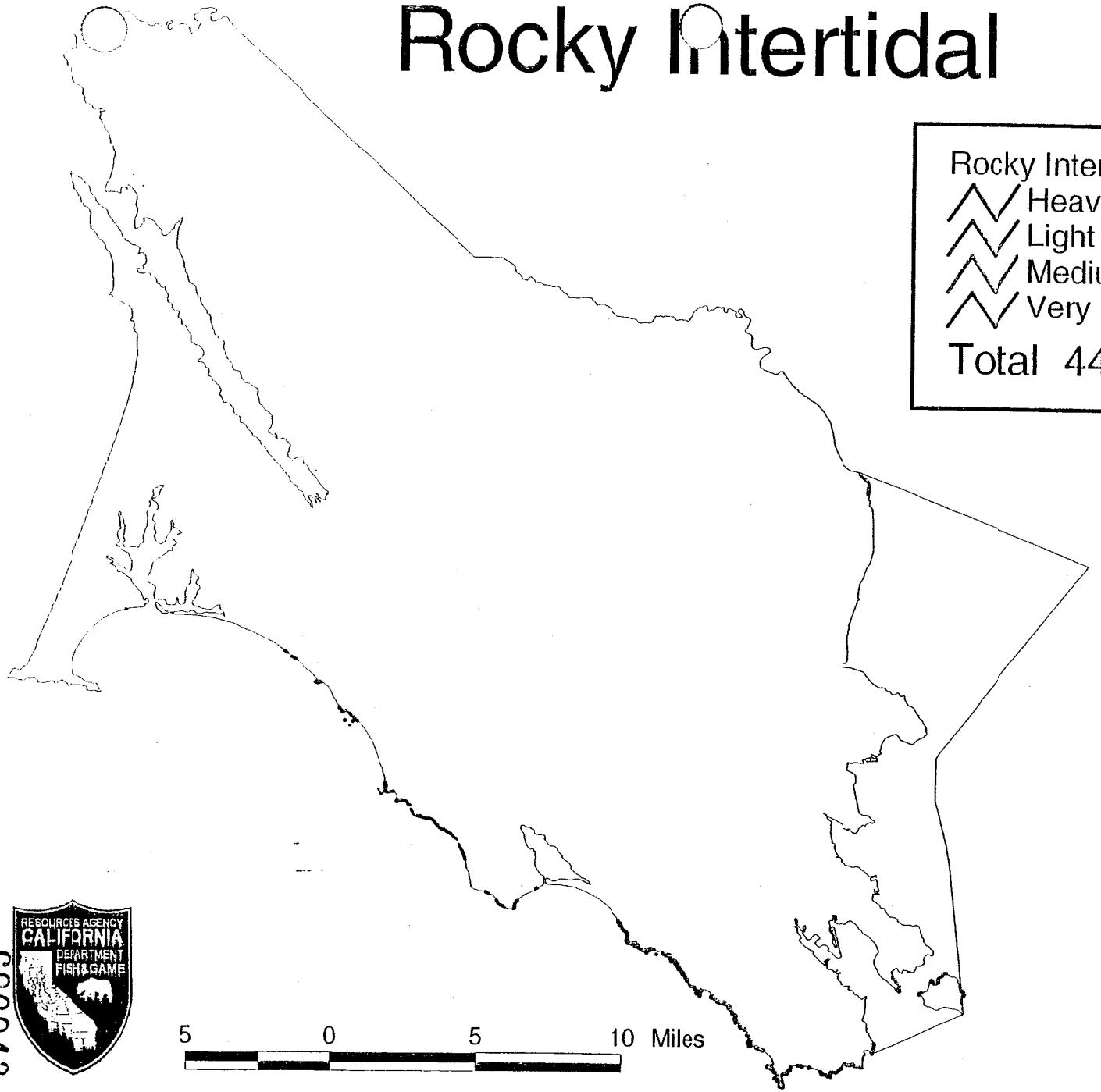
Rocky Intertidal



Rocky Intertidal Shoreline Oiling	
Heavy	629 Meters
Light	8,257 Meters
Medium	2,879 Meters
Very Light	32,731 Meters
Total	44,537 Meters

