Community Coastal Impact Assistance Program

Nushagak Bay Education and Research Project

Award Amount
$ 29,617

Grantee
University of Alaska Fairbanks Bristol Bay Campus, Bristol Bay Campus

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Location
This proposal focuses on expanding the Bristol Bay Environmental Science Lab's (BBESL) summer environmental programs that involve advanced high school and undergraduate college students. BBESL is located at UAF Bristol Bay Campus in Dillingham and has been involved in summer field research and educational activities in Nushagak Bay since 2006. These programs include field-based environmental studies that also train Bristol Bay students, interns in research techniques. The 2010 BBESL summer programs will concentrate on Nushagak Bay, an estuaries or transition zone between rivers and the ocean. Further, this project will develop an important GIS database for analysis of regional estuarine information collected in this project as well as data to be collected in future studies.

Project Duration
Project Start Date: March, 1,2013
Project End Date: May 31,2014

Project Description
This project will fund the Bristol Bay Environmental Science Lab (BBSEL) to further develop its summer environmental programs for advanced high school and college students. BBESL is located at UAF Bristol Bay Campus in Dillingham and has been involved in summer research and educational activities in Nushagak Bay since 2006. This education and research program will fit with BBESL's place-based scientific research and citizen science programs and will train local students and empower communities to start collecting important baseline data. This hands-on education and research program will focus on estuaries, the transition zone between rivers and the ocean. The field program will introduce advanced high school and college students from across Bristol Bay to some of the important tools used in environmental science and expose them to complex ecological topics not found in the traditional classroom setting. A range of baseline data will be collected and a GIS database will be developed to allow for the integration and analysis of regional estuarine information. Further, the program will involve rural and Alaska Native students in developing scientifically sound approaches that address local environmental issues in rural Alaskan communities.

The specific goals of this project are to:

- Collect needed baseline data on water quality, benthic habitats, and biodiversity to help to study trends in Nushagak Bay Nushagak Bay;
- Establish a GIS estuary database that includes water quality, species diversity, and habitat maps for Nushagak Bay;
- Teach the scientific method, data collection, and critical thinking skills to the region's high school and college students;
- Train 6-10 students in basic field research methods concentrating on estuaries;
- Involve 2-4 interns in significant research projects in Nushagak Bay that will continue in future years;
- Assist Nushagak Bay communities by promoting science careers and helping to create a rural job workforce;
- Increase the number of Rural Alaskans who obtain a certificate or degree in the sciences; and
- Educate Bristol Bay communities on the economic and environmental importance of estuaries.

This program is part of a larger environmental studies program at UAF Bristol Bay that brings together local organizations including the Togiak National Wildlife Refuge (US Fish and Wildlife Service), Bristol Bay Marine Mammal Council, Qayasiq Walrus Commission, Bristol Bay Economic Development Corporation, and Bristol Bay Native Association. Working with local organizations means that much of the knowledge learned will remain in the region. Estuaries, such as Nushagak Bay, are the mixing zones between seawater and nutrient-laden river water and provide habitat for commercially and ecologically important biota. Estuaries are among the most important coastal features in terms of ecology and economics since they comprise an important component of oceanic and riverine food webs. They are an integral component of coastal systems; they serve as spawning and nursery grounds for populations offshore and play important roles in geochemical and physical processes such as sediment reworking and flux of chemicals.

Villages and communities in Bristol Bay use estuaries as safe harbors for commercial shipping, fishing fleets, and recreational boating. They support marine mammals, birds, wildlife and the area's commercial, subsistence, and sport/recreation fisheries and provide nutrient cycling that is important to the ecosystem. Additionally, Bristol Bay estuaries have traditionally been used as convenient disposal sites for sewage and fish cannery waste as many have extreme tides that flush waste away twice a day, which over time will have an impact on coastal habitats and environmental conditions.

One component of the project will employ students and interns to collect needed ecological information in Nushagak Bay through collecting water quality data, macroinvertebrates and fish species abundance via trawling, and the use of transects that measure substrate type and analyze functional composition and structure of biota. It will provide both a valuable learning tool for students and interns as well as important ecological data. All information gathered will be made available to users and the public via a GIS database. These data can then be used as baselines to

answer question concerning biotic change due to factors such as local anthropogenic influences, climate change, or natural variations.

To fill some of the gaps in knowledge of the estuary, this project will also concentrate efforts on collecting traditional knowledge from the residents in the adjacent communities. Areas to be investigated will first be identified through interviews with elders asking where and how they have used specifies habitats. Congruently, a literature search will be done to see where other scientists have conducted research. This recent and historical survey data will be plotted using GIS to show what is known. Identification of priority search areas will be identified based on multiple factors including data gaps about the benthic habitat.

Measurable Goals and Objectives

The measurable goals of this project are as follows:

- 2-4 interns will work on projects at BBESL during summer of 2013 (depending upon when funding is received)
- Data collection (water quality, benthic fauna, shoreline vegetation, and habitat quality) in an important Bristol Bay estuary (for Nushagak Bay);
- 6 to 10 students will complete intensive one week field course;
- A database containing water quality, benthic fauna, sediments, habitat type for Nushagak Bay will be established; and
- A GIS database of estuarine data collected (in Nushagak Bay) will be developed.

In the short term, BBESL staff and students will analyze and interpret the data and write analysis reports during the week long course. Students will share results with community members and/or local K-12 students in the area at the end of the week. A follow-up course will further analyze the data into scientific format and will give students the opportunity to attend a regional science conference to present their findings. In the long term, data will be integrated with other data collected by BBESL in Bristol Bay to be published in a peer-reviewed scientific journal on the topic of the marine/estuarine ecology and natural history of Nushagak Bay.

CIAP Authorized Use

The activities outlined for this project are consistent with CIAP Authorized Use 1: Projects and activities for the conservation, protection, or restoration of coastal areas, including wetlands. This project will directly result in the conservation and protection of coastal areas by:

1. Collecting, analyzing and interpreting water quality, benthic fauna, shoreline vegetation, and habitat quality in Nushagak Bay will provide researchers with baseline data about the coastal environment as well as local trends and conditions. All the data will be included in a GIS database that will be available to local, state and federal government agencies. This data will allow researchers to track changes in coastal environments over time and will provide a basis for coastal management decisions that increase protection of these environments. This is especially important when responding to environmental accidents or large scale development proposals.
2. The students, local school classes and residents will have a better understanding of the environmental importance of the Nushagak Bay estuary, making them better stewards of

the coastal area by their communities. It will help motivate residents to increase conservation, protection and restoration of coastal areas throughout the region.