State of Alaska
Coastal Impact Assistance Program

December 2010 Amendment

APPENDIX B-1.2

Project Descriptions: Direct to State Funding

Publically Solicited Projects – Tier 1

State of Alaska
Coastal Impact Assistance Program
Direct to State Funding

Tier 1- Publically Solicited Projects		
Project ID Number	**Project Title**	**Spending Estimate**
AKCIAP_PUB_T1-01	Barrow Area Information Database (BAID) Decision Support Tools Development Project	$1,638,838
AKCIAP_PUB_T1-02	Campbell Creek Estuary CIAP Project	$1,300,000
AKCIAP_PUB_T1-03	Arctic Ecosystem Integrated Survey	$3,000,000
AKCIAP_PUB_T1-04	Net and Debris Removal in Key Locations in the Waters Associated with the Ketchikan Gateway Borough	$61,500
AKCIAP_PUB_T1-05	Bristol Bay Anadromous Waters Research & Protection	$834,350
AKCIAP_PUB_T1-06	Walrus Diets in Bristol Bay: Conservation Concerns and Environmental Monitoring	$454,253
AKCIAP_PUB_T1-08	North Road Pipeline Extension, Crossings for Salmon Streams	$647,689
AKCIAP_PUB_T1-09	Beluga Slough Trail Reconstruction to Restore Wetlands	$448,116
AKCIAP_PUB_T1-10	Circulation Studies of Kachemak Bay, Alaska using satellite-tracked drifters	$196,437
AKCIAP_PUB_T1-11	Alaska Clean Harbors: Educating for Long-term Pollution Reduction for Alaska's Harbors	$282,615
AKCIAP_PUB_T1-13	Alaska Marine Debris Removal and Assessment	$988,562
AKCIAP_PUB_T1-14	South Point Higgins Beach Acquisition	$778,380
AKCIAP_PUB_T1-15	Real Time Surface Current Mapping for Conserving and Protecting the Coastal Environment of the Western Alaskan Beaufort Sea	$715,715
AKCIAP_PUB_T1-16	Coastal GIS Module of the Southeast Alaska GIS Library	$239,966
AKCIAP_PUB_T1-19	Shakespeare Creek Restoration Project	$202,250
AKCIAP_PUB_T1-20	White Mountain River/Bay Clean-Up	$6,210

STATE OF ALASKA
COASTAL IMPACT ASSISTANCE PROGRAM

North Slope Borough

This project will be conducted on behalf of the State of Alaska. It was selected through an open competitive procurement process and in accordance with 3 AAC 196.

PROJECT TITLE: Barrow Area Information Database (BAID) Decision Support Tools Development Project

PROJECT CONTACT

Contact Name:	Ben Greene Special Assistant to the Land Management Administrator
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PROJECT LOCATION

900 sq km in the coastal zone in and around Barrow, Alaska, conveyed to the Ukpeagvik Inupiat Corporation under the terms of ANCSA. **See MN-1**. Barrow, the northernmost community in the United States, is located on the Chukchi Sea coast, 10 miles south of Point Barrow, from which it takes its name. It lies 725 air miles from Anchorage. The community lies at approximately 71.290560° North Latitude and -156.788610° West Longitude. (Sec. 06, T022N, R018W, Umiat Meridian.) Where the Beaufort and Chukchi Seas meet.

PROJECT DURATION

3 years

ESTIMATED COST

Spending Estimate ($)				
TOTAL	**Year 1**	**Year 2**	**Year 3**	**Year 3.5**
$1,638,838	$537,382	$543,381	$558,075	

All of the funding will be with FY 10 funding.

Funding per Allocation Year of CIAP ($)				
TOTAL	**FY 07**	**FY 08**	**FY 09**	**FY 10**
$1,638,838	0	0	0	$1,638,838

PROJECT DESCRIPTION:

Barrow's location, infrastructure, population, and history combine to make it the focal point of varied and intense impacts including rapid climate change, accelerated erosion, sociocultural and environmental impacts due to current and future gas and oil development.

The project area - adjacent to the OCS planning areas for the Beaufort and Chukchi Seas – see **MN-2** - is anticipated to be subject to accelerated impacts in coming years.
The overarching goal of the BAID Decision Support Tools Development project is to expand capacity for informed, multi-stakeholder environmental decision making on Ukpeagvik Inupiat Corporation lands in the coastal zone near Barrow, Alaska. Stakeholders include state and local governmental agencies, the Arctic research community, tribal entities, non-profit entities, the gas and oil industry, hunters, landowners, and members of the general public.

This project is a multi-agency collaboration which leverages the Barrow Area Information Database (BAID; www.baid.ims.org), the expertise of scientists who created BAID and have been active in the area for more than 15 years, as well as collaborative partnerships that span governmental, tribal, private sector, and scientific entities. See **MN-3** for Project Roles and Responsibilities.

Problems: 1. A comprehensive inventory of wetlands and erosion features about the project area is lacking. Although many data sources about portions of the study area already exist, they are piecemeal. Varying resolutions, myriad dates, conflicting methodologies, and incompatible database structures drastically reduce their usefulness in the conservation and planning process.