RESOURCES AGENCY CALIFORNIA DEPARTMENT FISH & GAME

5 0 5 10 Miles

N W E S

BLTAC Highway One Roadside Survey For Pullout Removal

DRAFT

MILE MARKER	SITE DESCRIPTION	PROJECT DETAILS
16.95	Concrete culvert near Bolinas Triangle, 6 ft. high by 10 ft. wide	No Cal Trans project
16.85	Pull out at road edge	Clear excess roadside to prevent parking -- remove roadside edge or install rip-rap rock to block pullout
16.85 - 16.80	Pull out at road edge	Clear excess roadside to prevent parking -- remove roadside edge or install rip-rap rock to block pullout back to "Diamond" road sign
16.82	24 inch culvert	Clean culvert
16.62	Pull out at road edge	No Cal Trans project
16.61 - 16.51	Long turn in road with wide edge	Remove fill and excess road edge (up to 20 ft. wide), 20 inch culvert to clean, opposite side uphill bluff to taper,C11 install rip-rap along road edge.
16.50	Culvert	Clean culvert
16.47	Double concrete culvert -- Two 8 ft. by 6 ft. openings, below PRBO canyon	Major sediment from upstream, need to clean out during storms, sedimentation to address upstream on private property (check dams, etc.)
16.47 - 16.25	Winnebago Point - Cal Trans holding site	Remove all fill and old asphalt back to current highway road edge, grade slope to allow lagoon water to flow to highway edge, de-watering site, no
16.25 - 16.19	Old slump onto road with culvert	Remove ;pull out materials back to road edge, add rip rap, public views and safety, ACR bus stop/pullout

Post-it™ Fax Note 7671	Date 5/10/99	# of pages ▶ 3
To RON MUSZA	From CHRIS	
Co./Dept. OSD	Co. OSD	
Phone #	Phone #	
Fax #	Fax #	

03/09/1999
BL CalTrans HWY 1 work.xls

BLTAC Highway One Roadside Survey For Pullout Removal

DRAFT

MILE MARKER	SITE DESCRIPTION	PROJECT DETAILS
16.06 - 16.00	Paved pullout	No Cal Trans project,
15.93 - 15.84	Pull out at road edge	Remove excess material
15.88	12 inch culvert	Clean as needed
15.77 - 15.67	Pull out at road edge	Keep existing pull out, rock at road edge to prevent trespass into marsh, opposite bank to address
15.32	Pull out at road edge	Keep existing pull out, rock at road edge to prevent trespass into marsh, Volunteer Canyon delta - Ph.1 Upland mgmt., Ph.2 remove delta vegetation
14.72	Pull out at road edge	Remove pull out, rock to prevent trespass into marsh, Mc Kennan Gulch interpretive center, signs/speed zone/etc., encroachment/permit/EIS
14.62	Pull out at road edge	Remove pull out, rock to prevent trespass into marsh
14.41	Concrete box bridge with peninsula access	Fence or rock out road side parking, add gate for equipment access to clean channel, clean culvert and channel, restrict access
14.37 - 14.34	Pull out at road edge	Remove pull out and pine trees
14.29	Pull out at road edge	Remove pull out to road edge and add rock to prevent access, guard rail out?

DRAFT

BLTAC Highway One Roadside Survey For Pullout Removal

MILE MARKER	SITE DESCRIPTION	PROJECT DETAILS
14.06	Paved pullout	Remove excess pullout beyond paving starting 8 feet beyond hard pavement
13.45-13.54	Stinson Gulch creek	Remove pullout and excess road edge, guard rail?, GGNRA/State Park
13.35 - 13.32	Old causeway remnant	Block off causeway
12.98	Pull out at road edge	Rock road edge to prevent vehicle trespass, Avella property - private wetlands to restore
ALL	Various Sites	Use 24 inch minimum, double walled culverts for all replacement work, check on power/phone pole removal or relocation

