

Exxon Valdez Oil Spill
Restoration Project Annual Report

Youth Area Watch Program

Restoration Project 98210
Annual Report

This annual report has been prepared for peer review as part of the *Exxon Valdez* Oil Spill Trustee Council restoration program for the purpose of assessing project progress. Peer review comments have not been addressed in this annual report.

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Study History: The project effort was initiated as part of a detailed study plan in 1996 and is in its third year. The objective of the project is to involve the youth of Prince William Sound and Seward in research funded by *Exxon Valdez* Oil Spill Trustee Council.

Abstract: The project involved students from the Chugach School District, Cordova, Seward, and Valdez in current research and restoration projects funded by the *Exxon Valdez* Oil Spill Trustee Council in Prince William Sound (PWS) and Resurrection Bay. The restoration projects that utilized students were: (1) Restoration Project 98195: blue mussel collection and pristane hydrocarbon analysis, (2) Restoration Project 98244: harbor seal biosampling, (3) Restoration Project 98320M: oceanographic water testing and meteorological data recording, (4) Restoration Project 98320T: juvenile herring age/weight/length analysis and (5) Restoration Project 98273: surf scoter satellite tracking. Student involvement was from Cordova, Chenega Bay, Hinchinbrook Island, Seward, Tatitlek, Valdez and Whittier. Two half time project coordinators attempted to meet the diverse needs of these seven groups of students. Project involvement increased the awareness of youth regarding the effects of the oil spill and encouraged their involvement in subsistence, research and initial restoration processes. The guiding principle of this project is that the success of long-term effective restoration is dependent on youth involvement. The leadership of today's youth will be integral to restoration and subsistence for the future. The support of students within PWS is needed to insure that adequate subsistence and restoration are continued in the future.

Key Words: Blue mussel, Chenega Bay, Cordova, *Exxon Valdez* oil spill, harbor seal biosampling, Hinchinbrook Island, juvenile herring AWL (age-weight-length), meteorology, oceanography, Prince William Sound, pristane hydrocarbon, restoration, Resurrection Bay, Seward, subsistence, surf scoter, Tatitlek, Valdez, Whittier.

Project Data: (will be addressed in the final report.)

Citation:

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EXECUTIVE SUMMARY

The Chugach School District involved community youth with local (especially site specific) research, subsistence, and restoration. They provided the youth with the scientific skills and responsibilities necessary to conduct individual and community research. The students participated in various research projects associated with, and funded by, *Exxon Valdez* Oil Spill Trustee Council. This included the cooperative work with various research agencies and principal investigators. Students were given the opportunity to participate in all projects identified within this report. The coordinators facilitated training and communication for involved youth. The coordinators also served as day-to-day liaisons between the scientists that served on the bigger projects and the students that provided, or helped provide, information to those larger projects. The students took the skills that were learned through their involvement with these projects and incorporated them into restoration activities for their school, community and region.

INTRODUCTION

The program entitled "Youth Area Watch" is comprised of school enrolled youth (grades 6-12) of the Prince William Sound and Seward region. Through the Trustee Council's efforts and funding, these students have gained an increased knowledge and responsibility for the Sound's ecosystem. The Alaska SeaLife Center in Seward, nearing completion, will ensure increased local involvement in these and related projects. The students in Youth Area Watch have been given the opportunity by the Trustee Council to become more involved with scientific research in their communities. These experiences will help prepare them for assuming more active roles in subsistence and the restoration effort.

The Prince William Sound Science Center, the Alaska Native Harbor Seal Commission, the University of Alaska Fairbanks SEA Grant and Marine Advisory Program, the Institute of Marine Science, and the Auke Bay Laboratories conducted by NOAA in Juneau, have been involved with the Chugach School District to insure continued successful implementation of the Youth Area Watch program. These agencies allowed students from Chenega Bay, Cordova, Hinchinbrook Island, Seward, Tatitlek, Valdez and Whittier to be a part of their current research projects.

The students have continued to develop an awareness, during the 1997/98 school year, of many of the research projects in the oil impacted region of Prince William Sound and Resurrection Bay. They also have had the opportunity to work in conjunction with the principal investigators of the above mentioned agencies on research projects dealing with identified injured or endangered resources.

OBJECTIVES

Twenty-nine students and six site coordinators were chosen from the Chugach School District, Cordova, Valdez, and Seward. They participated in training and the subsequent research that was identified by the grant and is listed below. Each of the sites involved had students help collect data that was used by the on-going research projects. This data was also used to provide a base of understanding that allowed students to draw their own conclusions on the information that was gathered. The involvement was limited to the projects which are summarized as follows:

1. Pristane/blue mussel analysis, Project Number 98195.

This project was conducted by the Prince William Sound Pristane-Mussel Monitoring Program at the Alaska Fisheries Science Center, Auke Bay Laboratory, 11305 Glacier Highway, Juneau, AK 99801-8626. The principal investigators were Jeff Short and Pat Harris, both from the Auke Bay Laboratory.

