Exxon Valdez Oil Spill Trustee Council

Restoration Update

August 1995 Vol 2 No. 3

D. Lindsey Hayes and Dave Tessler place a video camera near a pigeon guillemot nest on Naked Island in Prince William Sound. The camera will record the comings and goings of the parent birds bringing food to the chicks. Photo by L.J. Evans.

APEX Study:

Does seabird recovery depend on forage fish?

An ecosystem-based project just underway this year as a pilot effort is exploring the possibility that a shift in food resources in Prince William Sound is preventing recovery of some injured bird populations from the oil spill.

The Apex Predator Ecosystem Experiment is investigating the relationship between continuing declines (or, in some cases, the failure to recover to pre-spill numbers) of pigeon guillemots, murres, and black-legged kittiwakes, and the availability of their main food resources. All of these top-of-the-food chain species were injured by the oil spill, and all feed on small fish referred to as "forage fish."

"Ecosystem studies such as the Apex project may help detect indirect effects on the wildlife in the sound from different sources," said Dr. Dave Duffy, Project Leader. "These include the oil spill, human efforts to ameliorate the oil spill, and future threats to the long-term sustainability of the Prince William Sound ecosystem."

Over the last 15 to 20 years, biologists have noted shifts in the species, distribution and abundance of forage fish, such as Pacific herring, capelin, juvenile pollock and sand lance, in the northern Gulf of Alaska and in Prince William Sound. Certain marine bird and mammal populations in the region which rely on small fish for a major part of their diets have declined during the same time period, making scientists speculate that there may be a connection. Seabird and mammal deaths resulting from the oil spill probably accelerated and intensified this decline, according to biologists.

Field biologists watching seabird nests in Prince William Sound and in the Barren Islands are gathering data on the number of eggs laid, chicks hatched and fledged, and the type and quantity of food brought back to the nests by adult birds to feed their young. Small radio transmitters attached to kittiwakes are providing information on how far the birds

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Inside...

Calendar

August 25

Trustee Council meeting in Anchorage to take action on FY96 Work Plan. Contact Rebecca Williams at 907/278-8012

September 8*

Trustee Council meeting in Anchorage to take action on first round of small parcels. Contact Rebecca Williams at 907/278-8012.

September 19–20

Public Advisory Group meeting in Valdez and field trip to Prince William Sound. Contact Cherri Womac at 907/278-8012.

September 22–23

Elders/Youth Conference on Subsistence in Anchorage. Contact Rita Miraglia at 907/267-2358.

September 29–October 1

Pacific Seabird Restoration Symposium in Girdwood. Contact Catherine Berg at 907/786-3598.

December 12*

Trustee Council meeting in Anchorage on final projects for FY96 Work Plan. Contact Rebecca Williams 907/278-8012.

January 16–18, 1996

Annual Restoration Workshop in Anchorage. Contact: L.J. Evans 907/278-8012.

**Tentative dates*

New In Print

The following new or recently published documents are available by contacting the Oil Spill Public Information Center at 645 G St., Anchorage, AK 99501-3451, or by calling 907/278-8008, toll free at 1-800-478-7745 (within Alaska) or 1-800-283-7745 (outside Alaska).

Draft Fiscal Year 1996 Work Plan, Exxon Valdez Oil Spill Trustee Council.

1995 Annual Status Report, *Exxon Valdez* Oil Spill Trustee Council.

Impact of the oil spill on juvenile pink and chum salmon and their prey in critical nearshore habitats, A. Wertheimer, et al.

Effects of pink salmon escapement level on egg retention, preemergent fry and adult returns to the Kodiak and Chignik management areas caused by the Exxon Valdez *oil spill*, C.O. Swanton, et al.

Impacts of the Exxon Valdez *oil spill on bottomfish and shellfish in Prince William Sound*, E. Haynes, et al.

Sockeye overescapement, D.C. Schmidt et al.

Database management, C. DiCostanzo.