Bolinas Lagoon Ecosystem Restoration

Hydraulics and Coastal Section M-7
Methodology and Findings

April 29, 1999

U.S. Army Corps of Engineers
San Francisco District

construction of the Bolinas Groin, and other "ocean side" alterations to the system. Unquestionably the changes in such a complex system such as Bolinas Lagoon/Bay had effects, but considering the magnitude of the effects was important. Between 1968 and 1998 the sedimentation rate in the lagoon fell dramatically from 2.27 million ft^3/yr to .71 million ft^3/yr. Between 1988 and 1998 the sedimentation rate was .2 million ft^3/yr above the estimated normal infilling rate. This rate was most likely lower in 1998 since this was an average over ten years. This means that the actual infilling rate may have been substantially closer to the normal infilling rate in 1998. This information was very important in determining the cause of the high sedimentation in the lagoon. If the alterations on the ocean side of the system were significant contributors, the sedimentation rate within the lagoon would not be falling since the conditions have not been altered greatly (possibly made worse) since 1968. On the other hand the watershed has been recovering from the last logging episode and better land management practices have been followed. This was strong evidence that the watershed's sediment input into the system was the major cause for the alterations within the lagoon.

Even more telling than the sedimentation rate evidence were the reports by Wilde and Yancey 1970, and J.W. Johnson (several reports). In these reports it was concluded that the sediment that was west of the inlet generally moved east from Duxbury Reef, and the sand on the Stinson Spit had a tendency to move in both directions. It was witnessed on several occasions that a high percentage of the material at the inlet was gravel and cobbles, which lends credence to the two references. Also this falls directly in line with the well documented behavior of Log Spiral beach formations. In this type of landform wave energy is refracted and diffracted in such a manner as to cause the incident waves crests to be nearly parallel to the beach. This results in relatively low wave induced currents and sand transport rates.

Summary and Conclusions

- The lagoon will potentially lose 2.3 million ft^2 (6.3% of 1998) of tidal habitat and 1.1 million ft^2 (16.0% of 1998) of subtidal habitat to upland habitat by the year 2058. The volume loss of each habitat was projected to be 42.28 million ft^3 and 3 million ft^3, respectively.

- The lagoon will potentially close in 25 to 30 years based upon the closure index analysis. It was also shown through two other analysis techniques that the lagoon inlet was in jeopardy.

- The lagoon had 139.62 million ft^3 of potential tidal prism and 86.75 million ft^3 of effective tidal prism in 1998.

- The lagoon has lost 55.83 million ft^3 of effective tidal prism between 1968 and 1998, and has been projected to lose another 42.28 million ft^3, by the year 2058, which represents a 49% loss of the 1998 effective tidal prism.

- Sediment grab samples proved inconclusive, but there is strong evidence that the watershed's sediment input has been the most significant cause of the lagoon/inlet reductions.

- Bathymetries clearly show the loss of several channels within the lagoon.

STATE OF CALIFORNIA GRAY DAVIS, *Governor*

SAN FRANCISCO BAY CONSERVATION AND DEVELOPMENT COMMISSION

THIRTY VAN NESS AVENUE, SUITE 2011
SAN FRANCISCO, CALIFORNIA 94102-6080
PHONE: (415) 557-3686

June 1, 1999

Mr. Dan Welsh
U.S. Fish and Wildlife Service
Sacramento Fish and Wildlife Service
3310 El Camino, Suite 130
Sacramento, CA 95821

SUBJECT: Potential Restoration Project for Natural Resources Impacted by the *Cape Mohican* Oil Spill: the Hamilton Wetlands Restoration Project

Dear Mr. Welsh,

Thank you for the opportunity to comment on the public scoping document describing projects to be potentially funded by the settlement resulting from the *Cape Mohican* oil spill. Please note that Commission staff is also providing comments on the projects listed in the public scoping document in a separate letter. This letter provides information about the Hamilton Wetlands Restoration project. On behalf of the agencies involved in implementing this project, we request that the natural resource trustees consider allocating funds to this project. I presented an overview of this project at the May 10 public workshop at Fort Mason. This letter follows the project information format outlined in the public scoping document; for additional information I have attached the project Feasibility Report and final Environmental Impact Report and Statement.

