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EXXON VALDEZ OIL SPILL PROJECT DESCRIPTION

Project Number: 93004

Project Title: Documentation, Enumeration, and Preservation of Genetically Discrete Wild Populations of Pink Salmon Impacted by EVOS in Prince William Sound.

Project Category: Restoration Monitoring and Management Action

Project Type: Fish and Shellfish

Lead Agency: Alaska Department of Fish and Game

Cooperating Agencies: U.S. Forest Service

Project Term: March 1, 1993 to June 30, 1995

INTRODUCTION

Historically, approximately five-hundred-million wild pink salmon fry emerged from streams throughout Prince William Sound (PWS) each year to migrate seaward. Adult returns of wild pink salmon averaged from 10 to 15 million fish annually. These returning wild-stock adults play an important role in the total Prince William Sound ecosystem; they convey essential nutrients and minerals from the marine ecosystem to estuaries, freshwater streams, and terrestrial ecosystems. Both juveniles and adults are important sources of food for many fish, birds, and mammals. Wild pink salmon also play a major role in the economy of PWS because of their contribution to commercial, sport, and subsistence fisheries in the area.

Wild-stock pink salmon suffered both direct lethal and sublethal injuries as a result of the Exxon Valdez oil spill (EVOS). Pink salmon embryos and alevins suffered increased mortality, diminished growth, and a high incidence of somatic cellular and genetic abnormalities as a result of spawning ground contamination and rearing in oiled areas. Wild stocks most impacted by the *Exxon Valdez* oil spill (EVOS) are also subject to excessive exploitation in mixed stock fisheries of western PWS which are targeting on large hatchery returns. Also, in 1989 the commercial harvest of pink salmon had to be shifted away from the hatchery and wild stocks in the oiled areas to target only the wild stocks in eastern Prince William Sound. This resulted in overharvest and depletion of these stocks evidenced by general run failures of stocks in the northern and eastern portions of Prince William Sound in 1991.

Furthermore, coded-wire tag recovery results from NRDA F/S Study 3 indicate that damaged wild salmon streams located on hatchery stock migratory corridors in western PWS experience a high incidence of genetic interchange as a result of straying from the burgeoning hatchery populations. Ample evidence in the literature suggests that hatchery fish are ill

adapted to wild conditions and that genetic interchange between hatchery and wild stocks may lead to reduced fitness of wild stocks. The combined effects of oil damage, excessive harvest, and genetic burden on wild fish may result in an overall reduction in population size, genetic diversity, and fitness of PWS salmon populations.

The proposed damage assessment and resource monitoring study will consist of field studies conducted from Cordova and laboratory studies in Anchorage. The majority of the funds support PWS field studies and will contribute to the local economy of Cordova. The project may result in altered harvest management strategies in PWS fisheries and will contribute to the natural recovery process for PWS pink salmon populations.

WHAT

Depending upon results from 1992, this project will monitor the recovery of damaged wild streams through timely and accurate estimates of wild pink spawning escapements, quantify the extent of hatchery stock staying into wild salmon streams, and examine the genetic structure of representative salmon populations from throughout PWS, measuring both within and between population diversity. Genetic sample sites will include those which tagging results indicate are highly susceptible to hatchery straying (see Restoration Science project R60) in order to better clarify putative EVOS impacts on hatchery/wild-stock interactions.

Fisheries managers will use escapement data inseason to enact harvest management strategies which insure that sufficient fish escape fisheries to spawn in streams damaged by EVOS. Data on straying rates will be used in conjunction with genetic data to develop alternate hatchery production strategies and develop criteria for wild-stock sanctuary areas where straying is minimal or does not occur. An understanding of the population genetics of affected pink salmon populations will also be used to guide restoration management decisions including those regulating commercial harvest. Genetic monitoring and risk assessment are also required to evaluate any supplemental restoration programs in a manner similar The Northwest Power Planning Council currently uses such a monitoring and evaluation program for their supplemental restoration program.

The specific objectives of the project are as follows:

1. Estimate straying rates of hatchery and wild stocks of pink salmon through systematic sampling of spawner carcasses in approximately 50 streams in PWS.
2. Monitor the recovery and status of pink salmon stocks through total weir enumeration of intertidal and upstream spawning escapements in eight streams which are representative of streams injured by the oil spill.
3. Define the genetic structure of pink salmon stocks in the EVOS-affected area in order to better direct harvest management decisions made for restoration purposes on a stock-specific rather than species-specific basis.
4. Provide information needed for genetic risk assessment and genetic monitoring of supplementation programs (e.g., as a result of Study R105) to guide stock-specific restoration and enhancement.

WHY

The most cost effective method for restoring injured wild pink salmon populations to their pre-spill condition is through modification of the human uses which affect their natural recovery. Commercial harvest is the major factor controlling wild pink salmon spawning escapement and reproductive success. The ability to impose stock-specific management on the commercial fishery and reduce fishery exploitation of oil impacted wild stocks is vital to their restoration. One of the most important pieces of information for stock-specific management of fisheries is timely and accurate escapement data which this project will supply.

The importance of pink salmon in the PWS ecosystem is predicated upon their abundance and their diverse spatial and temporal distribution. Genetic interchange between hatchery and wild fish may lead to reductions in the overall fitness and population size of wild stocks and will most certainly alter historic spatial and temporal abundance of wild pink salmon in the PWS ecosystem. The status of wild salmonid populations was a concern prior to the oil spill and the documented damage to these populations further increases the concern and the need to understand the underlying population structure and amount of gene exchange among populations. Reproductively isolated populations are by definition self-recruiting--the adults generally do not stray to repopulate depleted areas. Therefore, basing management decisions on known population structure is critical to facilitate successful restoration of reproductively isolated units.

Hatchery supplementation of wild pink salmon stocks cannot be contemplated without knowledge of the underlying population structure (see State of Alaska Genetic Policy). To do so would put the unique adaptive advantages of the wild stocks at risk. The same population genetic data will provide a baseline for possible mixed-stock fishery analysis (e.g., see Restoration Science Project R59) and possible genetic marking. Genetic marks are now used to manage the harvest of Fraser River pink salmon, for example, and such techniques may ameliorate the hatchery/wild-stock management problems exacerbated by the EVOS.

HOW

Adult salmon will be counted through weirs at eight streams where outmigrating fry were enumerated and coded-wire tagged, and where adults were counted in previous years. Weir crews will perform daily ground surveys of intertidal and upstream portions of the weired streams and at ten additional streams. At weekly intervals they will also apply Peterson disk tags to fish as they enter weired streams. During daily foot surveys crews will enumerate live and dead pink salmon, record Peterson disk tag recoveries from dead fish, and record the number of carcasses with missing adipose fin denoting the possible presence of a coded-wire tag. Heads from adipose clipped carcasses will be removed and sent to a centralized laboratory for tag extraction and decoding. Paired aerial and weir data will be used to calibrate aerial estimation procedures and estimate observer bias. Weir data, daily counts of live and dead fish, and results of Peterson disk tagging studies will be used to estimate average stream life for streams in the PWS aerial survey program. Improved stock specific estimates of spawning escapements combined with commercial catch contribution data will allow fisheries managers to accurately assess the impacts of the harvest management strategies on impacted stocks.

Pink salmon populations sampled during the escapement enumeration project represent a small percentage of the over 900 anadromous spawning populations in Prince William Sound. To better document the full extent of hatchery staying this project will expand tag recovery efforts in approximately 50 important spawning streams throughout PWS. Tag recoveries will be accomplished through multiple ground surveys during periods of peak salmon returns. Tag recovery sampling will be identical to the sampling at weired systems.

Tissue samples for baseline genetic data will be taken from 100 fish from two hatcheries and from spawned-out fish in 18 of the 50 streams sampled for straying. Both early and late stocks and intertidal and upstream-spawning stocks will be included among the 18 sampled. Heart, liver, and muscle tissue and aqueous humor will be removed from each individual sampled, frozen immediately on liquid nitrogen, and returned to Anchorage for storage at -80° C. Results of genetics samples will be used to define the genetic structure of pink salmon populations in PWS and identify reproductively isolated populations. Results of coded-wire tag recovery data will be analyzed and used in concert with genetic data to identify areas with no evidence of straying which could be designated as genetic sanctuaries which could be protected by future management actions and hatchery release strategies. Those oiled areas with documented high levels of straying should be monitored to examine the long term effects of straying and the resultant wild/hatchery salmon hybridization on the overall fitness of wild populations.

Genetic data will be collected using the techniques of allozyme protein electrophoresis on all samples and restriction fragment length polymorphism (RFLP) analysis of mitochondrial DNA (mtDNA) on a subset of samples. These procedures are well-established and currently being conducted in the genetics laboratory of ADF&G. As appropriate, data will be merged into the state and federal interagency coast-wide databases.

ENVIRONMENTAL COMPLIANCE

ADF&G has Title 16 permits for all of the proposed intertidal weirs. Corps of Engineers' permits are not required since none of the weirs are on navigable waters. All sampling on weired and unweired systems is covered by ADF&G biological collection permits. None of the proposed camps or structures are permanent nor will they permanently alter the study sites in any way. All weirs, camp structures, and equipment will be removed from study sites upon completion of the project.

WHEN

December 1993	-	Interim Report 1 including: Summary of weir counts, live and dead counts, stream life estimates, aerial surveyor bias estimates by stream, and hatchery straying rates by hatchery and stream for 1993.
December 1994	-	Interim Report 2 including: Summary of 1994 escapement and straying data and comparison of 1993 and 1994 results. Escapement and straying data analyses will be in the same format as 1993 report and including a comparison of 1993 and 1994 results.
June 1995	-	Final Report

BUDGET ($K)

	ADF&G
Personnel	$ 550.1
Travel	8.0
Contractual	168.5
Commodities	57.0
Equipment	33.0
Capital Outlay	0.0
Sub-total	$ 816.6
General Administration	82.5
Project Total	$ 899.1

EXXON VALDEZ OIL SPILL PROJECT DESCRIPTION

Project Number: 93005

Project Title: Cultural Resources Information, Education and Interpretation

Project Category: Management Action

Project Type: Archaeology

Lead Agency: United States Department of Agriculture, Forest Service

Cooperating Agencies: U.S. Department of Interior, National Park Service; Alaska Department of Natural Resources

Project Term: January 1, 1993 to September 30, 1993

INTRODUCTION

The *Exxon Valdez* oil spill affected cultural resources in the oil spill affected area. These resources are ethnographically within the Alutiiq, or Pacific Eskimo, area. Known sites in the region contain information from as long as 8,000 years ago to the early 20th century A.D. These sites are the non-renewable source of date which are the basis of knowledge about past peoples and their relationship to the marine and terrestrial animals, plants, and other natural resources of the area.

One of the most significant injuries to cultural resources as a result of the *Exxon Valdez* oil spill was vandalism and looting resulting from increased visibility and knowledge of site locations. Mitigation of this injury involves education of the public about the valuable cultural heritage information preserved in these archaeological sites, and the losses which result from the unscientific digging and looting of sites.

The proposed mitigation measures will occur for the most part in oil spill affected communities. Increased circulation of existing brochures and posters is proposed for Anchorage, communities in Prince William Sound, on the Kenai Peninsula, and on Kodiak Island. These same communities will be included in Alaska Archaeology Week activities, the expansion of which would be coordinated in Anchorage. Several projects will be developed locally and made available to communities both within the oil spill area and throughout the state. These include the proposed portable cultural resources exhibits, public service announcements, educational videos, curriculum developed to state educational standards, and educational pamphlets to be distributed through museums, visitor centers, tour operators, and other public outlets. Local groups will be organized and promoted in oil spill affected communities to involve interested amateurs in archaeology under professional guidance. Curriculum development will occur primarily in the communities of southcentral Alaska, and secondarily state-wide through the Department of Education and individual school districts.

WHAT

The overall goal and purpose of these projects it to educate the public to the value and finite nature of cultural resources, thereby effecting value and behavioral changes so that future site looting and vandalism is minimized or ended. In the process, damage that has occurred to archaeological sites as a result of the oil spill will be ameliorated. This will be accomplished through the following:

A. Development and distribution of brochures, public service announcements, and videos concerning the heritage value of cultural resources in the oil spill area.
B. Development, construction, and circulation of 6 portable exhibits on the cultural resources of the oil spill area.
C. Design, production and implementation of curriculum for elementary through high school and teacher training is proposed. This effort will be coordinated with local, State and Federal agencies, private institutions, and other interested parties.
D. Expansion of Alaska Archeology Week and associated activities.
E. Organization and promotion of local amateur groups interested in cultural resources.
F. Interpretation of cultural resources at sites on National Forest and State Parks.

WHY

Although some vandalism and looting of archaeological sites had occurred prior to the oil spill, the increased number of people in the area during clean-up activities and the increased knowledge of site locations led to a higher rate of vandalism of known sites. Because it is impossible to reverse this increase of knowledge about cultural resources, an educational response is necessary concerning the significance and proper treatment of archaeological sites. These educational projects will develop a stewardship ethic reflecting an appreciation for cultural resources, and will enable individuals to be directly involved in furthering the understanding of the prehistory of Southern Alaska.

HOW

Several agencies will cooperate in achieving the desired education results.

A. A Department of Interior National Park Service (NPS) archaeologist will arrange for production and distribution of additional copies of existing ARPA publications and posters, and will design and supervise the production and circulation of the six traveling cultural resource exhibits. This archaeologist will arrange an expansion of the Alaska Archaeology Week program to include oil spill affected communities and will prepare, with the assistance of a Visual Information Specialist, three public service announcements concerning cultural resources.

B. Three archaeologists working for the Alaska Department of National Resources (ADNR) will develop new cultural resource pamphlets to distribute to the public, as well as a script for a 15-20 minute video about the value of archaeological sites. The actual video will be produced under contract. Most importantly, the archaeologist will organize and promote, in oil spill affected communities, groups interested in local archaeology. In connection with these groups, the archaeologists will develop activities which involve amateurs in archaeological work under the guidance of professionals.

C. The Kodiak and Kenai Peninsula State Parks offices will develop and present programs for school-age children on the importance of protecting cultural resources, and will contract to develop visitor exhibits.

