If an approval number for the protocol was necessary, list it parenthetically following the statement.

Present results in a clear, simple, concise, and organized fashion. Avoid overlapping text with information in tables and figures; do not explain analyses that should be presented in the METHODS section. Results should be presented in past tense (e.g., body-mass loss occurred during winter). Reserve interpretation comments for the DISCUSSION section.

The discussion provides an opportunity for interpreting data and making literature comparisons. Reasonable speculation and new hypotheses to be tested may be included in the DISCUSSION. Do not repeat results and comment only on the most important findings. Systematic discussion of every aspect of the research leads to unnecessarily long manuscripts.

The MANAGEMENT IMPLICATIONS section should be short and direct, but explain issues important to conservation. This section may include speculation, but should address specific management opportunities or problems.

STYLE AND USAGE

Manuscripts with publishable data may be rejected because of poor writing style (e.g., long and complex sentences, superfluous words [Table 1], unnecessary information, and poor organization). Most editors are patient with this problem and are willing to offer helpful suggestions. However, referees are less tolerant of poor writing, and this problem may lead to negative reviews. Many of these problems can be corrected by having your manuscript critically reviewed by colleagues before submission for publication. Authors are urged to review Chapters 3 and 4 in the “CBE Style Manual” (CBE Style Manual Committee 1994) and “Writing with Precision, Clarity, and Economy” by Mack (1986). Manuscripts should be direct and concise.

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Many common problems may be avoided by use of a carefully prepared outline to guide manuscript writing. Other helpful suggestions are presented by Strunk and White (1979), Day (1983), and Batzli (1986). Use first person and active voice whenever appropriate to avoid superfluous wording. Review the list of commonly misused words (Table 2) before preparing your manuscript (e.g., use the word “mass” rather than “weight” to conform to international standards).

Numbers and Unit Names.--Use digits for numbers (e.g., 7 and 45) unless the number is the first word of a sentence, where it is spelled out. Use symbols or abbreviations (e.g., % and kg) for measurement units that follow a number unless the number is indefinite (thousands of hectares), is a “0” (zero) standing alone, or is the first word in a sentence. In such cases spell out the number and unit name or recast the sentence. Avoid using introductory phrases such as “A total of” Spell out numbers used as pronouns (i.e., one) or adverbs and ordinal numbers (e.g., first and second). However, use digits for cases such as 3-fold and 2-way. Convert fractions (1/4, 1/3, etc.) to decimals except where they misrepresent precision.

Hyphenate number-unit phrases used as adjectives (e.g., 3-m² plots and 3-year-old males), but not those used as predicate adjectives (e.g., plots were 3 m²). Insert commas in numbers ≥ 1,000 (except for pages in books, clock time, or year dates). Do not insert a comma or hyphen between consecutive, separate numbers in a phrase (28 3-m² plots). Do not use naked decimals; i.e., use 0.05, not .05.

Time and Dates.--Use the 24-hr system: 0001 through 2400 hr (midnight). Date sequence is day month year, without punctuation. Do not use an apostrophe for plural dates (e.g., 1970s). Spell out months except in parentheses, tables, and figures, in which 3-letter abbreviations are used with no period (e.g., 31 Mar 1947, Appendix B).

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Mathematics and Statistics.--Use italic font for Roman letters used as symbols for quantities (e.g., n , \bar{x} , F , t , Z , P , and X). Do not underline or italicize numbers, Greek letters, names of trigonometric and transcendental functions, or certain statistical terms (e.g., \ln , e , \exp , \max , \min , \lim , SD , SE , CV , and df). Use bold font for items that should be set in boldface type.

Insert a space on both sides of symbols used as conjunctions (e.g., $P > 0.05$), but close the space when used as adjectives (e.g., >20 observations). Where possible, report exact probabilities ($P = 0.057$, not $P > 0.05$). A subscript precedes a superscript (X_i^3) unless the subscript includes >3 characters. Break long equations for column-width printing (67 mm) if they appear in the main body of the manuscript; long equations and matrices can be printed page-width (138 mm) in appendices. Swanson (1974) or the CBE Style Manual Committee (1994:206-218) should be followed for general guidance, and MacInnes (1978) for advice on presentation of statistics. Authors are urged to read Tacha et al. (1982) and Wang (1986) for reviews of common statistical errors. Authors should consider statistical power when judging their results (*JWM* 59:196-198).

Abbreviations and Acronyms.--Metric units, their appropriate prefixes, and abbreviations identified by an asterisk in Appendix B may be used in the text. All other abbreviations or acronyms (except DNA) used in the Abstract or text must be defined the first time used; e.g., Bureau of Land Management (BLM). Acronyms established in the Abstract should not be reestablished in the text. Do not start sentences with acronyms; do not use an apostrophe with plural acronyms (e.g., ANOVAs). All abbreviations in Appendices A and B may be used within parentheses.

Punctuation.--Use a comma after the next-to-last item in a series of ≥ 3 items (e.g., red, black, blue). Do not hyphenate prefixes, suffixes, or combining forms unless necessary to avoid confusion. Common hyphenation errors occur in 3 cases: (1) a phrase containing a participle or an adjective is hyphenated as a compound when it precedes the word modified, and is written

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without a hyphen when it follows the word modified (e.g., a small-bird study vs. a study of small birds); (2) a modifier containing a number is usually hyphenated (e.g., a 6-year-old mammal); and (3) a 2-word modifier containing an adverb ending in *ly* is not hyphenated (e.g., a carefully preserved specimen).

Closing quotation marks are placed after periods and commas, but may be placed either before or after other punctuation (CBE Style Manual Committee 1994:177-181). Fences must appear in pairs, but the sequence varies. Use ([]) in ordinary sentences, use {[()]} in mathematical sentences, and use (()) only in special cases such as chemical names. Brackets are used to enclose something not in the original work being quoted (e.g., insertion into a quotation or a translated title [CBE Style Manual Committee 1994:58-59]).

Enumerating Series of Items.--When enumerating series, a colon must precede the numbered items unless preceded by a verb or preposition. Place numbers within parentheses for presentation of a simple series (e.g., Key words section of this manuscript). When enumerating lengthy or complexly punctuated series, place the numbers at the left margin, with periods but no parentheses, and indent run-on lines (see example in Tables subsection below).

COMMON AND SCIENTIFIC NAMES

Do not capitalize common names of species except words that are proper names (e.g., Canada goose [*Branta canadensis*], Swainson's hawk [*Buteo swainsoni*], white-tailed deer [*Odocoileus virginianus*]). Scientific names should follow the first mention of a common name, except in the title. If a scientific name is given in the Abstract, do not repeat it in the text or tables. Scientific names following common names should be in italic font in parentheses with the first letter of the genus upper-case and the species name in lower-case letters. Abbreviate genus names with the first letter when they are repeated within a few paragraphs, provided the meaning is clear and cannot be confused with another genus mentioned in the manuscript with the same first letter; e.g., we studied snow geese (*Chen caerulescens*) and Ross' geese (*C. rossii*).

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Do not use subspecies names unless essential and omit taxonomic authors names. Use "sp." (not italicized) to indicate unknown species. Use "spp." for multiple species; e.g., the field was bordered by willow (*Salix* spp.). Use the most widely accepted nomenclature where disagreement occurs. Use the most current edition of The American Ornithologists' Union Check-list (e.g., 1997) and periodic supplements published in *Auk* as general references for North American birds. For mammals, use Nowak (1991) or Whitaker (1996). There is no single reference for North America plants; we recommend citing the most widely accepted regional flora reference (e.g., in northwestern states, Hitchcock and Cronquist 1973). Omit scientific names of domesticated animals or cultivated plants unless a plant is endemic or widely escaped from cultivation, or is a variety that is not described adequately by its common name.

MEASUREMENT UNITS

Use Systeme Internationale d'Unites (SI) units and symbols. Use English units (or another type of scientific unit) in parentheses following a converted metric unit only in cases that may misrepresent (1) the statistical precision of the original measurement or (2) the correct interpretation of the results. However, these non-SI units are permitted:

area -- hectare (ha) in lieu of 10^4 m^2 ;

energy -- calorie (cal) in lieu of Joule (J);

temperature -- Celsius ($^{\circ}\text{C}$) in lieu of Kelvin (K);

time -- minute (min), hour (hr), day, etc. in lieu of seconds (sec);

volume -- liter (L) in lieu of dm^3 .

The CBE Style Manual Committee (1994:200-205) provided definitions of SI units and prefixes. The American Society of Testing Materials (1979) included many conversion factors.

CITING LITERATURE IN TEXT

In most cases, reference citations parenthetically at the end of a sentence; e.g., mallard-brood survival was higher in the wettest years (Rotella 1992). Published literature is cited by

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author and year; e.g., Jones (1980), Jones and White (1981). With ≥ 3 authors use "et al."; e.g., (Jones et al. 1982). Do not separate the author and date by a comma, but use a comma to separate a series of citations and put these in chronological order; e.g., (Jones 1980, Hanson 1986). If citations in a series have >1 reference for the same author(s) in the same year, designate the years alphabetically (in italics) and separate citations with semicolons; e.g., (Jones 1980*a,b*; Hanson 1981; White 1985, 1986). For citations in a series with the same year, use alphabetical order within chronological order; e.g., (Brown 1991, Monda 1991, Rotella 1991, Allen 1995). Do not give more than 6 citations in the text to reference a specific issue or scientific finding. For a quotation or paraphrase, cite author, year, colon, and page number(s); e.g., we used Neyman allocation to minimize variance (Krebs 1989:216). Use the same style for a book or other lengthy publication unless the reference is to the entire publication; e.g., Odum (1971:223).

Cite documents that are cataloged in major libraries, including theses and dissertations, as published literature. These citations include symposia proceedings and U.S. Government reports that have been widely distributed. However, cite such references as unpublished if they are not easily available. Cite unpublished information in the following forms: (J. G. Jones, National Park Service, personal communication), (D. F. Brown, Arizona Game and Fish Department, unpublished data), (D. E. Timm. 1977. Annual Waterfowl Report, Alaska Department of Fish and Game, Juneau, Alaska, USA).

A manuscript accepted for publication is cited as a published manuscript in the text using the anticipated publication year. In the LITERATURE CITED, show the year after the name(s) of the author(s) and "In Press" after the volume number (see below). Do not cite manuscripts that are in review; use the unpublished style.

LITERATURE CITED STYLE

Type the citations double-spaced immediately following the text, not necessarily on a new page. Spell out all words in cited literature, i.e., do not use abbreviations. However, the

Ratti

following 3 exceptions are allowed: Washington D.C.; “U.S.,” e.g., U.S. Department of Agriculture, and “USA” in author and publisher addresses. Alphabetize by author’s surname(s), regardless of the number of multiple authors for the same publication. Within alphabetical order the sequence is chronological. Use upper- and lower-case letters (typing all capital letters complicates editing names such as DeGraaf and vanDruff). Use 2 initials (where appropriate) with 1 space between each initial. For multiple citations with the same author(s), use a 5-spaced line to replace the author’s name(s) after the first citation. For serial publications, show the issue number only if the pages of each issue are numbered separately. As in the text, spell out ordinal numbers (e.g., Third edition). Use the word Thesis to denote Master of Science (M.S.) or Master of Arts (M.A.), and Dissertation for Doctor of Philosophy (Ph.D.). Do not write the total page number of books at the end of citations. Omit unnecessary words, but do not remove a conjunction if the meaning may be changed (e.g., Game and Fish vs. Game Fish). For publishers, do not include words like Company, Incorporated, Limited, or Publishing (e.g., Macmillan, not Macmillan Publishing Company). Please review the following examples.

Book -- More than 1 Edition

Smith, R. L. 1974. Ecology and field biology. Second edition. Harper & Row, New York, New York, USA.

Book -- More than 1 Volume

Palmer, R. S. 1976. Handbook of North American birds. Volume 2. Yale University Press, New Haven, Connecticut, USA.

Book -- Editor as Author

Temple, S. A., editor. 1978. Endangered birds: management techniques for preserving threatened species. University of Wisconsin Press, Madison, Wisconsin, USA.

Ratti

Chapter Within Book

Zeleny, L. 1978. Nesting box programs for bluebirds and other passerines. Pages 55-60 *in* S. A. Temple, editor. *Endangered birds: management techniques for preserving threatened species*. University of Wisconsin Press, Madison, Wisconsin, USA.

Theses or Dissertations

Tacha, T. C. 1981. Behavior and taxonomy of sandhill cranes from mid-continental North America. Dissertation, Oklahoma State University, Stillwater, Oklahoma, USA.

Journals – General Format

Miller, M. R. 1986. Molt chronology of northern pintails in California. *Journal of Wildlife Management* 50:57-64.

Journals in Press -- Year and Volume Known

Zelenak, J. R., and J. J. Rotella. 1997. Nest success and productivity of ferruginous hawks in northern Montana. *Canadian Journal of Zoology* 75:in press.

Journals in Press -- Year and Volume Unknown

Giudice, J. H., and J. T. Ratti. In Press. Biodiversity of wetland ecosystems: review of status and knowledge gaps. *BioScience*.

Symposia and Proceedings – Complete Volume

DeGraaff, R. M., technical coordinator. 1978. Proceedings of workshop on management of southern forests for nongame birds. U.S. Forest Service General Technical Report SE-14.

Symposia and Proceedings -- Individual Article

Dickson, J. G. 1978. Forest bird communities of the bottomland hardwoods. Pages 66-73 *in* R. M. DeGraaf, technical coordinator. Proceedings of workshop on management of southern forests for nongame birds. U.S. Forest Service General Technical Report SE-14.

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Symposia and Proceedings -- Part of a Numbered Series

Palmer, T. K. 1976. Pest bird control in cattle feedlots: the integrated system approach.

Proceedings of the Vertebrate Pest Conference 7:17-21.

Multiple Citations of the Same Author(s)

Peek, J. M. 1963. Appraisal of a moose range in southwestern Montana. *Journal of Range Management* 16:227-231.

_____. 1986. A review of wildlife management. Prentice-Hall, Englewood Cliffs, New Jersey, USA.

_____, and A. L. Lovaas. 1968. Differential distribution of elk by sex and age on the Gallatin winter range, Montana. *Journal of Wildlife Management* 32:553-557.

_____, _____, and R. A. Rouse. 1967. Population changes within the Gallatin elk herd, 1932-1965. *Journal of Wildlife Management* 31:304-316.

_____, and R. A. Rouse. 1966. Preliminary report on population changes within the Gallatin elk herd. *Wildlife Science* 82:1298-1316. (Note: fictitious citation used for example only.)

Government Publication

Lull, H. W. 1968. A forest atlas of the Northeast. U.S. Forest Service, Northeastern Forest Experiment Station, Upper Darby, Pennsylvania, USA.

Government Publication -- Part of a Numbered Series

Anderson, D. R. 1975. Population ecology of the mallard: V. Temporal and geographic estimates of survival, recovery, and harvest rates. U.S. Fish and Wildlife Service Resource Publication 125.

Ratti

Government Publication -- Agency as Author

National Research Council. 1977. Nutrient requirements of poultry. Seventh edition. National Academy of Science, Washington, D.C., USA.

Note: Cite in text as National Research Council (1977). For additional examples, see the LITERATURE CITED section of this manuscript.

TABLES AND FIGURES

Submit only essential tables and figures. Often tables overlap with presentation in the text, or the information can be easily printed in the text with less journal space. Do not present the same data in a table and a figure. Number tables and figures independently. In the text limit reference of tabular data to highlights of the most important information. Reference tables and figures parenthetically, and avoid statements such as "The results are shown in Tables 1-4." Prepare line drawings only for data that cannot be presented as clearly in a table. For general guidance follow CBE Style Manual Committee (1994:677-693).

Tables and figures should be able to stand alone (e.g., self-explanatory). Avoid reference to the text, and be sure the title includes the species or subject of the data, and where and when data were collected. In rare cases, titles or footnotes of tables and figures may be cross-referenced to avoid repeating long footnotes or the same data. However, this violates the "self-explanatory" rule and should be avoided.

Tables

Do not prepare tables for small data sets, those containing many blank spaces, zeros, repetitions of the same number, or those with few or no significant data. Put such data or a summary in the text. Day (1983) presents a practical discussion of tables.

For data that must be shown in a table, items that provide the most important comparisons usually read vertically, not horizontally. Construct tables for column-width (67 mm) printing. If the table will not fit in 1 column width, construct it for page-width printing not wider than 23 cm

Ratti

(9 inches). Some extra-wide tables can be printed vertically (e.g., *JWM* 50:192, 51:461), but such tables usually waste space. Extra-long and extra-wide tables require justification from the author.

Table titles may vary, but we recommend this sequence: (1) name of the characteristic that was measured (e.g., mass, age, density), (2) measurement unit or units in parentheses (e.g., cm, No./ha, M:100 F, or %), (3) name of organism or other entity measured (e.g., “of Canada geese”), and (4) location and date. Each part of the sequence can include >1 item (e.g., “Carcass and liver fat [%] and adrenal and kidney weight [mg] of white-tailed deer in Ohio and Michigan, 1975).”

Avoid beginning the title with superfluous words (e.g., The, Summary of, and Comparisons between) and words that can be presented parenthetically as symbols or abbreviations (e.g., %). Symbols such as *n* and % in the title seldom need repetition in table headings. Do not use abbreviations in table title, except within parentheses. However, use standard abbreviations and symbols (Appendix B) in the table body and in footnotes.

The lines printed in tables are called “rules,” and *JWM* standards are

1. None drawn vertically within the table.
2. Three rules across the entire table: below the title, below the column headings, and at the bottom. Type each as a single, continuous line.
3. Use rules that straddle subheadings within the column heading (e.g., *JWM* 50:48).
4. None to show summation; use “Total” or equivalent in the row heading.
5. Do not use rules to join the means in multiple-range tests. Use Roman upper-case letters instead of rules (e.g., 12.3A^a, 16.2A, 19.5B) where the superscript “a” references a footnote such as “^aMeans with the same letters are not different ($P > 0.10$)” (e.g., *JWM* 50:22). Upper-case letters may be used in a similar fashion to reference the relationship of data among columns (e.g., *JWM* 50:371).

Ratti

In column headings use straddle rules liberally to join related columns and reduce wordage (e.g., *JWM* 50:31). Label columns to avoid unnecessary print in the data field. For example, instead of " $\bar{x} \pm SE$," label \bar{x} and SE separately so that \pm need not be printed. Similarly, label sample size columns " n " instead of using numbers in parentheses in the data field.

Keep column- and row-heading words out of the data field. Type main headings flush left, and indent their subheadings (e.g., *JWM* 50:86). In the data field, do not use dashes (often misused to mean "no information") or zeros unless the item was measured, and 0, 0.0, or 0.00 correctly reports the precision. Similarly, respect digit significance in all numbers, particularly percentages. Do not use percentages where n is <26 , except for 1 or 2 samples among several others where n is >25 . Where the number of significant digits varies among data in a column, show each datum at its precision level; i.e., do not exaggerate precision. For P values only use 3 digits past the decimal and do not list $P = 0.000$; the correct form is $P \leq 0.001$.

For footnote superscripts use asterisks for probability levels and lower-case Roman (not italic) letters for other footnotes. Use this sequence for placing letters alphabetically: in the title, then left-to-right, and then down. Make certain that each footnote character in the title and table matches an explanation that is indented below the table. Left justify run-on lines of footnotes. Footnotes may be used to reduce cluttering the title and table with details. The most common errors in tables are single spacing, incomplete titles, naked decimal points, and ambiguous or unnecessary characters in the data field.

Figures

Most figures are either line (or computer) drawings or pictures ("picture" is used to distinguish scene or object photographs from photos of drawings). If possible, photographic prints should not exceed 20 x 25 cm. Submit 4 prints of a picture; for drawings submit either 4 prints or 1 print and 3 photographic copies. Retain original drawings to guard against loss or

Ratti

damage. Consult Allen (1977), Day (1983), and the CBE Style Manual Committee (1994:693-699) for additional guidance.

Type all figure captions on 1(or more) page(s). On the back of each figure lightly print (in soft pencil) the senior author's name, figure number, and "Top." Figure titles tend to be longer than table titles because figures are not footnoted. The title may be several sentences and include brief suggestions for interpreting the figure content.

Pictures.--Few pictures are accepted. They must have sharp focus, have high tonal contrast, a reference scale if size is important, a glossy finish, and must be unmounted. Letters, scales, or pointers can be drawn on the prints, but they must be of professional quality. Sets of 2-4 related pictures can be mounted as 1 figure if prints are the same width and will fit in a space 67 x <170 mm when reduced for printing. Label prints A, B, C, D or use "Top," etc., for reference in the figure title. Cropping improves composition of most pictures, but do not put crop marks on prints. Instead, put them on xerographic copies or sketches. Do not submit color prints unless you are able to pay for printing at approximately \$1,200/plate (as of 1997).

Line Drawings.--Consider whether a drawing can be printed column width (67 mm) or is so detailed that it must be printed page width (138 mm). The difference depends mainly on size of characters and lengths of legends drawn on the figure. If page width is necessary, consider omitting some of the detail and look for ways to shorten legends. Column-width figures are preferred (e.g., *JWM* 50:145).

Before revising the first sketch, determine the minimum height for letters, numbers, and other characters, which must be ≥ 1.5 mm tall after reduction for printing. Determine width in millimeters for the revised sketch. To determine the minimum height (mm) for characters, multiply the width by 0.0224 for column-width printing or 0.0109 for page-width printing. If in doubt as to printed width, use the column-width multiplier. The product is the minimum height in millimeters. Plan to use at least the next larger character height available. Hand-drawn lines and

Ratti

lettering and typewriter characters are not acceptable. We recommend professionally prepared line drawings. Lettering from modern personal computer graphics software and printers is acceptable.

For axis labels, use lower-case or italic letters where they are essential to the meaning, as in mathematical terms and most metric units (see subsection on Mathematics and Statistics and Appendix B). Otherwise use upper- and lower-case letters, which are more legible when reduced. Identify arbitrary symbols by legend within the figure (preferred) or, for those normally available to the printer (e.g., CBE Style Manual Committee [1994:693-699]), in the figure title.

TRANSMITTAL LETTER AND SUBMISSION

Check the most recent issue of the *JWM* for the name and address of the Editor in Chief. Send the manuscript with a transmittal letter that indicates you are submitting exclusively to the *JWM* and that no part of the manuscript has been published or is being considered for publication elsewhere. If any portion of the manuscript has been published or reported elsewhere, or if the manuscript relates to but does not duplicate other publications or manuscripts by the same authors, send 4 copies of each to assist referees and editors in assessing the submitted manuscript.

Theses and Dissertations do not constitute prior publication and need not be mentioned in the letter, but they should be cited in the manuscript. Similarly, abstracts of talks given at meetings do not constitute prior publication. Generally, unpublished reports that were required by sponsors and that were not distributed as part of a numbered series (or in other ways that might result in accession by libraries) do not constitute prior publication. Symposia proceedings are considered publications. Provide information that bears on ethical and copyright considerations and any other information that might facilitate review and editing.

REVIEW PROCESS

Manuscripts are submitted to the Editor in Chief who selects a minimum of 2 referees from *JWM* files and personal knowledge. The *JWM* has a board of Associate Editors (AE), each with

Ratti

specialized knowledge of subject areas. The manuscript is mailed to the referees and an appropriate AE. Referees are instructed to return their comments to the AE, who usually takes 1 of 2 actions after assessing the manuscript and review comments: (1) the manuscript is returned to the author(s) with suggestions for revision, or (2) the manuscript is rejected and the file is returned to the Editor in Chief (in both cases the author receives a copy of the review comments).

If the manuscript was returned to the author(s) for revision, the revised manuscript is reviewed again by the AE and either rejected, or returned to the Editor in Chief with a recommendation for acceptance. Sometimes the revision process requires several iterations before the AE makes a final decision.

A third referee may be selected if the editors feel it is necessary, (e.g., if referees differ widely in their opinions). Manuscripts returned to authors for revision must be returned to the AE within 6 months or the manuscript will be rejected, requiring resubmission. Final acceptance of manuscripts is decided by the Editor in Chief. Typically, the Editor in Chief follows the AE recommendation. However, the Editor in Chief may reconsider manuscripts that have been rejected or recommended for acceptance by an AE. Reconsideration of a rejected manuscript usually requires a convincing rebuttal letter from the authors.

For accepted manuscripts, authors are required to submit the final draft on diskette in word processor format (include text, followed by tables, and figure titles). Allen Press will typeset directly from the diskette; thus, incorporation of all final editorial changes is essential. Most word processor formats are acceptable; please label your diskette with operating system name and word processor format, including the version number.

The time between submission and final decision to accept or reject a manuscript averages 3-6 months, but varies from 3 to 20 months depending upon the number of revisions required and the time manuscripts are held by referees and authors. Manuscripts seldom are delayed in either

Ratti

editorial office more than 2-3 weeks during the review process. After acceptance, manuscripts usually are printed within 9-12 months.

ACKNOWLEDGMENTS

This section appears immediately before the LITERATURE CITED, should be brief, and include both initials (where appropriate) and the last name of individuals acknowledged.

Acknowledgments should be straightforward without qualifying adjectives. We thank G. A. Baldassarre, M. S. Boyce, C. E. Braun, H. E. Hodgdon, R. L. Lee, and M. M. Kirsch for review comments. G. C. White assisted with revision of the mathematics and statistics subsection. Portions of this manuscript have been extracted from Gill and Healy (1980) and Ratti and Ratti (1988) with permission of The Wildlife Society. This is Contribution 836, University of Idaho Forest, Wildlife, and Range Experiment Station. L. M. Smith was supported by the Caesar Kleberg Foundation for Wildlife Conservation.

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(Note: Many citations that were used in the guidelines text as examples do not appear in the LITERATURE CITED section above.)

(Immediately below the LITERATURE CITED section type the following in italics:)

Received

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Accepted

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Associate Editor:

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Table 1. Common expressions with superfluous words.^a

Superfluous wording	Suggested substitute
the purpose of this study was to test the hypothesis	I (or we) hypothesized
in this study we assessed	we assessed
we demonstrated that there was a direct	we demonstrated direct
were responsible for	caused
played the role of	were
on the basis of evidence available to date	consequently
in order to provide a basis for comparing	to compare
as a result of	through, by
for the following reasons	because
during the course of this experiment	during the experiment
during the process of	during
during periods when	when
for the duration of the study	during the study
the nature of	(omit by rearrangement)
a large (or small or limited) number of	many (or few)
conspicuous numbers of	many
substantial quantities	much
a majority	most
a single	one
an individual taxon	a taxon

Ratti

Table 1. Continued.

Superfluous wording	Suggested substitute
seedlings, irrespective of species	all seedlings
all of the species	all species
various lines of evidence	evidence
they do not themselves possess	they lack
were still present	persisted, survived
the analysis presented in this paper	our analysis
indicating the presence of	indicating
despite the presence of	despite
checked for the presence of	checked for
in the absence of	without
a series of observations	observations
may be the mechanism responsible for	may have caused
it is reasonable to assume that where light is not limiting	with light not limiting
in a single period of a few hours	in a few hours
occur in areas of North America	are in North America
adjacent transects were separated by at least 20 m	≥20 m apart
in the vicinity	nearby
separated by a maximum distance of 10 m and a minimum distance of 3 m	3-10 m apart

Ratti

Table 1. Continued.

Superfluous wording	Suggested substitute
the present-day population	the population
their subsequent fate	their fate
whether or not	whether
summer months	summer
are not uncommon	may be
due to the fact that	(omit by rearrangement)
showed a tendency toward higher survival	had higher survival
devastated with drought-induced desiccation	killed by drought

^aMack (1986:33). Reprinted with permission from the Ecological Society of America.

Table 2. Words that commonly need correction in *Journal of Wildlife Management* manuscripts.^a

Word and proper usage

accuracy (see precision): extent of correctness of a measurement or statement.

affect (see effect): verb, to cause a change or an effect; to influence.

among (see between): use in comparing >2 things.

between (see among): use in comparing only 2 things.

cf.: compare

circadian: approximately 24 hours.

continual: going on in time with no, or with brief, interruption.

continuous: going on in time or space without interruption.

diurnal: recurring every 24 hours; occurring in daylight hours.

effect (see affect): usually a noun, the result of an action; as an adverb (rare), to
bring about or cause to exist, or to perform.

e.g. (see i.e.): for example.

enable (see permit): to supply with means, knowledge, or opportunity; to make
possible.

ensure (see insure): to make certain or guarantee.

farther: more distant in space, time, or relation.

further: going beyond what exists, to move forward.

Ratti

Table 2. Continued.

Word and proper usage

i.e. (see e.g.): that is.

incidence (see prevalence): number of cases developing per unit of population per unit of time.

insure (see ensure): to assure against loss.

livetrapping: verb.

live trap: noun.

logistic: symbolic logic.

logistics: operational details of a project or activity.

mass (see weight): proper international use for measures of mass.

ovendry: adjective.

oven-dry: verb.

percent: adjective, adverb, or noun. Spell out only when the value is spelled out or when used as an adjective. Use “%” with numerals.

percentage: noun, part of a whole expressed in hundredths; often misused as an adjective, e.g., percent error, not percentage error.

permit (see enable): to allow, to give formal consent.

precision (see accuracy): degree of refinement with which a measurement is made or stated; e.g., the number 3.43 shows more precision than 3.4, but is not necessarily more accurate.

prevalence (see incidence): number of cases existing per unit of population at a given time.

Table 2. Continued.

Word and proper usage

sensu: as understood or defined by; used in taxonomic reference.

since: from some past time until present; not a synonym for "because" or "as."

presently: in the future, not synonymous with "at present" or "currently."

that (see which): pronoun introducing a restrictive clause (seldom preceded by a comma).

usage: firmly established and generally accepted practice or procedure.

utilization, utilize: avoid by using "use" instead.

various: of different kinds.

varying: changing or causing to change. Do not use for different.

very: a vague qualitative term; avoid in scientific writing.

weight (see mass): should seldom be used.

viz: namely.

which (see that): pronoun introducing a nonrestrictive clause (often preceded by a comma or preposition [for, in, or of which]); the word most often misused in *JWM* manuscripts.

while: during the time that. Use for time relations but not as synonym for "whereas," "although," and "similarly," which do not imply time.

^aAdapted in part from CBE Style Manual Committee (1994:123-125); also see Day (1983:123-125).

Ratti

Appendix A. Abbreviations for United States and Canadian political units. Spell out geographic locations given parenthetically in the text or in the LITERATURE CITED, but use ANSI abbreviations in tables, figures, and footnotes. Use U.S. Postal Service (USPS) abbreviations only in addresses with zip codes (e.g., author addresses). A blank means do not abbreviate.

Unit	ANSI	USPS	Unit	ANSI	USPS
U.S. and territories			U.S. and territories (continued)		
Alabama	Ala.	AL	Oklahoma	Okla.	OK
Alaska	Alas.	AK	Oregon	Oreg.	OR
American Samoa	Am. Samoa	AS	Pennsylvania	Pa.	PA
Arizona	Ariz.	AZ	Puerto Rico	P.R.	PR
Arkansas	Ark.	AR	Rhode Island	R.I.	RI
California	Calif.	CA	South Carolina	S.C.	SC
Canal Zone		CZ	South Dakota	S.D.	SD
Colorado	Colo.	CO	Tennessee	Tenn.	TN
Connecticut	Conn.	CT	Texas	Tex.	TX
Delaware	Del.	DE	Trust Territory Trust	Territ.	TT
District of Columbia	D.C.	DC	Utah	Ut.	UT
Florida	Fla.	FL	Vermont	Vt.	VT
Georgia	Ga.	GA	Virginia	Va.	VA
Guam		GU	Virgin Islands	V.I.	VI
Hawaii	Haw.	HI	Washington	Wash.	WA
Idaho	Id.	ID	West Virginia	W.Va.	WV
Illinois	Ill.	IL	Wisconsin	Wis.	WI
Indiana	Ind.	IN	Wyoming	Wyo.	WY
Iowa	Ia.	IA			
Kansas	Kans.	KS	Canadian provinces and territories		
Kentucky	Ky.	KY	Alberta	Alta.	AB
Louisiana	La.	LA	British Columbia	B.C.	BC
Maine	Me.	ME	Manitoba	Manit.	MB
Maryland	Md.	MD	New Brunswick	N.B.	NB
Massachusetts	Mass.	MA	Newfoundland	Newf.	NF
Michigan	Mich.	MI	Northwest Territories	Northwest Territ.	NT
Minnesota	Minn.	MN	Nova Scotia	N.S.	NS
Mississippi	Miss.	MS	Ontario	Ont.	ON
Missouri	Mo.	MO	Prince Edward Island	Prince Edward Isl.	PE
Montana	Mont.	MT	Quebec	Que.	PQ
Nebraska	Nebr.	NE	Saskatchewan	Sask.	SK
Nevada	Nev.	NV	Yukon Territory	Yukon Territ.	YT
New Hampshire	N.H.	NH			
New Jersey	N.J.	NJ	Other		
New Mexico	N.M.	NM	United States	USA	
New York	N.Y.	NY	New Zealand	N.Z.	
North Carolina	N.C.	NC	United Kingdom	U.K.	
North Dakota	N.D.	ND			
Ohio	Oh.	OH			

Ratti

Appendix B. Abbreviations commonly used in *Journal of Wildlife Management* tables, figures, and parenthetical expressions. Only those metric units and their appropriate prefixes (CBE Style Mananul Committee 1994:202-205, 206-218) identified with an asterisk may be abbreviated in the text. A blank means do not abbreviate.

Term	Abbreviation or symbol	Term	Abbreviation or symbol
Adult	ad	Logarithm, base e	*ln or log _e
Amount	amt	Logarithm, base 10	*log ₁₀
Approximately	approx	Male	M
Average	\bar{x}	Maximum	
Calorie	*cal	Meter	*m
Celsius	*C°	Metric Ton	t
Chi-squared	χ^2	Minimum	
Coefficient	coeff	Minute	*min
Coefficient of		Month	
correlation, simple	r	Month names	Jan, Feb, etc.
multiple	R	More than	*>
determination, simple	r^2	Number (of items)	No.
multiple	R^2	Observed	obs
variation	CV	Outside diameter	o.d.
Confidence interval	CI, $a \leq \bar{x} \leq a$ Or $\bar{x} \pm a$	Parts per billion	*ppb
Day		Parts per million	*ppm
Degrees of freedom	df	Percent	*%
Diameter	diam	Population size	N
Diameter, breast height	dbh	Probability	P
Equation(s)	eq(s)	Range	
Expected	Exp	Sample size	n
Experiment	exp.	Second	*sec
Female	F	Spearman rank correlation	r_s
F ratio	F	Square	sq
Gram	*g	Standard deviation (s)	SD
Gravity	g	Standard error (s_0)	SE
Hectare	*ha	Student's t	t
Height	ht	Temperature	temp
Hotelling's T^2	T^2	Trace ^a	tr
Hour(s)	*hr	Versus	vs.
Inside diameter	i.d.	Volt	*V
Joule	*J	Volume: liquid, book	vol, Vol.
Juvenile	juv	Watt	*W
Kilocalorie	*kcal	Week	
Lethal dose, median	LD ₅₀	Weight	wt
Less than	*<	Wilcoxon test	T
Limit	lim	Year	yr
Liter	*L	z-statistic	z

^aDefine in a footnote (e.g., tr = <1%).

EXXON VALDEZ TRUSTEE COUNCIL PROTOCOLS FOR INCLUDING INDIGENOUS KNOWLEDGE IN THE EXXON VALDEZ OIL SPILL RESTORATION PROCESS

INTRODUCTION, PURPOSE AND OBJECTIVES

Indigenous knowledge, including traditional ecological knowledge (TEK), provides an important perspective that can help the *Exxon Valdez* Oil Spill (EVOS) restoration effort by providing information and analysis of the environment and resources affected by the oil spill. Fishers, hunters, and gatherers have detailed descriptions of animal behavior and ecology. For many species, subsistence harvesters possess the following information:

- where it is found in any season
- what it eats
- how it moves from place to place
- when it mates
- where its young are born
- what preys on it
- how it protects itself
- how best to hunt for it
- population cycles

As astute observers of the natural world and as repositories of knowledge on the long term changes in their biophysical environment, practitioners of TEK can provide western biologists and ecologists with systematic and analytical observations that cover many years. While the differences between indigenous and scientific ways of knowing must be understood, restoration projects which successfully incorporate both perspectives will improve our collective understanding of the natural processes involved in the EVOS-affected region.

Working in and with Alaska Native communities requires sensitivity to their cultures, customs, traditions, and history. Successful working relationships are built on mutual respect and trust. The people of the communities of the oil spill area have experienced severe dislocations in their lives due to the *Exxon Valdez* Oil Spill. Subsistence and commercial fishing activities have been interrupted. Researchers and agency personnel have used the communities as logistical bases. Disruptions related to the clean up, litigation, and increased bureaucratic demands have impacted the people's ability to conduct their daily business. As a consequence of these stresses to their privacy and out of concern to preserve respect for their traditions, the Alaska Native communities of the area affected by the spill, assisted by EVOS staff, the Chugach Regional Resources Commission, and staff from Trustee Council agencies, have developed a series of protocols formalizing their relationship with outside researchers. These protocols provide a set of guidelines that will facilitate collaboration between Alaska Natives and scientists in meeting the goals of EVOS restoration. The protocols describe the major elements of a research partnership, but their application depends on common sense and courtesy. For those researchers planning to collaborate with local respondents in the collection of indigenous knowledge or whose proposed research directly affects subsistence activities, the EVOS Trustee Council requires consideration of these protocols prior to the initiation of research.

The objectives of these protocols are:

1. Provide guidelines for restoration project planning and review
2. Identify a set of ethical principles that establishes the parameters for a research partnership between Alaska Native communities and restoration scientists
3. Establish procedures for facilitating the collection of indigenous knowledge in restoration projects
4. Provide guidance on the development of research agreements between Alaska Native communities and researchers.

PROTOCOLS

1. Project planning and review.
 - a. In developing projects that include the collection and use of indigenous knowledge, researchers and community residents should keep in mind how this information will be used in improving restoration, management, education, and future research.
 - b. In designing restoration projects that include indigenous knowledge, researchers should recognize that local communities' knowledge of and interest in natural resources extends beyond the physical boundaries of the communities themselves to their harvest areas and beyond.
 - c. All research proposals involving indigenous knowledge will be reviewed by the TEK Specialist, the Community Facilitators, and village councils, and their recommendations will be forwarded to the Executive Director. The overall program of research involving indigenous knowledge will be reviewed annually.
 - d. Costs for incorporating TEK in a restoration project should be reflected in the project's budget.
2. Ethical principles. EVOS research which involves the collection and use of indigenous knowledge should follow the ethical principles for research listed below, which are based upon guidelines adopted by the Alaska Federation of Natives (AFN) Board of Directors in May 1993 (attached).
 - e. Advise Alaska Native communities and people who are to be involved in or affected by the study of the purpose, goals, and time-frame of the research, the proposed data-gathering techniques, and the potential positive and negative implications and impacts of the research.
 - f. Obtain the informed consent of the appropriate governing bodies and of individual participants
 - g. Protect the knowledge and cultural/intellectual property of the Alaska Native people
 - h. Seek to hire local community research assistants, and provide meaningful training to Alaska Native people to develop research skills, as appropriate
 - i. Use the local Alaska Native language in oral communications whenever English is the second language
 - j. Address issues of confidentiality of sensitive material
 - k. Include Alaska Native viewpoints in the final study report
 - l. Acknowledge the contributions of local research assistants and respondents in project reports

- m. Provide the communities with a summary of the major findings of the study in non-technical language.
- n. Provide copies of the annual and final project reports and related publications to the local library

The AFN Guidelines also include establishing and funding a ANative Research Committee.@ This may not be necessary in most EVOS Restoration Projects, depending upon the scope of the collection of indigenous knowledge and the wishes of the local community. Also, a new entity may not be necessary. For example, the traditional council may serve as such a review body. This point should be addressed in a Aresearch agreement,@ as discussed in #4, below.

3. Facilitating the collection of indigenous knowledge.

- o. Initial contacts should be made through the TEK Specialist hired under Project 97052B to discuss the potential collection of indigenous knowledge in a project. The TEK Specialist will then pass the requests on to the communities concerned, and assist in establishing contact between the researcher and the Community Facilitator. The TEK Specialist will also inform the Spill Area Wide Coordinator of such requests.
- p. Once contact has been established through the TEK Specialist, researchers should use the Community Facilitator or designee as the primary community contact.
- q. The Community Facilitator or designee will arrange for the researcher to meet with the Village Council (or other appropriate body authorized by the Village Council) to discuss the project's goals, scope, methods, expectations, benefits and risks. The Facilitator or designee will help orient the researcher to the community and its customs.

4. Research agreements. The researcher and the Village Council (or other appropriate body authorized by the Village Council), assisted by the Community Facilitator, will work together to set up a research agreement. In developing the agreement, the following topics should be considered: the nature of the research, the form of consent that will be required, the need for local research assistants, compensation of participants, acknowledgments, anonymity and confidentiality of personal and other sensitive information, project monitoring, project review, final disposition of data, and provision of study results. The agreement may take one of several forms, such as a binding contract, a memorandum of agreement, a letter of agreement, or a village resolution. In any agreement, the responsibility and expectations of the researcher and the community should be spelled out. Terms and conditions should be clear and understandable to all parties, should not place unreasonable or unfair burdens on the participants, and must be consistent with applicable laws.

AFN BOARD ADOPTS POLICY GUIDELINES FOR RESEARCH

At its quarterly meeting in May 1993, the AFN Board of Directors adopted a policy recommendation that includes a set of research principles to be conveyed to scientists who plan to conduct studies among Alaska Natives.

The principles will be sent to all Native organizations and villages in the hope that compliance by researchers will deter abuses such as those committed in the past which lately have come to light.

Alaska Natives share with the scientific community an interest in learning more about the history and culture of our societies. The best scientific and ethical standards are obtained when Alaska Natives are directly involved in research conducted in our communities and in studies where the findings have a direct impact on Native populations.

AFN recommends to public and private institutions that conduct or support research among Alaska Natives that they include a standard category of funding in their projects to ensure Native participation.

AFN conveys to all scientists and researchers who plan to conduct studies among Alaska Natives that they must comply with the following research principles:

- Advise Native people who are to be affected by the study of the purpose, goals, and time-frame of the research, the data-gathering techniques, the positive and negative implications and impacts of the research.
- Obtain the informed consent of the appropriate governing body.
- Fund the support of a Native Research Committee appointed by the local community to assess and monitor the research project and ensure compliance with the expressed wishes of Native people.
- Protect the sacred knowledge and cultural/intellectual property of Native people.
- Hire and train Native people to assist in the study.
- Use Native language whenever English is the second language.
- Guarantee confidentiality of surveys and sensitive material.
- Include Native viewpoints in the final study.
- Acknowledge the contributions of Native resource people.
- Inform the Native Research Committee in a summary and in non-technical language of the major findings of the study.
- Provide copies of studies to the local library.

**EXXON VALDEZ OIL SPILL TRUSTEE COUNCIL
PROCEDURES FOR STATE AND FEDERAL AGENCIES AND
THEIR CONTRACTORS FOR DESTROYING DOCUMENTS
OR PHYSICAL EVIDENCE RELATED
TO THE *EXXON VALDEZ* OIL SPILL**

When a state or federal agency, or a contractor for such an agency, determines that documents in any form (including written, electronic, photographic and magnetic) or physical evidence (such as tissue samples) which are related to the *Exxon Valdez* oil spill (EVOS) are no longer necessary for restoration or other purposes, there are certain requirements imposed by state and federal courts that must be met before the items can be destroyed. These requirements will vary depending upon the nature of the item, the date on which it was created or collected and whether it is unique. There are certain significant legal consequences if items are destroyed other than as prescribed by the courts. Please follow the procedures described below before you destroy one of these items.

1. Create an inventory of the items you wish to destroy that contains the following information for each item:

- a. A description of the item;
- b. The date the item was created or obtained by the governments or their contractors;
- c. A description of any analyses of the item, including the location of those analyses;
- d. Whether the item is unique or is a copy of a still existing original item.

2. Transmit the inventory to:

The Anchorage Environmental Section of the Alaska Department of Law at:
Environmental Section
Department of Law
1031 West 4th Avenue, Suite 200
Anchorage, Alaska 99501

or via Facsimile: (907) 278-7022

and to the U.S. Department of Justice, Environment & Natural Resources Division at:
801 B Street, Suite 504
Anchorage, AK 99501-3657

or via facsimile: (907) 271-5827

3. Attorneys for the State and United States will coordinate as necessary with the EVOS Trustee Council Science Director and the person wishing to destroy the item to determine what steps need to be taken to permit destruction and, where required, to confer with Exxon and other parties or submit applications for relief to the Court.

EXXON VALDEZ OIL SPILL TRUSTEE COUNCIL REVIEW PROCESS FOR RESEARCH PROJECTS THAT INVOLVE COLLECTIONS

The Trustee Council is appropriately sensitive to the collection (i.e., killing) of birds or mammals as part of any research project, for the Council's ultimate aim is to restore the health of the injured ecosystem. At the same time, it is recognized that in order for certain research projects to achieve their objectives, certain collections may be required to gather information that could not otherwise be obtained. As stated in the *Restoration Plan*, "... possible negative effects on resources and services must be assessed in considering restoration projects." (Policy #7)

Any scientific project that proposes a take of birds or mammals should be allowed to proceed only if the advantages of doing so outweigh the disadvantages. The general health of the population being sampled needs to be assessed and a finding made that proposed collection(s) would not result in further injury to the health of the population being investigated.

In order for the Science Director to recommend whether a proposed collection is necessary and appropriate to further restoration objectives, investigators should address each of the questions listed below. This information should be provided as a part of the project proposal.

1. How many individuals are proposed to be collected and at what approximate times and locations? How do these numbers compare with the total population in the general collecting area?
2. How is the general health of the population? Is the population increasing, decreasing or holding steady in the proposed sampling area? Is reproduction and young survival normal?
3. Is the proposed take likely to affect any population trends?
4. Is the proposed method of take humane? Are there any effective, alternative means to obtain the data?
5. What will be lost if there is no take allowed?
6. What can we realistically hope to learn that will justify this collection?
7. Have federal and/or state permits been secured? If not, why not?

The Science Director will review the proposed collection and consult with others with appropriate expertise. If appropriate, the Science Director could conduct this review concurrent with a federal and/or State permit review. The Science Director will then make a recommendation to the Executive Director. The Executive Director will inform the Program Advisory Committee and the Trustee Council of this recommendation in writing prior to final approval of a project proposal. All federal or State permits will be required prior to implementation of a project.

EXXON VALDEZ OIL SPILL TRUSTEE COUNCIL SUPPLEMENTATION CRITERIA

DISCUSSION

Supplementation describes artificial techniques that provide on-site survival benefits to natural fish populations. By this definition, supplementation must provide benefits to natural populations in the localities where they complete their life cycle. Examples of supplementation include constructing spawning channels to increase spawning habit, using rearing pens to increase marine survival, or providing remote-release salmon runs for the purpose of drawing fishing pressure away from injured wild stocks.

The Trustee Council recognizes that supplementation techniques are important tools for restoration of certain fish stocks. However, supplementation also has the potential to injure stocks of fish. Because of this potential, each supplementation proposal must show that it does not carry unacceptable risks.

Supplementation Criteria. To explore the opportunities and potential risks of supplementation, the Trustee Council sponsored a workshop on the subject in January 1995. The criteria and guidelines developed in the workshop will be used by the Trustee Council when considering supplementation projects for possible Trustee Council funding. They are summarized below.

Benefits of Supplementation. To be considered for Trustee Council funding, a supplementation proposal must demonstrate that its benefits outweigh its risks. Examples of benefits are rehabilitating of wild populations, providing additional population for harvest, or protecting subpopulations that may be in danger of extinction.

Genetic Risk. Genetic risk involves risk to the natural stocks being targeted, or to other non-targeted stocks. Genetic risk operates through the forces of natural selection, genetic drift, gene flow and mutation. The risks may have the effect of decreasing the adaption of natural populations to their environment, or making them more vulnerable to natural and human changes. The risks include: loss of genetic variation within natural breeding populations; change in genetic composition of the population through natural selection; or hybridization of the natural stock with supplemental stock of a different genetic character. All of these can lead to poor survival in future generations and loss of production. They can also make a local population less able to rebound from a change such as a year of overharvest, or a year of poor survival at sea. If a population or subpopulation has not been reduced from historic population levels, and is not in danger of extinction, supplementation proposals that involve significant genetic risk are not likely to be funded by the Trustee Council

Mixed-stock Fisheries. Supplementation proposals must not create or exacerbate problems in mixed-stock fisheries. Mixed-stock fisheries, like those of Prince William Sound, create the potential for additional risk and benefits. In some circumstances, the pressure for additional harvest that accompanies successful supplementation may cause

overharvest of an unsupplemented stock. For example, pink salmon returns to the Coghill District of Prince William Sound have not always met escapement goals. Fish returning to this district must “run the gauntlet” of fishing vessels in the southwest and western parts of Prince William Sound at the time when the fleet is focused on the large hatchery return in these areas. Thus, supplementation that increases the concentration of fishing vessels in this district has the potential to exacerbate this problem. Conversely, supplementation efforts, including techniques such as establishing alternative remote-release runs, which draw the fleet from these areas, may have the effect of allowing the Coghill District stocks to more regularly meet escapement goals.

Monitoring and Evaluation. Because of the potential for significant risk, an evaluation program is necessary to assess the likelihood of success and potential for risk. Once a proposal is implemented, monitoring is necessary to assess whether the program succeeded and whether significant harm was avoided. The degree of evaluation and monitoring should be dependent upon the level of risk. Those proposing higher risk projects should be willing to incur higher monitoring and evaluation costs than those proposing projects with lesser potential risk.

Economic Criteria. To the extent it is available, information regarding the economic costs and benefits of a project must be provided for the Trustee Council to evaluate a project. However, quantifiable economic data may not capture intangible values, such as the value of preventing the extinction of a subpopulation of a resource, and the Trustee Council may elect to approve a project with a quantified benefit/cost ratio of less than one after considering these non-quantified values.

Procedural Criteria. The State of Alaska requires permits for some types of supplementation—for example, a fish transport permit—or approval by the Regional (Salmon) Planning Team. These permits bring the substantial expertise of Alaska fisheries managers to the evaluation of supplementation projects. Proposals for Trustee Council funding should have cleared these requirements before the Council is asked to approve a project. Federal law requires an evaluation of potential environmental effects according to the standards of the National Environmental Policy Act. Because of the potential for risk, the analysis may require significant cost or time, but it must be completed before a final decision is made concerning funding a supplementation project.

EXXON VALDEZ OIL SPILL TRUSTEE COUNCIL INVESTMENT POLICIES

INTRODUCTION

The purpose of these policies is to provide the *Exxon Valdez* Oil Spill Trustee Council (the "Council") with a comprehensive set of guidelines for the proper management of its investment decisions. Pursuant to its responsibilities to administer natural resource damage recoveries from the Exxon Valdez oil spill, the Council must follow a procedurally prudent process when investing the Joint Trust Fund assets. Prudence is based on the conduct of the Council in managing the assets, and is evaluated by the *process* through which risk is managed, assets are allocated, custodians and managers are chosen, and results are supervised and monitored.

Today's standard of prudence places the emphasis on responsibilities related to the investment portfolio and its purpose, rather than on investment performance. The Council has the responsibility for the general management of the Joint Trust Fund's assets. It is responsible for setting and managing the Joint Trust Fund's investment policy. The Council is not an investment manager or investment specialist and is not responsible for the ultimate investment results. Although it is not possible to guarantee investment success, following the process outlined herein will significantly improve the odds of structuring an investment portfolio which will stand up to public scrutiny and benefit the Joint Trust Fund by providing an acceptable long-run return.

COUNCIL RESPONSIBILITIES IN GENERAL

Through a 1991 settlement of natural resource damage claims in *State of Alaska v. Exxon Corporation, et al., No. A91-083 CIV*, and *United States of America v. Exxon Corporation, et al., No. A91-082 CIV*, the State of Alaska and the United States, acting through trustees for natural resources injured by the Exxon Valdez oil spill ("Trustees"), are to jointly receive \$900,000,000 in damages payable over a term of years. A substantial portion of these damages are required to be segregated and used by the governments for purposes of restoring, replacing, enhancing, rehabilitating or acquiring the equivalent of natural resources and services lost or injured as a result of the oil spill. These monies, and the interest earned on them, are to be placed in a "Joint Trust Fund" administered by the Trustees. An integral part of this responsibility is to provide prudent and productive investment management of Joint Trust Fund assets and any other receipts as provided either by law or a decision of a Court of law.

A separate Memorandum of Agreement and Consent Decree (the MOA) entered into by the State of Alaska and the United States in *Civil Action No. A91-081*, described the co-management of these natural resource damage recoveries. The MOA specifies that the following officials act on behalf of the public as Trustees:

State of Alaska Members:

- Attorney General, State of Alaska;
- Commissioner, Alaska State Department of Environmental Conservation;
- Commissioner, Alaska State Department of Fish and Game;

U.S. Government Members:

- United States Secretary of Agriculture;
- United States Secretary of the Department of the Interior; and
- Administrator of the National Oceanic and Atmospheric Administration, United States Department of Commerce.

Subsequently the Council was created by the Trustees to manage the co-trustee relationship required under the MOA. The authority of the Council is governed by a 1992 Memorandum of Understanding ("MOU") between the state and federal Trustees. Under the terms of the MOA and MOU, all matters before the Council which require a vote, make a recommendation, approve or disapprove an item, or otherwise render a decision shall require the unanimous agreement of the six Council members or their designees.

The Council is responsible for the management of the Joint Trust Fund's assets. The Council has broad authority to engage experts and to delegate its investment responsibilities, as it deems appropriate. The Council, when formulating investment policies, has obligated itself to review the recommendations from the Executive Director. The Executive Director will consult with the Investment Working Group (IWG) and such other consultants as the Council may retain from time to time. The IWG consists of one state and one federal Council member or designee, as determined by the Council, and appropriate state and federal officials and at least two investment experts, who are selected by the Executive Director. At least two members of the IWG must have experience and expertise in financial management and the management of institutional investment portfolios.

The Joint Trust Fund is currently held in the registry of the United States District Court and invested by the Court Registry Investment System. In 1999 Public Law 106-113 was enacted, allowing the Joint Trust Fund to be invested in accounts outside the United States Treasury. Under that legislation, such outside investments are limited to income-producing asset classes, including debt obligations, equity securities, and other instruments or securities that have been determined by unanimous vote of the Council to have a high degree of reliability and security. The Joint Trust Fund is also to be managed and allocated consistent with the Resolution of the Council adopted March 1, 1999 concerning the Restoration Reserve.

MISSION STATEMENT

The Council shall establish policy, set direction, and provide oversight and stewardship for the prudent investment and management of the Joint Trust Fund.

INVESTMENT OBJECTIVES IN GENERAL

1. Achieve superior administrative and investment performance on a consistent basis when measured against a national universe of public funds.
2. Actual returns will equal or exceed target returns over time while limiting total risk to that which is appropriate to the investment time horizon.
3. Use the best known processes consistent with the Council goals and objectives, specifically but without limitation:
 - Good financial reporting;
 - Good custodian selection and evaluation;
 - Good manager selection and evaluation;
 - Asset allocation; and
 - Awareness of new investment alternatives.
4. Use excellent management practices, as evidenced by:
 - Staff longevity;
 - Independence; and
 - Education and training.
5. Regularly communicate the investment goals, objectives and performance results with the public.

STATUS

Section 311(f) of the Federal Water Pollution Control Act, as amended 33 U.S.C. 1321 (f) establishes liability to the United States and to States for injury, loss, or destruction of natural resources resulting from the discharge of oil or the release of hazardous substances or both and provides for the appointment of State and Federal Trustees.

The Memorandum of Agreement and Consent Decree (MOA) entered into by the State of Alaska and the United States in Civil Action No. A91-081, governs the use of the natural resource damages, paid by Exxon. The State and Federal Governments act as co-trustees in the collection and joint use of all natural resource damage recoveries for the benefit of natural resources injured, lost or destroyed as a result of the 1989 *Exxon Valdez* oil spill.

The terms of the settlement are contained in the Agreements and Consent Decrees entered into by the State of Alaska and Exxon Corporation Civil Action No. A91-083, and United States of America and Exxon Corporation Civil Action No. A91-082.

The United States Congress in Public Law 102-229 recognized the MOA and Consent Decree. Alaska State Legislature recognized the MOA and Consent Decree in AS 37.14.400.

Pursuant to Public Law 106-113, Joint Trust Funds may be deposited in the Natural Resource Damage Assessment and Restoration Fund and/or accounts outside the United States Treasury. The law requires that the funds are invested only in income-producing obligations and other instruments or securities that have been determined unanimously by the Council to have a high degree of reliability and security.

Guidance regarding the authorities and responsibilities of agencies that receive Joint Trust Funds is incorporated in the Procedures of the *Exxon Valdez* Oil Spill Trustee Council, adopted August 29, 1996.

ADMINISTRATION

The Executive Director and the Trustee Council Office manage the day-to-day administrative functions of the Council, and report directly to the Council. The 1993 Agreement between the State of Alaska and the *Exxon Valdez* Oil Spill Trustee Council requires that the State create and assign an exempt position, designated as the Executive Director of the *Exxon Valdez* Oil Spill Trustee Council, to be responsible to the Council. The State is further required to create and assign exempt positions from the State service to be responsible to the Executive Director for such senior positions under the Executive Director as are approved by the Council.

