19.11.02 (9 of 12)

Resurrection Bay Contaminant Survey
Submitted Under the BAA

Project Number:	02 628 -BAA
Restoration Category:	Monitoring
Proposer:	Qutekcak Native Tribe
Lead Trustee Agency:	
Cooperating Agencies:	
Alaska SeaLife Center:	No
New or Continued:	New
Duration:	11 months
Cost FY 02:	$120.4
Cost FY 03:	$8.5
Geographic Area:	Resurrection Bay, Seward, Kenai Peninsula
Injured Resource/Service:	Subsistence, Recreation & Tourism

ABSTRACT

Qutekcak Native Tribe (QNT) would like to lead the way in protecting Resurrection Bay from pollution and misuse. Immediate sources of pollution in the bay include industry, fisheries, wastewater treatment discharge, leaky septic systems, boat harbor, coal terminal, and large ships such as barges, ferries, and cruise ships. QNT proposes to collect twenty ocean floor sediment samples from Resurrection Bay and analyze for contaminants including metals, coliform bacteria, pesticides, and other Persistent Organic Pollutants. The results of the analyses will be publicized via public meetings, reports, and a website.

INTRODUCTION

The Resurrection Bay Contaminant Survey would be a new project beginning in January, 2002 and ending November, 2002 Work done in FY02 will include hiring, preparation, sample collection, contaminant analysis, and data analysis The project will run into FY03 in order to complete the data analysis, maps, reports, website, and final meeting

NEED FOR THE PROJECT

A. Statement of Problem

Toxic chemicals have been discharged to coastal areas from a variety of sources for decades These chemicals include trace metals and organic contaminants, such as polychlorinated biphenyls (PCBs), pesticides, and polycyclic aromatic hydrocarbons (PAHs) The sediment layers become a record keeper of contaminants and reflect the industrial and waste disposal history of the region

Since the late 1980s, studies have found elevated levels of persistent organic pollutants (POPs) in many animals including sea otters, seals, walruses, killer whales, peregrine falcons, northern fur seals and bald eagles (*Federal Funds Will Pay for Contaminant Study*, by Associated Press, Appendix A) Blood sampling of Native Alaskans has also shown the presence of POPs This can be quite a surprise for natives living in rural areas with no industry or farming Many persistent organic pollutants such as PCBs and DDT are now banned in many countries However, they are still used in parts of the world POPs tend to migrate toward arctic regions and accumulate in the air, water, animals, and people (*Native Groups seek Arctic Toxin Study*, by Doug O'harra, Appendix A)

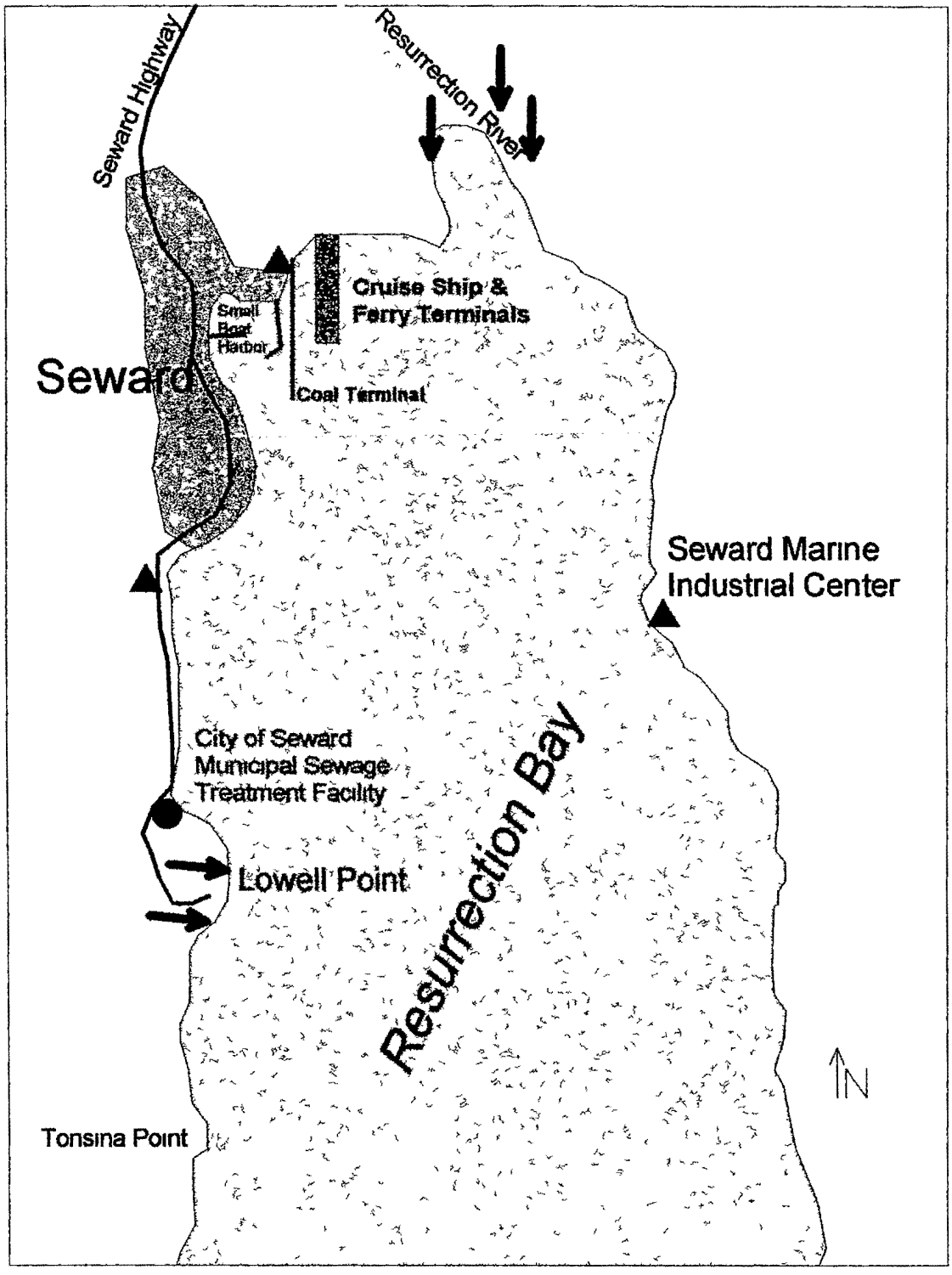
Cruise ships regularly dump sewage, gray water, ground-up or incinerated garbage, and oily bilge water into Alaskan waters legally Illegal dumping of waste oil and hazardous chemical from photo processing labs, dry cleaning operations and print shops has also been discovered While new regulations are in the works, and the cruise line industry is cooperating, there may already be long-term damage to the environment (*Bill Limits Cruise Ship Dumping*, by David Whitney, *Cruise Ship Tank New Tests*, by Paula Dobbyn, Appendix A)

Immediate sources of pollution in Resurrection Bay include industry, fisheries, wastewater treatment discharge, leaky septic systems, boat harbor, coal terminal, and large ships such as barges, ferries, and cruise ships (see figure 1, page 3)

B. Rationale/Link to Restoration

This sampling will provide important information that may answer questions about the health of the ecosystem, the decline in population of sea mammals, and the health of the native people who rely on the bay for food

Figure 1
Map of Resurrection Bay/Seward and Sources of Pollution



not to scale

▲ Location of Fisheries

→ Potential Sources of Residential Septic Tank Seapage

C. Location

The Resurrection Bay Contaminant Survey will most directly benefit the Qutekcak Tribal Members and residents of Seward Other residents of the Kenai Peninsula and Alaska may benefit as well since this project will give a good indication of what contaminants linger in the environment and affect the foods we eat

COMMUNITY INVOLVEMENT AND TRADITIONAL KNOWLEDGE

Tribal members will be informed of the project through newsletters and potluck dinners Their input and concerns will be incorporated, as appropriate, into the sampling procedure. Seward residents will be informed of the project through articles in the local paper and the project website

Several fishing boats owned by tribal members are available for contract for this project By using local natives, we will have an expertise of the bay conditions and may also learn information about what concerns he or she may have about the environment A sampling technician will be hired and will likely be a native tribal member

PROJECT DESIGN

A. Objectives

1 Collect and analyze sediment samples for evaluation of contaminants in Resurrection Bay
2 Increase awareness of tribal members and residents of the environmental quality of Resurrection Bay

B. Methods

This project is intended to be a screening process for contaminants of concern It will give a good indication of what contaminants are present and if they are present in quantities that may be problematic The expense of the laboratory analysis limits the number of sample sites to a quantity that may not be statistically significant, but nonetheless will be an excellent indication of whether or not there should be concern and if further investigation is warranted

The Project Leader and Sampling Technician will finalize the selection of sampling points These points will be based upon several factors listed below

Pollution Sources Most samples will be collected in proximity to known or suspected pollution sources

Baseline Points Several samples will be collected from areas where contamination is unlikely These samples will provide a baseline from which contaminated samples can be compared

Feasibility Sample locations will have to take into account feasibility Locations such as 10 feet away from a cruise ship, and samples in very deep water will be too risky or difficult to attain Tentative sampling sites are shown in Figure

2 on page 6 Sample locations may also be modified in the field to accommodate unforeseen problems with obtaining samples such as a rocky bottom

Samples collected will be analyzed for contaminants listed on page 7

Tribal members and the public will be able to find out about this project by newsletter articles, newspaper articles, meetings, and reports QNT has a monthly newsletter that is distributed to all tribal members and interested persons Regular articles will be published tracking the progress of the project The Seward-Phoenix Log is a weekly newspaper serving the Seward area This project will be high profile and will likely have articles written by newspaper staff and/or contributed by the PL or ST QNT has quarterly potluck dinners that are well attended and are a great place to distribute information, gather feedback and answer questions There will also be an end of project meeting for the tribe and community At this meeting will be a presentation of the results of this project and what steps will be taken as a result of the out come

A website will be created as an in-kind service The website will include maps, reports, and data that can be downloaded and used by scientists, natives, students, and residents for research or their own use (Letter of Commitment in Appendix D)

QNT also proposes to send the results of this project to regulatory agencies and environmental action groups If problems exist we will work with all interested parties to try to come up with solutions to benefit the Tribe, the residents of Seward, and all Alaskans

C. Cooperating Agencies, Contracts, and Other Agency Assistance

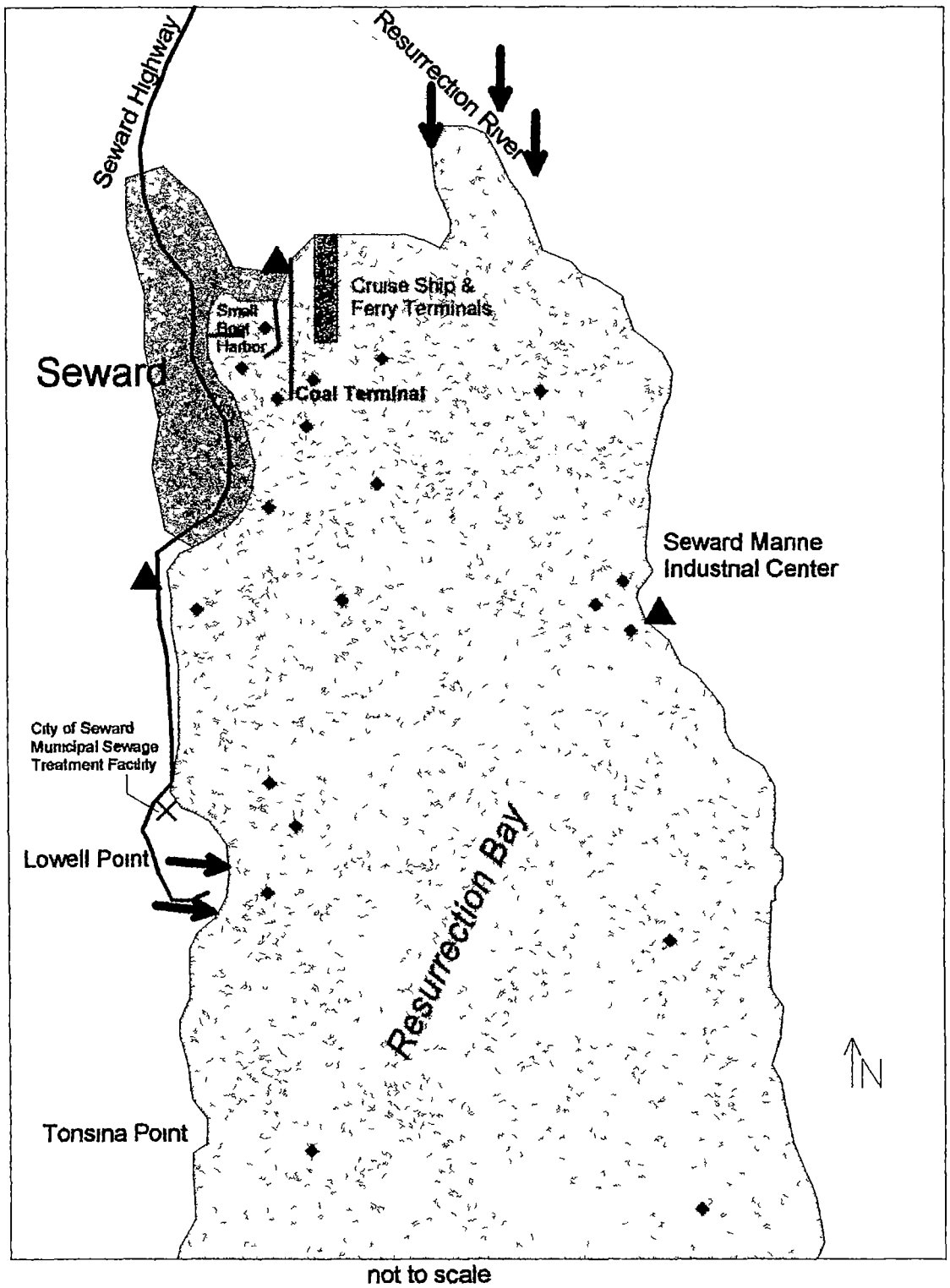
not applicable

SCHEDULE

A. Measurable Project Tasks for FY 02 (October 1, 2001 – September 30, 2002)

FY02	
Jan-Feb 2002	Hire Sampling Technician
Feb-Apr 2002	Plan Sampling & Develop Sampling Protocol, Post info on website
Mar-Apr 2002	Purchase Supplies, Contract Boat, Contract Lab
May-July 2002	Collect Samples & deliver to lab for analysis
Aug-Sept 2002	Compile & Analyze Data, update website
FY03	
Sept-Oct 2002	Prepare maps and final report, update website
Nov 2002	Hold community meeting for dissemination of materials and final report

Figure 2
Tentative Sampling Locations



▲ Location of Fisheries

→ Potential Sources of Residential Septic Tank Seapage

◆ Tentative Sampling Location

Contaminants of Concern

Symbol/ Abbreviation	Analyte Name	Probable Source
Ag	Silver	Run-off from Industrial Areas Waste-water Discharge Storm Run-off Illegal Dumping
Al	Aluminum	
As	Arsenic	
Be	Beryllium	
Cu	Copper	
Cr	Chromium	
Cd	Cadmium	
Fe	Iron	
Hg	Mercury	
K	Potassium	
Mg	Magnesium	
Mn	Manganese	
Mo	Molybdenum	
Na	Sodium	
Ni	Nickel	
P	Phosphorous	
Pb	Lead	
Sb	Antimony	
Se	Selenium	
Sn	Tin	
Sr	Strontium	
Ti	Titanium	
V	Vanadium	
Zn	Zinc	
NH4	Ammonia	fisheries
coliform	Total Coliform	residential septic tank leakage
Oil & Grease		harbors, boats, natural oil seeps, pipeline leaks
Total PHC	Total Petroleum Hydrocarbons	Residual oil from Exxon Oil Spill Natural petroleum seeps Ballast/Bilge water from ships Storm run-off from roads
PAH	Polyaromatic Hydrocarbons	
N	Nitrate + Nitrite	
Cl	Free Chlorine Residual	Water & Sewage Treatment, Oil refining
pest	Organochlorine Pesticides	Local and Global use
Dioxin		pesticide still used in parts of the world
PCB	Total Polychlorinated biphenyls	Used in electrical transformers (not locally)
DDT	Trichlorodiphenyl dichloroethane	pesticide still used in some parts of the world
DDE	Dichlorodiphenyl dichloroethylene	DDT degradation product
DDD	Dichlorodiphenyl dichloroethane	DDT derivative of metabolite
furans		Pesticides still used in parts of the world migrating to polar regions
toxiphene		
heptachlor		

B. Project Milestone and Endpoints

1 Prepare to sample
   - Completed when personnel hired, boat & lab contracted, equipment purchased, sampling protocol created
   - Expected date of completion for this milestone April 2002
2 Collect Samples
   - Completed when all samples have been successfully completed and delivered to the laboratory within appropriate time
   - Expected date of completion for this milestone July 2002
3 Final Reports, Disseminate information to public
   - Completed when data has been analyzed, maps created, reports finished, website updated, public meetings held

C. Completion Date

The final reports and meetings will be held in November 2002

PUBLICATIONS AND REPORTS

All resulting data and information will be compiled into an end report. This report will be available for public use The information will also be published on the internet on the project's website All information would also be available for news agencies, state & federal regulatory bodies, environmental action groups, etc

PROFESSIONAL CONFERENCES

The Project Leader will attend the National Tribal Environmental Council meeting in the Spring of 2002 Since the project will not yet be started at this time, the participation will be limited However, if the funders of this project would rather the travel to this meeting be done in 2003, a presentation could be prepared The location of this meeting for 2002 and 2003 is yet unknown

COORDINATION AND INTEGRATION OF RESTORATION EFFORT

The Resurrection Bay Contaminant Survey will be a high profile project in the community of Seward and possibly throughout Alaska The finding of significant levels of contaminants will heighten awareness of conservation and pollution reduction The finding of little contaminants will provide the tribal members, Seward residents, and others a newfound optimism in the health of the bay and the foods that come from it

The community and native involvement in this project will bring a better understanding and respect for the scientific community's and EVOS Trustee Council's mission to enhance subsistence, monitor pollution, and increase involvement of the tribes and residents of the affected areas

PROPOSED PRINCIPLE INVESTIGATOR

Name: Paula Homan
Affiliation Environmental Liaison/EVOS Community Facilitator for Qutekcak Native Tribe
Mailing Address P O Box 1467, Seward, AK 99664
Phone Number (907) 224-3571
Fax Number (907) 224-5874
Email Address homan@ptialaska.net
resume in Appendix B

OTHER KEY PERSONNEL

Sampling Technician Native Hire
This position will assist the Project Leader in planning and executing sampling
This position will likely be a native hire or tribal member

Tribal Administrator Jeanne Galvano
This position works under the direction of the Qutekcak Native Tribe and will coordinate fiscal management, grant administration, data documentation and report preparation

Hatchery Director Ron Long
This position will provide support in any or all activities

LITERATURE CITED

Articles included in Appendix A

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

Budget Category:	Authorized FY 2001	Proposed FY 2002	LONG RANGE FUNDING REQUIREMENTS					
Personnel		$37.2						
Travel		$6.0						
Contractual		$50.4						
Commodities		$3.6						
Equipment		$12.2						
Subtotal	$0.0	$109.4	Estimated FY 2003					
Indirect		$11.0						
Project Total	$0.0	$120.4	$8.5					
Full-time Equivalents (FTE)		0.9						
	Dollar amounts are shown in thousands of dollars.							
Other Resources		$4.5						

Comments:
FY03 amount will be for final report, maps, meeting, and, if necessary, long-term storage of samples.

Indirect Cost covers fringe benefits, Tribal Counil oversite, insurance, office space, supplies, and equipment.

Other Resources: $2.5 In-kind contribution of website. $2.0 discount from laboratory. Letters of commitment in Appendix C

FY02

Prepared: April 10, 2001

Project Number: 02628-BAA
Project Title: Resurrection Bay Contaminant Survey
Name: Qutekcak Native Tribe

FORM 4A
Non-Trustee
SUMMARY

FY 02 *EXXON VALDEZ* TRUS COUNCIL PROJECT BUDGET
October 1 2001 - September 30 2002

Personnel Costs			Months Budgeted	Monthly Costs	Overtime	Proposed FY 2002
Name	Position Description					
P Homan	Project Leader/Principal Investigator		6 0	3 8	0 0	22 8
						0 0
vacant	Sampling Technician		4 0	2 6	0 0	10 4
						0 0
J Galvano	Tribal Administrator		0 6	4 0	0 0	2 4
						0 0
R Long	Hatchery Director		0 4	4 0		1 6
						0 0
						0 0
						0 0
						0 0
						0 0
	Subtotal		11 0	14 4	0 0	
					Personnel Total	$37 2

Travel Costs	Ticket Price	Round Trips	Total Days	Daily Per Diem	Proposed FY 2002
Description					
Seward to Anchorage for Meetings & Training			8	0 2	1 6
					0 0
Seward to Anchorage for Sample Delivery			6	0 2	1 2
					0 0
Seward to National Tribal Environmental Council (location yet unkown)	2 5	1	7	0 1	3 2
					0 0
					0 0
*Since there is no place to include mileage it has been included under per diem					0 0
					0 0
					0 0
					0 0
					0 0
				Travel Total	$6 0

FY02

Prepared April 10, 2001

Project Number 02__
Project Title Resurrection Bay Contaminant Survey
Name Qutekcak Native Tribe

FORM 4B
Personnel
& Travel
DETAIL

Contractual Costs Description	Proposed FY 2002
Boat Contract	11 0
Lab Contract - Analytica Laboratory in Anchorage will perform analysis on 20 samples for the contaminants listed on page 7 Quote is in Appendix C	39 4
Contractual Total	$50 4

Commodities Costs Description	Proposed FY 2002
Personal Protection Equipment - gloves coveralls rainsuits	0 5
Heavy Duty Cable	0 4
Temperature/pH Meter	0 5
Miscellaneous - deionized water duct tape buckets log books	2 2
Commodities Total	$3 6

FY02

Prepared April 10 2001

Project Number 02__
Project Title Resurrection Bay Contaminant Survey
Name Qutekcak Native Tribe

FORM 4B
Contractual & Commoditi es

FY 02 *EXXON VALDEZ* TRUS COUNCIL PROJECT BUDGET
October 1 2001 tember 30 2002

New Equipment Purchases Description	Number of Units	Unit Price	Proposed FY 2002
			0 0
			0 0
Gravity-Type Messenger Activated Core Sampler	2	5 0	10 0
Wench	1	0 5	0 5
Global Positioning System	1	0 7	0 7
Computer Programs for Mapping	2	0 5	1 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	$12 2

Existing Equipment Usage Description	Number of Units	

FY02

Prepared April 10 2001

Project Number 02__
Project Title Resurrection Bay Contaminant Survey
Name Qutekcak Native Tribe

FORM 4B
Equipment
DETAIL

Appendix A

Supporting Articles

Federal funds will pay for contaminant study

The Associated Press

(Published December 18, 2000)

Half a million dollars in federal money has been allocated so that Alaska tribes can work with state government to research contaminants

The Agency for Toxic Substances and Disease Registry recently received the money, spearheaded by Alaska Sen Ted Stevens, for the yearlong study

Researchers have met with several state, federal and Alaska Native organizations to begin determining what the focus of the study should be and whether it will be statewide or rurally centered

The Atlanta-based agency works closely with the Centers for Disease Control and Prevention Organized in 1985, the agency's main job is to identify communities where people have been exposed to hazardous substances in the environment and to recommend actions to protect them

Research in Alaska will look at possible contaminants in people, subsistence foods and the land, organizers said

Several studies in recent years have shown a growing concern over contaminants migrating northward Of greatest concern are persistent organic pollutants, which include DDTs, PCBs and dioxins

These toxins don't break down as quickly in the Arctic, according to a study conducted by state, federal and Native organizations that was released in September

As the contaminants flow in the air and water, they get into the food chain and are eventually eaten by fish, sea mammals and birds

The study showed that toxins are already affecting these foods Adak Island sea otters have DDT concentrations up to 36 times greater than sea otters in Southeast Alaska

In peregrine falcons along the Interior and Arctic regions, mercury was reported at high enough levels to be harmful to reproduction Studies have found elevated DDT levels in Aleutian bald eagles, PCBs and pesticides in beluga whale blubber, and persistent organic pollutants in Western-area Steller sea lions

When these foods are eaten by indigenous peoples, contaminants are transferred

The risk of contamination doesn't seem to be as great in adults as in their children, the study said Unborn children, infants and nursing babies receive toxins through their mothers

PESTICIDES MAY INHIBIT SALMON DEFENSES

The Associated Press

(Published August 2, 2000)

Seattle -- Low levels of pesticides can keep salmon from smelling properly, blocking their ability to detect predators, catch prey and return to their native streams, new research suggests

The research, done at the National Marine Fisheries Service, is scheduled for publication in the Canadian Journal of Fisheries and Aquatic Sciences in September It suggests that reducing or eliminating pesticides and other pollutants in fresh water may be an important factor in restoring salmon, said John Stein, director of the service's Environmental Conservation Division

"We need to be cognizant of the possible effect pesticides have," Stein said Tuesday

Salmon rely heavily on their sense of smell Pesticides can plug up their noses, Stein said

When a salmon's skin is punctured -- such as when one is eaten -- it releases a scent into water that alerts nearby salmon to the presence of danger The natural response of the other salmon is to freeze in the water and slowly sink until the danger passes, Stein said

But when salmon have been exposed to low levels of pesticides, which can be found in many Northwest waters, they do not respond that way They simply continue feeding, making them more likely to be killed by a predator, Stein said

Researchers compared the reactions of Pacific salmon exposed to diazinon with those not exposed Diazinon is commonly used in back yards and on farms to kill insects, and can reach streams when washed away by rain Levels of pesticide used in the tests were comparable to levels that the U S Geological Survey has routinely found in Western streams, Stein said

The Seattle-based researchers focused on salmon's antipredatory behavior, but the evidence also suggests pesticides could affect other survival instincts, Stein said The fish rely on their noses to feed, mate and possibly to find their way back to their native streams, where they spawn

The research was prompted by British studies of Atlantic salmon that showed four pesticides, including diazinon, impaired the fish's mating behavior, he said

One of the British researchers, Andrew Moore of the Centre for Environment, Fisheries and Aquaculture Science, presented findings at a meeting in Seattle this week He said that pesticides inhibit a male salmon's sense of smell, and thus its ability to detect that a female is ovulating and ready to reproduce

Environmental groups, including the Seattle-based Washington Toxics Coalition, have filed papers saying they intend to sue the federal Environmental Protection Agency unless it directly addresses the issue The EPA has 60 days to respond An agency spokesman declined to comment

Previously, officials determined safe levels of pesticides by seeing what concentration would kill the fish

"The EPA has not looked at the subtle effects of pesticide on salmon," Erika Shreder, staff scientist at the Toxics Coalition, told the Seattle Post-Intelligencer

But Heather Hansen, executive director of Washington Friends of Farms and Forests,

2 CRUISE LINES CITED BY EPA FOR FOULING AIR
FINES URGED FOR PRINCESS, NORWEGIAN

By Paul Queary
The Associated Press

(Published August 4, 2000)

Juneau -- Two cruise lines face fines for violating Alaska's clean-air laws last summer, the Environmental Protection Agency announced Thursday

The EPA recommended $110,000 in civil fines for Princess Cruises and a $55,000 penalty against Norwegian Cruise Line for violating smokestack emissions standards

"Polluting the very environment from which these companies profit is completely unacceptable to Alaskans," said Marcia Combes, director of the EPA's Alaska office

Similar complaints against Carnival Cruise Line, Holland America Line-Westours and Celebrity Cruises are in the works, said Steve Torok, the EPA's senior representative in Juneau

Cruise ships generate their own power while in port, and the smoke from their engines can be seen building up under the low clouds that often cover Southeast Alaska

The federal agency took over enforcement of the state's marine vessel emission standards last year after budget cuts forced the Department of Environmental Conservation to abandon its own monitoring program

Trained observers monitor smokestacks to measure opacity, or how difficult it is to see through the smoke In general, visible emissions from a ship cannot reduce visibility above the stack by more than 20 percent Ships are allowed to exceed those standards for brief periods while docked and for longer stretches when maneuvering in and out of port

The Sun Princess violated standards Aug 16 while docked in Seward, the EPA said Illegal smoke was spotted Sept 18 over the Dawn Princess, also in Seward

"It's regrettable that we had these instances," said Dean Brown, executive vice president of Los Angeles-based Princess Cruises "They're both really due to technical and operational issues that we're taking steps to resolve "

Brown said increases in smoke can be caused by generators and boilers starting up and by testing of equipment during maintenance Also, like many other cruise ship industry officials, Brown was dubious about the visual monitoring

"Unfortunately, the method is very technical and has a lot of requirements to it and is not precisely scientific," Brown said

The Norwegian Dynasty was cited for violations in Juneau on Aug 28

"Because it's pending litigation, it's our company policy not to comment," said Jorge Martinez, a spokesman for Miami-

based Norwegian Cruise Line

Both companies have 30 days to respond to the administrative complaints They

said people should not jump to conclusions Her group promotes the responsible use of pesticides

Native groups seek Arctic toxin study
Pollution rising in North's food chain

By Doug O'harra
Daily News Reporter

(Published October 13, 2000)

The list of chemicals reads like the keywords in some ecological nightmare PCB, DDT, HCH, dioxin, arsenic, cadmium

But these dangerous contaminants -- persistent organic pollutants and heavy metals -- aren't restricted to some ruined wasteland on another continent

Over the past decade, scientists working in many separate studies have documented their increasing presence in Alaska's air, water, wildlife and people They rarely appear in concentrations that directly threaten human health, and doctors say Alaskans should continue to eat wild foods

Yet the stubborn presence of these pollutants in the Arctic environment raises a catalog of unanswered questions about long-term effects

"These contaminants are coming here from thousands of miles away, and over time they are accumulating in the food chain," said Alaska Lt Gov Fran Ulmer "For people who consume these foods -- the seal and the whale and the birds and the fish -- we need to know more "

"The fact that we're finding any of these chemicals that aren't used in the Arctic in the Arctic is alarming," added Carl Hild, from the Institute for Circumpolar Health Studies at the University of Alaska "When we're finding them in tissues and umbilical cord blood, that's alarming "

Faced with evidence that these potentially toxic substances will continue to spread through the Arctic environment, a coalition of 12 government agencies and Native groups on Thursday called for a comprehensive U S program to track the pollutants, document their effects and figure out the risks

The program would coordinate research and monitoring, draw on traditional Native knowledge and observations, educate people on risks, and work with other Arctic nations to eliminate the chemicals' use

"An organized, systematic approach is needed," stated a report released Thursday by the Interior Department, the state Department of Environmental Conservation and 10 other agencies and organizations "As many other Arctic countries have done, the United States should establish a fully funded Arctic contaminants program "