Blue mussels were collected by Pat Harris and the Youth Area Watch students throughout the Sound and Resurrection Bay to measure their pristane concentration levels. Pristane is a hydrocarbon made by *Neocalanus* and *Calanus* copepods. It is thought that the copepods use pristane to help maintain their buoyancy in seawater. When these copepods are abundant in the spring, many fish and birds feed on them. The pristane in the copepods transfers to the predators when the copepods are eaten. Pristane is also released in feces of predators into the water. Mussels may then ingest the pristane in these feces as they filter water during feeding. It is Jeff Short's hypothesis that areas in Prince William Sound which contain mussels with high pristane concentrations are near important feeding habitats for many marine animal species, especially juvenile pink salmon and herring. By sampling mussels and measuring their pristane concentrations, the investigators can identify the timing, locations and intensity of plankton blooms in the Sound.

The scientists are also trying to understand the transfer of energy in the food web through the Prince William Sound ecosystem. The copepods are near the bottom of the food chain. A plentiful zooplankton supply helps insure healthy populations on the higher trophic levels. More copepods means more energy available for fish, birds and mammals. Hatcheries monitor plankton abundance to help decide when to release fry, and knowing the pristane levels in mussels can help that effort.

The only biological sources of pristane in Prince William Sound are the *Neocalanus* and *Calanus* copepods. Since pristane is a chemically stable compound that concentrates in fat deposits, it is easily transferred through all of the levels of the food chain. Therefore, pristane can be used as a "tracer" of energy from the copepods through the ecosystem. The ultimate goal of this research is to understand some of the natural factors which control the fish, mammal and bird populations in Prince William Sound by studying the energy flow through the ecosystem. Analyses of pristane in mussels is a way to see how much of this energy flows through the lower levels of the food web.

Students collected mussels along a 20 meter transect once or twice per month (depending on a schedule established by Pat Harris). Twenty mussels were collected during each collection and were placed in a collection bag with water. They were then labeled, frozen, and stored until picked-up or shipped. The students were provided Ziplok bags and labeling tags.

2. Harbor Seal management and biosampling, Project Number 98244.

This project was conducted by the Alaska Native Harbor Seal Commission, the Alaska Department of Fish and Game, the National Marine Fisheries Service, and the University of Alaska Sea Grant. The principal investigators were Vicki Vanek (Alaska Department of Fish and Game) and Monica Riedel (Executive Director of the Alaska Native Harbor Seal Commission).

Seals in certain geographic areas of Alaska appear to be healthy, and their numbers are stable or growing. But in several areas of Alaska, especially the Prince William Sound and Kodiak

regions, there are far fewer harbor seals now than there were 20 years ago. The principal investigators are making an attempt to determine the cause of the declines and possible methods for promoting recovery. They are collecting data to determine factors contributing to the decline. Possible factors include disease, inadequate food supply, high pup mortality rate, and low birth rates. Comparison of seals in different areas gives a better understanding and offers possible conclusions to the hypotheses set forth.

Seal hunters from various communities in the Aleutians, Bristol Bay, Kodiak area, Prince William Sound, and the Southeast were working with researchers to answer questions about the health of Alaska's harbor seals. They collected measurements and samples from subsistence harvested harbor seals so that researchers (from National Marine Fisheries, Alaska Fish & Game, and the University of Alaska) working together could study and compare the health of harbor seals around the state.

Samples from different parts of the seal were collected for different reasons. The skin was used for genetic studies to determine stock identity and to understand how closely related harbor seals are in different parts of the state. The blubber was used for fat analysis. This helps to learn about a seal's diet and the health of their energy stores. Also, testing was done to determine if certain contaminants were present. The teeth were used to learn exact age. The whiskers were used for stable isotope studies. This provides information about large scale changes in the diet. The stomach contents were sampled to determine recent diet. The skull was used for morphometric studies. The liver, heart, and kidney were used to determine the health of the seal and certain contaminant levels. The measurements and weights were used to study growth and body condition.

Hunters and the respective students from each village or sampling site had one set of spring scales, data forms, small bag labels, magic markers, measuring tape, Ziplok bags, rulers, and a very sharp knife. Sampling generally occurred about once a month if subsistence hunting was taking place in the community.

3. Oceanographic and meteorologic data collection, Project Number 98320M.

This project was conducted by Shari Vaughan, physical oceanographer for the Prince William Sound Science Center.