Any person appointed to the position of Executive Director to the Council shall serve at the pleasure of the Council and may be removed from the position only upon the unanimous vote of all members of the Council. Any person appointed to a senior staff position by the Executive Director shall serve at the pleasure of the Executive Director. Removal of any of these individuals, including the Executive Director, need not be based on cause and no property or other interest in continued employment is or may be created. An organization chart of the Trustee Council Office is shown on Table 1.

The Executive Director of the *Exxon Valdez* Oil Spill Trustee Council shall engage experts and contract for investment services, as the Council deems appropriate. This may involve entering into 'reimbursable services agreements' with State and/or Federal agencies (e.g., the Alaska Department of Revenue and/or the United States Department of the Interior) for personal services costs and associated contractual costs.

GENERAL RESPONSIBILITIES FOR THE PARTIES

Without limitation of any fiduciary, administrative, or other responsibilities, implied or expressed herein, the parties shall have the following responsibilities for the proper management and administration of the Joint Trust Fund. The parties shall include:

- Trustee Council
- Executive Director/Trustee Council Office Staff
- Investment Working Group
- Auditor
- Legal Counsel

- Bank Custodian(s)
- Investment Consultant(s)
- Investment Managers

Trustee Council

- Adopt prudent investment goals and objectives;
- Adopt an appropriate asset allocation strategy;
- Select one or more consultants, bank custodians, external investment managers, and legal counsel who may include the Alaska Department of Law and the United States Department of Justice;
- Control investment and administrative expenses, and incur only those costs that are reasonable in amount and appropriate to the investment responsibilities of the co-trusteeship;
- Provide for an annual, independent audit of the Joint Trust Fund's financial statements;
- Provide for an independent review of investment performance;
- Develop an annual budget;
- Adopt and implement an investment education policy;
- Report financial and investment policies and performance to the public; and
- Avoid conflicts of interest, and conform to the fundamental fiduciary duties of loyalty and impartiality.

Executive Director/Trustee Council Office Staff

- Maintain responsibility for the administration and management of the Trustee Council Office;
- Facilitate staff, which performs the administrative functions of the Council and ensures compliance with State and Federal law, the Memorandum of Agreement and Consent Decree, and the Memorandum of Understanding;
- Recommend budget strategies and proposals to the Council;
- Coordinate all administrative matters of the Council, including meeting agendas;
- Make recommendations concerning policies, investment strategies, and procedures in consultation with the Investment Working Group;
- Advise the Council regarding the selection of custodians, an investment consultant, and investment managers in consultation with the Investment Working Group;
- Account for and report on the investment activity of all funds under the investment responsibility of the Council;
- Advise the Council on the evaluation of investment policies and performance of the portfolios in consultation with the Investment Working Group;
- Develop, recommend and implement internal control policies and procedures in consultation with the Investment Working Group to ensure all investment assets are safeguarded;
- Monitor investment managers and custodians for compliance with investment policies established by Council; and
- Recommend and maintain the information systems adequate to fulfill the accounting, monitoring, investing, cash management and other information needs of the Council, in consultation with the Investment Working Group.

Investment Working Group

- Review investment policies, strategies and procedures;
- Make recommendations to the Executive Director concerning policies, investment strategies and procedures;
- Advise the Executive Director regarding the selection of custodians, an investment consultant, and investment managers;
- Provide other advice as requested by the Executive Director;
- Attend the asset allocation and investment manager performance review meetings of the Council;
- Brief the Council at the Executive Director's request and/or at the request of a member of the Investment Working Group;
- Act as "prudent expert" on behalf of the Executive Director;
- Develop and recommend investment policy and strategy to the Executive Director;
- Develop and recommend internal control systems and procedures to the Executive Director to ensure all investment assets are safeguarded;
- Recommend to the Executive Director information systems adequate to fulfill the accounting, monitoring, investing, cash management and other information needs of the Council; and
- Advise the Executive Director on the evaluation of investment policies and performance of the portfolios.

Auditor

- Measure and validate financial statements and management of the Joint Trust Fund;

Background Note:

The auditor is selected by the Council. However, the Council does not have a direct say over the work of the auditor because audits are based upon an independent review of financial statements consistent with the standards prescribed by the American Institute of Certified Public Accountants in conformance with generally accepted accounting principles and Government Accounting Standards Board guidelines.

Legal Counsel

- Provide legal assistance and advice to the Council as required.

Bank Custodian

- Provide safekeeping and custody of all securities purchased by managers on behalf of the Council;
- Provide for timely settlement of securities transactions;
- Maintain short-term investment vehicles for investment of cash not invested by managers;
- Check all manager accounts daily to make sure that all available cash is invested;
- Collect interest, dividend and principal payments on a timely basis;
- Process corporate actions on a timely basis;
- Price all securities at least on a monthly basis, preferably on a daily basis contingent on asset class and types of securities;
- Lend securities at the direction of the Council;
- Value and monitor derivatives and the trades from which they emanate;

- Provide monthly, quarterly and annual reports;
- The Custodians generally are asked to provide data and reports directly to the Council and service providers on a regular basis; and
- Provide continuing education programs for the Council.

Investment Consultants

- Recommend strategic procedures and process;
- Identify problems, issues and opportunities and makes recommendations;
- Upon the request of the Council, prepare an asset allocation study together with alternatives;
- Assist with manager structure, selection, monitoring and evaluation;
- Monitor and evaluate the overall performance of the portfolio;
- Carry out special projects at the request of Council; and
- Provide continuing education to the Council and staff, as appropriate.

Background Notes:

The Council selects and appoints investment consultants to provide objective, independent third-party advice on specific investment classes, including debt and equity securities, real estate, alternative investments, and other areas where focused attention is needed. Investment consultants do not accept discretionary decision-making authority on behalf of Council. Investment consultants function in a research, evaluation, education and due diligence capacity for Council and are fiduciarily responsible for the quality of the service delivered.

Investment Managers

- Act as a “prudent expert” on behalf of the Council;
- Develop a portfolio strategy within the specific mandate and asset size determined by the Council;
- Manage, purchase and sell assets for the portfolio; and
- Act as a co-fiduciary for assets under its management.

RESPONSIBILITIES OF THE COUNCIL

The statutory responsibility of the Council is to invest Joint Trust Fund monies in income-producing obligations and other instruments or securities that have a high degree of reliability and security. Although it is a matter of debate whether the Joint Trust Fund is a true trust or simply a misnomer for public money restricted to a particular use, the statutory responsibilities of the Council in the management of the Joint Trust Fund are best defined through analogy to the Restatement (Third) of Trusts which indicates that trust property shall be made productive with primary emphasis on the preservation of capital and due consideration for the maximization of income. When investing trust

property, the trustee has a duty to conform to the terms of the trust, and to conform to applicable law in the absence of provisions in the trust. In the absence of contrary law or trust provisions it imposes the standard of the “prudent investor” which

“ . . . requires the exercise of reasonable care, skill, and caution, and is to be applied to investments not in isolation but in the context of the trust portfolio and as a part of an overall investment strategy, which should incorporate risk and return objectives reasonably suitable to the trust.”

Restatement (Third) of Trusts, §277

The standard of the “prudent investor” has been viewed as approving a portfolio theory of investments but does not impose a duty to maximize income. Indeed, the standard gives primary emphasis to preservation of the trust estate, while receiving a *reasonable* (emphasis added) amount of income rather than incur undue risks. Only where all else is equal should the trustee choose the investment that produces the greater return. In addition, the trust must be invested in such a way that the purpose of the trust is not thwarted. It is therefore imperative that investment policies and asset allocation strategies adopted by the Council reflect the underlying purposes and intent of the Joint Trust Fund.

Looking to the Restatement (Third) of Trusts, therefore, the responsibilities of the Council can be summarized as follows:

1. Take all actions for the sole benefit of the Joint Trust Fund.
2. Prepare written investment policies and document the process. In doing so the Council shall:
 - Determine the mission and objectives of the Joint Trust Fund;
 - Choose an appropriate asset allocation strategy;
 - Establish specific investment policies consistent with the Joint Trust Funds’ objectives; and
 - Select investment managers to implement the investment policy.
3. Diversify assets with regard to specific risk and return objectives appropriate to the intended use of the Joint Trust Fund.
4. Use “prudent experts” to make investment decisions.
5. Control investment expenses.
6. Monitor the activities of all investment managers and investment consultants.
7. Avoid conflicts of interest.

The Council and staff should regularly undertake continuing education relevant for their duties. Specifically, all Council members and key staff should participate in an educational program, which provides basic instruction on the four primary components of the investment management process:

- Investment responsibility and procedural process;
- Developing investment policy guidelines and designing optimal investment manager structures;
- Implementing investment policy; and
- Monitoring and controlling an investment program.

INDEMNIFICATION

State law, [AS 37.10.071(e)] provides that the State shall indemnify fiduciaries of a state fund or an officer or employee of the state against liability under AS 37.10.071(d) for breach of a statutory duty in exercising investment, custodial, or depository powers or duties to the extent that the alleged act or omission was performed in good faith and was prudent under the applicable standard of prudence. However, actions which do not fall within the area of good faith and prudent practices are not statutorily entitled to indemnification. Indemnification language consistent with AS 37.10.071(e) as well as the desire of State trustees to hold retained investment managers and other retained fiduciaries to high standards are included in contract language with such retained consultants.

The Trustee Council may wish to ensure that trust assets and its own services are protected and in that respect may purchase insurance or provide for self-insurance to cover the acts including fiduciary acts, errors and omissions of its members and agents.

As a general matter, the Attorney General has advised members of State boards analogous to that of the Council that it would act in defense of such board member actions consistent with the provisions of AS 37.10.071(e), or would retain counsel to act in that regard. There are no comparable indemnification provisions under federal law. Federal employees are normally represented by the United States Department of Justice in litigation arising out of their official duties.

A fiduciary of a state fund under Alaska law relating to the Council would be each person provided by law to manage investments in an account invested by the State of Alaska (AS 37.10.071(f)(3)). In this respect, the consultants retained by State trustees are not fiduciaries per se and as such are not entitled to the cross-indemnification for acts which were taken in good faith or within the scope of prudent behavior under AS 37.10.071. However, such consultants would certainly be held to a standard of care applicable to their standards of professional responsibility, and liability and a requirement to indemnify the Joint Trust Fund may be built into contracts. Auditors and investment consultants are not fiduciaries of a state fund within the statutory definition of AS 37.10.071(f). However, a custodial bank may have certain fiduciary obligations to the extent that, for example, it is involved in short-term cash management and securities lending functions if such services are utilized.

DELEGATION OF AUTHORITY

The Council, through the appropriate state and/or federal agencies, may contract for investment, custodial or depository services on a discretionary or non-discretionary basis to the State and Federal governments and their employees, or to independent investment management firms, banks, financial institutions or trust companies by designation through appointments, contracts or letters of authority.

CODE OF ETHICS AND CONFLICTS OF INTEREST

The State trustees and employees of the Trustee Council Office are subject to the Alaska Executive Branch Ethics Act (AS 39.52). In general, the State law provides that high moral and ethical standards are essential for the conduct of free government and that a Code of Ethics for the guidance of public officers will discourage those officers from acting upon personal or financial interests in the performance of their public responsibilities, and will improve standards for public service and promote and strengthen faith and confidence in public officers.

The State Code of Ethics provides that any effort to benefit a personal or financial interest through official action is a violation. The Code details specific prohibitions pertaining to the abuse of official position, acceptance of gifts, improper use of disclosure of information and improper influence. By law, the State trustees are subject to conflict of interest disclosure requirements of AS 39.50 which includes the delivery of annual reports on financial and business interests to the Alaska Public Officers Commission.

All federal government employees are subject to the standards of conduct provided by the Ethics in Government Act of 1978, Public Law 95-521, as amended, including the Ethics Reform Act of 1989, Public Law 101-194. The statutory prohibitions are found in Title 18 of the United States Code, Sections 201 through 209, which include representational activities, conflict of interest, and dual compensation. Standards of conduct for all government employees are also delineated by Executive Order 12674, as amended by Executive Order 12731. The federal standards of conduct are further delineated in the regulations of the Federal Register, and include acceptance of gifts from outside sources; gifts between employees; gifts from foreign sources; acceptance of travel and related expenses; outside work; honoraria; outside activities; political activity; lobbying; procurement; misuse of government time, equipment, and information; nepotism; negotiating for non-federal employment; post employment; disclosure of financial interests; and penalties. The Department of the Interior, Commerce and Agriculture have additional ethics standards and requirements for all of their employees, including annual training and financial disclosure statements for specific persons, which include members of the Trustee Council.

STRATEGIC ASSET ALLOCATION POLICY IN GENERAL

The Council recognizes that strategic asset allocation is the single most important policy decision affecting portfolio return and risk. At least annually, the Council will evaluate its current strategic asset allocation policies. The current policies will be compared with potential alternative policies on a consistent basis.

The specific status of the Joint Trust Fund, including funding status, earnings assumptions, liquidity requirements, and expected growth shall be considered. The Council's investment consultant will use a "mean variance" optimization approach to evaluate the current and alternative policies. The specific inputs to the modeling process will be defined and contrasted with actual historic results. The implications for expected return and risk will be considered over multiple time horizons. The development of optimized asset allocations requires estimates of risk (standard deviation of returns for each asset class), the modeled return for each asset class, and the correlations of each asset class with other asset classes. The strategic analysis will include those asset classes for which the Council believes reasonable inputs are available. Asset subsets where meaningful historic data are not available shall not be considered as a part of the strategic asset allocation analysis. Such subsets or categories, however, may be included as part of an appropriate broad asset category.

Manager Structure

Within each major asset category, the Council will determine an appropriate management structure. The structure analysis will consider the potential benefits, risks and costs associated with utilizing active versus passive investment approaches, varied investment philosophies and approaches and vendor diversification.

For each major asset category, the Council will strive to achieve a structure that assures potential exposure to the entire asset category. Particular emphasis, however, may be placed on those subcategories or approaches where the Council has determined the potential benefits are superior to alternative approaches. For example, with respect to international exposure, the management structure may result in a systematic asset allocation bias in favor of developed markets and a corresponding bias against emerging market. Similarly, with respect to domestic equities, the structure decisions may result in a slight bias in favor or against a particular investment style. All such decisions shall be conscious decisions. Unless explicitly decided to the contrary, assets within each major asset category shall be allocated among managers so as to achieve broad diversification and aggregate return and risk profiles similar to the broad market.

At least annually, the Council shall review its management structure to ascertain that desired diversification is being achieved. The Executive Director, in consultation with the IWG, staff, and investment consultants shall prepare such analysis and recommendations for the Council's consideration.

Manager Selection

A rigorous, objective due diligence process will be utilized in the selection of all investment managers retained by the Council. The analysis will be conducted by the Council's investment consultant. The managers' roles in the Council program and specific evaluation criteria will be defined prior to the identification of potential candidates. Candidates will be evaluated both quantitatively and qualitatively.

- Quantitative factors will include a comprehensive analysis of historic performance over a variety of market environments. Candidate performance will be evaluated relative to appropriate market indices and peer groups. Candidates will be analyzed

to determine whether portfolio construction has adhered to their stated investment styles.

- Qualitative factors such as ownership structure, depth of staff, professional expertise, experience managing comparable portfolios, key employee incentives, stability, and potential conflicts of interest also will be considered.

The consultant will identify a semi-finalist group of candidates. All semi-finalists will be judged by the consultant as capable of meeting the Council's needs. The Council will interview all or a portion of the semi-finalist group and make the final selection. The IWG's recommendations to the Executive Director shall be solicited as an integral part of this process.

Guidelines for Manager Termination

The performance of the Council's investment managers will be monitored on an ongoing basis. The Council may place a manager on a "Watch List" or terminate a manager at any time. The Council may, by separate resolution, adopt specific criteria to be utilized in identifying developments, which would cause a manager to be placed on a "watch list" and removed from such a list.

Securities Lending

The Council may enter into a securities lending arrangement with an agent(s) when the Council concludes that such arrangements would be beneficial to the Joint Trust Funds. Securities lending services may be provided by the Council's bank custodian or an independent service provider. Securities lending programs result in the agent undertaking a direct or indirect asset management function. The Council will use the same skill and due diligence in the evaluation and selection of such agent(s) as utilized in the selection of money managers.

Rebalancing Guidelines

The Council may periodically instruct staff to shift and/or limit staff's authority to shift assets within asset classes and/or among asset classes. Unless restricted by Council action, the Executive Director or an appropriate designee shall have discretion to move assets among investment managers and asset categories provided that such actions are consistent with movement of the actual asset allocation within the variability bands of the Council's strategic asset allocation policy and manager structure targets. Such adjustments to the actual asset allocation may be made without prior Council approval when the actual asset allocation falls outside of the variability target bands at end of a calendar month. The Executive Director shall make the necessary adjustments to the initial target allocation within 30 calendar days. Staff shall report any asset shifts at the next regular Council meeting. Such reports will include a description of the rationale for the shift.

INDIVIDUAL ACCOUNT PROGRAM OBJECTIVES

The Council is responsible for the prudent investment of the Joint Trust Fund within the defined purpose and investment objectives of each program mandated by law and policies

of the Council. The Council anticipates that the Joint Trust Fund (Restoration Reserve), along with other unallocated funds and accrued interest, will have a fair market value of approximately \$170 million on or about October 1, 2002. Consistent with the March 1, 1999 resolution funds in the Restoration Reserve and other remaining unobligated settlement funds available October 1, 2002, shall be allocated in the following manner:

- \$55 million of the estimated funds remaining on October 1, 2002 and the associated earnings thereafter will be managed as a long-term funding source, with a significant proportion of these funds to be used for small parcel habitat protection.; and
- The remaining balance of the funds on October 1, 2002 will be managed so that the annual earnings, adjusted for inflation, will be used to fund annual work plans that include a combination of research, monitoring, and general restoration.

Consequently, the Joint Trust Fund has a twofold investment mandate: (1) short-term liquidity for ongoing habitat restoration purposes, including the probable acquisition of lands, and (2) a long-term endowment to generate future income. Future land purchases are subject to ongoing negotiations and the timeline of their corresponding investments cannot be determined until such negotiations are concluded. The investment horizon of these funds would change based upon the probable acquisition date.

Each program mandate shall be evaluated relative to an appropriate market benchmark and also relative to an appropriate peer group of competitive alternatives. The number of investment options and the market benchmarks shall be determined by the Council.

STATEMENT OF INVESTMENT OBJECTIVES AND POLICIES

Introduction

The Council hereby establishes the following Statement of Investment Objectives and Policies ("the Statement") for the investment of the Joint Trust Fund. The Council assumes full and complete responsibility for establishing, implementing and monitoring adherence to the Council's policies. The Council reserves the right at any time to amend, supplement or rescind this Statement.

Investment Objectives

- Provide adequate liquidity for ongoing restoration purposes.
- Preserve the inflation-adjusted value of invested capital on endowment funds.
- Realize competitive, total rates of return.
- Incur minimum levels of risk that are appropriate to other long-term investment objectives.

Time Horizon

- Establish short and long-term investment objectives
- Evaluate performance over one-, three-, and five-year time periods, with primary emphasis for endowment funds placed on the longer time periods.

Benchmarks

Given the investment objectives and time horizons of the Joint Trust Fund, benchmarks are established to gauge progress towards their achievement. The benchmarks are as follows:

- Variability of total market value. The percentage change in the market value shall be contrasted to that expected from normal investment strategy.
- Competitive rates of return. (Unless specified otherwise, the following benchmarks are based on time-weighted rates of return.)
 1. For liquidity purposes, total annualized returns equal to inflation as measured by the U.S. Consumer Price Index of all Urban Wage Earners.
 2. For endowment purposes, the total annualized returns shall be established by separate resolution and shall be in excess of inflation as measured by the U. S. Consumer Price Index of all Urban Wage Earners.
 3. Total annualized returns should equal or exceed the return on a *passively* managed (market index based) portfolio with the same asset mix as the normal strategic asset mix.
 4. Total Joint Trust Funds' annualized returns should exceed the median return on an *actively* managed portfolio with the same asset mix as the normal strategic asset mix and comparable risk.
 5. The time-weighted, total rates of return shall be compared to the total rates of return for similar public funds.
- Passively Managed Strategic Benchmark. Performance shall be compared on a quarterly basis to that of a passively managed strategic benchmark. On a biannual basis, performance will be presented to the Council. However, the main purpose of this comparison shall be to contrast the long-term, actively-managed, pre-investment fee performance results versus that of a passively managed portfolio with an asset mix identical to the normal strategic asset mix. The passively managed strategic benchmarks shall be as follows:

Asset Class	Market Indexes
Cash	90-Day U.S. Treasury Bills
Broad Domestic Equity	Russell 3000 Index
Domestic Large Cap	S&P 500 Index
Domestic Small Cap	Russell 2000 Index
International Equity	EAFE Index
Domestic Fixed Income	Lehman Aggregate Index
Intermediate Fixed Income	Lehman Intermediate Gov't Index
International Fixed Income	Salomon Non-Dollar Gov't Bond Index

On a quarterly basis, an independent contractor shall calculate the *passively* managed strategic benchmark by multiplying the respective index total return times the normal strategic asset mix percentage. These statistics will be summed to generate a weighted average total passively managed benchmark return. For periods longer than one quarter, the quarterly returns, in factor form, will be chain-linked. In the case of periods longer than one year, the return shall be annualized.

- Actively Managed Strategic Benchmark. On a quarterly basis, an independent contractor shall calculate the *actively* managed strategic benchmark by multiplying the median actively managed portfolio return for each asset class segment times the normal strategic asset mix percentage. These statistics will be summed to generate a weighted average total actively managed benchmark return. For periods longer than one quarter, median returns for each asset class segment shall be determined for the length of the period and then multiplied times the appropriate normal strategic mix percentage. Those statistics will also be summed to generate a weighted average total actively managed strategic benchmark return.
- Asset Class Segments. To maintain an efficient risk/return profile and for the purpose of setting objectives and policies for the different asset classes, assets shall be structured into domestic equity, international equity, domestic fixed income, and international fixed income segments. Collectively and/or individually, portfolios shall be called Managed Account(s), whether the investments are direct or through units of commingled funds. Managed Account investments shall be made with the care, skill, prudence and diligence under the circumstances then prevailing that a prudent investor acting in a like capacity and familiar with these matters would use in the conduct of Trust Funds of like character and with like aims.

EXXON VALDEZ OIL SPILL TRUSTEE COUNCIL GULF OF ALASKA ECOSYSTEM MONITORING AND RESEARCH PROGRAM PROCESS FOR PROVIDING SCIENTIFIC AND TECHNICAL ADVICE AND PEER REVIEW

I. DESCRIPTION OF PROCESS FOR SCIENTIFIC ADVICE

The GEM Program is a long-term monitoring and research program, responsive to the needs of resource management agencies, stakeholders and the public, consistent with the program's mission and goals, and held to a high standard of scientific excellence. The process for providing scientific and technical advice includes 1) advice on the program as a whole; 2) advice at the individual project level; and 3) peer review of all proposals and reports.

The GEM scientific advice process builds upon the Trustee Council's successful record of 13 years of peer-reviewed science. This process will be implemented by staff to the *Exxon Valdez* Oil Spill Trustee Council; a committee structure consisting of a Scientific and Technical Advisory Committee (STAC) and related subcommittees and work groups; and a periodically convened independent review committee (see Figure 6.1 below). Programmatic and technical review largely will be separated. This process will be reviewed and refined over time, as experience with program implementation permits better understanding of the Trustee Council's needs for scientific advice under GEM.

In addition to scientific advice provided by the proposed STAC and subcommittees, the Trustee Council also relies on advice from the Program Advisory Committee, other members of the public, and trustee agency staff. The Executive Director is expected to take this broad spectrum of advice into account when resolving conflicting issues and developing recommendations for Trustee Council consideration.

A. Staff

Since the Trustee Council receives information and guidance from a number of sources, the Council relies on its Executive Director to ensure that all advice and reviews are organized and summarized to assist the Council's decision-making. The Executive Director reports directly to the Trustee Council and has the ultimate responsibility for implementing all the Trustee Council's programs, policies and procedures.

The Executive Director will be assisted by a Senior Science Advisor for Oil Spill Effects, a Science Director and other staff.

The Senior Science Advisor for Oil Spill Effects will provide advice on direct oil-spill related injury and recovery, including peer review of related project proposals and reports. This position will chair the Oil Effects Subcommittee and report the committee's recommendations to the STAC.

The Science Director will assist the Executive Director by 1) providing scientific leadership for the GEM Program; 2) serving as GEM's primary scientific spokesperson and a non-voting permanent co-chair of the STAC; 3) coordinating the scientific committee structure; and 4) ensuring that the GEM Program is implemented with a high standard of scientific excellence. This role is expected to adapt to the changing needs of the growing GEM program.

B. Committee Structure

Scientific and Technical Advisory Committee (STAC). The STAC is a standing committee that is expected to provide the primary scientific advice to the Executive Director on how well the collection of proposed monitoring and research projects (the Work Plan) and the overall GEM Program meet the mission and goals of the Trustee Council (GEM Program Document Vol. I, Chapter 1) and test the adequacy of the GEM conceptual foundation (see Figure 4.3). As needed and appropriate, the STAC may participate in and/or lead the peer review process of proposals and project reports.

Subcommittees. The subcommittees are standing committees organized to address the "nuts and bolts" of developing and implementing projects responsive to the Council's needs, coordinating among scientists and other interested parties, and helping to organize technical peer review of individual proposals.

Work groups. *Ad hoc* work groups are subcommittees temporarily formed to address specific issues. They have a specific purpose and a limited duration.

C. External Review Committee

Periodically (every five to ten years), the Trustee Council will contract with an external entity, such as the National Research Council, to review the entire GEM Program.

II. ESTABLISHING AND MAINTAINING COMMITTEE STRUCTURE

A. Scientific and Technical Advisory Committee (STAC)

Responsibilities

1. The STAC shall meet as often as needed to provide to the Executive Director broad programmatic advice and guidance on the GEM Work Plan with respect to the GEM Program's mission, goals, conceptual foundation, central hypotheses and questions.
2. The STAC shall recommend to the Executive Director projects for the GEM Work Plan best suited to the mission, goals, conceptual foundation, and central hypothesis. A written record of these recommendations shall be presented to the Program Advisory Committee (PAC) and to the Trustee Council.

3. The STAC co-chairs shall brief the PAC and the Council once a year on the state of the GEM program and on other occasions at the request of the Trustee Council, the Executive Director, or the STAC.
4. The STAC, in conjunction with the subcommittees, shall provide leadership in identifying and developing testable hypotheses relevant to the conceptual foundation and central questions of the GEM Strategic Plan, consistent with the GEM Program's mission and goals and the policies of the Trustee Council.
5. The STAC, using recommendations provided by the subcommittees and other means, shall identify and recommend syntheses, models, process studies, and other research activities for the Invitation to Submit Proposals.
6. The STAC shall meet with subcommittee chairs as needed.
7. The STAC shall select the subcommittee members, following a process approved by the Trustee Council. The STAC shall receive reports and briefings from the subcommittee chairs as needed.
8. The STAC shall assist Trustee Council staff in identifying peer reviewers, and may, upon request, conduct peer review on individual responses to the Invitation for Proposals and project reports.
9. Subject to funding restrictions and in consultation with the Executive Director, the STAC may convene special review panels or work groups to evaluate and make recommendations about aspects of the GEM program, or to meet with project investigators and others to fully explore particular projects or issues.

Membership

1. The STAC shall have seven members: six voting members appointed by the Trustee Council with the advice of the independent nominating committee and the Trustee Council's GEM Science Director as the seventh member who serves as permanent non-voting co-chair.
2. The STAC members shall be drawn from the scientific sectors of academic, government, NGO, and private institutions. Together the members shall possess expertise in the habitats, species and environments of the Alaska Coastal Current and offshore, the intertidal and subtidal (nearshore), the watersheds, modeling, resource management, human activities and their potential ecological impacts, and community-based science programs.
3. The STAC members shall be selected for their expertise, broad perspective, long experience and leadership in areas important to the GEM Program.
4. STAC members cannot be principal investigators for presently funded or ongoing GEM projects.
5. The STAC members shall serve terms of four years, renewable once at the option of the Trustee Council, except during the first two years of the program when three members shall serve initial terms of two years, renewable for a full four year term. All renewals for a second term are at the option of the Trustee Council.
6. After serving on the STAC, a person is not eligible to serve again on the STAC for two years, with the exception of a person who was appointed from the list of alternates to complete a partial term. A person appointed as an alternate is eligible to be nominated to an open membership slot to serve a full term, and may, if serving less

than two years and at the discretion of the Trustee Council, also be eligible for renewal.

7. In the event of a vacancy prior to the end of a term, the Trustee Council shall appoint a replacement from among the list of alternates. Inactive members may be removed by the Trustee Council from the STAC membership.

Rules of Procedure

1. The STAC shall elect a co-chair by majority vote at least once every two years. The Science Director shall serve as the other co-chair.
2. Matters that cannot be resolved by consensus shall be decided by four affirmative votes of the STAC membership.
3. The STAC shall develop procedures for interfacing with the subcommittees, work groups and the Program Advisory Committee.

B. Subcommittees

Responsibilities

1. Subcommittees shall provide guidance within each habitat type to the STAC and to the Trustee Council staff regarding testable hypotheses and other topics for consideration in future Invitations to Submit Proposals.
2. Subcommittees shall identify implementation strategies and possible locations for measuring monitoring variables that are relevant to the key questions and testable hypotheses.
3. Subcommittees shall, upon request, help organize the peer review on proposals and project reports in their broad habitat types, including recommending appropriate peer reviewers.
4. Initially, the subcommittees shall be organized along the lines of the four primary habitat types: offshore, Alaska Coastal Current, nearshore and watersheds, with additional subcommittees for oil effects and data management. The subcommittee structure may change following further review and discussion (and pending final NRC review).
5. Subject to funding restrictions, subcommittees may convene special review panels from time to time to evaluate and make recommendations about aspects of the GEM program. At other times, special panels may meet with project investigators and others to fully explore particular topics, problems, or projects.
6. A subcommittee may notify the STAC when it encounters the need for a work group.

Membership

1. Subcommittees are composed of at least 5 and not more than 8 individuals: scientists, resource managers, and/or other experts selected by the STAC primarily for their disciplinary expertise and familiarity with a broad habitat type (watersheds, intertidal and subtidal, ACC, or offshore). Other criteria include institutional and professional affiliations in order to promote collaboration and cooperation.

2. Subcommittee members serve three year renewable terms.
3. Subcommittee members may include principal investigators of GEM projects.
4. Nominees who agreed to serve, but were not selected by the STAC, may serve as peer reviewers and recommend peer reviewers, and are automatically considered as nominees to fill vacancies on subcommittees.

Rules of Procedure

1. Subcommittees shall elect their own chairs, usually in a person's third year on the committee.
2. Matters that cannot be resolved by consensus shall be decided by majority vote of the membership.

C. Work Groups

Responsibilities

1. Work Groups shall recommend to the STAC or a subcommittee courses of action on the task for which the work group has been established. Tasks may include developing strategies to implement specific monitoring and research goals.
2. Work Groups may help organize the peer review on proposals submitted to address the task for which the work group has been established.

Membership

1. Any number of individuals may be appointed to work groups established by the Executive Director at the request of the STAC. Expertise will depend on the issue to be addressed.
2. Members are approved by the Executive Director from nominees submitted by the STAC or subcommittee that identified the need for the work group.
3. Work groups are expected to be issue specific and of a limited duration specified by the Executive Director at its inception.

Rules of Procedure

1. Work groups shall elect a chair by majority vote.
2. Matters that cannot be resolved by consensus shall be decided by majority vote of the membership.

III. SELECTING COMMITTEE MEMBERS

A. Selection Process for STAC

1. The Executive Director shall issue a public call for nominations to serve on the STAC. The call will identify the types of expertise and the qualifications the Trustee

- Council desires to see for the nominees. Any person (including oneself) or organization is free to make a nomination.
2. Those nominating a person -- or the person being nominated -- will be asked to submit a one-page synopsis of the nominee's qualifications to the Executive Director.
 3. At the request of the Executive Director, a Nominating Committee will convene to develop a recommended list of persons fitting STAC membership criteria. The Nominating Committee shall recommend to the Executive Director a nominee for each vacant seat on the STAC, after determining that each is willing to serve on the STAC. Remaining nominees who are willing to serve may become alternates. The list of nominees and alternates shall be forwarded to the Trustee Council by the Executive Director.
 4. The Nominating Committee may suggest names of persons not nominated if there are gaps in desired expertise among the nominees provided to it by the process (i.e., nominating committee members may also make their own nominations).

STAC Nominating Committee

Responsibilities

1. The STAC Nominating Committee shall review nominations for the STAC; if necessary, it may solicit additional nominations at its discretion.
2. The nominating committee shall provide the Executive Director a list of preferred and alternate nominees for appointment to the STAC.
3. The Nominating Committee chair shall brief the Trustee Council on its recommendations.

Membership

1. The STAC Nominating Committee shall be composed of seven members who are familiar with the development and operation of regional monitoring programs similar to GEM.
2. Nominating Committee members may not currently be receiving funding from the Trustee Council, nor may they be closely associated with, or dependent on, those who are funded by the Trustee Council. For example, the Nominating Committee members may not be funded investigators within the EVOS/GEM program, nor may nominating committee members be the immediate supervisors or supervisees of currently funded investigators, or members of their immediate family.
3. At least five Nominating Committee members shall reside in Alaska. STAC nominees and current STAC members may not serve on the Nominating Committee.
4. Nominating Committee members shall be selected by the Executive Director in consultation with the Trustee Council. The Executive Director shall also determine the life of the Nominating Committee.

Rules of Procedure

1. The Nominating Committee shall elect a chairperson by majority vote to conduct the meetings.
2. The Nominating Committee shall establish a schedule and a process for developing a recommended list of nominees for the STAC that is consistent with applicable state and federal statutes, particularly with regard to Equal Employment Opportunity principles and diversity considerations.
3. The Executive Director shall provide assistance as requested by the Nominating Committee chair.

B. Selection Process for Subcommittee Members

1. The Executive Director shall issue public calls for nominations to the subcommittees. The announcements shall list desirable qualifications and other nominating criteria.
2. The STAC shall review the nominees and make recommendations to the Trustee Council for approval.

C. Selection Process for Work Group Members

1. The Executive Director shall approve work group members upon the recommendation of the STAC and/or subcommittees.

IV. PEER REVIEW

Each project proposal, as well as some annual and all final reports, will be peer-reviewed by appropriate experts who are not competing for funding from the GEM program in the same competition and, in general, also are not conducting projects funded by the Trustee Council. The external peer review process will provide a rigorous critique of the scientific merits of proposals and reports. The goals of the review process are to ensure that studies sponsored by the Trustee Council 1) adhere to a high standard of scientific excellence; 2) have scientific objectives that are relevant and consistent with the GEM Program's conceptual foundation, central questions, and testable hypotheses; and 3) use valid methods that will allow them to achieve these objectives. The peer review may be either paid or volunteer, or some combination, whichever is most expeditious and appropriate. Reviews and recommendations shall be documented in writing.

The STAC or subcommittees may convene work groups from time to time to evaluate and make recommendations about aspects of the GEM program. These may include special peer review panels that would meet with project investigators and others to fully explore particular topics, problems, or projects.

A framework for peer review shall be developed by Trustee Council staff and include the following:

- A clear statement of the purposes of the peer review
- The role of the peer reviewer
- Guidelines for achieving and maintaining impartiality

The Science Director is responsible to the Executive Director and the Trustee Council for maintaining independence and the appropriate level of expertise for each peer review activity, training of peer reviewers in established procedures, and establishing an honorarium (payment) process for peer reviewers when necessary to accomplish the needed peer review.

Figures follow on two pages

Figure 4.3 Selecting monitoring elements starts with the mission and goals established by the Trustee Council, as expressed in the conceptual foundation, which is regularly updated by new information from a variety of sources. GEM Program Document, Vol. I, Chapter 4, page 38.

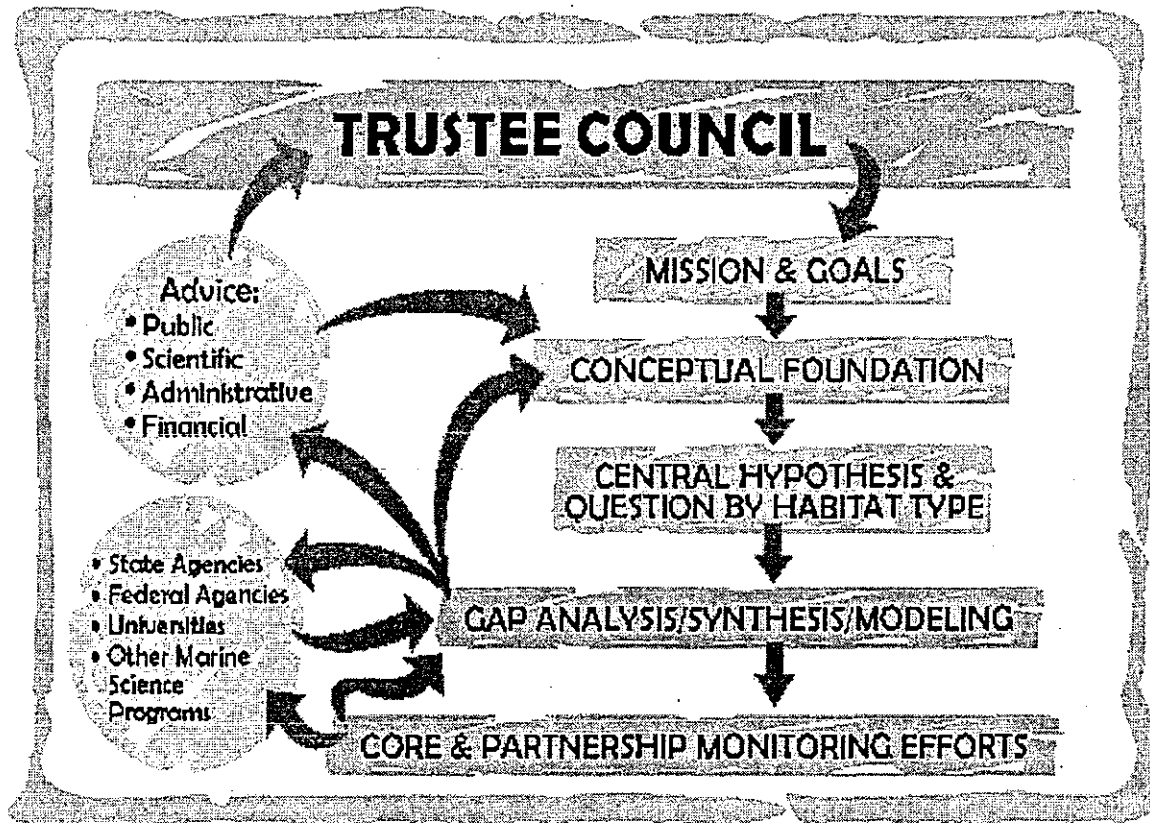
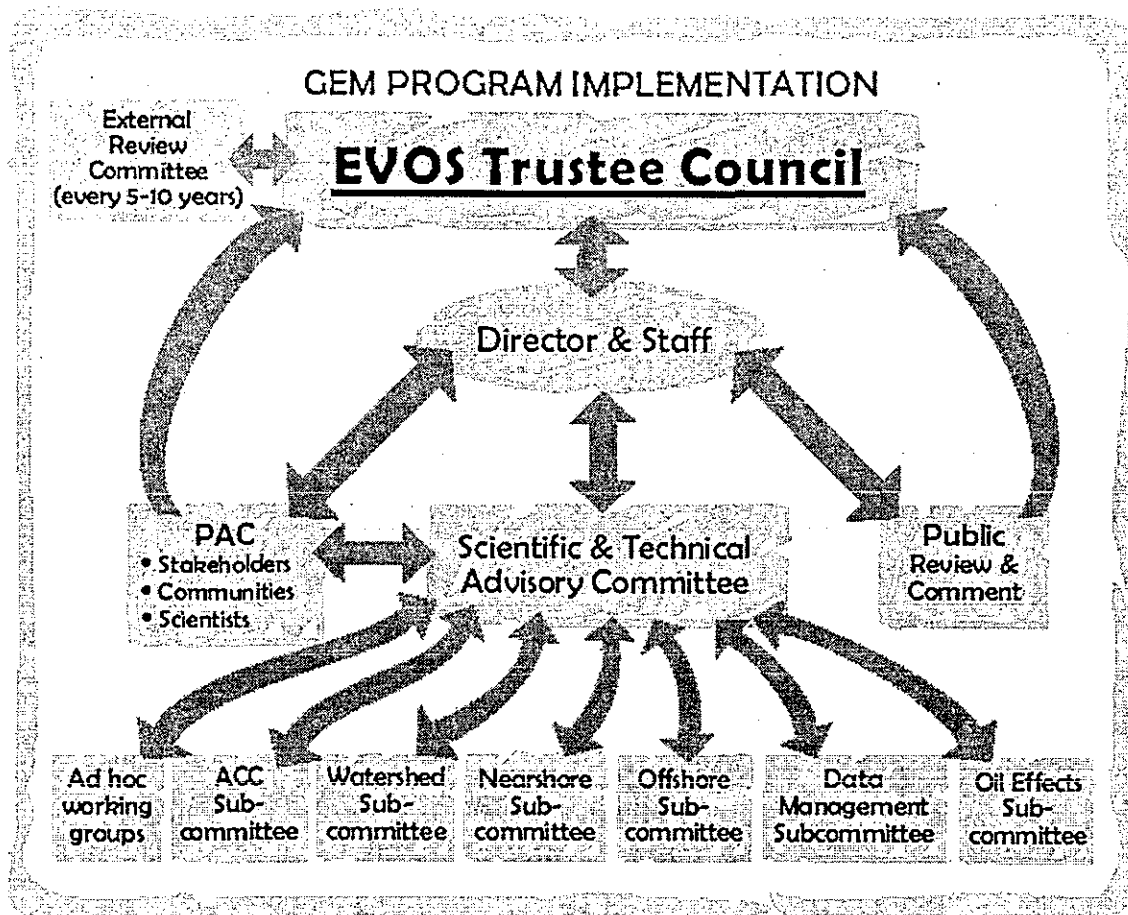


Figure 6.1. The organizational elements involved in GEM implementation. Modified in response to comments from the NRC, after GEM Program Document, Vol. I, Chapter 6, page 66.





EVOS
Trustee Council
Meeting

April 18, 2002

AGENDA

Exxon Valdez Oil Spill Trustee Council

441 W. 5th Ave., Suite 500 • Anchorage, Alaska 99501-2340 • 907/278-8012 • fax 907/276-7178



AGENDA EXXON VALDEZ OIL SPILL TRUSTEE COUNCIL TELECONFERENCE MEETING

April 18, 2002 2:30 p.m.

441 West 5th Ave., Suite 500, ANCHORAGE

DRAFT

Trustee Council Members:

CRAIG TILLERY
Assistant Attorney General
State of Alaska

MICHELE BROWN
Commissioner
Alaska Department of
Environmental Conservation

DRUE PEARCE
Senior Advisor to the Secretary
for Alaskan Affairs
U.S. Department of the Interior

MARIA LISOWSKI for
DAVE GIBBONS
Forest Supervisor
Forest Service Alaska Region
U.S. Department of Agriculture

JAMES W. BALSIGER
Administrator, Alaska Region
National Marine Fisheries Service

FRANK RUE
Commissioner, Alaska
Department of Fish & Game

Teleconferenced in Anchorage, Restoration Office, 441 W 5th Ave, Suite 500
_____ Federal Chair

1. Call to Order - 2:30 p.m.
 - Approval of Agenda*
 - Approval of Meeting Notes*February 25, 2002
2. Executive Director's report
3. Public comment - 2:45 p.m.
4. FY 02 Work Plan Modifications*
 - Project 02052

Federal Trustees
U.S. Department of the Interior
U.S. Department of Agriculture
National Oceanic and Atmospheric Administration

State Trustees
Alaska Department of Fish and Game
Alaska Department of Environmental Conservation
Alaska Department of Law

5. PAG Charter*

6. STAC appointments*

7. Injured Resources and Services - briefing (Bob Spies)

Adjourn - 4:30 p.m.

* Indicates tentative action items.

MEETING NOTES
FEBRUARY 25, 2002

Exxon Valdez Oil Spill Trustee Council

441 W. 5th Ave., Suite 500 • Anchorage, Alaska 99501-2340 • 907/278-8012 • fax 907/276-7178



TRUSTEE COUNCIL MEETING NOTES

Anchorage, Alaska

February 25, 2002

By Molly McCammon
Executive Director

Trustee Council Members Present:

● Dave Gibbons, USFS
Drue Pearce, DOI
James Balsiger, NMFS

Frank Rue, ADF&G
Michele Brown, ADEC
*Craig Tillery, ADOL

* Chair

In Anchorage: Gibbons, Pearce, Balsiger, Rue, Kent, Brown and Tillery.

● Alternates:

Maria Lisowski served as an alternate for Dave Gibbons for the entire meeting.

Meeting convened at 9:48 a.m., February 25, 2002, in Anchorage.

1. Approval of the Agenda

APPROVED MOTION: Approved the February 25, 2002 agenda
(Attachment A).

Motion by Pearce, second by Lisowski.

2. Approval of Meeting Notes

APPROVED MOTION: Approved December 11, 2001 meeting notes
(Attachment B).

Motion by Brown, second by Pearce.

3. Asset Allocation Policy

Discussion - No changes made to the Asset Allocation Policy.

Federal Trustees
U.S. Department of the Interior
U.S. Department of Agriculture
National Oceanic and Atmospheric Administration

State Trustees
Alaska Department of Fish and Game
Alaska Department of Environmental Conservation
Alaska Department of Law

Public comment period began at 11:05 a.m.

No Public comments received

Public comment period closed at 11:06 a.m.

4. Project 02360 Amendment:

APPROVED MOTION: Approved a motion to amend project 02630, Planning for Long-Term Research and Monitoring Program, by authorizing an additional \$16,100 be added to the budget to develop a report summary of strategies and approaches that other state agencies have developed to fund their surface water quality monitoring programs. (Attachment C)

Motion by Rue, second by Balsiger.

Public comment period re-opened 11:32 a.m.

Public comments received by 1 individual from Anchorage.

Public comment period closed 11:51 a.m.

BREAK

Off the record at (11:51 a.m.)

On the record at (12:19 p.m.)

5. STAC Process

APPROVED MOTION: Approved a motion to approve the Scientific and Technical Advisory Committee (STAC) process. (Attachment D).

Motion by Rue, second by Pearce.

6. Support for PICES

APPROVED MOTION: Approved a motion to approve \$14,000 of Project 02630 (Restoration Office portion) contractual costs be given to PICES for travel and report expenses.

Motion by Brown, second by Rue.

7. Bonus awards

APPROVED MOTION: Approved a motion to disallow the allocation of EVOS funds to be used for bonuses given out of Project 00159 (\$5000), Project 00163 (\$2500), and Project 01423 (\$2796).

Motion by Rue, second by Pearce.

8. Small Parcel KEN 309

APPROVED MOTION: Adopted resolution 02-05 (Attachment E) to provide funds for the State of Alaska to purchase all of the seller's rights and interests in small parcel KEN 309.

Motion by Rue, second by Brown.

9. Small Parcel KAP 285

Discussion regarding concerns about how the purchase of KAP 285 would impact local economic potential. No formal action taken.

Meeting adjourned 2:02 p.m.

Motion by Rue, second by Lisowski.

FINANCIAL

Exxon Valdez Oil Spill Trustee Council

441 W. 5th Ave., Suite 500 • Anchorage, Alaska 99501-2340 • 907/278-8012 • fax 907/276-7178



MEMORANDUM

TO: Trustee Council

THROUGH: Molly McCammon
Executive Director

FROM: Debbie Hennigh
Special Assistant

DATE: April 8, 2002

RE: February Investment Reports

Included are the Department of Revenue's reports as of February 28, 2002:

- Statement of Invested Assets,
- Statement of Investment Income and Changes in Invested Assets,
- Asset Allocation Policy with Actual Investment Holdings, and
- Performance Measurement.

Also attached are the following graphs for activity ending February 28, 2002:

- Investment Fund Assets, and
- Earnings (Loss).

Also included are graphs of each investment pool's activity for October 2000 through February 2002, the entire investment fund/benchmark, and each individual pool/benchmark for February 2002.

Attachments

Cc: Investment Working Group

STATE OF ALASKA
DEPARTMENT OF REVENUE
TREASURY DIVISION

Exxon Valdez Oil Spill Investment Fund

STATEMENT OF INVESTED ASSETS

February 28, 2002 and 2001

Investments (at fair value)	<u>2002</u>	<u>2001</u>
Cash and cash equivalents		
Short-term Fixed Income Pool	\$ 208,655	\$ 93,846
Marketable debt and equity securities		
Broad Market Fixed Income Pool	73,275,581	60,852,550
Non-retirement Domestic Equity Pool	78,115,740	49,329,178
SOA International Equity Pool	<u>30,330,853</u>	<u>22,147,519</u>
Total invested assets	<u>\$ 181,930,829</u>	<u>\$ 132,423,094</u>

STATE OF ALASKA
DEPARTMENT OF REVENUE
TREASURY DIVISION

Exxon Valdez Oil Spill Investment Fund

STATEMENT OF INVESTMENT INCOME
AND CHANGES IN INVESTED ASSETS

For the period ended February 28, 2002

	CURRENT <u>MONTH</u>	FEDERAL YEAR TO <u>DATE</u>
Investment Income		
Cash and cash equivalents		
Short-term Fixed Income Pool	\$ 141	\$ 2,343
Marketable debt and equity securities		
Non-pooled investments		
Broad Market Fixed Income Pool	688,562	1,212,955
Non-retirement Domestic Equity Pool	(1,626,802)	5,825,158
SOA International Equity Pool	504,085	477,737
Commission Recapture	1,042	9,054
Total income from marketable debt and equity securities	<u>(433,114)</u>	<u>7,524,904</u>
Total investment income (loss)	(432,974)	7,527,247
Total invested assets, beginning of period	182,411,919	174,451,698
Net contributions (withdrawals)	<u>(48,116)</u>	<u>(48,116)</u>
Total invested assets, end of period	<u>\$ 181,930,829</u>	<u>\$ 181,930,829</u>

STATE OF ALASKA
DEPARTMENT OF REVENUE - TREASURY DIVISION

Exxon Valdez Oil Spill Investment Fund
Asset Allocation Policy (effective 4/24/00) with Actual Investment Holdings as of
February 28, 2002

	Asset Allocation		Fair value	Current Allocation	Variance
	Policy	Range			
Cash and cash equivalents					
Short-term Fixed Income Pool	0.00%		208,514	0.11%	-0.11%
Total cash and cash equivalents	0.00%		208,514	0.11%	-0.11%
Marketable debt and equity securities					
Broad Market Fixed Income Pool	42.00%	35% - 49%	73,275,581	40.28%	1.72%
Non-retirement Domestic Equity Pool	41.00%	34% - 48%	78,115,740	42.94%	-1.94%
SOA International Equity Pool	17.00%	12% - 22%	30,330,853	16.67%	0.33%
Total marketable debt securities	100.00%		181,722,174	99.89%	0.11%
Total holdings	100.00%		181,930,689	100.00%	0.00%
Short-term Fixed Income Pool Interest Receivable			141		
Total Invested Assets at Fair Value			181,930,829		

Exxon Valdez Oil Spill Investment Fund

Period Ending February 28, 2002

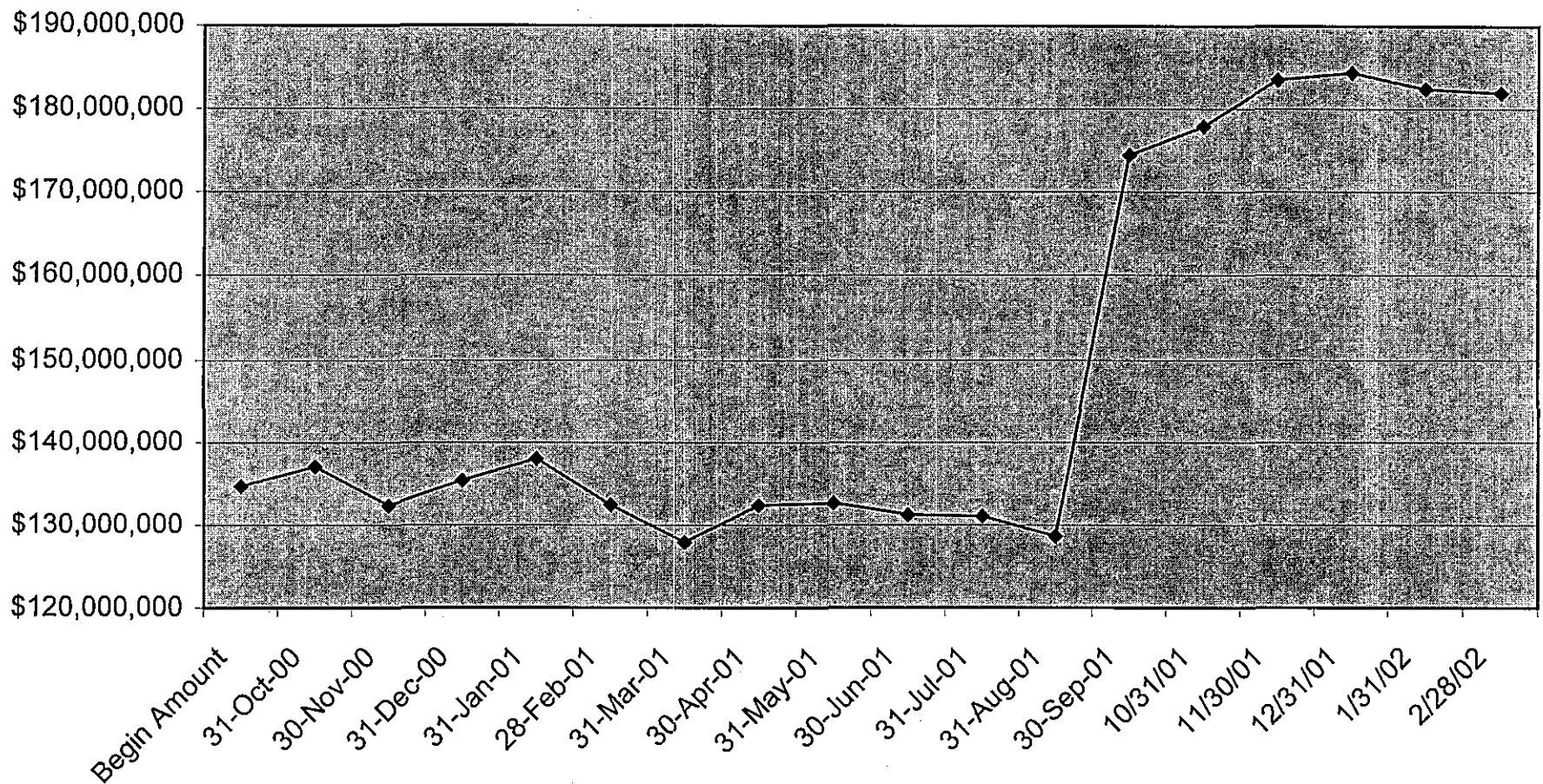
	<u>Mkt Value (\$M)</u>	<u>Monthly Return</u>	<u>3 Mo. Return</u>	<u>Calendar YTD</u>	<u>Federal Fiscal YTD*</u>	<u>Inception to Date**</u>
AY02 EVOS Investment Fund	181,931	-0.24	-0.86	-1.30	4.31	-3.41
EVOS Investment Fund Index		-0.31	-0.98	-1.39	4.51	-5.99
Short-term Fixed Income Pool	208	0.06	0.43	0.24	0.92	4.75%
91 day T-Bill		0.13	0.44	0.28	0.92	4.37%
Broad Market Fixed Income Pool	73,276	0.94	0.88	1.61	1.67	10.44%
Lehman Brothers Aggregate Index		0.97	1.14	1.79	1.83	10.51%
Non-Retirement Domestic Equity Pool	78,116	-2.04	-1.92	-3.27	8.06	-14.72%
Russell 3000 Index		-2.05	-1.91	-3.27	8.10	-16.16%
SOA International Equity Pool	30,331	1.69	-2.28	-2.96	1.63	-17.44%
Morgan Stanley Capital Intl. (EAFE)		0.70	-4.08	-4.65	2.00	-19.68%

Source: State Street Bank, Insight.

* Federal Fiscal YTD indicates a term beginning October 1, 2001 to current period ending.