Assessment of injury to harbor seals in Prince William Sound, Alaska, and adjacent areas following the Exxon Valdez *oil spill*, K. Frost et al.

Technical support study for the restoration of Dolly Varden and cutthroat trout populations in Prince William Sound, S. Sharr et al.

Injury to Prince William Sound spot shrimp, C. Trowbridge.

Injury to demersal rockfish and shallow reef habitats in Prince William Sound, 1989-1991, A. Hoffman, et al.

Injury to salmon eggs and preemergent fry in Prince William Sound, S. Sharr et al.

Subsistence restoration project, R. Miraglia.

Characterization of upland habitat of the marbled murrelet in the Exxon Valdez *oil spill area*, R.L. DeVelice et al.

The **Restoration Update** is published approximately six times a year by the *Exxon Valdez* Oil Spill Trustee Council. Its purpose is to update interested members of the public about actions, policies and plans of the Trustee Council to restore resources and services injured by the *Exxon Valdez* oil spill.

For more information, mailing address correction, or to request future articles on specific subjects, contact L.J. Evans, Editor, at the address below.

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New pink salmon ID system in PWS ready to go

A new system to mark all the pink salmon released from fish hatcheries in Prince William Sound is in place and ready for operation, fishery managers reported last week. The technique, called thermal otolith mass-marking, uses temperature fluctuations in water circulating through the hatchery to cause identifiable marks to be formed in a tiny bone in the salmon called the otolith.

By marking all of the hatchery-raised pink salmon released into the sound, fish biologists will be able to differentiate hatchery-raised fish from wild pink salmon stocks. This information will allow investigation of factors still affecting the wild stocks injured by the 1989 oil spill.

The Trustee Council is funding the research and development phase of the project. Costs for continuing the program will be supported by the Prince William Sound Aquaculture Corporation and the Alaska Department of Fish and Game.

"This technique has been proven in other places, but it's never been applied on this scale for in-season management," said Mark Willette of the Department of Fish and Game.

In the usual hatchery environment, cold fresh water is constantly circulated through hundreds of trays or incubators holding the fertilized salmon eggs, and later hatched fish. Addition of a boiler unit to the hatchery allows the water temperature to be increased by the few degrees necessary to create bands in the otolith, or ear bone, as it grows. The critical time period is between October and December. Boilers have been plumbed in and test-fired in all four of the pink salmon hatcheries in Prince William Sound, Willette said.

Before the fish hatch, a small increase in the water temperature results in more calcium deposited in the otolith, which appears as a light ring when viewed under a microscope. A drop in temperature causes more protein to be laid down, resulting in a dark ring.

A change of 3 1/2 degrees for 24 hours creates one band. By precisely manipulating the water temperature, hatchery staff will be able to mark each fish released and make the marking patterns unique for each hatchery.

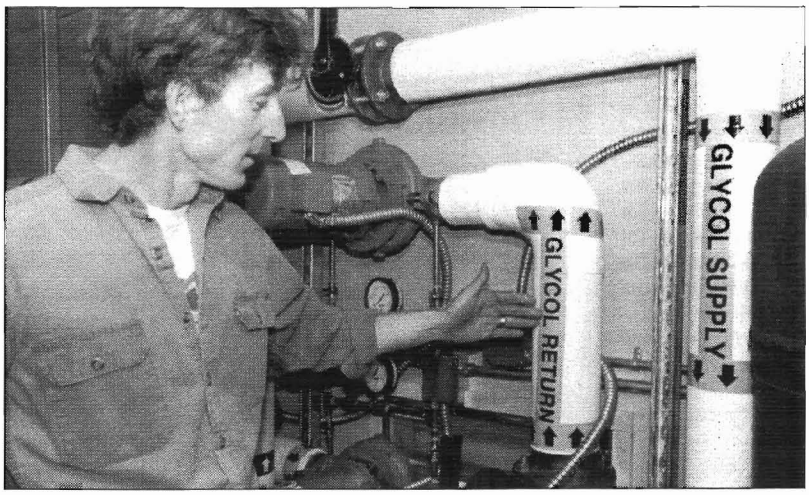
When an adult fish returns to spawn, the otolith has grown from smaller than the head of a pin at the time of marking to about the diameter of a pencil eraser. Field biologists will remove the otoliths from a percentage of the catch and send them to the Fish and Game lab in Juneau for analysis, where they will be examined under a microscope.