Project Location

The Hamilton Wetlands Restoration Project will restore a diverse mix of wetlands to over 900 acres of diked baylands at the former Hamilton Army Airfield in the City of Novato, Marin County, on the west side of San Pablo Bay. The site is a diked bayland that has subsided to elevations below those suitable for tidal marsh. The project will beneficially reuse over 10 million cubic yards of clean sediment from Bay navigation channel dredging projects to raise site elevations to support establishment of wetland vegetation. Establishment of the mix of wetland habitats will complete the reuse process for the closed military base.

Relationship to Damage Caused by the Spill

The *Cape Mohican* oil spill impacted approximately 99 acres of wetlands and/or mudflats. Sampling data indicated that oil from the *Cape Mohican* was detected as far north into San Pablo Bay as the northern side of China Camp, and thus likely impacted San Pablo Bay fish and birds and their habitat. The *Cape Mohican* spill also impacted visitor use of Angel Island State Park and Golden Gate National Recreation Area. The Hamilton wetland restoration project will provide in-kind compensation for habitat and wildlife impacts by providing approximately 900 acres of habitat for bird species such as herons, egrets, shorebirds, waterfowl, and other migratory species that were impacted by the oil spill. Although the public will not be allowed into the sensitive habitat areas of the marsh, the San Francisco Bay Trail will provide public access by traversing one edge of the site, thus providing mitigation for the public access impacts from the *Cape Mohican* spill.

600050

Background

The California Coastal Conservancy and the San Francisco Bay Conservation and Development Commission (BCDC) are managing the Hamilton wetlands restoration project at the state level and have completed a conceptual plan for the project. While the site was historically owned by the Army, ownership will be transferred to the State once the Army has cleared the site of contaminants to a level suitable for wetland habitat. In late 1998, the U.S. Army Corps of Engineers finalized a feasibility analysis to provide for federal involvement in the project. The project environmental review process is complete, with a final Environmental Impact Review and Statement issued in late 1998.

The conceptual design for the restoration project is based on the physical characteristics of the site. Additionally, the conceptual design incorporates lessons learned from past wetland restoration projects in the San Francisco Bay area, such as the nearby Sonoma Baylands Project which also included the use of dredged material. The design will create a landscape that gradually slopes from uplands to the Bay —much as the historic shoreline did—supporting large expanses of tidal and seasonal wetlands.

The project is intended to achieve three regional goals:

- Create a diverse array of wetland and wildlife habitats that benefit a number of fish, bird, and wildlife species including shorebirds, herons, and other migratory birds, as well as special status species such as the California clapper rail, the salt marsh harvest mouse, steelhead, and others.
- Reduce in-Bay disposal of dredged material and beneficially reuse dredged materials.
- Facilitate the base-closure and reuse process.

Currently, the final design process is underway. Construction is scheduled to commence in 2001.

Project description

To accomplish the goals of the project, the site will be filled with clean material from Bay dredging projects to construct upland and seasonal wetland features and to speed the formation of tidal wetlands. Two channels to the Bay will restore tidal waters to the site. Dredged material will be placed low enough in tidal areas to allow the wetlands to form naturally on sediments carried in on the tides. Salt pannes, a feature of historic Bay wetlands that flood only on the highest spring tides, and areas of seasonal wetlands will be created at the upper margin of the tidal areas. The result will be one of the largest contiguous tidal wetlands in the Bay.

The project helps implement the San Francisco Estuary Project's Comprehensive Conservation and Management Plan (CCMP) goals for Wildlife and Wetlands by restoring large, contiguous expanses of tidal wetlands and necessary adjacent uplands, providing habitat to help recover endangered species and increasing biodiversity. The project will implement a reuse plan for the base developed by local citizens of Novato and advance the objectives of the San Francisco Bay Plan, CALFED, the Long Term Management Strategy for Dredged Material Disposal in San Francisco Bay, and the recently issued Regional Habitat Goals Project.