** Inception Date: October 31, 2000

Exxon Valdez Oil Spill Trustee Council Investment Fund Assets

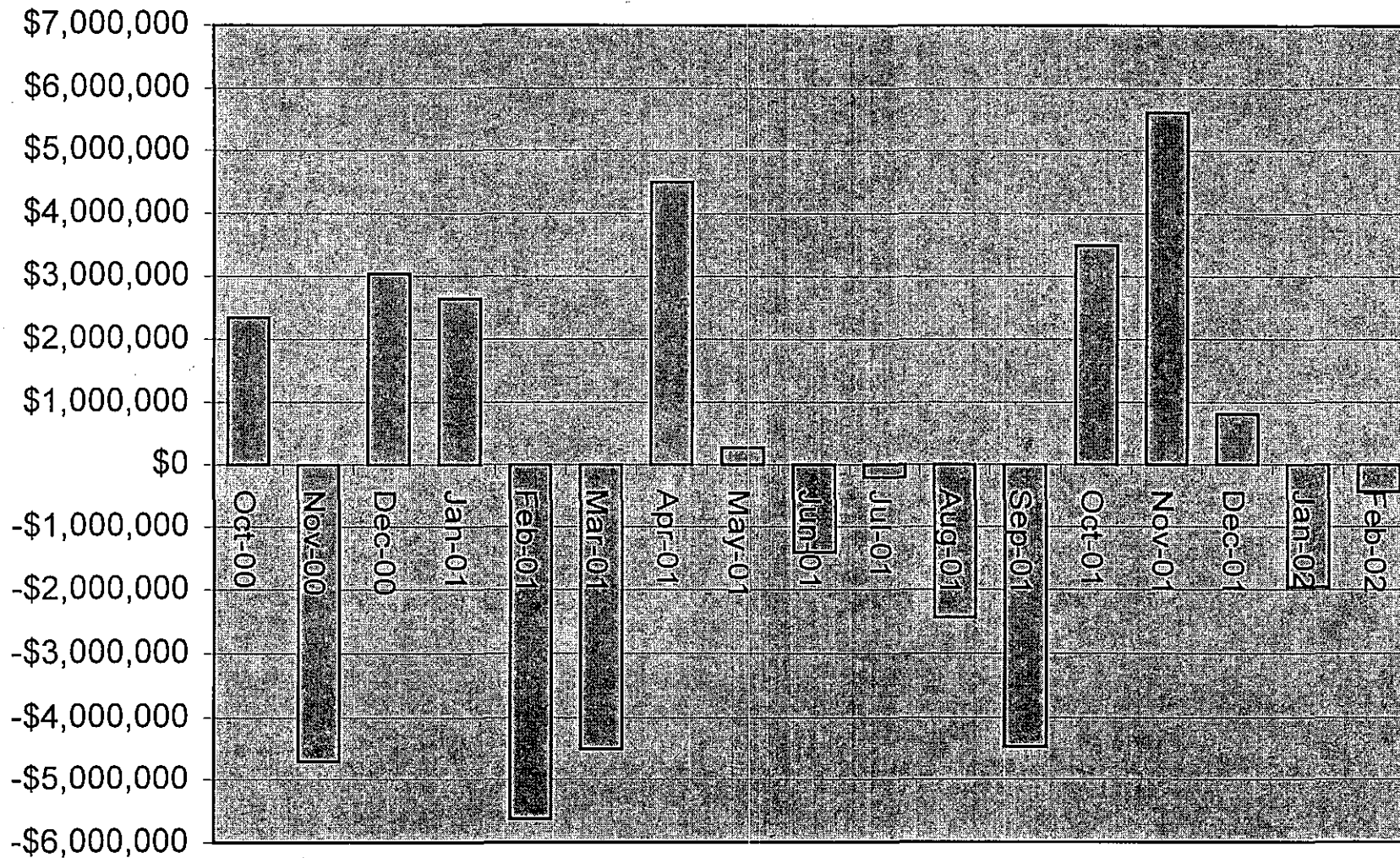


Note: September's amount reflects addition of Exxon's last payment of \$66,113,500

EVOS Investment Fund Earnings (Losses)				
	SFY 01	SFY 02	Total	
31-Oct-00	\$2,503,034			
30-Nov-00	-\$4,794,990			
31-Dec-00	\$3,042,417			
31-Jan-01	\$2,652,034			
28-Feb-01	-\$5,626,092			
31-Mar-01	-\$4,499,192			
30-Apr-01	\$4,497,983			
31-May-01	\$267,233			
30-Jun-01	-\$1,412,478			
31-Jul-01		-\$203,007		
31-Aug-01		-\$2,442,542		
30-Sep-01		-\$4,465,637		
31-Oct-01		\$3,499,297		
30-Nov-01		\$5,613,492		
31-Dec-01		\$811,775		
31-Jan-02		-\$1,964,261		approximate
28-Feb-02		-\$432,974		doesn't include fees of \$48,116
Total Earnings/Losses	-\$3,370,051	\$416,143	-\$2,953,908	

Exxon Valdez Oil Spill Trustee Council

Investment Fund Earnings (Loss) as of February 28, 2002



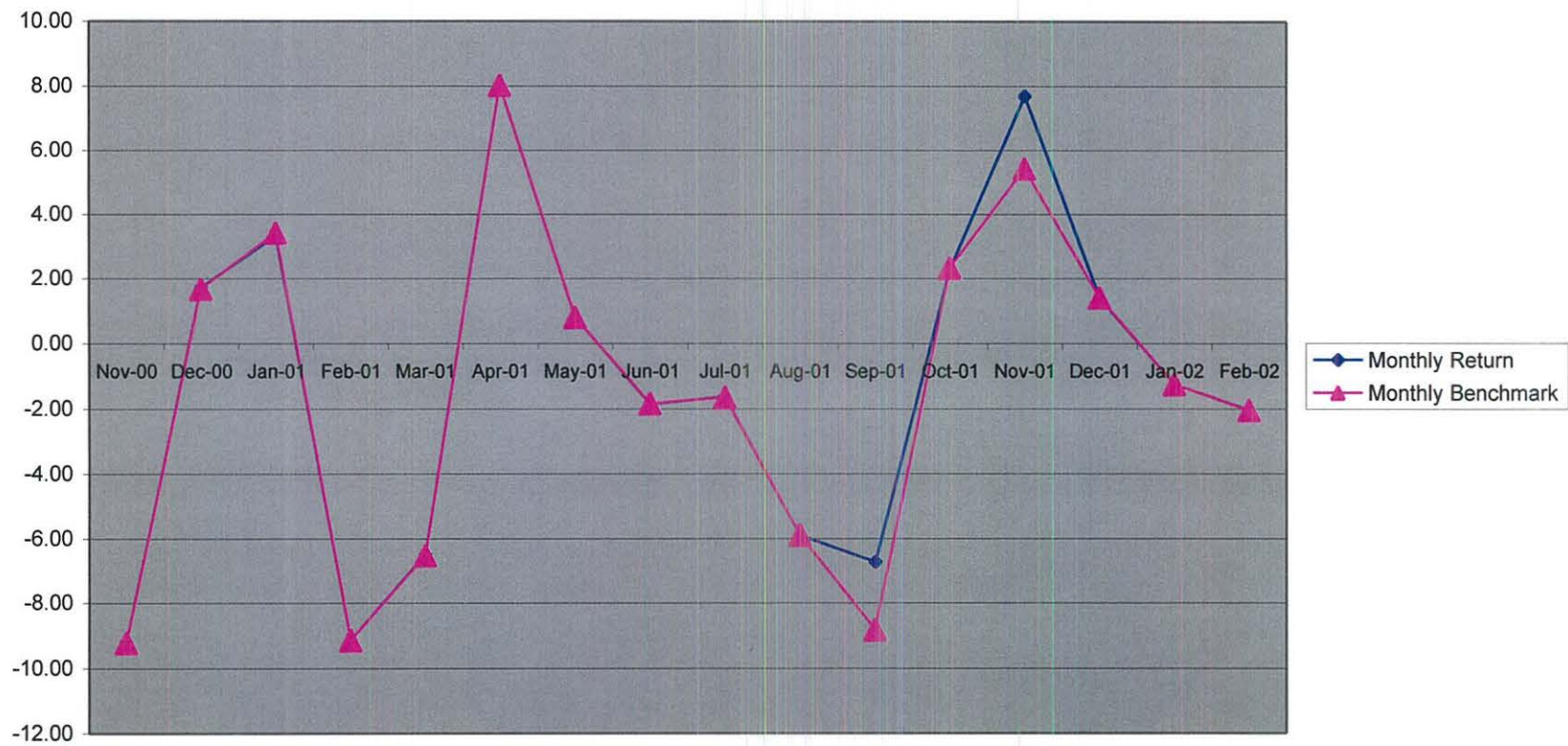
Domestic Equities Pool - Russell 3000 Index

NOTE: The increase in assets from August 2001 to September 2001 is due to Exxon's last payment and not earnings.

	Nov-00	Dec-00	Jan-01	Feb-01	Mar-01	Apr-01	May-01	Jun-01	Jul-01	Aug-01	Sep-01	Oct-01	Nov-01	Dec-01	Jan-02	Feb-02
Monthly Return	-9.20	1.72	3.34	-9.14	-6.49	8.03	0.80	-1.86	-1.63	-5.9	-6.72	2.31	7.69	1.39	-1.25	-2.04
Monthly Benchmark	-9.22	1.68	3.42	-9.14	-6.52	8.02	0.80	-1.84	-1.65	-5.89	-8.82	2.33	5.42	1.41	-1.25	-2.05
Market Value (\$M)	51,649	52,537	54,290	49,329	46,126	49,828	50,228	49,294	48,492	45,636	72,291	73,960	79,649	80,756	79,743	78,116

Domestic Equities Pool - Russell 3000 Index

February 2002



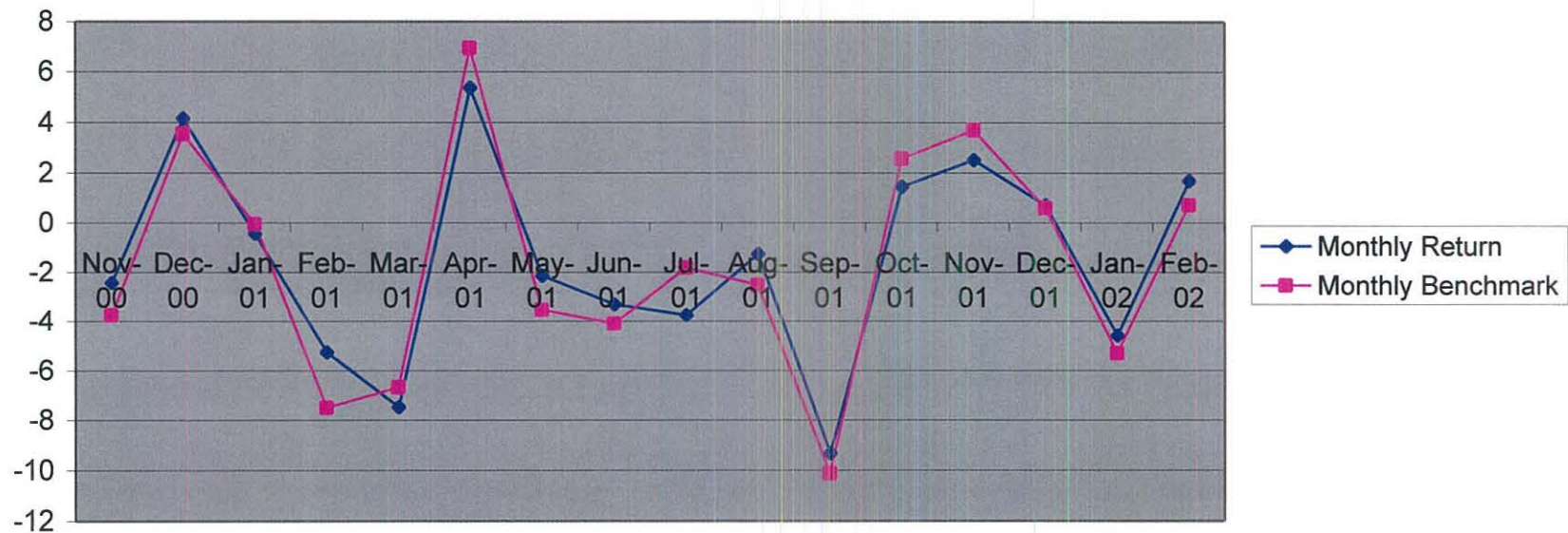
International Equities Pool - Morgan Stanley Capital Intl (EAFE)

NOTE: The increase in assets from August 2001 to September 2001 is due to Exxon's last payment and not earnings.

	Nov-00	Dec-00	Jan-01	Feb-01	Mar-01	Apr-01	May-01	Jun-01	Jul-01	Aug-01	Sep-01	Oct-01	Nov-01	Dec-01	Jan-02	Feb-02
Monthly Return	-2.43	4.16	-0.44	-5.25	-7.47	5.37	-2.15	-3.31	-3.75	-1.26	-9.33	1.45	2.52	0.7	-4.58	1.69
Monthly Benchmark	-3.75	3.55	-0.05	-7.5	-6.67	6.95	-3.53	-4.09	-1.82	-2.53	-10.13	2.56	3.69	0.59	-5.31	0.7
Market Value (\$M)	22,541	23,479	23,375	22,148	20,494	21,593	21,128	20,430	19,664	19,416	29,844	30,275	31,039	31,256	29,826	30,331

International Equity Pool - Morgan Stanley Capital Intl. (EAFE)

February 2002



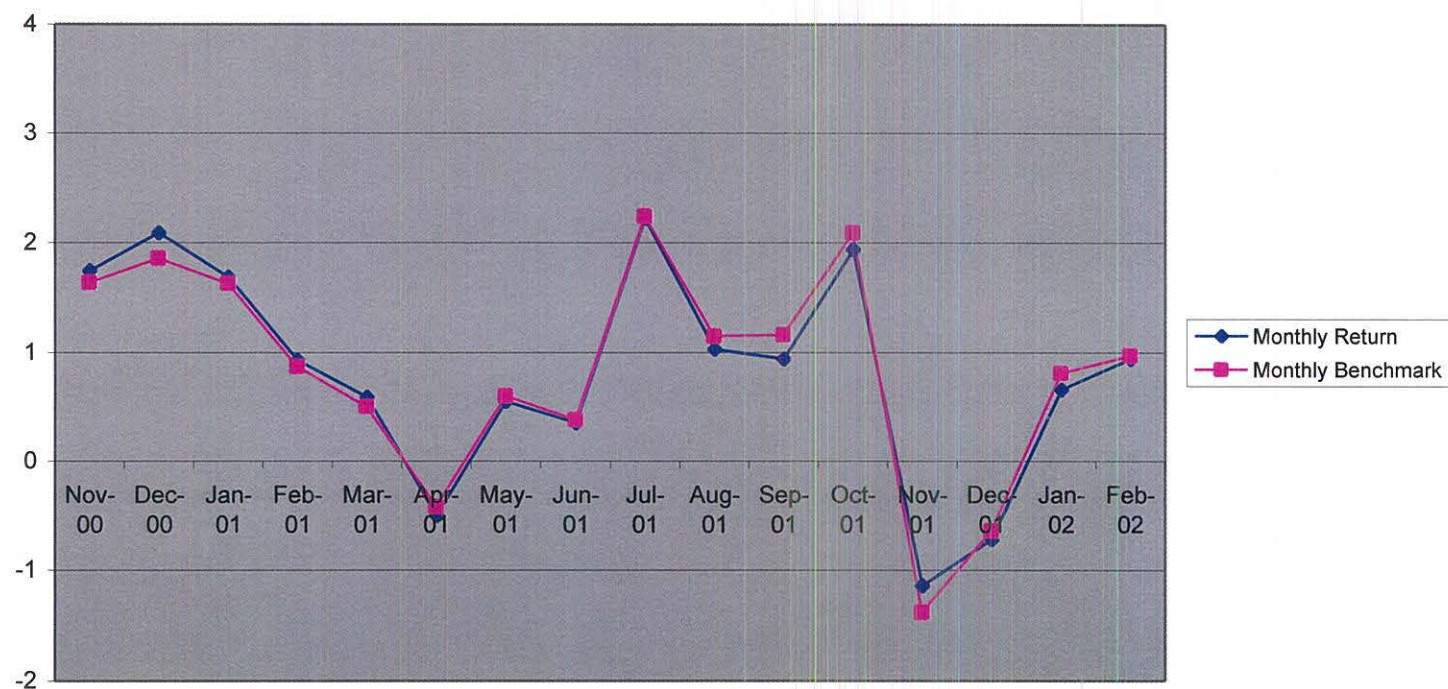
Fixed Income Pool - Lehman Brothers Aggregate Index

NOTE: The increase in assets from August 2001 to September 2001 is due to Exxon's last payment and not earnings.

	Nov-00	Dec-00	Jan-01	Feb-01	Mar-01	Apr-01	May-01	Jun-01	Jul-01	Aug-01	Sep-01	Oct-01	Nov-01	Dec-01	Jan-02	Feb-02
Monthly Return	1.75	2.09	1.69	0.93	0.59	-0.5	0.55	0.35	2.22	1.03	0.94	1.94	-1.14	-0.72	0.66	0.94
Monthly Benchmark	1.64	1.86	1.63	0.87	0.5	-0.42	0.6	0.38	2.24	1.15	1.16	2.09	-1.38	-0.64	0.81	0.97
Market Value (in \$M)	58,073	59,289	60,291	60,853	61,210	60,906	61,238	61,458	62,822	63,483	72,063	73,460	72,621	72,108	72,587	73,276

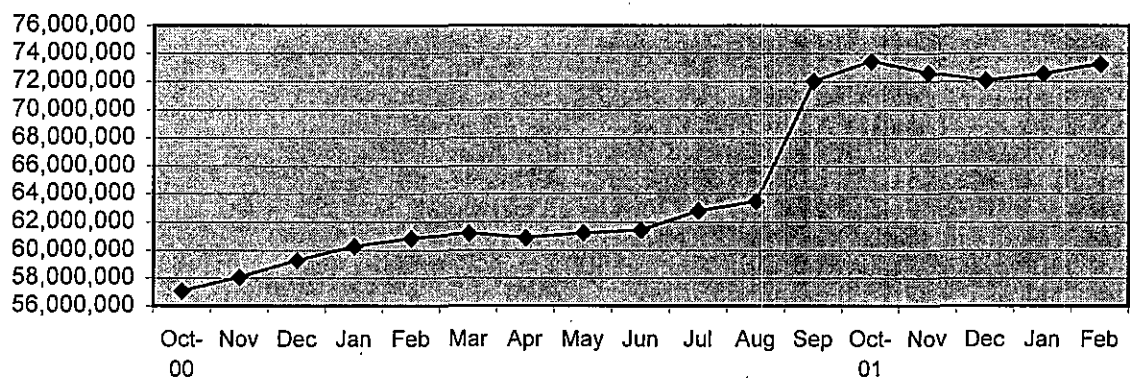
Fixed Income Pool - Lehman Brothers Aggregate Index

February 2002



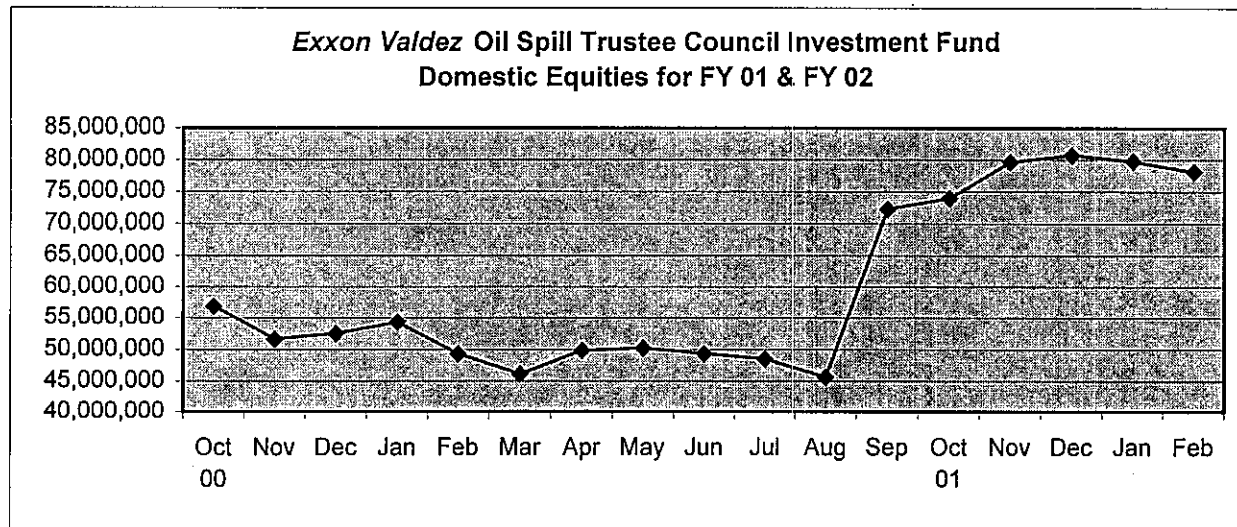
Oct-00	57,075,942
Nov	58,072,794
Dec	59,288,677
Jan	60,291,225
Feb	60,852,550
Mar	61,209,483
Apr	60,905,590
May	61,238,245
Jun	61,457,699
Jul	62,822,366
Aug	63,483,499
Sep	72,062,627
Oct-01	73,460,139
Nov	72,621,000
Dec	72,108,186
Jan	72,587,000
Feb	73,275,581

**Exxon Valdez Oil Spill Trustee Council Investment Fund
Fixed Income for FY 01 & FY 02**



Note: September's increased amount is due to contributions from Exxon's last payment.

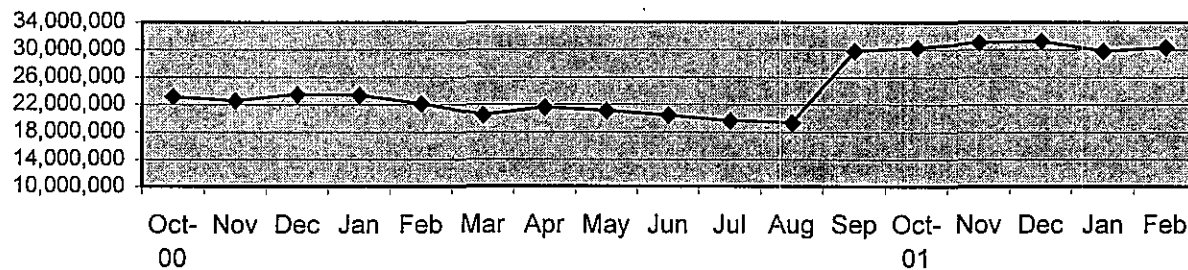
Oct 00	56,879,447
Nov	51,648,963
Dec	52,536,681
Jan	54,289,747
Feb	49,329,178
Mar	46,126,312
Apr	49,828,183
May	50,227,785
Jun	49,293,870
Jul	48,492,162
Aug	45,636,080
Sep	72,290,582
Oct 01	73,960,245
Nov	79,649,000
Dec	80,755,640
Jan	79,743,000
Feb	78,115,740



Note: September's increased amount is due to contributions from Exxon's last payment.

Oct-00	23,102,643
Nov	22,540,761
Dec	23,478,963
Jan	23,374,808
Feb	22,147,519
Mar	20,493,757
Apr	21,593,395
May	21,128,062
Jun	20,429,757
Jul	19,663,491
Aug	19,415,611
Sep	29,844,062
Oct-01	30,275,491
Nov	31,039,000
Dec	31,256,254
Jan	29,826,000
Feb	30,330,853

**Exxon Valdez Oil Spill Trustee Council
Investment Fund
International Equities for FY 01 & FY 02**



Note: September's increased amount is due to contributions from Exxon's last payment.

Exxon Valdez Oil Spill Trustee Council

441 W. 5th Ave., Suite 500 • Anchorage, Alaska 99501-2340 • 907/278-8012 • fax 907/276-7178



MEMORANDUM

TO: Trustee Council Members

FROM: Molly McCammon
Executive Director

RE: Deferred Project 02052 / Natural Resource Management and Stewardship
Capacity Building

DATE: April 3, 2002

In approving the FY 02 Work Plan this past August, the Trustee Council approved \$45,000 in interim funding for Project 02052/Natural Resource Management and Stewardship Capacity Building. The balance of funding for the project was deferred pending further discussion about options for community involvement and stewardship development under GEM.

The Trustee Council's primary community involvement project for the past 7 years has been /052, under a contract with the Chugach Regional Resources Commission. Although this project originally was intended to involve all aspects of EVOS communities - city councils, native corporations, tribes, fishermen, etc. - in reality, it has focused on native tribes. The /052 project title and description have now been revised to reflect that.

This project is only one aspect of the Trustee Council's community involvement and outreach efforts. Attached for your information is a brief background paper on those efforts to date. More work will be done in the future to involve community and public involvement in all aspects of the Council's programs.

On March 6, 2002, I held an informal discussion and brainstorming session on tribal involvement in GEM. Participants were the Project 02052 proposers (Patty Brown-Schwalenberg and Henry Huntington of CRRC) and representatives of other organizations involved in environmental monitoring programs with tribes in the spill region (Christine Cellantano/Chugachmiut, Fred Matsuno/EPA, and Elijah Donat/Native American Fish and Wildlife Society). It was a very informative, constructive discussion that provided some good examples of ways in which GEM and the tribes might work together.

Further discussion and thought is needed to integrate some of the ideas discussed at the brainstorming session into the GEM program. These discussions and planning will happen over the next several months, with a goal of presenting to you at least the initial stages of a tribal involvement effort as part of the FY 03 GEM Work Plan.

In the meantime, for FY 02, I am recommending continuation of Project /052. As in FY 01, the project would focus on integrating Tribal Natural Resource Programs with GEM. Primary objectives in FY 02 would be (a) completion of the Tribal Natural Resource Management Plans currently in progress in Tatitlek, Eyak (Cordova), Pt. Graham, Nanwalek, and Ouzinkie (b) completion of an Inter-tribal Integrated Natural Resource Management Plan currently in progress for the Chugach/lower Cook Inlet region, and (c) active participation by the spill-region tribes in GEM planning meetings and workshops. The long-term goal of the Trustee Council contribution to the project is local stewardship of marine resources.

Recommendation:

Approve additional \$86,400 for Project 02052. This brings the total approved for Project 02052 to \$131,400.

[NOTE: The cap for the FY 02 Work Plan is \$5,000,000. Approval of these additional funds for Project 02052 would bring the total approved by the Trustee Council for FY 02 to \$4,595,000.]

Attachments: Project 02052 DPD
Project 02052 budget
Background paper on EVOS tribal and community involvement

02052rev1.doc

Natural Resource Management and Stewardship Capacity Building

Project Number: 02052

Restoration Category: General Restoration

Proposer: P. Brown-Schwalenberg/CRRC

Lead Trustee Agency: ADFG

Cooperating Agencies: None

Alaska SeaLife Center: No

New or Continued: Continued

Duration: 8th year, 8 year project

Cost FY 02: \$131,400

Geographic Area: All

Injured Resource/Service: Subsistence

ABSTRACT

In FY 02, this project will shift its focus from community involvement to the integration Tribal Natural Resource Management Programs with the Gulf Ecosystem Monitoring and Research Program (GEM). Communities involved in the project include those in the Alaska Peninsula Region/Chignik Lake, Chenega Bay, Cordova (Eyak), Kodiak Island Region/Ouzinkie, Nanwalek, Port Graham, Seward (Qutekcak), Seldovia, Tatitlek, and Valdez. In FY 02, project will focus on three objectives: (a) completing Tribal Natural Resource Management Plans in five pilot communities (Tatitlek, Eyak (Cordova), Port Graham, Nanwalek, and Chenega), (b) completing an Inter-Tribal Integrated Natural Resource Management Plan for the Chugach/Lower Cook Inlet region, and (c) actively participating in GEM planning meetings and workshops. The long-term goal of the Trustee Council contribution to the project is local stewardship of marine resources.

INTRODUCTION

In FY 02, this project will shift its focus from community involvement to the integration of Tribal Natural Resource Programs with the Gulf Ecosystem Monitoring Program. The project is designed to enhance the stewardship capacity of the Alaska Native community in the spill region. and This project will examine the communities' interests, priorities and activities through their Tribal Natural Resource Programs and how these relate to the GEM Program. Candidate projects emerging from our planning effort will exhibit a blend of modern measurement science and traditional observation, which will be beneficial to both the GEM Program and the Tribal Natural Resource Programs.

After a pilot effort beginning in three communities in FY 95, ten Community Facilitators were hired in FY 97 through cooperative agreements with the Village Councils of Chenega Bay, Chignik Lake (Alaska Peninsula Region), Eyak (Cordova), Nanwalek, Ouzinkie (Kodiak Island Region), Port Graham, Qutekcak (Seward), Seldovia, Tatitlek, and Valdez to involve communities in the EVOS restoration process. The Spill Area Wide Community Involvement Coordinator worked with the Community Facilitators to promote communication among the EVOS Trustee Council, the communities, and scientists. Their efforts continued through FY 00 and FY 01 while five pilot communities (Cordova, Nanwalek, Ouzinkie, Port Graham, and Tatitlek) also began development of Tribal Natural Resource Management Plans, designed to assist the communities in having a more active role in GEM. These pilot communities were funded at a higher level for the additional work required.

In FY 00, workshops were held to further develop the technical capacity of the communities in the Chugach Region and spill area. This increased capacity is a key component in their efforts to ensure the sustainability of their subsistence resources. One workshop was held in December 2000 between the village corporations and Tribes to discuss ways of cooperatively managing village corporation lands. Additionally, the corporations and Tribes in Prince William Sound have been working extensively with the United States Forest Service to ensure their involvement in the Chugach National Forest Management Plan Revision currently underway. Cooperative and collaborative management of lands and resources have been actively discussed and strategies for further developing a formal relationship are underway. In FY 00, the pilot communities, as well as members of the CRRC Board, traveled to Lac du Flambeau, Wisconsin to observe the Tribal natural resource research and monitoring program currently being conducted by the Lac du Flambeau Band of Lake Superior Chippewa Indians. This trip was an effort to provide the communities with an opportunity to experience first hand a model Tribal Natural Resource Management Program, which could perhaps serve as a model for programs in the spill area. This trip also served to encourage more Tribal involvement in the community research and monitoring aspects of the GEM Plan.

In FY 01, the CRRC Board of Directors held a Strategic Planning Session. During this meeting they identified Tribal Natural Resource Management Plan development along with an EVOS \$20 million Tribal Community Fund as top priorities of CRRC. The Board of Directors also prioritized the communities' involvement in GEM and community involvement/Traditional Ecological Knowledge, indicating their interest in remaining involved in the EVOS process. In October of 2000, project personnel (the Community Facilitators, Natural Resource Specialists,

Science Advisor, Principal Investigator, TEK Specialist, and Spill Area Wide Community Involvement Coordinator) all participated in the Trustee Council's GEM Workshop, advocating for meaningful community involvement and TEK being incorporated into the GEM Plan/Program.

In March 2001, the Principal Investigator and Spill Area Wide Community Involvement Coordinator, in cooperation with the Chugach Alaska Corporation, Chugachmiut, and North Pacific Rim Housing Authority, organized the Chugach Regional Summit on Natural Resources for participation by the Board of Directors of the Chugach Region Native Corporations, Tribal Councils, and regional organizations. The Community Facilitators and Natural Resource Specialists also participated. During this Summit the communities identified barriers, and developed solutions, for the Tribal Natural Resource Management Programs and discussed ways to assist in creating cooperative relationships between the Tribes, Native corporations, and state and federal management agencies in the area of jurisdiction, enforcement and management of natural resources. Meetings were held in Nanwalek and Port Graham to explore these opportunities that resulted in cooperative projects being developed for submission to the Federal Subsistence Board.

In FY 02, specific project tasks will be (a) completing Tribal Natural Resource Management Plans in five pilot communities (Tatitlek, Eyak (Cordova), Port Graham, Nanwalek, and Ouzinkie), (b) completing an Inter-Tribal Integrated Natural Resource Management Plan for the Chugach/Lower Cook Inlet region, and (c) actively participating in GEM planning meetings and workshops. In addition, the Tribes will work to further develop their technical capacity to conduct research and monitoring projects under the GEM program and to identify common areas of interest between the Tribal Natural Resource Programs and GEM. Once these common areas of interest are identified, the goal will be to develop methods by which Tribes can assume specific research and monitoring activities of GEM, while leveraging other funds to implement other aspects of their Tribal Natural Resource Management Plans.

In FY 02, the position of Spill Area Wide Community Involvement Coordinator will be replaced with a Tribal Natural Resource Program Planner. This person (to be hired) will be responsible for coordinating the overall project out of the Restoration and CRRC offices, to accomplish the following tasks:

1. Continue the involvement of community members and Tribal Natural Resource Management Programs throughout the spill region in development of the GEM Program. This will include active participation of the Tribal Natural Resource Program Planner and Tribal representatives in various GEM planning meetings and workshops, such as the January 2002 EVOS Annual Workshop and the intertidal workshop to be held in Homer in April.
2. Serve as contact point for natural resource personnel in each of ten participating communities (Alaska Peninsula Region/Chignik Lake, Chenega Bay, Cordova, Kodiak Island Region/Ouzinkie Nanwalek, Port Graham, Seldovia, Seward, Tatitlek, and Valdez). The Tribal Natural Resource Program Planner will:

- a. Coordinate and assist in the completion of Tribal Natural Resource Management Plans in the five pilot communities and incorporate individual plan information into an Inter-Tribal Integrated Natural Resource Management Plan.
 - b. Coordinate the participation of the Tribes in the EVOS annual restoration workshop and various GEM planning meetings and workshops.
 - c. Work with the TEK Specialist (see below) to facilitate participation of natural resource personnel in capacity building efforts (e.g., training sessions, workshops, conferences).
3. Communicate findings and results of relevant EVOS research to the Natural Resource Specialists.
 4. Provide input at Restoration Work Force and Public Advisory Group meetings.
 5. Attend (in person or by teleconference) all Trustee Council meetings and report to the Tribes on relevant actions taken.
 6. Prepare quarterly project status reports and an annual project report, as required by the Trustee Council's reporting procedures.

Trustee Council funding will support roughly one-quarter time of an existing Natural Resource Specialist (or similar position) in each of the five pilot communities. The specific tasks to be undertaken by the Natural Resource Specialists include the following:

1. Complete Tribal Natural Resource Management Plans and begin work, if possible, on action (i.e., implementation) plans. The current status of the plans is as follows:
2. Participate in completion of an Integrated Inter-Tribal Natural Resource Management Plan. This plan, which addresses the Chugach/lower Cook Inlet region, is currently in its third draft.

Tatitlek: Plan completed. Next step is to prepare species-specific action plans. MOA with Tatitlek Corporation is in place regarding Tribal management of resources.

Eyak (Cordova): First draft of plan is done.

Port Graham: Third draft of plan is done. MOA with Port Graham Corporation is in place regarding Tribal management of resources.

Nanwalek: First draft of plan is done.

Ouzinkie: Plan not yet drafted.

3. Participate in the EVOS Annual Restoration Workshop, various GEM planning meetings and workshops, the Native American Fish & Wildlife Society Conference, Alaska Forum on the Environment conference, and the EPA Region X environment management conference.
4. Work with project staff to identify common areas of interest between the Tribal Natural Resource Management Plans and the GEM Program.

5. Continue building the technical natural resource capacity at the community level through participation in training and education opportunities, including research and monitoring techniques.
6. Inform the Tribal Natural Resource Program Planner of community issues, concerns, or questions regarding GEM. These issues could be identified through community meetings or through other means, and could include ideas for integrating GEM and the Tribal Natural Resource Management Plans.
7. Coordinate any activities that have a direct impact on the local community resources and any research projects that will complement the Tribe's traditional knowledge of the traditional use areas.

In addition, Project 02052 will support travel necessary for participation of other communities (Chenega Bay, Valdez, Seldovia, Seward (Qutekcak), Chignik Lake) in the spill region in various GEM planning meetings and workshops and in capacity-building activities (e.g., training and workshops).

The specific tasks for the Traditional Ecological Knowledge (TEK) Specialist will be to:

1. Assist the Tribal Natural Resource Programs with completion of their Tribal Natural Resource Management Plans, specifically in the areas of traditional ecological knowledge.
2. Assist spill area communities as requested, in developing methods for documenting TEK and otherwise incorporating it into research and monitoring programs related to GEM.
3. Provide other assistance as necessary to the project and to the Tribal Natural Resource Program Planner.

The specific tasks for other science advisors will be to:

1. Work with the communities to identify GEM related projects within their Tribal Natural Resource Management Plans.
2. Coordinate community input in the GEM program, including serving as the liaison with other GEM scientists, as appropriate, to get community input in the design and implementation of GEM.
3. Participate, in coordination with the Tribes, in various GEM meetings and workshops.
4. Help develop additional research and monitoring ideas outside of GEM to meet community interests in resource stewardship.
5. Assist in building the technical natural resource capacity at the community level.

6. Assist the Tribal Natural Resource Program Planner in communicating findings and results of relevant EVOS research to the Natural Resource Specialists.

NEED FOR THE PROJECT

A. Statement of Problem

Marine bird, fish and mammal stocks are believed to be profoundly influenced by the marine environment that hosts them and the food-webs that support their production. Variations in annual production and species composition associated with cycles and shifts in ocean climate have been documented. To meet the mission of GEM, the physical condition of the northern Gulf of Alaska and selected target populations must be carefully tracked through time. The emerging "historical records" provide important insight about how the ecosystem responds to environmental fluctuations on scales from weeks and months to decades and ideally centuries. GEM monitoring will be strengthened significantly by the addition of coastal observations in the many sub-environments stretching from Prince William Sound to the Alaska Peninsula. There is a critical need to establish a long-term observational program in coastal waters because the edge-zone of the northern Gulf is used by many sport, subsistence and commercial resources as reproductive and nursery habitat.

In addition, the *Exxon Valdez* oil spill caused severe disruption of the lives of many people living in the spill impacted area. The oil spill also caused residents of the area to be concerned about the safety of their wild food sources, and the integrity of the surrounding natural environment. While scientific studies aimed at restoring the resources and services damaged by the oil spill have occurred throughout the spill area, most of the researchers work for agencies or institutions based in Anchorage, Fairbanks, or outside Alaska. Residents have voiced concern over a lack of involvement by spill area communities in the restoration efforts, and incomplete communication to spill area inhabitants of study proposals and results. While the past several years have facilitated an increasing amount of communication between the scientists and the communities, there still exists a void for meaningful involvement in the restoration process by the community members at the grass roots level. At the same time, researchers have recognized that local residents have traditional knowledge that could help them answer questions they have not been able to answer through conventional scientific means.

In addition, communities in the spill area are very concerned about the long-term stewardship and management of lands and resources important to their subsistence way of life. These communities have been developing their Tribal Natural Resource Management Programs at the local level to ensure long-term health of injured oil spill species, important subsistence resources, and responsible management of lands in proximity to their villages and traditional use areas. The Gulf Ecosystem Monitoring Plan is also very concerned with the ecosystem and coordination between the communities and the Trustee Council regarding community-based monitoring and will be necessary to effectively monitor and document change in the Gulf of Alaska ecosystem.

Furthermore, the EVOS Trustee Council has recognized the need to increase communication and community involvement in the restoration process. This was stressed throughout the GEM Workshop, held in Anchorage in October 2000. The National Research Council also cited the need for meaningful community involvement in the interim report submitted by the Committee to Review the Gulf of Alaska Ecosystem Monitoring Program *entitled The Gulf Ecosystem Monitoring Program: First Steps Toward a Long-Term Research and Monitoring Plan, February 2001*. During the Public Advisory Group's April 4, 2001 meeting, the integration of community involvement into the GEM Program was identified as a top priority.

Therefore, it is evident that the integration of Tribes, their Natural Resource Programs, community research and monitoring, and GEM must take place in order to ensure meaningful community involvement in the GEM Program. The specifics of how this will occur must be defined by the communities and presented to the Trustee Council.

B. Rationale/Link to Restoration

This project furthers the Trustee Council's goals of facilitating the involvement of spill area residents and resource users in the restoration process and ensuring the long-term stewardship of marine resources. It also reaffirms the Trustee Council's dedication to the involvement of people living in the oil spill affected areas in the restoration and research and monitoring process.

In addition, people living in the spill area have detailed knowledge about the condition of resources, which can significantly add to data collected as part of scientific studies and enhance the success of restoration efforts. Local people have expressed a desire to be involved in all aspects of restoration, and a willingness to work with researchers. The Tribes in the Chugach Region and the Ouzinkie Tribe are in the process of developing Tribal Natural Resource Management Plans. These plans are leading the way for the creation of methods and projects that will ensure the continued abundance of subsistence resources important to their communities. Tatitlek's plan was completed in FY 01, three other plans (Eyak, Port Graham, Nanwalek) are in draft form, and Ouzinkie's plan has not yet been drafted.

These Plans form the basis for development of Tribal Natural Resource Management Programs. The Tribal Natural Resource Management Plans outline overall interests of the communities, including economic development, traditional use area management, and various other aspects of their Natural Resource Management Programs. The Chugach Tribes are also currently working with the Chugach Regional Resources Commission to develop an Inter-Tribal Integrated Natural Resource Management Plan. This plan will coordinate all the Tribal Plans to provide a format for the Tribes to work cooperatively to address issues related to management, monitoring and research of their traditional use areas. Both the Tribal plans and the Inter-Tribal Integrated Natural Resource Management Plan will be instrumental in planning for participation in the GEM community-based research and monitoring programs. GEM must integrate local Tribal Natural Resource Management Plans and Programs into the overall GEM Program to effectively monitor environmental conditions and indicator species. This project will open communication lines and help facilitate the interaction between the different entities.

At present, the only systematic and year-round monitoring program of ocean conditions in the northern Gulf of Alaska is maintained in outer Resurrection Bay by the Institute of Marine Science, University of Alaska Fairbanks (GAK-1 station) and in Cook Inlet by Cook Inlet Keeper. Also, some seasonal records of temperature and plankton volumes have been made over the years by aquaculture corporations in Prince William Sound, lower Cook Inlet, and at Kodiak. These observations, coupled with those undertaken by several private organizations in the region, provide evidence that citizen monitors can be important contributors to long-term programs, but also demonstrate that to be effective, these efforts must be standardized and coordinated over time, which can be accomplished through the GEM Program. Furthermore, resource managers will benefit greatly from any new information arising from GEM and other coastal monitoring programs, such as information and data generated by the Tribes.

C. Location

This project will be spill area wide. All communities will have some level of involvement, based upon their needs and interests. In FY 02, five communities will be pilot project communities. These are Eyak, Nanwalek, Ouzinkie, Port Graham, and Tatitlek. Chenega Bay, Chignik Lake, Qutekcak, Seldovia, and Valdez will continue their involvement through their local governing bodies. Other regional, Native, and community organizations will be encouraged to participate and mold the parameters for the monitoring programs. Tribal Natural Resource Management Program development efforts may expand to other communities as the five pilots communities move forward. The idea is to use the five pilot communities as models for other interested communities.

The project's benefits will be realized both in meaningful involvement by the communities and their Tribal Natural Resource Management Programs, and in the restoration of the injured resources. Better communication among the Trustee Council staff, researchers, and residents of the communities impacted by the spill should improve the effectiveness of restoration efforts and the GEM Program.

COMMUNITY INVOLVEMENT AND TRADITIONAL KNOWLEDGE

The core of this project is the incorporation of community involvement and traditional knowledge into the EVOS restoration process and the GEM Program. Communities will be informed of EVOS projects and research findings, and provide input into the Trustee Council process through a network of Tribal Natural Resource Specialists, the Tribal Natural Resource Program Planner, TEK Specialist, Principal Investigator, and Science Advisor. The Natural Resource Specialists will be hired locally.

PROJECT DESIGN

A. Objectives

The objectives of the project will be to:

1. Complete the Tribal Natural Resource Management Plans for the five pilot communities. In the case of Tatitlek, where the plan is complete, complete the action plans (i.e., implementation plan) for some specific marine species listed in the management plan.
2. Complete the Inter-Tribal Integrated Natural Resource Management Plan, the regional plan for the Chugach/lower Cook Inlet region.
3. Facilitate community input into GEM
4. Compare the research parameters of the GEM Program to the Tribal Natural Resource Management Plans, to identify where their interests in research and monitoring overlap. This information will then be used to identify ways that the EVOS Trustee Council and the Tribes can work together in order to meet their common objectives.
5. Further develop the tribal technical management capacity of the Tribal Natural Resource Management Program personnel through participation in technical workshops and training sessions.
6. Improve the communication of findings and results of EVOS research to spill area Village Councils, inhabitants and the appropriate regional organizations. It is expected that by doing so, this project will increase the effectiveness of overall restoration efforts.

B. Methods

All project objectives will be achieved through the collaborative work of the PI, the Tribal Natural Resource Program Planner, the Natural Resource Specialists, the Tribal Natural Resource Management Programs, the TEK Specialist, and the Science Advisor.

C. Cooperating Agencies, Contracts, and Other Agency Assistance

ADF&G will contract with CRRC for overall coordination of a network of Natural Resource Specialists through a Tribal Natural Resource Program Planner. Additionally, CRRC will contract with Dr. Henry Huntington to serve as the TEK specialist, and with other science advisors (not yet unidentified) as needed.

SCHEDULE

A. Measurable Project Tasks for FY 02 (October 1, 2001 – September 30, 2002)

NOTE: With the exception of some workshop travel in early 2002, this project was not authorized to begin until March 2002.

March 2002:	Contract with CRRC and ADF&G renewed
March 2002:	MOU renewed between ADF&G & CRRC
March 2002:	Advertise and hire Tribal Natural Resource Program Planner

March 2002:	Subcontracts with Tribes for Natural Resource Specialists renewed.
April 2002:	Contract with TEK Specialist renewed.
April 2002:	Contract with Science Advisor developed and signed.
January 2002:	Participate in EVOS Restoration Workshop
February 2002	Attend Region X EPA Environmental Conference and Alaska Forum on the Environment Conference
March 2002:	Attend BIA Integrated Resource Management Program Development Conference.
May 2002:	Attend the Native American Fish & Wildlife Society Conference.
September 2002:	Complete work on Tribal Natural Resource Management Plans for Eyak, Port Graham, Nanwalek, and Ouzinkie
September 2002:	Complete Inter-Tribal Integrated Natural Resource Management Plan
September 2002:	Complete Tatitlek Tribal Action Plans for specific marine species
Ongoing:	Participate in GEM planning meetings and workshops, as well as capacity-building and training activities, as the opportunities arise

B. Project Milestones and Endpoints

March 2002:	Contracts with Tribes in place.
January 2002:	Attend EVOS Restoration Workshop.
September 2002:	Ouzinkie, Port Graham, Nanwalek, and Eyak Tribal Natural Resource Management Plans completed.
	Inter-Tribal Integrated Natural Resource Management Plan completed.
	Some Tatitlek species-specific action plans completed.
April 2003:	Annual report submitted to EVOS.

C. Completion Date

Since the objective of this project is to integrate GEM with the Tribal Natural Resource Management Programs, we believe this program should be continued throughout the restoration, research, and monitoring process.

PUBLICATIONS AND REPORTS

An annual report will be submitted by CRRC by April 15th, 2003.

PROFESSIONAL CONFERENCES

The Tribal Natural Resource Specialists, Tribal Natural Resource Program Planner, TEK Specialist, Science Advisor, and Principal Investigator will be attending the Native American Fish & Wildlife Society Conference, which will be held in Anchorage, May 2002. The

Conference will focus on community planning, natural resource monitoring, stewardship and how to integrate these initiatives with other research and monitoring efforts. This Conference will provide an excellent opportunity for the communities to examine other Tribal Natural Resource Management Programs and talk with people who are recognized as community involvement and community monitoring experts. Furthermore, Ms. Patty Brown-Schwalenberg, the Principal Investigator, plans to give a presentation at the conference on the Community Involvement Project, Traditional Knowledge, and the Tribes' role in the upcoming GEM Program.

NORMAL AGENCY MANAGEMENT

Not applicable.

COORDINATION AND INTEGRATION OF RESTORATION EFFORT

This project is an effort to GEM with the Tribal Natural Resource Management Programs and builds on the established relationship between CRRC and the communities in Prince William Sound. Other organizations may be included, such as the Cook Inlet Keeper, Regional Citizen Advisory Councils, Kachemak Bay Research Reserve, Alaska Wilderness Recreation and Tourism Association, and various others.

CRRC is contributing a considerable amount of in-kind services to the project. CRRC's Tribal Natural Resource Management Program development project has been operating for the past three years in four of the villages in the Chugach Region (Tatitlek, Port Graham, Nanwalek, and Cordova (Eyak)) and Ouzinkie. CRRC, through a BIA contract, is providing technical assistance in the villages to develop their Management Programs. The Native American Fish & Wildlife Society will be providing training and technical assistance through their Regional Conference and technical workshops. Part of the normal duties of the Natural Resource Specialists will be to collect traditional harvest and other baseline data (such as population assessments) on the resources in their traditional use areas.

EXPLANATION OF CHANGES IN CONTINUING PROJECTS

In FY 02, this project will shift its focus from community involvement to the integration of Tribal Natural Resource Management Programs with the Gulf Ecosystem Monitoring and Research Program (GEM).

PROPOSED PRINCIPAL INVESTIGATOR

Patty Brown-Schwalenberg, Executive Director
Chugach Regional Resources Commission
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PRINCIPAL INVESTIGATOR

Patty Brown-Schwalenberg: Ms. Brown is the Executive Director of the Chugach Regional Resources Commission (CRRRC) since 1994. She assists the Chugach Region Tribes in developing their Tribal natural resource programs, developing projects that stimulate the local community economy, and addressing issues and concerns directly related to subsistence and natural resources. She has worked for the past 19 years in such positions as Tribal Administrator for her Tribe, the Lac du Flambeau Band of Lake Superior Chippewa Indians, Society Administrator for the Native American Fish & Wildlife Society, Office Manager of the Bering Sea Fisheries Development Fund, and as a private consultant, assisting Alaska Native Tribes in obtaining funding for natural resource management programs, and setting up their natural resource program administrative systems. CRRRC and the previous organizations that Ms. Brown has operated have consistently met all standards of proper management, including annual program and financial audits.

OTHER KEY PERSONNEL

Tribal Natural Resource Program Planner. The Tribal Natural Resource Program Planner position is vacant at this time. Please see attached position description for information on desired background and education.

Dr. Henry Huntington: CRRRC has contracted with Dr. Huntington to serve as the TEK Specialist. Dr. Huntington received his Ph.D. at the University of Cambridge (U.K.), Scott Polar Research Institute in Polar Studies. He has served as the Environmental Coordinator for the Inuit Circumpolar Conference (ICC), coordinating ICC policy regarding the Arctic Environmental Protection Strategy (AEPS), in cooperation with indigenous organizations in Russia and Scandinavia. He was also responsible for traditional ecological knowledge and other research projects under the auspices of the AEPS.

Science Advisors: We previously contracted with Dr. Ted Cooney for these services, but logistically it has been a challenge trying to make travel arrangements since he lives in Montana. Therefore, we are currently working with the EVOS Restoration Office staff to identify others with similar qualifications residing in Alaska.

LITERATURE CITED

Exxon Valdez Oil Spill (EVOS) Trustee Council, "FY2001 Annual Workshop, October 12-13, 2000 Work Group Notes." Unpublished.

Exxon Valdez Oil Spill (EVOS) Trustee Council, "Exxon Valdez Oil Spill Public Advisory Group Meeting Summary." April 4, 2001. Unpublished.

National Research Council, The Gulf Ecosystem Monitoring Program: First Steps Toward a Long-Term Research and Monitoring Plan. Interim Report. February 2001. National Academy Press, Washington, D.C.

FY 02 EXXON VALDEZ TRUSTEE COUNCIL PROJECT BUDGET

October 1, 2001 - September 30, 2002

Budget Category:	Authorized FY 2001	Proposed FY 2002						
Personnel		\$0.0						
Travel		\$0.0						
Contractual		\$122.8						
Commodities		\$0.0						
Equipment		\$0.0						
Subtotal	\$0.0	\$122.8	LONG RANGE FUNDING REQUIREMENTS					
General Administration		\$8.6	Estimated FY 2003					
Project Total	\$0.0	\$131.4						
Full-time Equivalents (FTE)		0.0						
Dollar amounts are shown in thousands of dollars.								
Other Resources								
Comments:								

FY02

Prepared: 3/8/02

Project Number: 02052
 Project Title: Natural Resource Mgmt. & Stewardship Capacity
 Building
 Agency: ADF&G

**FORM 3A
 TRUSTEE
 AGENCY
 SUMMARY**

FY 02 EXXON VALDEZ TRUSTEE COUNCIL PROJECT BUDGET

October 1, 2001 - September 30, 2002

Revision -8-02

Budget Category:	Authorized FY 2001	Proposed FY 2002												
Personnel	\$37.5	\$40.0												
Travel	\$22.1	\$20.0												
Contractual	\$110.0	\$45.0												
Commodities	\$2.0	\$1.8												
Equipment		\$0.0												
Subtotal	\$171.6	\$106.8	LONG RANGE FUNDING REQUIREMENTS											
Indirect	\$17.1	\$16.0	Estimated FY 2003											
Project Total	\$188.7	\$122.8	\$0.0											
Full-time Equivalents (FTE)	0.8	0.5												
Dollar amounts are shown in thousands of dollars.														
Other Resources														
<p>Comments:</p> <p>ADF&G GA (7%) needs to be added to this budget: $\\$122.8 + \\$8.6 = \\$131.4$. Of this amount, \$45.0 was approved by the Trustee Council 8/6/01. Balance for approval in April 2002 is \$86.4.</p> <p>Indirect - CRRC's indirect amount is 15%. This includes costs related to general office operation.</p> <p>Annual Restoration Attendance - 6% of the Project Budget.</p> <p>Professional Conferences - 6% of the Project Budget will go towards the Project Personnel's attendance at the Native American Fish & Wildlife Society Conference to be held in Anchorage in May 2002.</p> <p>Community Involvement - 100% of the Project Budget.</p> <p>CRRC and its member Tribes will also be providing in-kind contributions to this project (totaling \$93,000),, as follows:</p> <table> <tr> <td>Tribal Natural Resource Personnel -</td> <td>\$20,000.00</td> </tr> <tr> <td>Bureau of Indian Affairs funding support</td> <td>43,000.00</td> </tr> <tr> <td>GIS Mapping System</td> <td>30,000.00</td> </tr> </table>									Tribal Natural Resource Personnel -	\$20,000.00	Bureau of Indian Affairs funding support	43,000.00	GIS Mapping System	30,000.00
Tribal Natural Resource Personnel -	\$20,000.00													
Bureau of Indian Affairs funding support	43,000.00													
GIS Mapping System	30,000.00													

FY02

Prepared: 3/8/02

Project Number: 02052
 Project Title: Natural Resource Mgmt. & Stewardship Capacity Building
 Name: Chugach Regional Resources Commission

**FORM 4A
 Non-Trustee
 SUMMARY**

October 1, 2001 - September 30, 2002

FY02

Project Number: 02052
Project Title: Community Involvement Planning for GEM
Name: Chugach Regional Resources Commission

FORM 4B
Personnel
& Travel
DETAIL

Prepared: 3/8/02

FY 02 EXXON VALDEZ TRUSTEE COUNCIL PROJECT BUDGET

October 1, 2001 - September 30, 2002

Contractual Costs:		Proposed
Description		FY 2002
TEK Specialist & Science Advisor		20.0
Sub-contracts with Tribal Councils in spill area to provide facilitation services, participate in GEM planning and implementation, and other duties as outlined in the DPD (5 pilot communities at \$5,000 each). Based on roughly one-quarter time for remaining 6 mo. of FY 02 (April-Sept) at roughly \$15/hr. plus benefits.		25.0
Contractual Total		\$45.0
Commodities Costs:		Proposed
Description		FY 2002
Incidental costs for workshops (meeting space rental, supplies, food, etc.)		1.8
Commodities Total		\$1.8

FY02

Project Number: 02052
 Project Title: Community Involvement Planning for GEM
 Name: Chugach Regional Resources Commission

FORM 4B
 Contractual &
 Commodities
 DETAIL

Prepared: 3/8/02

FY 02 EXXON VALDEZ TRUSTEE COUNCIL PROJECT BUDGET

October 1, 2001 - September 30, 2002

New Equipment Purchases:		Number of Units	Unit Price	Proposed FY 2002
Description				
				0.0
				0.0
				0.0
				0.0
				0.0
				0.0
				0.0
				0.0
				0.0
				0.0
				0.0
Those purchases associated with replacement equipment should be indicated by placement of an R.		New Equipment Total		\$0.0
Existing Equipment Usage:		Number of Units		
Description				

FY02

Project Number: 02052
 Project Title: Community Involvement Planning for GEM
 Name: Chugach Regional Resources Commission

FORM 4B
Equipment
DETAIL

Prepared: 3/8/02

EVOS Tribal and Community Involvement

The purpose of this report is to provide background for a discussion of how to incorporate tribal and community involvement in the Gulf Ecosystem Monitoring (GEM) program.

Our Commitment

Since its inception, the *Exxon Valdez* Oil Spill Trustee Council has been committed to public participation and local community involvement in all aspects of the restoration program. The Trustee Council recognizes the tremendous loss of livelihood and cultural heritage caused by the 1989 oil spill and has devoted a major portion of the restoration funds to the restoration of natural and archaeological resources that are important culturally and economically. This effort has included significant public and community involvement and outreach. As the GEM program develops, the Trustee Council hopes to expand community involvement, use of local and traditional knowledge, public participation, education, and outreach. These will be major components of the Trustee Council's long-term effort to restore and better understand the northern Gulf ecosystem.

As an organization, the Trustee Council is committed to having community members actively involved in:

- Planning and developing the program
- Guiding the goals and topics of research projects
- Collecting data and participating in long-term monitoring efforts
- Providing Traditional Ecological Knowledge
- Interpreting results in a local context
- Educating other community members about ongoing research

Some of this involvement will come in the form of participation in various planning and review committees. Other involvement will be in the form of working with scientists to provide quality data and input into the GEM program. Portions of GEM monitoring will rely on citizen volunteers based on successful programs throughout North America. Requests for proposals will ask proposers to state how communities will be involved and informed about each project. Funds for community involvement and/or TEK components will be provided.

The remainder of this report documents the efforts and actions the Trustee Council has taken to date to involve tribes, communities, stakeholders and the general public.