Information from the marked fish will be used to reduce the interception of wild pink salmon in mixed stock fisheries. The marked fish will also help answer questions about how much returning hatchery and wild stocks stray from their natal streams, evaluate factors which influence growth, and examine effects hatchery-grown fish may be having on the wild stocks. In additional studies being undertaken by NOAA, the otolith marking project will make it possible for NOAA investigators to tell if the fish from the sound stay together out in the ocean, or if they disperse, Willette said.

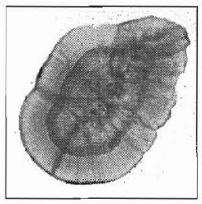
The otolith marking technique will replace a much more labor-intensive program of inserting coded wire tags into hatchery fish. Using coded wire tags to track the hatchery fish requires handling of each fish to be marked when it is just a few inches long. Only one in 600 of the fish released can be marked using this technique. Marking all of the fish from each hatchery will increase the degree of certainty possible when fishery managers are dealing with harvest allocations. Willette estimated that the first adult fish with marked otoliths will return in 1997.

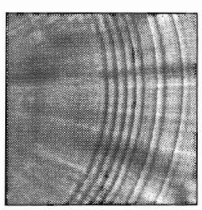
"Many subtle variables could be contributing to the declines we see in the wild stocks. The otolith marking program will give us greater flexibility and certainty to help answer these questions," Willette said.

For more information on the otolith marking project, contact Tim Joyce at the Cordova office of the Alaska Department of Fish and Game at 907/424-3212.



Chuck Pratt, Assistant Manager at AFK hatchery, points out the heat exchange system in the new boiler unit. Photo by L.J. Evans





Above is a microscopic view of a whole pink salmon otolith, at 100X magnification. The closeup of a marked otolith below at 400X magnification shows several bands of light and dark. The bands enable researchers to identify the year and hatchery where the fish spawned. Photos by Chris Munk, ADF&G.

Veterinarians Kathy Burek and Dan Mulcahy team up to surgically implant a tiny satellite transmitter in a common murre from East Amatuli in the Barren Islands. The transmitters will provide valuable data on how far the murres range to find food and where they go once the chicks have fledged.
Photo by L.J. Evans.

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range to find their food.

Other teams of researchers are using state-of-the-art hydroacoustic equipment and field observations to collect information on the locations, quantities and kinds of forage fish present in the waters near nesting colonies, where the birds congregate, their fishing success rates, and how well they are able to locate the schools of forage fish.

Concurrent studies conducted by the Sound Ecosystem Assessment project on salmon and herring productivity, and by Alaska Department of Fish and Game projects on harbor seals, will also contribute information to the APEX project.

In a related study, satellite radio transmitters were implanted in late July in ten murres and five tufted puffins at the Barren Islands to track their movements over the next few months. In addition, laboratory scientists are assessing the nutritional value to seabirds of various forage fish, as well as analyzing stomach contents to find out what the *fish* are eating.

"The shifts we've observed in availability of different forage fish seem to have an effect on how many chicks hatch and survive," said Duffy. "We think some of these fish may serve the birds as equivalent nutritionally to a square meal, while others may be equivalent to junk food."

Pre-spill data from the mid-1980's indicated that sand lance were much more abundant in the diet of pigeon guillemots in the sound then than they are now. It seems that sand lance keep recurring as a key species for seabirds, at least partly because their high fat content makes them especially valuable nutritionally, Duffy said. Sand lance also seem to be one of the species the birds can usually find close to shore.