"Something is happening in America's Arctic, and we need to find out what it is," added Lisa Guide, Interior deputy assistant secretary for policy management, speaking at a press conference in Washington, D C

Alaska Gov Tony Knowles on Wednesday announced a Cabinet-level team to study the report and come up with a plan of action this winter

"We have to determine what are the right questions to get us the right answers," said DEC commissioner Michelle Brown "We're in this for the long haul "

Among other actions, Knowles also said he would ask President Clinton to take a strong stand on an international treaty that would ban 12 of the most serious organic pollutants Final negotiations among 120 countries will take place in South Africa in December

On Thursday evening in Barrow, Ulmer presented the report and its recommendations to the Arctic Council, which comprises the countries that border the Arctic Ocean Next week, many of the report's authors plan to discuss the threat of contaminants in a panel discussion at the Alaska Federation of Natives convention in Anchorage

"I think that the state can play a leadership role in bringing groups together," Ulmer said "Right now, there are many different activities, but they're disconnected "

Still, Ulmer and Brown noted that ultimate solutions may lie outside Alaska, that Alaskans, in a sense, are "victims" of practices in other parts of the world

"The state can only do so much," Ulmer said "It isn't just a state problem It's a national problem, and it's an international problem "

The report climaxes a decade-long realization that wind and ocean currents have been transporting to Alaska PCBs, or polychlorinated biphenyls, the pesticide DDT, as well as dioxins, furans and chlordane

PCBs, a large family of chemicals used in electrical transformer oils, plastics and paints, have been banned in the United States since 1979, but they're still used in Asia Most uses of DDT in the United States were halted in 1972, but the insecticide is still used outside the country, especially in places battling outbreaks of malaria

Since the late 1980s, studies have found the elevated levels of the chemicals in wide range of animals sea otters, seals, walruses, killer whales, peregrine falcons, northern fur seals and bald eagles

"While we have a lot of research on what is happening to these animals, we don't know a lot about what happens to the people who are eating them," Brown said "We don't know what is happening at the end of the fork "

Still, experts say traditional food remains a healthful choice because tests have shown levels of pollutants to be very small

"I want people to understand that our Native communities are not going to stop eating traditional foods," said Patricia Cochran of the Alaska Native Science Commission "The foods feed not only the health of our bodies, but they feed the health of our spirits " Brown, the DEC commissioner, added "What we really have here is a blessing We have an early warning sign A lot of the world didn't have that "

Reporter Doug O'Harra can be reached at do'harra@adn com

Cruise ships tank new tests
Discharges exceed legal limits

By Paula Dobbyn
Daily News Reporter

(Published October 24, 2000)

A stew of heavy metals, fecal coliform and total suspended solids in excess of legal limits has turned up in the latest discharge samples taken from three cruise ships operating in Alaska waters, according to documents obtained Monday from the Alaska Department of Environmental Conservation

The fecal coliform count in one sample exceeded 2 4 million colonies per 100 milliliter sample, according to the DEC Federal law bars fecal coliform from being higher than 200 colonies in a sample that size, said Deena Henkins, DEC water quality chief Fecal coliform is a bacteria found in human waste

In addition, di-n-butylphthalate, a chemical often used in plastics manufacture, showed up in one ship's discharge in an amount almost three times higher than what the federal government considers safe, the documents indicate Because of its potentially lethal health and environmental effects, the U S Environmental Protection Agency ranks di-n-butylphthalate as a "priority pollutant "

The banned pesticide heptachlor was not detected in this latest round of sampling, although it did show up in three tests earlier this month, according to state environmental officials The names of the ships involved are withheld from the public

The wastewater of all 21 foreign-flagged cruise ships plying Alaska waters was tested this summer to see what it contains The cruise industry agreed to the tests voluntarily amid public concerns about how the increasing number and size of cruise ships might be affecting the environment

Of the 36 samples of sewage taken as of last week, not one fully complied with federal standards and more than 70 percent of sink and galley water -- also called gray water -- had levels of fecal coliform that far exceeded standards, wrote Gov Tony Knowles in a recent Los Angeles Times opinion column

"Current federal law is riddled with loopholes, and enforcement is poor, while states are denied the authority to monitor and enforce compliance The dirty secrets of cruise ships, most of which sail under flags of countries like Liberia and Panama for tax advantages, should not be allowed to hide behind international law," Knowles wrote The governor has asked cruise-ship companies to meet with him on Nov 13 to explain the test results and their plans to fix the problems

State officials say the test results point to a pattern that causes concern if not alarm The pattern indicates that cruise-ship wastewater contains high fecal coliform counts, combined with metals such as copper, lead and zinc, as well as the occasional priority pollutant such as di-n-butylphthalate

"It's similar to what we've seen before My bottom line is that I remain concerned, but it's too soon to draw conclusions Obviously we have a fecal coliform pattern and we're seeing metals in the water fairly consistently," said David Rogers, a DEC water-quality manager

Michael Crye, president of the International Council of Cruise Lines, said he had not yet seen the results so could not comment on them specifically But the Arlington, Va -based trade association supports enhanced analysis of cruise-ship discharges to get a better understanding of what they contain, Crye said ICCL has doubts about whether heptachlor was actually found, he said

The independent contractor hired by the state, the industry and federal government to carry out this summer's testing said he's also somewhat skeptical about whether the heptachlor results were accurate A Colorado laboratory analyzing the cruise-ship samples is rechecking its heptachlor results to see if anything could be awry, said David Eley, a former Coast Guard port captain in Juneau who now runs Cape Decision International Services, a consulting business

The tests have not turned up any evidence of photo-processing chemicals or dry-cleaning solvents, chemicals that Royal Caribbean Cruise Lines admitted to dumping in Southeast waters in 1994 and 1995 The company paid Alaska a $6 5 million fine last year

The Coast Guard, meanwhile, is awaiting the last batch of test results before issuing violation notices on several cruise ships that had malfunctioning sewage treatment systems this summer, said Rob Lorrigan, the federal agency's port captain in Juneau, on Monday After the first test results showed high fecal coliform levels, Coast Guard inspectors boarded five ships and found evidence of mechanical difficulties with the onboard sewage equipment

The five ships that will receive violation notices are the Ocean Princess, Ryndam, Norwegian Sky, Galaxy and Volendam, Lorrigan said

Oil leak tracked to hole in Cook Inlet pipeline
SHEEN Unocal divers find hole smaller than a quarter-inch in pipe

By Jon Little
Daily News Peninsula Bureau

(Published February 17, 2001)

Soldotna -- The source of a Cook Inlet oil leak, and the resulting week-long shutdown of Unocal's Dolly Varden production platform, was traced Thursday to a hole smaller than a quarter-inch in an undersea pipeline

Divers were able to pinpoint the hole, but ice floating in the Inlet made it unsafe for them to conduct further testing that would help Unocal figure out how to fix it, company spokeswoman Roxanne Sinz said

Until the line is fixed, Unocal will send crude oil through a natural gas line that leads to the platform, Sinz said It is a former oil line, so Unocal made the switch with minor modifications at either end, she said

Before the platform shut down for testing, it was pumping 3,800 barrels of oil a day, she said Oil was flowing through the alternate pipeline Thursday, but production was still ramping up

Sinz said she couldn't provide a cost estimate for the spill, but said it would run higher than the weeklong loss of oil revenues After this leak was discovered, Unocal sent crews to test six of its eight undersea pipelines and additional crews to the Dolly Varden platform, she said

The company will test its remaining two Inlet pipelines once the weather warms up, she said Testing is done by pumping lines full of seawater and gauging the pressure The last two lines run right up a beach, and the sea water would freeze in winter temperatures, she said

Officials at first thought a milky sheen that appeared near the platform on Feb 5 might have come from the natural gas pipeline that runs between the platform and the Trading Bay production facility on the west shore of the Inlet

But that line tested clean, and further tests indicated the platform's crude oil pipeline was losing pressure

Sinz has said the amount of oil believed lost is small, possibly 2 to 20 gallons

Most of Unocal's Cook Inlet pipelines were built in the 1960s The newest, connecting the Steelhead platform, was built in 1986 In 1999, a leak in a pipeline to the company's Dillon platform spilled about 460 gallons of oil and created a sheen 10 miles long

Reporter Jon Little can be reached at jlittle@adn com or at 907-260-5248

BIGGER CRUISE SHIPS MAY MEAN MORE TOURISTS

The Associated Press

(Published September 21, 2000)

Ketchikan -- Cruise ships may bring more passengers to Alaska next year as companies replace older ships with larger vessels, an industry official said

With two weeks left in the summer season, about 630,000 people visited Alaska this year by cruise ship, said John Hansen, president of the North West CruiseShip Association

Hansen told the Southeast Conference this week that most sailings were full and said he expects even more people to come next year as the major lines increase capacity by about 7 percent

The total number of ships won't change, Hansen told the gathering of local government officials from around Southeast Alaska, but bigger vessels will accommodate more people

Carnival Cruise Lines is replacing the aging Jubilee with the larger Carnival Spirit, Celebrity Cruise Lines is replacing the Galaxy with the Infinity and Royal Caribbean Cruise Line is introducing a third ship called the Radiance of the Seas, Hansen said

Meanwhile, Princess Cruises is taking the Sky Princess out of Alaska, leaving the company with only five ships operating in the state

Holland America Line is retiring the Nieuw Amsterdam and replacing her with a new ship called the Zaandam, while Radisson Seven Seas is replacing the Seven Seas Navigator with the larger Seven Seas Mariner this coming year

The Infinity and the Radiance of the Seas will both have gas turbine engines instead of the conventional diesel-burning engines, Hansen said The new engines are part of a gradual trend toward technology designed to ease the industry's occasionally troubled relationship with Southeast Alaska communities

The industry took a scathing attack from Gov Tony Knowles last week over results of wastewater sampling this summer Knowles called the results, which showed widespread violations of state and federal water quality, a disgrace

Hansen told his Southeast Conference audience that the cruise lines immediately began working with the Coast Guard and other agencies to find out if there problems with on-board treatment systems

And he said companies are researching and testing new technology to lessen water and air emissions

CRUISE LINE DENIES ILLEGAL DISCHARGES

By Paula Dobbyn
Daily News Reporter

(Published August 12, 2000)

An environmental group's allegation that the cruise ship Galaxy may have violated state water pollution standards is "dubious and unsubstantiated," according to Richard E Sasso, president of Celebrity Cruises Regardless, federal and state authorities will board the ship in Juneau on Sunday to inspect it

The Miami-based cruise company issued a statement Friday saying that after thoroughly reviewing the ship's logs it found no evidence that any violation took place on May 29 A company spokesman said interviews with the ship's crew also revealed that no illegal discharges occurred

A Haines organization, Campaign to Safeguard America's Waters, petitioned the Alaska attorney general this week to charge Celebrity Cruises and its parent company, Royal Caribbean, for discharging pollution into the water near Haines The group based the allegation on the testimony of a family that says it watched a frothy, white substance wash up on the shore in front of their house after the Galaxy made a turn in Lynn Canal and maneuvered into port Joey Jacobson, 16, took photographs of the discharge and turned them over to Gershon Cohen, a clean-water advocate who heads the environmental group

"Allegations of this sort, made in this public manner, do little to advance the important cause of environmentalism in Alaska, or to be fair to a company that has worked hard and invested heavily to protect that environment," Sasso said

The Coast Guard and the Alaska Department of Environmental Conservation will check the log books, interview the crew, talk to the Jacobson family and anyone else who may have witnessed the alleged incident, said Mike Conway, a DEC manager Coast Guard Capt Ed Page said it will be hard to prove an environmental crime took place without any discharge samples

It's imperative for people to report suspected pollution problems immediately and take samples if at all possible, said Conway

"The Coast Guard and the state will drop what they're doing and respond right away," he said

Reporter Paula Dobbyn can be reached at pdobbyn@adn com or 257-4317

REPORTING WATER POLLUTION

To file a report of suspected water pollution, contact the Coast Guard's National Response Center at 1-800-424-8802 In Southeast Alaska, reports can also be made to the Department of Environmental Conservation's response office at 1-907-465-5340 After business hours, call the Department of Public Safety's 24-hour hotline at 1-800-478-9300

DEC ACCUSES LINERS OF POLLUTION
CRUISE COMPANIES DENY THEIR SHIPS PUT OUT TOO MUCH SMOKE IN JUNEAU

By Paula Dobbyn
Daily News Reporter

(Published August 19, 2000)

Cruise ships illegally polluted Juneau's air on 15 occasions since mid-July, state environmental officials said Friday

The Alaska Department of Environmental Conservation issued violation notices to Princess Cruises, Norwegian Cruise Line, Holland America Line, Crystal Cruises, Celebrity Cruises and Carnival Cruise Lines The notices allege 11 ships owned by these companies emitted smoke in excess of what's allowed under state clean-air laws The companies have 30 days to respond and submit a plan for correcting the problems

The DEC will refer the matter to the attorney general for possible civil action after the cruise-ship season ends, according to the agency

Cruise-line officials expressed disappointment and noted that violation notices are not convictions One questioned the accuracy of the DEC smoke readings

The state action Friday comes amid increasing scrutiny of a rapidly expanding industry The number of cruise-ship passengers to Alaska has swelled from an estimated 237,000 in 1990 to an expected 632,000 this summer, with newer and larger ships on order

This month the federal Environmental Protection Agency recommended that Princess pay a $110,000 civil fine and Norwegian Cruise Line $55,000 for air-quality violations in Seward and Juneau last summer The agency likely will announce new air-quality violations against four cruise ships next week for incidents this summer, said EPA investigator John Pavitt on Friday He said he wouldn't name the ships before the agency issues the notices

The 15 violations were based on 81 visual examinations of cruise ship emissions so far this summer

"We do find some inconsistencies," said Eric Elvejord, spokesman for Holland America Elvejord said the cruise line would further examine its emissions logs and discuss the matter with the DEC, but it has already identified some aspects of the DEC readings that appear to conflict with information compiled by the ship He didn't provide specifics

"All I can say is it's regrettable that we have these alleged violations We'll compare our data to their data and go from there," said Joe Valenti, Crystal Cruises senior vice president

Unlike power plants, factories and other stationary sources of air pollution, cruise ships are not required to have air-quality permits so they don't have to monitor their emissions or maintain records, said DEC air permit manager John Kuterbach Many of the cruise lines do voluntarily They have cameras and meters inside the smokestacks that measure levels of carbon monoxide, nitrogen oxides, particulate matter and other substances entering the environment Some, including Holland America, have trained monitors in Juneau and Skagway that "read smoke "

Reading smoke -- or measuring opacity -- means a trained eye examines the smoke plumes coming out of a stack and estimates how much of the background landscape is obscured Under state standards, visibility may not be reduced by more than 20 percent except for brief periods while the ship is tied up at the dock, or for slightly longer periods while maneuvering

Some cruise lines have criticized the accuracy of opacity monitoring, and did so again Friday

"Based on our experiences in the past, reading smoke is a very subjective thing," said John Hansen, president of the Vancouver-based Northwest CruiseShip Association It can be influenced by weather, the time of day, the quality of the background against which the smoke is measured and other factors, Hansen said

"Our member lines have been working really hard to reduce the air emissions and opacity Our industry objective is no violations," Hansen said

Public complaints about air and water pollution from the large, foreign-flagged vessels have mounted in recent years, along with calls for increased government oversight

Kim Metcalfe-Helmar, a community activist pressing for tighter controls over the industry, was encouraged by Friday's action

"I'm glad they're doing something about it," she said

A cruise-ship working group, convened by the state last fall to address pollution issues, has resulted in some voluntary wastewater sampling and air quality monitoring this summer, largely paid for by the cruise-ship industry

The DEC's $250,000 smoke reading program began on July 11 and will continue for four more summers The money comes from a $6 5 million fine Miami-based Royal Caribbean Cruises Ltd paid last year for dumping toxic chemicals into the waters of Southeast in the mid-1990s and then lying about it to investigators

PRINCESS PLUGS PLAN TO CUT SHIPS' SMOKE
CRUISE LINERS WILL USE CITY POWER AT DOCKSIDE

By Paul Queary
The Associated Press

(Published September 29, 2000)

Juneau -- In another bid to repair the cruise ship industry's tattered public image in Alaska, Princess Cruises announced plans Thursday to plug ships into Juneau's power supply next year as a way to lessen the smoke that gathers in the capital city's skies during the busy tourist season

The massive ships run their engines in port to generate electricity, and the exhaust from the engines sometimes collects in a thick layer under Juneau's low-hanging clouds

Princess and five other lines were cited by the Alaska Department of Environmental Conservation for air quality violations this summer Cruise ships' air and water emissions have become a prominent issue in Alaska since high-profile dumping cases became public last year

"Juneau's unique in that with the topography there and the climate, you end up with this visible haze," said Dean Brown, executive vice president of Princess Cruises "The local people there are affected by it, and they don't like it

Brown said building the equipment necessary to connect with local power at its dock in Juneau will be a multimillion-dollar investment, though he declined to name a specific figure

"It's really going beyond anything required by law," Brown said

The power would come from the surplus generated by the Snettisham hydroelectric project south of Juneau, which normally generates far more power than the city uses

The proposed deal between Princess and Alaska Electric Light & Power allows the cruise line to buy surplus power at 4 6 cents per kilowatt-hour, said Peter Bibb, the utility's consumer affairs manager

Snettisham has a capacity of about 80 megawatts, and Juneau uses only about 45 megawatts during the summer Bibb estimated a cruise ship's consumption to be about 6 megawatts

Bibb said ships can produce their own power at about 3 cents per kilowatt-hour, a figure Brown agreed with

"At the rate they've quoted us, it will cost us more money to operate the ships with the shore power than if we were to generate the power ourselves," Brown said "It's potentially a couple of hundred thousand dollars a year "

At 4 6 cents per kilowatt hour, the cruise line would pay the utility about $276 an hour The money would result in a savings to local ratepayers, who would receive rebates, Brown and Bibb said

The proposal still must be approved by the Regulatory Commission of Alaska as well as the city of Juneau

The ships would not have access to power from AEL&P's backup generators when power from the dam isn't available, Bibb said Brown said the ships would rely on their own systems during outages

"This energy that we're selling them would otherwise go over the dam and it's lost," Bibb said

Bibb also cautioned that Princess might also lose access to the power if a dry year produced too little water from snow and rain to run Snettisham at capacity

A spokesman for Gov Tony Knowles expressed cautious approval Earlier this month Knowles called on cruise lines to use shore-side power, and he blasted them over wastewater sampling that showed widespread violations of water quality standards

"The governor is still looking forward to receiving a detailed report from the industry not only on their air emissions but also on the wastewater emissions," said Bob King, Knowles' press secretary "It's one company addressing one of the concerns about this industry "

Robert Reges, a Juneau lawyer who works with Cruise Control, a group concerned about the influence of the booming cruise ship industry, said cruise lines have rejected the idea in the past, saying that restarting engines would cause more pollution than running them while in port

"Have they done any calculations to see whether we're going to come out ahead or not?" Reges asked

Brown said ships typically start one of their engines when leaving anyway

can pay the fines or request a settlement conference If settlement talks fail, the cases would go to court Brown said Princess Cruises has not decided how to respond

The monitoring continues this year, Torok said

In June, smoke from four ships at the Juneau dock appeared to violate pollution limits, EPA inspector John Pavitt said Pavitt wouldn't name the ships because the data were still under review

Also, the state is conducting ambient air quality tests in downtown Juneau this year to measure the ships' effect

BILL LIMITS CRUISE SHIP DUMPING

By David Whitney
Daily News Reporter

(Published July 29, 2000)

Washington -- The Senate approved late Thursday an amendment to a Coast Guard bill that would fine cruise ships as much as $25,000 a day if they discharge untreated wastewater or hazardous chemicals anywhere within Alaska's Inside Passage

Under current law, it is legal for cruise ships to discharge untreated wastewater and chemicals as long as the vessels are in federal waters more than three miles offshore

The provision, sponsored by Alaska Sen Frank Murkowski, also tightens the federal regulations on the release of treated wastewater and "gray water" -- the drainage from sinks and showers

Current rules permit such water to be released at any time, even when the vessels are at port Under Murkowski's provision, such gray water can be released only if the vessel is underway and moving at least four knots

Violations of the new requirements would be a class D felony punishable by fines of up to $25,000 per violation Half that penalty could be paid to whistleblowers reporting the violations

"While we Alaskans always have welcomed the cruise industry and recognize its great importance to the local economy, there have been certain events in the recent past that have been less than welcome," Murkowski said

"We put more teeth into the enforcement provisions, and the Senate has gone along with the common-sense solution to make sure that cruise ships will do their part to protect Alaska's beauty and its environment," he said

Royal Caribbean Cruises Ltd pleaded guilty a year ago to seven felony crimes and paid $6 5 million in fines and restitution for dumping oily bilge water and other toxic chemicals at sea during Alaska cruises In 1998, the Dutch corporation that operates Holland America Line pleaded guilty to two felony counts of illegal dumping off Juneau in 1994 and agreed to pay $2 million in fines and restitution

Since those incidents, the cruise industry has said it has moved more modern vessels into the Alaska trade and taken steps to improve the handling of waste waters

Appendix B

Project Leader Résumé

Paula S. Homan

P.O. Box 2186, Seward, Alaska 99664 (907) 224-3571, cell 362-9069 homan@ptialaska.net

Education

B.S. GEOLOGY/GEOPHYSICS
UNIVERSITY OF MISSOURI-ROLLA
Graduated December 1992

Work Experience

QUTEKCAK NATIVE TRIBE, Seward, Alaska August 2000 - present
- Exxon Valdez Oil Spill Community Facilitator
- Environmental Liaison/Tribal Representative
- Water testing
- Grant Writing

pH ENVIRONMENTAL SERVICES, Seward, Alaska March 1999 - present
- Self employed
- Website Design
- Environmental Sampling
- Environmental Report Preparation

ADVANCIA CORPORATION, Lawton, Oklahoma January 1997 – March 1999
- Environmental Sampling – soil, groundwater, drinking water
- Technical Writing - Environmental Compliance
- Computer Mapping and Modeling Using AutoCAD Map R14, Surfer
- Data Collection and Management
- Development of brochures, presentations, reports

AUBURN UNIVERSITY, Auburn, Alabama March 1993 - June 1995
- Graduate Teaching Assistant
- Instructed and assisted students in introductory geology lab
- Prepared and graded assignments and tests
- Assessed grades and substituted for Professors

DOE RUN COMPANY, Viburnum, Missouri January - March 1993; June-Sept. 1992
- Created databases and computer programs used for mineral exploration
- Digitized maps and generated topographic maps using computers

U.S. GEOLOGICAL SURVEY, Rolla, Missouri March 1990 - June 1992
- Generated reports and maintained databases
- Data entry

Computer Experience

- Computer expertise with Microsoft programs such as Access, Excel, Powerpoint, Word, Internet
- AutoCAD Map Release 14, Surfer (contouring, mapping).
- Internet experience in research, email, FTP.
- Experienced with DOS, Windows, Mac, and Unix based operating systems.

Additional Training and Skills

- Hazardous Waste Operations & Emergency Response Certified (HAZWOPER 40 hour)
- Continuing Education Credits in Online Hazardous Waste Course, Microsoft Access Courses, and business writing.
- Graduate level courses include Ore Microscopy, Geochemistry, Geophysics, Structural Geology, Coal Technology, Remote Sensing.
- Geophysical experience with collection, downloading, and processing of gravity, resistivity, and conductivity data.

Appendix C

Letters of Commitment

CITY OF SEWARD
PO BOX 167
SEWARD ALASKA 99664-0167

- Main Office (907) 224-4050
- Police (907) 224-3338
- Harbor (907) 224-3138
- Fire (907) 224-3445
- Fax (907) 224-4038

February 22, 2001

Jeanne Galvano, Tribal Administrator
Qutekcak Native Tribe
P O Box 1467
Seward, AK 99664

Dear Ms Galvano,

The City of Seward supports the Qutekcak Native Tribe's proposed sediment sampling and research project for Resurrection Bay The community's economic base is strongly focused on a healthy natural environment Our fishing and tourism industries rely heavily on clean waters, free from pollution and misuse

To proactively insure a bright economic future, efforts to identify potential problems should be undertaken Should problems be identified, plans for remediation can be developed and implemented The ocean floor sediment sampling project will be an important first step in ensuring the continued environmental health of our region, and the long term health of our economy

Sincerely,
CITY OF SEWARD, ALASKA

W SCOTT JANKE
CITY MANAGER
907 224 4047
907 224 4038 fax
citymgr@seward net

pH Environmental Services
P O Box 2186
Seward, Alaska 99664
(907) 224-3571
homan@ptialaska net

Jeanne Galvano, Tribal Administrator
Qutekcak Native Tribe
P O Box 1467
Seward, AK 99664

Dear Jeanne

pH Environmental Services would like to offer its support of the Resurrection Bay Sediment Sampling Project by committing to create a website to publicize the data and results of this project

This commitment will include all labor required to design, compile, upload, maintain, and market a fully functioning website

Estimated value of these services is $2,500 00

Sincerely

Paula Homan

Paula Homan, owner

Quotation For Analytical Services

ANALYTICA

Analytica Alaska Incorporated
811 West 8th Avenue
Anchorage, AK 99501
(907) 258-2155
Fax (907) 258-6634

Quote #	**A01020016**	**Page**	Page 1 of 2
		Issue Date	2/22/01
Quoted By	Nancy Taylor	**Date Expected**	6/15/01
Project	**Qutekcak Resurrection Bay Research Project**	**Quote Expires**	11/1/01
		QC Level	3A
Client ID	006858	**EDD**	None
Company	PH Environmental Services	**Data Package**	ClientFinalReportADEC

Invoice To	Paula Homan	**Report to**	Paula Homan
Company	PH Environmental Services	**Company**	PH Environmental Services
Address	P O Box 2186 Seward, AK 99664	**Address**	P O Box 2186 Seward AK 99664
Phone	907-224-3571	**Phone**	907-224-3571
Fax	907-224-4085	**Fax**	907-224-4085
E-Mail	homan@ptialaska net	**E-Mail**	homan@ptialaska net

Test Package Group / Test Package	Description	Matrix	Turnaround (days)	# of Samples	Unit Price	Total Price
FRECL	Free Chlorine Residual	Aqueous	5	20	15 00	300 00
NH4_S	Ammonia as N (EPA 350 3 M)	Soil	10	20	18 00	360 00
IC Water Nitrate+Nitrite	Nitrate + Nitrite as N by IC (EPA 300 0)	Aqueous	10	20	20 00	400 00
otalP_S	Phosphorus, Total (EPA 365 2M)	Soil	10	20	28 00	560 00
ɔe_GT2	Selenium by GFAA, Total (EPA 270 2)	Aqueous	10	20	30 00	600 00
Hg_CTS	Mercury by CVAA, Total (SW 7471A)	Soil	10	20	38 00	760 00
TCMPN	Total Coliforms by MPN	Aqueous	2	20	57 00	1,140 00
AK 101 Soil	AK 101 GRO in Soil	Soil	10	20	66 00	1,320 00
1664_S	Oil & Grease, HEM (EPA 1664 M)	Soil	10	20	71 00	1,420 00
602FL	Volatile Compounds by Method 602	Aqueous	10	20	90 00	1,800 00
AK102/103 Soil	DRO/RRO AK 102/103	Soil	10	20	114 00	2,280 00
PCB_Soil	PCBs by GC (SW 8082)	Soil	10	20	133 00	2,660 00
Pest Soil	Organochlorine Pesticides by GC (SW 8081)	Soil	10	20	140 00	2,800 00
PAH in Aqueous Samples (Method 610)	PAH in Aqueous Samples (Method 610)	Aqueous	10	20	152 00	3,040 00
ICP_TS see list under quote comments	Metals by ICP, Total (SW 6010B)	Soil	10	20	186 00	3,720 00
8270_S	Semivolatiles by GC/MS (SW 8270C)	Soil	10	20	356 00	7,120 00
Miscellaneous Charges Soil	Miscellaneous Charges	Soil	21	20	455 00	9,100 00

Dioxin/Furans Method 8280A 2378-TCDD Only (1)

Quotation For Analytical Services

ANALYTICA

Analytica Alaska Incorporated
811 West 8th Avenue
Anchorage AK 99501
(907) 258-2155
Fax (907) 258-6634

Special Considerations **Sub Total (Normal Items)** **$39,380 00**

LineItemID	Description	Price	Quantity	SubTotal	Comment
	SubTotal of Special Considerations				

Grand Total **$39,380 00**

Comments Sediment sampling Client should strain off as much water as possible to assure adequate sample volume for analyses ICP Metals to include V Mg Mn Ag Cr Sr Pb Cu Mo Sb Cd Ti Al Sn K As Na Be Fe Ni & Zn

Analytica is offering a 5% discount on this project, in support of Qutekcak Native Tribe's Research Grant Application.

Development of a Paradigm for Ecosystem Monitoring, Submitted under the BAA

Project Number:	02629-BAA
Restoration category:	GEM Transition
Proposer:	Prince William Sound Science Center
Lead Trustee Agency:	NOAA
Cooperating Agencies:	Oil Spill Recovery Institute (OSRI) - $90K in matching
Alaska SeaLife Center:	No
Duration:	1 year
Cost FY02:	$88.8K
Geographic Area:	Prince William Sound
Injured Resource/Service:	GEM Transition

ABSTRACT

The National Research Council (NRC) recommended a list of modifications to the Gulf Ecosystem Monitoring (GEM) plan. However, we believe that the NRC missed some potentially serious issues regarding the limitations to existing science methods identified by GLOBEC planners in the early 1990's. Some of these were the limitations of measurement, correlation-based analyses, uncoupled prediction-observation, the individual-organism approach and more. Our experience with programs of the Prince William Sound Science Center, Oil Spill Recovery Institute and Sound Ecosystem Assessment addressed these issues with some success. We believe the sharing of this experience could help GEM develop focus, build a stronger scientific program and make direct contributions to the people of Alaska and marine science.