D. Under USDA Forest Service contract a curriculum will be developed by an individual or agency who will be responsible for design, production and dissemination, working cooperatively with Forest Service, NPS, ADNR, Native organizations and other interested parties. Summer institutes will be the venue for teacher training and materials development, to be followed by field testing of materials in classrooms. Subsequent summer institutes will emphasize rewriting of the curriculum, with finalization envisioned by the fifth institute. Teachers who have been trained and have field-tested material will become trainers of other teachers within districts and at institutes.

ENVIRONMENTAL COMPLIANCE

Development of curriculum, publications, and videos is categorically excluded from documentation in an environmental impact statement or environmental analysis.

WHEN

A. Curriculum Development Time Line

01/01/93 - 04/01/93 -	Develop contract/ Award contract.
04/01/93 - 09/30/93 -	Contact agencies and institutions/ Identify and collect instructional materials.
10/01/93 - 02/27/94 -	Plan with cooperative agencies the core Elementary Curriculum Outline/ Prepare advertisements/ Initiate contact for contracted persons.
07/01/94 - 08/31/94 -	Conduct the summer institute and prepare for field testing.
09/01/94 - 12/31/94 -	Coordinate the field testing and oversee the administering of testing of classroom participants.

B. Pamphlets

07/01/93 -	Drafts of four pamphlets complete
08/01/93 -	Final pamphlets complete
09/15/93 -	Pamphlets printed

C. Video

06/01/93 - Draft
07/01/93 - Final

D. Local Workshops

05/01/93 - Activity schedule set
06/01/93 - 08/31/93 - Local group activities
09/30/93 - Report on activities

BUDGET ($K)

	USFS	USNPS	ADNR	TOTAL
Personnel	$ 73.7	$45.6	$ 99.1	$ 218.4
Travel	6.5	0.0	11.0	17.5
Contractual	0.0	66.0	30.0	96.5
Commodities	3.2	23.0	1.3	27.5
Equipment	0.0	0.0	0.0	0.0
Capital Outlay	0.0	0.0	0.0	0.0
Sub-total	$ 83.4	$ 134.6	$ 141.9	$ 359.9
General Administration	11.0	11.5	17.0	39.5
Project Total	$ 94.4	$ 146.1	$ 158.9	$ 399.4

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EXXON VALDEZ OIL SPILL PROJECT DESCRIPTION

Project Number: 93007

Project Title: Archaeological Site Stewardship Program

Project Category: Management Action

Project Type: Archaeology

Lead Agency: Alaska Department of Natural Resources

Cooperating Agencies: U.S. Forest Service, Department of the Interior; National Park Service; Department of the Interior, Fish and Wildlife Service

Project Term: January 1, 1993 to January 15, 1994

INTRODUCTION

A. Background and Summary of Injury

The late prehistoric residents of the Prince William Sound, Kenai Peninsula, Kodiak Island and Alaska Peninsula areas oriented their subsistence activities to marine resources, and large numbers of archaeological sites occur along the coast in the area affected by the *Exxon Valdez* oil spill. Due to tectonic activity in this region, some archaeological sites which were once on dry land now occur in the intertidal zone, and 24 or more sites were directly oiled or disturbed by cleanup activities following the spill. In addition to these direct effects on archaeological resources, the spill brought hundreds of people into the spill area for response and damage assessment thereby increasing public knowledge of the locations of archaeological sites. Looting and vandalism of sites in the spill area has increased. Vandalism of archaeological sites is often caused by individuals that are interested in artifacts but are unaware of the damage caused by removing artifacts or disturbing the site. Vandalism results in the irretrievable loss of information from damaged sites. Vandalized sites cannot be returned to their original condition, and the most effective counters to vandalism are public education and increased oversight of the sites.

Site stewardship is the recruitment, training, coordination and maintenance of a corps of local interested citizens to watch over nearby archaeological sites. Site stewardship programs in Arizona, Arkansas and Texas have successfully reduced the incidence of vandalism of archaeological sites. A stewardship program for the area affected by the *Exxon Valdez* oil spill was initiated in 1992, and this proposed project would continue that program.

B. Location

In 1993, stewardship programs will be instituted using residents of Kodiak, Homer and Chenega. In subsequent years, the program will expand to include other communities in the spill area.

WHAT

A. Goal

The goal of the Program is to reduce or eliminate vandalism at archaeological sites in the area affected by the *Exxon Valdez* oil spill.

B. Objectives

1. Recruit and train local residents to protect the archaeological resources in their areas.

2. Obtain agreements with private landowners and agencies with land management responsibilities to participate in the stewardship program.

WHY

A. Benefit to Injured Resources/Services

This proposed project will benefit archaeological sites by preventing their destruction through vandalism. Archaeological sites in the area affected by the *Exxon Valdez* oil spill that were not directly oiled are nevertheless subject to continuing injury related to the spill due to increased public knowledge of the sites. This project will benefit an injured resource by preventing further injury.

B. Relationship to Restoration Goals

This proposed project meets the Trustee Council goal of restoring the environment to its pre-spill condition through management action.

HOW

A. Methodology

The stewardship program is based on functioning programs in Arizona and Texas. The program will be managed by the Alaska Department of Natural Resources, Office of History and Archaeology (SOHA) with assistance from the U.S. Fish and Wildlife Service, the U.S. Forest Service, and the National Park Service during the early phase of program development. The SOHA will have ultimate management responsibility for the stewardship program. The SOHA will employ a State Coordinator to coordinate and administer the network of site stewards and steward coordinators. The U.S. Fish and Wildlife Service, U.S. Forest Service and National Park Service will assist in the implementation of the program. These federal agencies will also cooperate with the SOHA in continued operation of the program.

Agencies with land management responsibilities in the spill area, including the U.S. Forest Service, National Park Service and U.S. Fish and Wildlife Service, and private landowners interested in participating in the stewardship program will enter into agreements with the SOHA. The program will employ volunteers to watch assigned sites and report any changes or

disturbances to the sites. A local coordinator, also a volunteer, will guide day to day efforts and recruit and train new stewards. Local coordinators will also make recommendations on future actions to land owners and the State Coordinator. The State Coordinator will provide overall direction for the program. Land owners and managers will identify sites for monitoring, help select and train stewards, and provide technical advice and assistance.

B. Coordination with Other Efforts

The stewardship program will continue the current stewardship project effort begun in 1992. This program will complement the archaeological site monitoring proposal submitted by the National Park Service. The stewards, with their intensive level of site observations, will be a valuable supplement to patrols by monitoring teams. The monitoring teams will, in turn, provide the professional and legal expertise to act on damage reports from stewards. The stewardship program will also complement the Public Education proposal submitted by the U.S. Forest Service. Stewards could assist in public education outreach programs by giving lectures and talking in classrooms in their local areas.

ENVIRONMENTAL COMPLIANCE

This proposed project is a non-intrusive study that appears to qualify for a categorical exclusion from the requirements of the National Environmental Policy Act.

WHEN

January - February 1993	Prepare/print 1993 training materials/handbooks
Winter 1993	Develop agreements with landowners and agencies
March 1993	Train stewards
Sping/Summer 1993	Stewards in place
Fall 1993	Compile reports from stewards
January 1994	Submit Status Report

In subsequent years, additional areas within the spill area will be included in the program. Training materials will be modified as needed.

BUDGET ($K)

	ADN	USFWS	USNPS	USFS	TOTAL
Personnel	$ 52.0	$ 21.4	$ 4.4	$ 16.3	$ 94.1
Travel	8.5	6.0	4.0	6.0	24.5
Contractual	33.5	5.0	2.5	5.0	46.0
Commodities	2.0	2.6	1.5	2.5	8.6
Equipment	4.0	2.2	0.0	0.0	6.2
Capital Outlay	0.0	0.0	0.0	0.0	0.0
Sub-total	$ 100.0	$ 37.2	$ 12.4	$ 29.8	$ 179.4
General Administration	8.5	3.2	0.7	2.4	14.8
Project Total	$ 108.5	$ 40.4	$ 13.1	$ 32.2	$ 194.2

EXXON VALDEZ OIL SPILL PROJECT DESCRIPTION

Project Number: 93008

Project Title: Archaeological Site Patrol and Monitoring

Project Category: Restoration Management Actions

Project Type: Archaeology/Cultural Resources

Lead Agency: National Park Service

Cooperating Agencies: Department of the Interior, U.S. Fish and Wildlife Service; Department of Agriculture, U.S. Forest Service; Alaska Department of Natural Resources

Project Term: May 5, 1993 to March 1, 1997

INTRODUCTION:

The *Exxon Valdez* oil spill and associated cleanups have resulted in an increased public knowledge of archaeological resources in the oil spill area. The greater visibility of site locations brought on by oil spill activities has resulted in higher incidence rates of looting and vandalism to these resources (An Evaluation of Archaeological Injury Documentation, *Exxon Valdez* Oil Spill, NPS, DNR).

The purpose of this project is to ameliorate the impact of these higher rates of archaeological looting and vandalism. This will be accomplished by utilizing agency archaeologists and resource protection personnel who will conduct public contact patrols and archaeological site monitoring along the coastlines in the *Exxon Valdez* oil spill area. The agency teams will work in their respective areas making contact with the public and informing them of the values of protecting archaeological sites and the federal and state statutes that require this protection. The teams will also monitor selected segments of the coastline for signs of looting or vandalism that may require additional management or law enforcement action.

WHAT

The goal of this project is to reduce or eliminate archaeological site looting and vandalism through the following measures:

1. Create greater public awareness of the value of archaeological resources and the laws protecting them.

2. Create an agency presence and demonstrate agency interest in archaeological resources to discourage and prevent future vandalism in the oil spill area.

3. Identify areas most vulnerable to looting and vandalism that will require further law enforcement action.

4. Track the geographical and temporal variation in the incidence of looting and vandalism in order to take the appropriate protective measures.

5. Increase the efficiency and effectiveness of archaeological resource protection among the involved agencies.

WHY

Before the oil spill, archaeological resources were, practically speaking, protected by their unknown locations. Unfortunately, it is impossible to reverse the expanded knowledge of these resources gained by the public as a direct result of the spill and cleanup activities. Therefore, it is necessary to offset this knowledge of the resource with a positive presence by the agencies and additional effort to spread the message that these resources are protected by state and federal laws.

HOW

The agency teams will consist minimally of an archaeologist and a resource protection specialist. The interdisciplinary team approach is essential to the success of this project. The teams will make active contact with the public that utilizes the target coastal zones and inform them of the values of protecting archaeological sites and the federal and state laws that require this protection. They will also monitor selected segments of the coastline for signs of looting or vandalism that may require further management or law enforcement action and refer the information to the appropriate agency for action. Site patrol and monitoring will give priority to known problem areas where looting has already occurred or where sites are known to be at risk as identified in the archaeological resource damage assessment study, recently completed.

Standard resource protection and archaeological data collection practices will be employed. Successful programs for cooperative multi-agency patrol and monitoring projects have been developed in the American Southwest, and the National Park Service (NPS) has an incipient program in place in Alaska. Detailed field notes, photographs or video tapes, and all patrol reports, including a log of all public contacts, will be kept by the field teams.

The bulk of the project funding for this component will be distributed among the participating agencies for field personnel salaries, for supplies, and for flight time, fuel, etc., to supplement existing site patrol and monitoring efforts, or establish them where necessary. Augmenting existing agency efforts is the most cost-effective approach. The three federal agencies and the state already have existing patrol capabilities in the oil spill zone. The purpose here is to expand those capabilities to cover the affected archaeological sites. In addition, the NPS has used ARPA law enforcement funds from Washington for the last two years to expand the patrolling capabilities of several seasonal rangers in Katmai National Park to cover archaeological resources.

The technical lead for this component will be the National Park Service which has expertise in this area, including a well-developed archaeological resource protection and training program. An archaeologist with a law enforcement commission will act as project coordinator and the regional law enforcement specialist will act as a technical advisor to the program. Both will serve as trainers for field personnel.

Project Descriptions

The overall management of the project will be done by the project coordinator in consultation with the project technical advisor and the agencies. The project coordinator will ensure that there is uniformity among the agencies in carrying out the project, will act as the liaison among agencies, and will recommend the most efficient use of project resources.

The project coordinator will act as the project information officer and maintain all project records, including a copy of all field notes, patrol reports, photographs, and other records or data collected by field personnel. The project coordinator will also consolidate and analyze this information to produce an annual report for the project, and make recommendations for future efforts. Data will be maintained in the files of the project coordinator and will be made available to all participating agencies.

Uniform training for field personnel is essential to the success of this project, and will be conducted by the project coordinator and the technical advisor with input from the agencies. A nationally recognized expert on archaeological resource protection will be brought from Duluth, Minnesota for the training session. All field personnel must attend the project training, to be held at the beginning of each field season, before they will be allowed to participate in the project. Training will consist of orientation to the project, archaeological resource protection training, resource familiarization, and public education and contact techniques.

To ensure uniformity and comparability of observations and data collection, the project coordinator and the technical advisor will periodically review individual agency operations, including field evaluations. Issues of safety and logistics will be handled by individual agencies.

A plan of operations must be filed by each participating agency for each year. An annual report will be required from each agency, including a status report on the targeted sites. The project coordinator will prepare an annual report for the entire project which compiles and analyzes the data collected by each agency for that year, and make recommendations for the following year's effort.

This project will be coordinated with the archaeological site stewardship program currently administered by the US Fish and Wildlife Service, and with any other archaeological restoration projects approved by the Trustees.

ENVIRONMENTAL COMPLIANCE

The proposed project is a categorical exclusion from the National Environmental Policy Act.

WHEN

The duration of the full project will be three to five years, depending on the level of documented site damage.

May 1, 1993	Agency Operating Plans for 1992 Field Season Due
June 1 to June 5, 1993	Field Personnel Training in Anchorage
June 8 to August 27, 1993	Field Work
November 16, 1993	Agency Annual Reports and Copies of Field Data Due
March 1, 1994	Project Annual Report Due and Distributed to Agencies and Trustees.

Similar schedules would be implemented for following years.