Early reports from the field this summer are that most of the forage fish located are either large numbers of pollock, in a continuous deep layer, or small fish close to the surface and near to shore which the field researchers can't always identify, Duffy said. The fish are usually a couple hundred yards out and 100 feet or less deep. A lot of the smaller fish are probably sand lance, but the schools are small and there are few of them.

"A good part of the challenge turns out to be just catching some of the small fish close to shore that the hydroacoustic equipment identifies to find out for sure what they are," Duffy said.

Another early observation from the sound, Duffy said, is that the researchers don't seem to find many large schools of forage fish or large flocks of birds.

"In other parts of the world the schools of fish and bird flocks are usually much larger," Duffy said. "In most other marine systems, such as off Peru, the Galapagos Islands or California, or even in the deep Gulf of Alaska, a big flock of birds might be several thousand or even fifty thousand. We're finding that a big flock of seabirds in Prince William Sound would be a hundred birds. "

Duffy also reports that the region around the Barren Islands appears to be food-rich, while Prince William Sound seems poor. Also, predation pressure (gulls, eagles or other predators taking eggs and chicks) seems to be higher than he expected. The U.S. Fish and Wildlife Service field workers put up some scarecrows at kittiwake colonies to discourage bald eagles coming in for chicks.

"The scarecrows may have helped, but we're not sure yet. At the pigeon guillemot

"In other parts of the world the schools of fish and bird flocks are usually much larger... A big flock of seabirds in the Sound would be a hundred birds."

"The challenges increase as the number of birds you're working with goes down..."

colonies the predators may also include river otters taking the young or eggs."

Duffy also noted this is one of the most difficult systems he has worked in for the study of seabirds.

"The challenges increase as the number of birds you're working with goes down. When there are relatively few of them, they are harder to track and find their nests. Birds that nest in precarious places, such as cliffs or deep nest holes, look for the nest sites that are the most difficult to get to because those are the ones that are the safest from predators. Of course, this also makes them hard for researchers to get to as well."

"These people (the field biologists) are living in the rain, working in the rain, every single day. The logistics of living out there and still having to do your work are pretty impressive. It takes a lot out of you. It's easy for me back in Anchorage to ask why aren't they always getting this or that data, but the reality of carrying out that suggestion can be extremely daunting."

Because the Apex project is considered a pilot project and there is no certainty that seabird productivity can be linked with forage fish, the project will undergo a thorough review of the first year's findings in December before a decision is made by the Trustee Council on continued funding.

For more information contact Bruce Wright at 907/789-6601.

Rob Suryan and Theresa Sauer weigh a black-legged kittiwake from a colony southeast of Eleanor Island in Prince William Sound. A small radio transmitter was glued to the kittiwake's tail feathers, then it was released to return to its nest. Photo by L.J. Evans.

Build a Pigeon Guillemot Nest Box

Building pigeon guillemots nest boxes and mounting the boxes under piers or in other suitable locations could protect eggs and chicks from predators and encourage adults to take up residence.

A set of construction directions for nest boxes with dimensions and complete materials lists are available upon request by contacting the Trustee Council office.

It is best if the boxes are in place by late February or early March so they are present when the guillemots start looking for nest sites.

The nest boxes were designed and tested by Mary Mahaffey of the Fish and Wildlife Service in Olympia, Washington.

To request a copy of the nest box directions, contact L.J. Evans at 907/278-8012, or write the EVOS Restoration Office, 645 G Street, Suite 401, Anchorage, AK 99501.

Illustrations by George C. West.

A traditional Alutiiq hunting hat adorned the table during the signing ceremonies. Emil Christiansen, signs for the Old Harbor Corp.as Interior Secretary Bruce Babbitt reviews a document. Standing, l to r, (partially obscured) Vera Inga, Akhiok Kaguyak, Inc. Board Member; Sharon Eluska; Dan Sakura, DOI; Daniel Yakanak, AKI Board Member; and Ralph Eluska, President of AKI. Photo by Walt Ebell.