Development of a Paradigm for Ecosystem Monitoring

INTRODUCTION

The Gulf Ecosystem Monitoring Program (GEM) is an outgrowth of the mission of the EXXON VALDEZ Oil Spill Trustee Council The conceptual foundation of GEM was presented in a draft document, "Gulf Ecosystem Monitoring A Sentinel Monitoring Program for the Conservation of Natural Resources of the Northern Gulf of Alaska, Review Draft April 21, 2000 This draft was in turn reviewed by the National Academies, National Review Council (NRC), who presented an interim report in February 2001 While complimenting the GEM program as an unparalleled opportunity and a highly worthwhile endeavor, the NRC report was critical of many aspects of the interim draft The NRC was particularly concerned over a correct conceptual foundation and reasonable focus The NRC report emphasizes the difficulty of implementing an achievable program given the complexity of ecosystems While we agree with many aspects of the NRC report and find many strengths in the GEM program, we feel that there are missing elements in both the GEM draft plan and the NRC report that will ultimately preclude the program from realizing its full potential

We envision a two-step process is needed to modify GEM First, there is a general need to be more diligent in the application of scientific principles and methods to ecosystem research, development and monitoring Second, an ecosystem approach needs to be developed that defines ecosystem research, development and monitoring as a unique and new paradigm for marine science Given our background with the PWSSC, OSRI and SEA programs, we are experienced in both of these steps

The mission of the GEM program contains many elements in common with that of the Prince William Sound Science Center (PWSSC) and Oil Spill Recovery Institute (OSRI) programs They are ecosystem-based programs, evolved from concerns following the Exxon Valdez oil spill (EVOS), long-term endowed programs and centered in the same geographic region The Murdock Charitable Trust supported the initial development of the PWSSC ecosystem research, development, monitoring and education program These plans were largely influenced by the GLOBEC program, which recognized that significant advancements were needed in the development of new measurement and predictive tools before ecosystem dynamics could be understood

The PWSSC had its first opportunity to formalize a publicly interactive science plan, the Sound Ecosystem Assessment (SEA) Science Plan, with support from OSRI and EVOS Trustee Council in 1993 With a strong endorsement by independent peer review in 1994, the PWSSC had its first opportunity to initiate ecosystem research and development with the funding of the SEA program by the EVOS Trustee Council Adhering to the GLOBEC science plans, from the start of the planning to this date, the focus of the PWSSC was to develop the new tools needed for investigating ecosystem dynamics Although the partners in the SEA program (UAF and ADF&G) did not share the PWSSC focus, some significant new tools were developed to improve observation and prediction capability

As the SEA program funding dwindled, some of the products were advanced enough for implementation In concurrence with the GLOBEC design, these were new acoustical and optical observation techniques to provide model input and verify model predictions and numerical models for prediction The observation techniques were successful in that they overcame the temporal and spatial sources of variability enough to make repeatable measurements of fish populations on an ecosystem scale, and enable synoptic measurement of physical-biological factors that makeup the underlying mechanisms causing change The development of the numerical models was curtailed before verification was possible

However, the problem of sparse, inaccurate and incomplete information on physical and biological conditions in the ecosystem was identified as a major limitation to improving oil spill prevention and response The OSRI program saw value in the implementation of the new tools that the SEA program had developed because of the promise to fill needed gaps in information Thus, the OSRI nowcast-forecast program continued the development of methods and initiated verification of numerical models that was started by the SEA program and is itself a product of the SEA program After three years of continued funding after SEA, the OSRI nowcast-forecast program provided researchers the continuity they needed to integrate the new methods and the knowledge into an advanced and highly focused program to observe and predict ecosystem change We wish to share this approach and methods with GEM to help prioritize monitoring efforts, insure the collection of accurate information with the best technologies and give a guarantee to the people of the region that observation-prediction efforts are coupled, balanced and focused on important issues

Whereas, OSRI has a focused oil spill prevention and response R&D mission, the Center is a bioregional institution with a broader scope mission However, as sparse, accurate and complete information hampers oil spill issues, it also plagues management, industry and the public who are concerned about potentially deleterious and irreversible anthropogenic-driven change To accomplish our mission, the PWSSC is building an information system to provide the people in the region the most accurate and complete data available in user-friendly forms that they can play a role in protecting the natural resources that they depend upon to maintain their quality of life

Many of the information services coming from the R&D developments need a home and this will be a continuing role for the PWSSC Some information services already have appropriate homes in the regional offices of government agencies, such as with ADF&G, but some components do not have regional agency representation In addition, no agency has authority of another with respect to the components of the ecosystem they manage, so the PWSSC is taking the responsibility to look at the ecosystem as a whole and identify important ecosystem components that are not represented adequately by agency operations For example, despite the availability of an unprecedented amount funds over the last decade, the two most dominant fishes in the Sound, herring and pollock, have been almost totally ignored by the government damage assessment, restoration and management programs Defining and maintaining a balanced ecosystem monitoring program in a bioregion is best made the responsibility of an interacting group of scientists and the public, in contrast to the present agency prioritization processes, which result in a grossly imbalanced single-species approach

The ecosystem can be broken into physical and biological components First, the physical structure and conditions in the ecosystem can be thought of as the foundation for biological production We hypothesize that animal populations primarily deal with changing physical

conditions, where they can, through redistribution to preferred locations Thus, the comprehensive monitoring and prediction of physical changes in the environment (wind, temperature, currents, etc) are important dominant features as are the distribution of the populations of animals responding to physical forcing Synoptic observations of both are prerequisites to taking the population bioenergetics approach that defines growth and in part survival so these are of some of the foundation material for ecosystem monitoring

Second, there is the question of animal population selection In Prince William Sound, historical data indicated that Pacific herring might once have been the dominant fish biomass However, seven years of monitoring the dominant fish stocks in the Sound show walleye pollock to be the dominant fish biomass Rice (1994) found that in Arctic and sub-Arctic marine food webs, it is common for a single species of fish, a planktivor, to dominate the fish assemblage When a single species dominates the food web it can have profound effects on the other animal populations in the ecosystem by capturing and storing the majority of annual production from lower trophic levels and then due to its specific behavior and physiology, controls the flow of carbon to higher trophic levels Thus, in the past decade it is pretty clear that walleye pollock are eating the majority of zooplankton available in the spring bloom, either directly during the bloom or indirectly after the bloom when they resort to feeding on juvenile fishes, including the cannibalization of their own young As a dominant species that regulates the major source of food for higher trophic levels, the fish-eaters (seals, sea lions, seabirds and other fishes), the pollock are far less supportive of a diverse and productive wildlife predator assemblage than herring due to their behavior and quality as prey (Thomas and Thorne 2001) Therefore, it is obvious to us that the correct approach for choosing the species to monitor in arctic and subarctic marine ecosystems starts with the dominant species, since quantitative knowledge of their populations sets the conditions for a majority of the higher trophic levels We suppose that any evaluation of ecosystem-level impact requires first the knowledge of the dominant species accumulation and dispersion of carbon to satellite populations

Since synoptic measures of physics and dominant animal populations are required, the use of advanced, acoustical and optical technologies are mandated Since the sampling problems of space and time are enormous even with these technologies, double sampling approaches that utilize the patchy behavior of animals are mandated to make quantitative observations of populations Since understanding the higher trophic level organisms requires quantitative observations of prey populations, which are commonly the dominant populations in a system, it follows that steps one and two are essential to the study of ecosystem dynamics

Recognizing the importance of quantitative estimates of animal distributions and abundance to the development of sustainable management practices, the Institute (OSRI) is collaborating with the Alaska Department of Fish & Game and the National Oceanic and Atmospheric Administration to establish an annual monitoring program estimating the abundance and distribution of spring zooplankton, walleye Pollock, Pacific herring and their predators In doing so, we are relying heavily on the acoustical-optical methods developed with support of the EVOS Trustee Council on the Sound Ecosystem Assessment (SEA) program The methods have produced highly precise estimates of fish populations that show existing age-structure models can over- and under-estimate fish biomass by several fold Management at this level of error causes ecological and economic damage to fish stocks and fisheries

Therefore, the Institute's monitoring of dominant fishes not only contributes to a better understanding of the marine ecosystem but to improved oil prevention and response, fisheries management and most marine operations This is the selling point of building bioregional nowcast-forecast systems The approach and technologies are transferable once the dominant animal populations are defined The approach provides information services to such a wide variety of industries, agencies and public that it is a platform for cooperation, cost sharing and the development of mutual understanding

Prince William Sound is unique in Alaska today because of the information provided from the nowcast-forecast system As this information system is developed and becomes more operational, we envision a host of new users and public benefit The plan is to turn operations over to the PWS Science Center, while the Institute continues the R&D effort The Center collaborates extensively with agencies and industry to implement and transfer these new technologies This is a program that brings science to the people We believe adoption of this approach in other important bioregions of the State, such as Kodiak, Bristol Bay and Southeast Alaska is essential

Furthermore, this ecosystem program is relatively inexpensive For instance, the monitoring of spring zooplankton, and the two dominant fishes in PWS costs approximately 250K per year, so it could have been instituted in the four primary bioregions of the state with $1 0 million a year, or endowed permanently for about $20 million This is only about one third of what NOAA received in funding this year just for Steller sea lion issues Such a program would be a major bargain for the people in these bioregions, which includes the state and federal agencies that regulate marine and air transportation, fishing, oil and other related industries With the annual allotment, it is reasonable add comprehensive monitoring of the physical and wildlife resources to this effort If there is a desire to tie these bioregions together in the larger picture that national programs such as GLOBEC and GOOS are working on, then the bioregion numerical models can be nested within larger domain models in a coordinated program

The biggest impediment is that the methods have been developed and are only in the possession of only a few senior scientists at this time and are not taught in the university setting Thus, there is an urgent need to adopt a program of technology transfer and training soon while much of the expertise in the field is still available for this purpose

Since the PWSSC and OSRI programs are much smaller, a tighter focus has been necessary As ecosystem programs tend to be overly broad and ambitious, an element clearly pointed out in the NRC review of the GEM program, those forced lessons could be useful as EVOS TC evolves from a post-oil spill research program to a long-term ecosystem program More importantly, the OSRI planning process included a rigorous analysis of scientific approaches that addressed, solved, and even went beyond many of the criticisms leveled at GEM by the NRC report We propose to evaluate the GEM draft plan, apply OSRI lessons and concepts to the approach, and draft recommendations to GEM that would improve research efficiency and focus, including initiatives that are in common with OSRI and where savings can be achieved in both programs by improved communications and mutual cooperation As the latter goal is also very important to the OSRI program, it will match EVOS TC in this effort Both the GEM document and the NRC review emphasize the importance of mutual cooperation and communication among the many entities working in this area

NEED FOR THE PROJECT

A Statement of Problem

The mission of the Gulf Ecosystem Monitoring Program (GEM) is "to sustain a healthy and biologically diverse marine ecosystem in the northern Gulf of Alaska and the human use of the marine resources in that ecosystem through greater understanding of how its productivity is influenced by natural changes and human activities" The program review by the National Academies, National Review Council (NRC), was somewhat critical of the statement, pointing out that such a mission is likely to prove difficult to put into practice since the definition of "healthy" is hard to define, and separation of change from human causes and natural events is difficult While the definition of healthy is uncertain, without doubt tracking change and separating natural from human causes are clearly an important parts of ecosystem "health care" The tracking and separation are inherent in the GEM goals

The GEM program outlines five goals detect, understand, predict, inform and solve The NRC review was again critical of the goals, believing them to be unrealistic, and suggesting focus on detection of change and understanding the causes of change However, we would argue in part against the NRC Verification of prediction becomes the ultimate goal when GEM goals are set in a functional relationship Verification is quantitative measurement that determines the accuracy of a prediction Thus, quantitative measurement and estimation are a more focused description of the GEM goal to detect Prediction is the summary of scientific understanding, which are both GEM goals Accurate predictions are required to solve problems (a GEM goal) Informing is the educational component that is inseparable from any scientific endeavor

GEM can build its scientific foundation through this ultimate goal, to verify prediction Measurement is essential to prediction and prediction is essential to measurement When field measurement is uncoupled with efforts to model the ecosystem the results are meaningless The real issue is to know what can be quantitatively measured, how the measurements can be used to verify predictions of what we understand, and how the measured error in the prediction can be reduced to improve predictive ability This process allows the assessment of improvement of knowledge by the reduction of measured error in the prediction Improving knowledge with better predictions sets the foundation for ecosystem problem solving

The NRC correctly complimented the GEM program on its ecosystem-centered approach (while expressing concerns in its Final Thoughts section that the program was evolving into a "piece-meal, small-scale, project-driven approach") Historically, fisheries management has relied on single-species harvest strategies that ignore interactions among species, and in many cases ignore environmental effects This restricted approach has failed more often than not (Hilborn, 1997, Sharp, 1997, Stephenson 1997, Thomas, Patrick, Kirsch and Allen, 1997) However, ecosystem-centered research is not a panacea Many ecosystem research programs have expended major efforts in ecosystem research, addressed broad aspects of various ecosystems, and have had little or no impact on the success (or lack of) of fisheries management

Part of the problem is that the complexity of the ecosystem requires long-term monitoring of several important indicators Single-species fisheries management often collects long-term information, but on too few variables In contrast, major ecosystem studies acquire substantial

information at considerable cost, but collect data over too few years and often do not monitor the variables critical to fisheries management A review of the last 30 years of ecosystem research from MESCAL, CUEA, and IBP of the 1970s through the more recent GLOBEC programs shows that every program failed to meet expectations One common scapegoat for failure is that the programs did not fully address the complexity of the ecosystem Even the NRC review suggested this as a deficiency in the GEM program draft

Our answer to this dilemma is that the past programs failed to prioritize the dominant ecosystem features in creating an ecosystem program Most of the past ecosystem programs have been developed by teams which have specific strengths in terms of expertise but also glaring weaknesses MESCAL and CUEA were primarily physics and phytoplankton GLOBEC has been primarily zooplankton Our approach, to establish comprehensive coverage of physical structure and conditions and prioritize the trophic structure by the carbon consumed and stored allows us focus to narrow the scope of the program to a tractable set of dominant populations Planning for this kind of program defines the expertise needed instead of the other way around, which the tradition way but also is inherently biased and does not address the ecosystem issues with a balanced monitoring program

B Rationale/Link to Restoration

This project centers on the issues surrounding ecosystem synthesis and GEM transition

C Location

The study will be carried out in Cordova

COMMUNITY INVOLVEMENT AND TRADITIONAL KNOWLEDGE

A key element in the success of the OSRI implementation is community involvement The model described in the NRC report, Box 2-6, is integral to the OSRI program Several elements are readily transferable to the GEM program We will detail the structural elements of the OSRI program that are relevant to this subject and relate lessons in communication that have been, and are being learned Clearly, one reason for the strong public perception of the success of the OSRI program has been the incorporation of community input As a result, the community has acquired some "ownership" of the OSRI research and the perception that the program is addressing meaningful community issues

PROJECT DESIGN

A Objectives

This proposal provides a vehicle to incorporate the extensive experience of the senior principal investigators in ecosystem planning and implementation The objective of the project is to evaluate the GEM draft plan, apply concepts to the approach that were learned in the earlier OSRI planning process, and draft recommendations to GEM that would improve research

efficiency and focus, including initiatives that are in common and where savings can be achieved in both programs by improved communications and mutual cooperation

B Methods

Many of the problems with historical ecosystem studies center around sampling limitations In 1989, the National Science Foundation GLOBEC program defined the limitations of observing and predicting animal population change in marine ecosystems (GLOBEC 1990a,b c) One of the primary failures in past marine research was identified as the use of sparse, discrete measurements with nets to estimate abundance GLOBEC recommended the combination of acoustical and optical quasi-continuous measurement technologies with discrete net sampling to resolve confounding temporal and spatial variation Thomas (1992a) concluded that implementation of such methods were the single most important improvement that could be made to improve fisheries science and management

The GLOBEC planning documents substantially influenced ecosystem research in Prince William Sound The Sound Ecosystem Assessment (SEA) program in Prince William Sound, funded by the EXXON VALDEZ Oil Spill Trustee Council, developed and applied many GLOBEC-based concepts, including stress on acoustical and optical quasi-continuous measurement technologies and close interface between measurements and the modeling process The SEA program acquired important understanding of many key features of the Prince William Sound ecosystem over a five-year period from 1994 to 1999 With the cessation of the SEA program in 1999, the Oil Spill Recovery Institute (OSRI) took up the maintenance of those concepts The Oil Spill Recovery Institute implemented a nowcast/forecast program designed to collect critical, long-term information in Prince William Sound (Thomas and Cox 2000) Although the OSRI program is derived from concepts initiated in the GLOBEC planning process and developed within the EVOS SEA program, the OSRI approach has evolved beyond those programs in many respects Central to the OSRI approach is the tight linkage among measurement, hypotheses, prediction and verification These foundational concepts are closely linked to the stated goals of the GEM program The GEM goal statement is excellent NRC's criticism of that statement is based on erroneous assumptions NRC's apprehension is understandable However, the problem is not the goals, it is the definition of the goals Consider Box 2-2 in the NRC report ("Are the GEM goals attainable") "Detection of change is a reasonable and attainable goal and should be one of the core purposes of GEM Detection of change should not be assumed to be easy the climatic regime shift that occurred in the Gulf of Alaska in the late 1970's was not detected until 15 years after it occurred, because picking up the signals is challenging Detection hinges on measuring appropriate variables, consistent interpretation of data, and having a priori expectation of what changes will occur and why " The most important point is left out, detection of change depends on measurement capability Measurements of change must have sufficient accuracy to have real meaning Further, the change that is measured must have real meaning If the change does not have meaning, if the mechanism of change cannot be interpreted, or if the change cannot be measured with meaningful accuracy, then there is no point in measuring the change That leads to "understanding" If the mechanism of change cannot be stated in a testable hypothesis or a verifiable model then there is no understanding, and again there is no reason to try to detect the change

The NRC report errs in its discussion of prediction First of all, it is overly broad in the implied definition of prediction, focusing on large-scale global climate change as an example Prediction is simply the extension of detection and understanding If you can measure a parameter and understand the mechanism of change, then you can predict change Furthermore, and this is the most important point, prediction is the verification of understanding If you do not predict, then you have no measure of your understanding, and if you have no understanding, there is no merit to your investigation, and no reason to try to detect change Further yet, verification of prediction requires measurement You start with measurement, and you end with measurement The conceptual heart of science is to be able to hypothesize the mechanism of change and then be able to measure with sufficient accuracy to detect change The space between the two is prediction Without these elements you do not have science This is the conceptual framework that must be applied to the GEM draft plan if it is to successfully carry out its stated mandate

There are many levels to this conceptual framework that focus on feasibility The GEM draft incorporates many problems in common with most ecosystems studies These problems include lack of focus, vague objectives, inadequate sampling designs and irrelevant issues The NRC review recognizes some of these problems Most programs lack focus because insufficient attention has been paid to objectives Too many EVOS studies have been merely data gathering, not hypothesis-driven Monitoring projects must be able to define how change will be detected, and how causes can be identified and quantified

Another weakness that needs to be overcome is the total dependence upon correlation analysis to make predictions The problem is well articulated in Cullen (1989), a GLOBEC planning document, "Many correlations between population variability and associated biological and physical variables have been reported However, these correlations are generally unsuccessful predictors of population variability and, hence, of limited usefulness As a consequence of having available only a correlative understanding of the fluctuations in marine populations, policy formulation in global fisheries, climate effects, and pollution can be addressed with neither confidence or vigor " Many parameters may be good indicators of change, and may even provide short-term predictive ability However, mere correlation is not sufficient The mechanism of change must be understood to be able to determine what causes correlation and what can change to alter correlation and produce error

Most programs fail to detect change because the survey design has insufficient precision, usually because of the lack the sampling power A careful analysis of many projects will show that they do not have the necessary sampling power to detect change For example, analysis of historic zooplankton sampling procedures in PWS will show that more than 9,000 years of sampling would be required to make a **single** estimate of zooplankton standing biomass with acceptable precision using the methodology applied in the SEA program That extreme lack of sampling power is more common than not Mere measurement has no value without the precision to detect meaningful change We wish that this problem were only limited to GEM but there are more examples of meaningless measurement programs than meaningful Thus, if GEM wanted to cop out, it would have the preponderance of the parishioners in the field to support that decision However, we want GEM to be successful and that will require scientific rigor and control applied to all GEM projects

A key feature of all historic ecosystem studies is model-driven hypothesis (Thorne and Thomas 2000) The NRC review correctly points out that an overall conceptual model is important as a

guide to GEM planning and implementation, at the same time pointing out the dangers of a conceptual model that is too restrictive The most successful approaches have been to embed highly developed specific sub models within a broad conceptual model Both knowledge and model understanding are inadequate to fully address all the complexities of an ecosystem However, good model development can lead to understanding the processes that have major impacts The OSRI approach, through its Nowcast/Forecast program development has been to build a strong physical model around physical measurements and link to critical biological processes EVOS has previously supported the development of foundational models for herring and pink salmon production PWSSC investigators are collaborating with modelers in other programs, including GLOBEC, to further develop these models OSRI is funding a modeling effort in F02 to facilitate these developments

It is important to stress that the key to successful model development is a tight linkage among measurement/verification and hypotheses/prediction Good model development requires good measurement and visa versa Model development without measurement capability for verification is an exercise in abstraction Measurement without a model to assimilate data and predict outcome for verification is baseless

C Cooperating Agencies, Contracts, and Other Agency Assistance

This project will be conducted by scientists of the Prince William Sound Science Center The Principal Investigators have been extensively involved in the planning process of the Oil Spill Recovery Institute's Nowcast/Forecast program The project is proposed as an equal match between EVOS TC and OSRI

SCHEDULE

A Measurable Project Tasks for FY 02

The product of this project will be a detailed analysis of the GEM working document, an analysis of the lessons learned in the OSRI planning process and how they can be applied to the GEM planning, and an examination of areas in common where duplication of effort can be eliminated These elements will be incorporated in the final report of this one-year project

B Project Milestones and Endpoints

The final report will be completed at the end of the one-year project

C Completion Date

All of the project objectives will be completed at the end of the year

PUBLICATIONS AND REPORTS

The final report will be the publication of the project

PROFESSIONAL CONFERENCES

Participation in a professional conference other than the EVOS annual meeting is not envisioned under this project

COORDINATION AND INTEGRATION OF RESTORATION EFFORT

It is anticipated that on-going communications will take place between this project and GEM planners to ensure that the project maintains focus on the continued GEM development

PRINCIPAL INVESTIGATORS

Richard E Thorne, Senior Scientist
Gary Thomas, Ph D , Senior Scientist
Prince William Sound Science Center
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Responsibilities Dr Thorne will be responsible for project administration, evaluation of sampling designs, optimization analyses and writing He has vast experience working as a PI on research projects for over 30 years while at the University of Washington and at BioSonics Inc He is well published with over 50 peer-reviewed manuscripts and is an Affiliate Professor at the University of Washington

Dr Thomas will be responsible for project coordination, interfacing with OSRI physical oceanography and modeling projects and writing He has been working as a PI on research projects for over 20 years while at the University of Washington and at the PWS Science Center He is well published with over 60 peer-reviewed manuscripts and is an Affiliate Professor at the University of Miami and the University of Alaska at Fairbanks He has been a PI on past EVOS TC research projects

C V s for both investigators are attached Please address all correspondence related to this proposal to Richard E Thorne

OTHER KEY PERSONNEL

A modeler with experience in ecosystem and energetics models will provide inputs into the evaluation

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FY 02 EXXON VALDEZ TR COUNCIL PROJECT BUDGET

October 1, 2001 - September 30, 2002

Budget Category:	Authorized FY 2001	Proposed FY 2002						
Personnel		$0.0						
Travel		$0.0						
Contractual		$88.8						
Commodities		$0.0						
Equipment		$0.0	LONG RANGE FUNDING REQUIREMENTS					
Subtotal		$88.8		Estimated FY 2003	Estimated FY 2004	Estimated FY 2005		
General Administration		$6.2						
Project Total	$0.0	$95.0		$0.0	$0.0	$0.0		
Full-time Equivalents (FTE)		7.0						
	Dollar amounts are shown in thousands of dollars.							
Other Resources		$90.0						

Comments:

FY 02

Project Number: 02629-BAA
Project Title: Development of a new Paradigm for Ecosystem Monitoring , submitted under the BAA
Agency: NOAA

FORM 3A TRUSTEE AGENCY SUMMARY

Prepared:

FY 02 EXXON VALDEZ TR COUNCIL PROJECT BUDGET

October 1 20[illegible] September 30, 2002

Budget Category	Authorized FY 2001	Proposed FY 2002
Personnel		$65 6
Travel		$2 4
Contractual		$1 1
Commodities		$0 6
Equipment		$0 0
Subtotal		$69 7
Indirect		$19 1
Project Total	$0 0	$88 8
Full time Equivalents (FTE)		7 0
Other Resources		$90 0

LONG RANGE FUNDING REQUIREMENTS

Estimated FY 2003	Estimated FY 2004	Estimated FY 2005
$0 0		

Dollar amounts are shown in thousands of dollars

Comments

*Salary rate for G L Thomas reflects research time at 20% reduction from administrative costs

**OSRI is contributing $90,000 to this program

FY 02

Prepared

Project Number
Project Title Development of a new Paradigm for Ecosystem Monitoring, submitted under the BAA
Name Prince William Sound Science Center
Agency NOAA

FORM 4A
Non Trustee
SUMMARY

FY 02 EXXON VALDEZ TR COUNCIL PROJECT BUDGET

October 1 2001 September 30 2002

Personnel Costs				Months	Monthly		Proposed
	Name	Position Description		Budgeted	Costs	Overtime	FY 2002
	R E Thorne	co Principal Investigator		1 5	11 0		16 5
	G L Thomas	co Principal Investigator		1 5	11 4		17 1
	Other	Modeller		4 0	8 0		32 0
							0 0
							0 0
							0 0
							0 0
							0 0
							0 0
							0 0
							0 0
							0 0
		Subtotal		7 0	30 4	0 0	
						Personnel Total	$65 6

Travel Costs		Ticket	Round	Total	Daily	Proposed
	Description	Price	Trips	Days	Per Diem	FY 2002
	EVOS and collaborative workshops	0 4	2	8 0	0 2	2 4
						0 0
						0 0
						0 0
						0 0
						0 0
						0 0
						0 0
						0 0
						0 0
					Travel Total	$2 4

FY 02

Prepared

Project Number

Project Title Development of a new Paradigm for Ecosystem Monitoring, submitted under the BAA

Name Prince William Sound Science Center

Agency NOAA

FORM 4B
Personnel
& Travel
DETAIL

Contractual Costs	Proposed
Description	FY 2002
tele, communications, fax etc	0 2
maintenance	0 2
network costs (based on $100 /mo x staff months)	0 7
Contractual Total	$1 1

Commodities Costs	Proposed
Description	FY 2001
supplies	0 6
Commodities Total	$0 6

FY 02

Prepared

Project Number
Project Title Development of a new Paradigm for Ecosystem Monitoring, submitted under the BAA
Name Prince William Sound Science Center
Agency NOAA

FORM 4B
Contractual & Commodities DETAIL

FY 02 EXXON VALDEZ TF E COUNCIL PROJECT BUDGET

October 1 2001 September 30, 2002

New Equipment Purchases	Number	Unit	Proposed
Description	of Units	Price	FY 2002
			0 0
			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	
Description	of Units	

FY 02

Prepared

Project Number
Project Title Development of a new Paradigm for Ecosystem Monitoring, submitted under the BAA
Name Prince William Sound Science Center
Agency NOAA

FORM 4B
Equipment
DETAIL

Project Title:	Acquisition of current Chemical, Physical, and Biological information of Kodiak Regional Water Quality Components Relevant to Fisheries and Oceanographic Investigations.
Project Number:	02633
Restoration Category:	Ecosystem Synthesis / GEM Transition
Proposer:	Kodiak Area Native Association
Lead Trustee Agency:	
Cooperating Agencies:	Non are requesting funding under this project for FY 02
Alaska SeaLife Center:	No
Duration:	1st year
Cost FY 02:	
Cost FY 03:	
Geographic Area:	Kodiak Island Region
Injured Resources / Service:	Bald Eagle, River Otter, Black Oyster Catcher, Clams, Intertidal Communities, Mussels, Pacific Hearing, Pink Salmon, Sea Otter, Sediments, Sockeye Salmon, and Sub Tidal Communities, Common Loon, Harbor Seal, Cutthroat Trout, Dolly Varden, Rockfish, and other species

ABSTRACT

The proposed project will: develop nearshore monitoring stations to gather information on species composition and rates of settlement of shellfish, barnacles, algae, and other important marine organisms; develop monitoring stations for remote telemetry of temperature, salinity, currents, zooplankton densities, and other data relevant to fisheries and oceanographic investigations; develop methods for utilization of satellite imagery technology through coordination with NASA.