A. Community Involvement Project

From 1995-2001, the Trustee Council has provided almost \$2 million to the Chugach Regional Resources Commission (CRRC) to hire a community facilitator in each of ten spill area communities as well as a region-wide community involvement coordinator. CRRC is a regional organization of several tribal governments in the Chugach region, including Prince William Sound and lower Cook Inlet. Facilitators typically have been employees of the tribal government in each community. The communities included Chenega Bay, Tatitlek, Valdez, Cordova, Port Graham, Nanwalek, Seldovia, Ouzinkie, Seward, and Chignik Lake. The facilitators had five major purposes:

1. **Provide results of oil spill restoration projects to the communities.** Facilitators were paid to disseminate twice-monthly updates provided by the Community Involvement Coordinator about the restoration effort to members of their local communities. They would also attend the Trustee Council's Annual Restoration Workshops where they could talk directly to scientists and obtain answers to their questions in a manner they could understand and share when they returned to their communities.
2. **Facilitate communication between local communities and the Trustee Council.** The project was designed to provide for regular communication between communities, facilitators, and the Trustee Council. Each month, the facilitators were to meet with members of their community to request opinions, ideas for restoration projects, and concerns and then submit a monthly report to the Community Involvement Coordinator who would pass the information on to the Trustee Council. Facilitators also participated in retreats and workshops to evaluate the program and provide feedback to the Trustee Council.
3. **Promote community-based projects and involvement throughout the life of the restoration effort.** Facilitators worked with the Community Involvement Coordinator and EVOS staff to help spill area communities develop competitive proposals for projects of interest to local community members. Many of these projects are described below.
4. **Serve as primary contact for EVOS in the Community.** Requests for information, assistance, and input were all filtered through the facilitator who served as key contact person. Principal investigators were urged to use them as their village contact.
5. **Provide tribal input into development of GEM.** Facilitators have been regularly briefed on the status of GEM planning and consulted about their priorities. The project has helped fund development of natural resource management plans in several villages, with an eye towards seeing that these local plans and the GEM plan are complementary.

B. Integrating Traditional Ecological Knowledge (TEK)

In 1994, the Trustee Council received its first call from a community resident to incorporate Traditional Ecological Knowledge (TEK) of spill area residents into the restoration program. Two years later, the 1996 annual restoration workshop had TEK as its theme and led to a set of protocols for incorporating TEK into restoration projects developed by a committee of Alaska Natives and others and approved later that year by the Trustee Council. The Trustee Council has provided funds each year since 1995 toward the goal of incorporating TEK into the restoration program. Efforts have included:

1. Developing a TEK handbook and reference guide for biologists documenting the sources of TEK in the spill area and incorporating it into a western science approach.
2. Providing funds for CRRC to contract with TEK expert Henry Huntington. He has worked directly with Alaska Native elders and hunters as well as scientists to bridge the gap between these two different approaches to understanding the natural world. A result of this process is that several EVOS projects incorporate TEK directly into their data sets and results, including projects on community natural resource management, fish and seabird studies, and a series of films about Alutiiq culture (see examples below).
3. Conducting two workshops to develop tribal management programs and bringing several scientists to spill area communities to share information.

Examples of projects incorporating TEK as a result of Trustee Council efforts include:

1. Researcher Jody Seitz conducted an extensive project involving Traditional Ecological Knowledge. Researchers interviewed thirty-nine spill area community members to document the historical distribution of forage fish such as juvenile herring, sandlance, capelin, and eulachon. This information was mapped and provided to the Alaska Predator Ecosystem Experiment (APEX) and Sound Ecosystem Assessment (SEA) researchers. The results were extremely valuable because they could not have been obtained from other historical sources or from current data collection efforts.
2. Scientist Dan Rosenberg solicited local participation from communities and conveyed results of his research on surf scoters, an important subsistence resource. The project idea came from local communities. Rosenberg worked with them throughout all stages of the project, from project design to writing the final report.
3. The Trustee Council provided funding support to the Alaska Native Harbor Seal Commission, which uses Alaska Native hunters to conduct biosampling of harbor seal tissues using lab-approved techniques. In 1999, the commission reached an agreement with the National Marine Fisheries Service to co-manage harbor seal populations.
4. Three videos have been produced with Trustee Council funds to provide the public information about Traditional Ecological Knowledge and concerns about subsistence use after the oil spill. The first two, *Alutiiq Pride: A Story of Subsistence* and *Changing Tides in Tatitlek* describe subsistence methods, interview Alaska Native people who experienced the spill first hand, show actual subsistence hunts, and illustrate the importance of subsistence in Alutiiq culture. The third documents the communities of Chenega Bay and Ouzinkie in relation to the effects of the oil spill, residual oil in the spill region, and concerns about PSP, a natural toxin found in clams harvested for food. These videos were distributed at no charge to all schools in Alaska via their school districts, all spill area tribal councils, and any other library or school in the U.S. upon request.
5. The Trustee Council funded Elders/Youth Conferences in 1995 and 1998 that brought together Alaska Native elders, youth, other subsistence users, scientists, and managers to share ideas about subsistence issues and facilitate community involvement. The Trustee Council paid for four people from each of 20 spill area communities to attend each conference. Participants shared stories, voiced frustration, and asked scientists questions about subsistence issues. They also developed ideas for youth to get more involved through spirit camps, internships, and educational opportunities. These workshops facilitated collaboration between communities of the spill area, while concerns and ideas generated at the conference were reported to the Trustee Council.

C. Use of Criminal Settlement funds on subsistence projects

A total of \$6,219,611 from the criminal settlement with Exxon, Inc. was appropriated to the Alaska Department of Community and Economic Development (DCED) to implement a grant program with the purpose of restoring, replacing, or enhancing subsistence resources or other services damaged or lost as a result of the *Exxon Valdez* oil spill. The grants were limited to the nine non-incorporated communities of Tatitlek, Chenega Bay, Port Graham, Nanwalek, Karluk, Chignik Lake, Chignik Lagoon, Perryville, and Ivanof Bay. The three Alaska state representatives on the Trustee Council must be consulted before grants are awarded. As community involvement and subsistence projects were proposed to the Trustee Council, those that could not be funded through the civil settlement were passed to this grant program, which

was not as legally constrained in its scope of fundable projects. The Trustee Council funded the planning process that preceded the grant awards and provided peer review for all proposals under this program. The planning process included sending a team to visit all 9 communities to brief them about the program and assist them identifying and prioritizing potential projects. To date, the state representatives of the Trustee Council have approved 24 projects. These projects include:

- Spirit camps in Prince William Sound and Kodiak Island
- Mariculture, hatchery, and processing facilities for the villages of Tatitlek, Chenega Bay, Chignik Lake, Chignik Lagoon, Perryville, and Ivanof Bay.
- Salmon enhancement projects on major subsistence runs near Nanwalek and Port Graham, and on the Kametolook River
- A weir project on the Chignik River
- A subsistence management education program in Tatitlek
- Cultural education centers and programs in Chignik Lagoon, Chignik Lake, Ivanoff Bay, and Perryville
- A preschool language program in Nanwalek
- Community smoke houses in Karluk
- A floating skiff dock in Port Graham
- Archaeological display equipment in Chignik Lake
- A "Subsistence, Stewardship, and Oil Spill Recovery Gathering" in Tatitlek

D. Youth Area Watch

In 1995, the Trustee Council launched the Youth Area Watch (YAW) program with the objective of involving youth from spill area communities in the science behind the restoration effort. Under the direction of the Chugach School District and Kodiak Island Borough School District, teachers are trained annually at the Alaska Sealife Center or Kodiak College. Students have participated in YAW from Cordova, Tatitlek, Valdez, Whittier, Chenega Bay, Seward, Nanwalek, Port Graham, Seldovia, Akhiok, Larsen Bay, Old Harbor, Port Lions, Kodiak City, Karluk, Chiniak and Port Lions. These students (grades 7-12) work with scientists on oil spill research both in the field and in the laboratory. Projects in which students have participated include:

- Harbor seal biosampling
- Seabird monitoring
- Identifying and photographing killer whales
- Analyzing chemicals found in intertidal mussels
- Collecting oceanographic data on cruises
- Sampling juvenile herring in Prince William Sound

In addition to assisting scientists, YAW students develop local restoration projects of their own that directly benefit their communities. Examples of these projects include:

- Black-legged kittiwake monitoring
- Constructing seal and orca skeletons for museum display
- Constructing a community greenhouse
- Teaching about composting
- Constructing a retrievable marine habitat in the community harbor

The program has also aligned itself with a major oceanographic study called the SALMON project through the University of Alaska, Fairbanks. YAW students compare oceanographic forecasts and predictions with their own observations in the field to help scientists refine their computer models. Teachers also provide local knowledge about climate change in the marine environment.

As of 2002, 168 students have participated in the Prince William Sound and Kodiak YAW programs with total funding from the Trustee Council of over \$885,000.

E. Other Restoration Projects

The Trustee Council has made a concerted effort to involve local communities affected by the oil spill in the restoration program. Projects funded include habitat enhancements of interest to sport and commercial fishermen, restoration of subsistence resources, food safety testing, and public outreach and participation. Here are some highlights that have resulted from the Trustee Council's effort to incorporate meaningful public participation and community involvement into the restoration program:

- Chenega residents worked with the National Marine Fisheries Service to clean up 12 local mussel beds.
- Local community members helped on a project to clean the Chenega area shoreline from residual *Exxon Valdez* oil on five cobble-boulder armored beaches.
- Alaska Native community members were paid to help NOAA conduct an extensive survey of lingering oil in Prince William Sound. Communities identified sites important to them that they wanted evaluated for residual oil and participated in the survey work itself.
- Waste management projects were funded in lower Cook Inlet, Kodiak Island, and Prince William Sound to address marine pollution in proximity to local communities and make improvements in local waste management infrastructure.
- The Trustee Council funded a project to restore coho salmon runs, producing 2,000 to 3,000 adults for harvest in a subsistence fishery near Tatitlek.
- With funding support from the Trustee Council, the Qutekeak hatchery in Seward produced over 800,000 clams during each year of a pilot project to seed clam beds for subsistence use near Port Graham, Nanwalek, and Tatitlek.
- The Trustee Council contributed partial funding to rebuild the Port Graham salmon hatchery that was destroyed by fire in 1998. The hatchery provides pink, sockeye, and coho salmon for the benefit of subsistence and commercial fishermen.
- The Trustee Council funded a project initiated by locals in the Native Village of Perryville to rebuild a declining coho salmon run on the Kametolook River used for subsistence.
- The Trustee Council funded a project initiated by the Valdez Native Tribe in conjunction with NMFS to provide information on spot shrimp abundance for subsistence users in Prince William Sound.
- The Trustee Council funded restoration and recreation enhancements along several miles of the Kenai River. These included access stairs, floating docks, interpretive displays, and streambank restoration for the benefit of sportfishing and tourism.
- The Trustee Council funded an assessment and restoration plan for Mariner Park in Homer, which promoted recreationally compatible use of the area by residents and tourists.
- Construction of the Alutiiq Archaeological Repository in Kodiak was funded to protect archaeological resources and educate the public about Alutiiq culture. In addition, the Trustee Council provided funding to train volunteers to monitor and act as site stewards of

archaeological sites on the Kenai Peninsula, Kachemak Bay, Uganik Bay, Uyak Bay, and the Chignik area of the Alaska Peninsula.

- The Trustee Council provided grant funds to Chugachmiut, Inc. to develop a regional archaeological repository in Seward, local display facilities in Chenega Bay, Tatitlek, Cordova, Valdez, Port Graham, Nanwalek, and Seldovia, and traveling exhibits.
- The Trustee Council funded the Port Graham Corporation to restore some salmon streams near the village of Port Graham.
- The Resource Abnormalities Study trained 61 volunteers in 19 spill area communities to take samples of abnormal animals harvested for subsistence. Samples were tested for hydrocarbons and human health effects at the National Marine Fisheries Service laboratory in Seattle. A Resource Abnormalities Hotline was established and the project communicated information on subsistence food safety to communities.

F. Annual Restoration Workshops

Every year in January, the Trustee Council holds its annual workshop free to the public, where EVOS scientists report their findings and future research directions are discussed. The Trustee Council pays to bring all its researchers as well as representatives from each community to the meetings. Each year's workshop has a different theme and in 1996, the theme was community involvement. Input received at these workshops is invaluable, and many research topics and priorities are developed as a result. For the 10th anniversary of the oil spill, the Trustee Council released a report to the nation and a documentary about the first ten years of oil spill effects and restoration.

G. Public Information and Outreach

The Trustee Council has produced numerous publications that inform the public about the status of injured resources, what the Trustee Council does with its funding, and other EVOS-related issues and activities. Except as noted, all documents are sent to a mailing list of over 3,000 and their availability is noticed in papers throughout the spill region. Publications can also be requested from the Anchorage Restoration Office, and many can be downloaded from the Web site. Public information and outreach efforts include:

- Annual Status Reports document major projects and land purchases as well as results of the restoration program explained in lay terms. These reports include an accounting of expenditures from the Trust Fund.
- The Restoration Notebook series contains detailed natural history and recovery information written by biologists about eight specific species injured by the spill and one about the damage, recovery, and status of subsistence resources. This series was distributed at no charge to all schools in Alaska via their school districts, all spill area tribal councils, and any other library or school in the U.S. upon request.
- Since 1993, the Trustee Council has regularly published Restoration Updates, which are several page newsletters about recent Trustee Council actions, upcoming meetings, ongoing activities, and where to find more information.
- Annual work plans, the Restoration Plan, Invitations for Proposals, and other program documents (e.g. GEM program document) are circulated for public review. The Trustee Council considers all public comments on these drafts.

- As needed, the Trustee Council also releases publications related to specific projects such as a set of publications about each region of the spill area and the specific projects that have benefited each region.
- For three years, the Trustee Council funded a production of "Alaska Coastal Currents" a two-minute program about restoration research that aired several times weekly on public radio, accompanied by columns in several regional newspapers. By working through the media, these reports created an avenue for outreach to an even broader community.
- The Trustee Council has a Web site easily accessible to anyone with Internet access and designed for a variety of users from scientists to government resource managers to high school students. The site covers facts about the oil spill, restoration projects, habitat acquisition, and the GEM program and has many major publications and documents that can be downloaded. Information on funding and upcoming events is regularly posted. The URL is <http://www.oilspill.state.ak.us>.
- The Public Advisory Group is composed of 17 representatives of various stakeholder groups including fishermen, subsistence users, and the public at large. This group provides direct input to the Trustee Council and has visited many spill area communities on annual field trips.
- All Trustee Council and Public Advisory Group meetings are advertised, free, and open to the public. Those unable to attend any meeting can listen and participate via teleconference. Public comment periods are scheduled at each Trustee Council meeting and Public Advisory Group meeting.
- Community meetings have been an important part of the restoration process since the day of the oil spill. These meetings have addressed a wide variety of topics including public participation, the Restoration Plan, TEK, waste management, the GEM program, archaeology, community involvement, and science updates. Over the years, the Trustee Council has sponsored public meetings in the villages of Cordova, Juneau, Chenega, Kodiak, Homer, Valdez, Seward, Seldovia, Tatitlek, Whittier, Anchorage, Fairbanks, Chignik Lagoon, Chignik Lake, Ouzinkie, Port Lions, Karluk, Larsen Bay, Akhiok, Old Harbor, Port Graham, Nanwalek, Kenai/Soldotna, and Perryville.

Exxon Valdez Oil Spill Trustee Council

441 W. 5th Ave., Suite 500 • Anchorage, Alaska 99501-2340 • 907/278-8012 • fax 907/276-7178



MEMORANDUM

TO: Trustee Council Members

FROM: Molly McCammon
Executive Director

DATE: April 4, 2002

RE: PAG Charter

Proposed action and motion: To adopt the attached draft charter for the Exxon Valdez Oil Spill Program Advisory Committee (dated 2-26-02).

Background: You were briefed on February 25, 2002 on proposed revisions to the Public Advisory Group charter. The attached draft reflects changes discussed by the Council at that time, with a summary sheet of proposed revisions.

This draft was circulated once again to the current Public Advisory Group. The only comment received was a recommendation by Stacy Studebaker, who serves in the recreation users seat, to keep commercial tourism and recreation users as separate seats because they may reflect different interests. I circulated her comment to the entire PAG and received one response indicating that she had a valid point.

My recommendation is to keep the two interests combined in order to give us more flexibility in seeking members to serve on the new advisory committee.

SUMMARY OF PROPOSED REVISIONS TO PAG CHARTER, 2/28/02

NOTE: This summary reflects the following changes discussed at the 2/25/02 Trustee Council meeting: Retain "local government" and "Native landowner"; add "tribal government"; delete 2 resource agency managers as ex officio members.

1. Change name from Public Advisory Group (PAG) to Program Advisory Committee (PAC)
2. Expand scope of PAC's advice to include "planning, evaluation, and conduct of long-term monitoring and research activities"
3. Extend existence of PAC from 9/30/02 to "at least 9/30/06"
4. Increase membership from 17 to 20
5. Change membership from specific assigned seats to appointments that "represent a balanced representation of" certain interests, as follows:

Current PAG (assigned seats)	Proposed PAC (interests to be represented)
Aquaculture	Expand to include mariculture
Commercial fishing	Same
Sport hunting & fishing	Same
Commercial tourism	Combine commercial tourism & recreation
Recreation users	
Conservation	Combine conservation & environmental
Environmental	
Forest products	Replace with marine transportation
Local government	Same
--	Tribal government
Native landowner	Same
Subsistence	Same
Science/academic	Replace with science/technical, and specify that the STAC will nominate 1-3 of its members to serve on PAC
--	Regional monitoring program
5 general public	Same, but don't specify number

6. Change number of meetings per year from "no less than four" to "no less than two"

CHARTER
EXXON VALDEZ OIL SPILL PROGRAM ADVISORY COMMITTEE

1. Official Designation: Exxon Valdez Oil Spill Program Advisory Committee.
2. Objectives and Scope: In accordance with and pursuant to Paragraph V.A.4 of the Memorandum of Agreement and Consent Decree entered into by the United States of America, through the Department of Justice, and the State of Alaska, through the Attorney General, on August 27, 1991 and approved by the United States District Court for the District of Alaska in settlement of United States of America v. State of Alaska, Civil Action No. A91-081 CV, hereinafter referred to as the MOA, the Program Advisory Committee shall advise the Trustees (State of Alaska Department of Law, State of Alaska Department of Fish and Game, State of Alaska Department of Environmental Conservation, U.S. Department of Agriculture, the National Oceanic and Atmospheric Administration of the U.S. Department of Commerce, and the U.S. Department of the Interior) through the Trustee Council with respect to the following matters:

All decisions relating to injury assessment, restoration activities, or other use of natural resource damage recoveries obtained by the Governments, including all decisions regarding:

- a. Planning, evaluation, and allocation of available funds;
 - b. Planning, evaluation, and conduct of injury assessments and restoration activities;
 - c. Planning, evaluation, and conduct of long-term monitoring and research activities;
 - d. Coordination of a, b, and c.
3. Period of Time Necessary for the Committee Activities: By order of the District Court for the District of Alaska, the Program Advisory Committee is to advise the Trustees, appointed to administer the fund established in settlement of United States v. Exxon Corporation, Civil Action No. A91-082, and State of Alaska v. Exxon Corporation, Civil Action No. A91-083, both in the United States District Court for the District of Alaska, in all matters described in Paragraph V.A.1 of the MOA referenced above. Final payment into the fund was September 1, 2001. A four-year period allowing the opportunity for the Trustees to reopen the agreement to possibly receive additional compensation for injuries begins October 2002 and ends September 30, 2006. It is expected that the need for the Program Advisory Committee will continue until at least September 30, 2006. Extension

of the Committee beyond such date is subject to the unanimous written consent of the designated trustees.

4. Official to Whom the Program Advisory Committee Reports: The Program Advisory Committee shall report to the Exxon Valdez Settlement Trustee Council through the Chair of the Program Advisory Committee at Trustee Council meetings. Other members of the Committee may report with the Chair, as appropriate. The Trustee Council's regular agenda shall include a period during which the Program Advisory Committee representative(s) may report on its activities, ask questions of the Trustee Council, and be available for questioning by the Trustee Council. The U.S. Department of the Interior is the designated Federal agency to which the Program Advisory Committee reports to ensure compliance with the Federal Advisory Committee Act, including the responsibility of ensuring the necessary support for the Program Advisory Committee. The Designated Federal Officer is the Alaska Office of Environmental Policy and Compliance's Regional Environmental Assistant, or his designee.
5. Administrative Support: Administrative support for the Program Advisory Committee shall be provided by the Trustee Council's Executive Director. The Executive Director shall prepare an annual budget for the Program Advisory Committee. The budget shall provide the Program Advisory Committee such funds as the Trustee Council deems appropriate for administrative support for the Program Advisory Committee, from the *Exxon Valdez Oil Spill Investment Fund* established as a result of the settlement of United States v. Exxon Corporation and State of Alaska v. Exxon Corporation. The estimated annual operating cost for the committee is \$55,000, including an estimated .5 staff years.
6. Program Advisory Committee Membership, Selection, and Service: The Program Advisory Committee shall consist of 20 members, including a Chair and Vice-Chair.
 - a. Qualifications for Service - Members shall be appointed to represent a balanced representation of the following interests: aquaculture and mariculture; commercial fishing; commercial tourism and recreation; conservation and environmental; local government; Native landowner; tribal government; science/technical; sport hunting and fishing; subsistence; marine transportation; regional monitoring programs; and public-at-large.

Representatives shall be chosen based on their demonstrated knowledge of the region, peoples, or principal economic and social activities of the area affected by the *Exxon Valdez* oil spill, roughly the northern Gulf of Alaska, or by demonstrated expertise in public lands and resource management or research as it relates to restoration, as applicable.

- b. Nomination and Selection - Nominations for membership may be submitted by any source. The Science and Technical Advisory Committee shall nominate at

least one but not more than three members to represent science/technical interests. From these nominations the Trustee Council will recommend membership to the Trustees, and following selection by the Trustees, the Secretary of the Interior appoints those selected by the Trustees.

- c. Minimum Term - Each member may serve two years from the date of appointment. Members are eligible for renomination and reappointment at the close of their terms. The Trustees may remove a member or officer of the Program Advisory Committee for reasons of malfeasance, incompetence, or failure to attend to membership responsibilities.
 - d. Officers - The Program Advisory Committee shall have a Chair and a Vice-Chair elected by the membership.
7. Expenses: Travel, per diem and administrative support shall be borne by the Trustee Council using funds from the *Exxon Valdez* Oil Spill Investment Fund established in settlement of *United States v. Exxon Corporation* and *State of Alaska v. Exxon Corporation*. While away from home or regular place of business in performance of business of the Program Advisory Committee, members shall receive travel expenses, including per diem in lieu of subsistence, at the applicable government rate.
8. Program Advisory Committee Meetings and Records: The Program Advisory Committee shall meet no less than two times per year.
- a. All Program Advisory Committee meetings will be open to the public. Any member of the public is permitted to file a written statement with the Program Advisory Committee and any member of the public may speak at a Program Advisory Committee meeting.
 - b. Detailed minutes of all meetings, including the time, date and place of the meeting, names of the Program Advisory Committee members and other staff of the Trustee Council present, names of the public who presented oral or written statements, an estimate of the number of other public present, an accurate description of each matter discussed and each matter resolved, if any, by the Program Advisory Committee, shall be prepared and made available to the public through the Executive Director. The Chair shall certify to the accuracy of all minutes of the Program Advisory Committee.
 - c. Meetings of the Program Advisory Committee shall be held at a reasonable time and in a place reasonably accessible to the public. Notice of meetings shall be published in accordance with AS 44.62.310(e), AS 44.62.175 and 41 CFR 101-6.1015(b).

- d. All accounts and records of the activities and transactions of the Program Advisory Committee shall be kept and maintained by the Staff of the Executive Director and, subject to the provisions of 5 U.S.C. section 552, such accounts and records shall be available for public inspection at the offices of the Executive Director.
 - e. All rules and procedures governing the proceedings of the Program Advisory Committee must be approved by the Trustee Council.
9. Administrative Authority: The-Program Advisory Committee functions are advisory only, and its officers shall have no administrative authority by virtue of their membership. The Trustee Council, through the Executive Director, shall procure all needed space, supplies, equipment, and support for the Program Advisory Committee.
10. Termination Date: The Federal Advisory Committee Act, 5 U.S.C. App., requires that the Program Advisory Committee shall terminate two years from the date of filing of this Charter unless the Committee is renewed before that date in accordance with the requirements of that Act.
11. Authority: This Program Advisory Committee is established as mandated by Paragraph V.A.4 of the MOA and shall be located in Alaska. Additional authority for its creation is found in the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended, 42 U.S.C. subsection 9601 et seq.

Secretary of the Interior

Date Signed: _____

Date Filed: _____

CERTIFICATION

I hereby certify that the renewal of the Charter of the Program Advisory Committee, an advisory committee to make recommendations to and advise the *Exxon Valdez* Oil Spill Trustee Council in Alaska, is necessary and in the public interest in connection with the performance of duties mandated by the settlement of United States v. State of Alaska, No. A91-081 CV, and is in accordance with the Comprehensive Environmental Response, Compensation and Liability Act of 1980, as amended and supplemented.

Date

Gale Norton

Secretary of the Interior

STAC
APPOINTMENTS

Exxon Valdez Oil Spill Trustee Council

441 W. 5th Ave., Suite 500 • Anchorage, Alaska 99501-2340 • 907/278-8012 • fax 907/276-7178



MEMORANDUM

TO: Trustee Council Members

FROM: Henry Huntington, Chair
STAC Nominating Committee

THRU: Molly McCammon
Executive Director

DATE: April 11, 2002

RE: Recommendations for STAC Committee

The STAC Nominating Committee met on Monday, April 8, 2002 to consider nominations received for the Trustee Council's new Scientific and Technical Advisory Committee (STAC). Henry Huntington was elected chair by the committee. Other members of the committee present were Vera Alexander, Hal Batchelder, Kirk Lohman, Patricia Livingston, Stan Senner, and Clarence Pautzke. Molly McCammon and Phil Mundy were in attendance as staff to the nominating committee.

Executive Director Molly McCammon had issued a public call for nominations on March 7, 2002. Sixteen nominations were received. The committee considered the qualifications of all the candidates, as well as the description of the STAC membership from the Process for Providing Scientific and Technical Advice and Peer Review adopted by the Trustee Council in February 2002:

The STAC members shall be drawn from the scientific sectors of academic, government, NGO and private institutions. Together the members shall possess expertise in the habitats, species and environments of the Alaska Coastal Current and offshore, the intertidal and subtidal (nearshore), the watersheds, modeling, resource management, human activities and their potential ecological impacts, and community-based science programs. The STAC members shall be selected for their expertise, broad perspective, long experience and leadership in areas important to the GEM Program. STAC members cannot be principal investigators for presently funded or ongoing GEM projects.

In view of the foregoing, the committee unanimously recommends the following be considered by the Trustee Council to serve on the STAC committee:

Federal Trustees
U.S. Department of the Interior
U.S. Department of Agriculture
National Oceanic and Atmospheric Administration

State Trustees
Alaska Department of Fish and Game
Alaska Department of Environmental Conservation
Alaska Department of Law

- Steve Braund
- Charles Miller
- Brenda Norcross
- Ron O'Dor
- Bill Seitz
- Warren Wooster

To allow for rotation of half the STAC every two years, three of the initial members of the STAC are to be appointed to two-year terms and the other three to four-year terms. Future appointments will all be for four-year terms. The nominating committee recommends that Norcross, Seitz, and Wooster be appointed for two years, and that Braund, Miller, and O'Dor be appointed for four years.

Steve Ignell and Ed Harrison are recommended as alternates for Warren Wooster and Charles Miller. Carol Blanchette is recommended as an alternate for Ron O'Dor and Brenda Norcross. No alternates from the available pool of nominees are recommended for Bill Seitz and Steve Braund. To replace either of them, additional nominations would have to be solicited.

The above candidates are recommended on the basis of their experience and expertise:

Stephen R. (Steve) Braund is principal of Stephen R. Braund & Associates, a private research and consulting firm in Anchorage established in 1978. He has a master's degree in anthropology from the University of Alaska Fairbanks. Mr. Braund's work has taken him to over 125 communities in Alaska, where he has examined a range of topics from cultural anthropology to subsistence harvests to rural Alaskan socioeconomic and sociocultural systems to fisheries. He has served as a Core Reviewer for the *Exxon Valdez* Oil Spill Restoration Program since 1999, and is thus familiar with the work of the Trustee Council and the planning for GEM. In addition to his professional expertise, Mr. Braund is a commercial salmon fisherman and president of the Northern District Set Netters Association of Cook Inlet.

Charles (Charlie) Miller has an extensive history of conducting science in the subarctic Pacific and a great breadth of knowledge of ocean and coastal processes. He served as co-chairman of the Trans-Atlantic Studies of Calanus project, an international effort that involved many countries on both sides of the North Atlantic. He was the organizer and leader in the 1980s of one of the most successful interdisciplinary oceanographic programs of that period, the Subarctic Pacific Ecosystem Research Program (SUPER). Charlie plans to retire this year after more than 30 years with the College of Oceanic and Atmospheric Sciences at Oregon State University, where he is Professor of Oceanography.

Brenda Norcross received her Ph.D. in marine science from the Virginia Institute of Marine Science at the College of William and Mary. She is currently a professor at the Institute of Marine Science at the University of Alaska Fairbanks. She is

currently finishing service on the National Research Council committee reviewing the Trustee Council's GEM Program, and thus, has strong familiarity with GEM. In addition, she has more than 13 years experience working in the Gulf of Alaska, including work on herring following the oil spill. She has experience in the nearshore and Alaska Coastal Current environments, as well as committee work for the North Pacific Marine Science Organization (PICES) and the North Pacific Fisheries Management Council on fisheries management issues.

Ron O'Dor is currently serving in a leadership role as the senior scientist for the Census of Marine Life, an international research and monitoring program funded by the Sloan Foundation and affiliated with the Consortium for Oceanographic Research and Education (CORE). Dr. O'Dor has been Professor of Biology at Dalhousie University since 1983 and is internationally recognized for innovative applications of technology to his work. His main research interests are in global-scale biodiversity and marine invertebrates. He has vast experience internationally and is familiar with numerous large-scale monitoring programs across the world.

William Seitz received his Ph.D. from Iowa State University. He is currently Director of the Alaska Science Center for the USGS (Department of Interior). He is familiar with the major natural resource management issues of Alaska, having served in a lead administrative role with the USGS since 1989. Dr. Seitz is familiar with the *Exxon Valdez* Oil Spill Trustee Council and has participated in early GEM planning sessions since its inception. He has a leadership role in planning and directing marine and freshwater research in all areas of Alaska, both as head of the Alaska Science Center and as a member of the North Pacific Research Board. He brings to the committee a knowledge of the interface between science and resource management, and a pragmatic view of how to monitor the effects of human activities on Alaska's marine resources.

Warren Wooster received his Ph.D. in oceanography from the University of California and began his career as a chemical oceanographer. He led many oceanographic expeditions including the Northern Holiday Expedition in the Gulf of Alaska in 1951. His scientific interests have grown much broader than chemical oceanography: he has published over 50 scientific articles on oceanography, fish and mammal production and links to oceanographic conditions. He has also contributed many articles on marine affairs, ranging from law of the sea to marine resources and international marine science institutions, and he has edited five books. Dr. Wooster was the first IOC (Intergovernmental Oceanographic Commission of UNESCO) Secretary, later became SCOR (Scientific Committee on Oceanic Research) Secretary and then President of SCOR and President of ICES (International Council for Exploration of the Sea). Warren was a key player in the formation of the North Pacific Marine Science Organization (PICES) and was its first chairman. He has been a member or chair of numerous committees and boards of the National Research Council. He was Dean of the Rosenstiel School of Marine and Atmospheric Sciences of the University of Miami and later came to the University of Washington's School of Marine Affairs, where he now holds an emeritus professor position.

It is our understanding that all of the nominees have agreed to serve on the STAC. We believe that the group listed above, together with EVOS Science Director Dr. Phil Mundy, will make an outstanding committee to help guide development of the GEM program.

A list of the other nominees considered by the STAC Nominating Committee is attached.

ATTACHMENT
Additional STAC Nominations

- Will Barber
- Andy Gunther
- Jeff Hetrick
- Ann Jochens
- Jim Reynolds
- Scott Smiley
- Gary Thomas

CAROL ANNE BLANCHETTE

Marine Science Institute
University of California
Santa Barbara, CA 93106

Voice 805-893-5144
FAX 805-893-8062
blanchet@lifesci.ucsb.edu

BIRTHDATE: April 15, 1966; New Brunswick, NJ U.S.A. (U.S.A. Citizenship)

EDUCATION:

PhD ZOOLOGY: Oregon State University, 1994 (Magna Cum Laude)
(Drs. Bruce Menge & Jane Lubchenco: advisors)
BS BIOLOGY: University of Notre Dame, 1988 (Magna Cum Laude)

ACADEMIC POSITIONS:

ASSISTANT RESEARCH BIOLOGIST: University of California, Santa Barbara 1999-present
POST-DOCTORAL FELLOW: University of California, Santa Barbara 1995-1999
INSTRUCTOR: University of California, Santa Barbara 1997 - present
POST-DOCTORAL FELLOW: Stanford University, Hopkins Marine Station 1994-1995
INSTRUCTOR: Oregon State University 1995-1996

RESEARCH INTERESTS:

Population and community ecology, marine ecology, algal and plant ecology, effects of scale, trophic interactions, biomechanics, effects of multiple disturbances on populations, communities and ecosystems, restoration ecology, biogeography

GRANTS AND AWARDS:

Bausch and Lomb Honorary Science Award, 1984
Alpha Epsilon Delta Honor Society 1987, 1988
Bernard J. Hanks UNDERC Fellowship 1987
Friday Harbor Fellowship 1989
Oregon State University Zoology Research Grants 1990, 1991, 1992, 1993
Western Society of Naturalists - Outstanding Paper Award 1992, 1993
Phycological Society of America Croasdale Fellowship 1991
Sigma Xi Grants-In-Aid-of-Research 1991
Seaspace Scholarship 1992
Holt Marine Education Fund Fellowship 1992
American Society of Zoologists - Outstanding Paper Award 1993
National Science Foundation - "Capturing Data in the Field: An Application Framework for Easily Creating Custom Data and Metadata Entry Forms on Handheld and Desktop Computers" (S. Gaines, M. Jones, M. Schildhauer and C. Jones - Co-PIs)

FIELD COURSE EXPERIENCE:

Practical Aquatic Biology, University of Notre Dame, 1987
Marine Phycology, University of Washington, Friday Harbor Laboratories, 1989
Advanced Invertebrate Zoology, University of Washington, Friday Harbor Laboratories, 1990
Biomechanics of Intertidal Organisms, Stanford University, Hopkins Marine Station, 1991

Seagrass Biology, University of Washington, Friday Harbor Laboratories, 1997

TEACHING EXPERIENCE:

INSTRUCTOR: UNIVERSITY OF CALIFORNIA, SANTA BARBARA

EEMB 120 Introduction to Ecology (1997, 1998)

Covers major concepts in population and evolutionary ecology, theoretical, experimental, and field studies pertaining to population growth and regulation, competition, predation, diversity, adaptation, and life history strategies.

EEMB 152 Applied Marine Ecology (1998, 1999)

Introduction to the application of ecological principles and methods to environmental problem solving in marine habitats. Focus on problems that are local, regional, and global in scale. Concepts illustrated with case studies.

INSTRUCTOR: OREGON STATE UNIVERSITY

Marine Biology, Phycology (1992, 1993, 1994, 1995, 1996)

GRADUATE TEACHING ASSISTANT: OREGON STATE UNIVERSITY

General Zoology (1988-1989)

Natural History of Invertebrates (1989)

Marine Biology - {Invertebrates, Ecology, Phycology and Ichthyology} (1990, 1991)

Marine Ecology (1991, 1992, 1993)

Anatomy and Physiology (1992)

TEACHING ASSISTANT: UNIVERSITY OF NOTRE DAME

General Biology (1987-1988)

Aquatic Biology - (1988)

RESEARCH EXPERIENCE:

PRESENT RESEARCH:

University of California, Santa Barbara. 1999 – present. I am one of two science and policy coordinators for the Partnership for the Study of Interdisciplinary Oceans (PISCO). PISCO was funded by the Packard Foundation and is intended to address long-term, large-scale marine ecological questions within a framework of conservation. Drs. Steve Gaines and Robert Warner, are the principal investigators at UCSB. My goals and duties in the first two years of this program have been to establish core elements of the research program. These include long-term monitoring programs for intertidal and subtidal community structure, design and implementation of process-oriented experiments and development of standardized protocols for the collection and storage of data and metadata. Our primary research goal in PISCO is to understand the interaction of the nearshore oceanographic environment with coastal marine communities along the West Coast of North America from Washington to Baja, California. This includes quantifying patterns of distribution, abundance and diversity of the biota in nearshore ecosystems, and determining how ecological, evolutionary and oceanographic processes influence these patterns. Strong evidence suggests that variation among nearshore benthic communities can depend on recruitment and such bottom-up oceanic influences as phytoplankton productivity and nutrient concentration, all of which vary significantly with currents, upwelling, and other physical oceanographic processes. We are attacking this question with intensive biological sampling of larvae, recruits, and post-settlement individuals in both subtidal and intertidal communities, combined with simultaneous monitoring of nearshore waters using a mooring array, benthically mounted ADCP's, coastal radar units, and remote sensing. We are also directly measuring key ecological processes in each intensive study area

with a series of experiments and measurements monitoring predation intensity, growth rates, and condition for selected species. Initially, these intensely studied sites have been focused in coastal regions of particular ecological significance: Pt. Conception and the Channel Islands, Monterey Bay, and the central Oregon Coast. We are now attempting to link these regions through yearly community surveys that cover the entire study area.

POSTDOCTORAL RESEARCH:

University of California, Santa Barbara. 1995 - 1999. Dr. Steve Gaines, principal investigator. We are examining the factors affecting marine biogeographic boundaries near Point Conception, CA. We are attempting to identify the broad class of mechanisms responsible for causing these boundaries (e.g. circulation and dispersal of larvae versus physically induced mortality of larvae or adults) by measuring patterns of settlement at a variety of sites and by transplanting individuals beyond their present range limits.

University of California, Santa Barbara. 1996 - 1999. Drs. Dan Reed and Sally Holbrook, principal investigators. We are exploring how communities recover from disturbances at different scales, and the feasibility of accelerating natural recovery processes using restoration techniques. We are examining the ecology of early life-history stages of surfgrass, the mechanisms underlying seed attachment and the factors influencing the survival of seedlings in nature following recruitment.

Hopkins Marine Station 1994 - 1995. Dr. Mark Denny, principal investigator. Our study focused on the mechanical design of limpets in a wave-swept, intertidal environment. We used a mathematical model to describe a limpet's probability of dislodgment based on measurements made in laboratory flows, and we have extended this model to the field by measuring sizes and tenacities of several limpet species found along the West Coast.

GRADUATE STUDY: Oregon State University, Department of Zoology. 1988 - 1994. My thesis research encompassed three major projects: 1) a theoretical assessment of how wave forces may limit sizes of intertidal macroalgae along wave-swept, rocky shores 2) an examination of the relation between size, growth and probability of survival in the common seaweed *Fucus gardneri* (rockweed), and; 3) a study of the life history and ecology of the brown alga *Postelsia palmaeformis* (sea palm) and the ecological dynamics of its understory community.

GRADUATE RESEARCH ASSISTANT: Oregon State University, Department of Zoology. 1990 - 1994. Dr. Bruce Menge, principal investigator. In a large, multi-year study we looked at the roles played by physical oceanographic factors, offshore productivity, and onshore ecological factors (herbivory, predation, and competition) in determining intertidal community structure.

FIELD RESEARCH ASSISTANT: Oregon State University, Department of Zoology. Summer 1992, 1993. I assisted in field research at St. Thomas, U.S.V.I. on the behavioral ecology of the reef goby *Gobiosoma evelynae* (Jeff Harding, Master's thesis research) and in a long-term study of the effect of predation on coral-reef fish communities (Dr. Mark Hixon, principal investigator).

BIOLOGICAL RESEARCH TECHNICIAN: Department of Biology, University of Notre Dame. 1987 - 1988. Dr. Stephen R. Carpenter, principal investigator. I participated in a study examining trophic interactions and community structure in natural lakes. My work included daily field sampling, water chemistry, zooplankton enumeration, data analysis and construction of experimental devices.

UNDERGRADUATE RESEARCH: Department of Biology, University of Notre Dame. 1987-1988. Dr. Stephen R. Carpenter, research advisor. I conducted independent field and laboratory research

examining the influence of environmental factors on vertical migration behaviors and reproductive fitness of the freshwater cladoceran *Daphnia pulex*.

PUBLICATIONS:

- Blanchette, C. A. 1994. The effects of biomechanical and ecological factors on population and community structure of wave-exposed, intertidal macroalgae. Doctoral dissertation, Oregon State University, Corvallis, OR 282 pp.
- Gaylord, B., C. A. Blanchette and M. Denny. 1994. Mechanical consequences of size in wave-swept algae. *Ecological Monographs* 64:287-313.
- Menge, B. A., E. L. Berlow, C. A. Blanchette, S. A. Navarrete, and S. B. Yamada. 1994. The keystone species concept: variation in interaction strength in a rocky intertidal habitat. *Ecological Monographs* 64:249-286.
- Blanchette, C. A. 1996. Seasonal patterns of disturbance influence recruitment of the sea palm, *Postelsia palmaeformis*. *Journal of Experimental Marine Biology and Ecology* 197:1-14.
- Blanchette, C. A. 1997. Size and survival of intertidal plants in response to wave action: A case study with *Fucus gardneri*. *Ecology* 78(5):1563-1578.
- Blanchette, C. A., S. E. Worcester, D. Reed and S.J. Holbrook. 1999. Algal Morphology, Flow, and Spatially Variable Recruitment of Surfgrass, *Phyllospadix torreyi*. *Marine Ecology Progress Series* 184:119-128.
- Blanchette, C. A., C. Thornber, and S. Gaines. 2000. Effects of Wave exposure on Intertidal Furoid Algae. *Proceedings of the California Islands Symposium* 5:347-355.
- Holbrook, Sally J., Daniel C. Reed, Kimberly Hansen and Carol A. Blanchette. 2000. Spatial and Temporal Patterns of Predation on Seeds of Surfgrass, *Phyllospadix torreyi*. *Marine Biology* 136:739-747.
- Denny, M. W. and C. A. Blanchette. 2000. Hydrodynamics, shell shape, behavior and survivorship in the owl limpet, *Lottia gigantea*. *Journal of Experimental Biology* 203:2623-2639.
- Blanchette, C. A., S. Gaines, and B. Miner. Geographic Variability in Form, Size & Survival of *Egregia menziesii* (Turner) Areschoug around Point Conception, California. (*Marine Ecology Progress Series* In Press).
- Menge, B. A., G. W. Allison, C. A. Blanchette, T. M. Farrell, A. M. Olson, T. Turner, and P. van Tamelen. Rocky intertidal macrophyte dynamics along an environmental stress gradient. (*Ecological monographs* In Review)
- Blanchette, C. A., S. E. Worcester and S. D. Gaines. Timing is everything: Seasonal storms, freezing temperatures and the biomechanics of *Ascophyllum nodosum*. (In review)
- Blanchette, C. A. The relative importance of competition, disturbance and predation in a rocky intertidal "kelp forest" community. (In manuscript).
- Miller, Luke P., C. A. Blanchette and S.D. Gaines. Effects of whelk predation on the distribution of two *Mytilus* species around Pt. Conception, CA. (In manuscript).

Blanchette, Carol A., Jennifer Caselle and Steven D. Gaines. Contrasting contributors to nearshore marine community structure around Pt. Conception, California (In manuscript).

Gaines, Steven D., Carol Blanchette, Jenn Caselle, Brian Grantham, Bruce Menge, Pete Raimondi. Coast-wide Patterns of Invertebrate Settlement: Abrupt Transitions Between Oceanographic Regimes (In manuscript).

Menge, Bruce A., Carol Blanchette, Tess L. Freidenburg, Steven D. Gaines, Jane Lubchenco, David Lohse, and Peter Raimondi. Cross-scale Linkages between Bottom-up Factors and Interaction Strength in Rocky Intertidal Communities (In manuscript).

Blanchette, Carol A., Steven D. Gaines, Suzanne Worcester, Sergio Navarrete, and Gerhard Finke. Patterns of marine invertebrate recruitment, growth and community structure: a mainland-island comparison (In Prep).

CONTRIBUTED PAPERS:

- 1990 Oregon State University Biology Graduate Student Symposium, Newport OR "Factors influencing distribution and aggregation size in *Postelsia palmaeformis*"
- 1992 Western Society of Naturalists, Santa Barbara, CA "Hydrodynamic forces on intertidal algae: the roles of velocity, drag and the acceleration reaction"
Pacific Ecology Conference, Friday Harbor, WA "Mechanical consequences of size in wave-swept algae"
- 1993 Western Society of Naturalists, Newport, OR "Effects of limpet grazing on sea palm size, seasonal abundance and understory community structure"
Pacific Ecology Conference, Oregon Institute of Marine Biology, Charleston, OR "Are limpets keystone grazers in the *Postelsia* understory community?"
American Society of Zoologists, Los Angeles, CA "Going with the flow: effects of wave exposure on thallus size and growth in the intertidal alga *Fucus gardneri*."
- 1994 Pacific Ecology Conference, Bamfield Marine Station, Vancouver Island, British Columbia "Going with the flow: effects of wave exposure on thallus size and growth in the intertidal alga *Fucus gardneri*."
- 1996 Ecological Society of America, Providence, RI "Ripping knotted wrackweed Down East: Do breaking strengths of *Ascophyllum* vary across seasons and sites?"
Western Society of Naturalists, Port Townsend, WA "Sea palm recruitment and the seasonal effects of mussel-clearing disturbance"
- 1997 International Temperate Reef Symposium, Santiago, Chile "Facilitation of surfgrass recruitment by host algal morphology and water flow"
Western Society of Naturalists, La Paz, BCS, Mexico - "Ripping knotted wrackweed down east: do breaking strengths of *Ascophyllum* vary across seasons and sites?" (Carol Blanchette, Suzanne Worcester, and Steve Gaines)
- 1999 California Islands Symposium, Santa Barbara, CA "Effects of Wave exposure on Intertidal Fucoid Algae" (Carol Blanchette, Carol Thornber, Steve Gaines)
- 2001 Ecological Society of America, Madison, WI "Cross-scale linkages between bottom-up factors and interaction strength in rocky intertidal communities" (Bruce A Menge, Carol

Blanchette, Tess L Freidenburg, Steven D Gaines, Jane Lubchenco, David Lohse, Peter Raimondi)

Society for Conservation Biology, Hilo, Hawaii "Patterns of marine invertebrate recruitment, growth and community structure: a mainland-island comparison" (Carol Blanchette, Steven D. Gaines, Suzanne Worcester, Sergio Navarrete, and Gerhard Finke)

INVITED PAPERS, SYMPOSIA, SEMINARS:

- 1994 Western Society of Naturalists, Monterey, CA invited symposium speaker: "Biomechanics of intertidal plants: the effects of wave exposure on algal size, growth and morphology" "New Frontiers in Biomechanics" symposium
Hatfield Marine Science Center, Newport, OR, invited seminar "Life in the surf zone: the effects of biomechanical and ecological factors on wave-swept intertidal plants"
- 1995 Stanford University, Hopkins Marine Station, invited seminar "Taking biomechanical models to the field: effects of wave forces on size and survival of intertidal plants"
- 1997 University of California, Santa Cruz, invited seminar "Taking biomechanics to the field: Pattern and process in wave swept plant communities"
- 1998 California State University, Northridge, invited seminar "Opening the Black Box: Exposing the coupling between coastal and oceanic ecosystems"
Western Society of Naturalists, Monterey, CA invited symposium speaker: "What can Biomechanics contribute to our understanding of community ecology" "Biomechanics and Ecology: Is the Marriage Working?"
Mellon Workshop, Las Cruces, Chile (ECIM): Linking benthic ecology and nearshore oceanography. "Benthic-pelagic links: phytoplankton, macrophytes, and sessile filter feeders."
- 2000 PISCO-Mellon Symposium, Corvallis, OR:
Coast-wide Patterns of Invertebrate Settlement: Abrupt Transitions Between Oceanographic Regimes (Steven D. Gaines, Carol Blanchette, Jenn Caselle, Brian Grantham, Bruce Menge, Pete Raimondi)
Cross-scale Linkages between Bottom-up Factors and Interaction Strength in Rocky Intertidal Communities (Bruce A. Menge, Carol Blanchette, Tess L. Freidenburg, Steven D. Gaines, Jane Lubchenco, David Lohse, and Peter Raimondi)
Temporal Change in Rocky Intertidal Community Structure (Pete Raimondi, Carol Blanchette, Dave Lohse, and Melissa Wilson)
Spatial and Seasonal Patterns Of Physical Processes Around Point Conception, CA: Implications For Larval Transport (Cynthia Cudaback, Brian Gaylord, Libe Washburn, and Carol Blanchette)
Bottom-up Effects on Macrophyte Assemblages in Relation to Upwelling Intensity (Carol Blanchette, Steve Gaines, Tess Freidenburg, Karina Nielsen, Patti Halpin, Gary Allison, Bruce Menge and Bernardo Broitman)
Methods for Monitoring the Body Temperatures of Intertidal Invertebrates: Why Thermal Stress is Organism-specific (Brian Helmuth, Chris Harley, Patti Halpin, Gretchen Hofmann, Gary Allison, Michael O'Donnell, Carol Blanchette, Clara Svedlund and Kristi Gardner)
Linking PISCO's Science and Policy Work: A focus on West Coast marine reserve activities (Heather Leslie, Renee Davis-Born, Jane Lubchenco, Carol Blanchette, Jenn Caselle, Mark Carr, Steve Gaines, and Bob Warner)
PISCO Policy and Outreach Accomplishments: 99-00 (Renee Davis-Born, Carol Blanchette, Jennifer Caselle, Heather Leslie, Mark Carr, Steven Gaines, Jane Lubchenco, Peter Raimondi, and Robert Warner)

PROFESSIONAL MEMBERSHIPS:

Ecological Society of America (ESA), Phycological Society of America (PSA), Association for Women in Science (AWIS), Western Society of Naturalists (WSN), American Institute of Biological Sciences (AIBS)

MANUSCRIPT REVIEWER FOR:

Ecology
American Naturalist
Journal of Phycology
Ecological Monographs
Marine Ecology Progress Series

SPECIAL APPOINTMENTS:

Secretariat and Webmaster of the Western Society of Naturalists, 2000-2003
Academic Advisor and Science Board member of the Shoreline Preservation Fund, UCSB 2000-present
Science Panel of MARINE (Multi-Agency Rocky Intertidal Network)
Scientific review committee for National Park Service Rocky intertidal monitoring program

UNIVERSITY, PROFESSIONAL AND COMMUNITY SERVICE:

President of the OSU Zoology Graduate Student Association 1992-1993
Science-By-Mail, Scientific correspondent, 1992-1995
Jason project scientist 1999
Research Mentor, Research Mentorship Program 1998, 1999, 2000, 2001
[I served as a mentor for 2 high school students each summer in the Research Mentorship program.
This is a hands-on program for highly motivated high school students interested in participating in
the conduct of academic research in the social, life or physical sciences.]
Judge for Best Student Paper Competition, Western Society of Naturalists, 1999, 2000
UCSB Women's Center, member and invited speaker, 1999, 2000
Project Oceanography, scientific consultant and featured scientist 2000-2001

SPECIAL SKILLS:

TAXONOMIC SKILLS:

Trained in systematics of marine and aquatic algae, plants, invertebrates and fishes
Familiarity with most species of west-coast, nearshore marine algae and invertebrates

COMPUTER:

Working knowledge of Apple macintosh and unix-based operating systems
Knowledge of HTML, CVS and skilled in web page design, and implementation
Extensive experience with data analysis and statistics in JMP and SAS

SCUBA:

Certified open-water SCUBA diver (PADI, 1988)
University of the Virgin Islands research-certified SCUBA diver (1992)
Stanford University research-certified SCUBA diver (1995)
University of California research-certified SCUBA diver (1996-present)

SAFETY, WATER, AND BOATING SKILLS:

Trained in advanced lifesaving, First-Aid, and CPR
Experience with small boat operation (small outboard and diesel)
Trained in mountaineering and climbing techniques, wilderness first-aid and swift-water rescue

STEPHEN R. BRAUND & ASSOCIATES

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FIRM RESUME

Stephen R. Braund and Associates (SRB&A), a small business concern which specializes in sociocultural, subsistence, socioeconomic, and cultural resources research and analysis, has been in existence since January 1978. The following is a brief summary of research conducted by Stephen R. Braund and Associates:

- 2000-2 Sustainability of Arctic Communities: Advancing the Science of Integrated Assessment** (National Science Foundation) - in progress. This three-year multi-disciplinary project under the direction of the Institute of Social & Economic Research (UAA) is a continuation of the Arctic Sustainability Project (see below) that set out to examine how the combined effects of climate change, oil development, tourism, and non-local hunting might change the sustainability of Arctic villages in the range of the Porcupine caribou herd. Using a strong community involvement component, this project will build on the previous work. The partner communities are Kaktovik, Aklavik, Fort McPherson, Old Crow and Arctic Village. This project adds a marine component that will explore key relationships between climate change and oil development and the successful access to bowhead and beluga whales. SRB&A is jointly responsible for this marine component in Barrow, Kaktovik, and Aklavik.
- 1998-02 Synthesis of Information on Socioeconomic Effects of Oil and Gas Activities in Alaska** (Minerals Management Service, U.S. Dept. of the Interior) - in progress. SRB&A is under contract to the MMS to produce a single-volume, scientific reference book that synthesizes selected Alaska social and economic research findings related to the socioeconomic effects of oil gas activities in Alaska in a series of peer-reviewed chapters.
- 2000-02 Pogo Mine Project** (Environmental Protection Agency) - in progress. Under subcontract to Michael Baker, Jr., Inc., SRB&A is responsible for the subsistence and cultural resources portions of an Environmental Impact Statement assessing the various components and alternatives associated with the development of the Pogo gold mine project located 38 miles northeast of Delta Junction Alaska. In association with this project, SRB&A conducted fieldwork on subsistence use areas and cultural resources collecting information during workshops held with Athapaskan residents from Healy Lake, Delta Junction, Dot Lake, Fairbanks and Tanacross.
- 2000-02 Aleknagik Wood River Bridge Project** (Alaska Department of Transportation and Public Facilities) - in progress. Under subcontract to Harding ESE, SRB&A is conducting the subsistence, socioeconomic, and cultural resources portions of an Environmental Assessment for a proposed bridge that would connect the community of Aleknagik which is located on two sides of Lake Aleknagik. This project included socioeconomic, subsistence, and cultural resource fieldwork in Aleknagik.
- 2000-02 King Cove Access Project** (Aleutians East Borough) - in progress. Under subcontract to Michael Baker, Jr., Inc., SRB&A is responsible for the subsistence and cultural resources portions of an Environmental Impact Statement assessing the various King Cove alternatives to establish a year-round, reliable access route between King Cove and Cold Bay, Alaska.

- 2000-02 Scientific Review Board - Arctic Nearshore Impact Monitoring In the Development Area (ANIMIDA)** – in progress. Under an agreement with Arthur D. Little, Braund is one of five members of the scientific review board for the MMS ANIMIDA project.
- 2001 Unocal Archaeological Compliance: Anchor Point Priority A, Deep Creek, South Ninilchik, Iliamna, and Cohoe** (Unocal). SRB&A prepared five Section 106 archaeological compliance reports in conjunction with planning for three prospects on the Kenai Peninsula (Anchor Point A, Deep Creek, South Ninilchik [11 drill pad locations]) and one disposal well (Cohoe) as well as the Iliamna Prospect on the west side of Cook Inlet (four test drill pad locations). SRB&A prepared the literature review, conducted consultations and field surveys, and wrote the final reports.
- 2001 Determination of Eligibility for the National Register of Historic Places - The Turner House, Anchorage, Alaska** (Cook Inlet Housing Authority). Under contract to the Cook Inlet Housing Authority, SRB&A conducted the literature review and archival research, consultation and field survey, and submitted the final report for this Section 106 review.
- 2001 Unocal Archaeological Compliance: Anchor Point Study Sites 1 & 2** (Unocal). SRB&A prepared the Section 106 archaeological compliance report in conjunction with planning for two prospects on the Kenai Peninsula (Anchor Point Study Sites 1 & 2). SRB&A prepared the literature review, conducted consultations and field survey, and wrote the final report.
- 2001 United Utilities, Inc. Central Office Construction, Gambell, Alaska** (U.S. Department of Agriculture, Rural Utilities Service). Under contract to United Utilities, Inc. SRB&A prepared the Section 106 archaeological compliance report for the United Utilities, Inc. Central Office Construction at Gambell, Alaska. SRB&A prepared the literature review, conducted consultation and field survey, and wrote the final report.
- 2001 Greens Creek Mine Stage II Tailings Expansion Environmental Impact Statement** (USDA Forest Service). Under subcontract to Michael Baker Jr., Inc., SRB&A prepared the Cultural Resources Affected Environment & Environmental Consequences for the Greens Creek EIS.
- 2001 Unocal Archaeological Compliance: Dionne No. 1, Albright No. 1 and Pearl No. 1, Pretty Creek No. 4 Prospects** (Unocal). SRB&A prepared the Section 106 archaeological compliance report in conjunction with planning for three prospects on the Kenai Peninsula (Dionne No. 1, Albright No. 1 and Pearl No. 1) and one prospect on the west side of Cook Inlet (Pretty Creek No. 1). SRB&A prepared the literature review, conducted consultation and field survey, and wrote the final report.
- 2000-01 Buckland, Alaska Water and Sewer Project - Section 106 Archaeology Compliance Report** (U.S. Army Corps of Engineers and City of Buckland). Under subcontract to URS Corporation, SRB&A conducted the appropriate literature search and fieldwork and prepared the Section 106 Archaeology compliance report for the Buckland water and sewer project.
- 2000-01 Alaska North Slope LNG Environmental Evaluation** (Alaska North Slope LNG Project Sponsor Group). Under subcontract to Oasis Environmental, SRB&A conducted the cultural resources and archaeological portion of this environmental evaluation of a North Slope to Cook Inlet gas pipeline and LNG plant/marine terminal at Nikiski. SRB&A provided the affected environment, analysis of alternatives and impacts, and mitigation measures for this project.
- 2000-01 Unocal Archaeological Compliance: Ninilchik Native Association 1 & 2** (Unocal). SRB&A prepared the Section 106 archaeological compliance report in conjunction with planning for drilling exploratory wells in the vicinity of Deep Creek on the Kenai Peninsula, Alaska. SRB&A prepared the literature review, conducted field survey, consultation, and wrote the final report.