2. The Arctic research portal BAID (www.baidims.org) is a robust cyber-infrastructure which hosts many datasets about the project area, but its interface is both outdated and too complicated for lay-people to use. It also lacks decision support tools which would enable users to visualize and manipulate data for environmental impact mitigation and development planning purposes.

3. G.I.S. capacity – in the form of local expertise – is limited and inadequate to fulfill the needs of local land managers and policy makers to respond to a host of development planning and environmental impact mitigation issues.

The project will address these problems by following a three-pronged approach:

1. Satellite Imagery Acquisition and Mapping Component

Wetlands Features/ Coastal Erosion: High-resolution, multispectral satellite imagery of the entire project area will be acquired and used to analyze wetland vegetation and determine rates of coastal erosion. First, spectral depth and 50-cm resolution imagery will be processed to improve accuracy and usability in Year One of the project. Second, this imagery will be used to map wetlands and other vegetation types in detail. Third, mapping will be validated by field data collections in Years One, Two and Three of the project. See **MN-4** for a diagram of the process.

Attribute information on vegetation, geomorphology, soil and topographic parameters will be collected for all sampled sites. Field observation points, located by Differential Global Positioning System (DGPS), will then be used for classification of the imagery. The end result- in Year Three -- will be the first comprehensive, accurate map – **a geospatial data layer in the BAID geodatabase** – documenting project area coastal wetlands and ecosystems at high resolution.

For the erosion dataset, in addition to the work outlined above, a combination of historical survey data and erosion data from related projects will be extended and analyzed through Years One, Two, and Three of this project. These data include aerial photographs dating back to 1947 and coastlines that have been digitized from a range of imagery by a number of different studies in the region.

Ongoing monitoring along the Beaufort and the Chukchi Sea: Surveys of 84 miles of coastline within the project area (see key, **MN-1**) will be conducted twice per project year by the field data collection team to measure interannual rates of erosion with a Differential GPS. The coastline will be digitized from the high-resolution satellite imagery in Year One as described in the mapping portion of this project component. The data will be analyzed to calculate rates of change over Years One, Two, and Three of the project.

2. BAID Upgrades and Decision Support Tools Component –
BAID is accessible from any computer via the internet at http://baidims.org/. Internet users may view data and manipulate some of the data. The infrastructure and geodatabase are housed on servers at University of Texas at El Paso (UTEP). Under this project, geodatabases will be duplicated in Anchorage and Barrow to allow local stakeholders to print maps and create and model more complicated scenarios on their own, without having to rely on the scientists at UTEP who juggle a range of projects and deadlines. Putting this data and the decision support tools in the hands of local stakeholders will continue the benefits of this project beyond the length of the project.
The BAID online user interface – see **MN-5** for screen shot of current BAID -- will be upgraded and interactive mapping tools will be developed to enable online visualization and decision support for environmental problem solving in the region.

a. BAID Portal Access (i.e.; online viewing within a browser such as Internet Explorer or Firefox) and functionality will be enhanced and expanded for non-specialists with upgrades of user interfaces in Adobe Flex in Year One. See **MN-6** for diagram of this process. Development will follow an iterative process wherein a Local Users Advisory Group will attend 3 user feedback sessions per tool/upgrade. During these sessions the Local Users Advisory Group will work with project personnel to: (1) identify and prioritize management objectives; and (2) to present and receive feedback for a prototype application that includes decision support data and tools to examine suitability indexes, identify conflicts and alternatives.

b. The BAID central geodatabase (i.e.; the servers housed at UTEP which contain both UTEP maps/data and hosted maps/data from over 40 research and government entities (see **MN-7** for list) will be augmented through (see **MN-8** for visual representation of database expansion)

- New and continuing partnerships with diverse holders of data Years One, Two, Three
- The digitization and data entry of historical data including combined historical survey data and other erosion data dating back to 1947. Years One and Two
- Crosswalking BAID wetlands data-layers with nationally approved categories - such as the Army Corps of Engineers National Wetlands Inventory – Years One, Two, and Three.

c. Two BAID decision support tools will be developed: See **MN-9** and **MN-10**

- **Erosion Monitoring Tool,** accessible online, an interactive program which allows users to select and review multiple facets of erosion within the BAID browser window, including:
  a. Historical trends of erosion
  b. Predictive models that will portray where erosion is likely to continue
  c. Coastal permafrost active layer expansion.
  d. Likelihood of Polar bear dens impact/loss
  e. Predict potential flooding from storm surges (useful in planning department for suggesting people move houses, future subdivisions)
  f. Elevation data, extend Barrow floodplains mapping within the project area (MN-1)

- **Development Activities Situation Tool**, accessible online, an interactive program will allow users to review the following facets within the BAID browser window to aid community planners in designing sustainable, low-impact development.
  a. Legislatively protected areas.
  b. Endangered Species Habitats (Polar Bear, Spectacled Eider, etc)
  c. Wetlands
  d. Powerlines / Powergrids
  e. Waterlines
  f. Telecommunications
  g. Native allotments/ownership

Access to these tools via http://baidims.org/ will improve the capacity of land managers to respond to plans for proposed development, consider multiple scenarios, make informed decisions about environmental issues, and to dynamically visualize coastal impacts and consequences.