BUDGET ($K)

	USNPS	USFWS	ADNR	USFS	TOTAL
Personnel	$ 41.0	$ 14.8	$ 48.3	$ 14.8	$ 118.9
Travel	10.7	2.3	2.3	2.3	17.6
Contractual	29.9	29.2	29.2	29.2	117.5
Commodities	0.0	5.5	5.5	5.5	22.0
Equipment	0.0	0.0	0.0	0.0	0.0
Capital Outlay	0.0	0.0	0.0	0.0	0.0
Sub-total	$ 87.1	$ 51.8	$ 85.3	$ 51.8	$ 276.0
General Administration	6.1	2.2	9.3	2.2	19.8
Project Total	$ 93.2	$ 54.0	$ 94.6	$ 54.0	$ 297.8

19.420

EXXON VALDEZ OIL SPILL PROJECT DESCRIPTION

Project Number: 93009

Project Title: Public Information, Education and Interpretation

Project Category: Restoration Management Actions

Project Type: Education

Lead Agency: Department of Agriculture, Forest Service

Cooperating Agencies: Department of the Interior, National Park Service; Alaska Department of Fish and Game

Project Term: January 1, 1993 to September 30, 1997

INTRODUCTION

A. Background on the Resource/Service

This project will provide interpretive materials and experiences for communities, visitors, commercial and recreation users in the oil spill area about the *Exxon Valdez* oil spill and resultant research and restoration projects.

B. Summary of Injury

Numerous people in the PWS communities suffered adverse impacts from the spill. In a broader sense, many Americans felt injured by the effects of the spill on what they believed was one of the more pristine and beautiful areas of Alaska.

C. Location

The public information outreach will benefit all of Southcentral Alaska with an emphasis on the communities of Valdez, Whittier, Cordova, Seward, Homer, Kodiak, and the Municipality of Anchorage.

WHAT

A. Goal

1. To inform and educate the public on the effects and impacts of the *Exxon Valdez* oil spill, current research and restoration project activities.

2. To provide to the public an accurate/balanced view of existing conditions in PWS.

3. To interpret PWS and the Gulf of Alaska environment to the public to enhance their enjoyment and understanding of this area.

4. To enhance eco-tourism recreation opportunities and experiences through interpretation of the natural resources and environment.

B. Objectives

1. Development of a family of brochures on the oil spill impacted areas - the focus of the brochures will be on how the different subject areas were or were not affected by oil spill, and on educating recreationists and other users of the oil spill areas about minimum impact use to avoid further damage to injured resources. Subjects to be covered would include but not be limited to marine mammals, waterbirds, anadromous fish, plants, upland wildlife, intertidal life, cultural resources, history of PWS, upland birds, and recreational opportunities.

2. The development and production of a family of videos on the oil spill impacted areas. These will be short (5-10 minute) videos that can be used in visitor centers, in kiosks, taken to schools, public meetings or can be sent off as stand alone entities or as a combined package to whomever has a need for this type of information.

WHY

This project will provide to the public balanced and accurate information on the oil spill, injured and non-injured resources, and on restoration efforts. This project would tie into the restoration team's need to provide the public with information.

HOW

A public-affairs specialist (PAS) will be hired by the Forest Service in FY 1993 as overall coordinator for the approved projects. The PAS will report to the public affairs officer on the Chugach National Forest and be responsible for monitoring the progress of all projects and for their ultimate completion. Projects may be accomplished by agency (both state and federal) specialists or by contract. The project coordinator will also be responsible and accountable for all project budgets. Support services such as clerical help, purchasing, contracting and the execution of interagency agreements (if needed) will be provided by the Chugach National Forest Supervisor's Office. Close coordination with other agencies will be critical. The project coordinator will need to work closely with other appropriate cooperating state and federal agencies to ensure their active involvement. All of the projects will be accomplished through the efforts of a multi-agency team.

ENVIRONMENTAL COMPLIANCE

These projects are categorically excluded (FSH 1909.15, paragraph 26.la, item #4).

WHEN

		Start	Complete
A.	**Brochures (10)**	10/92	09/93
	Writing Script	01/93	04/93
	Design and Layout	04/93	07/92
	Printing	07/93	09/93
B.	**Video (1)**	01/93	09/94
	Footage Gathering	01/93	07/93
	Edit & Duplicating	07/93	09/93

BUDGET ($K)

	USFS
Personnel	$ 69.0
Travel	10.0
Contractual	205.0
Commodities	2.0
Equipment	6.0
Capital Outlay	0.0
Sub-total	$ 292.0
General Administration	24.7
Project Total	$ 316.7

19.4.2 N

EXXON VALDEZ OIL SPILL PROJECT DESCRIPTION

Project Number: 93010

Project Title: Reduce Disturbance Near Murre Colonies Showing Indications of Injury from the *Exxon Valdez* Oil Spill

Project Category: Management Action

Project Type: Birds

Lead Agency: Department of the Interior, Fish and Wildlife Service

Cooperating Agencies: None

Project Term: January 1, 1993 to September 30, 1993

INTRODUCTION

A. Background on the Resource/Service

Common and thick-billed murres were the species of higher vertebrates most frequently injured by the oil from the *Exxon Valdez* oil spill. These diving seabirds have continued to demonstrate abnormal breeding behavior and low reproductive output at several sites since the spill. Murres normally nest in dense aggregations, presumably an adaption which reduces the rate of predation of eggs and chicks. Social behavior within aggregations apparently is important in stimulating the onset of laying and there is a tendency for laying within aggregations to be relatively synchronous. Murres often respond to abrupt, loud noises by panic flights from nesting cliffs. They are especially prone to panic flights when they are not incubating an egg or brooding a chick. If a small percentage of the murres in an aggregation have laid and a panic flight occurs, eggs tend to be abandoned temporarily. In contrast, after a substantial proportion of birds have laid, incubating birds are more likely to remain with eggs even when non-breeders and pre-breeders fly. In most locations, eggs left unattended are taken by avian predators (e.g., gulls, ravens). If food is adequate and eggs are lost early in incubation, murres will relay about 14 days after eggs are lost. Nevertheless, a lower proportion of chicks fledge from second eggs than from first. The result of panic flights, especially when such flights occur during early incubation, is reduced productivity.

B. Summary of Injury

Over 100,000 murres were killed by the oil, and counts of birds at colonies within the trajectory of the oil indicated reduced populations after the spill. In the 3 years following the spill, remaining murres at colonies affected by the oil have initiated laying relatively late, if they laid at all, and reproductive output has remained lower than normal. Avian predators have been responsible for much of the egg loss. Murres in colonies where a high percentage of the individuals are failing to reproduce tend to be flighty at the slightest disturbance. As indicated above, panic flights, especially early in incubation, tend to reduce productivity for the colony. With reduced populations, it is important for remaining murres to produce recruits at a high

enough rate to cause recovery. Poor reproductive success following the spill has continued, and few young were produced during the breeding seasons of 1989-1991 to recruit to breeding populations in the future. If this continues, recovery to former population levels is unlikely.

C. Location

The project will attempt to reduce disturbance at the main murre colonies where evidence of injury has been recorded. These colonies are Ugaiushak Island and Puale Bay, located on the south side of the Alaska Peninsula near the downstream end of the spill trajectory; the Barren Islands, located near Homer between the Kenai Peninsula and Kodiak Island area; the Triplet Islands, located between Kodiak and Afognak Island; and the Chiswell Islands, located near Seward. This project will include education displays and efforts in Kodiak, Homer, Seward, and Chignik.

WHAT

A. Goal

The purpose of this project is to facilitate the recovery of murre colonies affected by the *Exxon Valdez* oil spill by reducing disturbance during the breeding season.

B. Objectives

1. Educate people who use areas near the murre colonies affected by the *Exxon Valdez* oil spill about the need to avoid disturbance to birds.

2. To enhance productivity of murres by reducing disturbance.

WHY

A. Benefit to Injured Resources/Services

Murre colonies within the trajectory of the spill were injured initially by loss of breeding birds. The lingering effect has been abnormal breeding behavior resulting in reduced reproductive success. This may be the result of a breeding population composed almost entirely of young inexperienced birds which may not have been present in 1989 when the oil-related mortality occurred. Reducing disturbance near breeding colonies during the breeding season should enhance productivity by diminishing the panic flights which leave eggs and chicks exposed to predators. Reducing disturbance bouts also may accelerate the return to an earlier nesting phenology by reducing the proportion of pairs that are forced to relay lost eggs. The timing of chick hatching is presumably timed to coincide with maximum food resources needed to successfully rear chicks. A return to more normal timing would therefore favor higher reproductive output and foster restoration of populations to former levels.

B. Relationship to Restoration Goals

There are few reasonable proactive approaches that will aid restoration of murres, but minimizing disturbance likely will result in increased hatching success of murre eggs. Further, if eggs laid early are not lost, the phenology of breeding events should return to a more normal schedule, one adaptive for maximum survival of young.

HOW

A. Methodology

The public education campaign would include development of a brochure, articles in community and industry newspapers and magazines (e.g., commercial fisherman), presentations to communities and industry groups, and automated slide shows at visitor contact centers at Homer, Kodiak, and Seward. Recommendations would be provided on how users may conduct activities in a less disturbing manner (e.g., ask halibut charter operators to gaff fish rather than shooting them to eliminate the loud noise). The targeted audience would include tour boat and fishing charter operators from Seward and Homer, and commercial fishermen from villages in the vicinity of colonies (e.g., Kodiak, Seldovia, Chignik, Seward). In addition, workshops for charter operators would be held, the Federal Aviation Agency would be contacted to try to get advisories out to pilots in these areas, and regular radio and television spots would be developed for use in selected communities. Although existing facilities, communication networks, and ongoing programs would aid accomplishment of the objective, one person would be hired specifically to perform the duties associated with this project.

B. Coordination with Other Efforts

This effort will compliment existing interpretive programs, and provide an opportunity to build understanding an appreciation for marine resources. An effort would be made to solicit aid from the National Park Service and Alaska Department of Fish and Game to disseminate information. Another restoration project, monitoring would provide a basis for judging the effectiveness of this project to minimize disturbance. Coordination with existing law enforcement programs will be a part of this project, but no new regulations are proposed initially. Not only murres but other colonial seabirds would benefit from reduced disturbance.

ENVIRONMENTAL COMPLIANCE

This is a non-intrusive project which appears to qualify for categorical exemption under NEPA.

WHEN

October 1992	Advertise for and hire a lead person
November to December 1992	Plan specific strategies for project and coordinate with cooperators
January to March 1993	Produce brochure, develop presentations, and schedule presentations
April to August 1993	Distribute information, make presentations
September 1993	Analyze program effectiveness, recommend modifications

BUDGET ($K)

	USFWS
Personnel	$ 35.0
Travel	9.0
Contractual	4.0
Commodities	2.0
Equipment	2.0
Capital Outlay	0.0
Sub-total	$ 52.0
General Administration	4.8
Project Total	$ 56.8

19.4.2 m

EXXON VALDEZ OIL SPILL PROJECT DESCRIPTION

Project Number: 93011

Project Title: Develop Harvest Guidelines to Aid Restoration of River Otters and Harlequin Ducks

Project Category: Management Actions

Project Type: Birds/Mammals

Lead Agency: Alaska Department of Fish and Game

Cooperating Agencies: None

Project Term: January 1, 1993 to September 30, 1993

INTRODUCTION

A. Background on Resource/Service

River otters (*Lutra canadensis*) and harlequin ducks (*Histrionicus histrionicus*) occur throughout the area impacted by the *Exxon Valdez* oil spill. Damage assessment studies of both species has documented injury and raised the possibility of long-term detrimental effects. Legal harvest of these species is continuing. This is a controllable source of mortality that should be applied as a restoration tool. However, that application cannot occur until harvest guidelines are developed and implemented that fully utilize injury assessment information. This project will develop those guidelines.

B. Summary of Injury

Otters forage in intertidal and subtidal zones that were heavily contaminated with oil. Analysis of bile and blood samples indicated hydrocarbons were accumulated and that toxic effects of oil are continuing. Oiled mussels eaten by otter are likely one source of continuing contamination. Home ranges of radio-collared animals were larger in oiled than non-oiled areas suggesting that oil contamination made it more difficult for them to find food. Body lengths, body weights and diet diversity were all lower in oiled areas, further substantiating indications of food problems. A population decline in the oiled area in 1991 was indicated by a high rate of latrine site abandonment (nearly 15%) as compared to non-oiled sites (less than 4%).

C. Location

More than 2,000 sea duck carcasses were recovered after the spill, including more than 200 harlequins. Harlequins use the intertidal and shallow subtidal zones most heavily affected by the spill. They feed on invertebrates, such as mussels, which showed continuing evidence of hydrocarbon contamination. Tissues from about 40% of harlequins sampled in the oiled area during 1989 and 1990 were contaminated with hydrocarbons, and about 33% of birds collected in the spill area were in poor body condition. In 1991, surveys indicated a harlequin population decline and near-total reproductive failure in oiled areas of PWS. Preliminary results of 1992 surveys suggested continuing reproductive failure.

WHAT

A. Goal

This project will recommend harvest guidelines to facilitate restoration of river otters and harlequin ducks in PWS.

B. Objectives for river otters are to:

1. Estimate number, composition and location of historical and current harvest.
2. Recommend seasons and bag limits that will facilitate restoration.

C. Objectives for harlequin ducks are to:

1. Recommend seasons and bag limits that will facilitate restoration.

WHY

Manipulation of seasons and bag limits to aid recovery of river otter and harlequin duck populations is likely the only restoration action possible over the next several years. Mortality from trapping and hunting could be reduced and recovery thereby accelerated. However, it must be clear that the benefit to injured species outweighs the loss of resource use opportunity for the public.

Other restoration actions, such as transplants or protection and enhancement of habitat will not be effective in the short-term because both species likely suffer continued exposure to petroleum hydrocarbons through ingestion of contaminated food. Moreover, it is possible that natural degradation of hydrocarbons in the environment over a long period of time is the only way to eliminate this food contamination.