- 2000 **Per Capita Dollar Replacement Cost for Subsistence Foodstuffs in Shaktoolik and Inventory of Culturally Significant Subsistence Roles and Responsibilities of Inupiat Household Males.** (Private Client)
- 2000 **DeLong Mountain Terminal Project Resource Use Areas** (U.S. Army Corps of Engineers). Under contract to the COE, SRB&A prepared ArcView GIS maps of partial Kivalina contemporary hunting and fishing areas and observed distribution/migration/feeding areas for selected marine and terrestrial species. These maps also include terrestrial and bathymetric base map information. This work was conducted in association with the data gathered for the 1998 Kivalina Subsistence and Traditional Knowledge Interviews (see below)
- 2000 **Akutan and False Pass Subsistence Profiles** (U.S. Army Corps of Engineers). Under subcontract to ResourEcon, SRB&A prepared a brief description of False Pass and Akutan subsistence and assessed the effects of a proposed harbor on False Pass and Akutan subsistence activities.
- 2000 **Assessment of the Subsistence Role of Selected Women in Northern Alaska** (Private Client). SRB&A prepared a description of the roles and responsibilities of Inupiat women on the North Slope and assessed how selected woman fulfilled these roles and responsibilities.
- 1999 **Pioneer Unit Preliminary Assessments and Archaeological Evaluations** (UNOCAL). Under subcontract to Oasis Environmental, SRB&A produced an archaeological compliance report based on a field assessment of petroleum test well locations in the vicinity of Big Lake, southcentral Alaska.
- 1999 **Archaeological Permitting Analysis – Alaska North Slope Liquefied Natural Gas Alternatives** (ARCO Alaska). Under subcontract to Oasis Environmental, SRB&A assessed which permits (cultural resources) are required for several hypothetical alignment alternatives to construct and operate an LNG pipeline and associated facilities from the Alaska North Slope to either Valdez or several Cook Inlet locations.
- 1998-99 **Summary of 1998 Subsistence and Traditional Knowledge Interviews - Kivalina, Alaska** (NANA Regional Corporation and Cominco Alaska Incorporated) – draft. SRB&A conducted a series of workshops in Kivalina, Alaska in October 1998 related to contemporary subsistence activities and traditional knowledge on selected resources and topics.
- 1998 **Community-Based Commercial and Subsistence Fishing Potentially Affected by Fiber Optic Cable from Whittier to Shemya** (U.S. Army Space and Missile Defense Command). Under subcontract to Bristol Environmental Services, Inc., SRB&A provided a description of the communities potentially affected by the laying of a fiber optic cable between Whittier and Shemya Island and assessed the potential impacts to the marine subsistence harvesters and commercial fishers in those communities.
- 1995-00 **Sustainability of Arctic Communities: Interactions Between Global Changes, Public Policies & Ecological Processes** (National Science Foundation) - in progress. This four-year project under the direction of the Institute of Social & Economic Research (UAA) and the Institute of Arctic Biology (UAF) is addressing policy questions about the ability of Arctic human communities to sustain themselves in the face of development and global climate change. An interdisciplinary group is focusing on relationships between global changes in climate and development and changes in vegetation, caribou populations and movements, human use of caribou, wage employment, and perceived local control. The analysis region is northern Alaska

and northwestern Canada with a focus on the Porcupine Caribou Herd range. SRB&A, along with a co-researcher, are working on the community involvement portion of the project. Arctic Village in Alaska and Aklavik, Old Crow and Fort McPherson in Canada are participating in the study. In addition, SRB&A is responsible for synthesizing existing Geographic Information Systems (GIS) caribou harvest and distribution data from Alaska and Canada into ArcView to be used in community discussions.

- 1996-7 **Beaufort Sea Oil and Gas Development/Northstar Project** (U.S. Army Engineer District, Alaska). Under subcontract to Dames and Moore, SRB&A was responsible for the subsistence, cultural resources, and marine mammals (with Dr. Sam Stoker as a subcontractor) portions of the Northstar EIS as well as co-contributor to the traditional knowledge sections. SRB&A reviewed the literature; prepared a description of the subsistence seasonal round, harvest by species, and use areas for Barrow, Nuiqsut, and Kaktovik; conducted fieldwork in Barrow and Nuiqsut; and assessed potential impacts to subsistence and cultural resources related to the Northstar Project. This material was provided to Dames and Moore.

- 1997 **Economic Valuation of Subsistence Production for Families in Koyuk and Shaktoolik.** (Private Client). SRB&A prepared a seasonal round of subsistence activities, resources harvest lists, and prepared a subsistence valuation for Koyuk and Shaktoolik.

- 1997 **Preliminary Description of Subsistence - Wainwright, Alaska.** (U.S. Army Corps of Engineer-Alaska District, Civil Works Branch-Economics Section). SRB&A prepared a brief description of Wainwright subsistence including community history and population, role and importance of subsistence, seasonal round, subsistence harvest estimates and replacement costs related to the Wainwright Harbor Improvement Study.

- 1997 **Quantification of Subsistence and Cultural Need for Bowhead Whales by Alaska Eskimos - 1997 Update Based on 1997 Alaska Department of Labor Data.** (Alaska Eskimo Whaling Commission). Utilizing the method accepted by the International Whaling Commission (IWC) in 1988 for calculating need and relied on in 1994 to determine the bowhead quota, this update presented revised calculations based on 1997 population data generated by the State of Alaska, Department of Labor. The U.S. delegation reviewed this report for the IWC's 49th annual meeting in Monte Carlo in 1997 in support of their landed bowhead quota request.

- 1997 **Japanese Community-based Whaling Workshop.** (The Institute of Cetacean Research, Tokyo). Stephen Braund attended a workshop in Tokyo related to the issues of community-based whaling in Japan.

- 1996-97 **Archaeological Survey - Eureka Creek Drainage, South-Central Alaska.** (American Copper & Nickel Company, Inc.). SRB&A performed a cultural resources investigation of the proposed geological drilling sites in the Eureka Creek drainage, south-central Alaska American Copper & Nickel Company, Inc. as part of their mineral exploration permit on Bureau of Land Management administered lands in the Glennallen Resource Area. SRB&A prepared a report and submitted it to the Bureau of Land Management.

- 1996-97 **Chugach Electric Southern Intertie Project EIS Subsistence Report - Affected Environment.** (Chugach Electric Association, Inc.). Under subcontract to Dames & Moore, SRB&A prepared a subsistence affected environment report for the communities of Ninilchik, Hope, and Cooper Landing.

- 1996 **Subsistence Hunting of Gray Whales - Little Diomedes, Alaska** (Alaska Eskimo Whaling Commission, Barrow, Alaska) - draft. SRB&A conducted fieldwork at Little Diomedes and library

and archival research to provide information on the current and historic gray whale fishery on Little Diomed Island, Alaska.

- 1995-7 **Mapping of Hunting Areas and Travel Routes Based on Interviews with a Selected Group of Subsistence Hunters at Barrow and Wainwright, Alaska** (North Slope Borough Department of Wildlife Management) - in progress. Using GIS, SRB&A is digitizing and mapping data from over 75 interviews with hunters in Barrow and Wainwright concerning their hunting areas, harvests, camps and transportation routes. (See North Slope Borough Subsistence Mapping Project, ff.) The data will be prepared in GIS for presenting various visual displays of land and resource usage.
- 1995 **Community Conference on Subsistence and the Oil Spill** (Alaska Dept. of Fish and Game, Division of Subsistence). Funded by the Exxon Valdez Oil Spill Trustee Council, SRB&A organized and facilitated this two-day conference attended by four representatives each from 20 communities. SRB&A worked with an agenda committee of regional representatives, ADF&G staff and EVOS Trustee Council staff to develop a conference format that generated information exchange between residents of different regions, elders and youth, and residents and scientists. SRB&A prepared a summary report of the conference.
- 1995-6 **Traditional Ecological Knowledge of Beluga Whales: An Indigenous Knowledge Pilot Project in the Chukchi and Northern Bering Seas** (Inuit Circumpolar Conference [ICC]). In conjunction with subcontractor Pacific GIS, SRB&A consulted with ICC on the data collection design and protocol. Using Geographic Information Systems (GIS), SRB&A and Pacific GIS digitized and produced maps of traditional knowledge about beluga whale behavior and elements affecting their activity.
- 1995 **Potential Economic Impacts of CDQ Options for Western Alaska Communities** (Bering Sea Fishermen's Association). Under subcontract to ResourceEcon, SRB&A gathered published and unpublished census, subsistence and fisheries data and prepared detailed tables on the social and economic characteristics of 56 communities.
- 1994 **Contemporary Alaska Eskimo Bowhead Whaling Villages** (In *Hunting the Largest Animals - Native Whaling in the Western Arctic and Subarctic* A.P. McCartney, ed. Occasional Publication No. 36, The Canadian Circumpolar Institute, University of Alberta). An overview of the 10 Alaska Eskimo bowhead whaling communities and their approaches to bowhead whaling, including a discussion about each community for comparison.
- 1994 **Whittier Access Project Subsistence Technical Report** (Alaska Department of Transportation and Public Facilities and Federal Highway Administration). Under subcontract to HDR Engineering, Inc., SRB&A reviewed the literature; prepared a description of the subsistence seasonal round, harvest by species, and use areas for Chenega Bay, Tatitlek, Cordova, Whittier, Hope and Cooper Landing; conducted fieldwork in Tatitlek and Chenega Bay; and assessed potential impacts to subsistence due to the Whittier Access Project.
- 1994 **Archaeological Monitoring of the K-12 School Addition in Gambell, Alaska 1994** (Alaska Office of History and Archaeology). Under contract to Heery International, Inc., SRB&A monitored the excavations for the foundation of the K-12 addition to the Gambell school to determine the presence of cultural materials and human remains. SRB&A prepared a report that was submitted to the Alaska Office of History and Archaeology.
- 1994 **Quantification of Subsistence and Cultural Need for Bowhead Whales by Alaska Eskimos - 1994 Update Based on 1992 Alaska Department of Labor Data** (Alaska Eskimo Whaling Commission). Utilizing the method accepted by the International Whaling Commission (IWC) in

1988 for calculating need, this update presented revised calculations based on 1992 population data generated by the State of Alaska, Department of Labor. The U.S. delegation and the IWC relied on this report at the IWC's 46th annual meeting in Mexico in 1994 to determine the landed bowhead quota.

- 1992-6 **Alternative Caribou Management Systems in the Arctic** (Man and the Biosphere Program, U.S. Department of State). Under subcontract to the University of Alaska, Anchorage Institute of Social and Economic Research, SRB&A performed fieldwork and analysis in Alaska and Canada with resource managers and harvesters for this comparative study of caribou management systems in the two countries. SRB&A interviewed (formal survey technique) 220 traditional caribou users in 11 Alaskan communities and 123 traditional users in four Canadian communities. In addition, SRB&A interviewed 48 managers in both countries and participated in the data analysis and report preparation.
- 1993-4 **Military Operations Area (MOA) in Alaska EIS** (U.S. Air Force). Under subcontract to Jon Isaacs & Associates, SRB&A provided secondary subsistence and socioeconomic information for 37 communities potentially affected by changes in 17 MOAs in Alaska.
- 1992-3 **Communities' Mitigation Strategies Project** (Prince William Sound Regional Citizen's Advisory Council). This study was designed to facilitate the development of community and regional-based mitigation plans which address social, cultural, fiscal and economic concerns about future spills in Prince William Sound, Lower Cook Inlet, and Kodiak Island. Under subcontract to the University of Alaska, Anchorage Institute of Social and Economic Research, SRB&A was responsible for local involvement in identifying impacts, mitigation planning, and response that may occur after a large oil spill.
- 1992-3 **Qutekcak Native Tribe: History and Continuity** (Mount Marathon Native Association). SRB&A conducted a literature and archival review and fieldwork to document the history of Native people in Seward, Alaska.
- 1992-3 **Historical Properties Survey - Seward Highway: MP 0 (Seward) to MP 36 (Sterling Highway Intersection)** (Alaska Dept. of Transportation & Public Facilities). The purpose of this study was to provide information to enable the State Historic Preservation Officer to determine the eligibility of properties located along this portion of the Seward Highway for the National Register of Historic Places (NRHP). The report establishes an historic context and period of significance for the highway including Moose Pass and Seward, and then describes and evaluates the properties under the NRHP criteria.
- 1992 **Traditional Alaska Bowhead Whaling and the Bowhead Quota**. Published in Arctic Research of the United States 6:37-42.
- 1992 **The Continuity of the Valdez Native Population** (Valdez Native Association). SRB&A conducted a literature and archival review and fieldwork in Valdez to document the continuity of the Native population at Valdez.
- 1992 **Quantification of Subsistence and Cultural Need for Bowhead Whales by Alaska Eskimos - 1992 Update Based on 1990 U.S. Census** (Alaska Eskimo Whaling Commission, Barrow, Alaska). Utilizing the method accepted by the International Whaling Commission in 1988 for calculating need, this update presented revised calculations based on 1990 U.S. Census population data.
- 1992 **Air Combat Maneuvering Instrumentation System for Eielson AFB, Alaska (Yukon Measurement and Debriefing System)** (U.S. Air Force). Under subcontract to Jon Isaacs &

Associates, SRB&A evaluated the archeological significance of 23 proposed sites and recommended procedures for compliance with Section 106 of the National Historic Preservation Act.

- 1992 **Main Bay Hatchery Expansion Environmental Impact Statement** (Prince William Sound Aquaculture Corporation). Under subcontract to Dames and Moore, SRB&A assessed the subsistence effects of proposed hatchery expansion at Main Bay, Prince William Sound, Alaska.
- 1992 **Major Flying Exercises - Cope Thunder Environmental Assessment** (U.S. Air Force). Under subcontract to Jon Isaacs & Associates, SRB&A provided assistance in assessing the subsistence effects of proposed military training exercises in three airspace locations in Alaska. Analysis of secondary source subsistence data and SRB&A experience in Alaska provided the basis for this analysis.
- 1992 **Joint Military Training Exercises Environmental Impact Statement** (U.S. Army Corps of Engineers). Under subcontract to Dames and Moore, SRB&A assessed the subsistence effects of proposed military training exercises in 72 ground sites and 20 airspace locations throughout Alaska. Analysis of secondary source subsistence data and SRB&A experience in Alaska provided the basis for this analysis.
- 1991 **Subsistence and Cultural Need for Bowhead Whales by the Village of Little Diomed, Alaska** (Alaska Eskimo Whaling Commission, Barrow, Alaska). SRB&A conducted fieldwork at Little Diomed and library and archival research to document the bowhead whaling history of Little Diomed Island. The purpose of this research was to facilitate Diomed's request for a bowhead whale quota. Following the method used by SRB&A in 1988 to quantify subsistence and cultural need for bowhead whales by Alaska Eskimos in nine other communities (see below), this study quantifies Little Diomed's cultural and subsistence need for bowhead whales.
- 1991 **Saint Lawrence Island - The World of Women** (Vocational Economics, Inc.). SRB&A developed a methodology to identify and measure participation in the primary tasks performed by Eskimo women on Saint Lawrence Island.
- 1990-94 **Effects of the Exxon Valdez Oil Spill on Alutiiq Culture and People** (Cohen, Milstein, Hausfeld & Toll, Washington, D.C.). SRB&A conducted research in 15 communities located in Prince William Sound, Kodiak Islands, Lower Cook Inlet, and the Alaska Peninsula related to the effects of the 1989 Exxon Valdez oil spill in Prince William Sound.
- 1990 **Quantification of Local Need for Minke Whale Meat for the Ayukawa-Based Minke Whale Fishery** (Institute of Cetacean Research, Tokyo, Japan). Prepared with Junichi Takahashi, John A. Kruse, and Milton Freeman, this report was based on a survey of 922 randomly selected Japanese households in Oshika Township, Onagawa Township, and Ishinomaki City, a survey of all Japanese small-type coastal whaling boat owners, and surveys of other, non-overlapping places of use, such as local restaurants and inns. The purpose of the study was to quantify the local human need for Ayukawa-based minke whale meat for culturally significant end uses.
- 1989-90 **Economic Analysis of the S.S. Glacier Bay Oil Spill** (U.S. Department of Interior, Minerals Management Service). Under subcontract to Northern Economics and in association with Jon Isaacs & Associates and Resourcecon, SRB&A participated in a study of the economic impacts of the 1987 SS Glacier Bay oil spill in Cook Inlet, Alaska to commercial, personal use, subsistence, and sport fisheries as well as to commercial fish processors, tourism, recreation, and property values. SRB&A was primarily responsible for collecting and analyzing information regarding the spill's impact to the subsistence and personal use fisheries in Cook Inlet as well as contributing to the overall data collection, literature review and report production.

- 1988-92 **North Slope Borough Subsistence Mapping Project** (North Slope Borough Departments of Planning, Fish and Wildlife, and Administration). The North Slope Borough provided supplemental support for data gathering and analysis for the Minerals Management Service (MMS) North Slope Subsistence Study being conducted by SRB&A. In addition to the MMS scope of work (see below), SRB&A also conducted a supplemental subsistence use area mapping study in Barrow and Wainwright involving key informant hunters. The purpose of this additional mapping project was to provide information about the harvest areas used by Barrow and Wainwright residents not included in the MMS sample. Specifically, the mapping portion of the project focused on current use areas and seasonal transportation routes in relation to fixed camps, current harvest sites, and traditional use areas.
- 1989 **Contemporary Sociocultural Characteristics of Japanese Small-Type Coastal Whaling** (Institute of Cetacean Research, Tokyo, Japan). Prepared with Milton Freeman and Masami Iwasaki, this paper is intended to provide relevant information to an International Whaling Commission working group related to the sociocultural characteristics of Japanese STCW in order to aid this group in making recommendations concerning the need for a distinct category appropriate to small-type whaling.
- 1987-88 **Quantification of Subsistence and Cultural Need for Bowhead Whales by Alaska Eskimos** (U.S. Department of the Interior, Bureau of Indian Affairs). Presented at the 40th Annual Meeting of the International Whaling Commission in Auckland, New Zealand, this study determined the 1988 level of cultural and subsistence need for bowhead whales by Alaska Eskimos based on historic bowhead harvest levels and Eskimo populations in nine Alaska whaling villages. Based on the total number of whales landed from 1910-1969 divided by the total Eskimo population for years in which there were data on landed whales (including years of recorded zero landings) multiplied by the 1988 Eskimo population, the 1989 cultural need in the nine Alaska Eskimo whaling villages was 41 landed whales. The report includes an estimate of future need based on a projection of the Alaska Eskimo population in these communities to the year 2020. The report also contains a comprehensive appendix of "Data on Shore-Based Bowhead Whaling at Sites in Alaska" by S.R. Braund, W.M. Marquette, and J.R. Bockstoce.
- 1988 **Small-Type Coastal Whaling in Japan** (Fund to Promote International Educational Exchange). Braund participated with eleven other social scientists from the USA, Canada, England, Australia, Norway, and Japan in an international workshop on small-type coastal whaling in Japan during April 1988. The goals of the workshop were to document the social, economic, and cultural significance of small-type coastal whaling in Japanese whaling communities. For this report, Braund conducted fieldwork in the Japanese whaling communities of Abashiri, Wadaira, Ayukawa, and Taiji.
- 1986-93 **North Slope Subsistence Study** (U.S. Department of the Interior, Minerals Management Service). SRB&A was contracted by the MMS to collect, analyze, and report generalizable community subsistence harvest and location data for Barrow and Wainwright. An SRB&A field coordinator who lived in the communities directed local research assistants in collecting harvest data from a stratified, random sample of community households in Barrow and a census of Wainwright households. The final report includes yearly summaries of harvest data (amounts and location) as well as sociocultural and socioeconomic information. Maps were prepared for both communities displaying harvest location data for all important species or species groups. Dr. Sam Stoker (biologist), Dr. Ernest S. Burch, Jr. (anthropologist), and Dr. Jack Kruse (survey research) provided technical assistance to the project in their respective areas of expertise. Data collection continued for three years in Barrow (April 1, 1987 through March 31, 1990) and two years in Wainwright (April 1, 1988 through March 31, 1990).

- 1987 **Lisburne Offshore Development Project EIS** (U.S. Army Corps of Engineers and Arco Alaska). Under subcontract to Dames and Moore, SRB&A assessed the sociocultural and subsistence effects of the proposed Lisburne Causeway on the Eskimo communities of the Beaufort Sea. The analysis focused on the North Slope communities of Barrow, Nuiqsut and Kaktovik but included cursory analysis of subsistence use by Canadian communities in the Mackenzie River system. Through analysis of secondary source baseline data, potential sociocultural and subsistence impacts were assessed.
- 1986-88 **National Medical Expenditure Survey** (U.S. Department of Health and Human Services). SRB&A was subcontracted by Westat, Inc. of Rockville, MD to perform the Alaska portion of this nationwide survey. The study, entitled the National Medical Expenditures Survey, consists of two parts: the Survey of American Indians and Alaska Natives (SAIAN) and the survey of non-Native Americans. The SAIAN portion of the study will provide the first national estimates of the health care needs and the use of health care services by the population served by the Indian Health Service. SRB&A was responsible for the three round panel survey of 150 Alaska Native households over a 15 month period in the Bethel and Skagway-Yakutat-Angoon census districts.
- 1986 **Survey of Valdez Resident Attitudes** (City of Valdez). SRB&A joined with Bennett-Walter Associates and Dale Walberg to administer a telephone questionnaire survey of 500 Valdez residents. Faced with declining revenues, the City of Valdez was seeking to determine through this survey attitudes toward public services, funding levels for those services, and various economic development options. Perceptions of community change and quality of life were also explored. SRB&A directed the telephone interviews, supervising the team of locally-hired interviewers from a temporary field office in Valdez.
- 1985-86 **Aleutian/Pribilof Islands Sociocultural and Socioeconomic Systems Update** (U.S. Department of the Interior, Minerals Management Service). The objectives of this study were to update information on current conditions and trends of change in the social, cultural, and economic structure and organization of the St. George Basin area. SRB&A conducted fieldwork in the Pribilof Islands and in Akutan in the Aleutian Islands on social organization, values and ideology of the local residents, subsistence activities, ties between the cash and subsistence economies, and economic organization, including the role of commercial fisheries to the regional economy and economic ties to centers outside the study area, and effects of the discontinuance of Federal Fur Seal Harvest Subsidies.
- 1985 **Use Inventory for Selected Alaskan Streams** (Alaska Department of Environmental Conservation). The purpose of this study was to analyze stream use, water quality, and placer mining activity on Birch Creek, the Tolovana and Chatanika rivers, and Peters Creek and to discuss possible planning measures that will minimize conflicts between placer mining and other uses of the watersheds. Under subcontract to Dames and Moore, SRB&A assessed subsistence uses of Birch Creek by residents of Birch Creek Village, Circle, and Fort Yukon and summarized data on mining and recreational use of Birch Creek.
- 1984-86 **Effects of Renewable Resource Harvest Disruptions on Community Socioeconomic and Sociocultural Systems: King Cove** (U.S. Department of the Interior, Minerals Management Service). Given OCS activities in the St. George Basin and the potential disturbances posed to the marine environment, communities in the Aleutian/Pribilof Islands region could experience disruptions in the availability of local resources. The purpose of this study was to assess the sociocultural and socioeconomic effects on the community of King Cove of renewable resource harvest disruptions. Towards this end, SRB&A undertook a thorough literature review, approximately six person-months of fieldwork in King Cove, and prepared a comprehensive ethnography of the community. This ethnography includes a history of King Cove as well as a general profile of the contemporary community (including commercial fishing, subsistence

activities, wage employment, social relations, political structure, religion, education and values). The ethnographic baseline was used to measure potential impacts resulting from several different disruption scenarios.

- 1985 **Western Arctic Coal Development Project** (Alaska Native Foundation and the Alaska Department of Community and Regional Affairs). The purpose of this study is to assess the viability of utilizing the coal resources of the western arctic region as a substitute for fuel oil for all communities located on the west coast of Alaska. Under subcontract to Arctic Slope Consulting Engineers, SRB&A provided the village socioeconomic impact analysis by assessing the impact of both coal development and coal utilization in Point Lay, and coal utilization in Kivalina.
- 1984-85 **Diamond Chuitna Coal Project EIS** (U.S. Environmental Protection Agency and Diamond Alaska Coal Company). Under subcontract to Dames and Moore, SRB&A assessed the socioeconomic and sociocultural effects of development of the Beluga coal fields on the community of Tyonek, Alaska. Based on a literature review and field interviews, this study documented current patterns of subsistence resource use, economic conditions (including commercial fishing, subsistence, and wage economies), social conditions, local political structures, and local attitudes towards development of the coal deposits. SRB&A used this baseline information to assess potential impacts on the community in each of these categories.
- 1984-85 **A Social Indicators System for OCS Impact Monitoring** (U.S. Department of the Interior, Minerals Management Service). This study provided the MMS with a more thorough understanding of the present state of community well-being in village Alaska, with special attention given to the areas of social, economic, and cultural change that may result from OCS development. Both universal and culturally specific social goals and associated indicators or measures of those goals were identified and field validated in approximately 15 communities in the Aleutian/Pribilof Islands region, the Bering Strait region, and the NANA region. The study team (including SRB&A with the Institute of Social and Economic Research of the University of Alaska and Institute of Social Research of the University of Michigan) developed a methodology that will aid the MMS in implementation of a social indicators monitoring system.
- 1985 **Susitna Hydroelectric Project Resource User Survey** (Harza-Ebasco Susitna Joint Venture). Under subcontract to the University of Alaska, Institute of Social and Economic Research, SRB&A participated in the research and survey design and performed the field surveys in the Matanuska-Susitna Valley. The purpose of the study was to obtain comprehensive information about the extent, type, and value of use of natural resources of the Susitna River Basin, particularly by residents of the Susitna River Basin, Railbelt communities, and communities east of the resource area. SRB&A conducted fieldwork in rural and remote areas along the Parks, Glenn, Richardson, and Alaska highways as well as more inaccessible areas.
- 1984 **Case Studies of Three Past State Land Offerings** (Alaska Department of Natural Resources, Division of Land and Water Management). This report documents the type, date and rate of changes that occurred in three selected State land offering areas in Southcentral Alaska (Denali Lake, Hiline Lake, and the Talkeetna Paper Subdivision). For each study area lot ownership information and a chronological history of land settlement is presented. Based on interviews with 95 past and present land owners and field visits to each of the three study areas, both owners' perceptions of changes as well as observed changes are discussed. The report includes an analysis of changes in use patterns, physical changes (i.e., construction of cabins and/or trails, cutting of firewood, and changes in erosion, water quality, wildlife abundance) and social and attitudinal changes (i.e., attitudes towards various forms of development in the area, conflicts, and whether land owners' expectations were met). The report concludes with a summary of the differences and similarities between the study areas.

- 1984 **Bering Sea Facility Siting Project** (Alaska Department of Community and Regional Affairs). Under subcontract to Dames and Moore, Stephen Braund conducted a series of field visits to Kotzebue, Nome, Unalakleet, and Bethel to conduct a two-way information exchange with coastal management districts, municipal governments, tribal councils, village corporations, regional profit and nonprofit corporations, and other interested village residents. Braund and Associates presented information related to potential resource development in the Bering Sea area as well as a description of existing regulatory processes (state and federal) that influence facility siting. In addition, Braund and Associates gathered information from local representatives on the shortcomings of the existing regulatory processes and suggestions to improve public participation and local control over facility siting decisions.
- 1984 **Assessment of Cumulative Impacts of Petroleum Development on the Alaskan Arctic** (U.S. Department of the Interior, Minerals Management Service). Under subcontract to Maynard and Partch, Stephen R. Braund and Associates reviewed different methods used to forecast sociocultural impacts in Alaska. The project includes an overview of previous Socioeconomic Studies Program efforts to forecast sociocultural change, as well as an annotated bibliography of recent sociocultural and socioeconomic baseline and forecast documents. Selected forecasting methods are outlined and their applicability to cumulative North Slope impacts is considered.
- 1983-84 **An Evaluation of the Effects on Subsistence of a Proposed Land Trade in Cape Krusenstern National Monument** (NANA Regional Corporation). This report was prepared to comply with Section 810 of the Alaska National Interest Lands Conservation Act (ANILCA) related to a proposed land trade in Cape Krusenstern National Monument and its effect on local subsistence patterns.
- 1983-84 **Subsistence Economics, Marine Resource Use Patterns, and Potential OCS Impacts for Chukchi Sea Communities** (U.S. Department of the Interior, MMS and U.S. Department of Commerce, NOAA). Based on the subsistence portion of the Barrow Arch studies prepared by Stephen R. Braund & Associates and the Barrow Arch Synthesis Human Resource Use Workshop, this paper: 1) describes the contemporary subsistence economies of Point Hope, Point Lay, Wainwright, Atkasuk and Barrow, including how employment, cash, and technologically advanced harvest equipment has altered the seasonal round of North Slope residents; 2) presents maps and descriptions of major marine subsistence use areas for each community; and 3) describes potential OCS impacts on current marine subsistence use patterns.
- 1983 **Barrow Arch Socioeconomic and Sociocultural Description** (U.S.) Department of the Interior). Under subcontract to Alaska Consultants, Inc., the subsistence economy and contemporary subsistence land use patterns were analyzed, including subsistence land use mapping for Point Hope, Point Lay, Atkasuk, and Barrow. This analysis is based primarily on fieldwork in the North Slope communities during the summer of 1983. Subsistence mapping and discussion concentrates on the marine environment and identifies hunting range by species, intensive use areas, and hunting seasons by species. During the fieldwork, data was also collected on social organization, cultural values, and political organization.
- 1983 **Village Economies of the Lower Yukon** (Alaska Department of Community and Regional Affairs/Nunam Kitlutsisti). The purposes of this study are a description and model of how the economy of the seven Lower Yukon River villages function and a discussion of how OCS development would affect the communities. Under subcontract to Frank Orth and Associates, Braund & Associates was responsible for the subsistence portion of the village economies (including a valuation of subsistence harvests) and conducted fieldwork in St. Marys, Pitkas Point, Mountain Village, Emmonak, Alakanuk, Kotlik, and Sheldon Point.

- 1983 **Report on Nutritional, Subsistence, and Cultural Needs Relating to the Catch of Bowhead Whales by Alaskan Natives** (U.S. Department of the Interior). Stephen R. Braund was principal author (with assistance from Sam Stoker) of the U.S. Government position paper for the 34th Annual Meeting of the International Whaling Commission. This report addresses the importance of the bowhead whale in both the Alaska Eskimo culture and as a subsistence food resource. Alternative food resources, both store-bought meats as well as other natural resources, are also analyzed. The cultural need for bowhead whales is discussed in terms of village population trends, the number of whaling crews, and hunting efficiency (struck and lost ratio). Finally, the paper quantifies the current cultural need for subsistence bowhead whales based on the historic catch per crew (1960-1983) and per capita returns as adjusted by whaling participation per village.
- 1982-83 **Subsistence Study of the Nine Alaska Eskimo Bowhead Whaling Villages** (U.S. Department of the Interior). Under subcontract to Alaska Consultants, Inc., Stephen Braund served as Principal Investigator for this study. The objectives of this research were 1) to examine and describe the importance of Bowhead whaling to the Alaskan Eskimo culture and 2) to examine the potential for, and limitations to, the substitution of other Native and non-Native foods for the Bowhead whale. Data was primarily collected by means of a survey of 370 households in the communities of Kaktovik, Nuiqsut, Barrow, Wainwright, Point Hope, Kivalina, Wales, Savoonga, and Gambell.
- 1983 **Economic Strategies Plan for the Pribilof Islands** (City of St. Paul). Based on previous research and experience on the Pribilof Islands as well as additional fieldwork during February 1983, Stephen Braund provided information of the human environment related to the various economic strategies available to local residents. This work was performed under subcontract to Dames and Moore.
- 1982 **Kivalina and Noatak Subsistence Use Patterns - 1982** (Cominco Alaska). This study identifies and describes current subsistence patterns in Kivalina and Noatak that could potentially be influenced by the development of the Red Dog Mining Project. Specific emphasis is placed on Kivalina's 1982 subsistence harvest and use of Arctic Char. In addition, caribou and sea mammal use is also discussed.
- 1982 **Social and Recreational Impacts of Capital Relocation** (State of Alaska New Capital Site Planning Commission). Under subcontract to Frank Orth & Associates, this analysis addresses the potential social and recreational impacts resulting from relocating the state capital to Willow, Alaska.
- 1981-82 **Susitna Hydroelectric Project - Sociocultural Studies** (Alaska Power Authority). Under subcontract to Acres American, Inc., this study focuses on baseline information, potential sociocultural impacts, and residents' priorities related to access roads, construction camps, and policy alternatives of the proposed economic growth and the ability of different communities to accommodate change. Braund conducted fieldwork in Talkeetna, Trapper Creek, Curry, Chase, Gold Creek, Cantwell, and McKinley related to this study.
- 1981-82 **Bristol Bay Regional Power Plan - Sociocultural Study** (Alaska Power Authority). Based on fieldwork in 18 Bristol Bay communities and Braund's knowledge of the region, this report documents local community preferences, attitudes and concerns related to various power generation and transmission alternatives for the region, existing land use as well as subsistence patterns and potential conflicts with the project(s), preliminary socioeconomic information, and preliminary potential project impacts. This phase of the study, performed under subcontract to Dames and Moore, was designed to assist Stone & Webster Engineering Corp. and the Alaska Power Authority to identify the best alternative to provide power in the region.

- 1981 **St. Paul and St. George Harbor Feasibility Studies - Sociocultural Analysis** (Alaska Department of Transportation and Public Facilities). Performed under subcontract to Dames and Moore, this study includes baseline data as well as impact analysis related to the proposed port and harbor facilities on the two islands. Items addressed include local Aleut subsistence activities, local development of commercial fishing and onshore processing, anxiety related to potential transient fishermen and workers, the goals of the village corporations, and residents' priorities and concerns related to the potential disruption of their unique Aleut lifestyle caused by the withdrawal of NMFS and potential harbor impacts. Braund conducted fieldwork on both St. Paul and St. George for this study.
- 1981 **Cenaliulriit Coastal Management Program - Socioeconomic Inventory and Analysis** (Cenaliulriit Coastal Management District). Under subcontract to Policy Analysts, Ltd. (Dr. Rick Ender), Stephen Braund performed fieldwork and analysis related to village economies, subsistence, employment, and buying patterns in southwest Alaska. Braund conducted fieldwork on Nelson Island, Alakanuk, and Napakiak related to the coastal zone management plan for the region.
- 1980-81 **Bristol Bay Sociocultural Systems Analysis** (U.S. BLM/OCS Socioeconomic Studies Program). Stephen Braund conducted fieldwork in twelve Bristol Bay communities related to land use and ownership patterns, analysis of political organizations and interrelationships, subsistence, and resident's attitudes towards potential OCS oil and gas development in the region. Braund conducted informal interviews with local residents, federal and state agency officials in the area and in Anchorage, Native corporation personnel, as well as local and regional political leaders. In addition to agency regulations, the associated literature review includes an analysis of numerous relevant congressional acts, government policy decisions, the implementation of ANCSA, and several lawsuits.
- 1980-81 **Cook Inlet Subsistence Salmon Study** (Alaska Department of Fish and Game, Division of Subsistence). This project included an analysis of the regulatory history of the fishery (1960-1980), residents' attitudes towards these changes and current conditions, identification of user groups, and a general description of the Cook Inlet fishery since statehood. People in the Mat-Su Valley, Anchorage, and throughout the Kenai Peninsula were interviewed.
- 1979 **Lower Cook Inlet Sociocultural Analysis** (U.S. BLM/OCS Socioeconomic Studies Program). This contract with BLM resulted in a baseline of Cook Inlet communities (including historic, social, economic, political, and land related analyses) as well as projections for a base case and low, medium, and high oil development scenarios. Stephen Braund conducted fieldwork in the Cook Inlet area (Tyonek, Kenai, Ninilchik, Homer, Seldovia, Port Graham, and English Bay) and interviewed knowledgeable people, including local residents, agency personnel, and Native leaders. In addition to a comprehensive literature review, informal interviews, which helped determine residents' attitudes toward both their existing way of life and potential development, was a major method used in this study.
- 1979 **Bering-Norton Socioeconomic Systems Analysis** (U.S. BLM/OCS Socioeconomic Studies Program). Under subcontract to Policy Analysts, Ltd., Stephen Braund provided the land and housing analyses for Nome and Kotzebue. The report included baseline, base case projections, as well as low, medium, and high oil development scenarios. Braund conducted fieldwork in both these communities, interviewing local residents.
- 1978 **The Social and Economic Impacts of a Commercial Herring Fishery on the Coastal Villages of the Arctic/Yukon/Kuskokwim Area** (North Pacific Fishery Management Council). Through library research and fieldwork in 20 villages, Stephen Braund assessed the historic and present subsistence techniques, harvest levels, and relative nutritional, economic, and social importance of

herring to the local residents of the Bering Sea Coast. Braund performed this work under subcontract to Dames & Moore.

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EDUCATION:

1981 M.A. (Anthropology) University of Alaska, Fairbanks.
1973 B.A. (Honors) Northern Studies/English. University of Alaska, Fairbanks.
1964 Graduated West Anchorage High School

AREAS OF SPECIALIZATION:

Cultural anthropology of Alaskan Natives; human use of renewable resources; resource allocation issues; quantification of cultural and subsistence need for resources, including bowhead whales; Alaska bowhead whale subsistence harvests, cultural significance and use, analysis of rural Alaskan socioeconomic and sociocultural systems; fisheries research; Arctic history and ethnohistory; socioeconomic impact assessment; survey research; and analysis of subsistence use patterns, including changes over time, relationships with changing cash economies, mapping of subsistence harvest ranges, quantification of subsistence harvest amounts, subsistence valuation, and impacts of development on subsistence patterns.

FIELDWORK EXPERIENCE:

I have been an Alaskan resident since 1948 and have traveled extensively in rural Alaska. While growing up, I spent a summer on my grandfather's gold mine near Nome (1950), two summers at Unalakleet fishing (1957 and 1960), a summer as a construction worker on Adak (1964), and additional periods in other remote areas of Alaska. In the two years (1968-70) I lived and worked in Bethel (see employment), I had direct contact with over 300 Eskimo men from Western Alaska and often hunted, fished, and trapped with many of them. Numerous trips to surrounding villages provided further opportunity to observe and participate in the subsistence lifestyle.

Professional and academic work has taken me to over 125 rural Alaskan communities since 1969. Although this field experience includes all areas of the state, my research has been focused on Yup'ik and Inupiat communities in Bristol Bay, the Yukon-Kuskokwim Delta, Norton Sound, Bering Straits and the Bering Sea islands, Northwest Alaska, and the North Slope as well as communities on the Alaska Peninsula, Kodiak Island, the Aleutian/Pribilof Islands region, southcentral Alaska (Cook Inlet and the Matanuska-Susitna valley), and Prince William Sound. This experience of traveling, working, studying and living in rural Alaska since childhood has provided opportunities to acquire hands-on knowledge of rural communities and their inhabitants as well as a pragmatic approach to conducting fieldwork in remote areas with challenging cross-cultural situations.

I have been involved with the Alaska Eskimo Whaling Commission (AEWC) and the International Whaling Commission (IWC) related to the bowhead whale quota for Alaska Eskimos since the early 1980s. I was the principal author (see *Publications and Research Reports* below) of several documents that quantified the Alaska Eskimos cultural and subsistence need for bowhead whales (1983, 1988, 1994 and 1997) and documented Little Diomedes' bowhead whaling history (1991) as well as their use and dependence on gray whales (1996). I have attended IWC annual meetings in Sweden (1986), England (1987), New Zealand (1988), San Diego (1989), the Netherlands (1990), Scotland (1992), Mexico (1994), and Monte Carlo (1997). In addition, I have done fieldwork in Japan (1988, 1989, and 1990) related to Japanese Small-Type Coastal Whaling of minke, pilot, and Baird's beaked whales. This included fieldwork in Abashiri, Hokkaido; Ayukawa; Wadaira; and Taiji.

Research associated with a comparative study of caribou management systems in the Alaska and Canada in 1993-4 has provided me the opportunity to conduct fieldwork in Manitoba, Saskatchewan, Alberta, and the Northwest Territories in Canada. Research in 1996-02 associated with the National Science Foundation Sustainability project has focused on Old Crow, Fort McPherson, and Aklavik in Canada and Arctic Village in Alaska.

I also have a commercial salmon fishing site in Cook Inlet, am president of the Northern District Set Netters Association of Cook Inlet, an alternate boardmember of the Cook Inlet Aquaculture Association, and observe and/or participate in the Alaska Board of Fisheries and, occasionally, the North Pacific Management Council meetings. These activities add to my understanding of the commercial fishing industry, human resource use patterns, and the regulatory and management process of natural resources.

EMPLOYMENT:

- 1978-present** **Principal** in Stephen R. Braund and Associates (SRB&A), a small business concern that has provided consulting services to private industry and state and federal agencies since 1978. This firm specializes in sociocultural, socioeconomic, and subsistence research and analysis; fisheries and renewable resource use studies; resource allocation issues, and ethnographic baseline data collection and analysis. Over the past 23 years, SRBA has conducted or participated in over 80 studies throughout rural Alaska, Canada and Japan (See *SRBA Firm Resume*). As principal, I have been responsible for all aspects of financial and administrative management, conducted and/or directed all research, and have been an author on publications and research reports.
- 1975-76** **Warehouse Manager** at Tonsina Camp, an Alyeska Pipeline construction and maintenance camp.
- 1973** **Teaching Assistant**, Department of Anthropology, University of Alaska, Fairbanks.
- 1972** **Labor Foreman** for the renovation of the Gastineau Hotel, Juneau.
- 1968-70** **Project Supervisor** with the Alaska Department of Education and **Assistant Superintendent** for Braund, Inc., a construction firm specializing in remote facilities construction. For three years, I lived in Bethel while working on the Bethel Turnkey Housing Project and a concurrent Manpower Development Training program. Specific responsibilities included: administration of the training program, including teaching Eskimos math and carpentry principles; management of house construction, material coordination, cost analysis, and payroll; development and implementation of a labor cost code to account for the crew of over 100 men; hiring and discharging the Eskimo workers; and warehousing and inventory control of all building materials and tools for 200 houses.

REVIEW BOARDS

1999 to present: Minerals Management Service Arctic Nearshore Impact Monitoring In the Development Area (ANIMIDA) Scientific Review Board
1999 to present: *Exxon Valdez* Oil Spill Restoration Trustee Council core reviewer
1994-Present: Arctic Institute of North America Grant-In-Aid Committee member

PROFESSIONAL AFFILIATIONS:

Arctic Institute of North America
Alaska Anthropological Association
Cook Inlet Aquaculture Association Alternate Boardmember

LANGUAGE PROFICIENCY:

Yup'ik Eskimo: Two years study, University of Alaska, Fairbanks.
Italian: Two years study including a year in Italy.

PUBLICATIONS AND RESEARCH REPORTS:

- 2002 *Subsistence Uses of the Upper Tanana River Valley: Historical and Contemporary Patterns*. Draft report prepared as Background for the Pogo Project. Prepared for Michael Baker Jr., Inc., Anchorage, Alaska.
- 2002 *King Cove Subsistence Affected Environment*. Report prepared for the King Cove Access Project. Prepared for Michael Baker Jr., Inc., Anchorage, Alaska.
- 2001 *Determination of Eligibility for the National Register of Historic Places - The Turner House, Anchorage, Alaska*. Prepared for the Cook Inlet Housing Authority, Anchorage, Alaska.
- 2001 *Environmental Consequences (Social, Economic, Subsistence) and Secondary & Cumulative Impacts Study (Regional & Local Economy and Tourism & Recreation) - Aleknagik Wood River Bridge Project*. Draft report prepared for Harding Lawson Associates. Alaska Dept. of Transportation and Public Facilities.
- 2000 *DeLong Mountain Terminal Project Resource Use Areas*. Final maps prepared for the U.S. Army Corps of Engineers. (Stephen R. Braund & Assoc). Arcview GIS maps of partial Kivalina contemporary hunting and fishing areas and observed distribution/migration/feeding areas for selected marine and terrestrial species.
- 1999 *Summary of 1998 Subsistence and Traditional Knowledge Interviews, Kivalina, Alaska*. Draft Report prepared for NANA Regional Corporation and Cominco Alaska Incorporated.
- 1999 *Contrasts in Use and Perceptions of Biological Data for Caribou Management*. David R. Klein, Lisa Moorehead, Jack Kruse and Stephen R. Braund. Wildlife Society Bulletin 1999, 27(2):488-498.
- 1998 *Co-Management of Natural Resources: A Comparison of Two Caribou Management Systems*. Jack Kruse, Dave Klein, Steve Braund, Lisa Moorehead, and Bill Simeone. Human Organization 57(4):447-458.
- 1998 *Local Caribou Availability: A Report from Community Involvement Phase 1 of the National Science Foundation Community Sustainability Project*. (Gary Kofinas and Stephen Braund)

- 1998 *Community-Based Commercial and Subsistence Fishing Potentially Affected by Fiber Optic Cable from Whittier to Shemya*. Report prepared Bristol Environmental Services, Inc. (U.S. Army Space and Missile Defense Command).
- 1997 *Subsistence Technical Report - Northstar Prospect, Mid-Beaufort Sea North Slope, Alaska*. Report prepared for Dames and Moore for the Beaufort Sea Oil and Gas Development/Northstar EIS.
- 1997 *Preliminary Description of Subsistence - Wainwright, Alaska*. Report prepared for the U.S. Army Corps of Engineer-Alaska District, Civil Works Branch-Economics Section. Wainwright Harbor Improvement Study
- 1997 *Quantification of Subsistence and Cultural Need for Bowhead Whales by Alaska Eskimos - 1997 Update Based on 1997 Alaska Department of Labor Data*. Report prepared for the Alaska Eskimo Whaling Commission.
- 1997 *Chugach Electric Southern Intertie Project EIS Subsistence Report - Affected Environment*. Report prepared for Dames & Moore and Chugach Electric Association, Inc.
- 1996 *Defining Community Sustainability: A Report from Community Involvement Phase 1 of the National Science Foundation Community Sustainability Project*. (Gary Kofinas and Stephen Braund).
- 1996 *Subsistence Hunting of Gray Whales, Little Diomedea, Alaska*. Draft report prepared for the Alaska Whaling Commission. Barrow, Alaska.
- 1995 *Community Conference on Subsistence and the Oil Spill - Summary Report*. (Stephen R. Braund and Associates). Conference held September 22-23, 1995 at the Sheraton Hotel in Anchorage, Alaska and sponsored by the Exxon Valdez Oil Spill Trustee Council and the Alaska Department of Fish and Game Division of Subsistence.
- 1995 *Contemporary Alaska Eskimo Bowhead Whaling Villages*. (Stephen R. Braund & Elisabeth L. Moorehead). *In Hunting the Largest Animals - Native Whaling in the Western Arctic and Subarctic* A.P. McCartney, ed. Occasional Publication No. 36, The Canadian Circumpolar Institute, University of Alberta.
- 1995 *Potential Economic Impacts of CDQ Options for Western Alaska Communities*. (Jim Richardson, Pat Burden, and Stephen R. Braund & Associates). A report for the Bering Sea Fishermen's Association to the North Pacific Fishery Management Council.
- 1994 *Revised Data on the Subsistence Harvest of Bowhead Whales (Balaena mysticetus) by Alaska Eskimos, 1973-1993*. (R.S. Suydam, R.P. Angliss, J.C. George, S.R. Braund, & D.P. DeMaster). IWC SC/46/AS10.
- 1994 *Whittier Access Project Subsistence Technical Report*. (Stephen R. Braund and Associates). Prepared for the Alaska Department of Transportation and Public Facilities and Federal Highway Administration.
- 1994 *Archaeological Monitoring of the K-12 School Addition in Gambell, Alaska 1994* (Stephen R. Braund and Associates). Prepared for the Alaska Office of History and Archaeology.
- 1994 *Quantification of Subsistence and Cultural Need for Bowhead Whales by Alaska Eskimos - 1994 Update Based on 1992 Alaska Department of Labor Data*. (Stephen R. Braund and Associates). Prepared for the Alaska Eskimo Whaling Commission.
- 1993 *Effects of the Exxon Valdez Oil Spill on Alutiiq Culture and People*. (Stephen R. Braund and Associates and P.J. Usher Consulting Services). Prepared for Cohen, Milstein, Hausfeld & Toll and Sonosky, Chambers, Sachse, Miller & Munson.
- 1993 *Qutekcak Native Tribe: History and Continuity*. (Stephen R. Braund and Associates). Prepared for the Mount Marathon Native Association.

- 1993 *Historical Properties Survey - Seward Highway: MP 0 (Seward) to MP 36 (Sterling Highway Intersection)*. (Stephen R. Braund and Associates with JG Haigh-Design). Prepared for the Alaska Department of Transportation and Public Facilities.
- 1993 *North Slope Subsistence Study, Barrow, 1987, 1988, and 1989*. (Stephen R. Braund and Associates with Institute of Social and Economic Research, University of Alaska Anchorage). Prepared for U.S. Dept. of the Interior, Minerals Management Service, Alaska OCS Environmental Studies Program. Technical Report No. 149.
- 1993 *North Slope Subsistence Study, Wainwright, 1988 and 1989*. (Stephen R. Braund and Associates with Institute of Social and Economic Research, University of Alaska Anchorage). Prepared for U.S. Dept. of the Interior, Minerals Management Service, Alaska OCS Environmental Studies Program. Technical Report No. 147.
- 1992 *The Role of Social Science in the International Whaling Commission Bowhead Whale Quota*. Prepared for the Arctic Research of the United States Interagency Arctic Research Policy Committee 6:37-42.
- 1992 *Valdez: Native History and Continuity*. (Stephen R. Braund and Associates). Prepared for the Valdez Native Association.
- 1992 *Quantification of Subsistence and Cultural Need for Bowhead Whales by Alaska Eskimos - 1992 Update Based on 1990 U.S. Census*. (Stephen R. Braund and Associates). Prepared for the Alaska Eskimo Whaling Commission.
- 1991 *Subsistence and Cultural Need for Bowhead Whales by the Village of Little Diomed, Alaska*. (Stephen R. Braund and Associates). Prepared for the Alaska Eskimo Whaling Commission. Barrow, Alaska.
- 1990 *Economic Impacts of the S.S. Glacier Bay Oil Spill*. (Northern Economics, Stephen R. Braund & Associates, Jon Isaacs & Associates, and ResourceEcon). Prepared for U.S. Dept. of the Interior, Minerals Management Service, Alaska OCS Environmental Studies Program. Technical Report No. 146.
- 1990 *Quantification of Local Need for Minke Whale Meat For the Ayukawa-Based Minke Whale Fishery*. (Stephen R. Braund, Junichi Takahashi, John A. Kruse, and Milton Freeman). Prepared for the Institute of Cetacean Research, Tokyo, Japan. IWC TC/42/SEST8. . Also, *In Papers on Japanese Small-Type Coastal Whaling Submitted by the Government of Japan to the International Whaling Commission 1986-95*. The Institute of Cetacean Research, Toyko, Japan, 1996.
- 1989 *North Slope Subsistence Study, Barrow, 1988*. (Stephen R. Braund and Associates with Institute of Social and Economic Research, University of Alaska Anchorage). Prepared for U.S. Dept. of the Interior, Minerals Management Service, Alaska OCS Environmental Studies Program. Technical Report No. 135.
- 1989 *North Slope Subsistence Study, Wainwright, 1988*. (Stephen R. Braund and Associates with Institute of Social and Economic Research, University of Alaska Anchorage). Prepared for U.S. Dept. of the Interior, Minerals Management Service, Alaska OCS Environmental Studies Program. Technical Report No. 136.
- 1989 *Contemporary Sociocultural Characteristics of Japanese Small-Type Coastal Whaling*. (S.R. Braund, M.M.R. Freeman, and M. Iwasaki; Stephen R. Braund and Associates). Prepared for the Institute of Cetacean Research, Tokyo, Japan. IWC TC/41/STW1. Also, *In Papers on Japanese Small-Type Coastal Whaling Submitted by the Government of Japan to the International Whaling Commission 1986-95*. The Institute of Cetacean Research, Toyko, Japan, 1996.

- 1988 *North Slope Subsistence Study, Barrow, 1987.* (Stephen R. Braund and Associates with Institute of Social and Economic Research, University of Alaska Anchorage). Prepared for U.S. Dept. of the Interior, Minerals Management Service, Alaska OCS Environmental Studies Program. Technical Report No. 133.
- 1988 *Small-Type Coastal Whaling in Japan - Report of an International Workshop* (Akimichi, T. and P.J. Asquith, H. Befu, T.C. Bestor, S.R. Braund, M.M.R. Freeman, H. Hardacre, M. Iwasaki, A. Kalland, L. Manderson, B.D. Moeran, J. Takashashi) Occasional Paper Number 27, Boreal Institute for Northern Studies, University of Alberta.
- 1988 *Quantification of Subsistence and Cultural Need for Bowhead Whales by Alaska Eskimos.* (Stephen R. Braund, Sam W. Stoker, John A. Kruse; Stephen R. Braund and Associates). Prepared for the U.S. Dept. of the Interior, Bureau of Indian Affairs. IWC/TC/40/AS2.
- 1988 *The Skin Boats of Saint Lawrence Island, Alaska.* University of Washington Press, Seattle, Washington.
- 1988 *Kivalina, Alaska Subsistence Use Patterns.* (Stephen R. Braund and David C. Burnham). Paper presented at the Symposium on "Life and Survival in the North: the Relationship between Man and Animals" in Abashiri City, Hokkaido, Japan, February 1988.
- 1986 *Aleutians/Pribilof Islands Sociocultural and Socioeconomic Update.* (Stephen R. Braund and Associates with ResourceEcon, Patrick Burden and Associates, Social Research Institute, and Kirkwood and Associates). Prepared for U.S. Dept. of the Interior, Minerals Management Service Social and Economic Studies Program.
- 1986 *Effects of Renewable Resource Harvest Disruptions on Community Socioeconomic and Sociocultural Systems: King Cove.* (Stephen R. Braund & Associates with LZH Associates). Prepared for the U.S. Department of the Interior, Minerals Management Service Social and Economic Studies Program.
- 1985 *Subsistence Economics of Four Chukchi Sea Communities, Alaska.* (Stephen R. Braund and David C. Burnham). Paper Presented at the symposium Modern Hunting and Fishing Adaptations in Northern North America at the 84th Annual Meeting of the American Anthropological Association, Washington, D.C., December 7, 1985.
- 1985 *Western Arctic Coal Development Project - Village Socioeconomic Impact.* (Stephen R. Braund & Associates). Prepared for the Alaska Native Foundation and Arctic Slope Consulting Engineers.
- 1985 *Susitna Hydroelectric Resource User Survey.* (Institute of Social and Economic Research, Hellenthal & Associates, Stephen R. Braund & Associates and Dames and Moore). Prepared for Harza-Ebasco Susitna Joint Venture.
- 1985 *Diamond-Chuitna Coal Project Environmental Impact Statement Sociocultural and Subsistence Baseline and Impacts on Tyonek.* (Stephen R. Braund & Associates under subcontract to Dames and Moore). Prepared for Diamond Alaska Coal Company and U.S. Environmental Protection Agency.
- 1985 *A Social Indicators System for OCS Impact Monitoring.* (Stephen R. Braund & Associates with John Kruse of the Institute of Social and Economic Research [University of Alaska] and Frank Andrews of the Institute of Social Research [University of Michigan]). Prepared for U.S. Dept. of Interior, Minerals Management Service Social and Economic Studies Program Technical Report 116.
- 1984 *Case Studies of Three Past State Land Offerings.* (Stephen R. Braund & Associates). Prepared for the Alaska Department of Natural Resources, Division of Land and Water Management.