3. Local GIS and DGPS capacity and expertise component

This component will build local GIS data interpretation and DGPS data collection capacity as a powerful tool to effectively manage Barrow's delicate coastal area through increased and improved monitoring and protection. This will be achieved in six ways (a. b. c. d. e. f.).

a. Local GIS technicians will be recruited and will receive introductory training in GIS industry standard software from the Environmental Systems Research Institute (ESRI) and Trimble Geomatics Office. Following this introductory training, The GIS technicians will work side by side with experts in this highly technical field including Dr. Craig Tweedie, Allison Gaylord, Lars Nelson, a UTEP GIS Technician (tbd), and a UTEP Graduate Student obtaining their doctorate in environmental science and engineering (mentored by Tweedie). See **MN-11** for a visual depiction of project personnel. The goals of this work relationship are to dramatically speed the rate at which the local GIS technicians gain knowledge about the GIS field. – see **MN-12** for a visual representation of GIS training.

b. A local GIS seat (a powerful computer) and GIS software will be installed at Barrow and the BAID geodatabase will be mirrored by the North Slope Borough's subcontracted

Project Management GIS Engineering Firm at Barrow and Anchorage offices so that data entry efforts will not be duplicated and also so that GIS technicians gain hands-on experience carrying out the complex processes for assembling, entering and maintaining data.

c. GIS techs will accompany project scientists (UTEP field team) into the field for data verification and DPGS data collection to increase their understanding of the data collection/verification process in its entirety.

d. Over the course of the project, the GIS techs will be developed as Barrow points of contact while gaining broad knowledge of both the GIS process as well insight into how data issues interrelate and affect the interests of governmental entities, local management and industry.

e. Engineering Firm staff and GIS modeling experts will liaise with project collaborators to involve stakeholders, including local, state, and national entities from the beginning to the end of the project to produce a product that is the result of real people's needs based on their feedback.

f. A Decision Support Tools Handbook and community outreach module will be developed by Nuna Technologies and presented to a broad cross section of the Barrow community during the last year of the project. GIS personal will be trained to take the lead as point contacts for these resources.

Due to the highly technical and rapidly changing nature of GIS technologies and limitations of both resources and highly trained personnel, the North Slope Borough GIS division is currently being used to capacity addressing primarily issues regarding subdivisions and lease tracts for taxation purposes. By contracting this project to a GIS Engineering Firm - which has the expertise and partnerships with multiple scientific and governmental entities, including the NSB GIS department - we believe the current proposal will substantively assist to build community-wide GIS capacity while still retaining ties with and involving the NSB GIS division. This arrangement will both facilitate the completion of tasks as outlined in the current grant proposal and is consistent with and will contribute to current efforts within the NSB Planning and Community Services Department to rebuild NSB GIS capacity. The products of this project will allow users to query data on their own, freeing the time of community GIS technicians who are currently often tasked with retrieving this data in the form of maps for local land managers and policy makers.

Coordination with state and local entities: This project has the support of the State of Alaska Fish and Game Department, local tribal entity Native Village of Barrow, landowner Ukepagvik Inupiat Corporation, as well as the Alaska Ocean Observing System. In its current form, BAID is frequently accessed online by scientists, researchers and educators. The potential for use across local, state, federal, scientific and educational entities, as well as the general public is enormous. Once robust baseline data is collected, decision support tools are programmed, and the online interface is made simpler and more intuitive, we anticipate an exponential increase in use as the most comprehensive database about the area ever constructed will be available simply by typing http://baidims.org/ into a web browser.

Locally, the expansion of GIS capacity through the points mentioned in part 3 above give local stakeholders a way to access maps and information in a timely manner.

This project will complement approved CIAP State-Initiated Project #17: Imagery Base Maps and Elevation Models for Alaska Coastal Districts. The imagery form the BAID project will be of higher resolution than the coverage acquired in CIAP State-Initiated Project #17, and would help orthorectify the data from CIAP State-Initiated Project #17 (see attached email from Ed Fogels, Alaska Department of Natural Resources, Office of Project Management and Permitting, Director).

MEASUREABLE GOALS AND OBJECTIVES:

Project Goal 1: Collect and compile detailed wetlands features and erosion features data for the coastal area in and around Barrow. (see MN-1 for project area)
Annual Outcome Year 1: High resolution satellite imagery acquired and processed, field verification and collection 33% complete.
Annual Outcome Year 2: Field verification and collection 66% complete.
Annual Outcome Year 3: Field verification and collection 100% complete + Map layers complete: a series of high-resolution satellite image mosaics (less than 1m) covering the Barrow Peninsula in true color, black and white and color infrared; digitized historic aerial photos; high-resolution wetlands data crosswalked to national categories; derived erosion analysis.