Work proposed by this project will supplement normal management activities of ADF&G Division of Wildlife Conservation. It will allow formulation of harvest guidelines that consider restoration goals. Normal management activities for river otters and harlequins include at least four weeks of staff time devoted to collecting and analyzing harvest data, considering regulation changes, and implementing any season and bag limit changes that are approved. Those activities are supported by data entry services, travel funds, and facilities.

HOW

A. Methodology

1. River Otters.

The reliability of monitoring the use of latrine sites as an index to population trend will be evaluated. Literature will be searched and experts will be contacted to obtain opinions. If monitoring appears reasonable, it will be proposed as a continuation project.

Most harvest will be quantified by searching ADF&G furbearer sealing records. Additional harvest by local subsistence users that was not reported will be estimated using results of household surveys conducted by ADF&G Subsistence Division during 1992-93. Funding for those surveys is not requested as part of this proposal. All available information will be summarized by year beginning in 1985.

Harvest guidelines will be formulated by considering the restoration goal, population trend and harvest level. The goal is to restore the oil spill area to its pre-spill condition. Achieving it will require reversing an apparent downward population trend. The role of harvest mortality as a limiting factor will be estimated and guidelines formulated to insure that harvest facilitates recovery.

2. Harlequin Ducks.

Harvest and population data will be considered and harvest guidelines developed. The sport harvest data used will be very general in nature because specific information on harlequins in PWS has not been collected by management agencies. Existing subsistence harvest information is also non-specific. However, improved subsistence data is expected from household surveys that will be conducted by ADF&G Division of Subsistence during 1992-93. Population status information is expected from the harlequin duck restoration monitoring study (#93-033).

ENVIRONMENTAL COMPLIANCE:

No environmental assessment is required for this project.

WHEN

A. River Otter

November 1992	Make recommendation concerning emergency order changing 1992/93 trapping season.
March 1993	Evaluate reliability of latrine site monitoring as an index to population trends.
August - September 1993	Summarize harvest, make recommendation concerning an emergency order changing 1993/94 trapping season.

B. Sea Ducks

January 1993	Make recommendation on season and bag limits to Board of Game.

BUDGET ($K)

	ADF&G
Personnel	$ 6.6
Travel	0.5
Contractual	2.0
Commodities	1.0
Equipment	0.0
Capital Outlay	0.0
Sub-total	$ 10.1
General Administration	1.1
Project Total	$ 11.2

19.4.2 L

EXXON VALDEZ OIL SPILL PROJECT DESCRIPTION

Project Number: 93014

Project Title: Quality Assurance for Coded-Wire Tag Application in Fish Restoration Projects

Project Category: Technical Support

Lead Agency: Alaska Department of Fish and Game

Cooperating Agencies: None

Project Term: January 1, 1993 to December 31, 1993

INTRODUCTION

This project will maintain high quality coded-wire tag (CWT) application and CWT data tracking for EVOS restoration projects. The target species are pink, chum, and sockeye salmon. The *Exxon Valdez* oil spill (EVOS) injured wild pink and chum salmon eggs and fry. Various amounts of oil were deposited in intertidal spawning habitats in Prince William Sound (PWS) where up to 75% of the spawning occurs. Salmon eggs deposited in 1989 and all subsequent years have been contaminated and direct egg mortality has been documented. The growth and survival of juvenile salmon during the early marine period was reduced by oil contamination in 1989. Recently suspected genetic damages resulting from oil contamination in spawning beds may further reduce the productivity and fitness of wild salmon populations for many years to come. Sockeye salmon rearing lakes on Kodiak Island and elsewhere were damaged when fisheries were closed allowing large numbers of spawners to escape into rearing lakes. The resulting large fry populations overgrazed the resident fry food resources in the lakes causing a reduction in lake carrying capacity. The benefits of this project will be realized in the communities of Kodiak, Anchorage, Whittier, Valdez, and Cordova which support important sport and commercial fishing industries in the region.

WHAT

The goal of this project is to establish and maintain high quality CWT application and data tracking procedures within EVOS restoration projects. The project will achieve the following objectives:

1. Interface CWT application database with CWT recovery databases being developed for restoration projects,
2. Implement appropriate quality control standards, tag application, and data tracking procedures for CWT application within EVOS restoration projects and provide technical assistance to staff involved with CWT application,
3. Review data from CWT application projects at the end of the season to insure that quality control standards, tag application, and data tracking procedures are maintained, and
4. Conduct a pilot project to develop a methodology to quantify CWT placement in pink salmon fry and incorporate into CWT application database.

WHY

Coded-wire tagging is currently used in several fishery "management action" and "resource manipulation and enhancement" projects. Management action projects utilize CWT data to (1) direct fishing effort away from damaged wild salmon, and (2) inventory and evaluate the effects of straying hatchery salmon on wild salmon populations. Manipulation and enhancement projects utilize CWT as a tool to evaluate project success. Failure to assure proper CWT application procedures and data tracking may seriously compromise the quality of CWT programs, confound interpretation of CWT data, and reduce the success of EVOS restoration projects. This project is designed to maintain high quality CWT application and data tracking procedures to insure that this stock separation tool provides the expected results.

Coded-wire tagging is a very effective tool for marking large numbers of juvenile fish if high quality tag application and data tracking procedures are maintained. All CWT programs are based on the assumption that tagged fish are representative of untagged fish. Poor tag application and fish handling procedures will result in a violation of this assumption by (1) reducing the growth and survival of tagged fish, or (2) reducing the fishes' ability to home accurately to its stream of origin. Standard methods must be used during the application process to minimize damage to tagged fish, insure good tag placement, properly estimate number of tagged fish, number of untagged fish, tag mortality, tag retention, and number of good fin clips. This project will benefit all restoration projects that involve coded-wire tagging (e.g., Red Lake Salmon Restoration, Restoration of Coghill Lake Sockeye, Inventory and Effects of Straying of Hatchery Pink Salmon on Wild Pink Salmon Populations in PWS, Montague Island Chum Salmon Restoration) by insuring maintenance of quality control standards and interfacing of CWT application and recovery databases. Technical assistance will be provided to private groups that will use CWT to evaluate restoration program success (e.g., Chenega Chinook and Coho Stocking).

Poor tag placement is the most likely cause of reduced growth, survival, and homing ability in tagged fish. There is documented damage to the olfactory nerve in chum salmon fry tagged with CWT. Good placement is particularly important to maintain when tagging pink salmon fry because of their small size. Each year approximately one million CWTs are applied to pink salmon at five private nonprofit hatcheries in PWS. Recovery of these marked fish in hatchery broodstock and common property and cost recovery harvests is essential for effective management of hatchery and wild salmon populations. Recovery of CWT fish is currently being used to evaluate the effect of straying hatchery salmon on damaged wild salmon populations in PWS. A program to quantify CWT placement in pink salmon is needed to insure that variations in placement between tag codes do not confound interpretation of straying data.

HOW

This project will establish and maintain high quality CWT application and data tracking procedures within all EVOS restoration projects. The project will initially focus on a review of existing CWT quality control and tag application procedures. Sample sizes and procedures currently used to estimate tag mortality, tag retention, and fin clip quality will be evaluated and adjusted if necessary. The existing CWT application database will be interfaced with developing CWT recovery databases. Standard quality control, tag application, and data tracking procedures will be implemented. Documents detailing these procedures will be distributed to government and

private groups responsible for CWT application in various EVOS restoration projects. Each CWT application site will be visited periodically to answer questions and insure that CWT quality standards are being followed. Each restoration project involving CWT will prepare a report describing the methods and results from each field season. CWT reports will be reviewed for consistency with quality standards and recommendations will be developed for further improvement of the program.

A pilot study will be conducted to collect data needed to design a program to quantify CWT placement in pink salmon fry. Samples of tagged fry (n = 200) will be collected from randomly selected tag groups/codes of pink salmon. Fry tissues will be cleared with a sequential treatment of formaldehyde and potassium hydroxide solution. A computer image analysis system will be used to quantify tag placement within the head of each fish relative to a reference line drawn between the eyes. Histological analyses will be conducted to determine the degree of olfactory nerve damage in fish exhibiting poor tag placement. The data obtained from the study will be used to estimate sample sizes and costs associated with quantification of tag placement.

ENVIRONMENTAL COMPLIANCE

This project will not have a direct impact on any environmental parameters.

WHEN

This project will take place during FY93. Project activities will occur throughout much of the year.

Jan. - Feb.	Review and revise CWT quality control standards and interface CWT application database with CWT recovery databases
Feb. - June	Collect samples for tag placement study and assist restoration project staff involved with CWT application
June - July	Review data from CWT application projects
July - Sept.	Process samples from tag placement study and analyze data
Oct. - Nov.	Prepare annual report

BUDGET ($K)

	ADF&G
Personnel	$ 68.4
Travel	3.8
Contractual	10.3
Commodities	1.0
Equipment	0.0
Capital Outlay	0.0
Sub-total	$ 83.5
General Administration	11.3
Project Total	$ 94.8

19.4.2 K

EXXON VALDEZ OIL SPILL PROJECT DESCRIPTION

Project Number: 93018

Project Title: Enhanced Management for Wild stocks in Prince William Sound, Special Emphasis on Cutthroat Trout and Dolly Varden.

Project Category: Restoration Management actions

Project Type: Fish and Shellfish

Lead Agency: Alaska Department of Fish and Game

Cooperating Agencies: U.S. Department of Agriculture, Forest Service

Project Term: January 1, 1993 to September 30, 1994

INTRODUCTION

The status of many of the wild fish stocks and their habitats in the aftermath of the *Exxon Valdez* oil spill, are unknown. Numerous efforts have been conducted or initiated to evaluate effects of the oil spill on specific stocks and information exists scattered throughout various agencies on various aspects of some of these stocks. Higher mortality and slower growth rates for Dolly Varden and cutthroat trout was documented in oiled areas compared to non-oiled areas. Recreational fishing for Dolly Varden and cutthroat trout was curtailed by emergency closures and changes in sport regulations following the oil spill, likely resulting in faster recovery times for the stocks that were closed to sport fishing. In other parts of Prince William Sound (PWS), however, there is insufficient information on which to base population management actions for these two species. In addition, information to prioritized population and habitat management actions for most of the wild fish stocks in PWS is lacking or at least unconsolidated. Without appropriate information on which to base management action, injury may occur to other stocks due to overfishing or overly conservative regulations may be made which would unnecessarily restrict recreational sport fishing opportunities. Likewise, a readily accessible informational database is needed to identify appropriate strategies for protecting, maintaining and enhancing populations and habitat of wild stocks of fish in PWS.

Project personnel will operate weirs in Cordova, Valdez and western PWS at Eshamy Creek to sample outmigrating cutthroat trout and Dolly Varden. Where possible enumerations of other salmon smolts will be made. Concurrently, the Forest Service will construct a database of information on the wild stocks of cutthroat trout, Dolly Varden, coho salmon, pink salmon, and all other freshwater and anadromous fish in PWS. The combination of these two efforts will benefit all users who participate in sport fisheries in PWS by providing the means to assist resource managers in making prudent decisions regarding the viability and long term sustainable yield of all fish species in PWS.

WHAT

A. Goal

The goal of this project is to collect the information needed for the responsible management of populations and habitats of all fish species in PWS with a special emphasis on Dolly Varden and cutthroat trout. Resultant management actions will be prioritized toward recovery of depressed stocks of all species while assuring that anglers can fish for Dolly Varden and cutthroat trout where stocks are healthy enough to withstand fishing pressure.

B. Objectives

The Alaska Department of Fish and Game (ADF&G) objectives are as follows:

1. Determine the abundance of anadromous Dolly Varden and cutthroat trout over 200 mm in length outmigrating from Eyak Lake, McKinley Lake, Robe Lake and Eshamy Lake for both 1993 and 1994.

2. Obtain length compositions of the 1993 and 1994 outmigrations of Dolly Varden and cutthroat trout over 200 mm in length from Eyak Lake, McKinley Lake, Robe Lake and Eshamy Lake such that the composition is within ± 5% of the true value 95% of the time.

3. Estimate mean length and age for anadromous cutthroat trout that overwintered in Eyak Lake, Mckinley Lake, and Eshamy Lake such that the estimate is within ± 10mm of their true value 90% of the time.

The U.S. Forest Service (USFS) objectives are as follows:

4. Compile existing information on all freshwater and sea-run fish stocks in PWS in a readily available computerized format that will be made available to all interested resource management agencies.

WHY

The goal of this project is to collect the information needed to develop management strategies which will provide for the responsible management of wild fish stocks and their habitats in PWS, with special emphasis on Dolly Varden and cutthroat trout. Restoration project R 106, which was funded in 1991, provided preliminary information about the distribution of Dolly Varden and cutthroat in PWS and the adjoining CRD. Numerous other studies on other fish species have been conducted since the oil spill and much information prior to the oil spill on fish stocks in PWS exists scattered among various agencies and researchers. Information on where populations exist, their significance (e.g., biological, commercial, recreational cultural), habitat limiting factors, susceptibility to disturbance and potential impacts to populations and habitats are needed to adequately prioritize management actions. The availability of all this information in a readily accessible computerized format will increase the effectiveness of the Forest Service and other resource managers in the maintenance of population diversity in PWS.

Cutthroat trout and Dolly Varden population information is currently lacking for many sites in PWS. Two of the overwintering populations which will be studied in 1993 and 1994 are those of Eyak and McKinley Lakes. Both of these lake systems currently support popular sport fisheries; however, abundance and length composition for these populations is not known. Therefore we don't know how much fishing pressure either population can sustain. Furthermore, logging activities are planned for the Eyak Lake drainage. Population data from this site prior to logging will be useful in assessing the impacts of logging on these populations. Robe Lake was selected for evaluation because of the habitat restoration opportunities that exist at this site. This drainage once supported active sport fisheries for salmon and Dolly Varden. However, the lake has physically deteriorated in the last 20 years, and we don't know is what the lake currently supports for terms of fish. Because this site has the possibility of replacing lost fishing opportunity we feel that population research at this site is warranted. Eshamy Lake was a NRDA treatment site for Dolly Varden and cutthroat trout. We believe that monitoring at this site be continued in order to gauge the recovery of populations that were exposed to oil. Abundance and length parameters for the populations of the four sites will be studied for two consecutive years to obtain accurate estimates. These estimates, along with the information gained from NRDA F/S 5 and R 106 will be used to form a regulatory package for Dolly Varden and cutthroat trout fisheries in PWS that will be presented to the Alaska Board of Fisheries in 1996.