INTRODUCTION

The proposed restoration effort is to compile nearshore information of biological and ecological importance to be applied towards developing the best management practices for estuary and marine environments This project has been developed with three categories of science disciplines which are Water Quality Studies encompassing Chemical, Physical, Biological components of water quality, Phytoplankton and Zooplankton Assessments, and Paralytic Shellfish Poisoning Assessments

Portions of this project have already begun here on Kodiak Island The University of Alaska at Fairbanks is nearly completed with a three year study for detection of algae that causes paralytic shellfish poisoning Their work was centralized around the road accessible locations near the Kodiak City vicinity The other portion of this project proposal that has already begun is the development of a new rapid PSP test kit called MIST Alert This kit was developed by Jellet Biotech Limited The kit was developed with a Grant funded by EVOS

This project is being proposed to be developed for the Kodiak Island Region with potential applications to the Gulf of Alaska

NEED FOR PROJECT

A) Statement of problem

As a result of the incident of the oil spill, the biological and ecological resources of the coastal environments of Kodiak Island have been impaired and the effects all not totally understood at this time Beneficial Uses of these resources by Kodiak islanders have been impaired creating a need to monitor, analyze, and develop best management practices to reestablish the healthiness and productivity of resources that were bountiful

The injured resources of Kodiak Island are and not limited to Bald Eagles, River Otters, Black Oystercatchers, Clams, Inter-tidal Communities, mussels, Pacific herring, Pink salmon, Sea Otter, Sediments, Sockeye Salmon, Sub-tidal Communities, Common Loon, Harbor Seal, Cutthroat Trout, Dolly Varden, Rockfish, and other species

B) RATIONALE / LINK TO RESTORATION

Currently there is very limiting information as to the healthiness and productivity of the resources of Kodiak Island Initial assessments of the damages caused by the oil spill were conducted There exists an extremely important need to gather information, monitoring of the current conditions of the resources The information proposed to be gathered within the scope of this project brings together a holistic approach to assesses the impacts and responses of the resources affected by the oil spill incident

The information and continued development of cost effective research, monitoring and early response systems will greatly enhance the process of gathering information (information about how resources and services are recovering or whether restoration activities are successful)

C) Location

This project has been developed for the Kodiak Island region The scope of work to be

completed includes the seven communities located on the perimeter of the island The affected communities are, Ahkiok, Karluk, Larsen Bay, Old Harbor, Ouzinkie, Port Lions, and Kodiak

COMMUNITY INVOLVEMENT AND TRADITIONAL KNOWLEDGE

The communities will be involved via the Kodiak Island Village Environmental Council This is an established group whose membership representation includes Kodiak Island Borough, Tribal and City Councils form each of the seven communities, and the Kodiak Area Native Association (KANA) Monitoring / research findings and other project information would be provided by continuing community workshops that are being provided to the communities by KANA as an Environmental Outreach Program

Local resources such as human, equipment, and facilities will be greatly utilized for this project There have been training sessions and workshops presented by various State, University, and other Agencies These opportunities have been completed by many of the Islands community members Many members of the communities retain qualitative amounts of traditional and local knowledge Many members of the communities have supplied some of their knowledge to the Alaska Department of Fish and Game' Division of Subsistence Much of the knowledge retained and shared would provide necessary information for the identification of stratified monitoring sites

PROJECT DESIGN

A) Objectives

The objectives of this project are

1) To compile to water quality information (including sediments),
2) To compile phytoplankton / zooplankton, algae information,
3) To compile Paralytic Shellfish Poisoning information,
4) To develop the capabilities to utilize telemetry instruments,
5) To develop the capabilities to utilize Satellite Imagery / digital photography

B Methods

1) Monitoring of water columns chemical, physical, and biological components could be a useful tool in predicting healthiness and productivity levels of aquatic resources The data needed, survey methodologies, and Quality Assurance and Quality Control Plans are included in the EPA Coastal 2000 attachment
2) Monitoring of phytoplankton, zoophlankton, and algae could be a useful tool in predicting healthiness and productivity levels of aquatic resources The data needed and, survey methodologies, and Quality Control and Quality Assurance Plans are included in the Implementation of Improved Beach or Sea Monitoring Program for Detection of Algae that Cause Paralytic Shellfish Poisoning attachment
3) Monitoring of Paralytic Shellfish Poisoning could be a useful tool in predicting healthiness and productivity levels of shellfish resources The data needed and methodologies and Quality Control Plans are included in the PSP Monitoring attachment
4) Developing telemetry monitoring capabilities could be a useful tool in predicting healthiness and productivity levels of aquatic resources The technology for these

capabilities are being utilized in other monitoring activities and could be applied to this project

5) Developing techniques to utilize Statelite Imagery / Digital Photography are being currently being applied towards other monitoring and research projects KANA will be attending a meeting / workshop to coordinate these activities with NASA and various other Agencies

C) Cooperating Agencies, Contracts, and other Agency Assistance

This project has many cooperating agencies that are not submitting funds for this project The agencies are the United States Environmental Protection Agency, the University of Alaska at Anchorage, the University of Alaska at Fairbanks, and the Native American Fish and Wildlife Society

SCHEDULE

A) Measurable Project Tasks for FY 02 (October 1- September 30, 2002)

October	Begin Scoping Sessions with communities for input to monitoring locations
November	Develop monitoring locations and schedules, acquire monitoring and lab staff
December	Schedule and conduct training sessions for monitoring staff and lab staff
January	Begin monitoring and lab activities
February	Begin coordination of telemetry activities, continue monitoring and lab
March	Begin coordination of Satellite Imagery activities, continue monitoring and lab
April	Continue telemetry, monitoring, and lab activities
May	Continue telemetry, monitoring, and lab activities
June	Continue telemetry, monitoring, and lab activities
July	Continue telemetry, monitoring, and lab activities
August	Continue telemetry, monitoring, and lab activities
Sept	Continue telemetry, monitoring, and lab activities, develop and submit annual report including statistical data/information findings, analysis,

B) Project Milestones and Endpoints

Objective #1 shall be addressed in November and continuing through the life of the project It is scheduled to begin in November and continued through September Data banks will be generated weekly and entered into a master database on an ongoing basis

Objective #2 shall be addressed in November and continuing through the life of the project It is scheduled to begin November and continuing through September Data banks will be generated weekly and entered into a master database on an ongoing basis

Objective #3 shall be addressed in November and continuing through the life of the project It is scheduled to begin November and continuing through September Data banks will be generated weekly and entered into a master database on an ongoing basis

Objective #4 shall be addressed in February and continuing through the life of the project

Objective #5 shall be addressed in March and continuing through the life of the project

C Completion Date

The completion of this FY Project would be completed in September of 2003 KANA would like to continue with this project as a long term project with the potential of expanding through out the Gulf of Alaska

PUBLICATIONS AND REPORTS

At this time there are no plans to submit any manuscripts for publication in FY02 KANA concurs with EVOS that this process should begin ASAP and shall begin that process at an appropriate time The complete Annual Report shall be submitted prior to the April 15, 2003 deadline

PROFESSIONAL CONFERENCES

At this time KANA does not plan to present project materials at Professional Conferences

COORDINATION AND INTEGRATION OF RESTORATION EFFORT

Coordination activities would also be completed during the life of the project to ensure compatibility of work be done These project will also seek funding from alternative sources that may be identified as Request for proposals are made

FY 02 *EXXON VALDEZ* T EE COUNCIL PROJECT BUDGET

October 1, 2001 - September 30, 2002

Budget Category:	Authorized FY 2001	Proposed FY 2002						
Personnel		$331,852.8						
Travel		$43,740.0						
Contractual		$425,592.8						
Commodities		$0.0						
Equipment		$50,000.0	LONG RANGE FUNDING REQUIREMENTS					
Subtotal	$0.0	$851,185.6	Estimated FY 2003					
General Administration		$58,302.3						
Project Total	$0.0	$909,487.9						
Full-time Equivalents (FTE)		9.0						
	Dollar amounts are shown in thousands of dollars.							
Other Resources								

Comments:

FY02

Project Number: 02633
Project Title:
Agency: Kodiak Area Native Association

FORM 3A
TRUSTEE
AGENCY
SUMMARY

Prepared: 4/13/01

FY 02 *EXXON VALDEZ* T **EE COUNCIL PROJECT BUDGET**

October 1, 2001 - September 30, 2002

Personnel Costs		GS/Range/	Months	Monthly		Proposed
Name	Position Description	Step	Budgeted	Costs	Overtime	FY 2002
Survey Technician	Survey Technician		12 0	2613 0		31,356 0
Survey Technician	Survey Technician		12 0	2613 0		31,356 0
Survey Technician	Survey Technician		12 0	2613 0		31,356 0
Survey Technician	Survey Technician		12 0	2613 0		31,356 0
Survey Supervisor	Survey Supervisor		12 0	3266 3		39,195 6
Survey Supervisor	Survey Supervisor		12 0	3266 3		39,195 6
Project Manager	Project Manager		12 0	4355 0		52,260 0
Data Entry Technician	Data Entry Technician		12 0	2613 0		31,356 0
Lab Technician	Lab Technician		12 0	3701 8		44,421 6
						0 0
						0 0
						0 0
	Subtotal		108 0	27654 4	0 0	
					Personnel Total	$331,852 8

Travel Costs	Ticket	Round	Total	Daily	Proposed
Description	Price	Trips	Days	Per Diem	FY 2002
Kodiak to Akhiok	600 0	12	5	378 0	9,090 0
Kodiak to Karluk	600 0	12	5	378 0	9,090 0
Kodiak to Old Harbor	450 0	12	5	378 0	7,290 0
Kodiak to Ouzinkie	300 0	12	5	378 0	5,490 0
Kodiak to Larsen Bay	450 0	12	5	378 0	7,290 0
Kodial to Port Lions	300 0	12	5	378 0	5,490 0
					0 0
					0 0
					0 0
					0 0
					0 0
					0 0
				Travel Total	$43,740 0

FY02

Prepared 4/13/01

Project Number
Project Title
Agency Kodiak Area Native Association

FORM 3B
Personnel
& Travel
DETAIL

FY 02 *EXXON VALDEZ* T EE COUNCIL PROJECT BUDGET

October 1, 2001 - September 30, 2002

Contractual Costs		Proposed
Description		FY 2002
4A Linkage		425,592 8
When a non-trustee organization is used, the form 4A is required	**Contractual Total**	$425,592 8
Commodities Costs		Proposed
Description		FY 2002
	Commodities Total	$0 0

FY02

Prepared 4/13/01

Project Number
Project Title
Agency Kodiak Area Native Association

FORM 3B
Contractual &
Commodities
DETAIL

FY 02 *EXXON VALDEZ* TI EE COUNCIL PROJECT BUDGET

October 1, 2001 - September 30, 2002

New Equipment Purchases	Number	Unit	Proposed
Description	of Units	Price	FY 2002
Lab Analysis equipment as identified by UAF	1	50000 0	50,000 0
			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**	$50,000 0

Existing Equipment Usage	Number	Inventory
Description	of Units	Agency
Donated Materials		UAF
Donated Materials		UAA
Donated Materials		NAF&WS

FY02

Prepared

Project Number
Project Title
Agency

FORM 3B
Equipment
DETAIL

FY 02 *EXXON VALDEZ* 1 EE COUNCIL PROJECT BUDGET

October 1, 2001 - September 30, 2002

Budget Category	Authorized FY 2001	Proposed FY 2002	LONG RANGE FUNDING REQUIREMENTS					
Personnel		$331,852 8						
Travel		$43,740 0						
Contractual		$0 0						
Commodities		$0 0						
Equipment		$50,000 0						
Subtotal	$0 0	$425,592 8	Estimated FY 2003					
Indirect								
Project Total	$0 0	$425,592 8						
Full-time Equivalents (FTE)		0 0						
	Dollar amounts are shown in thousands of dollars							
Other Resources								

Comments

FY02

Prepared 4/13/01

Project Number
Project Title
Name Kodiak Area Native Association

FORM 4A
Non-Trustee
SUMMARY

FY 02 *EXXON VALDEZ* T EE COUNCIL PROJECT BUDGET

October 1, 2001 - September 30, 2002

Personnel Costs			Months	Monthly		Proposed
	Name	Position Description	Budgeted	Costs	Overtime	FY 2002
						0 0
						0 0
						0 0
						0 0
						0 0
						0 0
						0 0
						0 0
						0 0
						0 0
						0 0
		Subtotal	0 0	0 0	0 0	
					Personnel Total	$0 0

Travel Costs		Ticket	Round	Total	Daily	Proposed
	Description	Price	Trips	Days	Per Diem	FY 2002
						0 0
						0 0
						0 0
						0 0
						0 0
						0 0
						0 0
						0 0
						0 0
						0 0
						0 0
					Travel Total	$0 0

FY02

Prepared 4/13/01

Project Number
Project Title
Name Kodiak Area Native Association

FORM 4B
Personnel
& Travel
DETAIL

FY 02 *EXXON VALDEZ* 1 EE COUNCIL PROJECT BUDGET

October 1, 2001 - September 30, 2002

Contractual Costs	Proposed
Description	FY 2002
Contractual Total	$0 0

Commodities Costs	Proposed
Description	FY 2002
Commodities Total	$0 0

FY02

Prepared

Project Number
Project Title
Name Kodiak Area Native Association

FORM 4B
Contractual &
Commodities
DETAIL

FY 02 *EXXON VALDEZ* T EE COUNCIL PROJECT BUDGET

October 1, 2001 - September 30, 2002

New Equipment Purchases	Number	Unit	Proposed
Description	of Units	Price	FY 2002
			0 0
			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	
Description	of Units	

FY02

Project Number
Project Title
Name Kodiak Area Native Association

FORM 4B
Equipment
DETAIL

Prepared 4/13/01

Expanding the Seabird Tissue Archival and Monitoring Project (STAMP) Program for the GEM Program

Project Number: 02634

Restoration Category: Monitoring

Proposer: USFWS, USGS/BRD, NIST

Lead Trustee Agency: FWS-DOI

Cooperating Agencies: NIST and USGS/BRD

Alaska SeaLife Center No

Duration: 1 Year

Cost FY 02: $54.9 K

Cost FY 03: $0 K

Geographic Area: Prince William Sound, Kachemak Bay, Northern Gulf of Alaska

Injured Resource/Service: Common murres

ABSTRACT

This proposal lays the ground work for expanding the current Seabird Tissue Archival and Monitoring Project (STAMP) in the spill area. The work would include developing local community networks for collecting samples for the project, adding more seabird colony locations and species to the existing STAMP program, developing logistical plans for expanding the Project in the Gulf of Alaska, and completing analytical work on existing samples to provide a database that will be used to design a long-term monitoring plan for the upcoming EVOS-sponsored Gulf Ecosystem Monitoring (GEM) program.

INTRODUCTION

Seabird tissues, particularly eggs, have played important roles in environmental monitoring in Europe and Canada The Canadian Wildlife Service (CWS) collects, banks, and analyzes eggs and tissues from seabirds of the Atlantic and Pacific coasts as part of its Wildlife Toxicology Program (Mineau et al , 1984, Elliott, 1985, and Wakeford and Kasserra, 1997) Eggs are particularly useful for the temporal and spatial monitoring of persistent organic pollutants (e g , polychlorinated biphenyls (PCBs), chlorinated pesticides, dioxins) and mercury For example, the CWS successfully documented temporal changes in PCBs and pesticides in the Great Lakes by analyzing banked herring gull (*Larus argentatus*) eggs (Mineau et al , 1984) Also, eggs from alcids (seabirds belonging to the family Alcidae that includes murres, murrelets, auklets, guillemots, and puffins) were identified as key indicators for circumpolar monitoring of persistent organic pollutants (POPs) by all Arctic nations participating in the International Arctic Monitoring and Assessment Programme (AMAP) Phase II - Years 1998 - 2003 (AMAP Scientific Experts Workshop, Girdwood, Alaska, April 1998)

The AMAP report on the state of the Arctic environment summarizes knowledge on POPs in seabirds living in arctic environments However, the report is limited to the Canadian and Scandinavian Arctic (AMAP, 1998) It presents data indicating that piscivorous seabirds feeding at the top of the marine food web (e g , cormorants, puffins, kittiwakes) have higher levels of PCBs in their eggs than those feeding at lower levels (e g , eiders) Levels in seabird eggs were higher in the Scandinavian Arctic than in the Canadian Arctic and, within Canada, levels were higher in the high eastern Arctic than in the lower western Arctic Also, levels of PCBs approaching concentrations known to affect hatching success were found in thick-billed and common murre (*Uria lomvia* and *U aalge*), puffin, black guillemot (*Cepphus grylle*), and black-legged kittiwake (*Rissa tridactyla*) eggs from the Canadian and Norwegian regions of the Arctic (AMAP, 1998)

There are few data on the concentrations of POPs in colonial seabirds nesting in Alaska Kawano et al (1988) reported chlordane concentrations in thick-billed murres from the North Pacific and Gulf of Alaska However, the most comprehensive information on organochlorine residues in Alaskan seabird eggs was obtained 25 years ago (Ohlendorf et al , 1982) Extrapolating levels of POPs from the western Canadian Arctic database is not appropriate, because atmospheric and oceanic transport of contaminants from Southeast Asia eastward and northward into the Gulf of Alaska and Bering Sea, and the oceanic transport of other substances eastward along the northern and eastern coasts of Siberia and into the Chukchi and Bering seas probably affect overall contaminant patterns and levels in Alaskan seabirds Local sources from existing and former military installations also have to be considered

More than 95 % of the seabirds breeding in the continental United States breed at Alaskan colonies in the Gulf of Alaska and Bering and Chukchi seas (USFWS, 1992), and about 80 % of the Alaskan birds nest on Alaska Maritime National Wildlife Refuge (AMNWR) lands (G V Byrd, personal communication) In 1998 and 1999, the U S Geological Survey Biological Resources Division (USGS/BRD), AMNWR, and the National Institute of Standards (NIST) initiated a joint project to develop and test protocols for collecting, processing, transporting, and banking eggs collected from selected colonies of common and thick-billed murres on AMNWR lands This project, the Seabird Tissue Archival and Monitoring Project (STAMP) is collecting and cryogenically banking eggs from murre colonies for future research and is analyzing aliquots of these banked specimens for temporal and spatial monitoring of persistent bioaccumulative contaminants within the Refuge

Murres spend about 80 % of their time at sea (USFWS, 1992) They are capable of diving to depths of up to 200 m to capture prey, feeding on a wide variety of small fish, including capelin (*Mallotus villosus*) and Pacific sand lance (*Ammodytes hexapturus*), other osmerids and gadids, sculpins, pricklebacks, shannies, ronquils, and some larger invertebrates (e g , shrimp, squid) Murres only come ashore to breed in large colonies on precipitous sea cliffs and headlands, where they lay single eggs on bare rock ledges in dense aggregations The eggs are relatively large, yielding contents ranging from 75 g to 95 g, which is sufficient for multiple analyses Murres are also capable of laying replacement eggs about 13 to 14 days after losing first eggs

A protocol for collecting and banking seabird eggs was tested at murre colonies in the AMNWR in 1998 - 1999 Colonies, ranging from the Arctic Ocean (Chukchi Sea) to the North Pacific (Gulf of Alaska), were selected for sampling These colonies are located at Cape Lisburne in the Chukchi Sea, Little Diomede Island in Bering Strait, Bluff in Norton Sound (northern Bering Sea), St George Island in the southern Bering Sea, Bogoslof Island in the Aleutian chain, East Amatuli Island in the Barren Islands of northern Gulf of Alaska, and St Lazaria Island in the southeastern Gulf of Alaska near Sitka During this pilot phase, the draft collection, sample processing, transportation, and banking procedures were evaluated for practicality and suitability for obtaining uncontaminated samples and were modified where necessary This revised protocol, which has been published (York et al , 2001), serves as the SOP for future sampling work

Using the STAMP seabird egg protocol (York et al , 2001), both common and thick-billed murre eggs have been collected and banked from colonies on Little Diomede, St George, and Bogoslof islands, and common murre eggs have been obtained and banked from E Amatuli and St Lazaria islands The eggs (10 eggs per species per colony) were processed (contents separated from the shells and frozen) and the contents (egg samples) transported to the National Biomonitoring Specimen Bank at NIST in Charleston, South Carolina, where they were archived at temperatures of -150 °C The specimen banking procedures included cryohomogenizing frozen egg samples received from USGS/BRD, dividing this homogenate into A and B subsamples (approximately 40 g, each) which were sealed in permanent Teflon storage containers, storing the A and B subsamples in separate liquid nitrogen vapor freezers, and entering the specimen data into the sample tracking software of the NBSB, i e Archived Sample Tracking and Retrieval Operation (ASTRO) Subsample B is available for immediate analysis, subsample A is earmarked for long-term archiving for future research

In 2000, NIST began some analyses of aliquots of archived egg samples for POPs These analyses are being conducted through partial funding by USGS/BRD of a graduate student from the University of Charleston Grice Marine Laboratory, who is working under the direct supervision of NIST Charleston scientists (Drs Paul R Becker and John R Kucklick) This funding support will end by the fall 2001 The analytical results of this work will be compared among colonies, and with published Alaskan and Canadian seabird data and data from other species in Alaska This work represents the first step toward developing a database that will quantify and document the transfer of persistent organic compounds through seabird food webs in Alaska

Aliquots (1 - 2 g, each) of egg samples (from subsample B) from common murre colonies at Little Diomede, St George, and St Lazaria islands have been analyzed (n = 30) for 56 PCB congeners, chlordanes, DDTs, dieldrin, mirex, hexachlorocyclohexanes (HCH), and hexachlorobenzene (HCB) using established NIST methodology (Schantz et al , 1996) In addition to these analyses, both coplanar PCBs and polychlorinated naphthalenes (PCNs) will be measured using GC/NCI-MS with a recently developed method that specifically isolates planar compounds (Brubaker et al, 2000) Toxaphene will be measured according to Kucklick et al

(1996) and/or Glassmeyer et al (1999) Also, mercury and methylmercury analysis will be conducted using some methods recently developed at NIST These include isotope dilution cold vapor (CV) modification for inductively coupled mass spectrometry (ICP-MS) for mercury (Christopher, 2001) and solid phase microextraction followed by gas chromatography with atomic emission detection (SPME-GC-AED) for methylmercury (Tutsku et al , 2001)

Preliminary results from the analyses indicated that there were substantial differences in the concentrations of specific POPs in the common murre eggs from the St Lazaria colony compared to concentrations in the common murres eggs from the two Bering Sea colonies (Little Diomede and St George islands) Total PCBs, expressed as the sum of individual PCB congeners, and 4,4'DDE were significantly higher in the St Lazaria eggs Sum of PCB congeners was 247 ± 96 4 ng/g wet weight in eggs from St Lazaria compared with 104 ± 30 5 and 96 0 ± 44 4 for eggs from Little Diomede and St George, respectively, and 4,4'-DDE was 294 ± 97 1 ng/g wet weight in St Lazaria eggs compared with 68 6 ± 12 0 and 72 0 ± 21 3 for Little Diomede and St George eggs HCB was significantly lower in the St Lazaria murre eggs, i e 36 9 ± 7 28 ng/g wet weight compared with 81 0 ± 18 1 for Little Diomede and 79 3 ± 15 0 for St George Preliminary principal components analysis conducted on the fraction of total PCBs and organochlorine pesticides for each egg also indicates a clear and strong separation of the St Lazaria colony from the two Bering Sea colonies Common murre eggs from E Amatuli have not been analyzed, so we presently do not know how these birds might compare to the St Lazaria birds or to those from the Bering Sea Also, the thick-billed and common murre eggs collected at Bogoslof Island have not been analyzed

The results suggest the importance of continuing the analysis of murre eggs from the other Gulf of Alaska colony that has been targeted for STAMP (E Amatuli) and expanding STAMP to other murre colonies in the Gulf of Alaska and to other species of seabirds in the region, particularly species that feed in different habitats at different trophic levels

NEED FOR THE PROJECT

1 Statement of Problem

Some ongoing non-EVOS funded research and monitoring programs have the potential for contributing to the development of GEM, particularly if some addition support can be obtained from the Trustee Council This proposed project will lay the ground work for expanding the contaminant monitoring program on seabirds (STAMP) in the GEM area Common murre has been identified as a resource originally injured by the spill, but now recovering In monitoring this species and other seabirds in the GEM area, consideration should be given to POPs Although not directly related to the oil spill, these compounds have to be considered as factors that are present (in unknown amounts) and that have the potential for affecting the health of seabird populations in this region and, therefore, their population growth or decline Present funding for STAMP only allows for one murre colony to be monitored in the GEM area (E Amatuli Island) on a non-regular basis The other colonies that are presently part of the project are located in Southeast Alaska, Bering Sea, and Chukchi Sea

Under this proposal, initial steps will be taken to expand STAMP to include more extensive coverage of murre colonies within the GEM area and include additional seabird species Additional species will include black-legged kittiwakes, *Rissa tidactyla*, (surface feeders on small fish) and fork-tailed storm petrels, *Oceanodroma furcata*, (surface plankton feeders) For common murres, colonies at Gull Island (Kachemak Bay), and Middleton Island are ideal candidates for comparison with the existing STAMP colonies at E Amatuli and St Lazaria islands For black-legged kittiwakes,

colonies of interest include E Amatuli, Gull, and Middleton islands, and Shoup Bay in Prince William Sound Fork-tailed storm petrel colonies of interest are located at E Amatuli and St Lazaria islands, and the Wooded Islands (this species will be added to the work after the preliminary work with murres and kittiwakes is completed) Expanding STAMP to include more colonies and species in the GEM area will be an important step in developing a Gulf of Alaska monitoring program to document and quantify the transfer of persistent organic compounds through seabird foodwebs

2 **Rationale/Link to Restoration**

In developing GEM, consideration should be given to monitoring other contaminants in addition to those related to oil spills This is necessary, if one considers that many factors can affect the health of the system on which the seabirds depend There is very little information on concentrations of POPs in seabirds from the Gulf of Alaska, or how these concentrations compare among colonies within the region, how they compare with other seabird colonies in Alaska, and how they compare with known concentrations in other, more urbanized regions of the world In addition, eggs of seabirds are a subsistence resource and POPs concentrations in them should be measured to provide information that would be of use to local native communities and the regional health agencies

3 **Location**

The project will be undertaken in Kachemak Bay, Prince William Sound, and the Northern Gulf of Alaska The communities that will be affected are Seldovia, Port Graham, Nanwalek, New Chenega, Tatitlik, and Cordova

COMMUNITY INVOLVEMENT AND TRADITIONAL KNOWLEDGE

A main component of the proposed project is to develop local contacts as partners in the expansion of STAMP in the GEM area This will involve active local participation in specimen collections (e g , Gull Island) Some of the murre colonies are used locally for native subsistence food, and therefore, information on POPs types and levels is important to the local communities and their inhabitants In addition, the project welcomes the input of local knowledge about the colonies, which may help interpret project results The project will provide training to local participants in STAMP collection protocols An approach for providing feed-back of project results to the participating/affected communities will be developed in consultation with the communities through community facilitators, natural resource specialists, and the Spill Area-Wide Coordinator Since the communities will probably want to participate and therefore become partners in the project, the strategy will also include developing mechanisms for community input into project design

PROJECT DESIGN

A Objectives

1 Develop local community participation and expand STAMP in the GEM area

2 Provide training to local participants in STAMP protocols

3 Establish logistics plans for the collection, packaging and transport of seabird eggs from the colonies to the laboratories for analysis and banking

4 Complete the analysis of eggs collected in 1999 - 2001 from the two existing monitored colonies in the GOA to establish the initial database for the design of the expanded STAMP program in the GEM area

5 Develop plans for the feed-back of STAMP results to the participating communities

B Methods

1 Developing local participation An important part of expanding STAMP in the GEM area will be developing local community participation in the collection and handling of eggs for the project Some of these colonies are used by local native subsistence for the gathering of eggs for food The principal investigators will visit these local communities, explain the nature of the project to them, and determine their interest in local participation Also, local knowledge about the colonies may help in the interpretation of analytical results The murre eggs that have been obtained from Little Diomede Island for STAMP have been collected by local residents Based on this experience and the past experiences of the PIs in working with local communities within the STAMP and the Alaska Marine Mammal Tissue Archival Project (AMMTAP), this type of cooperation and assistance is feasible and highly desirable for the success of the project Currently, candidate local communities include Seldovia, Port Graham, Nanwalek, Tatitlek, New Chenega, and Cordova

2 Training The egg collection protocols developed by STAMP are designed to obtain eggs in a manner that insures the integrity of the sample for analysis and banking Local individuals will be provided hands-on instruction in these protocols Also during this period, estimates of the amount of resource support (equipment, materials, and monetary) will be determined for including in the out-year study plans for the project

3 Logistics planning A major consideration in the project will be determining the logistics required for collecting and transporting specimens in a timely manner and under conditions that ensures sample integrity Based on past experience, each collection location will present different problems that have to be overcome All three PIs have considerable experience in developing logistics plans tailored to the local situation, including Prince William Sound and the Gulf of Alaska Platforms for field collections include taking advantage of planned cruises, local subsistence activities, and shore-based seabird monitoring studies (FWS)

3 Analysis Unanalyzed egg contents samples (n = 20) collected from the murre colonies at E Amatuli and St Lazaria will be analyzed for persistent organic pollutants In addition, eggs from Bogoslof (n = 10) will be analyzed for comparative purposes This data and the analytical data already generated on STAMP murre colonies will be used to establish the initial database for the design of the expanded STAMP program in the GEM area Compounds to be measured include 56 PCB congeners, chlordanes (cis-chlordane, trans-chlordane, cis-nonachlor, trans-nonachlor, oxychlordane), heptachlor, heptachlor epoxide, DDTs (2,4'-DDT, 4,4'-DDT, 2,4'-DDD, 4,4'-DDD, 2,4'-DDE, and 4,4'DDE), dieldrin, mirex, hexachlorocyclohexanes (α-, β-, and γ-HCH), and hexachlorobenzene (HCB) A general description of the typical analytical procedures used is presented below

Aliquots of the cryohomogenized egg samples are first dried with Na_2SO_4 then extracted with dichloromethane using pressurized fluid extractor cell (PFE Dionex) as described in Kucklick et

al (2001) A mixture of internal standards are added to the PFE cell prior to extraction Six calibration solutions are also processed through the extraction and isolations steps Lipids are removed from the sample by size exclusion chromatography (SEC) then the extract is fractionated by using a semi-preparative aminopropylsilane column into relatively lower and higher polarity fractions (F1 and F2, respectively) The F1 fraction typically contains PCBs, heptachlor, 2,4'-DDE, 4,4'DDE, 2,4"DDT, hexachlorobenzene, oxychlordane, and mirex The F2 fraction contains 4,4'-DDT, cis- and trans-chlordane, cis- and trans-nonachlor, α-HCH, β-HCH, γ-HCH, heptachlor epoxide, 2,4'- and 4,4'-DDD, and dieldrin Concentrations are determined in the extracts by duplicate injections on a gas chromatograph with electron capture detection (GC-ECD) using 60 m DB-5 (J&W Scientific) and 60 m DB-XLB (J&W Scientific) capillary columns An aliquot of SRM 1946 "Lake Superior Fish Tissue (for Oganics)" or a gull egg control material from the Canadian Wildlife Service, National Wildlife Research Center is run with each set (a set is usually 10 samples) as a control GC with negative-chemical ionization (NCI) mass spectrometry (MS) is used to quantify oxychlordane in samples in which this compound splits between the two fractions

In order to normalize the analytical data based on lipid weight, total non-volatile solvent extractable (mainly lipid) material is measured in the sample from a portion of the dichloromethane extract Lipid is determined gravimetrically by first reducing the solvent volume from the extract with a Turbovap (Zymark), then allowing the remaining solvent to evaporate at room temperature The ratio of the residue to the wet mass extracted represents the fraction of the total non-volatile solvent extractable material

Statistical analysis will include ANOVA procedures to determine if the common murres at E Amatuli are significantly different in POPs concentrations in their eggs from those at St Lazaria and colonies at Bogoslof, St George, and Little Diomede islands In addition, principal components analysis (PCA) procedures will be used to estimate the degree of separation of among the colonies in the Gulf of Alaska and those in the Bering Sea, and to identify the principal analytes affecting any separations

5 Information feed-back to local participants An approach for providing project results to the participating/affected communities in a meaningful way will be developed in consultation with the communities through their EVOS community facilitators and the Spill Area-Wide Coordinator Because the communities will probably want to actively participate in the project, this strategy will also incorporate mechanisms for feed-back of information and recommendations from the communities to the project

6 Egg Collections Common murre and black-legged kittiwake eggs will be collected at Gull, Middleton, E Amatuli, and St Lazaria islands in Kachemak Bay and the Gulf of Alaska, and at Shoup Bay in Prince William Sound to help test collection techniques at new colonies and for new species Methods for collecting and transporting the eggs will follow current published protocols (see York et al , 2001) Collecting these eggs will also allow testing of pooling eggs for analyses (e g , pooling 10 kittiwake eggs into one sample)

C Cooperating Agencies, Contracts, and Other Agency Assistance

- Department of the Interior, U S Fish and Wildlife Service, Alaska Maritime National Wildlife Refuge
- Department of the Interior, U S Geological Service, Biological Resources Division, Alaska Biological Science Center
- Department of Commerce, National Institute of Standards and Technology

SCHEDULE

A Measurable Project Tasks for FY 02 (October 1, 2001 - September 30, 2002) and FY 03 (October 1, 2002 - September 30, 2003)

FY 02

15 Oct – 31 Dec 2001	Initiate contacts through EVOS community facilitators
1 Jan – 15 Jun 2002	Conduct information meetings and training for collectors
16 Jun – 15 Jul 2002	Collect eggs
1 Oct 2001 – 30 Sep 2002	Analyze samples collected in 1999 and 2001

