*Exxon Valdez* Oil Spill
Restoration Project Annual Report

# Youth Area Watch Program

Restoration Project 97210
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 second year. The objective of the project to involve the youths of Prince William Sound and Seward in research funded by the *Exxon Valdez* Oil Spill Trustee Council.

**Abstract:** The project involved students from the Chugach School District in current restoration projects funded by the *Exxon Valdez* Oil Spill Trustee Council in Prince William Sound and Resurrection Bay. The restoration projects with which students were involved included: (1) Restoration Project 97195: blue mussel collection and pristane hydrocarbon analysis, (2) Restoration Project 97064: harbor seal biosampling, (3) Restoration Project 97320M: oceanographic water testing and meteorological data recording and (4) Restoration Project 97320T: juvenile herring age/weight/length analysis. Student involvement was from Tatitlek, Chenega Bay, Whittier, Hinchinbrook Island, Seward, Valdez, and Cordova. A project coordinator employed by Chugach School District supervised students and coordinated activities between scientists and students to bridge the gap between hard scientific research and meaningful application of project activities. These projects 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; therefore, with the support of students within PWS, the future responsibility of adequate subsistence and restoration can be carried on under their ownership.

**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, Tatitlek, Valdez.

**Project Data:** (will be addressed in final report)

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## EXECUTIVE SUMMARY

The Chugach School District involved community youth with local (especially site specific) research, subsistence, and restoration, and provided the scientific skills and responsibilities to conduct individual and community research at their sites. The students participated in various research programs associated with, and funded by, EVOS restoration projects. These included the cooperative work with various research agencies and principal investigators in an attempt to develop a working database. Students were given the opportunity of participating in all such projects identified within this report. The coordinator served as the day-to-day liaison between the scientists that served on the bigger project and the students that provided, or helped provide, information to those larger projects. The students took the skills that were learned from these projects and made plans to incorporate them into restoration activities for their school, community and region during the 1997-98 school year.

## INTRODUCTION

The program entitled "Youth Area Watch" is comprised of school enrolled youth (grades 5-12) of Prince William Sound and Seward region who have gained, through the Trustee Council's efforts and funding, a knowledge and responsibility for the Sound's ecosystem to ensure that restoration provides for an adequate subsistence lifestyle in their future. The Seward Sealife Center, nearing completion, will ensure increased local evolvement in these and related projects. The Youth Area Watch has been given the opportunity by the Trustee Council to become more involved with scientific research and their community to prepare the region 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 by allowing the students from Tatitlek, Chenega Bay, Whittier, Hinchinbrook Island Cordova, Seward, and Valdez to be a part of their current research projects.

The students have continued to develop an awareness, during the 1996-97 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-five students and seven 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 the principal investigators as current research programs that require increased data to conclude

various hypotheses developed by various experts in each field. The students and their site coordinators were an integral part of the Youth Area Watch project which was initiated by the approved research listed below. Each of the sites involved had students help collect data that was used by the on-going research projects, and 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 specified in the approved grant: Project Number 97210, which are summarized as follows:

1. Pristane/blue mussel analysis, Project Number 97195. 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. 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 they 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 tropic 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 throughout the ecosystem. Analyses of pristane mussel beds 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 the minimum tides and a schedule established by Pat Harris). Twenty collected mussels, per collection period, were placed in a collection bag with water, froze, labeled, and stored until picked-up or shipped. The students were provided

Ziplok bags and labeling tags. The Seward High School and Elementary School were actually utilized during and after school by the Institute of Marine Science, under the guidance of A.J. Paul and Ruth McDonald, to derive data for energetics conducted at the Institute's facility.

2. Harbor Seal management and biosampling, Project Number 97244F. 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 Kate Wynne (University of Alaska Sea Grant), Vickie Vanek (ADF & G), and Monica Riedel (President of the Alaska Native Harbor Seal Commission).

Seals in certain geographic areas of Alaska appear to be healthy and their numbers stable or growing. But in several areas of Alaska, especially the Chugach 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 what would help them recover . They are collecting data to answer question like: were they diseased? was there not enough food? were they having fewer pups? would the decline spread? could help be available for them to recover? Comparison of seals in different areas give a better understanding and offer possible conclusions to the hypotheses set forth.

Seal hunters from various communities in the Aleutians, Bristol Bay, Kodiak area, Chugach 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 for genetic studies to pick stock identity and to understand how closely related harbor seals are in different parts of the state. The blubber was for fat analysis. This helps to learn about a seal's diet and how good are their energy stores. Also, testing is done to determine contaminant testing such as DIOXIN. The teeth were to learn exact age. Teeth are sectioned and there are rings inside that can tell the exact age. The whiskers were for stable isotope studies. This helps to learn the changes in the diet. The stomach was sampling contents. The skull was for morphometric studies. This helped to determine types of seals, their sizes relations, etc. The liver, heart, and kidney were to help determine the health of the seal and certain contaminant levels. The measurements & weights were to study growth and body conditions.