HOW

To estimate abundance of sea-run cutthroat trout and Dolly Varden, all emigrating fish over 200 mm in length, passing through weirs placed on the four streams and rivers, will be counted during the spring outmigrations for both species. To obtain length compositions for overwintering stock, all fish over 200 mm in length will be measured to the nearest 1 mm. To obtain estimates of mean length at age, three scales will be removed from all cutthroat trout emigrating through the weirs. Age will be determined by examination of the scales.

All existing information, including the results of the Dolly Varden and cutthroat trout field portion of this project, will be compiled by a contractor, hired and directed by Forest Service personnel. The contractor will work closely with individuals from the ADF&G, USFWS, NMFS and USFS researchers, and individuals who have information on wild fish stocks in PWS. A computer database will be developed using ORACLE software and will operate in a MS-DOS environment.

ENVIRONMENTAL COMPLIANCE

Title 16 permits will be obtained for each weir that is installed.

WHEN

January 1 - March 31, 1993	-	Operational plan will be written, materials purchased, crews will be hired and the Eyak River weir will be constructed.
January 1 - February 15, 1993	-	Contract for FS database will be written.
February 15 - April 15, 1993	-	Contract will be advertised
April 15 - June 30, 1993	-	Field Season
April 30, 1993	-	Contract will be awarded
May 1 - September 1, 1993	-	Database structure developed and start collecting information.
July 1 - September 1, 1993	-	Data entry, editing, and analysis. Cutthroat trout scales will be aged.
September 30, 1993	-	Preliminary Report
January 1 - March 31, 1994	-	Operational plan written, materials purchased and crews will be hired.
Sept. 1, 1993 - Sept. 1, 1994	-	Continued data compilation and computer database construction
April 15 - June 30, 1994	-	Second field Season
July 1 - September 1, 1994	-	Data entry, editing, and analysis. Cutthroat trout scales will be aged.
September 30, 1994	-	Database completed and installed on Forest Service computer.
September 1 - October 1, 1994		Final Report will be written.

BUDGET ($K)

	ADF&G	USFS	TOTAL
Personnel	$ 143.0	$ 5.0	$ 148.0
Travel	7.0	0.0	7.0
Contractual	35.5	50.0	85.5
Commodities	16.5	0.0	16.5
Equipment	0.0	0.0	0.0
Capital Outlay	0.0	0.0	0.0
Sub-total	$ 202.0	$ 55.0	$ 257.0
General Administration	24.0	4.3	28.3
Project Total	$ 226.0	$ 59.3	$ 285.3

19.4.2 J

EXXON VALDEZ OIL SPILL PROJECT DESCRIPTION

Project Number: 93019

Project Title: Chugach Region Village Mariculture Project

Project Category: Restoration Enhancement

Project Type: Fish and Shellfish

Lead Agency: Alaska Department of Fish & Game

Cooperating Agencies: Chugach Regional Resources Commission

Project Term: October 1, 1992 to September 30, 1996

INTRODUCTION

This project involves the culture of bivalve shellfish for use as a subsistence food and for economic development in Native villages of the Chugach Native Region. There are five Native villages in the region; Eyak, adjacent to Cordova; Tatitlek, in northern Prince William Sound; Chenega Bay, in southwest Prince William Sound; and Nanwalek and Port Graham, both of which are located on the southwestern tip of the Kenai Peninsula. All these villages will participate in this project. Shellfish have long comprised a significant subsistence food resource for these villages. This resource also has commercial potential for mariculture. A pilot commercial mariculture project underway near the Chenega Bay village in 1989 was aborted because of the oil spill.

The March 1989 *Exxon Valdez* oil spill adversely affected the waters and beaches utilized by the villagers. The oil spill affected the longstanding reliance of Chugach Native villages on the productivity of the marine habitat for their livelihood and traditional lifestyle.

Shellfish resources in the oil spill affected were affected in two ways. First, the sheltered habitats that were most hospitable to shellfish were also most protected against Prince William Sound's natural cleansing action. Oil spill residues tend to persist in contaminated shellfish habitats. The National Oceanic and Atmospheric Administration estimated that oil could remain in sheltered, low energy areas for twenty years or longer. Regardless of the action taken to remove the oil from shellfish beds, it will be a long time before these shellfish could be considered fit to eat. Second, the tendency of shellfish to accumulate, concentrate and store toxic contaminants such as polycyclic aromatic hydrocarbons (PAHS) compounds this habitat injury. An active approach to replace lost resources is needed.

The upshot is that the oil spill badly eroded community confidence in the healthfulness of this subsistence shellfish stock. It also arrested initial efforts to explore the commercial feasibility of shellfish mariculture. Thus, the oil spill has given special impetus and urgency to ongoing efforts to initiate Native-sponsored shellfish mariculture projects. Mariculture is a feasible and cost-effective means to conserve, repair and enhance the natural productivity of the renewable resource base.

WHAT

The broad long range goal of the village mariculture project is to strengthen the villages' economic well-being and self-sufficiency through the culture of shellfish stocks for subsistence and commercial harvest.

Three specific project sub goals are identified to implement the long range goal to strengthen Chenega Bay and Tatitlek's economies and economic self-sufficiency:

1. Develop self-supporting village-owned and managed commercial mariculture enterprises.
2. Create new local opportunities for employment and earned income.
3. Restore/enhance traditional subsistence as a supplement to cash income.

Eyak, Tatitlek and Chenega Bay have already begun the process of establishing mariculture operations. The first-year project objective for these villages will be to complete the development of an initial mariculture facilities installation, initiate maintenance activities, and expand the mariculture training program for the villagers.

First-year objectives for English Bay and Port Graham will be to identify potential sites for mariculture operations and initiate permitting procedures required for mariculture development.

Objectives for the ensuing years of the project will involve establishing mariculture operations for Port Graham and Nanwalek, continued training, expanding production and continued market development.

WHY

This project will provide the villages of the Chugach Native region with a means to develop the local bivalve resource in a manner that provides some level of protection against manmade disasters such as EVOS. The local marine environment offers one of the very few opportunities available to theses villages for economic development. EVOS amply demonstrated how vulnerable marine resource development is to disasters such as the oil spill. As well as being an efficient way of utilizing the local marine environment, the mariculture techniques that will be utilized in this project will allow steps to be taken to protect the shellfish that are under culture from the effects of disasters such as EVOS. Such steps could include moving the shellfish to a safe area or sinking them in subtidal water.

The project is designed to provide a long term source of income and subsistence food. It will provide a means for the villagers to maintain their traditional lifestyle in the face of increased and sometimes conflicting use of the area of the Chugach region. The project has already gone through feasibility testing and is designed to will become self sufficient after the development stage which will take the next four years. Development will consist of purchase and installation of seed and equipment, training interested villagers in mariculture techniques, and setting up a management structure in each village to take over the project after the development stage.

HOW

The basic strategy for the village mariculture projects will be to concentrate initially on oyster

culture. The reasoning is that oyster seed is readily available for culturing, there is a good market for oysters grown in Alaska, and oysters have proven to be an acceptable substitute for local shellfish species (oysters are not indigenous to Alaska) for subsistence use. The objective will be to set up a mariculture operation in each village that will produce about 650,000 marketable oysters per year.

The feasibility of establishing mariculture projects in the Native villages of the Chugach Region has been tested extensively at both Tatitlek and Chenega Bay. As mentioned, both these villages have established mariculture feasibility operations with very encouraging results. In addition, data collected from the Port Graham/Nanwalek (English Bay) area and from potential sites in the vicinity of Eyak suggest the mariculture would be successful in these areas as well.

For those villages that already have permitted mariculture areas, the procedure will be to establish new oyster culture operations or increase existing operations to commercial production levels. A mariculture specialist will be retained to organize the operations in these villages, help put together village crews for training and initiate a training program that will run concurrently with the development of the mariculture operations. Mariculture development plans, required as part of the permitting process, will be followed in setting up and developing the culture sites.

For those villagers without permitted sites, initial efforts will concentrate on locating suitable sites and submitting permit applications. Criteria used for locating sites will include the presence of residual oil, the amount of tidal flow, level of protection from adverse weather, upland ownership and ease of access from the village. It may be that for some reason it is determined that mariculture is not practical or feasible for a particular village at this time. In this case the village will be dropped from the project.

In addition to oysters, there is good potential for the culture of clams and scallops as well as the availability of good markets for these products. Clams and scallops are also important for subsistence use. It is hoped that this project can investigate the potential for clam and scallop mariculture on the Chugach region. However, before that can be undertaken, a reliable source of clam and scallop seed needs to be established.

The bulk of the cost for this project will go to training village residents in mariculture and in establishing a management structure for each village. In order to have an effective program it will be necessary to maintain these aspects of the project. Some cost savings could be realized by reducing the amount of seed and culture equipment. However, this would result in village projects with inefficient levels of production. Obviously, reducing the scope of the project to include fewer villages would reduce the cost. It would be possible to reduce the overall cost of the project by up to 50% and still maintain some level of long term benefit.

ENVIRONMENTAL COMPLIANCE

To obtain a permit a mariculture site must meet the criteria set forth in the Corps of Engineers general permit for mariculture projects in Alaska (GP 91-7). They must also be in compliance with the local coastal zone management plan. An environmental impact analysis has not been necessary for permitted mariculture sites.

WHEN

For villages without permitted mariculture sites:

March 1 - March 30, 1993	Identify suitable sites
March 1 - April 30, 1993	Apply for mariculture permits
March 1 - March 30, 1994	Obtain permits

For villages with permitted sites:

Jan. 1 - Dec. 31, 1993	Organize village crew, set up training schedule and initiate training
Jan. 1 - Jan. 31, 1993	Order culture equipment and seed
March 1 - June 30, 1993	Install culture equipment and seed
March 1 - March 30, 1993	Initiate ongoing maintenance schedule for mariculture operations
Ongoing -	Continue training and maintenance

Second Year:

January 3, 1994	Order new seed
March 1 - June 30, 1994	Install new seed
July 1994 - ongoing	Sort out market sized oysters from first year seed and place in intertidal hardening area
August 1994 - ongoing	Begin to market oysters
Ongoing -	Training and maintenance

The remaining years of the project will concentrate on increasing production efficiency in order to bring each village operation to the 650,000 marketable oyster per year level, and to increase marketing effort and improve transport.

BUDGET ($K)

	ADF&G
Personnel	$ 7.5
Travel	0.0
Contractual	556.8
Commodities	0.0
Equipment	0.0
Capital Outlay	0.0
Sub-total	$ 564.3
General Administration	24.8
Project Total	$ 589.1

19.4.2 I

EXXON VALDEZ OIL SPILL PROJECT DESCRIPTION

Project Number: 93020

Project Title: Bivalve Shellfish Hatchery and Research Center

Project Category: Restoration manipulation and/or enhancement

Project Type: Fish and shellfish

Lead Agency: Alaska Department of Fish and Game

Cooperating Agencies: None

Project Term: January 1, 1993 to September 30, 1993

INTRODUCTION

A. Background on the Resource/Service

Shellfish resources in the *Exxon Valdez* oil spill (EVOS) affected area were impacted in several ways. Most obviously, shellfish populations were damaged, destroyed and/or contaminated by the spill and/or subsequent cleaning activities.

B. Summary of Injury

Some bivalve shellfish populations were affected directly by the toxic effects of the spilled oil and subsequent cleaning. Still other populations were contaminated or were suspected to be contaminated to the degree that they were unfit for human consumption and/or were negatively affecting birds, mammals and other animals that fed upon those shellfish. Evidence indicates that natural cleansing is not proceeding well in some areas. The sheltered habitats most hospitable to shellfish were also those most protected from natural cleansing action. Oil spill residues continue to persist in these areas.

Native communities in the oil-impacted area were altered by the EVOS. Prior to the EVOS at least one mariculture feasibility study was under way (near Chenega Bay Village). This was terminated because of the spill. Replacement shellfish opportunities are reasonable expectations for impacted villages.

C. Location

The project involves two physical facilities. The proposed location for these facilities is in Seward, Alaska. A component of this study is to determine if that is the best location. Target locations for projects resulting from the operation of these facilities include Tatitlek, Chenega Bay, Eyak, Port Graham and Nanwalek.

WHAT

A. Goal

The goal of this project is to assess the feasibility of using aquatic farming technology to restore, replace or enhance bivalve shellfish populations in oil-affected areas and to mitigate the negative affects of the *Exxon Valdez* oil spill on native communities.

B. Objectives

The initial objectives of the project are to assess the feasibility of a shellfish production hatchery and a mariculture technical center to be used to restore, replace and/or enhance bivalve shellfish populations in oil-impacted areas. A report on the feasibility of the proposed facilities relative to potential uses will be generated from data collected during the year. Alternative configurations will be considered and analyzed. This initial study will also attempt to identify potential species and establish production goals for those species.

Native communities and organizations in the affected area would be involved from the outset in development of this project. Pending the results of the feasibility analysis, they would be the logical entity to operate the production shellfish hatchery.

If full funding for construction of the facilities is not realized from oil spill funds, additional funding sources will be required before they can be built. Though this would not affect the stated objectives, it would alter the project time frames and facility priorities

WHY

A. Benefit to Injured Resources/Services

Bivalve shellfish populations were severely impacted by the oil spill and by the cleanup efforts following. All of the affected populations were used to some degree by marine mammals, birds, fishes and in many cases for human subsistence. This project would provide the facilities and infrastructure to research techniques to restore, replace and/or enhance affected populations using shellfish hatchery and aquatic farm-based technology.

HOW

A. Methodology

Utilizing concepts already developed for the Seward shellfish hatchery and the ADF&G Mariculture Technical Center, a feasibility analysis of the project will be conducted. Engineering and biological expertise will be retained to conduct the analysis. If construction funds are later approved, direct restoration, replacement and/or enhancement of bivalve shellfish will be accomplished via an onshore production hatchery operated by the private sector using technology developed at a State-operated research center. The combination of the two facilities is necessary to accomplish the overall production objectives of this project because of the lack of technology for indigenous species.