FY 03

1 Oct – 31 Dec 2002	Develop logistical plans and plans for information feed back to participants, begin writing draft final report
1 Jan – 14 Apr 2003	Complete final report
10 Apr 2003	Submit final report with design for a GEM monitoring project to the Chief Scientist

B Project Milestones and Endpoints

December 2001	Complete making local contacts to develop partnerships
June 2002	Complete information meetings and training
July 2002	Complete collecting eggs
September 2002	Complete analyses of eggs collected in 1999 and 2001
April 2003	Submit final report to Chief Scientist

C Completion Date

A final report will be submitted to the Chief Scientist by 15 April 2003

PUBLICATIONS AND REPORTS

A final report will be submitted to the Chief Scientist by 15 April 2003 Also, a paper reporting results from STAMP will probably be submitted to *Science of the Total Environment* for publication in 2003

PROFESSIONAL CONFERENCES

STAMP results will be presented at the SETAC Conferences in November 2001 and November 2002

NORMAL AGENCY MANAGEMENT

Presently all agency partners in STAMP have limited funding for this project and expanding work in the Gulf of Alaska is doubtful without additional support Also, the work that AMNWR will do in not part of their normal seabird monitoring plan

COORDINATION AND INTEGRATION OF RESTORATION EFFORT

The proposed project will be coordinated and integrated with other AMNWR seabird monitoring projects It will also be closely coordinated with another project proposed by D G Roseneau (AMNWR) entitled "Evaluating the Feasiblity of developing a Community-Based Forage Fish Sampling Project for the EVOS GEM Program" to reduce travel costs

EXPLANATION OF CHANGES IN CONTINUING PROJECTS

This is a new study, not a continuing project

PROPOSED PRINCIPAL INVESTIGATOR

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PRINCIPAL INVESTIGATOR

David G Roseneau is the USFWS Principal Investigator for the STAMP He is a seabird biologist with 30 years of experience in seabird ecological research in Alaska He is responsible for all field collections and ecological analysis and interpretation for STAMP Also based on his experience in working with Alaska Native organizations and communities, he is responsible for Native community contacts, training in the communities, and development of logistics proposal for the project

Geoff W York is the USGS/BRD Principal Investigator for the STAMP He is a research biologist and is responsible for the seabird sample processing operation at the Alaska Biological Science Center in Anchorage He also has extensive experience in working with Alaska Native organizations on various research projects, including the Alaska Marine Mammal Tissue Archival Project (AMMTAP) For the proposed project, he will assist in Native community contacts, development of the logistics proposal, and provide assistance in training in the communities

Paul Becker is the NIST Principal Investigator for the STAMP with 25 years working in Alaska He is a research biologist and NIST Charleston Project Leader at the NIST Charleston Laboratory He has overall responsibility for the STAMP specimen archival, chemical analysis of samples, and the interpretation of the chemical data for the STAMP He has extensive experience working with Alaska Native organizations and communities, principally through his early work in establishing the AMMTAP His experience in PWS communities, occurred during the EVOS During the early stages of the spill he collected tissue specimens from harbor seals working with hunters in New Chenega, Tatitlek, and Nanwalek for effects assessment and for archiving in the NBSB This included providing training to local individuals on how to collect samples for contaminant evaluations

OTHER KEY PERSONNEL

Rebecca Pugh, Specimen Bank Leader at NIST Charleston, has principal responsibility for egg sample banking and cryohomogenization of samples

John Kucklick, Lead Organic Analytical Chemist at NIST Charleston, provides technical supervision of the graduate student who is analyzing the eggs for POPs

Stacy Vander Pol, NIST Charleston Technician and University of Charleston Graduate Student, performs POPs analyses and statistical analysis and interpretation of the resulting data

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2002 EXXON VALDEZ TRUS COUNCIL PROJECT BUDGET

October 1, 200 - September 30, 2002

Budget Category:	Authorized FFY 2001	Proposed FFY 2002						
Personnel	$0.0	$5.8						
Travel	$0.0	$2.8						
Contractual	$0.0	$42.3						
Commodities	$0.0	$0.2						
Equipment	$0.0	$0.0	LONG RANGE FUNDING REQUIREMENTS					
Subtotal	$0.0	$51.1	Estimated FFY 2003	Estimated FFY 2004	Estimated FFY 2005	Estimated FFY 2006	Estimated FFY 2007	Estimated FFY 2008
General Administration	$0.0	$3.8						
Project Total	$0.0	$54.9	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0
Full-time Equivalents (FTE)	0.0	0.2						
	Dollar amounts are shown in thousands of dollars.							
Other Resources								

Comments: This proposed budget is the Alaska Maritime NWR portion for the proposed "Expanding the Seabird Tissue Archival and Monitoring Project (STAMP) Program for the GEM Program."

The Alaska Maritime National Wildlife Refuge will donate 0.5 months of the project manager's time to the project.

FY02

Prepared: 04/08/01

Project Number: 02634
Project Title: Expanding the STAMP Program for the GEM Program
Agency: DOI-FWS

FORM 3A
TRUSTEE
AGENCY
SUMMARY

2002 EXXON VALDEZ TRUS COUNCIL PROJECT BUDGET

October 1, 200 - September 30, 2002

Personnel Costs		GS/Range/	Months	Monthly		Proposed
Name	Position Description	Step	Budgeted	Costs	Overtime	FFY 2002
David G Roseneau	Project Leader (Principal Investigator)	GS11/6	1 0	5 8	0 0	5 8
G Vernon Byrd	Project Manager	GS13/1	0 5	0 0	0 0	0 0
C Berg	Program Manager	GS12	0 1	0 0	0 0	0 0
	Subtotal		1 6	5 8	0 0	
					Personnel Total	$5 8

Travel Costs	Ticket	Round	Total	Daily	Proposed
Description	Price	Trips	Days	Per Diem	FFY 2002
Travel to Seldovia (for Gull Island)	0 1	1	1	0 1	0 2
Travel to Sitka (for St Lazaria Island)	0 5	1	2	0 2	0 9
Travel to Valdez (2 people) (for Shoup Bay)	0 4	2	2	0 2	1 2
Travel from Homer to Anchorage (for Middleton Island)	0 3	1	1	0 2	0 5
				Travel Total	$2 8

FY02

Prepared 04/08/01

Project Number
Project Title Expanding the STAMP Program for the GEM Program
Agency DOI-FWS

FORM 3B
Personnel
& Travel
DETAIL

2002 EXXON VALDEZ TRUS COUNCIL PROJECT BUDGET

October 1, 200 ı - September 30, 2002

Contractual Costs	Proposed
Description	FFY 2002
Contract to NIST (see Non-Trustee Budget Forms 4A and 4B)	35 0
Personal Services contract to the Seldovia Village Corp to assist biologists collect murre and kittiwake eggs at Gull Island	0 5
Transporation to East Amatuli Island (vessel charter 2 days @ $2 0K/day)	4 0
Transporation to St Lazaria Island (vessel charter 2 days @ $0 6K/day)	1 2
Transporation to Shoup Bay from Valdez (vessel charter no cost)	0 0
Transporation to Middleton Island from Anchorage (twin-engine air charter)	1 6
When a non-trustee organization is used, the form 4A is required **Contractual Total**	$42 3

Commodities Costs	Proposed
Description	FFY 2002
20 plastic buckets for transporting eggs ($10 00 each)	0 2
Commodities Total	$0 2

FY02

Prepared 04/08/01

Project Number
Project Title Expanding the STAMP Program for the GEM Program
Agency DOI-FWS

FORM 3B
Contractual & Commodities DETAIL

2002 EXXON VALDEZ TRUS COUNCIL PROJECT BUDGET

October 1, 200 - September 30, 2002

New Equipment Purchases Description	Number of Units	Unit Price	Proposed FFY 2002
No equipment is needed for the project			$0 0
Those purchases associated with replacement equipment should be indicated by placement of an R		**New Equipment Total**	$0 0

Existing Equipment Usage Description	Number of Units	Inventory Agency

FY02

Prepared 04/2/01

Project Number
Project Title Expanding the STAMP Program for the GEM Program
Agency DOI-FWS

FORM 3B
Equipment
DETAIL

FY 02 *EXXON VALDEZ* TRUS .OUNCIL PROJECT BUDGET
October 1, 2001 - September 30, 2002

Budget Category	Authorized FY 2001	Proposed FY 2002						
Personnel		$23 5						
Travel		$3 1						
Contractual		$0 0						
Commodities		$2 0						
Equipment		$0 0	LONG RANGE FUNDING REQUIREMENTS					
Subtotal	$0 0	$28 6	Estimated FY 2003					
Indirect		$6 4						
Project Total	$0 0	$35 0						
Full-time Equivalents (FTE)		0 8						
	Dollar amounts are shown in thousands of dollars							
Other Resources	$73 3							

Comments Indirect costs are 25% of the first $25 K of direct costs + 5% of $3 6K of direct costs Other resources includes salary and overhead/benefits costs for Becker (2 mos), plus an additional 0 5 mo of Kucklick's salary with overhead costs, plus additional overhead/benefits cost of Pugh, and Vander Pol These additional resources are handled through NIST internal funding (total contribution = $73 3 K) and will not be charged to the project

$3 5K of the project costs is for travel to attend annual restoration workshop and one scientific conference to present analytical results, and costs associated with report writing and printing

□

FY02

Prepared April 11, 2001

Project Number
Project Title Expanding the STAMP Program for the GEM Program
Name NIST

FORM 4A
Non-Trustee
SUMMARY

FY 02 *EXXON VALDEZ* TRUS COUNCIL PROJECT BUDGET

October 1, 2001 - September 30, 2002

Personnel Costs			Months	Monthly		Proposed
Name	Position Description		Budgeted	Costs	Overtime	FY 2002
S Vander Pol	Research Technician		6 0	2 8		16 8
P Becker	Research Biologist		2 0	0 0		0 0
J Kucklick	Organic Analytical Chemist		0 5	5 7		2 9
R Pugh	Research Biologist, Specimen Bank		1 0	3 8		3 8
	Subtotal		9 5	12 3	0 0	
					Personnel Total	$23 5

Travel Costs	Ticket	Round	Total	Daily	Proposed
Description	Price	Trips	Days	Per Diem	FY 2002
Charleston, SC, to Anchorage, AK - January 2002 Tech Workshop	1 5	1	2	0 2	1 9
Conference attendance and presentation (SETAC or comparable)	0 4	1	4	0 2	1 2
				Travel Total	$3 1

FY02

Prepared April 11, 2001

Project Number
Project Title Expanding the STAMP Program for the GEM Program
Name NIST

FORM 4B
Personnel
& Travel
DETAIL

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

Contractual Costs	Proposed
Description	FY 2002
Contractual Total	$0 0

Commodities Costs	Proposed
Description	FY 2002
1 Solvents and expendables for analysis	1 0
2 Report preparation and printing	1 0
Commodities Total	$2 0

FY02

Prepared April 11, 2001

Project Number
Project Title Expanding the STAMP Program for the GEM Program
Name NIST

FORM 4B
Contractual &
Commodities
DETAIL

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

New Equipment Purchases	Number of Units	Unit Price	Proposed FY 2002
Description			
Equipment purchases are not needed for the project			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	
HPLC with Foxy 200 Fraction Collector	2
Accelerated Solvent Extraction System (Dionex)	1
Turbo Vap II Workstation	1
HP 6890 Gas Chromatograph with Dual Electon Capture Detectors	1
HP 6890/5973 Gas Chromatograph with Mass Spectrometry Detection	1

FY02

Project Number
Project Title Expanding the STAMP Program for the GEM Program
Name NIST

FORM 4B
Equipment
DETAIL

Prepared April 11, 2001

Securing and sustaining the recovery of the marine ecosystem through a partnership with the marine-based economies of the spill-impacted communities

Submitted under the BAA

Project Number: 02636-BAA

Restoration Category: Research, Monitoring, General Restoration

Proposer: Consortium of spill-impacted fishery resources user-groups

Lead Trustee Agency

Cooperating Agencies:

Alaska SeaLife Center:

Duration: Oct 2001 -- Sep 2003

Cost FY 01: $148 - $341

Cost FY 02: $147 - $315

Geographic Area: spill-impacted region

Injured Resource/Service: all affecting commercial, sport, and subsistence fishing

I. ABSTRACT

The goal of securing and sustaining the recovery of the marine system is a first priority for the Trustee Council as well as for the spill-impacted region. Given the successes of the Council's Restoration Plan that goal is within our reach. The economies and the communities of the spill-impacted region are the natural partners for realizing the goal. In this regard commercial fishing has the involvement, resources, and motivation---through long term financial positions and committed financial risks---to be one of the most effective partners. The objective is a plan and a demonstration that a partnership with joint investment can accomplish significantly more toward our common goal than is possible through the same investments expended independently.

B □□□□INTRODUCTION

This proposal is based on the perspective that

> *the goal of securing and sustaining the recovery of the marine system impacted by the Exxon Valdez oil spill is among the highest priorities for the Trustee Council as well as for the spill-impacted region, and that given the successes of the Council's Restoration Plan that goal is within our reach*

This proposal is to point out to the Trustees that the economies and the communities of the spill-impacted region are the natural partners in realizing this goal The majority of the population of the spill-impacted region is sustained by economies and cultural practices predominantly dependent upon the resources of the marine ecosystems Their communities and their economies are on a recovery path that parallels the recovery of the marine system

Among these partners commercial fishing has the interests, the motivation, the involvement, the resources, the expertise, and both the long term financial position and the committed financial risks to be one of the most effective partners One obvious basis for this claim is the successful outcome of our partnership in 1993---the successful outcome of the Restoration program based upon our 1993 science plan is now well-known and widely acknowledged More generally, this claim is based on the obvious fact that securing and sustaining the recovery of the marine systems is quite naturally fundamental to the well-being of the industry Since the economic basis for the majority of the communities of the region is the commercial fishing industry, that which is fundamental to the industry is similarly fundamental to the communities

In the paragraphs that follow we offer to the Council three further factors presently affecting commercial fishing in Alaska These factors are unrelated to spill impacts and restoration The purpose of presenting these is that these factors each require efforts on the part of the industry which can contribute directly to the goal of securing and sustaining the recovery of the marine system The ability of the industry and the communities to respond to these factors is significantly advanced by the accomplishments of the Council's Restoration Plan, and the most effective responses will be ones that fully exploit and utilize the Council's results The utilization and the implementation of the results are in large measure precisely the effort that is now required to begin the process whereby we secure and sustain the recovery of the marine ecosystem

The three additional factors are 1) the ever-present risk to the marine system from some future oil spill, 2) competition from worldwide salmon aquaculture and the economic pressures of the present global economy, and 3) the extremely scarce industry-directed support from government or related industries for non-aquaculture fish production These three present-day realities all combine to make the incorporation of the best and the most current progress in understanding, tracking, and forecasting the course of the marine bio-production system a basic requirement for the viability of commercial fishing in the state waters of Alaska A large fraction of what commercial fishing needs to know to operate in an economically optimal manner is the same information the Council needs to know in order to secure and sustain the recovery of many of the components of the marine system

This proposal requests support for initial planning and for a limited scope demonstration of the structure and content of the proposed partnership The core objective to be achieved through this effort is the demonstration that through a partnership involving joint investment we can together accomplish significantly more toward the common goal of securing and sustaining the recovery of our marine ecosystem than could be realized through the same investments expended independently

NEED FOR THE PROJECT

A Statement of Problem

Anyone who has lived for any time at all in one of the southcentral Alaskan communities located in the path of the oil from the *Exxon Valdez* spill knows well that much more than the marine ecosystem was altered by the oil spill The damage, the response, and the recovery of the economic and social systems of the spill-impacted region in many ways parallel that which has occurred in the marine ecosystem

The Executive Director and the Trustees of the *Exxon Valdez* Oil Spill Trustee Council have understood that recovery would have direct effects beyond what can be measured by the abundance and the condition of the many marine species damaged by the spill The pace and the extent of the recovery of the marine system would determine the feasibility and the extent of the recovery of the marine-based economies It would similarly determine the fate and the health of native communities On the other hand, the Council recognized that despite the presumed advances of this "age of technology" the majority of the successes of the Restoration Plan would be advances in explaining, tracking, and documenting the process by which the marine system was impaired and then commenced to repair itself---or failed to repair itself There would be few cases in which there could be an intervention such that the recovery of the marine system was accelerated

It was this close relationship between the recovery of the economies and communities of the region and the recovery of the impacted ecosystems that was the basis for the partnership of commercial fishing interests and the *Exxon Valdez* Oil Spill Trustee Council in 1993 Through that partnership we developed a science plan [1] that addressed issues that were important both for the recovery of the economies and the communities dependent upon fishing and for the recovery of the damaged fish resources An important result from that partnership was a science plan with the proper balance between sufficient technical scope on the one hand and a targeted focus on carefully selected recovery related topics on the other The success of our partnership was acknowledged nearly immediately that balance between scope and focus became a core theme of the Restoration Plan and became known as the "ecosystem" approach to recovery and restoration

In March 1999 the five year program based on our 1993 science plan was formally concluded Representatives from commercial fishing attended the public presentations of the results from that program In June 1999 we begun our review of the results We could complete only a limited review during the height of the fishing seasons, and during

the fall and winter the industry was fully occupied by the immediacy of proposed regulatory changes with major consequences It was winter before more complete reviews could begin But once resumed we also began to review the other efforts that had been conducted under the Restoration Plan Here again we are quite pleased and impressed with what we find accomplished since 1994 The Restoration Plan has realized major advances through the two companion ecosystem projects and through the separate program areas of toxicology, oil exposure responses, disease, and genetics These accomplishment taken together certainly look to be a successful outcome relative to the objective of explaining, tracking, and documenting the process by which the marine system was (and in ways still is) impaired and then begins---or fails to begin---to repair itself

The Council has acknowledged in many documents and in many forums that the state of the art limits it to only a very coarse determination of the status of the marine system components The Council classifies resources in two ways either injured or not by the spill, and if injured then the present status is reported as either recovered, recovering, or nonrecovering The Council has noted that its use of the classification "recovering" in nearly all cases reflects the difficult challenge of identifying the present state of a resource that is but one part of a larger time-varying and interdependent marine ecosystem This is quite what one should expect at this stage--- the accomplishments have only just now delivered capabilities to explain, track, and document the process by which the components of the marine system are undergoing change season by season, year by year

With these successes in hand the Council is now in the best position ever to bring serious, meaningful, and relevant content to our collective understanding of the status and prognosis for those components injured by the *Exxon Valdez* oil spill The realization of these goals of the Restoration Plan is certainly among the highest priorities for both the Trustee Council and for the communities of the spill-impacted region In particular, it is certainly a top priority for commercial fishing In addition, there are other priorities for commercial fishing that are distinct from the spill and its impacts but which nevertheless are served by the achievements of the Restoration Plan By partnering once again with the Council commercial fishing can use the achievements in ways that will directly benefit commercial fishing and also directly contribute to the Council's goal of securing and sustaining the recovery of the impacted marine ecosystem

B Rationale/Link to Restoration

In summary, there are four fundamental facets that form the foundation of the proposed partnership

1 □□□□ the fundamentals of the partnership

1 The Trustee Council and the commercial fishing industry share the goal of securing and sustaining the recovery of our marine ecosystems through the fullest use of the advances and assets obtained through the Council's Restoration Plan

2 The marine-based economies of the spill-impacted region are now fully organized and actively engaged in the shared task of insuring the future of the marine ecosystems by means of the mature and well established RCAC process, that

regionwide process is ready to commence using to the fullest extent possible the advances and assets obtained through the Council's Restoration Plan

3 Fish production in Alaskan waters is by statute prohibited from pursuing the fish husbandry approach and instead is based upon the best and the optimal utilization of the marine ecosystem in a manner which optimally preserves the inherent productive capacity of that system, for commercial fishing in Alaska to survive economically it must incorporate into its methods, planning, and operations to the fullest extent possible the advances and assets obtained through the Council's Restoration Plan

4 Industry-directed support for commercial fishing in Alaskan waters is inherently limited not only by the scale of the economy but also by the inherent approach wherein the production system is optimally used but only minimally altered, precluding the expansion of the economy to include industries and methods devoted to "improving" the product and the production processes, to survive economically this production method must pursue consolidation through partnering with those entities---such as the Trustee Council---actively engaged in the use, maintenance, monitoring, and preservation of the marine system in its contemporary state

In the following paragraphs we offer some brief background regarding the last three topics of the foregoing list

2 □□□□ The responses to the ever-present risk of another oil spill

The communities of the spill-impacted region have been altered in a major way by the spill-induced realization that spills happen and precisely what the consequences of that can be The response to that realization has proceeded quite separately from the spill impacts and the efforts to recover from those impacts The response is primarily in the form of new organizations and new infrastructure whereby residents are empowered with the means to take an active role in the oversight and protection of the marine ecosystem The cornerstones of this response is the pair of Regional Citizen's Advisory Councils (RCAC), the Prince William Sound RCAC and the Cook Inlet RCAC Each RCAC consists of a board of directors comprised of a representative from each of the economic and governmental entities of the region Because the RCACs have roles and guaranteed access that is established by federal statute, the residents of the region interact with the oil industry in a setting wherein the overwhelmingly economic dominance of the oil industry has at least in part been equalized

There are other organizations besides the two RCACs which have formed for the purpose of increasing the oversight of terminal operations and oil transport in PWS However, for the purposes here it suffices to use the RCACs as the standard example They are among the first that were formed Their board structure has the effect of sustaining the necessary active participation and attention of each of the represented groups Commercial fishing has two permanent seats in the PWS RCAC both Prince William Sound Aquaculture Corporation and Cordova District Fisherman United have permanent seats on the Council

Throughout the region and throughout commercial fishing there is a sober appreciation of the disparity between the economic resources of the oil industry and that of the users of the marine resources and of the vulnerability of the latter to an unintended error by the former This appreciation sustains the active commitment to secure and insure a

successfully uneventful future coexistence of marine-based economies and the oil transportation industry Throughout the region and throughout commercial fishing there is the institutional will and the organizational means whereby the results from the Restoration Plan can be used to enhance the assurance of that uneventful future coexistence

3 □□□□ Salmon aquaculture

Another factor is salmon aquaculture Throughout the world there has been an explosive growth in salmon aquaculture and at the same time the state of Alaska has committed itself to an economic plan that excludes finfish aquaculture in state waters Competition from worldwide salmon aquaculture is now a fact of life for salmon fishing in Alaska The competition is not simply from pen reared Atlantic salmon from Canada and Chile, the New Zealand King Salmon Co Ltd has been producing and selling pen reared king salmon for several years (www kingsalmon co nz) One view is that the increased availability of salmon will ultimately help Alaska fishing by increasing the demand [2] During this same period there has been a sharp decline in the value of the salmon harvest This decline has been greatest for pink salmon but has occurred for the other species as well

The necessity of competing with farmed fish and the economic demands due to lower prices have resulted in increased efforts to better distinguish the differences in the Alaskan products and also in increased attention on production costs, consistency, and predictability In effect, farmed fish and declining prices have had the effect of changing the focus from solely harvest operations to a perspective of the marine system as the production system for commercial fishing In this context the questions are ones related to a significantly enhanced ability to know how the production system is functioning---its operational efficiency, the consistency of the output, and the ability to make significantly more well informed and longer term financial plans

For an example from salmon farming consider the first part of the statement of the "company focus" for the New Zealand King Salmon Co Ltd

> To guarantee quality and reliability, the company must own and control every stage of production

If this is the alternative to commercial fishing in Alaska, and since commercial fishing cannot own and control every stage of production of the marine ecosystem, at the least we will have to set the "company focus" for Alaska fishing as the necessity to "explain, track, and forecast every stage of production " Is this not in fact also the Trustee Council's goal for its Restoration Plan?

4 □□□□ Industry-directed support

The foregoing "company focus" for Alaska commercial fishing and the decision of the state to forego finfish aquaculture are at odds with the reality of present day economic incentives and support systems If the state had chosen salmon aquaculture then there would be the possibility of benefits from the system of national investment and infrastructure support administered by the Department of Agriculture Moreover, the pen-rearing process itself is but one of a large array of industries required for farm

production of salmon The overall process involves feed producers and the pharmaceutical industry It involves university and agency programs which develop methods to realize faster growth, improved uniformity and consistency for size and flesh composition, lower production costs and higher production yields, and the identification and isolation of the best performing strains Farm production therefore can have a correspondingly broad economic base with which to advance farm technology and practices

The statement of the "company focus" for NZ King Salmon Co suggests that the industry is sufficiently successful to be entering a consolidation phase The second half of the "company focus" statement for NZ King Salmon indicates that the consolidation includes significant corporate investment in independent research and development to advance its competitive position

> With assets such as a unique salmon stock resource and one of the cleanest and most ideal salmon rearing environments, the company is committed to research and the continuing improvements of fish husbandry, farming and processing techniques

The decision of Alaska to forego fish husbandry for its marine species is strongly supported by the commercial fleet and by those interested in the preservation of the Alaskan marine ecosystems However, this approach does require that the communities which are economically dependent upon fishing survive in an unequal competition Commercial fishing and the subsistence harvest of marine production have none of the benefits mentioned above yet these benefits are a contemporary norm for many industries In part this situation is due to scale In the case of subsistence the fundamental issue is that it is a non-economic activity For commercial fishing there is the limitation that the size of the economy is such that it is difficult to justify large national investment The production method by design seeks to optimally utilize the marine ecosystem with a minimum of alteration and disturbance to that system To succeed economically with that approach the industry requires many of the same scientific and technical assets and resources as have been developed by the Trustee Council during the six years of the Restoration Plan There is a compelling shared interest in securing and sustaining the accomplishments of the Restoration Plan that is fully complementary to the goal of recovery from the spill impacts

C Location

The fundamental issue for the industry in this effort is cost-to-benefit ratio Can the industry, in partnership with the Council and in coordination with state-funded agency programs, invest in efforts to secure and sustain the recovery of the marine ecosystem and on average obtain a positive return on that investment through the combined contribution of the four factors identified above as the "fundamentals of the partnership"?

It seems clear that the costs relative to benefit should decrease if each of Restoration Plan results is applied to the fullest extent possible The costs for implementing a given Restoration result will of course increase as the geographic domain of implementation is increased However, the increase will almost surely be less than proportional This is

because of the efficiencies typically recoverable when a single, common result is used many times rather than only once In contrast, the benefit should indeed increase in proportional to the geographic extent in which the result is utilized Consequently, to obtain maximum efficiency and hence to optimize the feasibility in terms of cost-to-benefit ratio Restoration Plan results should be used throughout the spill-impacted region

The obvious exception is in the case of a trial implementation such as the one proposed here In this case we will have to reduce the geographic domain to that for which the cost of the implementation is compatible with a reasonable cost for the trial Typically there is a minimum geographic extent associated with a meaningful trial, and that minimum will set the cost of the trial The location will be chosen from those for which the cost of the trial is a minimum From a trial over such a small geographic region we will know that the cost-to-benefit ratio should be the same or lower as we increase the geographic extent to the entire spill-impacted region

C □□□□COMMUNITY INVOLVEMENT AND TRADITIONAL KNOWLEDGE

This effort consists exclusively of community involvement The effort could be viewed as a traditional knowledge review of the Restoration Plan The demonstration trial and its evaluation will be organized and managed by the community The outcome of the demonstration will be evaluated using many measures, one of which will be the consistency with traditional knowledge

D □□□□PROJECT DESIGN

The project design consists of four parts review, evaluation and consensus, demonstration, and demonstration assessment and preliminary implementation strategy For each of the four parts there is an objective and a plan for execution

A Objectives

The first objective for the overall effort is to demonstrate the essentially obvious merit of the partnership Specifically,

> The first objective is to demonstrate that through a partnership involving joint investment we can together accomplish significantly more toward the common goal of securing and sustaining the recovery of our marine ecosystem than could be realized through the same investments expended independently

Realizing this first objective is clearly a benefit to the Council since this will demonstrate the means whereby the Council can improve the efficiency and effectiveness of its efforts to secure and sustain the recovery of the marine ecosystem This objective alone, however, is not sufficient to answer the essential financial question for the industry A second objective is the initial assessment of the financial return to the fishery-based economies---as specified in "fundamentals of the partnership"---that can be realized

through the implementation of the results from the Restoration Plan This assessment will determine the investment that can be made by the industry and consequently the nature of the partnership that is required to secure and sustain the recovery of the marine ecosystem

The objective for each part of the four-part project design follows

1 □□□□ Review by a core group

The purpose of this effort is to enable a core group of commercial fisherman with sufficient tenure and standing in the industry and with appropriate scientific backgrounds and experience to complete a careful and in-depth review of a selected subset of the results, resources, and assets obtained through the Restoration Plan

2 □□□□ Dissemination and a consensus demonstration trial

By means of their positions and standing in the various commercial fishing organizations, by means of their knowledge of and direct involvement in spill-impact and spill prevention and response issues, and through their involvement and familiarity with the scientific and technical community and with the managers and research staff within ADFG, the core industry group is to communicate and evaluate the Restoration results and their review of those results with commercial fishing, with spill prevention and response oversight groups, with the scientific and technical providers of the results, and with the managers and research staff of the regulatory agencies Through this communication and evaluation the core group will seek to establish a consensus among fishing industry groups and spill oversight groups regarding priorities and feasibility for a demonstration implementation of Restoration Plan results

3 □□□□ Coordinated demonstration trial

The core group will be the coordinators and project managers for the demonstration trial, facilitating the access and exchange between the industry, technical providers, and regulators

4 □□□□ Determination regarding continuation and the structure of the partnership

The core group will communicate with the industry, providers and regulators regarding the outcome of the trials and their assessment of those trials, the group will communicate to the Council the outcome as it relates to the issues of recovery and restoration In addition to this communication of results the core group will seek a consensus in within the industry and the spill oversight groups first in regard to the evaluation of the trial relative to the two overall objectives and second in regard to the form and structure of a continuing partnership

B Methods

The organizational structure of this effort consists of an ad hoc group from commercial fishing with the experience, seniority, and record of participation in the industry whereby they can communicate their review of the Restoration Plan results to a major fraction of those in key positions in the industry Hence, the investigators are board members of

organizations but currently do not hold positions wherein their work on this effort can be construed as conveying any endorsement or any position of any of the industry organization The method herein is a group with both maximum flexibility and maximum access For the initial phase, the review phase, it is the flexibility and the autonomy of the group that is a priority

For the demonstration effort the objective is the converse Once the review and discussion has been completed the goal is a consensus within the industry regarding the demonstrations Here it is the access and history of the investigators which is more important than their autonomy and flexibility

A further method is to limit the scope of the review and the range of options to be candidates for the demonstration The scope of this initial industry review and demonstration must be quite significantly bounded in order for the effort to be feasible Clearly, an early and a challenging task with be establishing the scope for the review This effort will benefit from assistance from the Chief Scientist, the Science Coordinator, and from the senior members of the scientific review committee