Project Goal 2: Evolution of BAID from what is primarily an Arctic research and logistics tool to a much more intuitive platform with data and interface requirements focused on addressing the needs of local management objectives. The mirroring of UTEP databases at GIS Engineering Firm offices in Barrow and Anchorage will allow local users to manipulate large amounts of data, create maps, and answer questions for local policy makers.
Annual Outcome Year 1: BAID user interface rewritten in Adobe Flex.
Annual Outcome Year 2: BAID decision support tools 50% complete. BAID geodatabase augmented with historical data and increased partnerships.
Annual Outcome Year 3: BAID decision support tools 100% complete. BAID geodatabase augmented by comprehensive vegetation cover map, and wetlands features map and erosion features map.

Project Goal 3: Training of Local Stakeholders for the Implementation of BAID: Decision Support Tools, Handbook and community outreach module presented to Barrow stakeholders, including Planning and Community Services Department, Planning Commission and Borough Assembly, to increase community-wide independent use of BAID Decision Support Tools. **Annual Outcome Year 3:** Borough Planning and Community Services Department, Planning Commission and Borough Assembly implement BAID during the planning and permitting process.

PROJECT CONSISTENCY WITH CIAP AUTHORIZED USE:

The Project is consistent with CIAP authorized use number 1; *Projects and activities for the conservation, protection, or restoration of coastal areas.*

The project is consistent with CIAP authorized use #1 and will provide a direct benefit to the coastal environment through the conservation, protection or restoration of a coastal area

through the development of the first comprehensive, accurate map – **a geospatial data layer in the BAID geodatabase** – documenting project area coastal wetlands and ecosystems at high resolution.

This comprehensive and accurate high-resolution map is essential both as a valuable piece of baseline data, but also as a means to identify sensitive coastal areas highly susceptible to erosion. With this visual tool, the North Slope Borough will be able to better place its equipment and earth fill or man-made reefs to stave off the effects of wave erosion and changing water levels.

As baseline data, this map will be crucial to evaluating the future effects of erosion and climate change as well as possible oil spills.

As a planning tool, this map will allow the North Slope Borough to determine the least environmentally damaging (to coastal area and wildlife) development alternatives in response to off-shore lease activity (on-shore facilities, increased population, etc) and developing appropriate measures to protect the important coastal resources of the proposed project area from these diverse effects.

Another direct benefit to the coastal environment through the conservation, protection or restoration of a coastal area will be through the development of a layman-friendly BAID platform, publicly accessible via the internet. This platform and associated decision support tools will allow managers and policy makers to easily review hundreds of pieces of data about the complex and delicate coastal area and make informed decisions on coastal development, conservation priorities, endangered and subsistence species protection, and oil spill response.

The BAID platform and the accurate map of the project area, will make land use planning and zoning vulnerable areas for conservation much easier than the current processes which are often impeded by conflicting maps, data-mismatches, and the differing opinions of coastal features by land users.

Another direct benefit to the coastal environment through the conservation, protection, or restoration of a coastal area will be through the training of local stakeholders . who will be able to use the knowledge gained from these opportunities to continue the project work beyond the length of this grant. (by continuing to add new and evolving data to the BAID geodatabases, and by increasing community wide GIS knowledge.

The data and decision support tools developed from this project will be applied to the conservation and protection of coastal and wetland areas in the following ways:

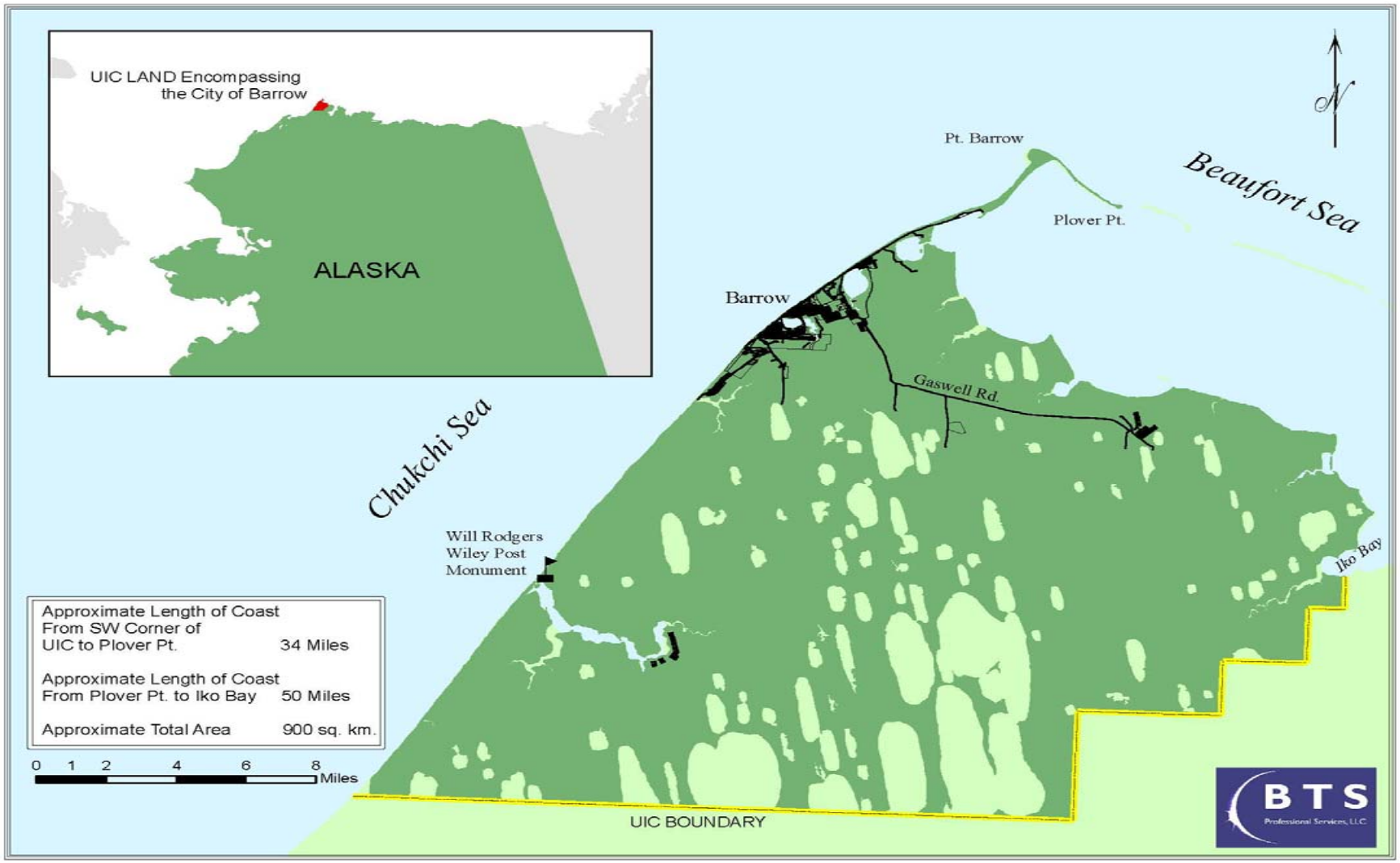
- Direct use in coastal planning, permitting and development. For the first time local, state and federal agencies will have direct access to imagery and data of the proposed project areas via an integrated format can be used to make informed decisions surrounding development projects, especially when the remote nature of Alaska's coastline impede adequate project review.
- Protecting endangered species through habitat modeling.
- Determining the placement of structures to avoid the effects of shoreline erosion.

- Accurate data will aid organizations like the National Science Foundation as they determine potential impact of climate change on the Arctic
- Use by Oil Companies and the North Slope Borough in determining the placement of oil spill response equipment so that critical coastal areas would be protected in the event of an oil spill.
- Determining the extent of shoreline damage after storm surges so that restoration needs can be assessed.
- Aiding the North Slope Borough Planning and Community Services Department, Planning Commission and Borough Assembly during the planning and permitting process to make decisions that will protect and conserve coastal areas and wetlands.

COORDINATION WITH FEDERAL RESOURCES OR PROGRAMS:
The project leverages the BAID (Barrow Area Information Database) research portal infrastructure which was initiated through a National Science Foundation grant and has subsequently been funded by a USGS Federal Geographic Data Committee as well as additional National Science Foundation grants. BAID has a collaborative relationship with BLM's North Slope Science Initiative – See **MN-13** as well as partnerships with diverse federal holders of data (see **MN-7**).

COST SHARING OR MATCHING OF FUNDS:
CIAP funds will not be used for cost sharing or matching purposes