Analysis of similar projects in other areas will be conducted. The information will be incorporated into the project design.

Evaluation and feasibility determinations of potential projects for restoration, replacement or enhancement of bivalve shellfish in more remote areas, but of import to marine mammals, birds and fish will also be accomplished.

B. Coordination with other efforts

During the process of needs assessment and feasibility analysis, necessary coordination of efforts needs will also be determined and analyzed. At this time ADF&G is aware of efforts by Alaska native groups to establish a shellfish hatchery and an aquatic farm industry in the oil-affected area. This project is supportive of and will be coordinated with those efforts to insure maximum efficiency and utility.

ENVIRONMENTAL COMPLIANCE

Project compliance with the National Environmental Policy Act (NEPA) will be assessed during the feasibility phase. Until project design and specifications are finalized, specific NEPA requirements cannot be determined. Aquatic farms are addressed under a Corps of Engineers' general permit (GP 91-7). If facilities are constructed, a determination of compliance with the Alaska Coastal Management Plan (ACMP) will be required. The required State and Federal permits will be identified and incorporated into the project planning process.

WHEN

The feasibility study will occur this budget year (1/1/93 - 9/30/93). The clam restoration/enhancement demonstration project will occur next budget year.

If the project is determined to be feasible and appropriate budgets realized, construction of the facilities will begin in 1993 (Oil Year 6). The facilities will be operational in 1994.

BUDGET ($K)

	ADF&G
Personnel	$ 37.6
Travel	8.0
Contractual	2.0
Commodities	2.4
Equipment	0.0
Capital Outlay	0.0
Sub-total	$ 50.0
General Administration	5.7
Project Total	$ 55.7

19.4.2 H

EXXON VALDEZ OIL SPILL PROJECT PROPOSAL

Project Number: 93025

Project Title: Montague Island Chum Salmon Restoration

Project Category: Restoration Manipulation and/or Enhancement

Project Type: Fish/Shellfish

Lead Agency: Department of Agriculture, Forest Service

Cooperating Agencies: Alaska Department of Fish and Game

Project Term: October 1, 1992 to September 30, 1997

INTRODUCTION

Prior to the 1964 earthquake, Montague Island streams accounted for nearly 8% of the total chum salmon production in Prince William Sound. Habitat alterations caused by the uplift, combined with a number of environmental and man induced factors, led to the virtual extirpation of chums on the Island. While some of the Island's historic chum producing streams are thought to have stabilized over time to once again support chum salmon populations, others have been slow to recover. Many of the historic chum salmon producing streams were also moderate- to lightly oiled by the *Exxon Valdez* oil spill, which caused further degradation of chum salmon habitat, particularly in the inter-tidal spawning areas. There is also a lack of sufficient brood source to reestablish numbers of chums within Montague streams through natural straying and reproduction.

WHAT

A. Goal

The goals of the project are as follows:

1. To reestablish wild stock populations of chum salmon on Montague Island and maintain the genetic diversity of wild chum salmon stocks in Prince William Sound.

2. To provide mitigation to identified injured species through habitat restoration. Once the project is established, it could contribute an estimated 300,000 pounds of salmon annually to the common property fishery. Approximately 10 miles of stream habitat will be rehabilitated to provide excellent habitat not only for fish species, but many wildlife species as well. In addition, at least one artificial spawning channel will be created.

WHY

Chum salmon were not specifically studied to determine injury from the oil spill. However, chum salmon spawn in the same inter-tidal habitats as pink salmon which were studied and determined to be injured. Enhanced habitat will provide off-site mitigation for the more severely damaged areas of the Sound and replace pink and chum salmon runs injured by the oil spill. Montague Island remains as one of the best Prince William Sound locations for improving wild chum salmon production.

This project offers a means of minimizing impacts on fisheries within Prince William Sound by increasing chum salmon production. This meets the goals of restoration Option Number 2 (Intensify Management of Fish and Shellfish) and 18 (Replace Fisheries Harvest Opportunities by Establishing Alternative Salmon Runs. It also provides a means for implementing Restoration Option Number 11 (Improve or Supplement Stream and Lake Habitats for Spawning and Rearing of Wild Salmonids). The Forest Service has expertise in a variety of established techniques for salmonid habitat improvement.

HOW

A four-year cooperative chum fry stocking effort in the Chalmers river was completed in 1990. This stocking proved successful when more than 1,000 chums were observed returning to Chalmers river. Pending favorable spawning success of these fish, stocking efforts will be expanded to include all historic chum salmon producing streams on Montague Island. Cooperative work with the Alaska Department of Fish and Game and Prince William Sound Aquaculture Corporation will continue to identify a source for brood stock and eggs will be collected for culture by 1994.

During 1991, spawning habitat surveys were conducted at fourteen of the seventeen top historic chum salmon producing streams, using the Chugach National Forest standard methods for quantifying fish habitat within streams. During FY 92, the habitat assessments will be completed in the remaining three of the seventeen historic chum streams, using the same standard methods. Based on the information collected, recommendations will be made on possible habitat restoration projects for several of the chum salmon streams. These projects will be further evaluated in FY 92 for hydrologic feasibility, using the slope area method (USGS standards for data collection and analysis) and aerial photo interpretation. Projects will include instream structures in the form of large boulders, and log placements, spawning channel development, and riparian habitat management.

During FY 92, riparian forest habitat will be evaluated at three stream sites in the Port Chalmers area of Montague Island, using the R10 standard methods for assessment of plant associations within forested areas. Based on the data collected, a riparian forest prescription will be developed for each of the three streams in the Port Chalmers area. Riparian forest management will include tree planting and tree thinning of selected zones. Beginning in FY 93, forest riparian areas in the Montague Strait area will be developed for each of these streams, and silvicultural techniques will be applied during FY 94-Fy 97. Through effective silvicultural management these areas can be rehabilitated to provide excellent habitat not only for fish species, but many wildlife species as well.

ENVIRONMENTAL COMPLIANCE

Given the scope of the proposed activities for FY 93, a categorical exclusion would be appropriate. However, larger scale projects such as spawning channel development or instream work using heavy equipment may be developed based on information collected during FY 92 and FY 93 field seasons. These type projects will require environmental assessments and therefore will be evaluated on a project by project basis. Any environmental compliance documents will be budgeted in the program for FY 94 and FY 95 if funding is approved to continue.

WHEN

During FY 93, boulder and log placement will be completed in three streams in the Port Chalmers area. In addition, riparian habitat rehabilitation of 25 acres will be completed at the same streams.

Also, during FY 93, riparian forest assessment will begin at five stream sites in the Montague Strait area. Riparian forest management will begin at those sites in FY 94 and be completed by FY 97.

As fisheries and hydrologic assessments are completed in FY 92, projects will be developed for implementation in FY 95-97. Prior to implementation, design and NEPA documentation will be necessary in FY 93-94.

BUDGET ($K)

	USFS
Personnel	$ 46.8
Travel	18.2
Contractual	0.0
Commodities	2.0
Equipment	7.5
Capital Outlay	0.0
Sub-total	$ 74.5
General Administration	7.0
Project Total	$ 81.5

19.4.2 G

EXXON VALDEZ OIL SPILL PROJECT DESCRIPTION

Project Number: 93026

Project Title: Fort Richardson Hatchery Water Pipeline

Project Category: Restoration Enhancement

Project Type: Fish

Lead Agency: Alaska Department of Fish and Game

Cooperating Agencies: None

Project Term: January 1, 1993 to June 30, 1994

INTRODUCTION

Overescapement of sockeye salmon occurred in the Kenai River as a result of the Exxon Valdez oil spill. This has led to a dramatic reduction in smolt survival.

The Fort Richardson Hatchery currently uses only 50% of available fish rearing space because the existing water supply is limited. Construction of a water pipeline to connect the Fort Richardson Hatchery to the Municipal water system would allow immediate doubling of fish production. This increased production would then be used to provide alternative sport fishing opportunities as early as 1994, thus reducing the impact caused by the loss of the Kenai River sockeye salmon sport fishery.

The increased production of rainbow trout and king, coho, and pink salmon resulting from this project would be released into lakes and streams throughout Upper Cook Inlet and on the Kenai Peninsula providing direct alternative sport fishing opportunities for severely impacted fishermen. Completion of this project would also increase hatchery dependability and reduce cost per unit of production so all areas served by the Fort Richardson Hatchery would indirectly benefit.

WHAT

The goal of this project is to provide alternative sport fishing opportunities to reduce the social and economic impact of the loss of the Kenai River sockeye salmon sport fishery. As a result of the expected closure of the Kenai sockeye salmon fishery it is estimated that at least 100,000 angler days will be lost each year. Increased production at the Fort Richardson Hatchery would ameliorate this loss.

Fish production objectives are as follows:

Species	Number	Size	Potential Angler Days
Rainbow Trout	250,000	100.0 g	50,000
King Salmon	800,000	15.0 g	25,000
King Salmon (catchables)	50,000	100.0 g	20,000
Silver Salmon	600,000	20.0 g	32,000
Pink Salmon	2,000,000	0.15 g	15,000

WHY

The decrease of sport fishing opportunities for sockeye salmon on the Kenai River would have significant social and economic impact on the Cook Inlet area. Over 335,000 angler days were spent in pursuit of salmon on the Kenai River in 1990. A major portion of this effort was directed toward sockeye salmon with an average annual harvest of 107,500 sockeye salmon valued at approximately $10,000,000.

The extremely low number of out-migrant smolts in 1991 and 1992 strongly suggests that sockeye salmon production in the Kenai River will be affected. It is possible that sockeye salmon fishing will be closed for a number of years starting in 1993. However, if immediate action is taken, the Fort Richardson Hatchery water pipeline project would provide alternative sport fishing opportunities during the years the Kenai River loses are expected to be most severe and would significantly reduce these impacts.

HOW

The main project objective would be met by constructing a water delivery system connecting the Municipal Water Utility with the hatchery. The main elements of this system include a cold water line running directly from the Municipal Water Plant to the hatchery and a second line that will provide heated water (via heat exchangers in the Sullivan Power Plant which is adjacent to the Water Plant) to accelerate fish growth.

An engineering feasibility study was completed in 1991 by F. Robert Bell and Associates. This study determined that this project was both technically and economically feasible. In a separate study the Anchorage Economic Development Corporation determined that this project would have a benefit/cost ratio of 2.8:1.

Fish cultural methodology will follow well established, standard Department of Fish and Game and FRED Division procedures and policies.

In the Fall of 1992, a peer review synthesis meeting will examine the proposed benefits and associated potential ecological risks of wild versus hatchery fish.

Construction permits will be required. They will be the responsibility of the contractor. The hatchery is on a military reservation. Access permits to the reservation may be required. This project may be required to meet requirements under Clean Water Act.

WHEN

If this project is approved by the Trustee Council, a minor amount of preliminary work would begin immediately. In cooperation with the Municipality we would solicit proposals for engineering and design for review so that an engineering firm could be hired as soon as an EIS was completed and funds were available. Major milestones are as follows:

Fall 1992	Project peer review synthesis meeting
January 1993	Environmental Impact Statement
January - March 1993	Public Review of EIS
March 1993	Contingent upon favorable public review and concurrence of the Trustee Council, design and construction funding is approved
March -- June 1993	Project design and engineering
April 1993	Collect rainbow trout eggs
June 1993	Award construction contract
July 1993	Collect king salmon eggs
September 1993	Collect coho eggs
January 1984	Water system on-line to support additional fish
June 1984	Release fish

ADDENDUM

1. The Municipality of Anchorage (which strongly supports this project) has an easement for this pipeline route; the corridor already contains an existing powerline.

2. After the pipeline is completed, the program will be partially operated by federal funding as it currently is; consequently, the NEPA public review process has been and will be followed before fish are released. This review process has been incorporated into the development of the ADF&G "Statewide Stocking Plan for Recreational Fisheries" (copy available upon request from FRED Div., Alaska Dept. of Fish and Game, 333 Raspberry Rd., Anchorage, AK 99518-1599). This document has been scheduled for review and updating in 1993. In addition, before any new release location is approved, it is also subjected to another ADF&G review process that addresses fish genetics, fish disease and fisheries management concerns (Fish Transport Permit or FTP process). Thus all releases are subject to both the federal NEPA and state FTP processes currently and will be in the future.

BUDGET ($K)

	ADF&G
Personnel	$ 30.0
Travel	0.0
Contractual	3,500.0
Commodities	0.0
Equipment	0.0
Capital Outlay	0.0
Sub-total	$ 3,530.0
General Administration	87.0
Project Total	$ 3,617.0

19.4.2F

EXXON VALDEZ OIL SPILL PROJECT PROPOSAL

Project Number: 93028

Project Title: Restoration and Mitigation of Wetland Habitats for Injured Prince William Sound Fish and Wildlife species

Project Category: Restoration manipulation and/or enhancement

Project Type: Birds/mammals/fish

Lead Agency: Department of Agriculture, Forest Service

Cooperating Agencies: None

Project Term: January 10, 1993 to September 30, 1997

INTRODUCTION

Past events associated with the 1964 earthquake drained the 250 ha lake within the San Juan Bay Drainage on Montague Island. Since the uplift, periodic flooding occurs during periods of high, nearly continues rainfall or in combination with snow melt. With this altered water regime the uplifted lake is undergoing a rapid succession from a sedge/grass community to a spruce/hemlock community. At the same time, downcutting of the San Juan Creek has changed the character of the stream along a major portion of its course through the former lake bed. Pool habitats important for anadromous fish rearing have been reduced and adjacent sedge meadows are undergoing plant succession to shrub and forest communities. Opportunities exist for long term improvement of PWS waterfowl, furbearer and anadromous fish habitat within the stream and in the adjacent wet meadow zones.

WHAT

A. Goal

The purpose of this project is to restore the wetland habitats used by waterfowl, anadromous fish and furbearing species impacted by the oil spill in Prince William Sound.

B. Objectives

1. Maintain a wetland component by flooding the uplifted lake bed and reversing succession from a forested habitat type to an early succession grass/sedge community.
2. Create pools and ponds in riparian and flood plain areas to restore associated aquatic vegetation.