All of the participants presently have Internet access and reasonably contemporary equipment whereby the effort can take full advantage of the efficiencies associated with current Internet resources This effort does ask for some cost sharing of costs for CDFU for this office and this facility is a key communications hub for much of the commercial fishing fleet The present facilities at CDFU are at the minimum required to support the organization but are not adequate for the additional burden this effort will ask of these facilities

C Cooperating Agencies, Contracts, and Other Agency Assistance

It is envisioned that the review and the demonstration phases of this effort will have differing interactions with the agencies and with the science and technical providers

During the review of selected Restoration Plan results the core industry group will very likely need to confer with those in the agencies and those from the scientific and technical community who were responsible for the Restoration Plan results In those cases where state and federal funding for the respective agency no longer provides for the group or the service which was responsible for the result, funds from this effort may be needed to cover the costs and expenses for conferring with those responsible for the results This will almost certainly be required in the case of providers of Restoration Plan results who are not agency employees

During the demonstration phase the focus will be on finding the extent to which existing state and federal programs provide part of the requirements for any of the contemplated demonstrations It is expected that candidate demonstrations which will have the greatest benefit versus cost for the industry will be least likely to have major aspects that are part of present state and federal agency programs There may be better chances of finding existing programs that can contribute to a demonstration effort in non-government research centers and universities, but then these will almost certainly be short term and one-time programs Such cooperation may be pursued in this effort, but the temporary

nature will make it difficult to use the cooperation as part of the evaluation of cost-to-benefit ratio Moreover, the effort required to seek out such cooperation will be high and hence no systematic search is contemplated

E □□□□SCHEDULE

A Measurable Project Tasks for FY 01 (Oct 01 2000 - Sep 30 2001)

	add parttime tech-admin person	pers
	agenda item for RCAC Dec board meeting	RCAC
	determine preliminary subset of Restoration Plan results to be reviewed	subset
1	upgrade for CDFU communications	comm/net
2	session on review & subset selection RCAC Dec 2000 board meeting	RCAC
3	network of key providers of selected subset of Restoration Plan results	network
4	attend Restoration Workshop 2001	Wrkshp
	agenda and invitations for PWSAC Mar 2001 board meeting	PWSAC
5	complete selection of subset	subset
6	prepare EVOSTC proposal for year 2, fy 2002	DPD
	part 1 of review of selected subset of Restoration Plan results	review1
7	special review session PWSAC Mar 2001 board meeting	PWSAC
	part2 of review of selected subset of Restoration Plan results	review2
	agenda and invitations for CDFU annual meet, RCAC Jul board meet	CDFU,RCAC
	communicate review to industry, confer re review, evaluate the review	commun
8	review at CDFU annual meeting at RCAC meeting	CDFU,RCAC
9	industry consensus regarding scope and results for demonstration trials	demo plan
	agenda and invitations for PWSAC Sep 2001 board meeting	PWSAC
	phase 1 of demonstration trials	demo1
10	confer re review and demonstrations PWSAC Sep 2001 board meet	PWSAC
	phase 2 of demonstrations	demo2
	agenda items for RCAC Dec 2001 board meeting	PWSAC
	part 3 of review	review3
	agenda and invitations for PWSAC Mar 2002 board meeting	PWSAC
11	present demonstrations RCAC Dec 2001 board meeting	RCAC
	phase 3 of demonstrations	demo3
12	Restoration Workshop Jan 2002	RstrWrkshp
	part 1 of evaluation of demonstration	eval1
13	EVOSTC Ann Report fy 2001	Ann Rpt
14	confer at PWSAC Mar 2002 board meeting	PWSAC
	agenda for RCAC Jul board meeting, CDFU annual meeting	CDFU,RCAC
	part 2 of evaluation of demonstrations	eval2
	establish initial recommendations	rec1
15	draft recommendations, CDFU ann meet, RCAC Jul 2002 board meet	CDFU,RCAC
16	prepare CDFU Technical Report	rec2
17	extract EVOS relevant items for EVOSTC Final Report	FnlRpt
18	dialogue with EVOSTC regarding partnership benefits, cost efficiency	partner

A Project Milestones and Endpoints

1	Dec 01, 2000	tech-admin & communications at CDFU
2	Dec 17, 2000	RCAC Dec meeting preliminary review
3	Jan 28, 2001	network of key sci-tech providers established
4	Jan 28, 2001	Restoration Workshop
5	Mar 01, 2001	selection of subset for review
6	Apr 15, 2001	EVOSTC DPD for year 2 fy2002
7	Mar 20, 2001	PWSAC Mar meeting special session on review of results
8	Jul 10, 2001	RCAC Jul meet, CDFU ann meet evaluation of review
9	Jul 15, 2001	concensus for demo plan
10	Sep 25, 2001	PWSAC Sep meet conference on review & demo plan
11	Dec 18, 2001	RCAC Dec meet mid-demo progress
12	Jan 26, 2002	Restoration Workshop
13	Apr 15, 2002	EVOSTC Annual Report fy 2001
14	Mar 20, 2002	PWSAC Mar meet presentation of demonstrations
15	Jul 01, 2002	CDFU Ann meet, RCAC Jul meet eval recommendations
16	Aug 01, 2002	CDFU Technical Report
17	Aug 30, 2002	EVOSTC project Final Report
18	Sep 15, 2002	complete dialogue regarding partnership

A Completion Date

September 15, 2002

B □□□□PUBLICATIONS AND REPORTS

The review of the Restoration Plan results, the demonstration plan, the demonstration evaluation, and the strategy for an economically feasible partnership will all be documented and archived in the form of CDFU Technical Reports

The results of the effort in the area of marine ecosystem recovery will be collected into a single report and will be the project Final Report

C. □□□□PROFESSIONAL CONFERENCES

As part of this effort it is not anticipated that investigators will attend professional conferences However, the core industry group will be using the annual, semi-annual, and quarterly industry meetings as ideal events in which to invite key groups of providers of Restoration Plan results to present to the industry their results It is envisioned that the support from the Council will enable these industry meetings to be expanded and become an obvious forum whereby the scope of the review is set, the completed review is communicated, discussed and evaluated, and a consensus is developed for the demonstration

D □□□□COORDINATION AND INTEGRATION OF RESTORATION EFFORT

This effort is a coordination and integration of the current results of the Restoration Plan by the industry which was most impacted by the *Exxon Valdez* oil spill

E □□□□PRINCIPAL INVESTIGATORS

1 □□□□Brief summaries of professional histories

2 □□□□ Co -Pi #1 Kenneth Adams

Mr Adams has been a commercial fisherman since 1981 During that period of time he has held permits and owned vessels for essentially all of the fisheries of PWS Currently he holds permits and vessels in Area E (PWS) for salmon purse seine and salmon drift gill netting as well as halibut IFQ for the central Gulf of Alaska He holds a M A degree in Biology from San Francisco State University and a B A in science from Trenton State College, N J In addition , he has completed several years of study toward a Ph D in Biology, with emphasis in marine studies at Univ of Calif Santa Barbara He has taught Biology in public high schools and Marine Biology courses locally at PWS Commu Coll in Cordova
Mr Adams has been an active member of various fishing industry related organizations since 1988
He was a board member of CDFU from 1988, through the course of the EVOS event in 1989 and continuing until 1996 He has been a member of PWSAC , the local aquaculture assoc from 1988 to the present and served as that organization's representative to United Fishermen of Alaska from 1995 to 1998
In addition, he had been involved with PWS Fisheries Ecosystem Research Planning Group (PWSFERPG), and has participated in the EVOS Trustee Council public process since 1992 He has attended the public presentation in Anchorage of the final results of the Trustee Council supported Sound Ecosystem Assessment (SEA) He is currently involved within the public process to help craft a Gulf ecosystem Monitoring (GEM)
program that is relevant to the resources and stakeholders dependent upon those resources in the spill impacted area
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Phone/fax 907-424-5456
e-mail address kadams@ctcak net

3 □□□□ Co-Pi # 2 Lloyd"Bud" Perrine

Mr Perrine started commercial fishing at age 14 on the Columbia river and did various types of work in the off season so that he could continue to participate in the fishing and crab industry from washington to the Bering Sea in Alaska
He has worked with stream side incubation and has spent considerable time around the Washington state hatchery system He has been involved with local fishing organizations, ADF&G , fish processors, and city government during his years as a resident of Cordova
Mr Perrine was a member of the grassroots organization, PWSFERPG that aided the creation of the SEA research program Since 1990 he has been involved with PWSAC as a general board member, chairman of PWSAC's board of directors and was its General Manager until just recently
He is no longer a fishing permit holder and has no plans to re-enter the fishery at this time
In 1981 he started a marine supply business with his wife that is in operation to this date Since his resignation from PWSAC as General Manager on April 3rd 2001, he plans to devote his time and attention to his business and issues of importance to PWS
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Co-PI #3 C Ross Mullins

Mr Mullins has been a commercial fisherman in Alaska since 1963 He has been a salmon gillnet and salmon seine fisherman in Prince William Sound for much of that time He gillnetted in Bristol Bay in the mid 1980's as well He has been involved with the PWS herring fisheries from the early 1970's until the Exxon Valdez oil spill, both as a processor/buyer and herring pound operator His current involvement with the fishery is as a salmon gillnet fisherman

Mr Mullins obtained a BFA degree from the San Francisco Art Institute in 1962 Prior to that time for various periods he attended the University of New Hampshire and the University of Michigan He served in the US Army from 1955-1957 He graduated from Concord High School in Concord, NH

Mr Mullins has been active in a number of fishery related industry organizations He was a board member of the Cordova Aquatic Marketing Assn /Cordova District Fishermen's Union from 1968 through 1984 where he served as the Marine Pollution Committee Chair He is a member of the Cordova District Fishermen United from 1989 to present and served on the Board of Directors from 1995 through 2000 Mr Mullins served on the Board of Directors/Executive Committee of the Prince William Sound Aquaculture Corporation from its inception until 1985 and again as a member of the Executive Committee from 1995 through 2000 Mullins serves as a director of the Commercial Fishery and Agriculture Bank from 1989 to present He was a founding member of the Prince William Sound Fishermen Plaintiffs Committee where he serves as chairman Mullins was a member of the Sound Science Review Planning Team for the several years that it was active, helping to plan a broad overview of research projects deemed desirable for the PWS region

Mr Mullins has a strong desire to see that the current EVOS/Trustee projects such as the GEM program continue to focus on areas of investigation that will result in practical benefit to the user groups in the spill impacted areas of Alaska He desires to see a greater emphasis on the joint partnering of industry with scientific investigation
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LITERATURE CITED

[1] PWSFERPG Sound Ecosystem Assessment Initial science plan and monitoring program Technical report, PWSFERPG, Cordova, AK, 1993

[2] Bud Perrine, Dir of PWSAC Personal communication

An Online ELH Database for the Northeast Pacific Ocean, Gulf of Alaska and Southeast Bering Sea

Project Number:	02637
Restoration Category:	Synthesis and Retrospective Analyses
Proposer:	J. T. Duffy-Anderson, A. C. Matarese, J. M. Napp and W. C. Rugen NOAA/AFSC, 7600 Sand Point Way NE, Seattle WA 98115
Lead Trustee Agency:	NOAA
Cooperating Agencies:	None
Alaska SeaLife Center:	No
Duration:	1st year - 1 year project
Cost FY 02:	$143,700
Cost FY03:	$1,200
Geographic Area:	Northeast Pacific Ocean, Gulf of Alaska, Southeast Bering Sea
Injured Resource/Service:	Commercial fishing, sport fishing

ABSTRACT

We propose a public, online, early life history database (ELH Database) for our 20+ years of ichthyoplankton data from the Northeast Pacific Ocean, Gulf of Alaska, and Southeast Bering Sea. The database would merge sample collection information with our larval identification guide and ichthyoplankton distributional atlas into a searchable, internet-based database. This database would provide global access to these resources, providing a platform for the generation of hypotheses and offering managers and other users access to accurate, relevant information on ichthyoplankton distributions in Alaska. Access to these data will significantly contribute to understanding how anthropogenic and climate forcing affect Alaska's marine resources.

INTRODUCTION

The mission of the Fisheries Oceanography Coordinated Investigations (FOCI) research program at the Alaska Fisheries Science Center is to understand how biological and physical processes contribute to recruitment variability of fish stocks in Alaska Results of our efforts have provided the foundation for a 20+ year ichthyoplankton data set which provides information on the distribution and abundance patterns of fish eggs and larvae that occur in this region Dissemination of this information can contribute significantly to a more complete understanding of the biology and ecology of fish populations in Alaskan coastal waters

Twelve years ago we published a taxonomic guide to the egg and larval stages of over 200 species of fishes that are known to spawn in the Northeast Pacific Ocean (Matarese *et al* 1989) In 1992, with support from NSF, we established the University of Washington Larval Fish Collection (UWLFC) to have our ichthyoplankton samples archived and available on loan to the scientific community Currently we have archived over 50,000 lots which span collections made from 1972 to 1992 Two years ago we transferred our mainframe ichthyoplankton database to a PC-application to create ICHBASE, which provided a format appropriate for the distribution of these data to the scientific community In the last two years, with support from GLOBEC, we initiated studies to examine the effects of climate variability on plankton and fish populations The culmination of the ichthyoplankton portion of this work is a synoptic atlas for the Northeast Pacific Ocean, Southeast Bering Sea and Gulf of Alaska (Matarese *et al* in preparation), which provides information on the spatial and temporal trends in dominant fish eggs and larvae from these regions (projected draft completion June, 2001) Unlike other geographic atlases (e g CalCOFI, Moser 1996) our work not only presents important ichthyoplankton information, but also provides information on adult spawning times and egg distribution As such, our atlas will be invaluable to scientists interested in relating physical and biological conditions during this period to patterns of fish egg, larval, and adult distribution in Alaska

We are interested in increasing the distribution of, and access to, our research results We propose a 1-year project (FY02) to create and produce an online, early life history database (ELH Database) for our 20+ years of ichthyoplankton data The ELH Database would merge over 20 years of sample collection information (cruise metadatabase) with our larval identification guide and ichthyoplankton distributional atlas into a searchable, internet-based database Unlike printed documents, a web-based product would be relatively easy to update with new or emerging results (e g changes in taxonomy, systematics, and identification of eggs and larvae), and would provide global access to these extensive and extremely valuable data Moreover, a web-based format would be accessible to a wider audience, it would offer insight into what data are available for modeling, and it would provide managers and other users access to accurate, relevant information on spawning and ichthyoplankton distribution in the highly dynamic coastal waters of Alaska We also propose to archive three more years of ichthyoplankton samples (1993-1995) in the UWLFC to continue to provide the scientific community with access to the larval samples The UWLFC website will be linked to our ELH Database website to facilitate online searches

Finally, we propose to design a template for similar databases for our nearly 15 years of springtime zooplankton, chlorophyll, and nutrient data (Biological Oceanography Database) and

more than 15 years of seasonal hydrographic data (EPIC) from the same region Future development of databases that parallel the online ELH Database will provide scientists, managers, and other users access to information that is important to understanding relationships between trophic levels These databases will also further our understanding of how bottom-up processes can affect ecosystem dynamics in Alaskan waters

We anticipate that the present proposal to implement the ELH Database will be the first in a series of proposals designed to develop and eventually merge our long-term data series on ichthyoplankton, zooplankton, and hydrographic conditions in the North Pacific Ocean We envision a co-joined database system which will be provided to the public on the World Wide Web

NEED FOR THE PROJECT

A Statement of Problem

A fundamental question in fisheries science concerns past fluctuations in commercial and recreational fish stocks (either due to anthropogenic influences, environmental variables, and/or biological determinants) and prospects for future variability Fish population size is largely determined during the early life history stages (Hjort 1914, Ricker and Foerster 1948, Cushing 1972, 1995, Horwood *et al* 2000), therefore studies focused on planktonic larval forms may offer unique opportunities to investigate and evaluate variation in marine populations Long-term data sets on fish eggs and larvae may be particularly valuable, as they provide a platform for protracted evaluations of spatial and temporal patterns in distribution and abundance Long-term data sets also lend themselves well to comparisons with prevailing oceanographic conditions and biological variables

The FOCI research program has a large information base of ichthyoplankton data (20+ year data set), which continues to grow rapidly Increased access to these data may provide other users with additional insight and opportunities to study and assess the effects of anthropogenic and climatic change on fish populations In the past we have provided access to our data through published papers, lab guides, and annual walleye pollock recruitment predictions for the North Pacific Fishery Management Council, but accessability to published material is often limited to a relatively narrow scientific audience We seek to broaden the accessability of our results to provide public access to these valuable materials

Our proposal offers an online database (ELH Database) which would provide global access to more than 20 years of integrated ichthyoplankton survey data from the North Pacific Ocean, Gulf of Alaska, and Southeast Bering Sea This database will provide the scientific community, fishery managers, community groups, and other users with the data necessary to evaluate the effects of biotic, abiotic, and anthropogenic change on recruitment variability in marine fish populations In addition, our proposal holds promise for the continued dissemination of our research results to the public By developing designs for parallel zooplankton and hydrographic databases, we anticipate providing a unique, comprehensive resource that offers ready access to long-term data collected from Alaskan waters

The data we plan to provide in the ELH Database will be particularly relevant to commercial and recreational fishing interests, as a more complete understanding of the factors that affect ichthyoplankton dynamics contributes to our understanding of recruitment variability in adult populations Moreover, we are specifically addressing a call by the GEM program to synthesize existing data sets and provide access to these results on the web Our website could prove invaluable to the GEM program as it can help scientists to link upstream studies/processes with downstream patterns (ex near Kodiak, Shelikof Strait, Shumigan Islands) Coordination of our site with future GEM-based ichthyoplankton work would provide an integrated paradigm of eastern GOA ichthyoplankton dynamics

B Rationale/Link to Restoration

The FOCI research program has been involved in research and monitoring of ichthyoplankton assemblages in Alaskan waters for over 20 years Throughout these studies most of our efforts have been concentrated on walleye pollock, a species that supports one of the world's largest commercial fisheries Ancillary to information gained on the early life history of walleye pollock, we have gathered substantial information on distribution and abundance patterns of eggs and larvae of a variety of other fishes that also occur in this region (for example Pacific cod, arrowtooth flounder, sablefish, greenlings, flatfishes, rockfishes, etc) In particular, we have considerable information on distribution and abundance of a variety of forage fish species that may be central to understanding trophic linkages and energy transfer (capelin, Pacific sand lance, Pacific herring etc) The result of our efforts is an extensive and valuable compilation of long-term data on 1) the taxonomy and morphology of over 200 species of fish larvae present in the North Pacific Ocean and Southeast Bering Sea (larval identification guide, Matarese *et al* 1989), 2) the distribution, abundance, seasonality, and size distributions of the larvae of over 100 of these fish species (distributional atlas, Matarese *et al* in preparation), 3) the supporting ichthyoplankton collection information (cruise metadatabase) including time of sampling, geographic areas sampled, gear used, sampling depth, etc , and 4) ichthyoplankton sample availability through the UWLFC database and website

Our ichthyoplankton collections have been primarily focused around a large walleye pollock spawning site located in Shelikof Strait, though collections also occurred near Cook Inlet, around Kodiak Island, along and adjacent to the eastern Aleutian chain (near Chirikof, the Shumigans, the Semidis, Unimak), in the Southeast Bering Sea, and off the northern west coast of the United States We recognize that a focus of the GEM program is to increase understanding of the marine ecosystem in Prince William Sound (PWS), however we stress that the links between PWS and coastal areas downstream must not be overlooked The Alaskan coastline is a co-joined and integrated ecosystem, with processes and events occurring upstream inevitably reverberating to downstream marine communities Viewed as a whole, our data can provide important information on the Gulf of Alaska ecosystem before, during, and after not only the *Exxon Valdez* oil spill, but a variety of other climatic and oceanographic episodes In addition, the information provided will help scientists, managers, local communities, fishing interests, and the general public make informed decisions about the management and future of Alaska's marine resources

C Location

The design, planning, and execution of this work will occur at the NOAA/Alaska Fisheries Science Center in Seattle, WA As noted above, the three components to be merged into the online ELH Database (cruise metadatabase, larval identification guide, and distributional atlas) will integrate our extensive compilation of ichthyoplankton information (1972-1996) gathered from the Northeast Pacific Ocean, Gulf of Alaska, and Southeast Bering Sea The finished ELH Database will be available as a link on the FOCI program and the AFSC web pages (program web pages can be found at http //www pmel noaa gov/foci/home html, and http //www afsc noaa gov respectively), which will transfer users to the database website Benefits of an ELH Database website are threefold 1) the data will be publically accessible and will reach a broader audience of interested users, 2) the web format will be comparatively easy to update, bridging the gap between data collection and data dissemination, and 3) the long-term data provided on the website can be used by many to evaluate actual or perceived ecosystem changes Groups that will benefit from use of the data provided on the website include scientific researchers, resource managers, policy makers, community leaders, and the general public

COMMUNITY INVOLVEMENT AND TRADITIONAL KNOWLEDGE

Since the proposed database will be online, local communities affected by the oil spill will be able to utilize the ELH Database in a manner identical to scientists, managers, or any other interested parties We propose to design a useful, public-friendly brochure to distribute to marine centers (ex Alaska SeaLife Center, Kodiak Fisheries Research Center, Prince William Sound Science Center), universities (ex University of Alaska Fairbanks-School of Fisheries and Ocean Sciences, University of Washington-School of Aquatic and Fisheries Sciences), and state agencies (Alaska Department of Fish and Game) This brochure will provide 1) information on the history of the FOCI ichthyoplankton sampling program, 2) the geographic areas sampled, 3) the collections that were made, 4) the types of data that can be accessed on the website, 5) the URL, and 6) the contact information for users interested in additional information We will also advertise on several appropriate list servers

PROJECT DESIGN

A Objectives

There are three objectives for this proposed project in FY 02

1 Merge three sources of ichthyoplankton information (cruise metadatabase, larval identification guide, and distributional atlas) into a workable template to build the ELH Database Design a website that will provide public access to the ELH Database

2 Transfer and archive three additional years of ichthyoplankton samples collected from the Gulf of Alaska and Southeast Bering Sea to the UWLFC

3 Develop designs for similar databases for nearly 15 years of zooplankton, chlorophyll, and nutrient data and 15+ years of hydrographic information collected from the same regions

B Methods

We will integrate a comprehensive cruise metadatabase of over 20 years of sample collection information with the larval identification guide and the ichthyoplankton distributional atlas into a searchable, internet-based ELH Database

A synopsis of the data to be made available on the proposed website through the identification guide, atlas, and cruise metadatabase is provided Figure 1 gives a summary of annual research cruises and numbers of ichthyoplankton collections taken from the Southeast Bering Sea, Gulf of Alaska, and U S West Coast Ichthyoplankton samples were collected using a variety of approaches Standard MARMAP oblique tows (Smith and Richardson 1977) were conducted to sample subsurface ichthyoplankton using 60 cm bongo samplers fitted with 505 µm mesh, or to a lesser extent, 333 µm mesh A total of 5910 bongo samples were collected in the GOA from 1978 through 1996 (Table 1, from Doyle, unpublished) and the data from these bongo tows form the basis of the distributional atlas Since 1985, a portion of these 60 cm bongo samples were collected simultaneously with 20 cm bongo nets designed to collect associated zooplankton These samples form the basis of the proposed zooplankton database Other gears were also used to sample ichthyoplankton but were generally not included in the data presented in the distributional atlas (neuston, Tucker trawl, MOCNESS) ELH Database users will be referred to an appropriate contact source if interested in samples derived from these gears

The data provided in the larval identification guide, atlas, and cruise metadatabase require varying degrees of modification and updating The larval identification guide is a complete, published, taxonomic reference to the egg and larval stages of fishes from the Northeast Pacific Ocean (Figure 2) At the time of its creation, desktop computers were unavailable and all the information relevant to the guide were collected, tabulated, and compiled on paper The information was entered into manuscript format using a dedicated word processor As a result, the data and text in the guide are not available in digital format Updating the format of the guide to make it useable for the website will be a priority Illustrations will be scanned into the computer and digitized Text from the guide will be entered into a meristic database to allow online users to enter meristic information on an unidentified larva and search the database for matching criteria Moreover, we will re-examine and re-identify ichthyoplankton samples that could not be conclusively identified to the species level due to taxonomic limitations at the time of original sorting We will review the literature and add new information that has become available since 1989 Once all the information from the guide has been upgraded, the guide will serve as the foundation for the construction of the ELH Database It should also be noted that the guide/mersitic database will continue to be updated as new or more complete identification information become available

The distributional atlas is in the final stages of completion (projected draft completion June, 2001) This atlas was prepared in digital format and can be readily incorporated into the web design The atlas is arranged by fish species, and provides information on the distribution

patterns of eggs, larvae, and adults along the west coast of the United States, the Gulf of Alaska, and the Southeast Bering Sea (Figure 3) Additional data for each species include graphical displays of larval sizes, seasonality, and interannual variability (Figure 4) These digitized data can easily be adapted to a format appropriate for online access Data will be continually updated to reflect the most recent scientific findings

The cruise metadatabase provides information on ichthyoplankton cruises conducted by the Alaska Fisheries Science Center from 1972 - present The metadatabase is in the process of being updated (80% complete), and efforts are underway to transfer data from our cruise catalog (which archives cruise data from 1972-1988) to PC format We also are in the process of gathering more recent cruise information (1989 - present) from a series of cruise reports to formulate a cohesive, working cruise metadatabase The cruise descriptions to be included on the ELH Database include a synopsis of the objectives, the area sampled, the number of cruise stations, sampling methodology, and an assessment of dominant ichthyoplankton collected The references for published papers and reports will be provided on the website

Most (1972-1992) of the samples of the fish eggs and larvae collected during these cruises are housed at the UWLFC The UWLFC is the largest repository of ELH stages in North America (>50,000 lots) and maintains a website (http //artedi fish washington edu) that has been widely advertised and utilized We would add our ichthyoplankton samples (includes egg, larval, and ecology data) collected from 1993-1995 to the collection to promote teaching and research Samples are available from the UWLFC through visitation and/or loan It is critical that we continue to transfer our larval fish samples to the UWLFC to provide public access to the specimens collected The UWLFC URL will be linked to our web page to provide users with information on specimen availability from each cruise

The online ELH Database itself will be a relational database built using Oracle or SQL Server The web pages will be constructed using various coding languages including HTML, ColdFusion and Javascript The basis of the website will be the laboratory identification guide, and all information described from the three data sources above will be provided on the website and available for downloading Graphics provided on the website will utilize existing line drawings and resulting image files Any new graphical work that needs to be prepared will use Adobe Photoshop, Adobe Illustrator, and ImageReady The ELH Database website will be linked to the UWLFC (noted above), NOAA, NMFS and a variety other associated online resources

We have developed a mockup of the user interface for the ELH Database that will be provided on the website (Figure 5) We envision a collapsible reference guide which will provide the general list of taxa available on the database Selection of a taxon will drop down information on what families are available, with additional selections revealing a species list Selection of a particular species of interest will open a species results page We envision several informational categories for each species including Illustrations, Meristics, Distribution, Life History, Abundance, and Literature Additional categories could include Length Frequency and/or Seasonality Selection of any one of these categories will reveal an information page, providing illustrations or relevant data in the form of maps, graphs, or tables Sample collection information, such as gears used, will be provided in a detailed synopsis from the cruise metadatabase Contact information for additional data requests and links to other relevant websites will be provided

The site will also allow the user to search for the identity of unknown ELH specimens through the use of meristic and locality data All taxa meeting the search criteria will be listed and the user can use the associated meristic data, illustrations, and accompanying ELH information to identify the unknown specimen

C Cooperating Agencies, Contracts, and Other Agency Assistance

An important component of providing accessability to the ichthyoplankton informational data described above is also providing access to the preserved samples themselves These samples are invaluable to researchers interested in addressing questions of larval feeding, growth, or nutritional condition We will continue to collaborate with the University of Washington to provide public access to our ichthyoplankton samples through the UWLFC As such, we request support for a University of Washington graduate student to be involved in the transfer and maintenance of ichthyoplankton samples from three additional years (1993-1995) This graduate student will transfer, inventory, and house the samples in the UWLFC This person will also catalog the relevant collection information and ecological data, and update the UWLFC website to provide public access to the samples

SCHEDULE

A Measurable Project Tasks for FY 02 (October 1, 2001 - September 30, 2002)

December 1	Complete update of cruise metadatabase
December 15	Begin updating larval guide to web-compatibility Begin verification and updating of historic egg and larval samples (will take approximately 4 months)
January 14 - 23 (2 days)	Attend annual restoration workshop
February 15	Begin transfer of ichthyoplankton samples to UWLFC, update inventory
April 1	Complete finalized prototype of ELH Database and the online user interface
April 15	Begin designing formats for the zooplankton and hydrographic databases using the ELH Database as a template
May 1	Complete update of larval guide
May 15	Transfer lab guide, atlas, cruise metadata to ELH Database
June 1	Complete transfer and inventory of ichthyoplankton samples to UWLFC Complete UWLFC website update
September 15	Complete online user interface for ELH Database
September 15	Finalize designs for future zooplankton, hydrographic databases

B Project Milestones and Endpoints

Objective 1 Merge three sources of ichthyoplankton information (the cruise metadatabase, the larval identification guide, and the distributional atlas) into a workable template to build the ELH Database Design the ELH Database website

Milestone A working prototype of the ELH Database exists, for a very limited number of fish species We anticipate a final prototype with sample taxa by April, 2002 The completed ELH Database with all three components merged for all fish species will be completed by August, 2002 The template for the online user interface will be completed and operational in September, 2002

Objective 2 Transfer and archive three additional years of ichthyoplankton samples (1993-1995) collected from the Gulf of Alaska and Southeast Bering Sea to the UWLFC

Milestone Ichthyoplankton samples will begin to be verified, transferred, prepared for long-term storage, and archived at the UWLFC in February, 2002 We anticipate this process will be completed by June 2002

Objective 3 Develop base designs for similar databases for nearly 15 years of zooplankton, chlorophyll, and nutrient data and 15+ years of hydrographic information collected from the same regions

Milestone Once the finalized prototype of the ELH Database is in place, we will begin modifications to update it for zooplankton and hydrographic searches We anticipate that design templates for these databases will be completed by September, 2002

C Completion Date

The project will be completed in FY 02 A final report will be submitted upon completion of the ELH Database The final report will be submitted no later than April 15, 2003

PUBLICATIONS AND REPORTS

The traditional peer-reviewed literature is not an appropriate outlet for the proposed project However, we will focus on increasing awareness about the website and the data that will be made available on it through published materials For example, we anticipate preparing a column on the ELH Database for the American Fisheries Society, Early Life History Section's publication *Stages* This outlet will increase awareness about the new website to other ichthyoplankton ecologists, drawing the scientific community to our resource In addition, we will provide informational brochures to a variety of educational, management, and fishing interests to promote the ELH Database and to instruct and encourage users beyond the scientific community to utilize the resources provided on the website