Project Cost

To date, a variety of sources, including the CALFED Bay/Delta Program, U.S. Army Corps of Engineers, the State Coastal Conservancy, the National Marine Fisheries Service, Environmental Protection Agency, and the Marin Community Foundation, have funded the $1.85 million cost of planning the Hamilton wetlands restoration project.

The total cost to construct and complete the project is approximately $55 million (see table 1), with 75% of this total (or approximately $41 million) coming from the federal government. The local cost-share portion of the project, $14 million, will come from a variety of sources, including CALFED, State appropriations, private foundations, and others.

Relocations	$2,138,200
Levees and floodwalls	$19,325,800
Dredged material placement	$27,809,100
Post-construction monitoring	$1,530,000
Preconstruction, engineering, and final design	$1,210,000
Lands	$241,600
Construction management	$2,900,000
Total Cost	**$55,154,700**
Federal cost-share (75%)	$41,000,000
Local cost-share (25%)	$14,154,700

Table 1. Cost summary for the Hamilton wetlands restoration project.

Funding Request

On behalf of the entities involved in this project, BCDC requests $500,000 from the Cape Mohican settlement for the Hamilton wetlands restoration project. Funding from the *Cape Mohican* oil spill settlement would be an important contribution to the Hamilton wetlands restoration project. We believe that the benefits from the Hamilton project directly correlate with the impacts from the oil spill. Fish and wildlife and their habitats will be restored through the Hamilton projects. Additionally, the Bay Trail will provide the public with public access opportunities to enjoy the site.

Thank you for the opportunity to propose this project. If you have any questions, please feel free to contact me at (415) 557-8765 or Steve Goldbeck at (415) 557-8786.

Sincerely,

JOHN WEBER
Coastal Program Analyst

JW/bb

Enclosures (2)

cc: California Coastal Conservancy, Attention: Terri Nevins
U.S. Army Corps of Engineers, San Francisco District, Attention: Scott Nicholson

PORT OF SAN FRANCISCO

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San Francisco, CA 94111
Telephone 415 274 0400
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June 18, 1999

Trustee Council, Cape Mohican Natural Resources Damage Settlement
c/o Dan Welsh
U.S. Fish and Wildlife Service
3310 El Camino Ave., Suite 130
Sacramento, CA 95821-6340

RE: Proposed Restoration Projects, Pier 94 and Pier 98
Port of San Francisco

Dear Trustees:

I am writing to address some of the issues raised by Bay Conservation and Development Commission Staff in a letter dated June 2, 1999 regarding the above-referenced projects.

Priority Use Designations (Page 3). BCDC's letter indicates that the proposed restoration and delineation of exposed wetlands at Pier 94 may be inconsistent with designated priority uses. I would like to clarify that our proposal is not to increase wetland acreage, but rather to improve the habitat quality of the existing wetlands. This area is designated in the referenced land use plans as reserved for Port Priority use. The Port acknowledges that it would be required to mitigate any impact to the existing wetlands if the area developed for maritime operations or other Port priority use.

With respect to Pier 98, the reference to a public access area "on the pier apron" is a somewhat misleading description, as there is no pier structure and no pier apron present.

The wetlands creation and public access improvements completed at Pier 98 are in compliance with the BCDC permit (No. M98-3). The permit authorizes "landscaping the entire upland area, primarily with native grasses and herbs". Revegetation of the newly-created transition zone (the sloped area between the wetlands and uplands), for which the Port has requested funding from the settlement, was not included in the original design plans. However, through the design and public comment process the Port has been made aware of the unique opportunity to enhance native plant habitat and increase biodiversity at the site by planting and maintaining transition zone species. If funded, the Port would certainly submit the revegetation plan to BCDC for permit approval.

Fill and Increased Surface Area of the Bay (Page 4). Neither of the proposed projects would involve placing fill in the Bay. Enhancement of the existing wetlands at Pier 94 would include removing potentially deleterious debris, such as concrete, asphalt, and tires. Other fill material might be excavated to improve tidal circulation. The proposed revegetation at Pier 98 would involve only planting. No new soil or other fill would be placed in the wetland or transition zone.