MN-1 Project Area



MN-2 OCS Development Adjacent to the Project Area

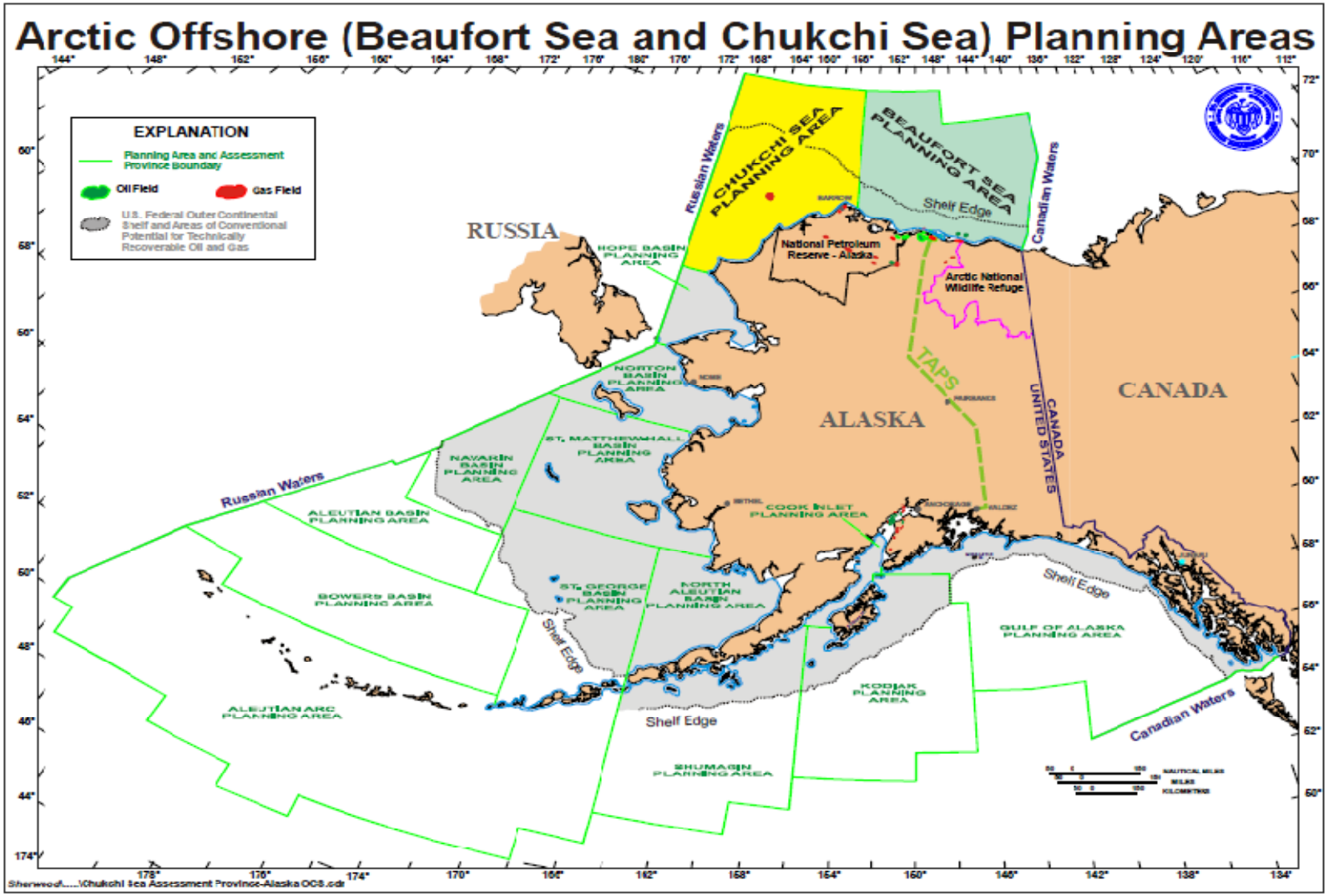


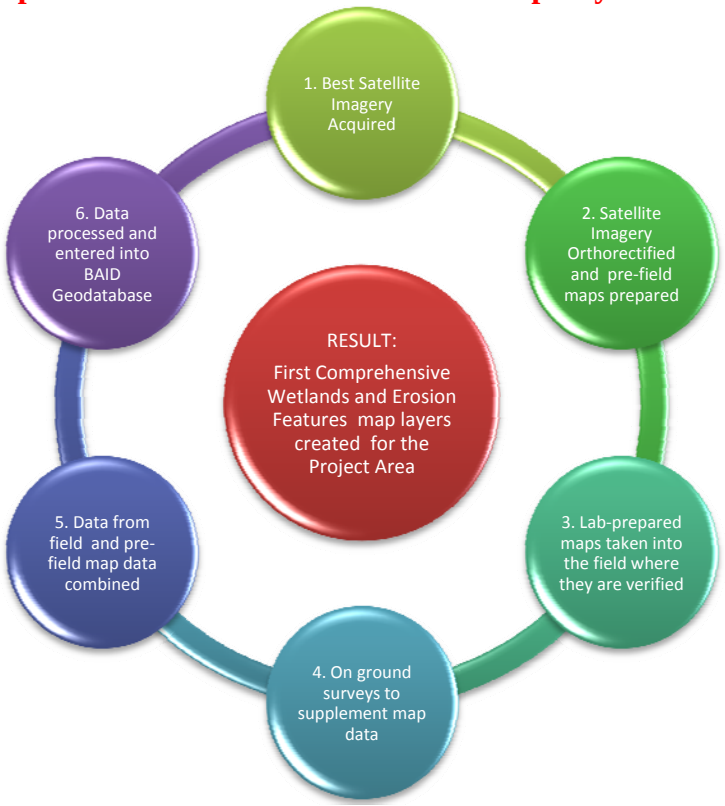
Figure 1. Locations of Beaufort Sea and Chukchi Sea Planning Areas and shelf-area assessment provinces.