WHY

This project has the potential to improve habitat for waterfowl and anadromous fish by creating

wetlands. Some intertidal wetlands were injured by the *Exxon Valdez* oil spill. This project would provide an equivalent resource replacement for those injured wetlands. This project will implement restoration option number 11 (improve or supplement stream and lake habitats) and number 25 (protect or acquire upland forest and watersheds, established or extend buffer zones for nest birds) identified in the Restoration Framework Document.

HOW

This project will be accomplished through the following sequence of events:

1. Feasibility

This consists of conducting the following analyses:

A. Hydrologic analysis to determine subsurface flow regimes
B. Soils analysis to determine soils types and,
C. Channel morphology analysis. Monthly surveys will determine wildlife use of the area from spring through fall.

2. Inventory Existing Habitat

This will be accomplished by low-level aerial photography of San Juan Bay area. This will be coordinated with proposal number 29854. Vegetation surveys will be conducted to determine existing plant community type.

3. Project Design

After feasibility and inventory studies are completed, vegetation objectives will be established specific to the targeted species and engineering design will be completed to meet those objectives.

4. Environmental Analysis

An Environmental Analysis will be conducted prior to a decision for any action. The scope of the Environmental Analysis will depend on the result of public scoping and issues developed.

5. Implementation

If the decision is made to implement the recommended engineering design after the Environmental Analysis this project could be accomplished over the following three years.

6. Monitoring

Monitoring will continue for five years after completion of the project to determine if the vegetation objectives were met.

ENVIRONMENTAL COMPLIANCE

Given the scope of this project an Environmental Analysis will be required. The first year's work is design work only and is categorically exempt from formal documentation in an environmental analysis.

WHEN

The following is the proposed schedule:

Jan. 1 - Feb. 15, 1993	Hydrologic Analysis
June 1 - June 15, 1993	Fly for Low Aerial Photography
June 15 - June 30, 1993	Soils Analysis
April 1 - Oct. 1, 1993	Wildlife Surveys
June 1 - June 30, 1993	Engineering Data Collection
Sept.1 - Sept. 30, 1993	Project Design
Jan. 1 - April 1, 1994	Environmental Analysis
Jan. 1, 1994 - Dec. 1998	Implementation (project construction)
Jan. 1, 1994 - Dec. 1998	Monitoring

BUDGET ($K)

	USFS
Personnel	$ 44.1
Travel	18.0
Contractual	5.0
Commodities	0.0
Equipment	8.0
Capital Outlay	0.0
Sub-total	$ 75.1
General Administration	7.0
Project Total	$ 82.1

19.4.2 E

EXXON VALDEZ OIL SPILL PROJECT DESCRIPTION

Project Number: 93029

Project Title: Prince William Sound Second Growth Management

Project Category: Restoration Manipulation and/or Enhancement

Project Type: Birds/Mammals

Lead Agency: U.S. Department of Agriculture, Forest Service

Cooperating Agencies: None

Project Term: January 10, 1993 to September 30, 1997

INTRODUCTION

The Prince William Sound area has several watersheds on National Forest Lands where timber harvest occurred in the early 1970's. These harvest areas have removed a portion of the old-growth vegetation in the *Exxon Valdez* oil spill area. The second-growth vegetation present on these areas can now be managed to improve habitat for certain wildlife and fish species and accelerate the return to old-growth vegetative conditions. Habitat for old-growth dependent oil spill injured species such as river otter, marbled murrelet, and harlequin duck can therefore be improved.

WHAT

A. Goal

The purpose of this project is to provide mitigation through habitat enhancement to identified injured wildlife species in Prince William Sound.

B. Objectives

1. Maintain understory vegetation components throughout the successional stages of second growth.

2. Increase successional trends in key wildlife habitat areas to develop old growth structure. Approximately 2,500 acres of second growth habitat will be evaluated for enhancement opportunities.

WHY

This project has the potential to improve habitat for pink and chum salmon, harlequin duck, marbled murrelet river otter and bald eagle. These species were injured by the *Exxon Valdez* oil spill. This project falls within the category of habitat protection and acquisition and manipulation

of resources since the objective is to enhance habitats for injured species. This project will implement restoration option number 11 (improve or supplement stream and lake habitats) and number 25 (protect or acquire upland forests and watersheds, established or extend buffer zones for nesting birds).

HOW

This project will be accomplished through the following sequence of events:

1. Inventory existing data base.

   This consists of compiling existing data on Prince William Sound second growth, establishing date of harvest, and entering GIS data base.

2. Inventory existing habitat.

   This will be accomplished by low level aerial photography of all second growth sites and field sampling to determine existing vegetation community type and site potential.

3. Define vegetation objectives.

   After the second growth areas have been described, vegetation objectives will be established specific to the targeted injured species.

4. Site Prescription

   Prescriptions will be developed identifying recommended treatment to meet the vegetation objectives. Treatment options could consist of pre-commercial thinning at varied spacing to maintain understory vegetation throughout the rotation.

5. Environmental Analysis

   An environmental analysis will be conducted prior to a decision as required by the National Environmental Policy Act.

6. Implementation

   If the decision is made to implement the recommended treatment after the Environmental Analysis this project could be accomplished over the following three years.

ENVIRONMENTAL COMPLIANCE

Given the scope of this project an environmental analysis will be required. This years proposed work is survey and project design work only which is categorically exempt from documentation in an environmental analysis.

WHEN

The following is the proposed scheduled:

Jan. 1 - Feb. 15, 1993	Inventory Existing Data Base
June 1 - June 15, 1993	Develop Low Aerial Photography
June 1 - Sept. 1, 1993	Inventory Habitat
Sept. 1, - Sept. 15, 1993	Define Vegetation Objectives
Sept. 15 - Sept. 30, 1993	Write Site Prescriptions
Nov. 1, - March 1, 1994	Environmental Analysis
Contract 1994-1997	Implementation of Prescriptions

BUDGET ($K)

	USFS
Personnel	$ 34.2
Travel	6.0
Contractual	10.0
Commodities	0.0
Equipment	6.0
Capital Outlay	0.0
Sub-total	$ 56.2
General Administration	5.8
Project Total	$ 62.0

19.4.2 D

EXXON VALDEZ OIL SPILL PROJECT DESCRIPTION

Project Number: 93031

Project Title: Red Lake Mitigation for Red Salmon Fishery

Project Category: Restoration, Manipulation and/or Enhancement

Project Type: Fish

Lead Agency: Alaska Department of Fish and Game

Cooperating Agencies: None

Project Term: January 10, 1993 to September 30, 1996

INTRODUCTION

Red Lake, located on the southwest side of Kodiak Island, has historically been one of the most consistent producers of sockeye salmon for Kodiak's commercial purse seine fishermen. The Department of Fish and Game's annual escapement goal for the system ranges from 200 to 300 thousand sockeye salmon. Since 1980, the catch has ranged from 25,000 to 1.5 million with an average of 450,000. This fishery has had an average annual value to fishermen of about $2.2 million and has reached as high as $10 million.

Careful management of the number of spawning fish is required to maintain this fishery at a high level. Young sockeye salmon spend at least their first year of life (up to 3 years) living and growing in lakes where they rely on microscopic-sized animals (plankton) for food. These animals, in turn, graze on tiny plants. If too many adult salmon spawn in the lake system, an overabundance of the young sockeyes will deplete their limited food source before they migrate to sea. When this happens, large numbers of young salmon die, survivors grow more slowly and smaller numbers migrate to the ocean to mature. So, large numbers of spawners in one year may result in an unusually small run in the next cycle.

In 1989, as a result of the *Exxon Valdez* oil spill, commercial salmon fishing was closed over most of Kodiak Island waters. The closure resulted in an escapement of 768,000 sockeye salmon into Red Lake, a 2.5 fold increase over the maximum desired. Data gathered showed low survival for the 1989 escapement year. Surveys showed low numbers of juveniles in the lake in the fall of 1990 and 1991; and in the spring of 1990, 1991, and 1992 reduced numbers of migrant smolts were observed.

The 1989 brood year failure could result in very low returns of sockeye salmon in 1993, 1994, and 1995. Minimum escapements may not be reached resulting in fishery closures and the purse seine fleet being displaced to other fishing areas. Fishing will not return to normal until several years after the numbers of outmigrating smolts have returned to normal. Therefore, if outmigrating smolt numbers are within the normal range in June and July of 1993, it will not be necessary to continue this project, though approved, because adequate numbers of adults for escapement goals and fisheries will be expected to return in the same years as the mitigation

fisheries this project would create. Conversely, until outmigration has been demonstrated to have returned to normal, it will be necessary to produce hatchery smolts for a mitigation fisheries.

This project will be undertaken at Kitoi Bay Hatchery where early run sockeye will be net pen-reared in brackish water for accelerated growth and released as age zero smolt. Returns from smolt releases will provide a fishery in Northeast Afognak district. The commercial purse seine fleet and associated business communities of Kodiak Island will have an opportunity to benefit from this project. Village residents of Afognak Island and other areas will also have increased subsistence fishing opportunities. The expected return of 4.8 million smolt released annually will be 100,000 sockeye. At a value of $1.00/pound and 5-pound average, the total value of the program is $500,000.

WHAT

A. Goal

Contingent upon the results of the sockeye salmon synthesis meeting, this project will be funded to provide an alternative commercial fishery to mitigate the impact of lost fishing opportunities as a result of very low returns of sockeye salmon in 1996 and beyond.

B. Objectives

The objectives of this project are as follows:

1. Modify existing incubation modules at Kitoi Bay Hatchery for receiving Afognak Lake sockeye eggs.

2. Collect 6 million early run sockeye salmon eggs from Afognak Lake and transport them to Kitoi Bay Hatchery.

3. Increase sockeye fry/smolt rearing capabilities at Kitoi Hatchery to accommodate 5 million fry/smolt.

4. Mark 10 - 15% of fry prior to net pen rearing for evaluation of returns, imprinting success and possible straying.

5. Net pen rear fry/smolt in brackish water to a target size of 4-5 grams and release by June 30.

6. Evaluate growth, diet and behavior of age zero smolt releases at Kitoi Bay until migration is complete.

7. Evaluate survival, imprinting and straying of returning adults in 1996 and 1997 by operating weirs at Little Kitoi, Paul's Bay; sampling at Afognak Lake weir; sampling at Little Afognak Lake.

WHY

If immediate actions are taken, alternative commercial sockeye salmon fishing opportunities can be provided beginning in 1996. The focus is to develop alternative fisheries in other areas where returns would be most manageable and wild stocks would be least affected. This proposal will mitigate the impact of the *Exxon Valdez* oil spill on future Red Lake commercial sockeye fisheries.

The Trustees should fund this project because immediate action is needed to offset the fishery losses due to overescapement of the 1989 brood adults.

HOW

Kitoi Bay Hatchery will be modified by the addition of an incubation module and incubation water disinfection capability. Six million early run Afognak lake sockeye eggs will be collected in August under sockeye culture guidelines, and transported by float plane to Kitoi Hatchery for incubation. After emergence and ponding in freshwater troughs, 10 -15% of the total sockeye fry will be marked by ventral fin clipping, prior to rearing in brackish water net pens. Marking quality will be monitored to assure valid marks. Following seawater challenge tests, fry (fingerlings) will be ponded into net pens in Little Kitoi Bay and reared to achieve 4 - 5 gram smolt with growth rate monitored on a weekly basis. Smolt will be released into Little Kitoi Bay after achieving target size and timed to parallel Afognak smolt outmigration timing. Once released, smolt movements will be monitored, samples will be collected for stomach content analysis and additional growth information. To evaluate returns from smolt releases as well as imprinting, a weir will be operated at Little Kitoi where escapement will be enumerated and age, sex and length data collected. Returning adults will be examined for marks. Also, the commercial harvest will be sampled in the same manner. Returning sockeye at Paul's Bay, Little Afognak, and the parent system at Afognak Lake will be sampled to assess possible straying. Paul's Bay will be weired and returns will be examined for marks as well as age, sex and length data collected. At Little Afognak, samples will be collected by beach seining and post spawning surveys. Samples will be collected and examined for marks at the Afognak River weir currently operated by ADF&G.

This project will be coordinated with NRDA F/S 27 which will continue damage assessment of Red Lake. Information from this study will determine the long term effects of overescapement, and the length that mitigation for fishing loss will be necessary. Also, a current zero check sockeye program in place at Kitoi will provide technical assistance in the mitigation project.

ENVIRONMENTAL COMPLIANCE

The following steps will be taken to comply with environmental regulations:

1. Completion of General Waterway/Waterbody application to be submitted to Habitat Division of ADF&G for the weirs at Little Kitoi and Paul's Bay.

2. Completion of Coastal Zone Consistency Review Questionnaire to be submitted to State of Alaska for both weired systems.

WHEN

Jan. 3, 1993 - Feb. 1, 1993	Permitting (FTP, Habitat)
Jan. 3, 1993 - Mar. 31, 1993	Kitoi modifications (incubation, rearing)
June 1, 1993 - July 1, 1993	Egg take preparation and supply orders
July 15, 1993 - Aug. 1, 1993	Egg take at Afognak Lake (6 million eggs)
Aug. 1, 1993 - Mar. 1, 1994	Incubation of eggs at Kitoi
Mar. 1, 1994 - Apr. 15, 1994	Marking of fry
Apr. 15, 1994 - May 30, 1994	Net pen rearing of fry
June 1, 1994 - June 15, 1994	Smolt released in Little Kitoi Bay
May 1, 1994 - Aug. 31, 1994	Adult weirs installed and operated at Little Kitoi and Paul's Bays
Sep. 1, 1994 - Oct. 1, 1994	Report writing

BUDGET ($K)

	ADF&G
Personnel	$ 59.4
Travel	0.7
Contractual	5.1
Commodities	16.8
Equipment	62.4
Capital Outlay	0.0
Sub-total	$ 144.4
General Administration	9.3
Project Total	$ 153.7

19.4.2C

EXXON VALDEZ OIL SPILL PROJECT DESCRIPTION

Project Number: 93032

Project Title: Pink and Cold Creek Pink Salmon Restoration

Project Category: Restoration, Manipulation and/or Enhancement

Project Type: Fish and Shellfish

Lead Agency: Alaska Department of Fish and Game

Cooperating Agencies: None

Project Term: January 10, 1993 to September 30, 1994

INTRODUCTION

This project will target Pink Salmon stocks (will also indirectly target Coho salmon at Cold Creek) at Cold and Pink Creeks on Afognak Island (see map). Pink Creek drains into Afognak River which enters Afognak Bay on southeast Afognak Island. Cold Creek drains into Danger Bay, adjacent to Duck and Izhut Bays on northeast Afognak Island. Restoration Study 105 surveyed these systems in 1992 to determine fishpass feasibility. A falls blocks pink salmon from reaching a potential spawning area in Pink Creek. Cold Creek has a steep gradient that blocks upstream migration at low to moderate water periods. Spawning area above the barrier at both Pink and Cold creeks has been determined to be of good to excellent quality and in sufficient quantity to support 3,000 and 9,000 spawners, respectively. Both systems currently have limited Pink Salmon production due to these barriers preventing access to spawning areas. Escapements to each of these systems have been limited to several hundred spawners each year.