- 1984 *An Evaluation of the Effects on Subsistence of a Proposed Land Trade in Cape Krusenstern National Monument.* (Stephen R. Braund and David Burnham of Stephen R. Braund & Associates). Prepared for NANA Regional Corporation.
- 1984 *Subsistence Economic, Marine Resource Use Patterns, and Potential OCS Impacts for Chukchi Sea Communities.* (Stephen R. Braund and David Burnham of Stephen R. Braund & Associates). Prepared for Department of Interior, Minerals Management Service and Department of Commerce, NOAA.
- 1984 *Barrow Arch Socioeconomic and Sociocultural Description.* (Alaska Consultants and Stephen R. Braund & Associates). Prepared for the U.S. Department of the Interior, Minerals Management Service. Technical Report No. 101.
- 1984 *Subsistence Study of Alaska Eskimo Bowhead Whaling Villages.* (Alaska Consultants and Stephen R. Braund & Associates). Prepared for U.S. Department of the Interior.
- 1983 *Village Economies of the Lower Yukon.* (Frank Orth & Associates and Stephen R. Braund & Associates). Prepared for Nunam Kitlutsisti.
- 1983 *Report on Nutritional, Subsistence, and Cultural Needs Related to the Catch of Bowhead Whales by Alaskan Natives.* (Stephen R. Braund and Sam Stoker, Stephen R. Braund & Associates; principal authors on this U.S. Government position paper). Prepared for U.S. Department of the Interior. IWC TC/35/AB3.
- 1983 *Kivalina and Noatak Subsistence Use Patterns.* (Stephen R. Braund and David Burnham, Stephen R. Braund & Associates). Prepared for Cominco Alaska.
- 1983 *Social and Recreational Impacts of Capital Relocation.* In Technical Report No. 12, Socioeconomic Impacts of Capital Relocation by Frank Orth & Associates (Alaska New Capital Site Planning Commission).
- 1982 *Susitna Hydroelectric Project Sociocultural Studies.* (Stephen R. Braund and Tom Lonner, Stephen R. Braund & Associates). Prepared for Acres American, Inc. and the Alaska Power Authority.
- 1982 *Bristol Bay Regional Power Plan Sociocultural Study.* Prepared by Stephen R. Braund for Dames & Moore, Stone and Webster Engineering Corporation and the Alaska Power Authority.
- 1982 *The Cook Inlet Subsistence Salmon Fishery.* Prepared for the Alaska Department of Fish and Game, Division of Subsistence.
- 1981 *St. Paul and St. George Harbor Feasibility Study Sociocultural Analysis.* Alaska Department of Transportation and Public Facilities. (Prepared for Dames & Moore).
- 1981 *The Skin Boats of St. Lawrence Island, Alaska.* M.A. Thesis, University of Alaska, Fairbanks.
- 1980 *North Aleutian Petroleum Development Scenarios Sociocultural Systems Analysis.* (with J. Payne) for the Bureau of Land Management, Alaska Outer Continental Shelf Office. Technical Report No. 67.
- 1980 *Lower Cook Inlet Petroleum Development Scenarios Sociocultural Systems Analysis.* (with S.R. Behnke). Prepared by Stephen R. Braund & Associates for the Bureau of Land Management, Alaska Outer Continental Shelf Office. Technical Report No. 47.
- 1980 *Bering-Norton Petroleum Development Scenarios, Local Socioeconomic Systems Analysis.* (with R.L. Ender, G.S. Harrison, and S. Gorski). Prepared by Policy Analysts, Ltd. for the Bureau of Land Management, Alaska Outer Continental Shelf Office. Technical Report No. 53.

- 1978 *The Social and Economic Impacts of a Commercial Herring Fishery on the Coastal Villages of the Arctic/Yukon/Kuskokwim Area.* (with J.E. Hemming and G.S. Harrison). Prepared by Dames and Moore for the North Pacific Fishery Management Council.
- 1973 *The Geography of Bethel, Alaska.* Paper prepared at University of Alaska, Fairbanks while a student.
- 1973 *Eskimo Perceptions of a 'Good' House.* Paper prepared at University of Alaska, Fairbanks while a student
- 1972 *Native Housing in Rural Alaska.* Paper prepared at University of Alaska, Fairbanks while a student
- 1971 *Bethel Housing: A Proposal.* Paper prepared at University of Alaska, Fairbanks while a student
- 1971 *The 'Blond' Eskimos.* Paper prepared at University of Alaska, Fairbanks while a student

Missing from SRBA firm resume:

Missing from SRB publications list:

1995 ICC Beluga Mapping Project

1993 Military Operations Area in Alaska EIS (U.S. Air Force) - in progress.

1992-3 Communities' Mitigation Strategies Project (Prince William Sound Regional Citizen's Advisory Council).

1992 Air Combat Maneuvering Instrumentation System for Eielson AFB, Alaska (Yukon Measurement and Debriefing System) (U.S. Air Force). Under subcontract to Jon Isaacs & Associates, SRBA evaluated the archeological significance of 23 proposed sites and recommended procedures for compliance with Section 106 of the National Historic Preservation Act.

1992 Main Bay Hatchery Expansion Environmental Impact Statement (Prince William Sound Aquaculture Corporation). Under subcontract to Dames and Moore, SRBA assessed the subsistence effects of proposed hatchery expansion at Main Bay, Prince William Sound, Alaska.

1992 Major Flying Exercises - Cope Thunder Environmental Assessment (U.S. Air Force). Under subcontract to Jon Isaacs & Associates, SRBA provided assistance in assessing the subsistence effects of proposed military training exercises in three airspace locations in Alaska. Analysis of secondary source subsistence data and SRBA experience in Alaska provided the basis for this analysis.

1992 Joint Military Training Exercises Environmental Impact Statement (U.S. Army Corps of Engineers). Under subcontract to Dames and Moore, SRBA assessed the subsistence effects of proposed military training exercises in 72 ground sites and 20 airspace locations throughout Alaska. Analysis of secondary source subsistence data and SRBA experience in Alaska provided the basis for this analysis.

Oasis ANS LNG EE (Roger H)

Unocal - 5 each Section 106 Reviews; 2001

Unocal - Anchor Point 2001

Unocal - Dionne, etc. 2001

Unocal 00 - Ninilchik CR Compliance (Roger H)

Pogo CR (Roger H)

Buckland Section 106 Compliance (Roger H; EDG)

United Utilities 2001

Greens Creek (RKH) 2001

Nominee's name: Dr. Ed Harrison

The person being nominated by Phil Mundy has been contacted and has agreed to consider serving if called upon to do so.

E-mail address: harrison@pmel.noaa.gov

**Mailing address: NOAA, PMEL, 7600 Sand Point Way NE, Bldg. 3 Rm. 2069
Seattle, WA 98115-0070**

Telephone number: (206) 526-6225

Affiliation: Government, Academic

Type of Expertise: Examples are MODELING, PHYSICAL OCEANOGRAPHY, MATHEMATICS, OCEAN OBSERVING SYSTEMS, GODAE, USGOOS

Locations of Expertise: ALASKA COASTAL CURRENT, OFFSHORE

Synopsis

Ed Harrison is a senior physical oceanographer with extensive experience in government who also has academic credentials. His research during the last decade has contributed to understanding mechanisms of climate change, including El Nino-La Nina events. During the same time he has worked to develop national and international cooperation in acquiring and using oceanographic data through bodies and efforts such as the Global Ocean data Assimilation Experiment (GODAE), the steering committee for U.S. Global Ocean Observing System (USGOOS), Global Climate Observing System (GCOS), and the United Nations - World Meteorological Organization ENSO 97 Steering committee. Dr. Harrison contributed his expertise to the development of the GEM program by participating in a meeting to develop core variables and data acquisition strategies, and as a member of the steering committee for U.S. GOOS.

CURRICULUM VITAE: D.E. Harrison

EDUCATION

- 1977 Harvard University, Ph.D. Applied Mathematics
- 1973 Harvard University, M.S. Applied Mathematics
- 1972 Reed College, B.A. Physics (Phi Beta Kappa)

PROFESSIONAL EXPERIENCE 1980 - Present

- 1989-present Professor (Affiliate), Department of Atmospheric Science, University of Washington
- 1989-present Professor (Affiliate), School of Oceanography, University of Washington
- 1985-1989 Associate Professor (Affiliate), Department of Atmospheric Science, and School of Oceanography, University of Washington
- 1984-present Oceanographer, NOAA/Pacific Marine Environmental Laboratory, Seattle, Washington

- 1984-1986 Associate Professor (visiting), Center for Meteorology and Physical Oceanography, MIT
- 1980-1984 Assistant Professor (visiting), Center for Meteorology and Physical Oceanography, MIT

PROFESSIONAL ACTIVITIES 1990 - Present

- 2000-present NOAA Decadal-Centennial Strategic Planning Team
- 2000-present NOAA OAR Climate Observing System Council, Chair
- 2000-present International GODAE Executive Group
- 1999-present NSF Ocean Information Technology Steering Group
- 1999-present US Carbon Cycle Science Observations Advisory Group
- 1998-present US GODAE Steering Group, Executive Committee
- 1998-present US Global Ocean Observing System Steering Group
- 1998-present NOAA Seasonal-Interannual Strategic Planning Team
- 1998-present NOAA Office of Global Programs Climate Observing Advisory Panel
- 1998 US Carbon Cycle Science Planning meeting
- 1997-present UN/WMO ENSO 97 Retrospective Steering Group
- 1996-present GCOS: Atmospheric Observations Panel for Climate
- 1996 NSF Ocean Models and Data Assimilation Working Group
- 1995-present GCOS/GOOS Ocean Observations Panel for Climate
- 1994-2001 Principal, NOAA/UW Stanley P. Hayes Center
- 1994-1995 WOCE Synthesis Group
- 1993-1995 OOSDP Guest Member

REFEREED PUBLICATIONS 1990 - Present

Harrison, D.E. and N.K. Larkin, 2001: Cold events: Anti-El Niño? In: M.H. Glantz (Ed.), Facts and Speculation about La Niña and Its Societal Impacts. Tokyo, Japan: *United Nations University Press*, (in press).

Harrison, D.E. and N.K. Larkin, 2001: Comments on "Comparison of 1997-98 U.S. temperature and precipitation anomalies to historical ENSO Warm Phases." *J. Climate*, 14, 1894-1895.

Harrison, D.E., R. Romea, and S.H. Hankin, 2001: Central equatorial Pacific zonal currents. I: The Sverdrup balance, nonlinearity and tropical instability waves. Annual mean dynamics. *J. Mar. Res.*, 59(6), 985-919.

Harrison, D.E., R. Romea, and G.A. Vecchi, 2001: Central equatorial Pacific zonal currents. II: The seasonal cycle and the boreal spring surface eastward surge. *J. Mar. Res.*, 59(6), 921-948.

Harrison, D.E. and G.A. Vecchi, 2001: January 1999 Indian Ocean cooling event. *Geophys. Res. Lett.*, 28(19), 3717-3720.

Harrison, D.E. and G.A. Vecchi, 2001: El Niño and La Niña - equatorial Pacific thermocline depth and sea surface temperature anomalies, 1986-1998. *Geophys. Res. Lett.*, 28(6), 1051-1054.

Larkin, N.K. and D.E. Harrison, 2001: Tropical Pacific ENSO Cold Events, 1946-1995; SST, SLP and surface wind composite anomalies. *J. Climate*, 14(19), 3904-3931.

Murphy, P.P., Y. Nojiri, D.E. Harrison, and N.K. Larkin, 2001: Scales of spatial variability for surface ocean pCO₂ in the Gulf of Alaska and Bering Sea: Toward a sampling strategy. *Geophys. Res. Lett.*, 28(6), 1047-1050.

Nowlin, W.D., N. Smith, D.E. Harrison, C. Koblinski, and G. Needler, 2001: An integrated, Sustained Ocean Observing System. In: *Observing the Ocean In the 21st Century*. Koblinsky, C.J. and N.R. Smith, editors, GODAE and Australian Bureau of Meteorology Publishers, Melbourne, (in press).

Reynolds, R.E. and D.E. Harrison, 2001: Climate Sea Surface Temperature analysis. In: *Observing the Ocean in the 21st Century*. Kolinsky, C.J. and N.R. Smith, editors, GODAE and Australian Bureau of Meteorology Publishers, Melbourne, (in press).

Vecchi, G.A., D.E. Harrison, and R. Reynolds, 2001: Subseasonal, Seasonal and Interannual variability of western Arabian Sea Sea Surface Temperature. (submitted).

Vecchi, G.A. and D.E. Harrison, 2001: Southwest Monsoon breaks and sub-seasonal SST variability in the Bay of Bengal. *Nature*, (accepted w/minor revision).

Bennett, A.F., B.S. Chua, D.E. Harrison, and M.J. McPhaden, 2000: Generalized Inversion of Tropical Atmosphere-Ocean (TAO) data and a coupled model of the Tropical Pacific. II: the 1995-96 La Niña and 1997-98 El Niño. *J. Climate*, 13(5), 2770-2785.

Bond, N.A. and D.E. Harrison, 2000: The Pacific Decadal Oscillation, air-sea interaction and central north Pacific winter atmospheric regimes. *Geophys. Res. Lett.*, 27(5), 731-734.

Harrison, D.E., G.A. Vecchi, and R.H. Weisberg, 2000: Eastward surface jets in the central equatorial Pacific, November 1992-March 1992. *J. Mar. Res.*, 58, 735-754.

Loukos, H., F. Vivier, P.P. Murphy, D.E. Harrison, and C. Le Quere, 2000: Interannual variability of equatorial Pacific CO₂ fluxes estimated from temperature and salinity data. *Geophys. Res. Lett.*, 27(12), 1735-1738.

Vecchi, G. and D.E. Harrison, 2000: Tropical Pacific sea surface temperature anomalies, El Niño and equatorial westerly wind events. *J. Climate*, 13(11), 1814-1830.

Harrison, D.E. and G. Vecchi, 1999: On the termination of El Niño. *Geophys. Res. Lett.*, 26(11), 1593-1596.

Bennett, A.F., B.S. Chua, D.E. Harrison, and M.J. McPhaden, 1998: Generalized Inversion of tropical atmosphere-ocean data and a coupled model of the tropical Pacific. *J. Climate*, 11(7), 1768-1792.

Craig, A.P., J.L. Bullister, D.E. Harrison, R.M. Chervin, and A.J. Semtner, Jr., 1998: A comparison of temperature, salinity, and chlorofluorocarbon observations with results from a 1° resolution three-Dimensional global ocean model. *JGR-Oceans*, 103, 1099-1119.

Harrison, D.E. and N.K. Larkin, 1998: Seasonal U.S. temperature and precipitation anomalies associated with El Niño: Historical results and comparison with 1997-1998. *Geophys. Res. Lett.*, 25(21), 3959-3962.

Harrison, D.E. and N.K. Larkin, 1998: El Niño-Southern Oscillation surface temperature and wind anomalies, 1946-1993. *Rev. Geophys.*, 36(3), 353-399.

Loukos, H., B. Frost, D.E. Harrison, and J. Murray, 1998: An ecosystem model with iron limitation of primary and export production in the equatorial Pacific at 140°W. *Deep-Sea Res.*, II, 44(4-10), 2221-2250.

Murphy, P.P., D.E. Harrison, R. Feely, T. Takahashi, and R. Weiss, and R.H. Gammon, 1998: Variability of delta pCO₂ in the subarctic north Pacific. A comparison of results from our expeditions. *Tellus*, 50B, 185-204.

Stockdale, T.N., A.J. Busalacchi, D.E. Harrison, and R. Seager, 1998: Ocean Modeling for ENSO. *J. Geophys. Res.*, 103(C7), 14,325-14,356.

Harrison, D.E. and N.K. Larkin, 1997: The Darwin Sea Level Pressure record, 1876-1996; Evidence for climate change? *Geophys. Res. Lett.*, 24(14), 1779-1782.

Harrison, D.E. and G. Vecchi, 1997: Westerly wind events in the tropical Pacific 1986-1995. *J. Climate*, 10(12), 3131-3156.

Loukos, H., B. Frost, D.E. Harrison, and J. Murray (1997): An ecosystem model with iron limitation of primary production in the equatorial Pacific at 140°W. *Deep-Sea Res.*, II, 44(9-10), 2221-2250.

Hankin, S., D.E. Harrison, J. Osborne, J. Davison, and K. O'Brien, 1996: A strategy and a tool, Ferret, for closely integrated visualization and analysis. *J. Visualization and Computer Animation*, 7, 149-157.

Harrison, D.E., 1996: Vertical velocity variability in the tropical Pacific - a circulation model perspective for JGOFS. *Deep-Sea Res.*, II, 43, 687-705.

- Harrison, D.E. and N.S. Larkin, 1996: The COADS sea level pressure signal: A near-global El Niño composite and time series results, 1946-1993. *J. Climate*, 9, 3025-3055.
- Kessler, W.S., M.C. Spillane, M.J. McPhaden, and D.E. Harrison, 1996: Scales of variability in the equatorial Pacific inferred from the Tropical Atmosphere-Ocean (TAO) array. *J. Climate*, 9, 2999-3024.
- Harrison, D.E. and A. Craig, 1993: Ocean model studies of upper-ocean variability at 0°, 160°W during the 1982-83 ENSO: Local and remote forced response. *J. Phys. Oceanogr.*, 23(3), 427-451.
- Giese, B.S. and D.E. Harrison, 1991: Eastern equatorial Pacific response to three composite westerly wind types. *J. Geophys. Res.*, 96, 3239-3249.
- Harrison, D.E., 1991: Equatorial sea surface temperature sensitivity to net surface heat flux: Some ocean circulation model results. *J. Climate*, 4(5), 539-549.
- Harrison, D.E. and B.S. Giese, 1991: Episodes of surface westerly winds as observed from islands in the western tropical Pacific. *J. Geophys. Res.*, 96(Sup.), 3221-3237.
- Murphy, P.P., R.A. Feely, R.H. Gammon, D.E. Harrison, K.C. Kelly, and L.S. Waterman, 1991: Assessment of the air-sea exchange of CO₂ in the South Pacific during austral autumn. *J. Geophys. Res.*, 96(C11), 20,455-20,465.
- Davison, J. and D.E. Harrison, 1990: Comparison of SEASAT scatterometer winds with tropical Pacific observations. *J. Geophys. Res.*, 95(C3), 3403-3410.
- Giese, B.S. and D.E. Harrison, 1990: Aspects of the Kelvin wave response to episodic wind forcing. *J. Geophys. Res.*, 95(C5), 7289- 7312.
- Harrison, D.E., B.S. Giese, and E.S. Sarachik, 1990: Mechanisms of SST change in the equatorial waveguide during the 1982-83 ENSO. *J. Climate*, 3, 173-188.
- Harrison, D.E. and D.S. Luther, 1990: Surface winds from tropical Pacific islands - climatological statistics. *J. Climate*, 3(2), 251-271.

Nominee's name: Dr. Steve Ignell

E-mail address: Steve.Ignell@noaa.gov

Mailing address: National Marine Fisheries Service
Alaska Fisheries Science Center
Auke Bay Laboratory
11305 Glacier Hwy.
Juneau, Alaska 99801
E-mail: steve.ignell@noaa.gov
Telephone:

Telephone number: (907) 789-6029

Affiliation: Government

The person being nominated by Phil Mundy has been contacted and has agreed to consider serving if called upon to do so.

Type of Expertise: MODELING, RESOURCE MANAGEMENT, BIOLOGICAL OCEANOGRAPHY, FISHERIES

Locations of Expertise: ALASKA COASTAL CURRENT, OFFSHORE

Synopsis: Steve Ignell is a senior government-based scientist who has been involved in developing the fisheries oceanography program at NMFS Auke Bay Laboratory under Jack Helle, the Ocean Carrying Capacity study (OCC). Through his work in building OCC, he has become thoroughly familiar with the oceanography of Alaskan waters, and in particular the marine ecology of salmonids. His work with the North Pacific Anadromous Fish Commission (its predecessor was INPFC) and the Pacific Salmon Commission has given him an understanding of the North Pacific governmental institutions involved in fisheries oceanographic investigations. He has served as an advisor to the GEM program, generously contributing his time to help GEM develop a strategy for using vessels of the Alaska Marine Highway as ships of opportunity for oceanographic instruments.

Resume

Name: Steven Eric Ignell

Education: Current PhD student, University of Alaska, Fairbanks
M.S., Fisheries Science, University of Alaska, Juneau, 1987
B.S., Physics, University of Washington, Seattle, 1977

Positions Held: 1994-Present Task Leader, Ocean Carrying Capacity Research Program
1986-1993 Task Leader, Squid Driftnet Research Program.
1981-2001 Mathematical Statistician

Professional: Chinook Technical Committee, Pacific Salmon Commission.
Salmon Subcommittee, International North Pacific Fisheries Commission
Salmon Plan Team, North Pacific Fisheries Management Council.
Committee on Scientific Research and Statistics, NPAFC

Ad-Hoc Fishery Development Committee, City and Borough of Juneau.
 Recipient, NOAA Silver Medal Award to the Driftnet Research Program
 Reviewer for: Fisheries Oceanography, Fishery Bulletin, and CJFAS

Publications:

- Auburn-Cook, M.E. and S.E. Ignell. 2001. Food habits of juvenile salmon in the North Pacific Ocean. North Pacific Anadromous Fish Commission Bulletin 2:89-97.
- Isakov, A.G., O.A. Mathisen, S.E. Ignell, and T.J. Quinn III. 2001. Ocean growth of sockeye salmon from the Kvichak River, Bristol Bay based on scale analysis. North Pacific Anadromous Fish Commission Bulletin 2:233-245.
- Ignell, S.E. and E. Haynes. 2000. Geographic patterns in growth of the giant Pacific sea scallop, *Patinopecten caurinus*. Fishery Bulletin 98(4):849-854.
- Ignell, S.E., S.R. Carlson, and R.A. Rumbaugh. 1995. Variability in frontal boundaries, temperatures, and the geographic ranges of species and pelagic marine communities along 175°30'E, 1978-91. Can. Spec. Publ. Fish. Aquat. Sci. 121:159-166.
- Ignell, S. E., L. J. Simon, and M. L. Dahlberg. 1994. Estimation of salmon bycatch in the 1989 Japanese squid driftnet fishery. U.S. Dep. Commerce, NMFS, NOAA Tech. Mem. NMFS-AFSC-29. 45pp.
- Ignell, S. E., and J. Murphy. 1993. Salmonid spatial patterns near the North Pacific Subarctic Frontal Zone. Int. North Pac. Fish. Comm. Bull. 52(II):253-271.
- Dahlberg, M.L., W. R. Heard, J. C. Olsen, and S. E. Ignell. 1992. Salmon research in Alaska planned by the Auke Bay Laboratory. In Y. Ishida, K. Nagasawa, D. W. Welch, K. W. Myers, and A. P. Shersnev [eds.] Proceedings of the International Workshop on Future Salmon Research in the North Pacific Ocean. National Research Inst. of Far Seas Fisheries, Shimizu, Japan. p.47-50.
- Ignell, S. E. 1991. Zonal variability in salmonid driftnet catch rates in the Central North Pacific Ocean. NOAA Tech. Rep. 105:89-95.
- Ignell, S. E. 1991. The fisheries for neon flying squid (*Ommastrephes Bartrami*) in the central North Pacific Ocean. U.S. Dep. Commerce, NMFS, NOAA Tech. Rep. 105:97-111.
- Day, R. H., D. G. Shaw, and S. E. Ignell. 1990. The quantitative distribution and characteristics of marine debris in the North Pacific Ocean, 1984-1988. In R. S. Shomura and M. L. Godfrey [eds.] Proceedings of the Second International Conference on Marine Debris. p. 182-211.
- Day, R. H., D. G. Shaw, and S. E. Ignell. 1990. The quantitative distribution and characteristics of neuston plastic in the North Pacific Ocean, 1985-1988. In R. S. Shomura and M. L. Godfrey [eds.] Proceedings of the Second International Conference on Marine Debris. p. 247-266.
- Ignell, S. E. 1990. The North Pacific--common ground for flying squid, salmonids, and squid driftnet fishermen. Alaska's Wildlife, July-August:27-29, 40.
- Ignell, Steve E. 1988. Effects of habitat variation on recruitment of pink salmon (*Oncorhynchus gorbuscha*) at Sashin Creek, Little Port Walter, Alaska. M.S. Thesis. University of Alaska, Juneau, Ak. 119 pps.
- Ignell, S., J. Bailey, J. Joyce. 1986. Observations on High-Seas Squid Gill-Net Fisheries, North Pacific Ocean, 1985. NOAA Technical Memorandum NMFS F/NWC-105.
- Haynes, E., and S. Ignell. 1983. Effect of temperature on embryonic development of Walleye Pollock, *Theragra Chalcogramma*. U.S. Fish. Wildl. Ser. Fish Bull. 81: 390-394.
- Leatherwood, S., E. Krygier, J. D. Hall, S. Ignell and A. E. Bowles. 1984. Killer whales (*Orcinus orca*) in Southeast Alaska, Prince William Sound, and Shelikof Strait: A Review of Available Information. Rep. Inst. Whal. Commn. 34: 521-530.

Publications in Review:

- Ignell, S. E., B. L. Wing, and B. D. Ebberts. Abundance and spatial pattern of salps within the North Pacific Frontal Zone. Submitted to Fishery Bulletin.
- Ignell, S. E. Time-series analysis of glacier mass balance and Southeast Alaska climate. In Laboratory review.

Curriculum Vita

Update: 2001

CHARLES B. MILLER

Social Security Number: 517-48-1348 Work Address: College of Oceanography
Date of Birth: 28 April 1940 Oregon State University
Married to Martha Clemons Corvallis, OR 97331-5503
Children (Eric, Matthew, Carolyn)

Educational Background

B.A. Carleton College, Northfield, Minnesota - Biology 1963
Ph.D. Scripps Institution of Oceanography - UCSD 1969

Professional Experience

NSF Postdoctoral Fellow - Auckland University 1969-1970
Assistant Professor, Oregon State Univ. 1970-1975
Associate Professor, Oregon State Univ. 1975-1980
Professor of Oceanography, Oregon State Univ. 1980-

Visiting Investigatorships

Woods Hole Oceanographic Institution Summer 1979
Station Zoologique - Villefranche Summer 1980
Scripps Institution of Oceanography 1980-1981
Ocean Research Institute, Tokyo Nov. 1987-Mar. 1988
Darling Marine Center - Univ. Maine Sep. 1989-Sep. 1990
Station Zoologique - Villefranche Dec. 1996-June 1997

Professional Societies

American Association for the Advancement of Science
American Geophysical Union
American Society of Limnology and Oceanography
The Crustacean Society
The Oceanographic Society
The World Association of Copepodologists
The Plankton Society of Japan

National/professional service (more fully reported for recent years):

- 1975 - NSF Panel - Future Oceanographic Ships
- 1975-76 - NSF - Alpha Helix Review Committee
- 1976-1979 - Editorial Board, Limnology and Oceanography
- 1979-85 - UNOLS Advisory Council (Chair 1983-1985)
- 1980 - Review panel - NSF Biological Oceanography
- 1981 - Chair for National Workshop - Subarctic Pacific Ecosystem Research
- 1984 - present - Associate Editor, Progress in Oceanography
- 1989 - Construction Review Committee - new R/V T. THOMPSON
- 1990 - Oceanography from Semi-submersible Platforms Workshop
- 1990 - UNOLS Executive Secretary Evaluation Committee
- 1990 - Review Panel - NSF JGOFS program
- 1990, Nov. - GLOBEC Workshop - Applications of molecular biology to zooplankton
- 1991 - UNOLS Fleet Improvement Committee (term runs to 1994)
- 1991, Sept. - GLOBEC Workshop - California Current Field Program Workshop
- 1992, April - NOAA Workshop - Oceanography from oil production platforms
- 1992, June. - GLOBEC Workshop - Arabian Sea Program (I prepared the report and GLOBEC Arabian Sea Implementation Plan, presented to GLOBEC steering committee, Miami, Feb., 1993)
- 1993, Sept. - Arabian Sea Workshop (NOAA sponsored, Sevastopol, Ukraine)
- 1993, Oct. - Convenor, PICES symposium on "Platforms of Opportunity" (Seattle)
- 1993, Dec. - Prince William Sound Fisheries Ecosystem Research Review (Cordova, AK)
- 1994, April - Co-chair (with Kurt Tande of Tromsø) of ICES Workshop - Trans-Atlantic Studies of *Calanus finmarchicus* (Oslo)
- 1995 - 1997 - PICES Working Group 9 on Monitoring of the subarctic Pacific
- 1995, July - ICES Working Group on Zooplankton Ecology, Woods Hole, MA
- 1996 - 2001 - Editorial board, Plankton Biology and Ecology (new journal of the Plankton Society of Japan)
- 1997, January - Convenor with Roger Harris of the Second TASC Symposium (Copenhagen)
- 1997, June - Foreign reader University of Bergen, Dissertation of Øyvind Fiksen
- 1999, August - Convenor with Kurt Tande, ICES Symposium on the Biology of Calanid Copepods, Tromsø, Norway
- 2000, February, PICES representative, ICES Working Group on Zooplankton Ecology, Honolulu, Hawaii
- 2000, November, NSF Review Panel, Biological Oceanography
- 2000- continuing - Chair, PICES CPR Committee
- 2001, Editorial Advisory Committee, Plankton Society of Japan

Honors

- Fellow, American Association for the Advancement of Science
- Best Presentation Award, ICES Annual Science Conference, 1997

Publications and Reports -

- 1970 Miller, C. B. Some environmental consequences of vertical migration in marine zooplankton. *Limnol. Oceanogr.* 15: 727-741.
Miller, C. B. Zooplankton indicators of the seasonal cycle of currents along the Oregon Coast. *Trans. Am. Micro. Soc.* 91:86.
- 1972 Miller, C. B., W. G. Pearcy, and M. H. Schonzeit. Comment on Kerfoot's Paper. *Am. Naturalist* 106:545-547.
- 1973 Frolander, H. F., C. B. Miller, M. J. Flynn, S. C. Myers and S. T. Zimmerman. Seasonal cycles of abundance in zooplankton populations of Yaquina Bay, Oregon. *Marine Biology* 21:277-288.
- 1974 J. K. Johnson and C. B. Miller. Dynamics of isolated plankton populations in Yaquina Bay, Oregon. p. 27-35 in Slotta, L. (ed.) *Proc. Third Ann. Tech. Conf. on Estuaries of the Pacific Northwest*.
Carrillo, E. B.-G., C. B. Miller, and P. H. Wiebe. Failure of interbreeding between Atlantic and Pacific populations of the marine calanoid copepod *Acartia clausi* Giesbrecht. *Limnol. Oceanogr.* 19:452-458.
Miller, C. B. (Editor). *Biology of the Oceanic Pacific*. Oregon State University Press. 157 pp.
- 1975 Peterson, W. T. and C. B. Miller. Year-to-year variations in the planktology of the Oregon upwelling zone. *Fish. Bull.* 73:642-653.
Sullivan, B. A., C. B. Miller, W. T. Peterson, and A. Soeldner. Mandibular morphology of copepods from the Subarctic Pacific and Oregon coastal zone. *Marine Biology* 30:175-182.
Marlowe, C. J. and C. B. Miller. Patterns of vertical distribution and migration of zooplankton at Ocean Station P. *Limnol. Oceanogr.* 20:824-843.
- 1976 Smith, L. R., C. B. Miller, and R. L. Holton. Small-scale horizontal distribution of coastal copepods. *J. exp. Mar. Biol. Ecol.* 23:241-253.
Peterson, W. T. and C. B. Miller. Zooplankton along the continental shelf off Newport, Oregon:1969-1972. Distribution, abundance, seasonal cycle and year-to-year variations. Oregon State University, Sea Grant Publ. No. ORESU-T-76-0002. 111 pp.
- 1977 Miller, C. B., J. K. Johnson, and D. R. Heinle. Growth rules in the marine copepod genus *Acartia*. *Limnol. Oceanogr.* 22:326-335.
Peterson, W. T. and C. B. Miller. Seasonal cycle of zooplankton abundance and species composition along the central Oregon coast. *Fishery Bulletin* 75:717-724.
Nath, J. H., C. B. Miller, J. W. Ambler, and R. M. Hansen. Engineering and biological aspects of the screens for OTEC intake systems. Oregon State University, RLO/2227/T26-2, 140 p.
- 1979 Peterson, W. T., C. B. Miller, and A. Hutchinson. Zonation and maintenance of copepod populations in the Oregon upwelling zone. *Deep-Sea Research* 26A:467-494.
Miller, C. B. Comments from a nominat referee on an exchange of notes. *Limnol. Oceanogr.* 24:785-787.

- 1980 Miller, C. B., D. M. Nelson, R. R. L. Guillard, and B. Woodward. Effects of media low in silicic acid concentration on tooth formation in *Acartia tonsa* Data (Copepoda, Calanoida). Biol. Bull. 159:349-363.
McGowan, J. A. and C. B. Miller. Larval fish and zooplankton community structure. CalCOFI Reports 21:27-36.
- 1981 Miller, C. B. and D. C. Judkins. Design of pumping systems for sampling zooplankton with description of two high-capacity samplers for coastal studies. Biological Oceanography 1:29-56.
Hogue, E. W. and C. B. Miller. Effects of sediment topography on small-scale spatial distributions of meiobenthic nematodes. J. Exptl. Mar. Biol. Ecol. 53:181-191.
- 1982 Terazaki, M. and C. B. Miller. Reproduction of meso- and bathypelagic chaetognaths in the genus *Eukrohnia*. Marine Biology 71:193-196.
- 1983 Miller, C. B. The zooplankton of estuaries. pp. 103-149 in Ketchum, B. (ed.) Estuaries and Enclosed Seas, Encyclopedia of World Ecosystems, Elsevier, Amsterdam.
Rothlisberg, P. C. and C. B. Miller. Factors affecting the distribution, abundance, and survival of *Pandalus jordani* (Decapoda, Pandalidae) larvae off the Oregon coast. Fishery Bulletin 81:455-472.
- 1984 Miller, C. B., B. W. Frost, H. P. Batchelder, M. Clemons and R. E. Conway) Life histories of large, grazing copepods in a subarctic ocean gyre: *Neocalanus plumchrus*, *Neocalanus cristatus*, and *Eucalanus bungii* in the Northeast Pacific. Progress in Oceanography 13: 201-243.
Miller, C. B. and M. J. Clemons. Seasonal variations in net phytoplankton in the oceanic subarctic Pacific. Deep-Sea Research 31:85-95.
- 1984 Miller, C. B., M. E. Huntley, and E. R. Brooks. Post-collection molting rates of planktonic, marine copepods: measurement, applications, problems. Limnology and Oceanography 29:1274-1290.
- 1985 Brodeur, R. D., D. M. Gadomski, W. G. Pearcy, and C. B. Miller, and H. P. Batchelder Abundance and distribution of Ichthyoplankton in the upwelling zone of Oregon during anomalous El Nino conditions. Estuarine, Coastal and Shelf Science 21: 365-378.).
Miller, C. B., H. P. Batchelder, and others. Response of the zooplankton and ichthyoplankton off Oregon to the El Nino event of 1983. pp. 185-187 in Wooster, W. and D. Fluharty, eds., El Nino North. Washington Sea Grant Program, Seattle.
- 1986 Terazaki, M. and C. B. Miller. Life history and vertical distribution of pelagic chaetognaths at Ocean Station P in the subarctic Pacific. Deep-Sea Research. 33: 323-337.
- 1987 Ambler, J. W. and C. B. Miller. Vertical habitat partitioning by copepodites and adults of subtropical oceanic copepods. Marine Biology 94: 561-577. Miller).
- 1988 Miller, C. B. and SUPER Group (13 authors). Lower trophic level production dynamics in the oceanic subarctic Pacific Ocean. Bulletin of the Ocean Research Institute, University of Tokyo. 26, Pt. I: 1-26.
Wiebe, P.H., C. B. Miller, J. A. McGowan, and R. A. Knox. Long Time Series Study of

- Oceanic Ecosystems. EOS 68: 1178-1190.
- 1988 Miller, C. B. *Neocalanus flemingeri*, a new species of Calanidae (Copepoda: Calanoida) from the subarctic Pacific Ocean, with a comparative redescription of *Neocalanus plumchrus* (Marukawa) 1921. Progress in Oceanography, 20: 223-273
- Miller, C. B. and M. J. Clemons Revised life history analysis for large grazing copepods in the subarctic Pacific Ocean. Progress in Oceanography, 20: 293-313.
- 1988 Miller, C. B. and R. J. Nielsen. Development and growth of large, Calanid copepods in the oceanic subarctic Pacific, May 1984. Progress in Oceanography, 20: 275-292.
- 1989 Miller, C. B. and M. Terazaki. The Life Histories of *Neocalanus flemingeri* and *Neocalanus plumchrus* in the Sea of Japan. Bull. Plankton Soc. Japan, 36: 27-41.
- Batchelder, H. P. and C. B. Miller. Life history and population dynamics of *Metridia pacifica*: Results from simulation modelling. Ecological Modelling, 48: 113-136.
- 1990 Miller, C. B., D. M. Nelson, and C. Weiss Morphogenesis of opal teeth in Calanoid copepods. Marine Biology, 106:91-101.
- 1991 Miller, C. B., T. J. Cowles, P. H. Wiebe, N. Copley, and H. Grigg. Phenology in *Calanus finmarchicus*; hypotheses about control mechanisms. Mar. Ecol. Prog. Ser. 72: 79-91.
- Miller, C. B. and H. Grigg. An experimental study of the resting phase in *Calanus finmarchicus* (Gunnerus). Proc. Fourth Int. Conf. on Copepoda. Bull. Plankton Soc. Japan, Spec. Vol. (1991): 479-493.
- Miller, C. B., B. W. Frost, B. Booth, P. A. Wheeler, M. R. Landry, and N. A. Welschmeyer. Iron-limitation cannot be the whole story; ecological processes in the subarctic Pacific. Oceanography, 4: 71-78.
- Miller, C. B., B. W. Frost, P. A. Wheeler, M. R. Landry, N. A. Welschmeyer and T. M. Powell. Ecological dynamics in the subarctic Pacific, a possibly iron-limited ecosystem. Limnol. Oceanogr., 36: 1600-1615.
- 1993 Mackas, D. L., H. Sefton, C. B. Miller and A. Raich. Vertical habitat partitioning by large calanoid copepods in the oceanic subarctic Pacific during spring. Prog. in Oceanogr., 32: 259-294.
- Miller, C. B. Pelagic production processes in the Subarctic Pacific. Prog. in Oceanogr., 32: 1-15.
- Miller, C. B. and K. Tande. Stage duration estimation for *Calanus* populations, a modelling study. Mar. Ecol. Prog. Ser. 102: 15-34.
- 1997 Aksnes, D. L., C. B. Miller, M. D. Ohman and S. N. Wood. Estimation techniques used in studies of copepod population dynamics - a review of underlying assumptions. Sarsia, 82: 279-296.
- Madin, L., J. Purcell and C. B. Miller. Abundance and grazing effects of *Cyclosalpa bakeri* in the subarctic Pacific. Marine Ecology Progress Series 157: 175-183.
- 1998 Miller, C. B., C. A. Morgan, F. G. Prahl and M. A. Sparrow. Storage lipids of the copepod *Calanus finmarchicus* from Georges Bank and the Gulf of Maine. Limnol. Oceanogr. 43: 488-497

- 1998 Miller, C. B., D. R. Lynch, F. Carlotti, W. Gentleman and C. V. W. Lewis. Coupling of an individual-based dynamic model of *Calanus finmarchicus* to a circulation model for the Georges Bank region. *Fisheries Oceanography* 7: 219-234.
- Tsuda, A. and C. B. Miller. Mate finding in *Calanus marshallae* Frost. *Philos. Trans. Roy. Soc. Ser. B (Biology)*, 353: 713-720.
- Thuesen, E. V., C. B. Miller and J. J. Childress. Ecophysiological interpretation of oxygen consumption rates and enzymatic activities of deep-sea copepods. *Mar. Ecol. Prog. Ser.* 168: 95-107.
- 2000 Strom, S. L., C. B. Miller and B. W. Frost. What sets lower limits to phytoplankton stocks in high-nitrate, low-chlorophyll regions of the open ocean? *Mar. Ecol. Prog. Ser.* 193: 19-31.
- Miller, C. B., J. A. Crain and C. A. Morgan. Oil storage variability in *Calanus finmarchicus* fifth copepodites. *ICES J. Mar. Sci.* 212: 1786-1799.
- Crain, J. A. and C. B. Miller. Detection of gender and sex ratio in *Calanus finmarchicus* early stage fifth copepodites. *ICES J. Mar. Sci.* 212: 1773-1779.
- Tande, K. S. and C. B. Miller (editors). Population Dynamics of *Calanus* in the North Atlantic. *ICES Marine Science Symposia*, Vol. 212. *ICES J. Mar. Sci.* 57 (6) Thirty-four papers.
- Tande, K. S. and C. B. Miller. Population dynamics of *Calanus* in the North Atlantic: Results from the Trans-Atlantic Study of *Calanus finmarchicus*. *ICES J. Mar. Sci.* 57: 1527.
- 2001 Crain, J. A. and C. B. Miller. Effects of starvation on intermolt development in *Calanus finmarchicus* copepodites: a comparison between theoretical models and field studies. *Deep-Sea Research II*, 48: 551-566.

In press:

- Miller, C. B. A variant form of *Megacalanus longicornis* (Copepoda: Megacalanidae) from deep waters off Southern California. *Hydrobiologia*

In review:

- Miller, C. B. and J. A. Crain. Seasonal variation of male-type antennular setation in female *Calanus finmarchicus* in the Gulf of Maine-Georges Bank area. *Mar. Ecol Prog. Ser.*

In litt.

- Crain, J. A. and C. B. Miller. Georges Bank: gonad development of *Calanus finmarchicus* correlated with everything else [title not chosen]
- Miller, C. B. Biological Oceanography. A textbook - Blackwell Science
- Miller, C. B. and J. A. Crain. Oil storage variability in *Calanus finmarchicus* fifth copepodites. II. (results from an additional year of data)

Invited Talks - I have presented one or more (*) research seminars at all of the following places:

Academy of Sciences, USSR, Far Eastern Division, Nahodka
Biological Laboratory, Nanaimo, B. C.
Bigelow Laboratory for Ocean Sciences, Boothbay Harbor, Maine
*Centro de Investigaciones Scientificas de Ensenada, B. C.
*Darling Marine Center, University of Maine
Escuela de Ciencia Marina de Ensenada, B. C.
Hiroshima University, Faculty of Applied Biology
Hokkaido University, Fisheries Department
Hokkaido Prefectural Fisheries Laboratory, Yoichi
Institute for Biology of the Southern Seas, Sevastopol
Institute of Ocean Sciences, Patricia Bay, B.C.
Japan Sea Regional Fisheries Research Laboratory, Niigata
Johns Hopkins University, Chesapeake Bay Institute
*NOAA Pacific Marine Laboratory, Seattle
Ocean Research Institute, Patricia Bay, B. C.
*Oregon Institute of Marine Biology, Charleston, OR
Plymouth Marine Laboratory, Plymouth, England
University of Oregon, Eugene
*University of Oregon, Oregon Institute of Marine Biology
*Scripps Institution of Oceanography
NMFS Southwest Fisheries Center, La Jolla, CA
Tokyo University of Fisheries
University of Bergen, Bergen, Norway
*University of California, Santa Barbara
University of Maryland, Center for Ecological and Estuarine Studies
University of Oregon, Eugene
*University of Paris VI, Station Zoologique de Villefranche
University of Rhode Island, Graduate School of Oceanography
University of Texas, Port Aransas Marine Laboratory
University of Southern California
University of Tokyo, Ocean Research Institute
University of Tromso, Tromso, Norway
*University of Washington, School of Oceanography
*Woods Hole Oceanographic Institution

Invited Participation in Symposia - recent only:

- AGU Ocean Science Meeting - Pelagic Ecology of the Subarctic Pacific
New Orleans, 1989
- ASLO Symposium on Nutrient Rich Oceanic Areas - Iron Limitation Cannot be the
Whole Story - San Diego, 1991
- U.S. - C.I.S. Arabian Sea Workshop - Mechanics of a Balanced Pelagic Ecosystem,
Sevastopol, Ukraine - Sept. 1993
- PICES Symposium - Review of the North Atlantic Continuous Plankton Recorder Survey
- Seattle, 1993
- AGU/ASLO Meeting, San Diego Feb. 1996 - Lipids in *Calanus finmarchicus* from
Georges Bank
- AGU Fall Meeting, San Francisco Dec. 1996 - Mate finding in *Calanus marshallae* Frost
- TASC Symposium - Molt cycle phase analysis of *Calanus finmarchicus* - Copenhagen,
1997
- ICES Annual Scientific Meeting, Baltimore, USA, Sept. 1997 - Coupling of life history
and advection models (with D. R. Lynch, F. Carlotti and others) (Upcoming)
- ICES TASC Symposium, Tromsø, Norway, August 1999 - Oil storage variability in
Calanus finmarchicus fifth copepodites
- PICES Annual Meeting - Hakodate, October 2000 - Diapause in interzonal migrator
copepods of the subarctic Pacific. (Invited)

TO: Molly McCammon, Executive Director

RE: STAC Nominations

I would like to be considered as a nominee for the STAC of GEM.

Name: ~~Brenda L. Norcross~~
Norcross@ims.uaf.edu
(907) 474-7990

Affiliation: ACADEMIC
Professor of Fisheries Oceanography
University of Alaska Fairbanks
School of Fisheries and Oceanography
P.O. Box 757220
Fairbanks, AK 99775-7220

Type of Expertise: MODELING
RESOURCE MANAGEMENT
HUMAN ACTIVITIES AND ECOLOGICAL IMPACTS
OCEANOGRAPHY
FISHERIES
ECOLOGY

Locations of Expertise: ALASKA COASTAL CURRENT
SUBTIDAL (NEARSHORE)

Synopsis: I have experience working in the Gulf of Alaska for 13 years. During that time I have investigated the effects of the *Exxon Valdez* oil spill on larval fishes, especially herring, in Prince William Sound. I was the head of the Herring Research Group of the Sound Ecosystem Assessment (SEA) Program. Simultaneously I conducted research discovering, describing and modeling habitats of juvenile flatfishes in the nearshore waters of the Gulf of Alaska.

I have been recognized for my leadership by the requests that I have received to serve on review and advisory committees. The attached vitae shows the relevant committees on which I served. I am very familiar with the GEM program because I recently spent two years serving on the NRC committee that reviewed GEM. I helped shape the role of the STAC. Because of this involvement, I feel that I would be an excellent candidate to serve on the STAC as GEM gets started.

Biographical Sketch of
BRENDA L. NORCROSS

SS# 355-42-8879

[http://www.sfos.uaf.edu/directory/faculty/norcross/
norcross@ims.uaf.edu](http://www.sfos.uaf.edu/directory/faculty/norcross/norcross@ims.uaf.edu)

Education:

Ph.D., Marine Science, Virginia Institute of Marine Science, School of Marine Science, College of William and Mary, Gloucester Point, Virginia, 1983
M.S., Biology, St. Louis University, St. Louis, Missouri, 1976
A.B., Biology, MacMurray College, Jacksonville, Illinois, 1971

Experience:

Professor, Institute of Marine Science, School of Fisheries and Ocean Sciences, University of Alaska Fairbanks, 2001-present
Associate Professor, Institute of Marine Science, School of Fisheries and Ocean Sciences, University of Alaska Fairbanks, 1996-2001
Sabbatical leave, Eastern Caribbean region, 1997-1998
Assistant Professor, Institute of Marine Science, School of Fisheries and Ocean Sciences, University of Alaska Fairbanks, 1989-1996

Professional Honors:

Aldo Leopold Leadership Program Fellow, 2001
Harriman Scholar, www.pbs.org/harriman, 2001
Meritorious Incentive Award, UAF School of Fisheries and Ocean Sciences, 1989

Service Activities:

Member, Bering Sea/Aleutian Islands Groundfish Plan Team, North Pacific Fisheries Management Council, 1995-present
Member, Scientific Steering Committee and REX Subcommittee, PICES-GLOBEC Climate Change and Carrying Capacity (CCCC) Program, 1995-present
Member, Committee to Review the Gulf of Alaska Ecosystem Monitoring Program and Plan, National Research Council, Polar Research Board, 2000-2002.
Convener, EVOSTC Herring Workshops, Anchorage, AK, February 2000, November 2000.
Member, Committee on Improving the Collection and Use of Fisheries Data, National Research Council, Ocean Studies Board, 1999-2000.
Chair, Herring Recruitment Group, Sound Ecosystem Assessment (SEA) Study, 1995-2000
Researcher, SMMOCI (Seabirds and Marine Mammals Oceanography Coordinated Investigations) with NOAA/NMML, USFWS Marine Reserve, and USGS-BRD, 1995-1999.
Member, Review Panel, Biological Oceanography, National Science Foundation, Washington, DC, May 1997
Member, Review Panel, Joint Institute Marine and Atmospheric Research (JIMAR), University of Hawaii, Honolulu, HI, January 1997
Member, Working Group 3 - Dynamics of Small Pelagics in Coastal Ecosystems, PICES-North Pacific Marine Science Organization, 1993-1995.
Member, Technical Advisory Committee, NOAA, Coastal Fisheries Ecosystems (CFE) Program, 1991-1993

Professional Training:

- Aldo Leopold Leadership Training in Leadership, Media, Policy, Business and NGOs, June and September 2001, <http://www.leopold.orst.edu/>
- Walden Institute Certified Online Instructor Program, 2001, <http://www.waldeninstitute.com/>
- "Integrating Problem Solving Into Fisheries Curricula Workshop", American Fisheries Society, San Antonio, TX, 1991
- "Teaching Excellence Workshop", UAF Faculty Development, Fairbanks, AK, 1991
- "Leadership and Supervisory Skills for Women Workshop", Norfolk, VA, 1987
- "Training in Forecasting Workshop", International Institute of Forecasters, Montreal, Canada, 1985

Seminar Presentations:

- "Herring in the Prince William Sound ecosystem", Harriman Expedition Retraced, M/V *Clipper Odyssey*, 2001 (invited)
- "Juvenile herring research following the *Exxon Valdez* oil spill", HUBEC (Hokkaido University, Bering Sea Ecosystem dynamics & Climate) seminar, Hakodate, Japan, 1997 (invited)
- "Effects of the *Exxon Valdez* oil spill on herring in Prince William Sound, Alaska and resulting ecosystem research", Hokkaido Central Fisheries Experimental Station, Yoichi, Japan, 1997 (invited)
- "Recruitment of juvenile flatfish in Alaska," Sheldon Jackson College, Sitka, AK, 1996
- "Habitats for juvenile flatfishes in Alaskan waters," University of the Virgin Islands, St. Thomas, USVI, 1996
- "Nursery grounds of halibut and other flatfishes around Kodiak, Alaska," International Pacific Halibut Commission, Seattle, WA, 1994
- "Fisheries assessment techniques for oil spill damages: Ideal vs. Real," University of South Florida, St. Petersburg, Florida, 1990
- "Impacts of Prince William Sound oil spill on larval fish," AFS Alaska Chapter Arctic Unit, Fairbanks, Alaska, 1989 (invited)

Publications:*Refereed*

- Brown, E.D., S.M. Moreland, B.L. Norcross and G.A. Borstad. In press. Estimating forage fish and seabird distribution and abundance using aerial surveys: survey design and uncertainty. *Fish. Res.*
- Mueter, F.J. and B.L. Norcross. In press. Spatial and temporal patterns in the demersal fish community on the shelf and upper slope regions of the Gulf of Alaska. *Fish. Bull. (US)*.
- Patrick, E.V., D.M. Mason, R.J. Foy, B.L. Norcross, A.J. Paul, K.D.E. Stokesbury, and T.C.Kline. In press. Model of the winter physiology and survival of age-0 Pacific herring (*Clupea pallasii*) in Prince William Sound, Alaska. *Fish. Oceanog.*
- Stokesbury, K.D.E., J. Kirsch, E.V. Patrick and B.L. Norcross. In press. Mortality estimates of juvenile Pacific herring (*Clupea pallasii*) in Prince William Sound, Alaska. *Can. J. Fish. Aquat. Sci.*
- Brown, E.D. and B.L. Norcross. 2002. Effect of herring egg distribution and ecology on year-class strength and adult distribution: preliminary results from Prince William Sound. In: F. Funk, J. Blackburn, D. Hay, A.J. Paul, R. Stephenson, R. Toresen, and D. Witherell (eds.).

- Herring: Expectations for a New Millennium. University of Alaska Sea Grant, AK-SG-01-04, Fairbanks.
- Norcross, B.L. and E.D. Brown. 2002. Estimation of first year survival of Pacific herring from a review of recent stage-specific studies. In: F. Funk, J. Blackburn, D. Hay, A.J. Paul, R. Stephenson, R. Toresen, and D. Witherell (eds.). Herring: Expectations for a New Millennium. University of Alaska Sea Grant, AK-SG-01-04, Fairbanks.
- Foy, R.J. and B.L. Norcross. 2002. Temperature effects on zooplankton assemblages and juvenile herring feeding in Prince William Sound, Alaska. In: F. Funk, J. Blackburn, D. Hay, A.J. Paul, R. Stephenson, R. Toresen, and D. Witherell (eds.). Herring: Expectations for a New Millennium. University of Alaska Sea Grant, AK-SG-01-04, Fairbanks.
- Norcross, B.L., E.D. Brown, R.J. Foy, M. Frandsen, S. Gay, T.C. Kline Jr., D.M. Mason, E.V. Patrick, A.J. Paul and K.D.E. Stokesbury. 2001. A synthesis of the life history and ecology of juvenile Pacific herring in Prince William Sound, Alaska. *Fish. Oceanog.* 10 (Suppl. 1):42-57.
- Cooney, R.T., J.R. Allen, M.A. Bishop, D.L. Eslinger, T.C. Kline, Jr., B.L. Norcross, C.P. McRoy, J. Milton, J. Olsen, V. Patrick, A.J. Paul, D. Salmon, D. Scheel, G.L. Thomas, S.L. Vaughan, and T.M. Willette. 2001. Ecosystem Controls of Juvenile Pink Salmon (*Onchorynchus gorbusha*) and Pacific Herring (*Clupea pallasii*) Populations in Prince William Sound, Alaska: a sound ecosystem assessment (SEA) synthesis. *Fish. Oceanog.* 10 (Suppl. 1):1-13.
- Abookire, A.A., J.F. Piatt and B.L. Norcross. 2001. Habitat of groundfishes in Kachemak Bay, Alaska in late summer. *AK Fish. Res. Bull.* 8:45-56.
- Mueter, F.J. and B.L. Norcross. 2000. Species composition and abundance of juvenile groundfishes around Steller sea lion (*Eumetopias jubatus*) rookeries in the Gulf of Alaska. *Alaska Fish. Res. Bull.* 7:33-43.
- Mueter, F.J., and B.L. Norcross. 2000. Changes in species composition of the demersal fish community in nearshore waters of Kodiak Island, Alaska. *Can. J. Fish. Aquat. Sci.* 57:1169-1180.
- Stokesbury, K.D.E., J. Kirsch, E.D. Brown, G.L. Thomas and B.L. Norcross. 2000. Seasonal variability in Pacific herring (*Clupea pallasii*) and walleye pollock (*Theragra chalcogramma*) spatial distributions in Prince William Sound, Alaska. *Fish. Bull. (US)* 98:400-409.
- Mueter, F.J. and B.L. Norcross. 1999. Linking community structure of small demersal fishes around Kodiak Island, Alaska to environmental variables. *Mar. Ecol. Prog. Ser.* 190:37-51.
- Foy, R.J. and B.L. Norcross. 1999. Spatial and temporal differences in the diet of juvenile Pacific herring (*Clupea pallasii*) in Prince William Sound, Alaska. *Can. J. Zoolog.* 77(5) 697-706.
- Stokesbury, K.D.E., R.J. Foy and B.L. Norcross. 1999. Spatial and temporal variability in juvenile Pacific herring (*Clupea pallasii*) growth in Prince William Sound, Alaska. *Environ. Biol. Fish.* 56:409-418.
- Norcross, B.L. and F.J. Mueter. 1999. The use of an ROV in the study of juvenile flatfishes. *Fish. Res.* 39:241-251.
- Norcross, B.L., A. Blanchard and B.A. Holladay. 1999. Models for defining near-shore nursery areas of flatfishes in Alaskan waters. *Fish. Oceanog.* 8:50-67.
- Moles, A. and B.L. Norcross. 1998. Effects of oil-laden sediments on growth and health of juvenile flatfishes. *Can. J. Fish. Aquat. Sci.* 55:605-610.
- Abookire, A.A. and B.L. Norcross. 1998. Depth and substrate as determinants of distribution of juvenile flathead sole (*Hippoglossoides elassodon*) and rock sole (*Pleuronectes bilineatus*) distribution in Kachemak Bay, Alaska. *J. Sea Res.* 39:113-123.