MN-3 Project Roles + Responsibilities

North Slope Borough -- Project Oversight

Barrow Technical Services: (BTS)	University of El Paso Texas: (UTEP)	Nuna Technologies : (NunaTech)	INSTAAR LAB	UIC Science
• Project management / coordination • Local GIS Infrastructure • Recruiting and basic training of GIS technicians •Project logistical support (lodging, field transportation, etc) •Local knowledge of area, culture and relationships/parternships between entities (liasing services) •Mirroring of BAID data in Barrow and Anchorage •Low and mid range processing of data for BAID geodatabase	• Satellite imagery selection + acquisition • Scientific field verification and data collection •Intermediate to advanced BTS GIS technicain training •BAID geodatabase expansion oversight •Mid and advanced range processing of data for BAID geodatabase •BAID interface and decision support tools programming •Erosion analysis collaboration	• BAID interface and decision support tools concept and design (lead iterative agile software development) •Support for data analysis, synthesis and quality control. •Support for acquisition of hisotric data; training / template development for metadata and lead for data archiving. • Liasing / coordination with state and national partnerships / initiatives •Development of Community Outreach Module and BAID user documentation	- Lab orthorectification of satellite data - Preparation of field maps - Scientific Erosion analysis - Expert guidance and review of BAID interface and decision support tools	- Cultural resource identification and preservation - Atypical training plot identification (due to human rather than natural activity) - Pre-historical erosion discovery and analysis

MN-4 Comprehensive Wetlands and Erosion Map Layers

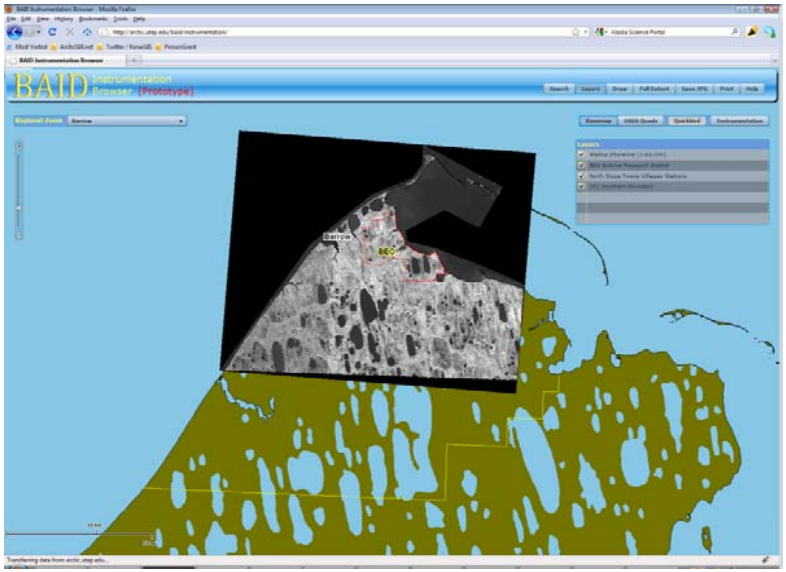


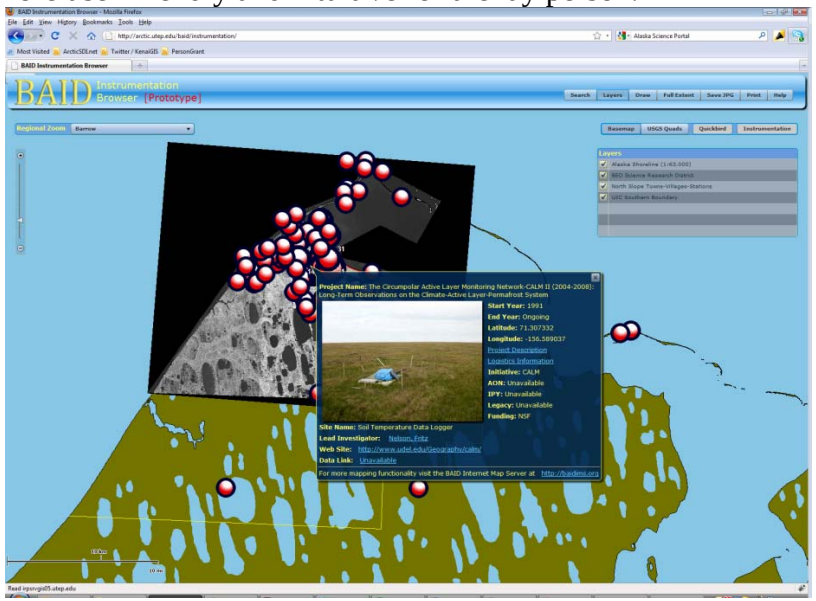
1. Satellites will take imagery of the area in July-August of the project years. Factors such as cloud cover and weather conditions will influence which imagery is chosen for this project. Secondary factor will be cost effectiveness.
2. Over several months, William Manley at the INSTAAR laboratory will transform the vendor-supplied product to one appropriate for detailed analysis of coastlines, wetlands, and other natural features.
3. The maps prepared at INSTAAR will be taken into field and verified by the field data collection team.
4. While in the field, additional surveys will be made to verify erosion, vegetation, topography, soils, and other features.
5. The verified map data, discrepancies and field-collected information discoveries will be combined in the first step of creating the map layer.
6. The data will be analyzed, digitized, run through quality control processes and finally entered into the BAID geodatabase.