Habitat protected on Kodiak Island

The presidents of two Alaska Native corporations signed agreements with Secretary of the Interior Bruce Babbitt on May 23 to protect more than 150,000 acres of prime habitat in the Kodiak region for species injured by the oil spill.

"These agreements will preserve important habitat, provide additional opportunities for hunting, subsistence, commercial and sport fishing, and other outdoor activities, and strengthen the local economy on Kodiak Island," Secretary Babbitt said in a statement.

"This is a tremendous victory for the salmon, bears and the people of the villages and the Kodiak region. It is an important milestone in the *Exxon Valdez* Oil Spill Trustee Council restoration program to heal the wounds from the 1989 disaster."

The lands owned by the corporations are within the Kodiak National Wildlife Refuge. The agreements, including purchase of surface title, negotiation of conservation easements and agreements for preservation of habitat on other lands which remain the property of the corporations, also allow for traditional hunting and fishing subsistence activities on certain lands near the villages.

Together, the agreements protect about 152,000 acres of land in perpetuity for a cost of $60.5 million, to be paid from E*xxon Valdez* civil settlement funds.

Emil Christiansen, President of Old Harbor Native Corporation, and Ralph Eluska, President of Akhiok-Kaguyak, Inc., represented their corporations. Secretary Babbitt, Assistant Secretary George T. Frampton, Jr. and Mollie Beattie, Director of the U.S. Fish and Wildlife Service, represented the Department of the Interior, and Molly McCammon, Executive Director, represented the *Exxon Valdez* Oil Spill Trustee Council, of which Secretary Babbitt is a member.

For information on the Kodiak National Wildlife Refuge, contact Jay Bellinger at 907/487-2600.

Youth/ Elders conference on subsistence and the oil spill to take place in September

A community conference on subsistence and the *Exxon Valdez* oil spill funded by the Trustee Council will take place in Anchorage on September 22 and 23. Four representatives from each of twenty communities in the oil spill area as well as invited Trustee Council agency staff and scientists are expected to attend.

The goal of the conference is to enhance the recovery of subsistence in the oil spill area. Conference participants will share concerns about natural resources and discuss ways local people can become involved in the restoration and use of subsistence resources.

Participants will discuss ways communities can re-invigorate subsistence practices, aid in actions to promote the recovery of subsistence resources and the health of the ecosystem, and incorporate local knowledge into natural resource recovery strategies. Scientists working on restoration projects will be available to answer questions about oil spill injuries and restoration of subsistence resources.

For more information contact Bill Simeone of the Alaska Department of Fish and Game Subsistence Division at 907/267-2309.

Kodiak shoreline survey finds little oil

"We found oil to be nonexistent or in trace amounts," was how surveyors summarized initial reports about this summer's observations on Kodiak beaches. This was the first shoreline oiling survey in the Kodiak area since 1991.

"At most locations we found no oil," said Jim Gibeaut, a geomorphologist hired by the Alaska Department of Environmental Conservation to assist with the survey.

Where oil was present, it was in isolated patches of mousse, soft asphalt with surface crusts or tar splotches, Gibeaut said. Only one location on the north end of Shuyak Island had subsurface oil and it was light and in a small area.

"This subsurface location as well as all other locations showed significant improvement since 1991," Gibeaut said.

As part of a 1995 Trustee Council funded project, an ADEC team experienced in tracking *Exxon Valdez* oil revisited 25 specific locations in June and July where oil was noted during the 1990 or 1991 Exxon and interagency shoreline surveys. They also visited several sites identified by Kodiak area community members as possibly having remaining contamination from the spill.

The team visited sites in Sturgeon Lagoon (southwest of Karluk), Uyak and Spiridon Bays (in the Larsen Bay area), one site on Afognak Island and about 12 sites dotted around Shuyak Island to the north.