PROFESSIONAL CONFERENCES

We anticipate sending one PI to attend the Larval Fish Conference (July 22-26, 2002 in Bergen, Norway) to present the ELH Database We will demonstrate the utility of the database to other researchers who are working in the field of fish early life history, taxonomy, and ecology This will increase awareness of this new resource and draw potential users to the database from other states and around the world Possible additional meetings are American Society of

Ichthyologists and Herpetologists annual meeting (2002), and the Western Groundfish Conference biannual meeting (2002)

We also anticipate sending two FOCI representatives to the Alaska SeaLife Center to promote the ELH Database and demonstrate its uses This visit will publicize the ELH database beyond the printed brochures mentioned above The visit will be educational in nature and will help to instruct the general audience on the utility of the data provided on the website

NORMAL AGENCY MANAGEMENT

It is highly unlikely that the FOCI research program would be able to offer this online database without the assistance of funding provided through the Trustee Council We strive to disseminate our results to the public and have done so in the past without funds from the Council in a series of written reports and published papers However, we are proposing a far-sighted information dissemination system that increases access by other researchers and managers and the general community as well This is a large undertaking requiring the assistance of the Trustee Council to support our efforts FOCI has an ongoing, active sampling program that requires taxonomists and database managers to verify and catalog yearly samples The support of the Trustee Program will allow us to provide additional staff to assist in the work on the development and implementation of the ELH Database so that our attentions to these regular duties do not diminish

COORDINATION AND INTEGRATION OF RESTORATION EFFORT

We seek to integrate this database with other restoration/research efforts Future collaborations could include efforts to update the ELH Database with data derived from cooperative ichthyoplankton collections in other areas of the GOA, particularly PWS, or efforts to link the database with other online sites that describe research efforts by others working in the field of fish early life history (for example, ICLARM, an international organization that offers an online fish and larval database for selected world-wide species)

EXPLANATION OF CHANGES IN CONTINUING PROJECT

New project No continuation from 2001

PROPOSED PRINCIPAL INVESTIGATOR

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Seattle, WA 98115
Ph 206-526-6465
FAX 206-526-6723
E-mail Janet Duffy-Anderson@noaa gov

PRINCIPAL INVESTIGATORS

Dr Janet Duffy-Anderson has extensive experience in the field of ichthyoplankton ecology (please see attached CV) She will share in the overall responsibility of coordinating the ELH Database including project planning, any additional data analyses, and web site coordination Dr Duffy-Anderson will also be the principal contact for all future ELH Database users interested in expanding their data inquiries She will prepare reports and attend all meetings and workshops

Dr Ann Matarese is an expert in the field of larval fish taxonomy, morphology and ecology (please see attached CV) She will share in the coordination and integration of the project components (sample collection database, larval identification guide, distributional atlas) Dr Matarese will also supervise the development of the online ELH Database and will be primarily responsible for the integrity of data reported on the website

Dr Jeffrey Napp is a specialist in the field of zooplankton dynamics (please see attached CV) It will be his responsibility to develop designs for future complementary zooplankton and hydrographic databases from 15 years of data collected from the Gulf of Alaska and Southeast Bering Sea

Mr William Rugen is a specialist in database design and development (please see attached CV) Mr Rugen is fluent in database programming and helped to build our present ichthyoplankton database (ICHBASE) He will develop and produce the interactive ELH Database and the online user interface Mr Rugen will have primary responsibility for the general functioning of the website and will be responsible for regularly updating the data and features provided

OTHER KEY PERSONNEL

Morgan Busby Mr Busby is a expert in the identification of ichthyoplankton He will be involved in reviewing and reclassifying historical ichthyoplankton samples that could not be identified to species at the original time of sorting

Deborah Blood Ms Blood is an authority on the identification of fish eggs She will be involved in the identification and reclassification of historical egg samples that could not be identified to species at the time of the original sorting

GS - 07 Level Hire (Term Appointment) This person will assist Mr Rugen in the design and implementation of the ELH Database

GS - 07 Level Hire (Term Appointment) This person will assist Mr Busby and Ms Blood in identifying and gathering ichthyoplankton samples that need re-identification

University of Washington Graduate Student Subcontract This graduate student will be involved in transferring, maintaining, and cataloging the Alaska Fisheries Science Center's larval fish samples (1992-1995) for the UWLFC This person will be responsible for sample archiving and updating the UWLFC website

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Tabl Summary of ichthyoplankton collections available in the d ise Numbers in columns indicate the number of tows with type of sampling gear Data presented are for the Gulf of ka only

YEAR	CRUISE	DATES	Bongo	Neuston	Tucker	Methot	MOCNESS
1977	4MF77	Oct 31-Nov 14	55	76	79		
1978	1WE78	Oct 27-Nov12	83	89	48		
	2MF78	Jun 20-July 5	85	106	85		
	3MF78	Sep 9-21	25	27			
	4DI78	Mar 29-Apr 20	80	103	66		
	4MF78	Sep 26-Oct 7	62	44			
	5MF78	Oct 19-Nov 1	17	10			
	6MF78	Nov 8-16	40	20			
1979	1MF79	Feb 14-Mar 8	83	85	38		
	1PO79	Sep 3-29	17	46			
	5TK79	May 16-24	55				
1981	1MF81	Mar 12-20	60				
	1SH81	Mar 5-30	126	123			
	2MF81	Mar 30-Apr 8	86				
	2SH81	Apr 16-24	57	58			
	3MF81	Apr 26-May 2	75				
	3SH81	May 20-28	53				
	4MF81	May 20-24	77				
1982	1DA82	Apr 4-23	80	77			
	2DA82	May 21-31	56	60			
1983	1CH83	May 14-30	68	73	4		
1984	1SH84	Apr 7-May 4	149	150			
	3CH84	Mar 27-28	35				
	4CH84	Mar 29-Apr 1	53				
	5CH84	Apr 4-8	71				
1985	1DI85	Mar 11-28	65				
	1MF85	Apr 2-11	93		19		
	1PO85	Mar 29-Apr 21	128	150			
	2PO85	May 16-Jun 8	185	179			
1986	1GI86	Mar 30-Apr 20	143	139			
	1MF86	Apr 4-12	76	102			
	2MF86	May 2-18	108				16
1987	1BB87	Apr 9-27	117				
	2MF87	Apr 4-16	153				3
	3MF87	May 19-27	57				8
	4MF87	Jun 18-Jul 16	18		11	165	
1988	1DN88	Mar 19-May 8	149				
	1MF88	Apr 1-13	164		21		
	2MF88	Apr 17-May 1	63		15	4	10
	3MF88	6-May	13				
	4MF88	May 20-Jun 7	6		175	6	

YEAR	CRUISE	DATES	Bongo	Neuston	Tucker	Methot	MOCNESS
1989	1MF89	Apr 6-15	128		6		
	2MF89	Apr 26-May 5	92		2		
	3MF89	May 9-24	211		9	2	
	4MF89	May 29-Jun 8	4		99		
1990	1MF90	Apr 7-13	107				
	2MF90	May 7-15	90		5		
	3MF90	May 18-24	17				
	4MF90	May 28-Jun 5	133		3		
	5MF90	20-Sep	6			6	
1991	1MF91	Apr 2-13	85				
	2MF91	Apr 16-27	149				
	3MF91	May 1-13	113				12
	4MF91	May 17-25	92				
	5MF91	Jul 23-31				60	
1992	1MF92	Apr 5-10	89				
	3MF92	May 2-14	157		1		4
	4MF92	May 18-28	133		7	3	
1993	2MF93	Apr 3-11	91			3	
	4MF93	May 3-15	138			3	5
	5MF93	May 23-Jun 3	114			5	
	6MF93	Sep 7-17			11		
1994	3MF94	Mar 13-Apr 9	17		15		
	5MF94	May 2-15	89		24		
	6MF94	May 24-Jun 1	135				
	8MF94	Sep 18-28		2			
1995	1MF95	Feb 19-22	1				
	4MF95	Mar 17-24	3				
	8MF95	May 21-28	91			3	
1996	1DI96	Apr 26-May 6	147				
	6MF96	May 2-16	167			1	5
	8MF96	May 24-Jun 1	125				
Totals			**5910**	**1719**	**743**	**261**	**63**

FIGURE CAPTIONS

Figure 1 Yearly cruise distribution available in the distributional atlas (Matarese *et al* in preparation) in the Bering Sea, Gulf of Alaska, and the U S west coast

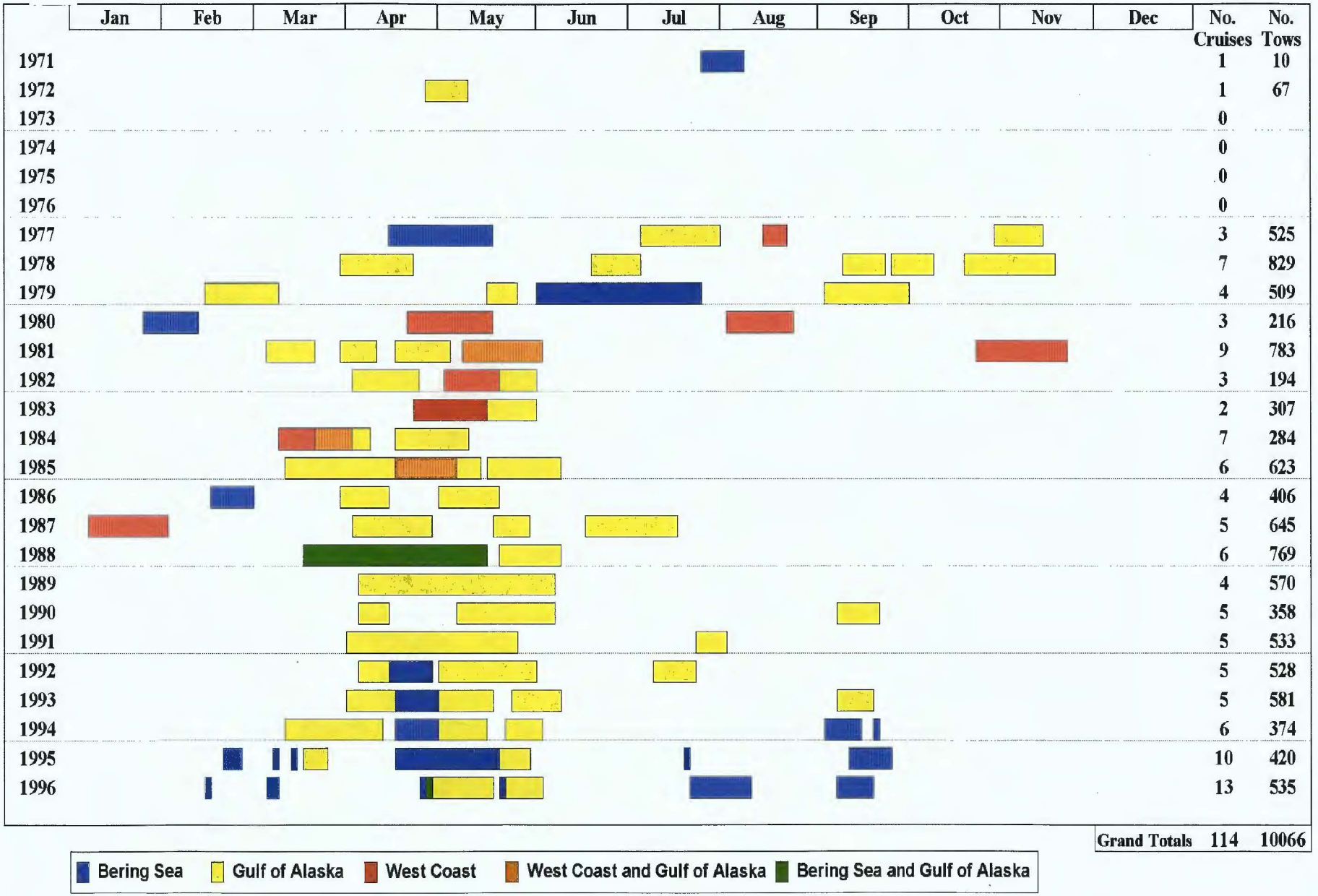
Figure 2 *Ammodytes hexapterus* Representative page from the larval identification guide (Matarese *et al* 1989)

Figure 3 *Mallotus villosus* Representative page from the distributional atlas (Matarese *et al* in preparation)

Figure 4 *Hippoglossus stenolepis* Representative page from the distributional atlas (Matarese *et al* in preparation)

Figure 5 *Theragra chalcogramma* Representative results window from the prototype of the ELH Database

Fi 1


Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
No. Cruises
No. Tows
1971 1 10
1972 1 67
1973 0
1974 0
1975 0
1976 0
1977 3 525
1978 7 829
1979 4 509
1980 3 216
1981 9 783
1982 3 194
1983 2 307
1984 7 284
1985 6 623
1986 4 406
1987 5 645
1988 6 769
1989 4 570
1990 5 358
1991 5 533
1992 5 528
1993 5 581
1994 6 374
1995 10 420
1996 13 535
Grand Totals 114 10066
Bering Sea
Gulf of Alaska
West Coast
West Coast and Gulf of Alaska
Bering Sea and Gulf of Alaska

MERISTICS

Vertebrae	Total: 65-67-74
	Precaudal: 40-44-47
	Caudal: 23-24-25
Branchiostegal rays	6-X-8
Caudal fin	X, 8+7, X
Pelvic fin	Absent
Dorsal fin	R: 54-X-63
Pectoral fin	R: 13-14-15
Anal fin	R: 24-X-32
Gill rakers	U: 3-X-6 L: 16-X-22

LIFE HISTORY

Range	S. California, 32-34°N, to Arctic, not specific
Ecology	Epi- and mesobenthal, intertidal to 275 m
ELH pattern	Oviparous; demersal, adhesive eggs; pelagic larvae
Spawning	Season: Nov-Feb[a]
	Areas: In areas of strong current[b]
	Mode:
	Migration:
Fecundity	Range/function: 1000[c] (*A. personatus*, western Pacific)-22,100[d] (southwestern Barents Sea)
Age at first maturity	1 yr[e] (western Pacific)
Longevity	

EARLY LIFE HISTORY DESCRIPTION

EGGS

Diameter	0.67-0.91 mm (0.80 mm)
No. of oil globules	One
Oil globule diameter	~0.26 mm
Yolk	
Envelope	
Hatch size	6-7 mm SL (as small as 4 mm)
Incubation time/temp.	2-12 wk

Pigment

- Embryo: Eyes, dorsal and ventral body

Diagnostic characters

LARVAE

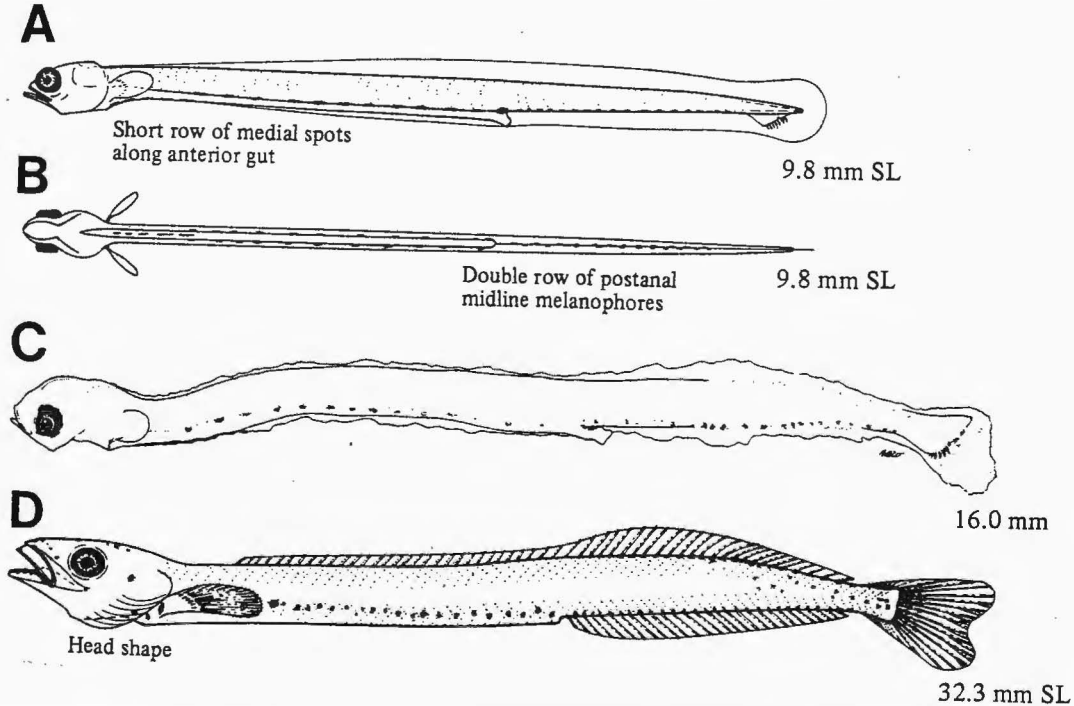
Preanal length	~60% SL
Length at flexion	11-13 mm SL
Length at transformation	16-31 mm SL
Sequence of fin development	Caudal, pectorals, dorsal and anal

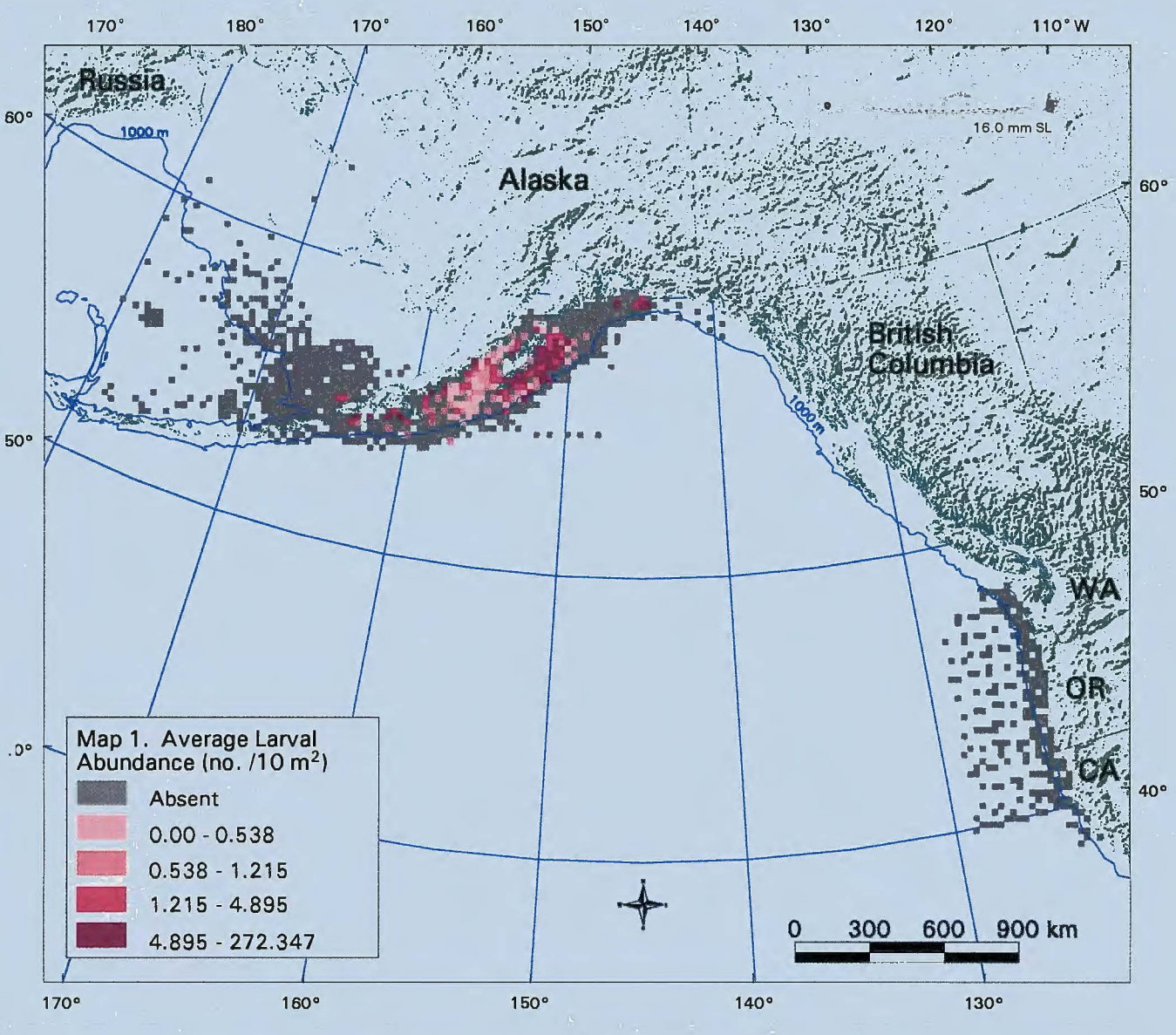
Pigment

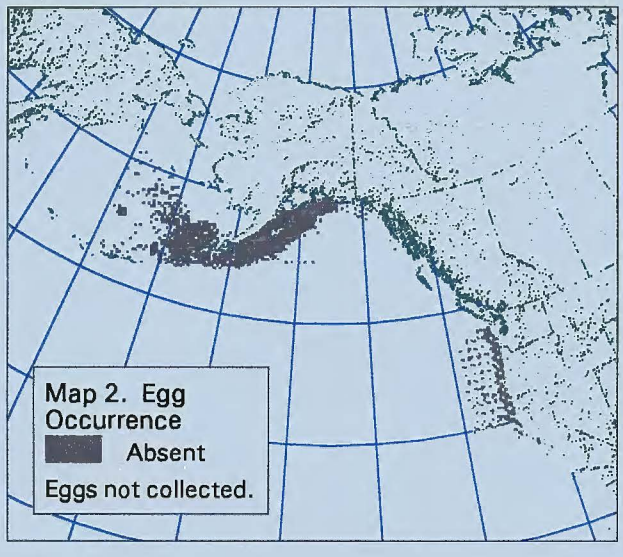
- Gut
- Double row postanal ventral pigment

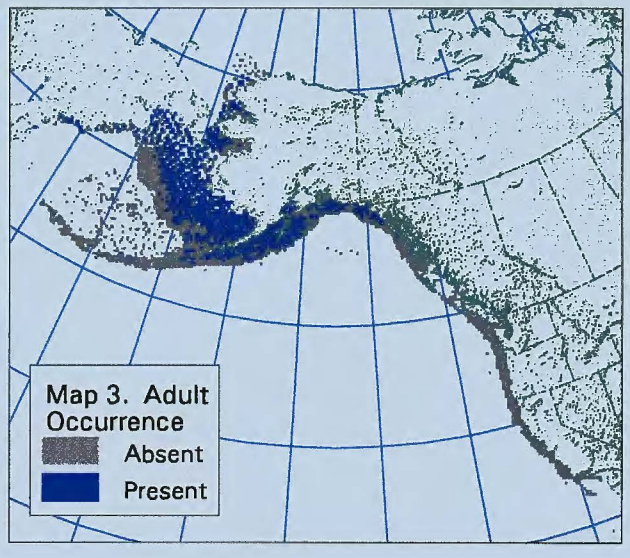
Diagnostic characters (see Table 4)

- Elongate body
- Gut length (~60% SL)
- Lightly pigmented
- Postanal ventral pigment (double row)
- Dorsal and anal fins begin development opposed to each other
- Elongate head shape in larger specimens




170°
180°
170°
160°
150°
140°
130°
120°
110° W
60°
50°
40°
Russia
Alaska
British Columbia
WA
OR
CA
1000 m
16.0 mm SL
Map 1. Average Larval Abundance (no. /10 m²)
Absent
0.00 - 0.538
0.538 - 1.215
1.215 - 4.895
4.895 - 272.347
0 300 600 900 km


Map 2. Egg Occurrence
Absent
Eggs not collected.


Map 3. Adult Occurrence
Absent
Present

Life History: *Hippoglossus stenolepis* are found from the Chukchi Sea to southern California. Occurring from near surface to depths of 1100 m, Pacific halibut spawn at depths of 180-550 m from November to March. Fish reach maturity at 5-7 years; females may produce up to 4 million eggs per season. Pelagic eggs are large, 2.9-3.8 mm in diameter, with a large yolk and very fine honeycomb patterning on the chorion. Pelagic larvae are about 8 mm SL and unpigmented at hatching and remain in the plankton until about 24 mm SL (Hart 1973, Matarese et al.1989).

Larval Distribution: Pacific halibut larvae are distributed from slope waters in the Bering Sea eastward into the Gulf of Alaska; larvae have not appeared in our collections from the southern extent of the adult distribution off the U.S. west coast. Highest average abundances occur along the western Gulf of Alaska over deep waters (about 1000 m). Larvae are collected March through June but most frequently are taken in late winter and spring. Larvae (about 10-25 mm SL) are collected throughout the winter and spring. Eggs have been occasionally collected in our U.S. west coast samples although newly hatched larvae (<10 mm SL) have not been. Overall catch by year indicates that Pacific halibut have been consistently captured since the 1980's.

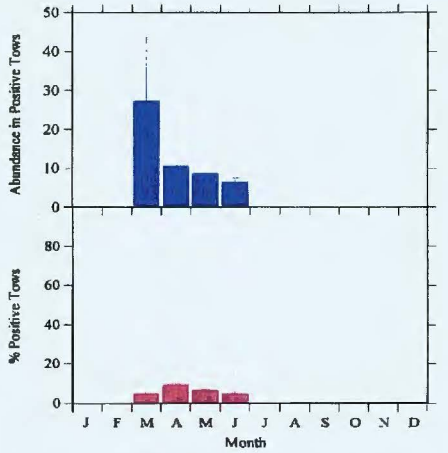


Figure 1. Overall catch by month. Upper histogram: Average abundance (no/10m^2) of larvae (with std. error bar) at stations where this species occurred. Lower histogram: Percent of stations where species occurred.

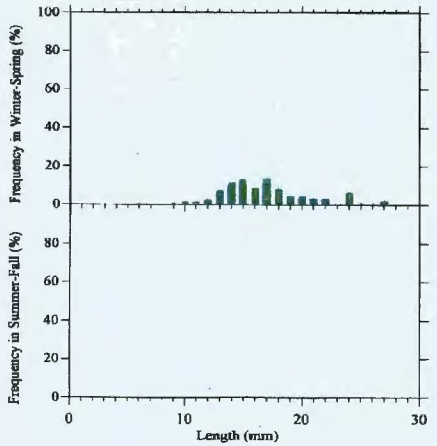


Figure 2. Length distribution of larvae as a percentage of total catch by season (1972-1996).

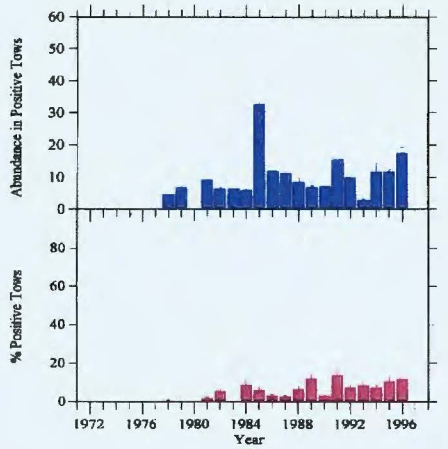
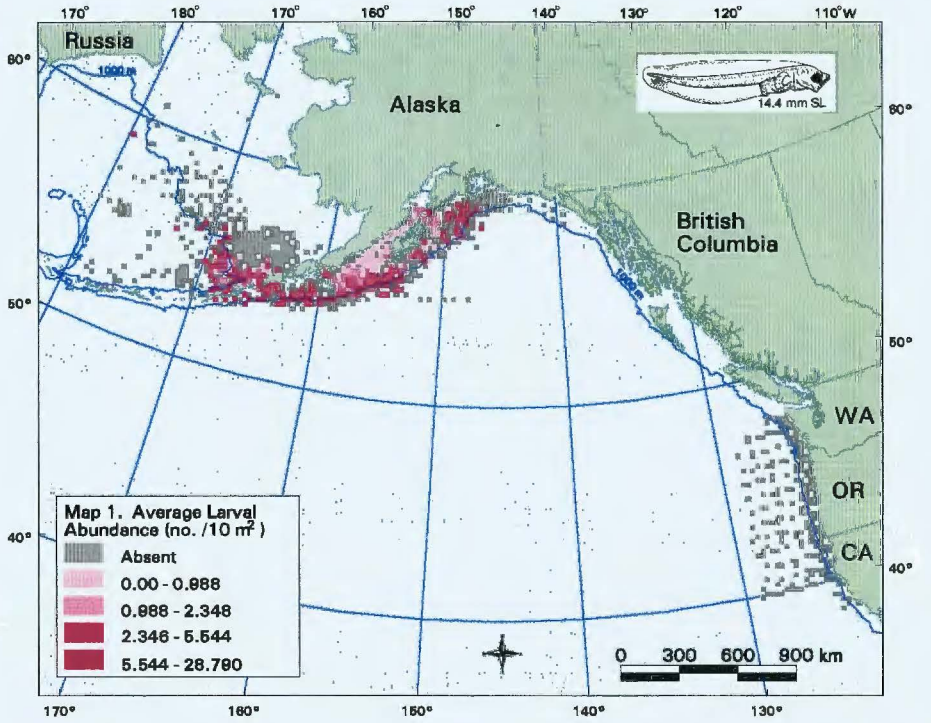
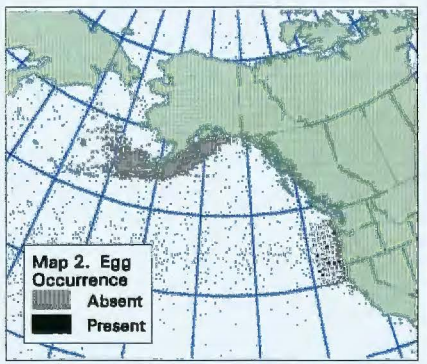
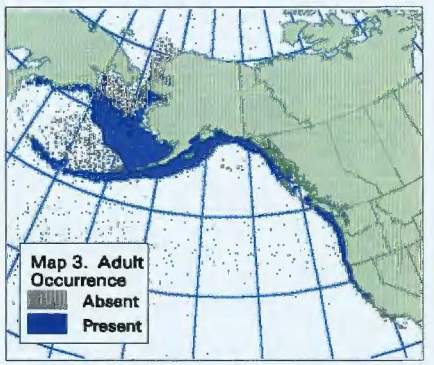


Figure 3. Overall catch by year. Upper histogram: Average abundance (no/10m^2) of larvae (with std. error bar) at stations where this species occurred. Lower histogram: Percent of stations where species occurred.