Physical oceanography activities consisted of semiweekly readings of temperature and salinity from 0, 5 and 10 meter depths at each site. The numerical data was determined using LaMotte oceanographic kits. The meteorologic data consisted of daily temperature, barometric pressure, wind direction and speed, and precipitation accumulation. The numerical data was read from digital weather stations set up at each site. Meteorologic and oceanographic data was posted on the Youth Area Watch web site.

Results from CTD data collection from transects across the Sound are in the process of being finalized for publication by Dr. Shari Vaughan, Oceanographer, Prince William Sound Science Center, Cordova.

4. Juvenile herring monitoring, Project Number: 98320T.

This project was conducted by Evelyn Brown and Kevin Stokesbury, Chief Scientists, Juvenile Herring Project, Institute of Marine Science, University of Alaska, Fairbanks.

The Youth Area Watch students were present with the principal investigators during a three-day long herring cruise in Simpson and Zaikof Bays. The students learned about the hypotheses set forth by various principal investigators working on the juvenile herring project. Data was collected in October 1998 and allowed the students to perform AWL processing and arrive at conclusions concerning the age classes and the hypotheses concerning the herring depletion in the Sound. Students were only able to participate in one cruise during this school year as this project was at the end of its funding cycle.

Results from the juvenile herring study are in the process of being finalized for publication by Evelyn Brown and Kevin Stokesbury, project leaders, Marine Advisory Program and the University of Alaska, Fairbanks.

5. Surf scoter satellite tracking, Project Number 98273.

This project was conducted by Dan Rosenberg of Alaska Department of Fish and Game.

This project was designed to study the life history and ecology of surf scoters that overwinter in Prince William Sound. This was accomplished by capturing birds in the spring and implanting them with light-weight radio transmitters. These transmitters allowed the birds to be tracked by satellite for up to one year. Only a small number of birds were implanted with transmitters (approximately 10). A larger number of birds were banded. Another portion of this project was the gathering of traditional ecological knowledge about surf scoters and other sea ducks. Youth Area Watch students took an active role in this part of the project by interviewing community members. Students were unable to participate in a cruise to capture birds due to adverse weather conditions.

METHODS

The project coordinators were Jennifer Childress and Joshua Hall. The coordinators developed a protocol in conjunction with the research project scientists: Kevin Stokesbury, Evelyn Brown, Shari Vaughan, Pat Harris, Jeff Short, Monica Riedel, Vicki Vanek, and Dan Rosenberg. The protocol established data collection, analysis and sampling techniques, cruise schedules, training sessions and lab visitations.

An application process determined which twenty-nine students within Prince William Sound and Seward would be selected by the Chugach School District. The selectees participated in the complete year, which was the third year for the Youth Area Watch project. There were four students selected from Tatitlek, three from Chenega Bay, one from Hinchinbrook Island, four from Whittier, four from Valdez, five from Cordova, and eight from Seward. Detailed training was provided to develop and satisfy the protocol which was necessary for the research involved in each project, both onshore and offshore. The onshore data collection was conducted near the respective community sites of Tatitlek, Chenega Bay, Whittier, Seward, Cordova, Valdez, and Hinchinbrook Island throughout the year. Offshore research was undertaken during strategic times of the 1997-1998 school year based on schedules of times and locations of the principal investigators.

The Youth Area Watch project developed sound research and analytical skills for the students. To insure the proper training, the students were given guidance throughout the project period. Intensive training periods were provided by the Alaska Harbor Seal Commission; Alaska Department of Fish and Game; the University of Alaska, Fairbanks; the Prince William Sound

Science Center; and The Auke Bay Laboratory (NOAA). The student participants were involved in two large-scale cruises as part of an overall ecosystem research training session. Both cruises were aboard vessels chartered through Kenai Fjords out of Seward. Small boats or skiffs from local communities were utilized for local restoration projects throughout the year.

The original memorandum of understanding was continued between each research principal investigator and the Chugach School District. This had been written by the project coordinator during the first year. The MOUs served as the work plan and as an agreement of expectations between the investigators and the students, with the roles and responsibilities of each. An MOU was established with Dan Rosenberg for the surf scoter project initiated in this project year.

The Chugach School District coordinated the efforts of the students with that of the science research centers mentioned above to provide an intensive training period during which the students, the coordinator, and the teachers became familiar with the data collection protocols specified by the principal investigators. The Youth Area Watch students compiled their data into a spreadsheet or database format. The scientists and coordinators involved with Youth Area Watch reviewed the data and conclusions filed by the students at the end of the collecting period. At that time, the students' work was analyzed, and feedback was given to reinforce potential findings and explanations. Students were also required to use the knowledge and skills gained from working with the project scientists to design and initiate local research/restoration projects.