I hope that this letter adequately addresses the questions raised by BCDC. If you have any questions or comments, please do not hesitate to contact me by phone (415-274-0568) or e-mail (carol_bach@sfport.com).

Sincerely,
Port of San Francisco

Carol Bach
Environmental Health and Safety Manager

cc: Steve McAdam, Bay Conservation and Development Commission

UNIVERSITY OF CALIFORNIA, DAVIS

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BODEGA MARINE LABORATORY
P.O. BOX 247
BODEGA BAY, CALIFORNIA 94923

June 1, 1999

Dan Welch
U.S. Fish and Wildlife
3310 El Camino, Suite 130
Sacramento, CA 95821
916-979-2110

Dear Dan:

Last week I spoke with John Tarply regarding a public scoping document that is being assembled for the Cape Mohican oil spill. Since Pacific herring were impacted and will be a part of any mitigation, we thought that it appropriate that mitigation include determination of whether herring in our region exist as one large population that utilizes several bays and estuaries for reproduction or as several distinct and separate populations that are genetically different from one another. This type of information would help discern the longer term impact of not only the Cape Mohican spill, but also of any other future disruptions or catastrophes.

Thank you for considering our proposed project and don't hesitate to contact me if there is anything I can help with on this project.

Sincerely,

Fred J. Griffin

TITLE OF PROPOSED PROJECT **Fisheries and Water Quality Enhancement Project: Reproductive Stocks of Pacific Herring in San Francisco Bay and California**

PROJECT CONTACTS

Fred J. Griffin, Assistant Research Biologist
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Fisheries and Water Quality Enhancement Project: Reproductive Stocks of Pacific Herring in San Francisco Bay and California

Project Location

Pacific herring (*Clupea pallasi*) will be sampled from spawning or pre-spawning schools of fish in San Francisco Bay, Tomales Bay, and Bodega Bay. Analysis of samples will be conducted at the Bodega Marine Laboratory in Bodega Bay.

Project Relationship to Damages Caused by the Spill

As documented by the California Department of Fish & Game Herring Survey Project, the oil spill in 1996 occurred during the Pacific herring reproductive season and directly impacted herring spawn habitat in San Francisco Bay. The spill reached herring spawning habitat in several regions of the Bay (e.g. Marin County shore, Angel Island, San Francisco shore) and occurred within weeks of a spawning event that took place along the San Francisco waterfront. It has been estimated that 8% of the 1996-97 herring spawn was on oil damaged substrata. Research that has followed the impacts of oil on herring reproductive output (e.g. the Exon Valdez spill) has demonstrated that both immediate and long-term damage to populations occurs after exposure to oil. In the Cape Mohican incident, this loss in reproductive output has been a contributor (along with abnormal El Nino/La Nina conditions) to a significant decrease in population size for the last two years.

The full impact of the spill, as well as other potential disturbances to herring reproduction and reproductive habitat in the future, cannot be known until regulators and fisheries biologists understand the population structure or genetics of herring that utilize San Francisco Bay and nearby bays for reproduction. If herring that spawn in San Francisco Bay and nearby Tomales and Bodega Bays belong to the same spawning stock or genetic pool, then an event such as the Cape Mohican spill impacts all three bays. Conversely, if herring that utilize each bay are reproductively isolated and constitute distinct genetic stocks, an episodic event in San Francisco Bay such as the Cape Mohican oil spill would disproportionately affect the San Francisco stock. Proper responses by agencies that are charged with insuring a viable herring population and with regulation of the fishery depends on knowing the population structure. Knowledge of the genetic relatedness of local herring becomes even more critical if distinct genetic stocks exist not only between northern California bays, but also within San Francisco Bay. If such a situation exists, reproductive stocks can be expected to be smaller, more susceptible to disruptions like a reproductive loss due to an oil spill. For example, if the spawn that was damaged by the Cape Mohican oil spill was from an isolated stock, the damage to the reproductive output of that stock would have been much greater than the 8% loss estimate that was based on the total San Francisco Bay herring spawn for 1996-97.