Hunters and the respective students from each village or sampling site had one set of spring scales to weight the seal, data forms, small bag labels, magic markers, measuring tape, Ziplok bags, rulers, and a very sharp knife. The hunts were best performed once per month and the seals delivered to the school where sampling could take place. This occurred only at the site where subsistence hunting was taking place.

3. Oceanographic and meteorologic data collection. Conducted by Shari Vaughan, physical oceanographer for the Prince William Sound Science Center, the students learned the basic essentials of physical oceanography and meteorology.

Physical oceanography activities included the basic oceanographic features such as semiweekly readings of temperature, salinity, alkalinity, conductivity, carbon dioxide content, pH, and dissolved solids from various depths and the same location. The numerical data was determined calibrated analysis using LaMotte's Oceanographic Kits. Students also collected a few zooplankton samples, but were not used as part of the on-going SEA biological oceanographic research. The meteorologic data consisted of temperature minimums and maximums, relative humidity, barometric pressure minimums and maximums, wind direction and speed, and rainfall accumulation. The numerical data was read from digital weather stations set up at each 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. 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 week-long herring cruises in Simpson, Zaikof, Eaglek, and Whale Bays. Fish monitoring was also accomplished at Tatitlek in Boulder Bay. The students learned about the hypotheses set forth by various principal investigators working on the juvenile herring project. Data was collected from October 1996 until the middle May 1997 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.

Monitoring of herring by the students with variable mesh gill nets and hoop nets was accomplished on an average of once each month. Due to the amount of time away from classroom, field time was limited. The data included species composition, number of fish caught, age, weight, length, stomach contents and analysis of scales. Ninety-eight percent of the herring gill-netted were adults. The AWL's for adults were submitted to the principal investigator, but little of the data was usable due to the age of the herring (age was beyond limits for study).

As during the previous year, the Chenega Bay Youth Area Watch students were too young and not physically able to pull the gill nets up and onto the new ferry dock. Therefore, no data was collected from these sites. Those students, however, were available to attend the cruises for training and data collection.

Results from the juvenile herring collection data collected from the quadrants under study in the Sound 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.

## METHODS

The project coordinator originally hired by the Chugach School District is identified as the same as the previous year. The coordinator developed a protocol in conjunction with the research project scientists: Kevin Stokesbury, Evelyn Brown, Shari Vaughan, Pat Harris, Jeff Short, Monica Riedel, Dan Gillikan, and Kate Wynne. The protocol established data collection, analysis and sampling techniques, cruise schedules, training sessions and lab visitations.

The application process determined which twenty-five students within the Prince William Sound and Seward would be selected by the Chugach School District. The selectees participated in the complete year, which was the second year for the Youth Area Watch project. There were four students selected from Tatitlek, three from Chenega Bay, one from Hinchinbrook Island, two from Whittier, five from Valdez, four from Cordova, and six 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 1996-1997 school year based on schedules of times and locations of the principal investigators. The onshore times and locations were determined by convenience and availability to the students and their site coordinator.

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; the University of Alaska, Fairbanks; the Prince William Sound Science Center; The Auke Bay Laboratory (NOAA), and the Chugach National Forest Service.

The student participants were involved in at least two of three cruises as part of an overall ecosystem research training session. The three were conducted on board the *Pacific Star.* Small boats or skiffs from local communities were not utilized because of insurance liabilities or unavailability.

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 MOU's served as the work plan and as an agreement of expectations between the investigators and the students, with the roles and responsibilities of each.

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 information into a spreadsheet or database format. The scientists involved with the Youth Area Watch reviewed the data and conclusions filed by the students at the end of the collecting period. At that time, the student's work was analyzed, and feedback was given to reinforce potential findings and explanations.

Written or oral reports on individual or site research, data collection, procedures, analysis, and conclusions were made by the students at their sites during the last month of the school year. These were submitted to the project coordinator.

The information gathered is now being used to help continue the implementation of restoration projects at the local level during the 1997-1998 school year by the participating sites and will be consistent with the Exxon Valdez Oil Spill restoration plan.