Written or oral reports on individual or site research, data collection, procedures, analysis, and conclusions were made by the students at the final Youth Area Watch cruise session in May.

RESULTS AND DISCUSSION

Students and site coordinators were selected during the last week of September, 1997. They received protocol training during an intense session during the first cruise in October 1997 as well as at different times during the school year based on numbers that were manageable and time allotted to correspond with the principle investigator's agenda. All sites participated in daily or weekly data collections. The *Glacier Explorer*, *Kenai Fjords*, *Auklet* and *Sound Access* were the vessels chartered by Restoration Project 98210 funding. These vessels were used for intensive protocol training of students and coordinators as well as site restoration activities.

Aircraft were chartered from Fishing & Flying out of Cordova for the training received from Pat Harris for the blue mussel collection. This was designed as an introduction into mussel collection techniques for those Youth Area Watch students who were not part of the program the previous year. Pat Harris made every attempt from that training session forward to include any student(s) from all sites that were on her collection route during the months of March through May. The students and coordinators then attended one of two laboratory sessions at Auke Bay Laboratories in Juneau. These sessions took place between April 15 and April 18. The 8-hour involvement at the lab included instruction in gas chromatography, qualitative and quantitative analysis of the hydrocarbon pristane (from the blue mussels they had collected), and age class determination of mussels through shell cross section analysis. The lab exercises equaled or went beyond what the students would have experienced in many of the better universities. Presentations were also made by Jeff Short and Pat Harris (the principal investigators) on their hypotheses regarding pristane through the food chain and its relationship to other population and energetic studies.

Blue mussels were also collected at all sites, frozen, and stored until shipment to the Auke Bay Laboratories. The sampling did not start until mid-February, 1998, and students collected at their sites for the remainder of the school year. At least one representative from each site collected throughout the summer to assure meaningful data for the principal investigators.

The Glacier Explorer was used for one cruise on which students worked with Kevin Stokesbury and Shari Vaughan in conjunction with the herring and oceanographic studies. Herring studies were conducted aboard the Kyle David. Oceanographic data (CTD) was collected aboard the Miss Kaylee. Because of limited space and time, not all students were able to participate in these collection processes. However, all sites did collect local oceanographic data (salinity and temperature) at specific depths (0 meters, 5 meters, and 10 meters). This data was collected twice a month and was submitted to the project coordinators for posting on the Youth Area Watch web site.

Weather records (barometric pressure, relative humidity, maximum and minimum temperatures, wind speed, and precipitation) were maintained daily during the school days. These records were also distributed to the project coordinators for posting on the Youth Area Watch web site.

Students and coordinators from Chenega Bay, Tatitlek, Valdez, Cordova and Seward attended one of two harbor seal biosampling trainings occurring in Valdez and Seward. The training in Seward took place on October 9-10, 1997. The training in Valdez took place on October 13-14, 1997. The objectives of the project and the biosampling procedures were presented by Vicki Vanek (Alaska Department of Fish and Game) and Monica Riedel (Alaska Native Harbor Seal Commission). Tatitlek, Cordova, Chenega Bay and Valdez had hunters who provided seals for biosampling at different times throughout the year. Students in Seward were unable to locate a hunter who was able to provide them with samples. The results of the data are being compiled by Vicki Vanek.

Dan Rosenberg (Alaska Department of Fish and Game) presented the scope and sequence of his surf scoter project to the students in Tatitlek. Students interviewed elders in the community to ascertain traditional ecological knowledge about surf scoters and other sea ducks. Students were unable to participate in a cruise in April with Dan Rosenberg due to adverse weather conditions.

Students from each community (Chenega Bay, Cordova, Seward, Tatitlek, and Whittier) designed and implemented a local research or restoration project. These projects were chosen based on their alignment with Trustee Council goals and student interest. The projects varied from site to site. Students in Chenega Bay built a community greenhouse and worked to educate the community on ways to use compost. Students in Cordova chose a local beach to clean in conjunction with the Center of Marine Conservation refuse analysis project. The *Auklet* was chartered in conjunction with this project. Seward students also participated in the refuse analysis project and cleaned three local beaches (Bulldog Cove, Fourth of July Beach, and Seward Beach). Additionally, students in Seward worked with the State Park Service to count murre carcasses on Seward beach. This project was conducted to help quantify the effects of the murre die off that occurred in the spring of 1998. Tatitlek students began the restoration of a local pond that was polluted with refuse including oil barrels and scrap metal. Students in Whittier began a long-term project monitoring the black-legged kittiwake colony on Passage Canal. These students made weekly trips to the colony aboard the Sound Access to record the