- Norcross, B.L., F.-J. M ter and B.A. Holladay. 1997. Habitat models for juvenile flatfishes around Kodiak Island, Alaska. *Fish. Bull. (US)* 95(3):504-520.
- Norcross, B.L., J.E. Hose, M. Frandsen and E. Brown. 1996. Distribution, abundance, morphological condition and cytogenetic abnormalities of larval herring in Prince William Sound, Alaska, following the *Exxon Valdez* oil spill. *Can. J. Fish. Aquat. Sci.* 53:2376-2387.
- Brown, E.D., B.L. Norcross and J.W. Short. 1996. Conditions affecting the distribution of oil from the *Exxon Valdez* spill and exposure of Pacific herring, *Clupea pallasii*, in Prince William Sound, Alaska. *Can. J. Fish. Aquat. Sci.* 53:2337-2342.
- Norcross, B.L. and M. Frandsen. 1996. Distribution and abundance of larval fishes in Prince William Sound, Alaska during 1989 after the *Exxon Valdez* oil spill. In S.D. Rice, R.B. Spies, D.A. Wolfe and B.A. Wright (eds.) *Exxon Valdez Oil Spill Symposium Proceedings. Am. Fish. Soc. Symp.* 18:463-486.
- Brown, E.D., T.T. Baker, J.E. Hose, G.D. Marty, M.D. McGurk, B.L. Norcross, and J.F. Short. 1996. The *Exxon Valdez* oil spill and Pacific herring in Prince William Sound, Alaska: A summary of injury to the early life history stages. In S.D. Rice, R.B. Spies, D.A. Wolfe and B.A. Wright (eds.). *Exxon Valdez Oil Spill Symposium Proceedings. Am. Fish. Soc. Symp.* 18:448-462.
- Norcross, B.L., B.A. Holladay, and F.-J. M ter. 1995. Nursery area characteristics of pleuronectids in coastal Alaska, USA. *Neth. J. Sea Res.* 34(1-3):161-175.
- Holladay, B.A. and B.L. Norcross. 1995. Diet of age-0 Pacific halibut in near-shore waters of Kodiak Island, Alaska. *Env. Biol. Fish.* 44:403-416.
- Moles, A. and B.L. Norcross. 1995. Sediment preference in juvenile Pacific flatfishes. *Neth. J. Sea Res.* 34(1-3):177-182.
- Moles, A., S. Rice, and B.L. Norcross. 1994. Non-avoidance of hydrocarbon laden sediments by juvenile flatfishes. *Neth. J. Sea Res.* 32(3/4):361-367.
- M ter, F.-J. and B.L. Norcross. 1994. Distribution, abundance, and growth of larval walleye pollock (*Theragra chalcogramma*) in an Alaskan fjord. *Fish. Bull. (US)* 92:582-590.
- Norcross, B.L. and D.M. Wyanski. 1994. Interannual variation in year-class strength of 0-age summer flounder, *Paralichthys dentatus*, in Virginia estuaries. *Fish. Bull. (U.S.)* 92(3):591-598.
- Norcross, B.L. 1992. Responding to an oil spill: Reflections of a fisheries scientist. *Fisheries (Bull. Am. Fish. Soc.)* 17(6):4-5.

Submitted

- Brown, E.D., J. Seitz, B.L. Norcross and H.P. Huntington. Ecology of herring and other forage fish as recorded by resource users of Prince William Sound and the Outer Kenai, Alaska. *Alaska Fish. Res. Bull.*
- Browning, A.L., B.L. Norcross, and S. Hills. Legal framework for marine protected areas in the United States. *Environ. Mgmt.*
- Dressel, S.C. and B.L. Norcross. Using poststratification to improve multispecies survey assessments: case study of juvenile flatfishes. *Fish. Bull.(US)*.

Nominee's name: Dr. Ron O'Dor

E-mail address: rodor@coreocean.org

Mailing address:

Senior Scientist,
Census of Marine Life
CORE Suite 800
1755 Massachusetts Ave. NW
Washington, DC 20036-2102

Telephone number: 1-202-332-0063 x239

Affiliation: Government, Academic

The person being nominated by Phil Mundy has been contacted and has agreed to consider serving if called upon to do so.

Current Affiliation: ACADEMIC, NON-GOVERNMENTAL ORGANIZATION (NGO)

Types of Expertise: Marine mammals, cephalopods, growth and physiology, fisheries. Patterns and processes controlling global-scale biodiversity, bioenergetics and control of growth and reproduction in invertebrates, telemetric measurement of activity and physiology of marine animals, radio-acoustic positioning and telemetry for marine environmental monitoring, biology and fishery of cephalopods (squids, octopuses, cuttlefish and *Nautilus*).

Locations of Expertise: ALASKA COASTAL CURRENT, OFFSHORE, INTERTIDAL AND SUBTIDAL (NEARSHORE)

Synopsis

Ron O'Dor, has been Professor of Biology at Dalhousie University since 1983. He is currently serving in a leadership role for the Census of Marine Life as senior scientist, having previously served as Chair of his department at Dalhousie. Prof. O'Dor is internationally recognized for innovative applications of technology to his work, as well as for his contributions to knowledge. The breadth and depth of his scientific experience, as well as his ample leadership experience at local, national and international scales, make him well qualified for the senior advisory body to GEM.

CURRICULUM VITAE: RONALD KEITH O'DOR

EDUCATION

- | | |
|---------|----------------------------------------------------------------------------------------------------------------------------------------|
| 1971-73 | Post-doctoral Fellow, Zoology, Cambridge University, U.K.
Supervisor: M.J. Wells |
| 1971 | Ph.D. (Physiology), University of British Columbia.
Thesis: Structures and functions of ultimobranchial calcitonins, with D.H. Copp |
| 1967 | A.B. (Honors, Biochemistry), University of California, Berkeley.
Thesis: Tissue variations in chicken lysozymes, with Allan Wilson |
| 1966 | A.A. (Chemistry) El Camino College, Torrance, CA. |

PROFESSIONAL EXPERIENCE

1997-2000 Chair, Biology Dept., Dalhousie U., Halifax, Nova Scotia, Canada
 B3H 4J1 Tel: (902) 494-2357, Fax: (902) 494-3736, Internet: odor@is.dal.ca
 1999 Visiting Scientist, Lincoln Marine Science Centre, Port Lincoln, Australia
 1996 Principal Investigator, ARF-1, STS-77, NASA, Kennedy Space Center, USA
 1996 Visiting Scientist, Lizard Island Research Station, Australia
 1994 Visiting Scientist, Port Elizabeth Museum, Port Elizabeth, South Africa
 1991 Visiting Professor, Faculty of Fisheries, Hokkaido University
 1989/91 Visiting Scientist, Motupore Is. Research Dept., UPNG, Papua New Guinea
 1989/90 Visiting Scientist, Dept. Oceanography and Fisheries, U. Azores, Horta
 1987 Sessional Professor, Bamfield Marine Station, Bamfield, B.C.
 1987 Sessional Professor, Shannon Point Marine Station, Anacortes, WA
 1986-93 Director, Aquatron Laboratory, Dalhousie University
 1986-87 Visiting Professor, University of British Columbia, Vancouver, B.C.
 1983- Professor, Biology Department, Dalhousie University
 1980 Visiting Scientist, Pacific Biological Station, Nanaimo, B.C.
 1979-85 Visiting Scientist, Laboratoire Arago, Banyuls, France (summers)
 1973-83 Assistant to Associate Professor, Dalhousie University
 1971-73 Post-Doctoral Research Fellow: Zoology Dept. Cambridge University, UK
 Biochemistry Dept., Stazione Zoologica, Naples, Italy.
 1965-67 Research Assistant, Lawrence Radiation Laboratories, Berkeley, CA
 1963-65 Chemical Technician, Metzler Co., Los Angeles, CA
 1962-63 Technical Assistant, Hughes Aircraft, El Segundo, CA

CURRENT RESEARCH INTERESTS

1. Patterns and processes controlling global-scale biodiversity.
 2. Bioenergetics and control of growth and reproduction in invertebrates.
 3. Telemetric measurement of activity and physiology of marine animals.
 4. Radio-Acoustic Positioning and Telemetry for marine environmental monitoring.
 5. The biology and fishery of cephalopods (squids, octopuses, cuttlefish and *Nautilus*).
- 87 Peer Reviewed Journal Articles, 7 Edited Books and Proceedings, 20 Contributions to Refereed Books and Symposia, 49 Specialized or Non-Refereed Articles, 27 Supervised Publications, 13 Derivative Publications, 128 Conference and Public Presentations

PROFESSIONAL SERVICES AND EXPERIENCE

21 Expert and Advisory Committees, 8 Organizational Memberships, 7 Conferences Organized, 9 Editorial Positions and Reviewer for 20 Journals

GRANTS, CONTRACTS AND THESES

46 Grants Administered, 15 Co-authored Grants, 11 Contracts, 5 Contributions to Engineering Practice, 4 Cruises, 36 Graduate Theses Supervised or Co-supervised

MEDIA EXPERIENCE

Maintain Web Sites: The Cephalopod Page, 1995; RAPTnet, 1997; CephBase, 1998
 Compas Focus Group on Department of Fisheries and Oceans Website
 Encountering the Media course, Barry McLoughlin Associates Inc., Ottawa, 1996

Scientific Advisor, *Oceans* series on Discovery Network, produced by G. Arbeid

SELECTED RECENT PUBLICATIONS IN REFEREED JOURNALS

- O'Dor, R.K.** (submitted) Telemetered cephalopod energetics: swimming, soaring and ballooning. *J. Soc. Integr. Comp. Biol.*
- O'Dor, RK**, Aitken, J.P., Andrade, Y., Finn, J. and Jackson, G.D. (2002) Currents as environmental constraints on the behavior, energetics and distribution of squid and cuttlefish. *Bull. Mar. Sci.*, in press.
- Jackson, G.D. and **O'Dor, R.K.** (2001) Time, space and the ecophysiology of squid growth, life in the fast lane. *Vie Milieu* 51: 205-215.
- Webber, D.M., Aitken, J. and **O'Dor, R.K.** (2000) Costs of vertical locomotion and vertical dynamics of cephalopods and fish. *Physiol. Biochem. Zool.* 73: 651-662.
- Voegeli, FA, Webber, DM, Smale, MJ, Andrade, Y & **O'Dor, RK** (2001) Ultrasonic telemetry, tracking and automated monitoring technology for sharks. *Environ. Biol. Fish.* 60: 267-281.
- Perez, JAA & **O'Dor, RK** (2000) Critical transitions in early life histories of short-finned squid, *Illex illecebrosus*, as reconstructed from gladius growth. *J. Mar. Biol. Assn.* 80:509-515
- Wood, JB & **O'Dor, RK** (2000) Do larger cephalopods live longer? *Mar. Biol.* 136:91-99.
- Manuel, JL, Pearce, CM, Manning, DA & **O'Dor, RK** (2000) The response of sea scallop (*Placopecten magellanicus*) veligers to a weak thermocline in 9m deep mesocosms. *Mar. Biol.* 137:169-175.
- O'Dor, RK** & Hoar, JA (2000) Does geometry limit squid growth? *ICES J. Mar. Sci.* 57:8-14.
- Seino, S, Tsuchiya, Y, **O'Dor, RK**, Uda, T, Nishihara, M, Kugimiya, K & Watnabe, N (1999) Behavioral monitoring of horseshoe crabs by radio-acoustic biotelemetry. *Proc. Coastal Engineering*, Jap. Soc. Civil Eng. 46:1296-1300 (In Japanese).
- Perez, A & **O'Dor, RK** (1998) The impact of environmental gradients on the early life inshore migration of the short-finned squid, *Illex illecebrosus*. *S. Afr. J. Mar. Sci.* 20:293-303.
- O'Dor, RK** (1998) Can understanding squid life history strategies and recruitment improve management? *S. Afr. J. Mar. Sci.* 20: 193-206.
- Herbinger, CM, Vercaemer, BM, Gjetvaj, B & **O'Dor, RK** (1998) Absence of genetic differentiation amongst geographically close sea scallop (*Placopecten magellanicus* G.) beds using cDNA and microsatellite markers. *J. Shellfish Res.* 17:117-122.
- O'Dor, RK**, Y Andrade, DM Webber, WHH Sauer, MJ Roberts, MJ Smale & FM Voegeli (1998) Applications and performance of Radio-Acoustic Positioning and Telemetry (RAPT) systems. *Hydrobiologia* 371/372:1-8.
- Wood, JB, Kenchington, E & **O'Dor, RK** (1998) Reproduction and embryonic development time of *Bathypolypus arcticus*, a deep-sea octopod (Cephalopoda: Octopoda). *Malacologia* 39:11-19.
- Pearce, CM, Gallager, SM, Manuel, JL, Manning, DA, **O'Dor, RK** & Bourget, E (1998) The effect of thermoclines and turbulence on depth of settlement and spat production of the giant scallop, *Placopecten magellanicus*, in 9.5m deep laboratory mesocosms. *Mar. Ecol. Prog. Ser.* 165:195-215.

Nominee's name: Dr. Bill Seitz

E-mail address: william_seitz@usgs.gov

Mailing address: USGS, Western Region, 1011 E. Tudor Rd.

Telephone number: 907-786-3385

Affiliation: Government

The person being nominated by Phil Mundy has been contacted and has agreed to consider serving if called upon to do so.

Type of Expertise: RESOURCE MANAGEMENT, MAMMOLOGY

Locations of Expertise: WATERSHEDS, MARINE-TERRESTRIAL LINKAGES

Synopsis:

Dr. Bill Seitz is the Director of the Alaska Science Center for the USGS. Dr. Seitz is familiar with the major natural resource management issues of Alaska, having served in a lead administrative role with the USGS in Alaska (Department of Interior) since 1989. Dr. Seitz is thoroughly familiar with the Exxon Valdez Oil Spill Trustee Council having supervised scientists conducting research for the Council since its inception, and having participated as an advisor in the development of the GEM Program since its conception. Dr. Seitz has a leadership role in planning and directing marine and freshwater research in all areas of Alaska, both as the head of the USGS Alaska Science Center, and as a member of the North Pacific Research Board.

Resume

Fish and Wildlife Administrator

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Director, Alaska Science Center

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EDUCATION

Ph.D. 1974 Wildlife Biology Iowa State University

M.S. 1972 Wildlife Biology Iowa State University

B.S. 1966 Fish & Wildlife Mgmt. Iowa State University

PROFESSIONAL POSITIONS

2001 - Present	Deputy Regional Director for Alaska, USGS and Director, Alaska Science Center, Anchorage, AK
1997 - 2001	Director, Alaska Biological Science Center, USGS, Anchorage, AK
1989 - 1997	Assistant Director, USGS Alaska Biological Science Center, Anchorage, AK

1983 - 1989	Leader, Information Transfer Section, Office of Information Transfer, U.S. Fish and Wildlife Service, Ft. Collins, CO
1976 - 1983	Assistant Leader, Colorado Cooperative Wildlife Research Unit, U.S. Fish and Wildlife Service, Ft. Collins, CO
1975 - 1976	Environmental Specialist, Office of Biological Services, U.S. Fish and Wildlife Service, Albuquerque, NM
1974 - 1975	Wildlife Biologist, Division of Ecological Services, U.S. Fish and Wildlife Service, Tulsa, OK

WILLIAM K. SEITZ

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EDUCATION

Ph.D.	1974	Wildlife Biology	Iowa State University
M.S.	1972	Wildlife Biology	Iowa State University
B.S.	1966	Fish & Wildlife Mgmt.	Iowa State University

PROFESSIONAL POSITIONS

2001 - Present	Deputy Regional Director for Alaska, USGS and Director, Alaska Science Center, Anchorage, AK
1997 - 2001	Director, Alaska Biological Science Center, USGS, Anchorage, AK
1989 - 1997	Assistant Director, USGS Alaska Biological Science Center, Anchorage, AK
1983 - 1989	Leader, Information Transfer Section, Office of Information Transfer, U.S. Fish and Wildlife Service, Ft. Collins, CO
1976 - 1983	Assistant Leader, Colorado Cooperative Wildlife Research Unit, U.S. Fish and Wildlife Service, Ft. Collins, CO
1975 - 1976	Environmental Specialist, Office of Biological Services, U.S. Fish and Wildlife Service, Albuquerque, NM
1974 - 1975	Wildlife Biologist, Division of Ecological Services, U.S. Fish and Wildlife Service, Tulsa, OK

MEMBERSHIP IN PROFESSIONAL SOCIETIES

Present: The Wildlife Society

Past: Sigma Xi

PUBLICATIONS FOR WILLIAM K. SEITZ

Seitz, W. K. and R. Q. Landers. 1972. Controlled burning in relationship to bobwhite quail populations on a southern Iowa public hunting area. *Iowa State J. Res.* 47:49-165.

Crim, L.A. and W. K. Seitz. 1972. Summer range and habitat preferences of bobwhite quail on a southern Iowa state game area. *Proc. Iowa Acad. Sci.* 79:85-89.

Seitz, W. K. and R. B. Dahlgren. 1975. Water-based recreational use patterns of the Upper Iowa River. *Iowa State J. Res.* 50:131-145.

Seitz, W. K. and R. B. Dahlgren. 1976. Socioeconomic characteristics and attitudes of users of the Upper Iowa River. *Iowa State J. Res.* 50:385-397.

Williams, G., K.R. Russell, and W.K. Seitz. 1977. Pattern recognition as a tool in the ecological analysis of habitat. Pages 521-531 in Classification, inventory, and analysis of fish and wildlife habitat; the proceedings of a national symposium. U.S. Dept. Int., Fish Wildl. Serv., FWS/OBS-78/76. 604 pp.

Nowlin, R.A., W.K. Seitz, and R.N. Denney. 1979. Initial progress of the Colorado moose reintroduction. *Proc. N. Am. Moose Conf. Workshop* 15:187-212.

Bergersen, E.P. and W. K. Seitz, editors. 1980. Cooperative Research Units, Fishery and Wildlife Annual Report 1977-78. U.S. Fish and Wildlife Service, Office of Cooperative Research Units, Washington, D.C. 84pp.

Hays, R.L., C. Summers, and W.K. Seitz. 1981. Estimating wildlife habitat variables. U.S. Dept. Int., Fish Wildl. Serv., FWS/OBS-81/47. 111pp.

Seitz, W.K., C.L. Kling, and A.H. Farmer. 1982. Habitat evaluation: a comparison of three approaches on the Northern Great Plains. *Trans. N. Am. Wildl. Nat. Resour. Conf.* 47:82-95.

Jackson, D.H., L.S. Jackson, and W.K. Seitz. 1985. An expandable drop-off transmitter harness for young bobcats. *J. Wildl. Manage.* 49(1):46-49.

Seitz, W.K., R.G. Streeter, R.E. Kirby, A.R. Taylor, T.J. Cortese, and D.H. Cross. 1985. Increasing communication between research and development scientists and operational managers—the U.S. Fish and Wildlife Service approach. *Trans. N. Am. Wildl. Nat. Resour. Conf.* 50:405-417.

Roelle, J., A. Farmer, D. Hamilton, S. Williamson, and W. Seitz. 1986. Water management alternatives at Reelfoot Lake: results of a workshop. U.S. Fish Wildl. Serv., National Ecology Center, Fort Collins, CO. NEC-87/04. 104 pp.

Curriculum Vitae

WARREN S. WOOSTER School of Marine Affairs, University of Washington, 3707 Brooklyn Ave. NE, Seattle, WA 98105-6715 (206-685-2497; fax 206-543-1417; wooster@u.washington.edu).
Born 20 February 1921 in Westfield, Mass.

Education

Ph.D. 1953. Univ. of California (SIO/UCLA). Oceanography. M.S. 1947. California Inst. of Technology. Chemistry. Sc.B. 1943. Brown University. Chemistry.

Employment

1991-date, **Professor Emeritus**, Schools of Marine Affairs, Fisheries, UW; 1976-1991, **Professor**, Inst. Marine Studies/School of Marine Affairs, School of Fisheries, UW; 1979-1982, **Director**, Inst. Marine Studies, UW; 1973-1976, **Dean**, Rosenstiel School of Marine and Atmospheric Science, University of Miami; 1963-1973, **Professor**, Scripps Inst. Oceanography; 1961-1963, **Director**, Office of Oceanography, Unesco; 1948-1961, **Research Oceanographer**, Scripps Inst. Oceanography; 1957-1958, **Director of Investigations**, Peruvian Council of Hydrobiological Investigations; 1943-1946, U.S. Naval Reserve

Professional Activities

Federal, **Member**, National Advisory Committee on Oceans and Atmosphere, 1975-1976; **Chairman**, University National Oceanographic Laboratory System, 1976-1978

NAS/NRC. **Chairman**, NAS Ocean Sciences Board, 1978-1981; **Member**, NAS Climate Board, 1979-1982; **Member**, NAS Geophysics Research Board, 1979-1981; **Member**, NRC Committee on Bering Sea Ecosystem, 1993-1996

International. **Secretary**, Intergovernmental Oceanographic Commission, 1961-1963; **President**, Scientific Committee on Oceanic Research, 1968-1972; **President**, International Council for the Exploration of the Sea, 1982-1985; **Chairman**, North Pacific Marine Science Organization (PICES), 1992-1996

Prof. Soc. **Fellow**, American Geophysical Union, **Fellow**, American Meteorological Society

Selected Recent Publications

1985. El Nino North. Effects in the Eastern Subarctic Pacific (Ed. With D.L. Fluharty) Washington Sea Grant. 312 pp.

1990. Abundance of oil sardine (*Sardinella longiceps*) and upwelling on the southwest coast of India. (with A.R. Longhurst). Can.J.Fish.Aquat.Sci. 47, 2407-2419.

1992. Variability of winter ocean conditions and strong years classes of northeast Pacific groundfish. (with A.B. Hollowed). ICES mar.Sci.Symp. 195, 433-444

1995. Decadal-scale variations in the eastern subarctic Pacific: I. Winter ocean conditions (with A.B. Hollowed). Can.Spec.Pub.Fish.Aquat.Sci. 121, 81-85

1998. Effects of interdecadal climate variability on the oceanic ecosystems of the NE Pacific. (with R.C. Francis, S.R. Hare and A.B. Hollowed). Fisheries Oceanography 7(1), 1-21

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INJURED
RESOURCES & SERVICES

Exxon Valdez Oil Spill Trustee Council

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MEMORANDUM

TO: Exxon Valdez Oil Spill Trustee Council

FROM: Molly McCammon *Submitted for*
Executive Director

RE: Update on Injured Resources and Services

DATE: April 10, 2002

The attached draft update on injured resources and services reflects the recommendation of the Chief Scientist, Dr. Bob Spies, following his discussions with peer reviewers and principal investigators. This draft is being circulated for public review, and will be brought to the Trustee Council for action at your June 11, 2002 meeting.

Exxon Valdez Oil Spill Restoration Plan
DRAFT Update on Injured Resources and Services
April 10, 2002

Exxon Valdez Oil Spill Trustee Council
441 W 5th Avenue, Suite 501, Anchorage, AK 99501-2340
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RESOURCES AND SERVICES INJURED BY THE SPILL

RESOURCES IN BOLDFACE HAVE BEEN RECATEGORIZED ON THIS RECOVERY LINE DURING THE MOST RECENT UPDATE (APRIL 10, 2002)

NOT RECOVERING

Species are showing little or no clear improvement since spill injuries occurred.

Common loon
Cormorants (3 spp.)
Harbor seal
Pigeon guillemot

RECOVERING

Substantive progress is being made toward recovery objective. The amount of progress and time needed to achieve recovery vary depending on the resource.

Clams
Designated Wilderness Areas
Harlequin duck
Intertidal communities
Marbled murrelets
Mussels
Pacific herring
Sea otter
Sediments

RECOVERED

Recovery objectives have been met

Archaeological resources

Bald eagle

Black oystercatcher
Common murre
Pink salmon
Killer whale (AB pod)
River otter
Subtidal communities
Sockeye salmon

RECOVERY UNKNOWN

Limited data on life history or extent of injury; current research inconclusive or not complete.

Cutthroat trout
Dolly Varden
Kittlitz's murrelet
Rockfish

HUMAN SERVICES

Human services that depend on natural resources were also injured by the oil spill. These services are each considered to be recovering until the resources on which they depend are fully recovered.

Recreation & tourism
Commercial fishing
Passive uses
Subsistence

UPDATE ON INJURED RESOURCES AND SERVICES

Introduction

History and Purposes of the List

In November 1994, the *Exxon Valdez* 1989 Oil Spill Trustee Council adopted an official list of Resources and Services Injured by the spill as part of its *Restoration Plan*. This list has served three main purposes in the Restoration Program:

1. It has highlighted injuries caused by the oil spill and cleanup efforts and helped the Trustees and the public track the status of important fish, wildlife, and other resources and services. The fish and wildlife on this list are thought to have suffered population-level or sublethal injuries, but it does not include every species or resource that suffered some

- degree of injury. For example, carcasses of about 90 different species of oiled birds were recovered in 1989, but only 10 species of birds have been on the list of injured species.
2. It has helped guide the *Restoration Plan*. This was especially important in 1994 when the plan was first adopted, but the list still serves to highlight resources that are in need of consideration.
 3. Finally, taken as a whole, the list of injured resources has helped the Trustees and the public track recovery of the overall ecosystem and the functions and human services that it provides.

The *Restoration Plan* states that the Injured Resources and Services list will be reviewed periodically and updated to reflect results from scientific studies and other information. With each review, a resource's progress toward a recovery objective is evaluated. The recovery objectives have been set to be as concrete and measurable as possible. Recovery objectives may be changed to reflect new insights about the nature of the injury and the best ways to evaluate recovery status.

The Injured Resources and Services list was first updated in September 1996. At that time, for example, the bald eagle was upgraded from recovering to recovered. In March 1999, several more changes were made. River otters were then considered to be recovered, and five resources—black oystercatchers, clams, marbled murrelets, Pacific herring, sea otters—were upgraded to recovering. One resource, the common loon, was moved from recovery unknown to not recovering. Five resources remained as recovery unknown. Four human services were classified as recovering.

In 2002, more than 12 years after the spill, recovery continues to progress and more changes have been made to the list. Seven more species or resources have been moved to the recovered category: archeological resources, black oystercatchers, common murre, killer whales, subtidal communities, sockeye salmon and pink salmon. No other changes have been made to the list, except that harlequin ducks have been moved from the not recovered to the recovering category.

The 1994 Restoration Plan provides that the Injured Resources and Services list can be updated any time new information becomes available. It is likely, however, that the next evaluation of changes in recovery status for all injured resources and lost or reduced services will be in 2006, 15 years after the 1991 settlement between the governments and Exxon and initiation of the restoration program.

How to Interpret this List

The assignment of resources to various categories continues to be based on judgements made after weighing the available evidence. Evidence weighed includes :

- a. Estimates of population sizes and trajectories in the spill area;
- b. Comparison of population estimates in oiled and unoiled areas of the northern Gulf of Alaska;
- c. Whether there has been continued exposure to residual oil in the spill area; and

d. Whether sublethal or chronic injuries persist or show improvement.

Some of the factors involved in making judgments about recovery status include:

A. Uncertainties in population estimates. Because of the variability in animal distributions and the challenges of getting accurate counts, especially of highly mobile fish, birds and marine mammals, most estimates of population size have wide ranges. For example, it is to be expected that ranges that are between at least 40% greater or smaller than the true population size will result from many census techniques. This range can be narrowed, but costs escalate with increasing effort to obtain greater accuracy.

B. Lack of prespill data. Many of the resources affected by the spill had limited or no recent data on their status in 1989. In addition, some of the available pertinent data was the result of limited sampling and had wide ranges in the population estimates. Having such patchy data on resources made it difficult to accurately assess initial injury. In turn, any uncertainties in injury inevitably lead to uncertainties in estimating recovery.

C. Interaction of spill and anthropogenic factors. It is increasingly difficult to separate what may be lingering effects of the spill from changes that are natural or caused by factors unrelated to the oil spill. In fact, what is often observed appears to be an interaction between oil effects and natural changes, such as the effects of the 1998 *El Niño* on common murrelets in the Barren Islands which were recovering from oil spill impacts. We now understand much more about long-term changes in climate in the northern Gulf of Alaska and how these changes affect marine species.

D. Emergence of new effects. Since the *Exxon Valdez* oil spill affected an area rich in wildlife and was so well studied, it would not be surprising that there are findings without precedent in the scientific literature on oil effects. One example of such an unprecedented effect is the sensitivity of Pacific herring and pink salmon to low concentrations of weathered oil (Carls a, 199x; Rice et al, 2001). We cannot discount evidence for an injury just because it had never been encountered in the aftermath of other spills.

Ecosystem Perspective and Recovery

The List of Injured Resources consists mainly of single species and resources, but, as noted above, it provides a basis for evaluating the recovery of the overall ecosystem, its functions, and the services that it provides to people. In fact, through the *Restoration Plan*, the Trustee Council adopted an ecological approach to restoration, and the studies and projects it sponsors have been ecological in character.

Page 35 of the *Restoration Plan* defines ecosystem recovery as follows:

Full ecological recovery will have been achieved when the population of flora and fauna are again present at former or prespill abundances, healthy and productive, and there is a full complement of age classes at the level that would have been present had

the spill not occurred. A recovered ecosystem provides the same functions and services as would have been provided had the spill not occurred.

Using this definition, the coastal and marine ecosystem in the oil spill region has not fully recovered from the effects of the oil spill. For example, harlequin ducks and sea otters still show signs of oil exposure and may be negatively affected by such exposure. Although full ecological recovery has not been achieved, the spill area ecosystem is still largely intact and functioning and on its way to recovery 13 years after the *Exxon Valdez* oil spill.

It is desirable to have injured resources obtain a state that would have occurred in the absence of the spill. However, it also is important to understand that ecosystems are dynamic and would have changed even in the absence of the oil spill. Given our present ability to predict multi-year changes in marine ecosystems, it is very difficult to know how the ecosystem would have changed in the absence of the spill. For that reason, it is also sometimes necessary to consider other measures (return to pre-spill status or attaining equivalent status in oiled and unoled areas) in order to have more concrete objectives. Also, as mentioned above, baseline data describing fish and wildlife populations, to say nothing of complex intertidal and subtidal communities, were generally poor in 1989. Therefore, in revising this list judgements have been made in the face of increasing knowledge—but also, great uncertainty—of how natural changes have occurred in the northern Gulf of Alaska.

ARCHAEOLOGICAL RESOURCES

Injury and Recovery

The oil-spill area is believed to contain more than 3,000 sites of archaeological and historical significance. Twenty-four archaeological sites on public lands are known to have been adversely affected by cleanup activities or looting and vandalism linked to the oil spill. Additional sites on both public and private lands were probably injured, but damage assessment studies were limited to public land and not designed to identify all such sites.

Documented injuries include theft of surface artifacts, masking of subtle clues used to identify and classify sites, violation of ancient burial sites, and destruction of evidence in layered sediments. In addition, residual oil may have contaminated sites.

Assessments of 14 sites in 1993 suggested that most of the archaeological vandalism that can be linked to the spill occurred early in 1989, before adequate constraints were put into place over the activities of oil spill clean-up personnel. Most vandalism took the form of “prospecting” for high yield sites. Once these problems were recognized, protective measures were implemented and successfully limited additional injury. Although some cases of vandalism were documented in the 1990s, there appears to be no spill-related vandalism at the present time.

The presence of oil in sediment samples taken from four sites in 1995 did not appear to have been the result of re-oiling by *Exxon Valdez* oil. Residual oil does not appear to be contaminating any known archaeological sites.

Two sites in Prince William Sound were so badly damaged by oiling and erosion that they were partly documented, excavated, and stabilized by professional archaeologists in

1994-1997. It appears that the two sites were intermittently occupied for periods of 2,000 and 3,000 years. Most of the cultural deposits are prehistoric in nature.

In 1993, the Trustee Council provided part of the construction costs for the Alutiiq Archaeological Repository in Kodiak. This facility now houses Kodiak area artifacts that were collected during the time of spill response. In 1999, the Trustee Council approved funding for an archaeological repository and local display facilities for artifacts from Prince William Sound and lower Cook Inlet. These are currently in various stages of construction.

Based on the apparent absence or extremely low rate of spill-related vandalism and the preservation of artifacts and scientific data on archaeological sites and artifacts, archaeological resources are considered to be recovered.

Recovery Objective

Archaeological resources are nonrenewable: they cannot recover in the same sense as biological resources. Archaeological resources will be considered to have recovered when spill-related injury ends, looting and vandalism are at or below prespill levels, and the artifacts and scientific data remaining in vandalized sites are preserved (e.g., through excavation, site stabilization, or other forms of documentation).

BALD EAGLES

Injury and Recovery

The bald eagle is an abundant resident of marine and riverine shoreline throughout the oil-spill area. Following the oil spill, a total of 151 eagle carcasses was recovered from the spill area. Prince William Sound provides year-round and seasonal habitat for about 6,000 bald eagles, and within the sound it is estimated that about 250 bald eagles died as a result of the spill. There were no estimates of mortality outside the sound, but there were deaths throughout the spill area.

In addition to direct mortalities, productivity was reduced in oiled areas of Prince William Sound in 1989. Productivity was back to normal in 1990 and 1991, and an aerial survey of adults in 1995 indicated that the population had returned to or exceeded its prespill level in the sound.

In September 1996, the Trustee Council classified the bald eagle as fully recovered from the effects of the oil spill. No additional work has been carried out specifically to assess the status of the bald eagle. However, the bald eagle has benefited enormously from the habitat protection program, including the acquisition of more than 1,400 miles of marine shoreline and 300 anadromous fish streams.

Recovery Objective

Bald eagles will have recovered when their population and productivity have returned to prespill levels.

BLACK OYSTERCATCHERS

Injury and Recovery

Black oystercatchers spend their entire lives in or near intertidal habitats and are highly vulnerable to oil pollution. It is estimated that 1,500-2,000 oystercatchers breed in south-central Alaska. Only nine carcasses of adult oystercatchers were recovered following the spill, but the actual number of mortalities may have been several times higher.

In addition to direct mortalities, breeding activities were disrupted by the oil and cleanup activities. When comparing 1989 with 1991, significantly fewer pairs occupied and maintained nests on oiled Green Island, while during the same two years the number of pairs and nests remained similar on unoiled Montague Island. Nest success on Green Island was significantly lower in 1989 than in 1991, but Green Island nest success in 1989 was not lower than on Montague Island. In 1989, chicks disappeared from nests at a significantly greater rate on Green Island than from nests on Montague Island. Disturbance associated with cleanup operations also reduced productivity on Green Island in 1990. In general, the overt effects of the spill and cleanup had dissipated by 1991, and in that year productivity on Green Island exceeded that on Montague Island.

Boat-based surveys of marine birds in the sound indicate that there are increases in numbers of oystercatchers in both the oiled and unoiled areas through 2000 (Stephenson et al., 2001). Given the fact that only about 9 carcasses of this species were recovered in 1989 after the spill, it is likely that the population of Prince William Sound is probably as large or larger than previous to the spill.

In 1998 the Trustee Council sponsored a study to reassess the status of this species in Prince William Sound. The data indicated that oystercatchers have fully reoccupied and are nesting at oiled sites in the sound. The breeding phenology of nesting birds was relatively synchronous in oiled and unoiled areas, and no oil-related differences in clutch size, egg volume, or chick growth rates were detected. A high rate of nest failures on Green Island probably can be attributed to predation, not lingering effects of oil. **Given general agreement between these results and those of the earlier work, which indicated that the effects of the spill had largely dissipated by 1991, black oystercatchers are considered recovered from the oil spill.**

Black oystercatchers nest on rocky beaches and have benefited enormously from the habitat protection program, including the acquisition of more than 1,400 miles of marine shoreline. In addition, introduced foxes, which prey on oystercatchers, were eliminated from two of the Shumagin Islands (Simeonof and Chernabura) in the southwestern part of the spill area.

Recovery Objective

Black oystercatchers will have recovered when the population returns to prespill levels and reproduction is within normal bounds. An increasing population trend and comparable hatching success and growth rates of chicks in oiled and unoiled areas, after taking into account geographic differences, will indicate that recovery is underway.

COMMON LOONS

Injury and Recovery

Carcasses of 395 loons of four species were recovered following the spill, including at least 216 common loons. Current population sizes in the spill area are not known for any of these species. Common loons in the spill area may number only a few thousand, including only hundreds in Prince William Sound. Common loons injured by the spill probably included a mixture of wintering and migrating birds. The specific breeding areas used by the loons affected by the spill are not known.

Boat-based surveys of marine birds in Prince William Sound give at least some insight into the recovery status of the loons affected by the oil spill. Prespill counts of loons exist for 1972-1973 and 1984-1985 only. After the spill, contrasts between oiled and unoled areas of the sound indicate that loons as a group are generally doing better in unoled areas than in oiled areas. Thus, the survey data suggest that the oil spill had a negative effect on numbers of loons (all species combined) in the oiled parts of the sound. It is not known what the populations of loons may have been had the spill not occurred.

Based on the surveys carried out through 2000, there are indications of recovery, but only in 2000. In 2000 the highest counts ever recorded for common loons occurred in March surveys of Prince William Sound, however these counts likely included some early migrants as well as wintering birds. In addition July counts were the third highest of the 11 years with data since 1972. These increases were limited to the unoled portion of the sound. One year of high counts in the unoled areas is insufficient to indicate recovery but may indicate that recovery has started. **Thus the common loon is considered still not to have recovered from the effects of the spill.**

Recovery Objective

Common loons will have recovered when their population returns to prespill levels in the oil-spill area. An increasing population trend in Prince William Sound will indicate that recovery is underway.

CLAMS

Injury and Recovery

The magnitude of immediate impacts on clam populations varied with the species of clam, degree of oiling, and location. Some littleneck clams and some butter clams were probably killed and may have suffered slower growth rates as a result of the oil spill and cleanup activities.

Studies by the NOAA Hazardous Materials Division and others have been conducted on intertidal and subtidal communities in relation to oil and shoreline treatments. In general, these studies indicated that intertidal fauna dwelling in soft sediments, including various clam species, had recovered to some extent within one-three years after 1989 on oiled-but-untreated shorelines. As of 1997, full recovery had not been achieved, especially on shorelines that were oiled and treated by hot-water washes. For example, one study found that densities of littleneck and butter clams were depressed through 1997 on oiled, treated mixed-sedimentary shores where fine sediments had been washed downslope during pressured water treatments.

Comparing oiled study sites on Knight Island with unoiled sites on Montague Island, researchers in the Nearshore Vertebrate Predator project found a full range of size classes of clams at the oiled sites, as well as more large clams. However, oiled sites also had fewer juvenile clams and lower numbers of several species. **Based on all of the evidence summarized above, clams are recovering, but are not yet fully recovered from the effects of the oil spill.** The Trustee Council is sponsoring a study of clam populations in FY02 to determine if the populations of clams on treated beaches have improved since 1997.

In communities on the Kenai Peninsula, Kodiak Island, the Alaska Peninsula and in Prince William Sound there are lingering concerns about the effects of the oil spill on clams. The Trustee Council sponsored a project to help restore subsistence uses of clams through hatchery production and outplanting to selected intertidal locations near villages (see subsistence).

Recovery objective

Clams will have recovered when populations and productivity have returned to levels that would have prevailed in the absence of the oil spill, based on comparisons of oiled and unoiled sites.

COMMON MURRES

Injury and Recovery

About 30,000 carcasses of oiled birds were picked up in the first four months following the oil spill, and 74 percent of them were common and thick-billed murres (mostly common murres). Many more murres probably died than actually were recovered. Based on surveys of index breeding colonies at such locations as the Barren Islands, Chiswell Islands, Triplet Islands, Puale Bay, and Ugiaushak Island, the spill-area population may have declined by about 40 percent following the spill. In addition to direct losses of murres, there is evidence that the timing of reproduction was disrupted and productivity reduced. Interpretation of the effects of the spill, however, is complicated by incomplete prespill data and by indications that populations at some colonies were in decline before the oil spill.

Postspill monitoring at the breeding colonies in the Barren Islands indicated that reproductive success was again within normal bounds by 1993, and it has stayed within these bounds each breeding season since then. During the period 1993-1997, the murres

nested progressively earlier by 2-5 days each year, suggesting that the age and experience of nesting birds was increasing, as might be expected after a mass mortality event. By 1997, numbers of murres at the Barren Islands had increased, probably because 3-and 4-year old nonbreeding subadult birds that were hatched there in 1993 and 1994 were returning to their natal nesting colony. **Although there were low counts in 1996, the counts in 1997 through 1999 at this index site bring the colony sizes to prespill levels and definitely indicate that full recovery has been achieved for common murres.**

Recovery Objective

Common murres will have recovered when populations at index colonies have returned to prespill levels and when productivity is sustained within normal bounds. Increasing population trends at index colonies will be a further indication that recovery is underway.

CORMORANTS

Injury and Recovery

Cormorants are large fish-eating birds that spend much of their time on the water or perched on rocks near the water. Three species typically are found within the oil-spill area.

Carcasses of 838 cormorants were recovered following the oil spill, including 418 pelagic, 161 red-faced, 38 double-crested, and 221 unidentified cormorants. Many more cormorants probably died as a result of the spill, but their carcasses were not found.

No regional population estimates are available for any of the cormorant species found in the oil-spill area. In 1996, the U.S. Fish and Wildlife Service Alaska Seabird Colony Catalog, however, listed counts of 7,161 pelagic cormorants, 8,967 red-faced cormorants, and 1,558 double-crested cormorants in the oil-spill area. These are direct counts at colonies, not overall population estimates, but they suggest that population sizes are small. In this context, it appears that injury to all three cormorant species was significant.

Counts on the outer Kenai Peninsula coast suggested that the direct mortality of cormorants due to oil resulted in fewer birds in this area in 1989 compared to 1986. In addition, there were statistically-significant declines in the estimated numbers of cormorants (all three species combined) in the oiled portion of Prince William Sound based on pre- and postspill boat surveys in July 1984-85 compared to 1989-91. It is not known what the counts and trends of cormorants would have been in the absence of the oil spill. **More recent surveys (through 2000) have not shown a significant increasing population trend since the oil spill, and for that reason these species are considered to be not recovering.**

Recovery Objective

Pelagic, red-faced, and double-crested cormorants will have started to recover when their populations show an increasing population trend in Prince William Sound.

CUTTHROAT TROUT

Injury and Recovery

Prince William Sound is at the northwestern limit of the range of cutthroat trout. Local cutthroat trout populations are believed to be small, and the fish have small home ranges and are geographically isolated. Cutthroat trout, therefore, are highly vulnerable to exploitation, habitat alteration, or pollution.

Following the oil spill, cutthroat trout in a small number of oiled index streams in Prince William Sound grew more slowly than in unoiled streams. The apparent difference in growth rates persisted through 1991. It was hypothesized that the slower rate of growth in oiled streams was the result of reduced food supplies or exposure to oil, and there was concern that reduced growth rates would result in reduced survival.

Preliminary data from a Trustee Council-sponsored study of resident and anadromous forms of cutthroat trout in Prince William Sound suggest that there is significant genetic variation among trout from different locations across the sound. These data are consistent with the idea that cutthroat populations are small and isolated. The report on this work is near completion. **Pending the completion and review of this additional work, the recovery status of the cutthroat trout remains unknown.**

Cutthroat trout have benefited from several other projects sponsored by the Trustee Council. In 1991-93, in response to the early evidence of injury to cutthroat trout, sport harvests were temporarily restricted in Prince William Sound. In 1994, out of concern about the long-term conservation status of this species, the Alaska Board of Fisheries permanently closed sport harvests during the April 15-June 15 spawning season in the sound. [WAITING FOR UPDATED CLOSURE INFORMATION FROM ADF&G.]

The Trustee Council sponsored inventories of streams in and around Prince William Sound to identify cutthroat trout habitat and the presence or absence of this species. Information from these inventories has been added to the Alaska Department of Fish and Game's Anadromous Waters Catalog, and this step brings to bear additional legal protection under state law in regard to actions affecting these streams. Additional habitat for cutthroat trout has been protected from among the more than 300 anadromous fish streams that have been acquired through the Trustee Council's habitat protection program.

Recovery Objective

Cutthroat trout will have recovered when growth rates within oiled areas are similar to those for unoiled areas, after taking into account geographic differences.

DESIGNATED WILDERNESS AREAS

Injury and Recovery

The oil spill delivered oil in varying quantities to the waters and tidelands adjoining eight areas designated as wilderness areas and wilderness study areas by Congress or the Alaska

State Legislature. Oil also was deposited above the mean high-tide line at these locations. During the intense clean-up seasons of 1989 and 1990, thousands of workers and hundreds of pieces of equipment were at work in the spill zone. This activity was an unprecedented imposition of people, noise, and activity on the area's undeveloped and normally sparsely occupied landscape. Although activity levels on these wilderness shores have returned to normal, at some locations there is still residual oil.

Among the affected areas were designated wilderness in the Katmai National Park, wilderness study areas in the Chugach National Forest and Kenai Fjords National Park, and Kachemak Bay Wilderness State Park. Six moderately to heavily oiled sites on the Kenai and Katmai coasts were last surveyed in 1994, at which time some oil mousse persisted in a remarkably unweathered state on boulder-armored beaches at five sites. These sites were visited again in 1999. The data from these sites indicate that there is still oil along Park shorelines on the Katmai coast. Surveys carried out in 2001 to determine the surface and subsurface distribution of oil in Prince William Sound found significant quantities of oil in shorelines within designated wilderness. The amount of oil in Prince William Sound has probably decreased since the early 1990s, and natural processes will probably lead to further reductions. **Therefore, designated wilderness is recovering but has not fully recovered from the oil spill.**

Recovery Objective

Designated wilderness areas will have recovered when oil is no longer encountered in them and the public perceives them to be recovered from the spill.

DOLLY VARDEN

Injury and Recovery

Dolly Varden are widely distributed in the spill area. In spring, anadromous forms of Dolly Varden migrate to the sea from the lakes and rivers where they spend the winter. Summers are spent feeding in nearshore marine waters. Thus, some Dolly Varden in Prince William Sound and perhaps at other locations were exposed to *Exxon Valdez* oil in 1989 and possibly beyond. In fact, concentrations of hydrocarbons in the bile of Dolly Varden were some of the highest of any fish sampled in 1989. By 1990, these concentrations had dropped substantially.

Like the cutthroat trout, there is evidence from 1989-90 that Dolly Varden in a small number of oiled index streams in Prince William Sound grew more slowly than in unoiled streams. It was hypothesized that the slower rate of growth in oiled streams was the result of reduced food supplies or exposure to oil, and there was concern that reduced growth rates would result in reduced survival. However, these growth differences did not persist into the 1990-91 winter. No growth data have been gathered since 1991.

In a 1991 restoration study sponsored by the Trustee Council, some tagged Dolly Varden moved considerable distances among streams within Prince William Sound, suggesting that mixing of overwintering stocks takes place during the summers in saltwater. This hypothesis

is supported by preliminary data from another Trustee Council-sponsored study, which indicates that Dolly Varden from different locations across the sound are genetically similar. The final report on this genetics study is due in 1999, but if this preliminary conclusion is born out, it would suggest that the Dolly Varden population in the sound should have little difficulty in recovering from any initial growth-related effects. **Pending completion of the genetics work and absent additional growth data, however, it is prudent to continue classifying the Dolly Varden as recovery unknown.**

The Trustee Council sponsored inventories of streams in and around Prince William Sound to identify Dolly Varden habitat and the presence or absence of this species. Information from these inventories has been added to the Alaska Department of Fish and Game's Anadromous Waters Catalog, and this step brings to bear additional legal protection under state law in regard to actions affecting these streams. Additional habitat for Dolly Varden has been protected from among the more than 300 anadromous fish streams that have been acquired through the Trustee Council's habitat protection program.

Recovery Objective

Dolly Varden will have recovered when growth rates within oiled streams are comparable to those in unoiled streams, after taking into account geographic differences.

HARLEQUIN DUCKS

Injury and Recovery

Harlequin ducks feed in intertidal and shallow subtidal habitats where most of the spilled oil was initially stranded. Oil remains in the subsurface of the intertidal zone through 2001, including under some mussel beds where harlequin ducks could be feeding. More than 200 harlequin ducks were found dead in 1989, mostly in Prince William Sound. Many more than that number probably died in the sound and perhaps thousands throughout the spill area. Because the spill occurred in early spring before wintering harlequins migrated from the sound to inland breeding sites, therefore the initial effects of the spill likely affected harlequin duck productivity beyond the immediate spill zone. The geographic extent and magnitude of these extended impacts are not known.

The current overwintering population of harlequin ducks in Prince William Sound is on the order of 18,000 ducks, while the summer population is about half that number. Surveys designed specifically to count harlequin ducks have been carried out in the fall, winter and spring in various years since the spill. Fall boat surveys to monitor molting-wintering harlequin ducks indicate a significant declining trend in the oiled western sound from 1995-1997, but no trend in the unoiled eastern sound. The spring harlequin duck surveys, carried out in 1997 and 2000 have only two years of data—too little on which to draw conclusions, but increases in all areas of the sound in 2000 are promising. Other boat surveys designed to monitor an entire suite of marine birds in the sound have shown mixed results: an increasing trend in March surveys in unoiled areas, no trend in oiled areas between 1997 and 2000, and an increasing trend in both oiled and unoiled areas in July of these same years.

Prespill data on harlequin populations and reproductive success are limited and difficult to interpret, but after the spill there was concern about poor reproductive success in the western versus eastern parts of Prince William Sound. This concern was based on observations of 7-15 broods in the eastern sound and few-to-no reports of broods in the western sound when comparable numbers of streams were surveyed. Subsequent research does not indicate any differences in the age- and sex-structure of harlequin populations in the eastern and western parts of the sound, but it is clear that the breeding habitat in the western sound is very limited compared to what is available in the eastern sound. Some harlequins remain in the sound to nest in the spring and summer, mostly on the eastern side, but it is now suspected that most harlequins of breeding age and condition probably leave the sound altogether to nest in interior drainages. Thus, conclusions of reproductive failure based on lack of broods in the oiled area do not now seem warranted.

Biopsies from harlequin ducks and from Barrow's goldeneye continue to show differences in an enzyme indicative of exposure to hydrocarbons between birds from oiled versus unoled parts of the sound. These differences are consistent with the possibility of continued exposure to spill-derived hydrocarbons in the western sound. The biological effect of this possible exposure has not been established, but three years of data (1995-98 winters) on overwintering survival of adult female harlequins indicate significantly lower survival rates in oiled versus unoled parts of the sound. This trend may be continuing. This result cannot be attributed unequivocally to oil exposure, but there is reason for concern about possible oil exposure and reduced survival for harlequin ducks in the western sound.

The population census trends, survival measures and indicators of exposure, taken together **suggest that the harlequin duck is recovering but has not fully recovered from the effects of the oil spill.**

Trustee Council-sponsored studies give insight into prospects for recovery of harlequin ducks. Although some harlequin ducks make major seasonal movements, they exhibit high site fidelity to summer breeding sites and to molting and wintering sites during nonbreeding seasons. Strong site fidelity may limit population recovery by immigration, but a genetic analysis of harlequin ducks indicates that the spill-area population is homogeneous (i.e., very similar throughout). Taken together, these data are consistent with a low rate of dispersal, perhaps at the subadult stage, or a rapid expansion of the population in recent geological time. To the extent that there is subadult dispersal from adjacent expanding populations, such dispersal would enhance recovery. It is likely, however, that recovery will largely depend on recruitment and survival from within injured populations. This recovery may be compromised if exposure to lingering hydrocarbons reduces fitness and survival of harlequin ducks.

The Trustee Council has made a major investment in harlequin ducks, studying the possibility of on-going oil-related effects, gaining knowledge that will benefit long-term management and conservation, and protecting nesting and overwintering habitats. Harlequin ducks nest along anadromous fish streams, typically under forest cover and at higher elevations. Some of the more than 300 anadromous fish streams protected with the support of the Trustee Council provide nesting habitat for harlequin ducks. Molting and overwintering habitats are protected along the more than 1,400 miles of marine shorelines acquired through the habitat protection program. As a result, the terrestrial portion of the habitat base for harlequin ducks in the spill area is now significantly more secure.

Recovery Objective

Harlequin ducks will have recovered when hydrocarbon exposure is similar between oiled and unoiled areas; when numbers are stable or increasing; and when demographic attributes are similar and densities return to prespill levels.

HARBOR SEALS

Injury and Recovery

Harbor seal numbers were declining in the Gulf of Alaska, including in Prince William Sound, before the oil spill. *Exxon Valdez* oil affected harbor seal habitats, including key haul-out areas and adjacent waters, in Prince William Sound and as far away as Tugidak Island, near Kodiak. Estimated mortality as a direct result of the oil spill was about 300 seals in oiled parts of Prince William Sound. Based on aerial surveys conducted at trend-count haulout sites in central Prince William Sound before (1988) and after (1989) the oil spill, seals in oiled areas declined by 43 percent, compared to 11 percent in unoiled areas.

In a declining population deaths exceed births, and harbor seals in both oiled and unoiled parts of Prince William Sound have continued to decline since the spill. It is not known what harbor seal populations would have been had the spill not occurred. **For the period 1989-1997, the average estimated annual rate of decline was about 4.6 percent. The population showed some signs of stabilizing in the 1990s, but surveys in 2000 and 2001 indicate that the decline is continuing. Therefore, harbor seals continue to be considered not recovering.**

Environmental changes in the late 1970s may have reduced the amount or quality of prey resources, including such forage fishes as Pacific herring and capelin, available to harbor seals in the northern Gulf of Alaska ecosystem. These changes may have been responsible for or contributed to the initial prespill harbor seal decline, and the ecosystem may now support fewer seals than it did prior to the late 1970s. Recent studies, however, indicate that the seals in the sound, especially pups and yearlings, are in very good condition and do not show evidence of nutritional stress. Ongoing sources of mortality include killer whale predation, possible shark predation, subsistence hunting, and commercial fishery interactions (e.g., drowning in nets). Satellite tagging studies sponsored by the Trustee Council and genetic studies carried out by the National Marine Fisheries Service indicate that harbor seals in the sound are largely resident throughout the year and have limited movement and interbreeding with other subpopulations in the northern Gulf of Alaska, suggesting that recovery must come largely through recruitment and survival within resident populations.

Harbor seals have been a major focus of research sponsored by the Trustee Council since the oil spill. This research includes documentation of population trends in the field, improved statistical techniques for the analysis of aerial survey data, and exploration of possible sources of mortality and lack of recovery in the population, including health and diet. One study quantified normal blood chemistry values for several hundred seals; this database serves as a valuable tool for evaluating the health status of other seals. Several

projects exploring blood chemistry and other health parameters in relation to diet also have been carried out.

Harbor seals have long been a key subsistence resource in the oil-spill area. Subsistence hunting is affected by the declining seal population, and fewer opportunities to hunt seals have changed the diets of subsistence users who traditionally relied on these marine mammals. With partial support from the Trustee Council, the Alaska Native Harbor Seal Commission is working to involve Native hunters in research on and management of harbor seals. Alaska Native subsistence hunters have been helpful by providing seal researchers with measurements and hard-to-obtain tissue samples from harvested seals.

Recovery Objective

Harbor seals will have recovered from the effects of the oil spill when their population is stable or increasing.

INTERTIDAL COMMUNITIES

Injury and Recovery

Portions of 1,400 miles of coastline were oiled by the spill in Prince William Sound, on the Kenai and Alaska peninsulas, and in the Kodiak Archipelago. Both the oil and intensive clean-up activities had significant impacts on the flora and fauna of the intertidal zone. Intertidal communities are intrinsically important and are resources for subsistence users, sea and river otters, and a variety of birds, including black oystercatchers, harlequin ducks, and pigeon guillemots.

Initial impacts to intertidal organisms occurred at all tidal levels and in all types of habitats throughout the oil-spill area. Many species of algae and invertebrates were less abundant at oiled sites than at unoiled reference sites. Some, more opportunistic species, including a small species of barnacle, oligochaete worms, and filamentous brown algae, colonized shores affected by the oil spill and clean-up activities. The abundance and reproductive potential of the common seaweed, *Fucus gardneri* (known as rockweed or popweed), also was reduced following the spill.

In the lower and middle intertidal zones on oiled rocky shores, algal coverage and invertebrate abundances had returned by 1991 to coverages and abundances similar to those observed in unoiled areas. However, large fluctuations in the algal coverage have taken place in the oiled areas since the spill. This pattern is consistent with continued instability due to the original spill impact and the subsequent cleanup, however instability of *Fucus* populations through the last 12 years probably results from a combination of spill- and naturally-induced changes, with a greater influence of natural events in the later years.

On the sheltered, bedrock shores that are common in Prince William Sound, full recovery of *Fucus* is crucial for the recovery of intertidal communities at these sites, since many invertebrate organisms depend on the cover provided by this seaweed. As of 1997 *Fucus* had not yet fully recovered in the upper intertidal zone on shores subjected to direct sunlight, but in many locations, recovery of intertidal communities had been substantial. In other habitat

types, such as estuaries and cobble beaches, many species did not show signs of recovery when they were last surveyed in 1991. In studies of the effects of cleanup activities on beaches, invertebrate molluscs and annelid worms on oiled and washed beaches were still much less abundant than on comparable unoiled beaches through 1997.

More recent data should soon be available, including results of a study in the summer of 2002 to determine if intertidal clam populations on oiled shorelines are comparable to those on unoiled shorelines. **Based on substantial progress, but the lack of full recovery of some soft-sediment intertidal invertebrates, as well as the role of oil in initiating *Fucus* population instability, the intertidal communities are considered to be recovering.**

Beyond describing the effects of the oil spill and cleanup operations, the Trustee Council's restoration program has benefited intertidal communities in several respects. Although most tidelands in the spill area are already in state ownership, Trustee Council funds enabled the protection of sedge and mudflat habitats on the Homer Spit and enhanced protection of and access to rocky intertidal habitats at Kachemak Bay and at Lowell Point near Seward. Research and monitoring sponsored by the Trustee Council have greatly expanded knowledge of the distribution and ecology of north Pacific intertidal organisms, such as sea stars, and have provided models for statistically powerful sampling designs that can be incorporated into future injury assessments.

Recovery Objective

Intertidal communities will have recovered when community composition on oiled shorelines is similar to that which would have prevailed in the absence of the spill. Indications of recovery are the reestablishment of important species, such as *Fucus* at sheltered rocky sites, the convergence in community composition and organism abundance on oiled and unoiled shorelines, and the provision of adequate, uncontaminated food supplies for top predators in intertidal and nearshore habitats.