The very light oiling conditions found in the Kodiak region relative to Prince William Sound can probably be attributed to three main factors, Gibeaut said. There was lighter initial oiling; the oil that reached the Kodiak beaches was thicker, emulsified oil and less able to penetrate into beach sediments and thus persist in subsurface layers; and the shorelines in that area are relatively high wave-energy shorelines, which tends to scour the oil residues off, he said.

Gibeaut speculated that this summer's scrutiny will probably be the last *Exxon Valdez* shoreline oiling survey in the Kodiak region.

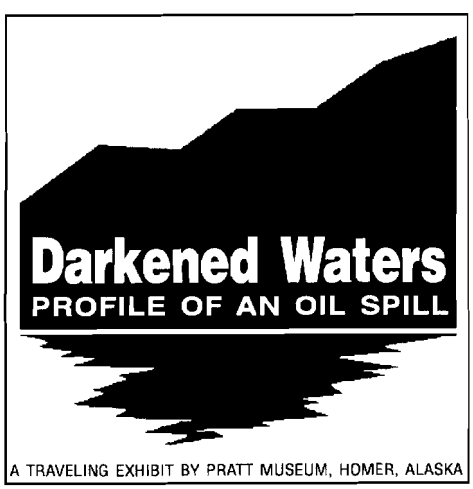
"We found that the Kodiak shorelines look very good with respect to shoreline oiling," he said.

A report analyzing the teams' findings will be completed this winter. For more information, call Ernie Piper at 907/269-7500.

Darkened Waters returns to Alaska

Six years after the spill, *Darkened Waters: Profile of an Oil Spill* is returning at last to Alaska.

In June of 1989, staff at the Pratt Museum in Homer prepared an exhibition about the *Exxon Valdez* oil spill that quickly became the museum's most visited attraction.



At the urging of hundreds of visitors from other parts of the U.S. as well as Alaska, the Pratt staff built a second exhibit which has since toured the nation. The original traveling exhibition premiered at the Oakland Museum in June, 1991.

The Pratt Museum has won national acclaim for *Darkened Waters*, which was awarded the Museums Alaska Award for Excellence in 1991.

Since June of 1991 the exhibition has traveled to 11 major venues, including the Smithsonian Institution's National Museum of Natural History in Washington, D.C.

The exhibit will tour Alaska for seven months:

Nov. 1-Dec. 15, 1995:
Alaska State Museum, Juneau

Jan. 3 -Mar. 1, 1996:
Anchorage Museum of History and Art

Mar. 20 - May 30, 1996:
University of Alaska Museum, Fairbanks

The exhibition may keep traveling as interest in the subject matter remains high.

For more information on the itinerary of *Darkened Waters* following its Alaska venues, contact Mike O'Meara at the Pratt Museum, 3779 Bartlett Street, Homer, AK 99603, telephone at 907/235-8653.

Three hired in spill area villages to aid info exchange

The village councils of Chenega Bay, Tatitlek and Port Graham have each hired a local resident on a part-time basis to aid information exchange with the Trustee Council. The facilitators will assist in community outreach, including communication of traditional knowledge and local interests, between the villagers, the Trustee Council and scientists participating in restoration efforts.

In addition, the local facilitators will coordinate local support and equipment for researchers working on *Exxon Valdez* oil spill restoration projects in or near their communities.

Mike Eleshansky in Chenega Bay, Gary Kompkoff in Tatitlek, and Walter Meganack, Jr. in Port Graham will be the primary contact persons in their communities for oil spill restoration projects. This program is funded by the Trustee Council and coordinated through the Subsistence Division of the Alaska Department of Fish and Game.

Walter Meganack, Jr. (left), Gary Kompkoff and Mike Eleshansky met with Trustee Council staff and scientists in July to prepare for their roles as local facilitators. Photo by Rita Miraglia.

For information contact:

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