## RESULTS and DISCUSSION

Students and site coordinators were selected during the last week of September, 1996. They received their protocol training at different times during the school year based on numbers that were manageable and time allotted to correspond with the principle investigator's agenda. The sites that were selected for daily or weekly data collections were Tatitlek, Whittier, and Seward. Other site varied based on project participation, time allotments, and weather. The *Pacific Star* and the *Kyle David* were the only vessels chartered by Project 97210 funding. The students and coordinators received most of the juvenile herring monitoring training aboard these two vessels. During the months of January through April of 1997, the Youth Area Watch students were actively participating with Kevin Stokesbury and Evelyn Brown taking juvenile herring samples aboard the *Kyle David* and the *Pacific Star.* These and other vessels were chartered by the Institute of Marine Science, University of Alaska, Fairbanks, which provided the opportunity for students to become familiar with acoustics and collecting procedures for CTD data. The collections were made at Simpson, Whale, Zaikof, and Eaglek bays. The data was distributed to various research sites where samples had been requested. The students are awaiting the results from all collection activities. The results will be submitted by the personal investigators for the juvenile herring monitoring at the end of this fiscal year.

Aircraft were chartered from Fishing & Flying out of Cordova for the training received from Pat Harris and 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 was on her collection route during the months of March through May. The students and coordinators then attended a laboratory session at the Auke Bay NOAA Lab at Juneau on April 11-12, 1996. Their 8-hour involvement at the lab included instruction in gas chromatography, electrophoresis, qualitative and quantitative analysis of the hydrocarbon Pristane (from the Blue Mussels they had collected), and parasitic exploration in the brains of salmon. The labs 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 pickup by one of the representatives from the Auke Bay Laboratory at Juneau. The sampling did

not start until mid-February, 1997, and students collected at their sites for the remainder of the school year and then at least one representative collected throughout the summer, corresponding to the planktonic blooms and increased feeding phases, to assure meaningful data for the Auke Bay Lab.

Oceanographic data (CTD) was collected aboard the *Bering Explorer* under the direction of Shari Vaughan. Because of limited space or the excessive time away from the classroom, not all students were able to participate in this collection process. However, all sites did collect their own data (salinity, pH, temperature, and dissolved solids) at their sites and at specific depths (0m, 5m, and 10m (if possible)). This data was recorded once a week or bimonthly, depending on site, and was kept at the site for the previous year's comparison, or it was sent to Chugiak High School to be placed on a web page which has a collection of such data from around the Prince William Sound and the Bering Sea.

With very few exceptions, weather records (barometric pressure, relative humidity, maximum and minimum temperatures, daily maximum and minimum wind speeds, average daily wind direction, and rainfall) were maintained daily during the school days. These records were also distributed to Chugiak High School for inclusion onto the web site.

Harbor Seal biosampling training was conducted in Cordova. The objectives of the project and the biosampling procedures were presented by Kate Wynne (Marine Advisory Program) and Monica Riedel (Alaska Native Harbor Seal Commission). The biosampling was performed by Vickie Vanek (ADF & G). The Tatitlek students were later asked to address the Alaska Native Harbor Seal Commission to dance and explain their part in the biosampling project. Tatitlek, Cordova, Chenega Bay and Valdez had hunters who provided seals for biosampling. The results of the data will not be available for at least one year from the end of this school year.

Stream restoration protocol was discussed and training accomplished by Dan Gillikin, Chugach Forest Service at Girdwood and Portage. Those students who had streams as their restoration project participated. Additional stream restoration training is scheduled for this year with the Chugach Forest Service.

Cordova High School Youth Area Watch students participated with David Scheel at PWSSC in radio-tagging octopus to increase their awareness in restoration of octopus around Orca Inlet.

The Seward students were involved with energetics at the Institute of Marine Science in Seward under the guidance of Judy McDonald and A.J. Paul. The students spent from one to five hours per week at the institute. The Seward daily newspaper published an article dealing with these students' research at the institute as well as their overall involvement with Youth Area Watch.

## CONCLUSION

The identified agencies: The Chugach School District, the Alaska Department of Fish and Game, the University of Alaska, Fairbanks, the NOAA Auke Bay Laboratories, the Prince William Sound Science Center, the Alaska Native Harbor Seal Commission, Chugachmiut and the Chugach Regional Resources Commission,

and the Youth Area Watch will continue to take an active role in the development of this project and the commitment to the future of local youth with the Prince William Sound. Without the participation of all parties, this project, as a whole, would not have been the success it was. The Youth Area Watch has not only involved itself with current scientific research, acquainted itself with chief scientists in Alaska, been involved with ongoing scientific hypotheses, but has also emphasized the need for meaningful involvement by oil impacted community youth.

It has been the intent through this project to combine and leverage current research funds with the aforementioned participating organizations resources. With the Chugach School District administering the Youth Area Watch Program through a contract with the Alaska Department of Fish and Game, the program will continue to sustain itself in subsequent years through the assistance of alternative funding sources.