Afognak Bay, Izhut Bay and other areas on northeast Afognak as well as Shuyak Island were oiled in 1989 and oil still remained in these areas in 1990. Resource damage assessment was not conducted in these areas, however, in Prince William Sound, damage to pink salmon eggs and juveniles has been documented under similar conditions of oil contamination.

This project will be undertaken at Pink Creek (252-342) and Cold Creek (252-331) which are located on Afognak Island. The benefits from this project will be realized by increased Pink (and Coho) returns to these systems, providing up to 17,000 (pinks) for commercial and subsistence harvest. The villages of Port Lions, Ouzinkie, and the City of Kodiak will benefit economically from this project through direct fishery receipts and all associated fisheries business enhancement.

WHAT

A. Goal

The goal of this project is to increase Pink salmon spawning capability, and overall pink salmon (and coho) returns, by enhancing fish passage above barriers in Pink and Cold creeks.

B. Objectives

The objectives of this project are as follows:

1. Evaluate pink salmon escapement and spawning distribution in Cold and Pink creeks.

2. Bypass barriers in Cold and Pink creeks by installing steeppass sections or cutting channels in substrate.

3. Evaluate fish passage through barrier bypasses by conducting peak spawning surveys.

WHY

This project will be an economical way to increase wild Pink and Coho stocks in specific areas contaminated by oil or areas in close proximity to impacted areas. In PWS, Pink salmon eggs and fry were injured by oil contamination. These injuries were documented in PWS. In the waters near Afognak and Shuyak Islands, similar impacts may have occurred. Since a significant amount of spawning area is presently unavailable to Pink (and Coho) salmon on these systems due to barrier falls, this project will realize a measurable benefit by making these areas available to spawning Pink salmon.

HOW

Initially prior to construction, a peak spawning survey would be conducted to define peak salmon distribution in Pink and Cold creeks. Bypass construction materials would be staged at each project site. Construction would require steeppass sections resulting in a 15-foot rise to bypass the barrier falls at both Cold and Pink creeks. Channels also would be cut leading into the upstream end of the steeppasses. Water diversion structures such as gabions, reinforced with steel pipe and rebar, would divert water into the channels and steeppasses. Cables would be anchored into the rock substrate to secure the steeppasses. This project would be evaluated by stream surveys during the peak pink salmon spawning period.

This project will be directly related to previous feasibility work conducted through Restoration Project 105. Feasibility stages of this project were defined through R105. In addition, Alaska Department of Fish and Game, FRED Division, in cooperation with Kodiak Regional Aquaculture Association operates other fishpass projects on Afognak Island. Efforts for this project will be assisted through technical assistance and offered by these ongoing projects.

MATCHING ELEMENTS

The Department of Fish and Game has already purchased from other funding sources the needed steep pass components which are valued at approximately $70,000.

ENVIRONMENTAL COMPLIANCE

The following steps will be taken to comply with environmental regulation:

1. Completion of General Waterway/Waterbody application to be submitted to Habitat Division of ADF&G for both Pink and Cold Creeks.

2. Completion of Coastal Zone Consistency Review Questionnaire to be submitted to State of Alaska for both creeks.

3. Compliance with any environmental land use regulations imposed by Afognak Natives (land owners) will be strictly adhered to.

WHEN

Nov. 1, 1992 -	Dec. 1, 1992	DSP
Jan. 1, 1993 -	Jan. 15, 1993	Habitat application Equipment order, steeppass
Feb. 15, 1993 -	Feb. 30, 1993	Fabrication Stage steeppass section
Mar. 15, 1993 -	Mar. 30, 1993	at sites Construction, steeppass
July 1, 1993 -	Aug. 1, 1993	installation
Aug. 15, 1993 -	Aug. 31, 1993	Peak spawning survey
Nov. 1, 1993 -	Dec. 1, 1993	Report writing Follow up construction
July 1, 1994 -	Aug. 15, 1994	modification
Aug. 1, 1994 -	Aug. 31, 1994	Final peak spawning survey
Nov. 1, 1994 -	Dec. 1, 1994	Final report writing

BUDGET ($K)

	ADF&G
Personnel	$ 21.3
Travel	0.0
Contractual	3.6
Commodities	2.3
Equipment	5.4
Capital Outlay	0.0
Sub-total	$ 32.6
General Administration	3.5
Project Total	$ 36.1

EXXON VALDEZ OIL SPILL BRIEF PROJECT DESCRIPTION

Project Number: 93050

Project Title: Update: Restoration Feasibility Study #5 (*Identification and Recordation of Information Sources Relevant to Land and Resources Affected by the Exxon Valdez Oil Spill)*

Project Category: Technical Support

Lead Agency: Alaska Department of Natural Resources

Cooperating Agencies: None

Project Term: March 1, 1993 to May 31, 1993

INTRODUCTION

Restoration planning and implementation projects proposed to enhance and accelerate the recovery of areas affected by the *Exxon Valdez* oil spill require information on natural resources, land status, and damage assessment. In a previous study, Restoration Feasibility Study #5, DNR compiled information identifying available sources of information pertaining to land status, existing and proposed uses of both public and private lands, natural and cultural resource inventories, existing infrastructure, management plans, maps and other resource documents that were relevant to the restoration process. Since this project was completed in March 1991, much damage assessment and other ancillary information has become available. To facilitate the restoration process it is necessary to identify available damage assessment information, locate its source, determine its availability and evaluate its relevance within the context of restoration.

Information will be collected and added to an existing DNR database and be published as an Update to Restoration Feasibility Study #5, *Identification and Recordation of Information Sources Relevant to Land and Resources Affected by the Exxon Valdez Oil Spill*. This document would then be made available to Principle Investigators, Restoration Planners and the public.

WHAT

A. Goal

The goal of this project is to identify sources of existing information pertinent to the *Exxon Valdez* Oil Spill Restoration Process. Specific objectives include the following:

1. Identify location and source of damage assessment studies and update the existing document to reflect new information.

2. Identify the sources and locations of maps, management plans, and other resource documents pertaining to land status, public resources, land use patterns, ownership, existing and proposed land use, vegetation, fish and wildlife populations, habitat, recreational value, commercial resources and cultural resources.

3. Produce a selected bibliography identifying the source and location of reports, maps, scientific literature, management plans and studies relevant to the restoration process.

WHY

In order to properly plan for the design and implementation of appropriate restoration projects, it is necessary to review and make accessible existing information about land and resource status, damage assessment in the affected area, and existing and proposed land use. This information should be updated to reflect new and recently released damage assessment studies. The restoration team should consider updating this publication on a yearly basis to provide a complete body of knowledge for Restoration Planners, Principle Investigators and the public.

HOW

A survey of existing and ongoing damage assessment studies will be conducted as well as an update of previously compiled information published in Restoration Feasibility Study #5. Information collected will be added to the existing DNR database and an Update to Restoration Feasibility Study #5 will be published. Technicians collecting information for this study will coordinate with other agencies in order to provide a comprehensive survey of existing information.

ENVIRONMENTAL COMPLIANCE

The project qualifies for a categorical exclusion under the National Environmental Policy Act.

WHEN

The project will begin March 1, 1993 and be completed May 31, 1993.

March 1, - April 1, 1993	Survey damage assessment studies.
April 1, - May 15, 1993	Update RFS #5 database.
May 15, - May 31, 1993	Prepare database for publishing.

BUDGET ($K)

	ADNR
Personnel	$ 6.9
Travel	0.0
Contractual	1.5
Commodities	0.4
Equipment	0.0
Capital Outlay	0.0
Sub-total	$ 8.8
General Administration	1.4
Project Total	$ 10.2

19.4.2 A

EXXON VALDEZ OIL SPILL PROJECT DESCRIPTION

Project Number: 93052

Project Title: Identification and Protection of Important Bald Eagle Habitats.

Project Category: Restoration Habitat Protection and/or Acquisition.

Project Type: Birds

Lead Agency: U.S. Fish and Wildlife Service

Cooperating Agencies: None

Project Term: January 1, 1993 to September 30, 1995

INTRODUCTION

Bald eagles are closely associated with intertidal habitats. They use these areas for feeding, and they nest almost exclusively within 200 meters of the beach. The *Exxon Valdez* oil spill caused direct mortality to an estimated 800-900 bald eagles throughout the spill area and significant losses to productivity in Prince William Sound. This project would complete the nest inventory in Prince William Sound which was begun during damage assessment studies; nest tree marking and other habitat protection work would be undertaken cooperatively with landowners, emphasizing areas likely to be developed in the near future. Identification of important feeding or seasonal concentration areas may involve areas from the Kenai Peninsula to Cape Yakataga. Primary benefits would be to bald eagles and other species dependent on timbered, shoreline habitats in Prince William Sound. Secondary benefits would occur in areas outside Prince William Sound, which are deemed critical to bald eagles.

WHAT

A. Goal

The goal of this project is to identify and protect threatened or important bald eagle habitats to ensure the recovery of bald eagles from the *Exxon Valdez* oil spill, and maintain healthy bald eagle populations over the long term.

B. Objectives

1. Inventory and mark bald eagle nests, emphasizing areas likely to be developed.

2. Provide land managers with maps depicting locations of bald eagle nest sites on their lands.

3. Develop a list of lands that require additional measures to ensure protection, such as conservation easements or outright acquisition.

4 Monitor a sample of radio-tagged bald eagles to gain a better understanding of shoreline use for feeding and nesting, improve management guidelines, and to identify important concentration areas for bald eagles.

WHY

Bald eagle habitats within the spill area have been identified in development plans for timber, minerals, oil and gas, and other types of uses that may not be compatible with eagle nesting, feeding, and roosting requirements. Some threats to habitat are imminent, such as logging of which might be essential bald eagle habitat in Prince William Sound, Copper River Delta, Kenai Peninsula, Cape Suckling, and Afognak Island. The timely identification and protection of threatened habitats will enhance the recovery of bald eagles from the *Exxon Valdez* oil spill, and maintain healthy bald eagle populations over the long term.

This study will improve the rate of recovery and prevent further degradation of critical bald eagle habitat. Data acquired from this study will provide input for an overall habitat protection strategy for the spill area, which will benefit not only bald eagles, but any species dependent upon timbered shoreline, old growth forest, and intertidal or riparian areas. This study represents an essential step toward justifying and prioritizing specific lands for acquisition.

HOW

The study will have three main elements: (1) inventory and marking of bald eagle nest trees, (2) distributing maps of eagle nests to landowners and providing guidelines for protection of habitats, and (3) continuing to monitor a sample of eagles radio-tagged during the damage assessment study to document shoreline use and identify important concentration areas.

The first element will involve habitat reconnaissance by helicopter to locate bald eagle nests. These efforts would concentrate in areas not previously surveyed in Prince William Sound during damage assessment studies. Areas with nests would later be visited by boat to mark the tree and record the characteristics of the site. The location would be verified using a Global Positioning System (GPS) receiver. These data would be entered into the GIS database.

The second element would provide land owners with a map of nests on their lands and a copy of the regional guidelines for bald eagle management. Lands under imminent threat of logging would be targeted for initial reconnaissance and subsequent cooperative habitat protection work with landowners.

The third element of this project will involve monitoring a sample of radio-tagged adult and immature eagles to document habitat use throughout the year. Flights will be conducted weekly and specific locations will be mapped for individuals in each age group. These locations will be examined to determine the extent and types of habitats that eagles use as requirements for food and shelter shift throughout the year. Nests of tagged adults will represent an unbiased sample, which will be characterized to assess nesting habitat. Information will be gathered on concentration areas as they are observed, recording the location and cause of the concentration. Low level surveys will be conducted to determine the numbers of eagle using concentration areas.

Information acquired through this study will complement data collected during the damage assessment study on bald eagles. It will help identify important eagle habitats, and contribute to other efforts directed at assessing the relative value of certain habitat or specific areas to wildlife.

ENVIRONMENTAL COMPLIANCE

The proposed project is a non-intrusive study that appears to qualify for a categorical exclusion from the requirements of the National Environmental Policy Act.

WHEN

This project should be initiated immediately because 1) some lands containing high densities of eagle nests are targeted for logging in the immediate future, 2) this information is necessary to guide decisions on land acquisitions or other types of habitat protection, and 3) a huge investment in time, resources, and money was made to capture and radio-tag a large sample of bald eagles from 1989 to 1991, as part of the damage assessment process. A delay in initiating this project will result in the loss of these transmitters as their battery life is consumed, and a valuable investment will be wasted.

Monitoring of radio-tagged birds would be resumed as soon as funds are available, and continued weekly for 12 months. Contacts with landowners would begin during winter 1993. Nest surveys will conducted in May 1993. Tree marking, focusing on areas with the greatest threat of logging, would be conducted during the summers of 1993 and 1994. Mapping and GIS work will be accomplished during winters.

BUDGET ($K)

	USFWS
Personnel	$ 55.5
Travel	3.0
Contractual	89.0
Commodities	2.0
Equipment	25.0
Capital Outlay	0.0
Sub-total	$ 174.5
General Administration	13.5
Project Total	$ 188.0