KITTLITZ'S MURRELETS

Injury and Recovery

The Kittlitz's murrelet is found only in Alaska and portions of the Russian Far East. A large fraction of the world population, which may number only a few tens of thousands, breeds in Prince William Sound. The Kenai Peninsula coast and Kachemak Bay are also important concentration areas for this species. Very little is known about Kittlitz's murrelets, but they are known to associate closely with tidewater glaciers and nest on scree slopes and similar sites on the ground.

Seventy-two Kittlitz's murrelets were positively identified among the bird carcasses recovered after the oil spill. Nearly 450 more *Brachyramphus* murrelets were not identified to the species level, and it is reasonable to assume that some of these were Kittlitz's. In addition, many more murrelets probably were killed by the oil than were actually recovered. It is likely that about 500 individuals died as an acute effect of the oil spill, which would represent a substantial fraction of the world population.

Because so little is known about this species, the Trustee Council funded an exploratory study on the ecology and distribution of the Kittlitz's murrelet in Prince William Sound starting in 1996. This project found that this species has an affinity for tidewater glaciers in the northern and northwestern parts of the sound. It also appears that reproductive output in 1996 and 1997 was extremely low or absent, and some Kittlitz's murrelets were apparently paired with marbled murrelets. There appear to be about 1,200-1,400 Kittlitz's murrelets during summer in the four bays studied in northern and northwestern sound. Another, more extensive marine bird boat survey conducted in 2001 suggest a sound-wide summer population of about 2,500 murrelets. These estimates are consistent with what is believed to be a small Alaskan and world population.

The population data, indications of low reproductive success, and affinity to tidewater glaciers (of which the lower elevation glaciers are receding rapidly) are reasons for concern about the long-term conservation of Kittlitz's murrelets. **Specifically with reference to the effects of the oil spill, however, the original extent of the injury and its recovery status are still unknown and may never be resolved. Therefore this species is in the recovery unknown category.**

Recovery Objective

No recovery objective can be identified for Kittlitz's murrelet at this time.

KILLER WHALES

Injury and Recovery

More than 115 killer whales in eight "resident" pods regularly use Prince William Sound/Kenai Fjords as part of their ranges. Other whales in "transient" groups are observed in the sound less frequently. There has been particular concern about the resident AB pod, which numbered 36 animals prior to the spill. Fourteen whales disappeared from this pod in 1989 and 1990, during which time no young were recruited into the population. By 1993 the AB pod had increased to 26 individuals as births outpaced deaths. In 1995 mortalities, including animals orphaned in 1989-1990, reduced the pod to 22 whales. Since 1995 the pod again increased steadily in size to 26 individuals in 2001. While AB pod has not regained its prespill size of 36 individuals, **there has been sufficiently steady growth in the pod so that there is confidence that the restoration objective of increasing or stable size has been met. Therefore the killer whales are considered to have recovered from the spill.**

The original link between the AB pod losses and the oil spill was circumstantial. The rate of disappearance and likely mortality of killer whales in this well-studied pod in Prince William Sound following the spill far exceeded rates observed for other pods in British Columbia and Puget Sound over the last 30 years, or in the northern Gulf of Alaska over the last 18 years. In addition to the effects of the oil spill, there had been concern about the possible shooting of killer whales due to conflicts with long-line fisheries prior to the oil spill. This appears not to be an issue since no long-line fisheries had been carried out between the last enumeration of this pod in 1988 and the spill in the spring of 1989, after

which there were numerous missing whales. Although there are no recent indications of such conflicts, the effects from the conflicts in the 1980s may still be apparent.

Overall numbers within the major resident killer whale pods in Prince William Sound are at or exceed prespill levels, even though the AB pod may or may not regain its former size. There is concern, however, that a decline in resightings of individuals within the AT1 group of transient killer whales has accelerated following the oil spill. Since 1990 and 1991, 11 individuals have been missing from the AT group and are now almost certainly dead. During that same period there has been no recruitment of calves into this pod of transients. Transient killer whales largely prey on marine mammals, and there has been a 60 percent decline in the harbor seal population in the sound over the last two decades. Changes in the availability of such an important prey species could influence killer whale distribution and reproduction.

Trustee Council-sponsored research on contaminants in killer whales in Prince William Sound indicates that some transient whales, including the AT1 pod, are carrying high concentrations of PCBs, DDT, and DDT metabolites in their blubber. The presence of such contaminants is not related to the oil spill. Contaminants are significantly higher in the mammal-eating transients than in the fish-eating residents, consistent with the fact that contaminants bioaccumulate—that is, they are more concentrated at higher trophic levels. Concentrations are highest in first-born calves, indicating that contaminants are passed on by nursing females. The high concentrations of contaminants found in the transient whales, including those in the AT1 group, are comparable to those found to cause reproductive problems in other marine mammals, but there is no unequivocal evidence of a link between contaminants and poor reproduction in the AT1 group.

Other work sponsored by the Trustee Council includes a detailed genetic analysis that has shown definitively that resident and transient killer whales in Prince William Sound are genetically distinct. The Trustee Council also has sponsored development of acoustic techniques for identifying and monitoring killer whales. Data on sightings and movements of killer whales indicate that the area around Knight Island and passages to Knight Island are among the most heavily used parts of Prince William Sound by both resident and transient killer whales.

Recovery Objective

Killer whales in the AB pod will have recovered when the number of individuals in the pod is stable or increasing .

MARBLED MURRELETS

Injury and Recovery

The northern Gulf of Alaska, including Prince William Sound, is a key area of concentration in the distribution of marbled murrelets. The marbled murrelet is federally listed as a threatened species in Washington, Oregon, and California; it also is listed as threatened in British Columbia.

The marbled murrelet population in Prince William Sound had declined before the oil spill. The causes of the prespill decline are not known for certain, but environmental changes in the late 1970s probably reduced the availability or quality of prey resources. There is, nonetheless, clear evidence that oil caused injury to marbled murrelets in the sound. Carcasses of nearly 1,100 *Brachyramphus* murrelets were found after the spill, and about 90 percent of the murrelets that could be identified to the species level were marbled murrelets. Many more murrelets probably were killed by the oil than were found, perhaps as much as 7 percent of the spill area population.

The recovery of the marbled murrelet population in Prince William Sound is assessed primarily through standard marine bird boat-based surveys. As a result of boat surveys carried out in July for seven years from 1989-2000, densities of marbled murrelets decreased in both the oiled and unoiled areas of Prince William Sound. However, for the March surveys carried out in most years between 1990 and 2000, there have been no significant trends in the population size, although the counts have increased in both oiled and unoiled areas. The reason for the summer time declines in both oiled and unoiled areas is probably due to some factor other than the oil spill.

The Trustee Council's recovery objective requires a stable or increasing population for marbled murrelets; stable or increasing productivity would indicate that recovery is underway. The summer time marbled murrelet population is not stable nor increasing, but the March population is stable over time. Marbled murrelet productivity, as measured by surveys of adults and juveniles on the water in Prince William Sound, appears to be within normal bounds. **On these bases, it appears that the marbled murrelet is at least recovering from the effects of the oil spill, but clearly has not yet fully recovered.**

Marbled murrelets have been a major focus of the Trustee Council's restoration program, including both habitat protection and research and monitoring activities. Marbled murrelets are known to nest in large, mossy trees within stands of old-growth forest. Following the oil spill, Trustee Council researchers identified specific habitat types and areas within the spill zone that are especially valuable to nesting murrelets. Much of the 600,000 acres of habitat protected with Trustee Council funds is forested, including significant habitat that is suitable for and used by nesting murrelets (for example, on Afognak Island).

In the area of research and monitoring, the Trustee Council's Alaska Predator Ecosystem Experiment (APEX) project has investigated the relationship between marbled murrelet declines and the availability and abundance of forage fish, such as Pacific herring, sand lance, and capelin. It appears that there is a direct correlation between the availability of forage fish and production of young murrelets, based on the presence of juvenile murrelets on the water in Prince William Sound. Historical trawl data analyzed as part of this project supported a decision by the North Pacific Fishery Management Council to limit bycatch of forage fish in commercial fisheries and to preclude the startup of fisheries targeting forage fish (not including herring).

Recovery Objective

Marbled murrelets will have recovered when their populations are stable or increasing. Stable or increasing productivity will be an indication that recovery is underway.

MUSSELS

Injury and Recovery

Mussels are an important prey species in the nearshore ecosystem throughout the spill area and are locally important for subsistence. Beds of mussels provide physical stability and habitat for other organisms in the intertidal zone and were purposely left alone during *Exxon Valdez* cleanup operations.

In 1991, high concentrations of relatively unweathered oil were found in the mussels and in underlying byssal mats and sediments in certain dense mussel beds. The biological significance of oiled mussel beds is not known precisely, but they are potential pathways of oil contamination for bird and mammal populations, e.g., harlequin ducks, and sea otters, which include mussels and other prey in and around mussel beds in their diets. The Trustee Council's Nearshore Vertebrate Predator project has evidence of hydrocarbon exposure in sea otters, river otters, harlequin ducks, and Barrow's goldeneyes in oiled parts of Prince William Sound in 1996 and 1997. Again in 2000 both sea otters and harlequin ducks showed evidence of oil exposure, but the pathway of such exposure has not been established.

About 30 mussel beds in Prince William Sound still contained *Exxon Valdez* oil residue when last sampled in 1995. Twelve of these beds had been cleaned on an experimental basis in 1993 and 1994. In 1995, oil hydrocarbon concentrations in mussels at half the treated beds were lower than would have been expected if the beds had not been cleaned. In 1996, however, limited sampling indicated that several of the cleaned beds had been recontaminated from surrounding or underlying oil residue.

Mussel beds along the outer Kenai Peninsula coast, the Alaska Peninsula, and Kodiak Archipelago were surveyed for the presence of oil in 1992, 1993, and 1995. In 1995, hydrocarbon concentrations in mussels and sediments at these Gulf of Alaska sites were generally lower than for sites in Prince William Sound, but at some sites substantial concentrations persisted. While several sites in Prince William Sound still contained high concentrations of oil in 1995, over half the sites surveyed demonstrated significant natural declines that suggest background concentrations should be reached in the next few years. Oil contamination in mussels, however, will likely persist for many years at certain sites that are well protected from wave action or where oil penetrated deeply into underlying sediments.

The latest available data, taken in 1999, indicates that oil is still being accumulated in mussels, but more data will be available soon on samples taken in the summer of 2001. Since the latest available data indicates that oil remains in mussels, they are considered to be recovering from the oil spill, but not yet fully recovered.

Recovery Objective

Mussels will have recovered when concentrations of oil in the mussels reach background concentrations.

PACIFIC HERRING

Injury and Recovery

Pacific herring spawned in intertidal and subtidal habitats in Prince William Sound shortly after the oil spill. A significant portion of these spawning habitats, as well as herring staging areas in the sound, were contaminated by oil. Field studies conducted in 1989 and 1990 documented increased rates of egg mortality and larval deformities in oiled versus unoiled areas. Subsequent laboratory studies confirm that these effects can be caused by exposure to *Exxon Valdez* oil, but the significance of these injuries at a population level is not known.

The 1988 prespill year-class of Pacific herring was very strong in Prince William Sound, and, as a result, the estimated peak biomass of spawning adults in 1992 was very high. Despite the large spawning biomass in 1992, the population exhibited a density-dependent reduction in size of individuals, and in 1993 there was an unprecedented crash of the adult herring population. A viral disease and fungus may have been the immediate agents of mortality, but such other factors as competition for food may have reduced herring fitness and survival. Laboratory investigations since the population crash have shown that exposure to very low concentrations of *Exxon Valdez* oil can compromise the immune systems of adult herring and lead to expression of the viral disease. The extent to which the exposure to oil contributed to the 1993 disease outbreak is uncertain. There is also evidence that plankton production in the 1990s was less than in the 1980s, and so food limitation at the time of a peaking population may have contributed to the 1993 population crash.

Numbers of spawning herring in Prince William Sound remained depressed through the 1995 season. In 1997 and 1998 the spawning biomass was about double that of 1994, the season following the crash, and there were limited commercial harvests for herring in the sound. The increased biomasses in 1997 and 1998 were signs that recovery had begun. Unfortunately, in the last several years the recovery has stalled and the population has yet to recruit a highly successful year-class, which is fundamental to recovery of this species.

Thus, full recovery has not been achieved, and the Pacific herring can only be considered to be recovering. Because the Pacific herring is extremely important ecologically and commercially and for subsistence users, the Trustee Council has made a major investment in restoration projects that benefit herring. In the area of habitat protection, Trustee Council funds have acquired more than 1,400 miles of upland shorelines, some of which will help protect water quality in areas used by spawning herring. Research sponsored by the Trustee Council also has identified bays that are important as herring nursery and overwintering areas, and this information will be useful to natural resource managers for decisions about siting facilities or planning responses to future oil spills.

The Trustee Council's Sound Ecosystem Assessment has resulted in new understanding of the importance of body condition in determining overwintering survival of herring and in the influences of the Gulf of Alaska in herring productivity within Prince William Sound. Techniques for improving stock and spawning biomass assessments through spawn deposition surveys and hydroacoustic and aerial surveys also have been supported by the Trustee Council. Ongoing research on herring disease in relation to commercial fishing practices, such as the enclosed "pound" fisheries, have direct implications for management of the herring fishery. Improvements in knowledge about the biology and ecology of herring

and in assessment and management tools will enhance conservation and management of this species over the long term.

Recovery Objective

Pacific herring will have recovered when the next highly successful year class is recruited into the spawning population and when other indicators of population health are sustained within normal bounds in Prince William Sound.

PIGEON GUILLEMOTS

Injury and Recovery

Although pigeon guillemots are widely distributed in the north Pacific region, nowhere do they occur in large concentrations. Because guillemots feed in shallow, nearshore waters, the guillemots and the fish and invertebrates on which they prey are vulnerable to oil pollution.

Like the marbled murrelet, there is evidence that the pigeon guillemot population in Prince William Sound declined before the oil spill. The causes of the prespill decline are not known for certain, but environmental changes in the late 1970s probably reduced the availability or quality of prey resources. There is, nonetheless, clear evidence that oil caused injury to the guillemot population in the sound. An estimated 10-15 percent of the spill-area population died immediately following the spill. Boat-based surveys of marine birds before (1984-85) and after the oil spill indicated that the guillemot population declined throughout the oiled portion of the sound. It is not known what pigeon guillemot populations would be had the oil spill not occurred. These same boat surveys indicated that numbers of guillemots in the summer time remained depressed along both oiled and unoled shorelines in the sound through 2000. March surveys reveal no significant trends in abundance although the data appear to suggest a decline at this time of year as well. **For these reasons the pigeon guillemot is still considered to be not recovering from the effects of the oil spill.**

The Trustee Council's Alaska Predator Ecosystem Experiment (APEX) has investigated the possible link between pigeon guillemot declines and the availability of high-quality forage fish, such as Pacific herring and sand lance. This work has revealed a strong connection between the availability of certain prey fishes, especially sand lance, and guillemot chick growth rates, fledging weights, and nesting population size. Historical trawl data analyzed as part of this project supported a decision by the North Pacific Fishery Management Council to limit bycatch of forage fish in commercial fisheries and to preclude the startup of fisheries targeting forage fish (not including herring).

The APEX project and the Nearshore Vertebrate Predator (NVP) project, also sponsored by the Trustee Council, addressed the possibility that exposure to oil is limiting the guillemot's recovery. The biochemical data indicated that adult guillemots were experiencing greater hydrocarbon exposures in western Prince William Sound than in the eastern portion of the sound as recently as 1999. However, guillemot chicks which are restricted to the nest and are fed only fish are not being exposed to hydrocarbons.

Pigeon guillemots nest in rock crevices and under tree roots at the tops of rocky cliffs and steep slopes. They have benefited greatly from the habitat protection program, including the acquisition of more than 1,400 miles of marine shoreline. In addition, introduced foxes were eliminated from two of the Shumagin Islands (Simeonof and Chernabura) in the southwestern part of the spill area.

Recovery Objective

Pigeon guillemots will have recovered when their population is stable or increasing. Sustained productivity within normal bounds will be an indication that recovery is underway.

PINK SALMON

Injury and Recovery

Certain features of the life history of pink salmon made this species highly vulnerable to damage from the oil spill. As much as 75 percent of wild pink salmon in Prince William Sound spawn in the intertidal portions of streams, where embryos deposited in the gravel were chronically exposed to hydrocarbon contamination in the water column or leaching from oil deposits on adjacent beaches. When juvenile pink salmon migrate to saltwater they spend several weeks foraging for food in nearshore habitats. Thus, juvenile salmon entering seawater from both wild and hatchery sources could have been exposed to oil as they swam through oiled waters and fed along oiled beaches. Trustee Council-sponsored studies have documented two primary types of injury due to the exposure of these early life stages: First, growth rates in both wild and hatchery-reared juvenile pink salmon from oiled parts of the sound were reduced. Second, there was increased egg mortality in oiled versus unoled streams.

In the years preceding the spill, returns of wild pink salmon in Prince William Sound varied from a maximum of 23.5 million fish in 1984 to a minimum of 2.1 million in 1988. Since the spill, returns of wild pinks have varied from a high of about 12.7 million fish in 1990 to a low of about 1.9 million in 1992. In 2001 the return of wild stock fish was estimated to be 6.7 million fish. The decade preceding the oil spill was a time of very high productivity for pink salmon in the sound, and, given the tremendous natural variation in adult returns, it is impractical to measure directly the extent to which wild salmon returns since 1989 were influenced by the oil spill. Based on intensive studies, including mathematical models, carried out following the spill, wild adult pink salmon returns to the sound's Southwest District in 1991 and 1992 were most likely reduced by a total of 11 percent.

Reduced juvenile growth rates in Prince William Sound occurred only in the 1989 season, but higher egg mortality persisted in oiled compared to unoled streams through 1993. No statistically significant differences in egg mortalities in oiled and unoled streams were detected in 1994 through 1996, but in 1997 there was again a difference. It is not clear whether the 1997 difference was due to the effects of lingering weathered oil, perhaps newly exposed by storm-related disturbance of adjacent beaches, or due to other factors. Patches of

weathered oil still persist in or near intertidal spawning habitats in a few of the streams used by pink salmon in southwestern Prince William Sound. It is possible that patches of oil may be exposed as winter storms shift stream beds back and forth and result in local episodes of increased pink salmon egg mortality. The duration, scale, and number of any such events now would be very limited in comparison to the situation that existed in the southwestern sound in 1989-1993. Therefore, the biological impact of exposure to any such lingering oil is unlikely to limit pink salmon populations, assuming there are no drastic negative changes in the quality of freshwater habitats and ocean rearing conditions. In addition, measurements taken in a stream that had been oiled in 1989 showed concentrations of polynuclear aromatic hydrocarbons (PAH) that were only about 1 part per trillion, a level well below concern. It seems highly unlikely that oil is affecting pink salmon populations at the present time.

The Trustee Council's recovery objective in 1999 required a sequence of two years each of odd- and even-year runs without differences in egg mortality. This data is no longer gathered by the Department of Fish and Game. Therefore, a more usable recovery objective has been used that is based on hydrocarbon exposure of embryos. **It seems highly unlikely that oil is accumulating in pink salmon embryos and affecting pink salmon populations at present. Therefore, the pink salmon are considered recovered.**

The Trustee Council has made a major investment in studying the effects of the oil spill on pink salmon and in improving conservation and management of wild stocks in Prince William Sound. Studies on the effects of oil on pink salmon have led to new insights about how oil can affect salmon, especially in regard to the toxicity of even very small concentrations of weathered oil on early life stages. This information will be useful in evaluating water quality standards for oil in water and in contingency planning for future oil spills.

The Trustee Council has sponsored several projects directed at improved management of pink salmon. One of the most beneficial projects sponsored by the Trustee Council was development and implementation of a thermal mass marking project in Prince William Sound. This project, which is now being sustained by the Alaska Department of Fish and Game and the Prince William Sound Aquaculture Association, puts a unique mark on the otoliths (ear bone) of hatchery-reared fry released in the sound. Technicians can readily identify these fish when they are caught as returning adults. This information is used for in-season adjustments of harvests (times and areas) to better protect wild stocks and to more fully utilize hatchery stocks when doing so does not jeopardize wild stocks of pink salmon. Another project sponsored by the Trustee Council characterized the genetic stock structure of pink salmon in the sound. The results of this project will improve confidence that management actions are adequately protecting the genetic diversity of small wild stocks.

Throughout Alaska there is increasing recognition of the importance of changes in marine ecosystems on the growth and survival of salmon. The Sound Ecosystem Assessment (SEA) project explored oceanographic and ecological factors that influence production of pink salmon and Pacific herring in Prince William Sound. These factors include such things as the timing of spring plankton blooms and changes in circulation patterns that link the sound to the Gulf of Alaska. These natural factors are likely to have the greatest influence on year-to-year returns in both wild and hatchery stocks of pink salmon.

Pink salmon have been major beneficiaries of the Trustee Council's habitat protection program. The more than 600,000 acres of land protected through the Trustee Council

program include 300 streams with spawning and rearing habitat for salmon. Wild populations of pink salmon have been enhanced by creating or providing access to additional spawning habitat, such as the Port Dick spawning channel on the outer Kenai coast. This project is expected to result in production of additional pink salmon available for commercial harvest each year.

Recovery Objective

Pink salmon will have recovered when there is little or no evidence of ongoing oil exposure.

RIVER OTTERS

Injury and Recovery

River otters have a low population density in Prince William Sound. Twelve river otter carcasses were found following the spill, but the actual total mortality is not known. Studies conducted during 1989-91 identified several differences between river otters in oiled and unoled areas in Prince William Sound, including biochemical alterations, reduced diversity in prey species, reduced body size (length-weight), and increased home-range size. Because there were few prespill data, it is not certain that these differences are the result of the oil spill. Although some of the differences (e.g., in blood values) persisted through 1996, there were few differences documented in 1997 and 1998. **Thus, there are no indications of possible lingering injury from the oil spill, and the Trustee Council's recovery objective has been met.**

The Trustee Council's habitat protection program and research and monitoring projects have benefited spill-area river otters. More than 1,200 miles of marine shoreline and more than 280 streams used by anadromous fish streams have been protected; much of this area provides high-value habitat for river otters.

Through the Nearshore Vertebrate Predator project and other studies, much information has been gathered that will improve long-term conservation and management of river otters. These breakthroughs include development of a new method for live-trapping otters, which will improve the ability of wildlife managers to estimate population sizes for this elusive species, and new insights in the recycling of aquatic nutrients into forest ecosystems at otter latrine sites, which has important implications from a conservation standpoint. In addition, work in progress at the Alaska SeaLife Center on the blood chemistry of river otters in relation to small doses of oil will aid interpretation of biochemical tests for exposure from oil and other contaminants.

Recovery Objective

The river otter will have recovered when biochemical indices of hydrocarbon exposure or other stresses and indices of habitat use are similar between oiled and unoled areas of Prince William Sound, after taking into account any geographic differences.

ROCKFISH

Injury and Recovery

Very little is known about rockfish populations (of several species) in the northern Gulf of Alaska. A small number of dead adult rockfish was recovered following the oil spill, and autopsies of five specimens indicated that oil ingestion was the cause of death. Analysis of other rockfish showed exposure to hydrocarbons and probable sublethal effects. In addition, closures to salmon fisheries apparently had the effect of increasing fishing pressures on rockfish, which, in turn, may have adversely affected local rockfish populations. **However, the original extent of injury and the current recovery status of this species are unknown.**

Because little is known about rockfish abundance and species composition in the spill area and because rockfish are harvested commercially, even basic information about these species could provide a basis for improved management or, at least, the identification of priorities for more targeted research. Accordingly, starting in FY 1998, the Trustee Council sponsored a multi-year study of genetic stock structure in black, dusky, and yelloweye rockfish throughout the spill area and the adjacent Gulf of Alaska. The Alaska Department of Fish and Game study was not completed.

Recovery Objective

No recovery objective can be identified.

SEA OTTERS

Injury and Recovery

By the late 1800s, sea otters had been eliminated from most of their historical range in Alaska due to excessive harvesting by Russian and American fur traders. Surveys of sea otters in the 1970s and 1980s, however, indicated a healthy and expanding population in most of Alaska, including Prince William Sound. Today the only harvests of sea otters are for subsistence purposes.

About 1,000 sea otter carcasses were recovered following the spill, and additional animals probably died but were not recovered. In 1990 and 1991, higher-than-expected proportions of prime-age adult sea otters were found dead in western Prince William Sound, and there was evidence of higher mortality of recently weaned juveniles in oiled areas. By 1992-93, overwintering mortality rates for juveniles had decreased, but were still higher in oiled than in unoiled parts of the sound.

Based on both aerial and boat surveys conducted in western Prince William Sound, there is statistically significant evidence of a population increase following the oil spill (1993-98). Observations by local residents bear out this general increase. However, within the most

heavily oiled bays in the western sound, such as those on northern Knight Island, the aerial surveys indicate that recovery is not complete.

The Trustee Council's Nearshore Vertebrate Predator project addressed the lack of recovery in sea otters in the heavily oiled bays of western Prince William Sound. The lack of recovery may reflect the extended time required for population growth for a long-lived mammal with a low reproductive rate, but it also could reflect the effects of continuing exposure to hydrocarbons or a combination of both factors. Through 2000, researchers have continued to find biochemical evidence of oil exposure in sea otters on northern Knight Island. Biochemical samples from 2001 are now being analyzed. An additional hypothesis is that food supplies are limiting recovery, but the evidence does not fully support this idea.

It is clear that sea otter recovery is underway for much of the spill-area, with the exception of populations at the most heavily oiled bays in western Prince William Sound. For this reason, sea otters continue to be in the recovering category.

Researchers sponsored by the Trustee Council continue to explore hypotheses for lack of recovery in western Prince William Sound.

Sea otters have benefited from many aspects of the Trustee Council's program. Sea otters are found along many miles of the more than 1,400 miles of marine shoreline that has been protected through the habitat protection program. Results of research and monitoring projects have also been valuable. For example, an aerial survey protocol is now being used more widely to monitor sea otter populations, and an improved and validated technique for aging sea otters using their teeth will aid biologists and veterinarians wherever sea otters are found. Another example is new information on age-specific reproductive rates, which is crucial for understanding the effects of subsistence harvests on sea otters. These new techniques and insights will aid sea otter conservation and management over the long term.

Recovery Objective

Sea otters will have recovered when the population in oiled areas returns to its prespill abundance and distribution. An increasing population trend and normal reproduction and age structure in western Prince William Sound will indicate that recovery is underway.

SEDIMENTS

Injury and Recovery

Exxon Valdez oil penetrated deeply into cobble and boulder beaches that are common on shorelines throughout the spill area, especially in sheltered habitats. Cleaning and natural degradation removed much of the oil from the intertidal zone, but visually identifiable surface and subsurface oil persists at many locations.

A comprehensive survey of shorelines in Prince William Sound, was conducted in 1993, but that survey has been repeated in the summer of 2001 with revised methods for better quantifying the oil remaining in intertidal sediments. The surveys conducted in 2001 indicate that about 20 acres of continuously oiled intertidal habitat now persist in Prince William Sound. While it appears that natural weathering processes are gradually reducing the amount

of remaining oil in sediments, the amount estimated in 2001 is about twice the amount estimated to be in the sediments in 1993 using methods that were designed in 1989 more for clean up decisions than for quantitative estimates of remaining oil. The shorelines of the outer Kenai and Alaska Peninsula coasts get more wave action than most shorelines within Prince William Sound. These Gulf of Alaska sites tended to be contaminated with oil in the form of mousse, a stable emulsion of oil in water, which can persist for long periods in a largely unweathered state. Five of six index beaches on the gulf coast have a heavy boulder "armor," and were last visited in 1993 and 1994. At this time, surface and subsurface oil mousse persisted in a remarkably unweathered state in the armored beaches (more and later data from Gail Irvine on the AP?).

In 1995, a shoreline survey team visited 30 sites in the Kodiak Archipelago that had measurable or reported oiling in 1990 and 1991. The survey carried out in 1995 around Kodiak Island found no oil or only trace amounts, so oiling in the Kodiak area has not persisted as it has in the sound. Following the oil spill, chemical analyses of oil in subtidal sediments were conducted at a small number of index sites in Prince William Sound. At these sites, oil in subtidal sediments was mostly confined to the uppermost 20 meters water depths (below mean low tide), although elevated levels of hydrocarbon-degrading bacteria (associated with elevated hydrocarbons) were detected at depths of 40 and 100 meters in 1990 in Prince William Sound. By 1993, however, there was little evidence of *Exxon Valdez* oil and related elevated microbial activity at most index sites in Prince William Sound, except at those associated with sheltered beaches that were heavily oiled in 1989. These index sites—at Herring, Northwest, and Sleepy bays—are among the few sites at which substantial subtidal oiling is still known to occur.

Based on the information above, sediments are considered to be recovering.

However, the presence of surface and subsurface oil continues to compromise wilderness and recreational values, expose and potentially harm living organisms, and offend visitors and residents, especially those who engage in subsistence activities along still-oiled shorelines. Concern on the part of Chenega Bay residents has been particularly strong. In 1997, with support from the Trustee Council, a project was carried out to use a chemical surfactant and other means to remove additional crude oil from 10,000 m² of beach on LaTouche and Evans islands in southwestern Prince William Sound. This effort was a partly successful, but it was not possible to remove all of the oil.

Recovery Objective

Sediments will have recovered when there are no longer residues of *Exxon Valdez* oil on shorelines (both tidal and subtidal) in the oil-spill area. Declining oil residues and diminishing toxicity are indications that recovery is underway.

SOCKEYE SALMON

Injury and Recovery

Commercial salmon fishing was closed in Prince William Sound and in portions of Cook Inlet and near Kodiak in 1989 to avoid any possibility of contaminated salmon being sent to market. As a result, there were higher-than-desirable numbers (i.e., "overescapement") of spawning sockeye salmon entering the Kenai River and also Red and Akalura lakes on Kodiak Island. Research carried out following the spill demonstrated that initially these high escapements produced an overabundance of juvenile sockeye that then overgrazed the zooplankton, thus altering planktonic food webs in the nursery lakes. The result was lost sockeye production as shown by reduced growth rates during the freshwater part of the sockeye life history and declines in the returns of adults per spawning sockeye. Although sockeye freshwater growth tended to return to normal within two or three years following the overescapement, there are indications that these systems are less stable for several years after an initial overescapement event.

The negative effects of the 1989 overescapement on sockeye productivity, as measured by return per spawner, in the Kenai River watershed were readily apparent for returns from the brood years 1989-1992. Production of zooplankton in both Red and Akalura lakes on Kodiak Island has rebounded from the effects of the overescapement at the time of the oil spill. By 1997, Red Lake had responded favorably in terms of smolt and adult production and was at or near prespill production of adult sockeye. At Akalura Lake there were low juvenile growth rates in freshwater during the period 1989-92, and these years of low growth correspond to low adult escapements during the period 1994-97. Starting in 1993, however, the production of smolts per adult increased sharply and the smolt sizes and age composition suggested that rearing conditions have improved. There also was concern about overescapement effects in lakes on Afognak Island and on the Alaska Peninsula. However, analysis of sockeye freshwater growth rates of juveniles from Chignik Lake on the Alaska Peninsula did not identify any impacts associated with a 1989 overescapement event. **It is highly unlikely that the effects that reverberated from the overescapements in 1989 continue to affect sockeye salmon and this species is considered to be recovered from the effects of the oil spill.**

The Trustee Council has made a major investment in the restoration and management of sockeye salmon, especially in the Kenai River system. Research sponsored by the Trustee Council has documented not only the effects of overescapement events (as described above), but also the mechanism by which the effects are manifested in glacial-lake systems. This work is helping fisheries managers better monitor and predict annual changes in sockeye fisheries. With support from the Trustee Council, genetic stock identification and hydroacoustic stock assessment techniques were developed and are being employed to improve in-season management of the Cook Inlet sockeye fisheries.

Sockeye salmon have benefited greatly from the Trustee Council's habitat protection program throughout the spill area. These acquisitions include streambank, lakeside, and watershed habitats along the Kenai and Moose rivers on the Kenai Peninsula, the Eshamy-Jackpot Bay area of Prince William Sound, the Red and Fraser lakes area on Kodiak Island, and Laura and Pauls lakes on Afognak Island. In addition to habitat acquisition, the Trustee Council sponsored a project to stabilize and restore degraded streambanks on public lands along the Kenai and Russian rivers. This project restored spawning and rearing habitat important for salmon and enhance recreational fishing, which was a service injured by the oil spill.

Recovery Objective

Sockeye salmon in the Kenai River system and Red and Akalura lakes will have recovered when adult returns-per-spawner are within normal bounds.

SUBTIDAL COMMUNITIES

Injury and Recovery

Shallow subtidal habitats of Prince William Sound, from the lower intertidal zone to depths of about 20 meters, typically have dense stands of kelp or eelgrass and contain numerous polychaete worms, snails, clams, sea urchins, and other invertebrate life. These subtidal communities provide shelter and food for an array of nearshore fishes, birds, and marine mammals.

Oil that was transported down to subtidal habitats, as well as subsequent cleanup activities, apparently caused changes in the abundance and species composition of plant and animal populations below lower tides. Different habitats, emphasizing eelgrass beds and adjacent areas of soft sediment, were compared at oiled and unoiled sites from 1990-1995. It is difficult to draw firm conclusions from this study, because it is hard to distinguish between natural site differences (e.g., percent sand and mud) and those differences actually resulting from the oil spill or cleanup.

Concentrations of hydrocarbons in subtidal sediments were significantly higher at oiled sites than at unoiled reference sites. These concentrations dropped sharply by 1991, but evidence of oil contamination due to *Exxon Valdez* oil persisted at some locations through 1995 at very low concentrations.

Biologically, negative effects of the oil were most evident for oil-sensitive species of amphipods, which were consistently less abundant at oiled than at unoiled sites. Reduced numbers of eelgrass shoots and flowers may have been due to increased turbidity associated with cleanup activities (e.g., boat traffic). Two species of sea stars and helmet crabs also were less abundant at oiled sites. Some invertebrates living in the sediment, including species in eight families of polychaete worms, two families of snails, and one family of mussels, were greater in numbers at oiled sites. These species are more tolerant of oil exposure and may have also responded to the organic enrichment associated with oil. Some of the species that showed increased numbers also may have benefited from reduced competition or predation due to the effects of the spill.

By 1995, based on post-spill comparisons of oiled and unoiled sites, there was recovery of most constituents of the eelgrass community. Given that the remaining faunal differences may be due to the influence of natural factors and that it has been seven years of additional natural recovery since the last study of subtidal fauna, the intertidal communities are judged to be recovered.

Recovery Objective

Subtidal communities will have recovered when community composition in oiled areas, especially in association with eelgrass beds, is similar to that in unoiled areas or consistent with natural differences between sites such as proportions of mud and sand.

HUMAN SERVICES

COMMERCIAL FISHING

PASSIVE USE

RECREATION AND TOURISM

SUBSISTENCE

COMMERCIAL FISHING

Injury and Recovery

Commercial fishing is a service that was reduced through injury to commercial fish species (see individual resource accounts) and also through fishing closures. In 1989, closures affected fisheries in Prince William Sound, Cook Inlet, the outer Kenai coast, Kodiak, and Chignik. These closures harmed the livelihoods of persons who fish for a living.

Recovery is still not complete for Pacific herring, one of the injured resources that is commercially fished. The recovery status of rockfish is still unknown and will likely never be known. No spill-related district-wide fishery closures related to oil contamination have been in effect since 1989. However, the Prince William Sound herring fishery was closed 1993-96 due to a disease outbreak that may be related to the oil spill, was open to limited commercial harvest in 1997 and 1998, and has remained closed since then. **For these reasons, commercial fishing, as a lost or reduced service, is in the process of recovering from the effects of the oil spill, but full recovery has not been achieved.**

The period before the oil spill was a time of relative prosperity for many commercial fishermen. The years 1987-88 saw some of the highest ever per pound prices for salmon and increased capitalization of the fishery. Thus, fishermen's expectations for income in 1989 were very high, making the fishery closures and other spill effects even more disruptive.

For a variety of reasons, as discussed below, income disruptions continue today, as evidenced by changes in average earnings, ex-vessel prices, and limited entry permit values. For example, for the period 1981-2000, fishermen's average earnings in the Prince William Sound salmon seine fishery peaked in 1987 (\$176,500), dropped in 1989 by more than half, rebounded in 1990, hit a new low in 1992-93 (runs in 1992-93 were the lowest in 15 years), then hovered somewhat below the 1989 level until 1999-2000, when average earnings climbed to the \$130,000 level. Average per-fisher harvests have varied widely during this period, with the three highest years being 1996, 1999, and 2000. Ex-vessel prices were highest in the period 1987-90, and have been below prices of the early 1980's ever since. Limited entry permit prices in this fishery reached a peak in 1989-91, nearly double the price in any earlier year in this period, and have declined since to currently ten percent of their

peak price (from \$236,000 in 1989 to \$22,000 in 2000). The number of permits fished, roughly 250 each year 1981-91, had declined to 130 in 2000.

Natural variability in fish returns and a number of economic changes in the commercial fishing industry since 1989 probably mean that many of these changes in income are not directly attributable to the spill. However, these factors also make discerning spill-related impacts difficult. Economic changes confronting the industry include the increased world supply of salmon (due primarily to farmed salmonids) and corresponding reduced prices, entry restrictions in certain fisheries (such as Individual Fishing Quotas, IFQs, for halibut and sablefish), allocation changes (e.g., a reduction in the allocation of Cook Inlet sockeye salmon to commercial fishermen), changes in processing capacity (closure of major processors in Cordova and Kenai, and a recently announced closure in Larsen Bay on Kodiak Island), and new measures imposed by the North Pacific Fishery Management Council on offshore groundfish fishing to protect the declining number of Steller sea lions.

Although a number of studies aimed at allocating financial impacts to the oil spill versus other factors have been carried out, the federal jury's compensatory award (as opposed to the \$5 billion in punitive damages) in the private lawsuit against Exxon is the current legal determination of the liability and damages regarding commercial fishermen (including permit holders, fishing crew, spotter pilots, and vessel owners). The jury award was less than the damage claimed by commercial fishermen and more than that acknowledged by Exxon. In brief, the jury determined that any financial effects on fishermen after 1989, with the exception of the salmon seine fishery in Prince William Sound in 1992-93 and the herring fishery in Prince William Sound in 1993, are not attributable to the spill. The jury considered damage claims for the period 1989-95, including claims related to size of harvest, fish prices, limited entry permit values, and vessel values.

Trustee Council scientists have documented some continuing biological injury to Pacific herring (see individual resource accounts). This continuing injury, and the closure of the herring fishery in most years since the oil spill, has had a direct effect on commercial fishing.

The Trustee Council has invested and continues to invest in projects to understand and restore commercially important fish species that were injured by the oil spill. These projects include enhancement work, such as building structures in streams to increase habitat for coho salmon in Prince William Sound, increasing salmon production by reconstructing the fish ladder to pass pink and coho salmon at Little Waterfall Creek in the Kodiak area, and excavating Port Dick Creek on the Kenai Peninsula to reclaim spawning habitat for pink and chum salmon. Projects have also been funded to develop tools that have immediate benefit for fisheries management. Catch accounting tools such as otolith mass marking of pink salmon and improved herring biomass estimates aid management in Prince William Sound, as do in-season genetic stock identification and marine sonar surveys for sockeye salmon in Cook Inlet. In addition, the Council has funded research projects, such as the Sound Ecosystem Assessment and genetic mapping, which will enhance the ability to predict and manage fisheries over the long-term, and studies to determine how disease is affecting recovery of the herring population in Prince William Sound and what factors might trigger an outbreak.

In addition, the Trustee Council's habitat program has protected more than 643,600 acres important for restoration, including over 300 streams valuable for salmon spawning and rearing and 1,400 miles of coastline. Researchers in the Pacific Northwest have concluded

that depleted salmon populations cannot rebuild if any habitat that is critical during any of their life stages is seriously compromised. Sockeye salmon, too, have benefited from the Council's habitat program, which has protected streambank, lakeside, and watershed habitats on the Kenai Peninsula, in Prince William Sound, and on Kodiak and Afognak islands. The Council has also provided funds to stabilize and restore degraded streambanks along the Kenai and Russian rivers.

Recovery Objective

Commercial fishing will have recovered when the commercially important fish species have recovered and opportunities to catch these species are not lost or reduced because of the effects of the oil spill.

PASSIVE USE

Injury and Recovery

Passive use encompasses nonuse values, such as the appreciation of the aesthetic and intrinsic values of undisturbed areas and the value derived from simply knowing that a resource exists. Injuries to passive use are tied to public perceptions of injured resources. **Because recovery of a number of injured resources is incomplete and in some cases has not begun, the Trustee Council considers passive use, as a lost or reduced service, to be recovering from the spill but not fully recovered.**

Immediately following the oil spill, the State of Alaska, using a contingent valuation approach, measured substantial losses of passive use values resulting from the spill. This approach involved surveying a sample of U.S. households to elicit how much people would be willing to pay in additional taxes to fund a program designed to prevent future spills. Prior to answering the survey questions, respondents were provided information about the spill's impact, including the number of miles of shoreline oiled, an estimate of the number of birds, sea otters, and harbor seals killed, and the conclusion that few fish were harmed, as well as projections of when recovery would occur (typically three to five years).

In updating the status of passive uses, the Trustee Council has chosen not to repeat the contingent valuation study, which was very expensive and time consuming. However, the key to recovery of passive use is knowing that restoration of injured resources has occurred. Toward this end, in the years since the settlement between Exxon Corporation and the state and federal governments, the Council has undertaken a comprehensive program to restore injured resources and has made a deliberate and consistent effort to inform the public about the status of restoration.

The two key components of the Trustee Council's restoration effort are the research, monitoring, and general restoration program and the habitat protection and acquisition program. The research, monitoring, and general restoration program, which is funded each year through the annual work plan, focuses mostly on knowledge and stewardship as the best tools for long-term health of the marine ecosystem. It also includes development of tools to benefit fisheries management and some direct enhancement activities, such as improving

access to spawning habitat. Projects to monitor the status of injured resources, including resources such as killer whales for which no active restoration may be possible, have also been funded through the annual work plan. The habitat protection program preserves habitat important to injured resources through the acquisition of land or interests in land. As of March 2002, the Council has protected more than 643,600 acres of habitat, including more than 1,400 miles of coastline and over 300 streams valuable for salmon spawning and rearing. A summary of the Council's public information efforts follows.

The Trustee Council maintains a combined mailing/e-mail list of roughly 3,000 people and organizations, both inside and outside of Alaska, to whom it sends information updates; annual work plans, which describe the work underway in a particular year to restore the injured resources and services; the *Annual Status Report*, which reports to the public on the progress of restoration; updates to the Restoration Plan (1996, 1999); and notice of the Council's annual restoration workshop. The workshop, which provides another venue for reporting on the progress of restoration, is attended by all EVOS researchers and open to the news media and public.

In addition, from 1996 through early 1999 the Council aired a weekly radio series, "Alaska Coastal Currents", throughout the state. This two-minute program, produced by the Alaska Public Radio Network, was designed to communicate news of marine science and other restoration activities. The program was accompanied by a weekly newspaper column based on the radio series.

Since 1997, the Trustee Council has had a web site (www.oilspill.state.ak.us) that offers detailed information about restoration efforts. It provides information on the status of lingering oil, the final reports (in pdf format) of all completed EVOS projects, a map and description of each habitat parcel protected by the Council, and numerous bibliographic references on related topics as well as links to other relevant web sites.

The project final reports, which are peer reviewed by independent scientific peer reviewers, are also available to the public through the Alaska Resource Library and Information Services (ARLIS) in Anchorage as well as at several other libraries in the state, at the Library of Congress, and through NTIS (National Technical Information Service). ARLIS also houses books, videotapes, maps, and other materials related to the oil spill, a listing of which is available online at <http://www.arlis.org>. In addition, the Council supports researchers in publishing their project results in the peer-reviewed scientific literature, which expands their audience well beyond Alaska. More than 486 such papers have been published as of March 2002.

The Council has also published its Restoration Notebook series, which tells the story of injury and recovery from the spill of select injured species. Written by EVOS researchers, it is distributed free upon request, and is suitable for high school age and older.

The 17-member Public Advisory Group (PAG), which was established in the civil settlement between Exxon Corporation and the state and federal governments, is an important means of keeping stakeholders and others informed of the progress of restoration. In addition to holding quarterly meetings with the Trustee Council staff, in many years the PAG has held an open house in one or more communities in the spill area. Additional public meetings have been held throughout the spill area by the Council and its staff. All meetings of the Council are widely advertised and opportunity for public comment, often via the teleconference network, is always provided. In 1998-99, in preparation for the tenth anniversary of the spill,

the Trustee Council stepped up its efforts to inform the public about the status of restoration. A visual exhibit on restoration activities traveled to spill area communities. Another exhibit was put on display at the Alaska SeaLife Center in Seward. A 30-minute video was produced and aired on public television in Alaska and was distributed to every school in the state.

At the time of the tenth anniversary, major stories appeared in National Geographic Magazine, Alaska Geographic, Outside Magazine, Sports Afield and several other magazines. Several newspapers, including the Boston Globe, the Philadelphia Inquirer, and the Seattle Times, also published major stories. A source reel prepared by the Council and containing three hours of footage related to restoration activities was distributed to a number of media outlets (ABC, CBS, CNN, and others) and documentary filmmakers.

Recovery Objective

Passive uses will have recovered when people perceive that aesthetic and intrinsic values associated with the spill area are no longer diminished by the oil spill.

RECREATION AND TOURISM

Injury and Recovery

The oil spill disrupted use of the spill area for recreation and tourism. In the years since the spill, there has been a marked increase in the number of visitors to Alaska. Preliminary data for the summer of 2001 indicate over 1.2 million visitors, compared to approximately 600,000 visitors in the summer of 1989. Visitation to the spill area has experienced a similar increase. For example, since 1993 the annual number of visitors to the Kenai Fjords National Park Visitor Center has been nearly double what it was in 1988. In 2000, the number of visitors to the USFS Crooked Creek Visitor Information Center in Valdez was nearly 70 percent greater than in 1989. From 1989 to 1997, the number of sportfishers increased by 65% in Prince William Sound, by 25% in the Kodiak Region, and by 15% in the Kenai Peninsula region. [WAITING FOR ALLEN BINGHAM/ADF&G TO PROVIDE UPDATED FIGURES]

However, the Trustee Council's recovery objective requires that the injured resources important to recreation be recovered and recreational use of oiled beaches not be impaired, and this objective has not been met. **Therefore, the Council finds recreation to be recovering from the effects of the spill, but not fully recovered.**

Several resources important for wildlife viewing still are not recovering from the spill or their recovery is unknown, including harbor seal, common loon, cormorant (three species), Kittlitz's murrelet, and pigeon guillemot. Other resources, including sea otter and marbled murrelet, are recovering. The bald eagle, another resource important for wildlife viewing, has recovered from the effects of the spill. (See individual resource accounts for more information on recovery status.)

[THIS PARAGRAPH NOT YET UPDATED—HAVE CALLS OUT TO "KEY INFORMANTS".] Telephone interviews were conducted in early 1999 with key informants who recreated extensively in the oil spill area before the spill and currently. Nearly all of the

key informants with experience in Prince William Sound continued to report diminished wildlife sightings in the sound, particularly in heavily oiled areas such as around Knight Island. They reported seeing significantly fewer seabirds, killer whales, sea lions, seals, and sea otters since the spill, but also reported observing increases in the number of seabirds in the last couple of years. Key informants with experience along the outer Kenai coast also reported diminished sightings of seabirds, seals, and sea lions. Changes in the amount of wildlife observed could be due to the oil spill or to other factors.

Sportfishing resources for which the recovery status is unknown are cutthroat trout, Dolly Varden, and rockfish. In 1991-93, in response to evidence of injury to cutthroat trout, sport harvests were temporarily restricted in Prince William Sound. A closure during the April 15-June 15 spawning season in the sound has been in effect since 1994; this closure reflects concern about the long-term conservation status of cutthroat trout, rather than specific spill-related concerns. [WAITING FOR UPDATED INFO. ON SPORTHARVEST CLOSURES FROM ALLEN BINGHAM/ADF&G] The salmon species that were injured (pink and sockeye salmon) are recovered from the effects of the spill.

Harlequin ducks, which are hunted in the spill area, are still not recovered. The Alaska Board of Game restricted sport harvest of harlequin ducks in western Prince William Sound and Kenai Fjords in 1991. Those restrictions were removed in the 1999-2000 hunting season when sea duck limits were changed statewide to have different limits for resident and non-resident hunters. There are currently no special restrictions for harlequins in Prince William Sound or Kenai Fjords.

Trustee Council-sponsored surveys of oiled shorelines indicate that residual oil is still present on some beaches. The results of the most recent survey in Prince William Sound (2001) indicate approximately 20 acres of shoreline are still contaminated with oil. Oil was found at 58 percent of the 91 sites assessed and is estimated to have the linear equivalent of 5.8 kilometers of contaminated shoreline. The most recent survey of the Kenai outer coast and the coast of Katmai National Park (1999) found oil mousse persisting in a remarkably unweathered state on five moderately-to-heavily-oiled boulder-armored beaches (the oil is chemically similar to 11-day *Exxon Valdez* oil). A survey of 30 oiled sites in the Kodiak Archipelago in 1995 found no oil or only trace amounts. [THIS PARAGRAPH NOT YET UPDATED—HAVE CALLS OUT TO "KEY INFORMANTS".] Key informants telephoned in early 1999 indicated that some beaches in Prince William Sound, particularly in the western portion of the sound, continue to be avoided by some recreational users, particularly kayakers and campers, because of the presence of residual oil. In 1999, informants indicated that the possible presence of residual oil currently has no effect on recreational activities along the outer Kenai coast, the Kodiak Archipelago, and the Lake Clark and Katmai national park coastlines.

In 1997, the Trustee Council provided funding for the residents of Chenega Bay, working with the Department of Environmental Conservation, to use PES-51, a citrus-based chemical agent, to clean some of the most heavily-oiled sites near their village. One year later, a statistical analysis showed that the cleanup method reduced the amount of oil remaining on these beaches by a factor of three compared with reductions observed on untreated beaches. However, considerable subsurface oil remains that was inaccessible at the time of treatment, but was uncovered during storms the following winter. NOAA's Auke Bay Lab found no biological injury due to the cleanup.

Recreational users have benefited greatly from the Trustee Council's large parcel habitat acquisition program, which is opening more than 1,400 miles of shoreline and over 300 salmon streams to public use. Several smaller acquisitions have specific recreational significance, such as the Overlook Park tract near Homer and the Lowell Point parcel in Seward. In addition, in an effort to preserve the world-class fisheries on the Kenai River, the Council is in the process of protecting roughly 5,200 acres along the river and its watershed and has contributed roughly \$1.8 million to riverbank restoration projects.

Recreation was also affected by changes in human use in response to the spill. For example, displacement of use from oiled areas to unoiled areas, particularly in the years immediately following the spill, increased management problems and facility use in unoiled areas. The State of Alaska dedicated over \$10 million of its criminal settlement with Exxon to restoring recreational facilities and use in state parks in the spill area. Improvements include trails, cabins, boat launches, interpretive displays, and campsites. In addition, the Trustee Council has funded U.S. Forest Service development of a human use model for western Prince William Sound, which is intended to aid planning for and mitigation of human uses so that injured species continue to be protected. The model may also assist in planning for future recreation needs in the sound.

Recovery Objective

Recreation and tourism will have recovered, in large part, when the fish and wildlife resources on which they depend have recovered and recreation use of oiled beaches is no longer impaired.

SUBSISTENCE

Injury and Recovery

Fifteen predominantly Alaskan Native communities (with a total population of about 2,200 people) in the oil-spill area rely heavily on harvests of subsistence resources, such as fish, shellfish, seals, deer, and waterfowl. Many families in other communities also rely on the subsistence resources of the spill area.

Household interviews conducted with subsistence users in communities throughout the spill area in 1989 indicated that subsistence harvests of fish and wildlife in most of the communities declined substantially following the spill. Key factors in the reduced harvests included reduced availability of fish and wildlife, concern about possible health effects of eating oiled fish and wildlife, and disruption of the traditional lifestyle due to cleanup and related activities. Household interviews were repeated each year 1990-1993 and again in 1998. By 1993, the estimated size of the subsistence harvest and participation in subsistence activities appeared to have returned to prespill levels in some communities, with the harvest rebounding first in the communities of the Alaska Peninsula, Kodiak Island, and the lower Kenai Peninsula and lagging behind a year or more in the Prince William Sound communities.

In 1998, which is the most recent year in which household interviews were conducted, the interviews indicated that subsistence continues to recover from the effects of the oil spill, but has not fully recovered. The percentage of those interviewed who reported that subsistence uses are lower than before the spill has declined. Concerns about food safety and effects on the traditional lifestyle have lessened. Concerns about resource availability and greater harvest effort remain, but harvest levels in all communities interviewed are at or approaching prespill levels. Subsistence harvests in 1998 varied among communities from 250-500 pounds per person usable weight, indicating continued strong dependence on subsistence resources.

Regarding resource availability, subsistence users continued to report scarcity of a number of important subsistence resources, including harbor seals, herring, clams, and crab. These observations are generally consistent with scientific studies funded by the Trustee Council that continue to find that some subsistence species (e.g., harbor seals, Pacific herring, clams) are not recovered from the effects of the spill. The Council continues to support research projects that seek to understand why these resources are not recovering and what, if anything, can be done to speed their recovery (see individual resource accounts).

According to those interviewed, the 1998 increase in pounds harvested at a time of continued reduced resource availability reflects greater harvest effort (traveling farther, spending more time and money) than would have been required before the spill to achieve a similar harvest. It also reflects increased reliance on fish in the subsistence diet. For example, 1998 interviews in Chenega Bay indicated reductions in the per capita pounds harvested of marine mammals (from 140 pounds pre-spill to 15 pounds in 1998) and a corresponding increase in the per capita pounds harvested of salmon (from 70 pounds pre-spill to 225 pounds in 1998). In many communities, shellfish harvests have also declined significantly, for example in Nanwalek from 16 pounds pre-spill to 9 pounds in 1998. Increased fish harvests and decreased marine mammal and shellfish harvests occurred in most communities where interviews were conducted. The cultural and nutritional importance of each resource varies, and these changes in diet composition remain a serious concern to subsistence users.

The decline in shellfish consumption noted above reflects food safety concerns as well as reduced availability of shellfish. From 1989-94, subsistence foods were tested for evidence of hydrocarbon contamination, with no or very low concentrations of petroleum hydrocarbons found in most subsistence foods. However, because some shellfish can readily accumulate hydrocarbons, subsistence users have been advised not to eat shellfish from beaches where oil can be seen or smelled on the surface or subsurface. By 1998, a large majority of those interviewed expressed confidence about most foods except certain shellfish, such as clams, and concerns about the presence of PSP (paralytic shellfish poisoning) in clams outweighed concerns about lingering hydrocarbon contamination from the oil spill.

Interviews indicate that the increased fish consumption is attributable in part to enhancement projects funded by the Trustee Council, including a chinook remote release project near Chenega Bay, a coho remote release project near Tatitlek, stream enhancement efforts near Port Graham, and support of broodstock development at the Port Graham hatchery. In addition, the State of Alaska has used a portion of its funds from the criminal settlement with Exxon to sponsor a sockeye salmon enhancement project near Nanwalek. Under the Trustee Council's clam project, which was designed to restore clam populations

near subsistence communities in lower Cook Inlet and Prince William Sound, the conditions to successfully spawn Alaska littleneck clams in the hatchery and raise large numbers of clam larvae and young clams (seed) were defined. Large batches of clams have been raised in the hatchery and some of these have been placed on beaches near villages where subsistence users might harvest them in the future.

Subsistence users continue to emphasize that the value of subsistence cannot be measured in pounds alone. Harvest levels do not encompass the cultural value of traditional and customary use of natural resources. Following the oil spill, there was concern that the spill disrupted opportunities for young people to learn cultural subsistence practices and techniques, and that this knowledge may be lost to them in the future. In 1998, the number of subsistence users reporting a decline in the influence of elders in teaching subsistence skills and values had decreased and the number reporting that young adults are learning enough subsistence skills had increased. Also, the number reporting less sharing of subsistence resources, another integral aspect of subsistence culture, had decreased. However, many of those interviewed continue to express concern about these elements of the traditional lifestyle, with more than 50 percent responding that the traditional way of life has not recovered since the spill.

To promote restoration of subsistence services, the Trustee Council has sponsored two Elders/Youth Conferences and production of three documentary films designed to transmit local knowledge of subsistence to the scientific community, resource managers, and decision makers. In addition, the Council provided funds in 1993 for construction of the Alutiiq Archaeological Repository in Kodiak and in 1999 for an archaeological repository and local display facilities in the Prince William Sound/lower Cook Inlet region. The State of Alaska has used a portion of its Exxon criminal settlement funds for "spirit camps" in Prince William Sound and on Kodiak Island.

In the 1998 household interviews, a number of subsistence users commented that some of the current influences on subsistence may not be attributable to the oil spill. Factors such as demographic changes in village populations, ecosystem-wide changes such as ocean warming, increased competition for subsistence resources by other people (e.g., sport fishing charters) and predators (e.g., sea otters), and increased awareness of PSP and other contaminants may play a role in resource availability, food safety, and participation in traditional practices.

The Trustee Council will likely repeat the household interviews with subsistence users in communities through the spill area in 2004 or 2005.

Recovery Objective

Subsistence will have recovered when injured resources used for subsistence are healthy and productive and exist at prespill levels. In addition, there is recognition that people must be confident that the resources are safe to eat and that the cultural values provided by gathering, preparing, and sharing food need to be reintegrated into community life.