Background

Pacific herring inhabit the northern Pacific Ocean from California to Korea with populations in the Bering Sea that extend to the White, Kara, and Barents Sea regions of the Arctic Ocean. Throughout their range herring are an economically and ecologically important species; in California they rank in the top three fisheries. Preservation of sustainable herring populations is a high priority in Japan (where stock supplementation has been implemented), Alaska (where Exxon Valdez mitigation is occurring), British Columbia (where herring are designated as a

sentinel species) and Washington (where herring are being recognized as a pivotal species to the ecology of Puget Sound), and in California (where the fishery is tightly regulated). Preservation requires fairly accurate predictions of population sizes, which is difficult with herring since populations undergo natural fluctuations in the absence of fishing and urban pressures

The concept that Pacific herring segregate into discrete populations within a geographical region has been supported by a number studies in Japan, British Columbia, Alaska, and California. Such characteristics as within-region temporal spawning differences, repeated return of fish to spawn sites, salinity differences of spawn sites, egg size, growth patterns, and parasite differences have been reported, but genetic evidence has both supported and argued against reproductively isolated groups (within a region). Most recently research using mitochondrial DNA (mtDNA) and microsatellite markers has revealed differences between Alaskan populations, suggesting that genetic differences among these populations positively correlate with geographic distance.

The fact that herring in California are not considered to be in immediate danger (e.g. as are winter run Chinook salmon) does not mean that they are not ecologically threatened and that their existence into the future is guaranteed. There are several reasons to suggest that California herring will need help in the future. First, they constitute the southernmost eastern Pacific breeding population(s) and because of the climatic variability of the California coast, they are subjected to more environmental stresses than more northerly stocks. Second, herring have not received much attention by those groups empowered to reduce and reverse the decline of the San Francisco Bay Estuary, yet it is evident that there has been loss of spawning habitat due to urban based destruction of natural substrates, in preferred spawning habitats. The loss of marine algae and plants coupled with siltation of rock or gravel areas is significant. Because of this reproductive displacement herring routinely spawn on artificial structures, like creosote pilings along the San Francisco waterfront, substrates on which herring embryos do not survive. Proper management of this fishery, the last remaining urban fishery on the West Coast of the United States, requires that regulators understand the herring population structure.

Project Description

We will determine the genetic relatedness of different spawning schools of Pacific herring collected from San Francisco, Tomales, and Bodega Bays using mtDNA and microsatellite DNA markers. Fish will be sampled from pre-spawning and spawning schools from November to March. Sources of fish will include commercial fishermen and the California Department of Fish and Game's San Francisco Bay and Tomales Bay Herring Monitoring projects. Fin clips from at least 100 herring will be taken at each sampling and preserved in ethanol. Genomic DNA will be extracted from the fin clips and used to reconstruct mtDNA and microsatellite sequences via the polymerase chain reaction (PCR). Genetic variation in the mitochondrial ND1 gene, which has been utilized with Alaskan herring, will be analyzed using agarose gel electrophoresis of cleavage products generated by four or more restriction endonucleases. These products have been shown to reveal extensive variability in this gene in both Alaskan and Washington herring populations. Microsatellites (5-9 loci) will be amplified using primers

available from Dalhousie University. These loci have been shown to discriminate between closely related, yet distinct populations.

The genetic data for each collection will be treated as a separate sample which will provide information on the relatedness of different spawning schools as well as on the relatedness of fish from the three spawning regions (San Francisco, Tomales, and Bodega Bays).

Project Cost

It is estimated that the project will require two years to complete. The project cost for each year is $84,400 and the total for the two years is $168,800.

DNA probes and related supplies	$ 12,000
Travel costs for sample collection	5,000
Analysis of samples	50,000
Yearly Total Direct Costs	$ 67,000
Yearly Indirect Costs (26% of TDC)	17,400
YEARLY TOTAL	$ 84,400
PROJECT TOTAL (Two Years)	$168,800