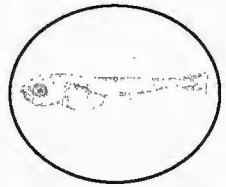


Example results page (list selection)

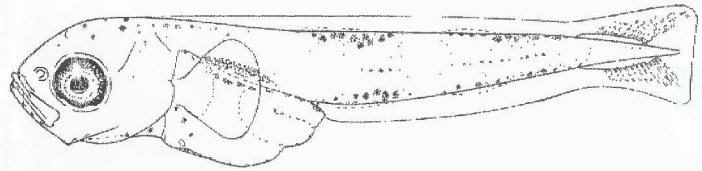
Collapsible list of taxa appears on left and results appear on right side. Right side changes as different taxa are chosen from list. Results from meristics search would appear on left and taxon data that appears on right would be based on which taxa was chosen (drill down format).

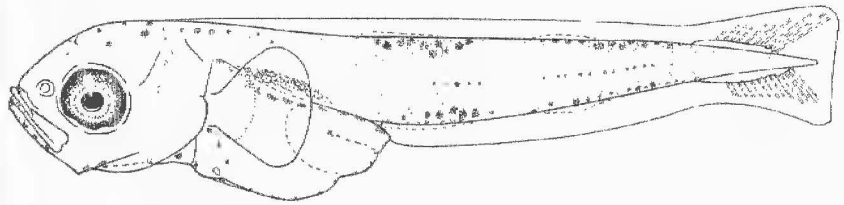
- Elopomorpha
- Scopelomorpha
- Aulopiformes
- Myctophiformes
- Gadiformes
  - Moridae
  - Melanonidae
  - Merlucciidae
  - Gadidae
    - Boreogadus saida
    - Eleginus gracilis
    - Gadus macrocephalus
    - Microgadus proximus
    - Theragra chalcogramma
  - Macrouridae
- Ophidiiformes
- Batrachoidiformes
- Lophiiformes
- Gobiesociformes
- Atherinomorpha

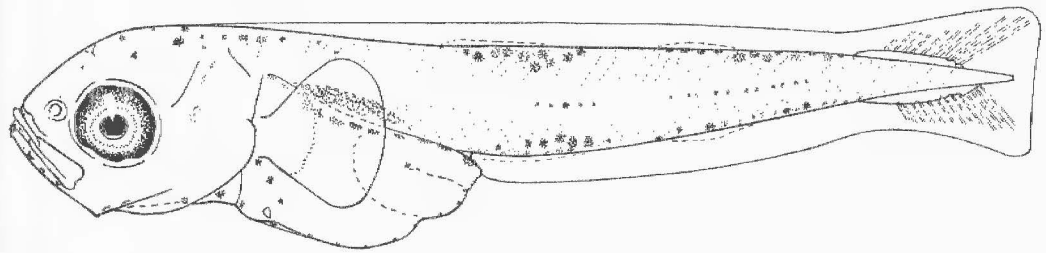
Theragra chalcogramma			
Illustrations	Meristics	Distribution	Literature
Life History	ELH Description	Abundance	



Each taxa would have a page set up like this. Data related to category chosen (i.e. illustration, meristics, abundance, etc.) would appear below. Illustration is category currently chosen. Would probably limit number of illustrations to 4 or 5 per species. For distribution and abundance, maps would be used in this section.







FY 02 *EXXON VALDEZ* TRUS **COUNCIL PROJECT BUDGET**
October 1, 200 ptember 30, 2002

Budget Category	Authorized FY 2001	Proposed FY 2002
Personnel		$101 9
Travel		$5 4
Contractual		$16 9
Commodities		$3 0
Equipment		$0 0
Subtotal	$0 0	$127 2
General Administration		$16 5
Project Total	$0 0	$143 7
Full-time Equivalents (FTE)		2 8
Other Resources		

LONG RANGE FUNDING REQUIREMENTS

Estimated FY 2003					
$1 2					

Dollar amounts are shown in thousands of dollars

We request $101 9K to support personnel who will be working on the project Of this, 60 0K will hire 2 new GS/7-1 level support personnel for one year (Term Appointments) to assist in 1) computer programming and database development, and 2) re-identification and taxonomic updating of historical ichthyoplankton samples

3 3K will allow the lead-PI to attend the Restoration Workshop and one co-PI to present the ELH Database at a scientific meeting (Larval Fish Conference, Bergen, Norway, 2002) 2 1K will allow 2 FOCI representatives to travel to the Alaska SeaLife Center to present the database and demonstrate its features

We request 16 9K as a subcontract to support a graduate student at the University of Washington to catalog and archive the ichthyoplankton samples so that samples can be available to the scientific community

2 0 K will be used for supplies associated with the development of the ELH Database 1 0K will be used to design and distribute an informational brochure

FY 03 includes the preparation of a final report, 0 25 mo time by the Lead PI (1 0k) and 0 2K for manuscript preparation supplies

FY02

Prepared 03/01

Project Number 02637
Project Title An Online ELH Database for the Northeast Pacific, Gulf of Alaska and Southeast Bering Sea
Agency NOAA

FORM 3A
TRUSTEE
AGENCY
SUMMARY

Personnel Costs		GS/Range/	Months	Monthly		Proposed
Name	Position Description	Step	Budgeted	Costs	Overtime	FY 2002
Janet Duffy-Anderson	Research Fishery Biologist, Lead PI	GS-12/1	2 0	4 4	0 0	8 8
Ann Matarese	Research Fishery Biologist, co-PI	GS-12/6	2 0	5 2	0 0	10 4
Jeffrey Napp	Research Oceanographer,co-PI	GS-13/6	1 0	6 1	0 0	6 1
William Rugen	Computer Specialist, co-PI	GS-11/3	2 0	4 0	0 0	8 0
Deborah Blood	Fishery Biologist	GS-11/6	1 0	4 3	0 0	4 3
Morgan Busby	Fishery Biologist	GS-11/6	1 0	4 3	0 0	4 3
GS-7 Level Hire (Term Appt)	Fishery Technician	GS-7/1	12 0	2 5	0 0	30 0
GS-7 Level Hire (Term Appt)	Computer Technician	GS-7/1	12 0	2 5	0 0	30 0
						0 0
						0 0
						0 0
						0 0
	Subtotal		33 0	33 3	0 0	
					Personnel Total	$101 9

Travel Costs	Ticket	Round	Total	Daily	Proposed
Description	Price	Trips	Days	Per Diem	FY 2002
Lead PI to Trustee Council Annual Restoration Workshop	0 6	1	2	0 1	0 8
Co-PI to Larval Fish Conference (July 2002 Bergen, Norway) to present ELH Database	1 5	1	5	0 2	2 5
					0 0
2 FOCI representatives to Alaska SeaLife Center to promote the ELH Database	1 0	2	1	0 1	2 1
					0 0
					0 0
					0 0
					0 0
					0 0
					0 0
					0 0
					0 0
				Travel Total	5 4

FY02

Prepared 03/01

Project Number
Project Title An Online ELH Database for the Northeast Pacific, Gulf of Alaska and Southeast Bering Sea
Agency NOAA

FORM 3B
Personnel
& Travel
DETAIL

Contractual Costs		Proposed
Description		FY 2002
4A Linkage	Subcontract to a graduate student at the University of Washington (20 hr/week)	16 9
When a non-trustee organization is used, the form 4A is required	**Contractual Total**	$16 9

Commodities Costs	Proposed
Description	FY 2002
Supplies for ELH Database development	2 0
Supplies for printing and distribution of informational brochure	1 0
Commodities Total	$3 0

FY02

Prepared 03/01

Project Number
Project Title An Online ELH Database for the Northeast Pacific, Gulf of Alaska and Southeast Bering Sea
Agency NOAA

FORM 3B
Contractual & Commodities DETAIL

New Equipment Purchases Description	Number of Units	Unit Price	Proposed FY 2002
			0 0
			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 Description	Number of Units	Inventory Agency

FY02

Prepared 03/01

Project Number
Project Title An Online ELH Database for the Northeast Pacific, Gulf of Alaska and Southeast Bering Sea
Agency NOAA

FORM 3B
Equipment
DETAIL

FY 02 *EXXON VALDEZ* TRUS COUNCIL PROJECT BUDGET

October 1, 200' – ptember 30, 2002

Budget Category	Authorized FY 2001	Proposed FY 2002	[redacted]
Personnel		$0 0	
Travel		$0 0	
Contractual		$9 4	
Commodities		$4 0	
Equipment		$0 0	LONG RANGE FUNDING REQUIREMENTS
Subtotal	$0 0	$13 4	Estimated FY 2003
Indirect		$3 5	
Project Total	$0 0	$16 9	
			[redacted]
Full-time Equivalents (FTE)		0 0	
			Dollar amounts are shown in thousands of dollars
Other Resources			

Comments

We request $16 9 K to support costs associated with archiving ichthyoplankton samples at the UWLFC

FY02

Prepared 03/01

Project Number
Project Title An Online ELH Database for the Northeast Pacific, Gulf of Alaska and Southeast Bering Sea
Name University of Washington

FORM 4A
Non-Trustee
SUMMARY

FY 02 *EXXON VALDEZ* TRUS **COUNCIL PROJECT BUDGET**
October 1, 2001 ptember 30, 2002

Personnel Costs				Months	Monthly		Proposed
	Name	Position Description		Budgeted	Costs	Overtime	FY 2002
							0 0
							0 0
							0 0
							0 0
							0 0
							0 0
							0 0
							0 0
							0 0
							0 0
							0 0
		Subtotal		0 0	0 0	0 0	
						Personnel Total	$0 0

Travel Costs		Ticket	Round	Total	Daily	Proposed
	Description	Price	Trips	Days	Per Diem	FY 2002
						0 0
						0 0
						0 0
						0 0
						0 0
						0 0
						0 0
						0 0
						0 0
						0 0
						0 0
					Travel Total	$0 0

FY02

Prepared 03/01

Project Number
Project Title An Online ELH Database for the Northeast Pacific, Gulf of Alaska and Southeast Bering Sea
Name University of Washington

FORM 4B
Personnel
& Travel
DETAIL

Contractual Costs	Proposed
Description	FY 2002
Subcontract to a graduate student at the University of WA to prepare, transfer, and archive AFSC ichthyoplankton samples at the UWLFC (20 hr/wk, 12 mo)	9 4
Contractual Total	$9 4

Commodities Costs	Proposed
Description	FY 2002
Supplies for ichthyoplankton sample storage (vials, labels, fixative, caps, etc)	4 0
Commodities Total	$4 0

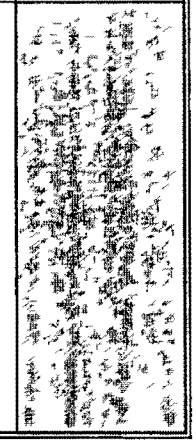
FY02

Prepared 03/01

Project Number
Project Title An Online ELH Database for the Northeast Pacific, Gulf of Alaska and Southeast Bering Sea
Name University of Washington

FORM 4B
Contractual & Commodities DETAIL

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
			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

Prepared 03/01

Project Number
Project Title An Online ELH Database for the Northeast Pacific, Gulf of Alaska and Southeast Bering Sea
Name University of Washington

FORM 4B
Equipment
DETAIL

Field Experiments for Testing Spill-Impacts Hypotheses from Long-Term Monitoring

Project Number:	~~To be assigned~~ 02639
Restoration Category:	Monitoring
Proposer:	NOAA/NOS/Office of Response & Restoration Hazardous Materials Response Division Seattle, Washington
Lead Trustee Agency:	NOAA
Cooperating Agencies:	
Alaska SeaLife Center:	No
Duration:	1-year project
Cost FY 02:	$71.5
Geographic Area:	Prince William Sound, Lower Cook Inlet
Injured Resource/Service:	Intertidal Communities

ABSTRACT

NOAA/OR&R initiated two intertidal experiments in 2000 to test hypotheses concerning long-term effects of oil spill cleanup. The first of these, located in Kasitsna Bay, tests the hypothesis that aggressive shoreline cleanup has caused unnatural long-term cycling in rocky intertidal communities, Fucus in particular. The second experiment, in Lower Herring Bay, tests the hypothesis that shoreline washing on oiled beaches physically alters grain size structure to the extent that biological recovery has been delayed and infaunal communities are fundamentally altered. Although both of these experiments were begun under NOAA OR&R s long-term monitoring program, that program has ended. Funding under this proposal will permit annual sampling and data collection while transitioning the Kasitsna Bay project to the Kachemak Bay National Estuarine Research Reserve and the Lower Herring Bay project to alternative funding support in 2003.

INTRODUCTION

Hypothesis-driven research is of greatest value when conducted in the context of long-term observations

Dr Tom Malone Horn Point Biological Station UMCES March 2000

Intertidal communities in Prince William Sound were among those most directly affected by shoreline oiling and the subsequent cleanup during the *Exxon Valdez* response NOAA/OR&R studied these communities for 12 years in its long-term monitoring program, which yielded important guidance for spill response, monitoring, and understanding fundamental concepts about recovery Through the long-term trends, we characterized certain trends of interest that have served as the basis for generating ideas and hypotheses about ecosystem response in the face of disturbance

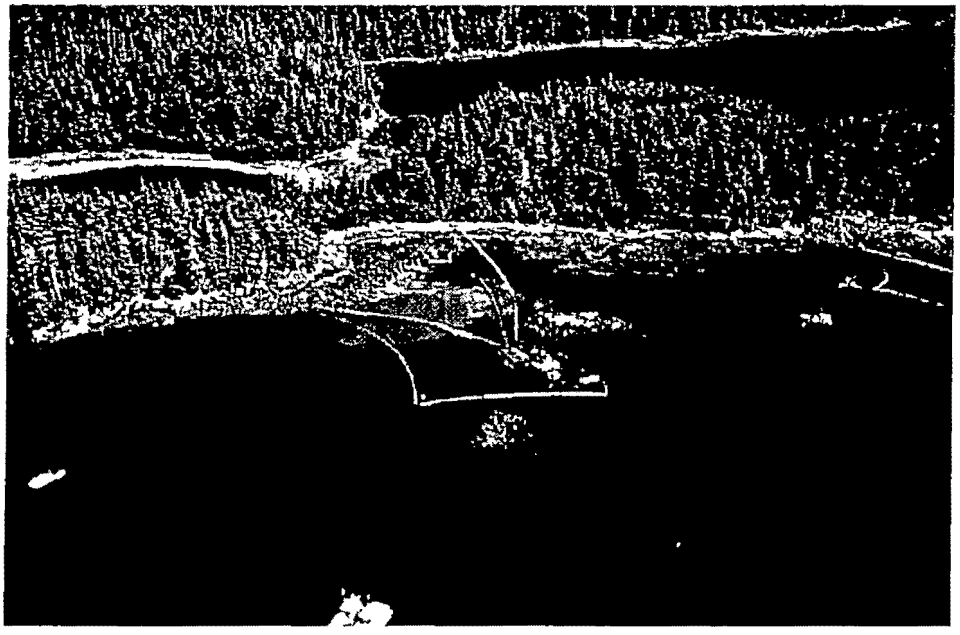
The results from NOAA/OR&R s broader monitoring did not permit the establishment or ruling out of a causal mechanism for the conditions we documented But having identified potential links and associated questions of interest, we designed targeted research to answer our questions in direct and presumably more conclusive fashion Hence, the relevance of the above observation concerning the value of hypothesis-driven experiments we have used the broader monitoring to characterize conditions in the intertidal, define trends of interest, and then to provide a relevant context for focused hypothesis-driven research In the final phase of the NOAA/OR&R program, we initiated two experiments to test hypotheses under more controlled conditions in the field The results of these experiments will provide illuminating (and we believe important) insights into cleanup activities as potential causes of certain biological trends, and should permit us to establish or rule out the link This proposal requests one-year funding to continue the long-term research while making the transition from NOAA/OR&R s monitoring program, which ended in the year 2000

The first experiment examines the relationship between infaunal communities and grain-size structure at depositional (i e , gravel) beaches following washing treatment simulating that which might occur following a spill There is a large body of literature that links physical characteristics of the environment to infaunal community structure We have circumstantial evidence to suggest that washing techniques may have changed grain-size at oiled and cleaned beaches to the extent that the return of those beaches to biological conditions comparable to pre-spill has either been delayed or prevented aerial photographs taken during cleanup in 1989 show vast plumes of silty material being washed out of beaches, after-the-fact statistical correlations show a strong relationship between grain size and infaunal communities

Monte Carlo tests were applied in a canonical correspondence analysis between a group of physico-chemical parameters (total organic carbon, total Kjehldahl nitrogen, grain size) and 1993-1997 infaunal data TOC and TKN were not significantly related to infaunal abundance However, a highly significant (p†0 001) relationship existed between infauna and the 63 sediment (very fine sand) fraction at study sites Nevertheless, this does not permit us to directly link the cleanup to biological changes on beaches

In summer of 2000, we established an experimental site to study whether or not hydraulic washing of depositional beaches can be responsible for measurably altering grain size over an extended (> 1 yr) period of time, and whether this in turn can affect the biological communities living in this substrate The site is located in Lower Herring Bay, a location chosen because of its

desirable grain size characteristics and because it would accommodate the 24 2 m x 2 m study plots necessary to give the experiment sufficient statistical power Twelve pairs of plots were established, and the cobble/gravel substrate of one of each plot pair was randomly selected for excavation, washing, and return Grain size and infaunal cores were collected before and after treatment



Block Island monitoring site, July 1989, showing sediment plume during cleanup

Lower Herring washing experiment, June 2000

The second experiment involves the possible role of aggressive shoreline cleanup in initiating long-term trends (cycles) in the cover of rockweed in the rocky intertidal We have good qualitative (photographic) evidence as well as quantitative epibiota data from site monitoring to indicate that something happened to *Fucus gardneri* cover between 1993 and 1994 Following oiling and cleanup impacts in 1989, cover of this common intertidal alga increased steadily until 1994, when the cover declined dramatically At some sites, the percent recover seemingly crashed to levels approaching bare rock Why did this occur? Was it spill-related? We and others conjectured that this was possibly related to spill- or cleanup-induced changes in population structure to a single age cohort instead of a mixed stand of different cohorts Because of this, when the 1989 cohort reached the end of its normal life cycle in 1993-1994, cover was drastically reduced This could be contrasted to a normal situation with a mixture of age cohorts, in which the die-off of one cohort would not be expected to significantly affect overall cover due to the presence of many others

However, while we have documentation of the trends over time, we can only speculate as to the cause of these trends Therefore, we implemented a field experiment in Kasitsna Bay to directly investigate whether a substantial perturbation (such as that from cleanup, or of natural origin as from a severe winter freeze) could cause certain patterns of cycling in Fucus cover that would not otherwise be seen In this experiment, 13 triplets of 0 25 m^2 plots containing healthy stands of Fucus were defined and marked In 1999, one plot in each triplet was scraped and sterilized with a torch In 2000, a second plot was treated in the same way The third plot in each triplet remains as an unmodified reference These will be tracked over at least five years to observe recruitment patterns and to ascertain if a cyclical pattern of plant cover (similar to that observed in the Sound) is induced With the experiment fully implemented, low cost follow-up field data collection on an annual basis is easily accomplished and will in future years be accomplished with assistance from the Kachemak Bay National Estuarine Research Reserve

***

These are two examples of targeted research studies that have been derived from and designed around trends observed in the long-term monitoring program The underlying patterns that are driving the focused experiments became apparent only over an extended period of time, underscoring the value of the long-term program

NEED FOR THE PROJECT

A Statement of Problem

The problem that will be addressed by this research is that of the appropriate interpretive framework for understanding monitoring results, and ultimately, whether specific observed effects or long-term trends can be attributed to oil spill activities

B Rationale/Link to Restoration

As we make the transition from Restoration to GEM, it is a reasonable expectation to use the accumulated monitoring information to define longer-term impacts of the oil spill However, in doing so, it is critical to ensure that the effects attributed to the spill and cleanup truly are linked to those activities Monitoring alone will not allow us to do so, it is only by focusing experimental effort on the questions of interest that the question of causation can be answered

C Location

The two field study locations are in Kasitsna Bay (Lower Cook Inlet) and in Lower Herring Bay (Knight Island, Prince William Sound)

COMMUNITY INVOLVEMENT AND TRADITIONAL KNOWLEDGE

The Kachemak Bay National Estuarine Research Reserve will be an invited participant in the Kasitsna Bay *Fucus* work, and will assume ownership of the annual monitoring activity beginning in 2003

PROJECT DESIGN

A Objectives

The objectives of the proposed study are to collect samples and data in support of two field experiments fully implemented in the year 2000 These two research projects are designed to directly link or refute a connection between oil spill activities and observed long-term trends in the Prince William Sound intertidal zone

B Methods

Both field studies described in this proposal were previously established under NOAA/OR&R s long-term monitoring program, which ended in 2000 Substantial effort was invested in physical and statistical background studies, and then site selection and experimental setup With the experiments now fully in place, sample and data collection are the substantive activities that will be supported in this funding request

For the Fucus study in Kasitsna Bay, data collection consists of the reading of the 39 permanently marked epibiota quadrats at the study site All plants and animals will be quantified in the quads Fucus will be measured in two ways percent cover, and number of discrete plants This will be accomplished over two field days by three scientists (Dr Terrie Klinger and Dr Allan Fukuyama, one recorder) Logistical support will be arranged through NOAA s Kasitsna Bay Laboratory

The Lower Herring Bay site will be visited by float plane embarking from the Kasitsna Bay Laboratory Two scientists (Dr Allan Fukuyama, Gary Shigenaka) will collect one grain size and two infaunal cores from each of 24 established study plots These will be returned to the Kasitsna Bay Laboratory and processed/preserved there Enumeration of infauna will be performed by Dr Fukuyama in Edmonds, WA, while grain size measurements will be performed by MRS in Ventura, CA using volumetric methods described in Coats et al (1999)

Personnel and project management

The project will be implemented by an experienced team of scientists who have been directly involved in intertidal research and monitoring studies both in Prince William Sound and elsewhere The work will be coordinated by NOAA/Office of Response & Restoration, with Gary Shigenaka as Principal Investigator

Responsibilities for each of the participants is as follows

NOAA/Office of Response & Restoration Seattle, WA (Shigenaka)
- Overall project management
- Logistical support for field sampling efforts
- Sampling and data analysis
- Manuscript preparation

University of Washington Seattle, WA (Klinger, & Fukuyama)
- Biological support
- Lead field scientist (Fukuyama)
- Lead for infauna analysis (Fukuyama)
- Lead phycologist (Klinger)

Marine Research Specialists Ventura, CA (Imamura & Coats)
- Grain size meaurements
- Data analysis
- Manuscript preparation

C Cooperating Agencies, Contracts, and Other Agency Assistance

Dr Carl Schoch, Research Director at the Kachemak Bay National Estuarine Research Reserve will accompany the field team and is expected to assume oversight of the field sampling in 2003

SCHEDULE

A Measurable Project Tasks for FY 02

Kasitsna Bay Fucus study

Field sampling will be conducted in June 2002, epibiota data will be entered, and verified by September, 2002

Lower Herring Bay washing study

Field sampling will be conducted in June 2002, infauna and grain size analyses will be completed by September 2002

A progress report providing trend information for epibiota (Kasitsna Bay) and infauna and grain size (Lower Herring Bay) through 2002 will be completed by the end of December, 2002 The Kasitsna Bay data will cover the period 1999-2002, the Lower Herring Bay data 2000-2002

A more detailed schedule is presented below

B Project Milestones and Endpoints

All field work will be completed by July 2002, and epibiota data will be entered and databases updated by September 30, 2001 Infauna and chemistry data will be available December 31, 2001 Two final reports and one manuscript will be completed by April 2002 It is anticipated that the manuscript will be reviewed, revised and submitted for final acceptance by September 2002

October 1, 2001	Project initiation
January 2002	Trustee workshop
February 4, 2002	Project planning meeting with key scientific personnel
June 20-22, 2002	Kasitsna Bay Fucus sampling
June 23-26, 2002	Lower Herring Bay sampling & sample processing
September 30, 2002	Data entry completed
December 31, 2002	Data report completed

C Completion Date

It is anticipated that the project will be completed by December 2002

PUBLICATIONS AND REPORTS

One report will be prepared for the Trustee office to summarize the background and objectives for the study, and discuss trends in epibiota, infauna, and grain size through 2002 This deliverable will be completed by the end of calendar 2002

PROFESSIONAL CONFERENCES

No funding is being requested for attendance at professional conferences in FY02 There is potential for members of the scientific team to seek support from external sources for presentations at scientific meeting in FY03, when results from the proposed work have been analyzed

NORMAL AGENCY MANAGEMENT

The experiments were initiated under NOAA/OR&R s Prince William Sound Monitoring Program, which was funded through Restitution That effort ended in 2000 Biological monitoring studies of this type (i e , unrelated to answering narrowly defined questions for spill response operational issues) are not funded by normal agency operations in NOAA

EXPLANATION OF CHANGES IN CONTINUING PROJECTS

None

PROPOSED KEY INVESTIGATORS

Gary Shigenaka
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Terrie Klinger
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Allan K Fukuyama
Fukuyama/Hironaka Taxonomic and Environmental
7019 157th Street S W
Edmonds, WA 98026

OTHER KEY PERSONNEL

Eiji Imamura
Douglas Coats
Marine Research Specialists
3639 E Harbor Blvd , Suite 208
Ventura, CA 93001

BIOGRAPHICAL SKETCHES FOR PRINCIPAL INVESTIGATORS

Gary Shigenaka is the proposed principal investigator for this project A graduate of the University of Washington s School of Oceanography (1976) and Institute for Marine Studies (1987), he was part of NOAA s initial *Exxon Valdez* damage assessment team in 1989 and since 1991 has managed NOAA s long-term monitoring program in Prince William Sound He has been a field party scientist in every project monitoring visit to the Sound save one, when his son was born in 1995 He has extensive experience in fisheries biology, oceanography, and environmental monitoring Prior to joining NOAA/HAZMAT in 1990, Mr Shigenaka worked on the National Status and Trends Program in Washington, DC and Seattle

Allan K Fukuyama, B S in zoology (1973), University of California Davis, M A in biology (1985), San Francisco State University Moss Landing Marine Laboratories, Ph D in fisheries (2000), University of Washington, is a marine biologist with thirteen years uninterrupted intertidal and subtidal experience in the spill-impacted Alaskan environment Dr Fukuyama completed his Ph D in 2000, with post-Exxon recovery of intertidal and shallow subtidal

ecosystems with an emphasis in infaunal organisms as the basis for his research Since 1993, Mr Fukuyama has owned Fukuyama/Hironaka Taxonomic & Environmental Services in Edmonds, WA

Terrie Klinger, B A biology (1979), University of California Berkeley, M Sc botany (1984), University of British Columbia, Ph D biological oceanography (1989), Scripps Institution of Oceanography, is the lead investigator for Fucus studies in Kasitsna Bay She has a broad-based training in algal systematics and algal ecology, having studied the algae of the temperate northeast Pacific for more than a decade Dr Klinger spent three years studying the effects of the *Exxon Valdez* oil spill on benthic algae

Other Key Personnel

Eiji Imamura is President and Manager of Marine Research Specialists in Ventura, CA He has over 20 years experience in managing applied marine environmental programs Mr Imamura specializes in the design and implementation of multidisciplinary marine programs for environmental impact assessment Prior to establishing Marine Research Specialists, Mr Imamura was the Director of Battelle Ocean Sciences He also served as Chief of the Environmental Studies Program for the U S Department of Interior s Minerals Management Service Atlantic OCS Region

Douglas A Coats, B S in physics (1975), California State Polytechnic University at Pomona, M S in oceanography (1979), Scripps Institution of Oceanography, Ph D in oceanography, Scripps Institution of Oceanography (1982) Dr Coats has over 20 years experience interpreting oceanographic data to resolve complex marine environmental issues He has analyzed a wide variety of interdisciplinary oceanographic data sets using multivariate statistical methods to interrelate marine biological, physical, and chemical processes

LITERATURE CITED

Coats, D A , E Imamura, A K Fukuyama, J R Skalski, S Kimura, and J Steinbeck 1999 Monitoring of biological recovery of Prince William Sound intertidal sites impacted by the *Exxon Valdez* oil spill NOAA Technical Memorandum NOS OR&R1 Seattle NOAA/NOS 73 pp + appendices

FY 02 *EXXON VALDEZ* TRU COUNCIL PROJECT BUDGET

October 1, 200 ptember 30, 2002

Budget Category:	Authorized FY 2001	Proposed FY 2002	LONG RANGE FUNDING REQUIREMENTS					
Personnel		$12.0						
Travel		$7.9						
Contractual		$40.0						
Commodities		$5.0						
Equipment		$2.0						
Subtotal	$0.0	$66.9	Estimated FY 2003					
General Administration		$4.6						
Project Total	$0.0	$71.5						
Full-time Equivalents (FTE)		0.2						
			Dollar amounts are shown in thousands of dollars.					
Other Resources								

Comments:

FY02

Prepared:

Project Number: 02.639
Project Title: Field Experiments for Testing Spill-Impacts Hypotheses from Long-Term Monitoring
Agency: NOAA

FORM 3A
TRUSTEE
AGENCY
SUMMARY

FY 02 *EXXON VALDEZ* TRU **COUNCIL PROJECT BUDGET**

October 1, 200 ptember 30, 2002

Personnel Costs		GS/Range/	Months	Monthly		Proposed
Name	Position Description	Step	Budgeted	Costs	Overtime	FY 2002
Gary Shigenaka	Oceanographer	GS/13/5	2 0	6 0		12 0
						0 0
						0 0
						0 0
						0 0
						0 0
						0 0
						0 0
						0 0
						0 0
						0 0
	Subtotal		2 0	6 0	0 0	
					Personnel Total	$12 0

Travel Costs	Ticket	Round	Total	Daily	Proposed
Description	Price	Trips	Days	Per Diem	FY 2002
Trustee workshop January 2002	2 0	2	6	0 1	4 6
Field sampling, PWS & K-Bay	1 5	1	6	0 1	2 1
PI meeting September 2002	0 5	2	2	0 1	1 2
					0 0
					0 0
					0 0
					0 0
					0 0
					0 0
					0 0
					0 0
				Travel Total	$7 9

FY02

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FORM 3B
Personnel
& Travel
DETAIL

Contractual Costs	Proposed FY 2002
Description	
MRS	40 0
When a non-trustee organization is used, the form 4A is required **Contractual Total**	$40 0

Commodities Costs	Proposed FY 2002
Description	
Misc sampling supplies	5 0
Commodities Total	$5 0

FY02

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FORM 3B
Contractual & Commodities DETAIL

New Equipment Purchases Description	Number of Units	Unit Price	Proposed FY 2002
	1	2 0	2 0
			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**	$2 0

Existing Equipment Usage Description	Number of Units	Inventory Agency

FY02

Prepared

Project Number
Project Title Molecular Biomarkers as a New Technique for Assessing Physiological Contaminant Stress
Agency NOAA

FORM 3B
Equipment
DETAIL