MN-5 / Current BAID screenshots

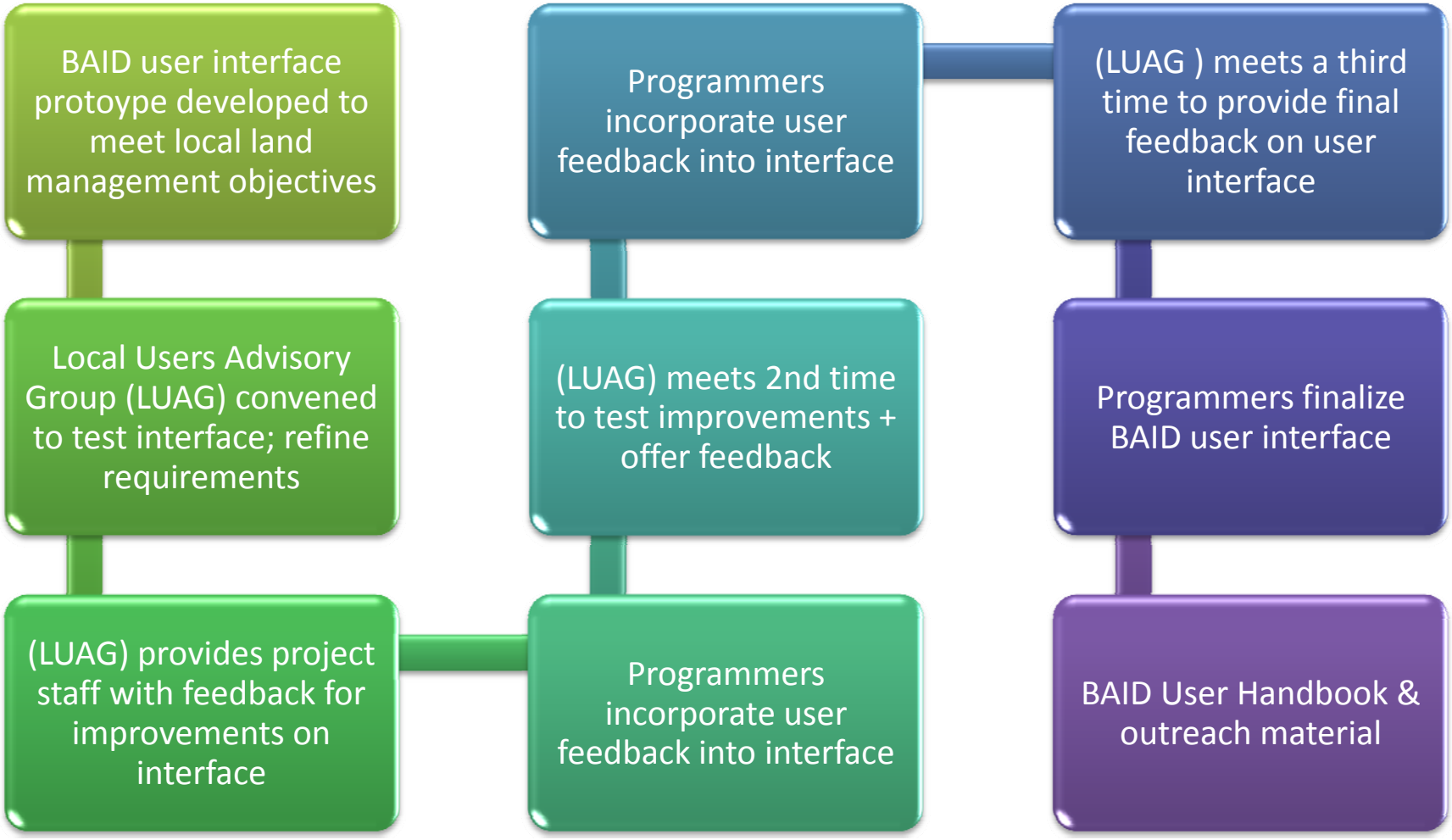
The figures below demonstrate the teams' capacity to develop and host Flex applications for the Barrow area. The screen shots include examples from a Flex application developed to track the locations of instrumentation in the Barrow area. This application embeds 2002 Quickbird imagery from Digital Globe, base maps from USGS, the State of Alaska, the UIC boundary and instrument sites with links to photographs and more information about associated projects.

This project will use adobe flex to make this interface much more user friendly and intuitive for the lay person.





MN-6 BAID User Interface/Internet Portal Access – Overview of Iterative Agile Software Development Process (to be led by Nuna Technologies)



MN-7 – Entities which contribute data to BAID

North Slope Borough GIS

United States Geological Service -- USGS

National Science Foundation -- NSF

National Snow and Ice Data Center -- NSIDC

National Oceanic and Atmospheric Administration – NOAA

US Fish and Wildlife Service – Department of the Interior

Barrow Arctic Science Consortium – BASC

Institute of Arctic and Alpine Research at Boulder -- INSTAAR

Ukpeagvik Inupiat Corporation

EOL Development Deployment Data Services

Atmospheric Radiation Measurement – ARM

Cold Regions Research and Engineering Laboratory – CRREL

US Permafrost Association

Alaska Satellite Facility – ASF

Arctic Research Consortium of the US -- ARCUS

UNAVCO

CH2MHILL Polar Services

Michigan State University Plant Biology / Arctic Ecology

University of CA Berkeley

San Diego State University

University of Texas at El Paso

University of Montana

University of Alaska Fairbanks

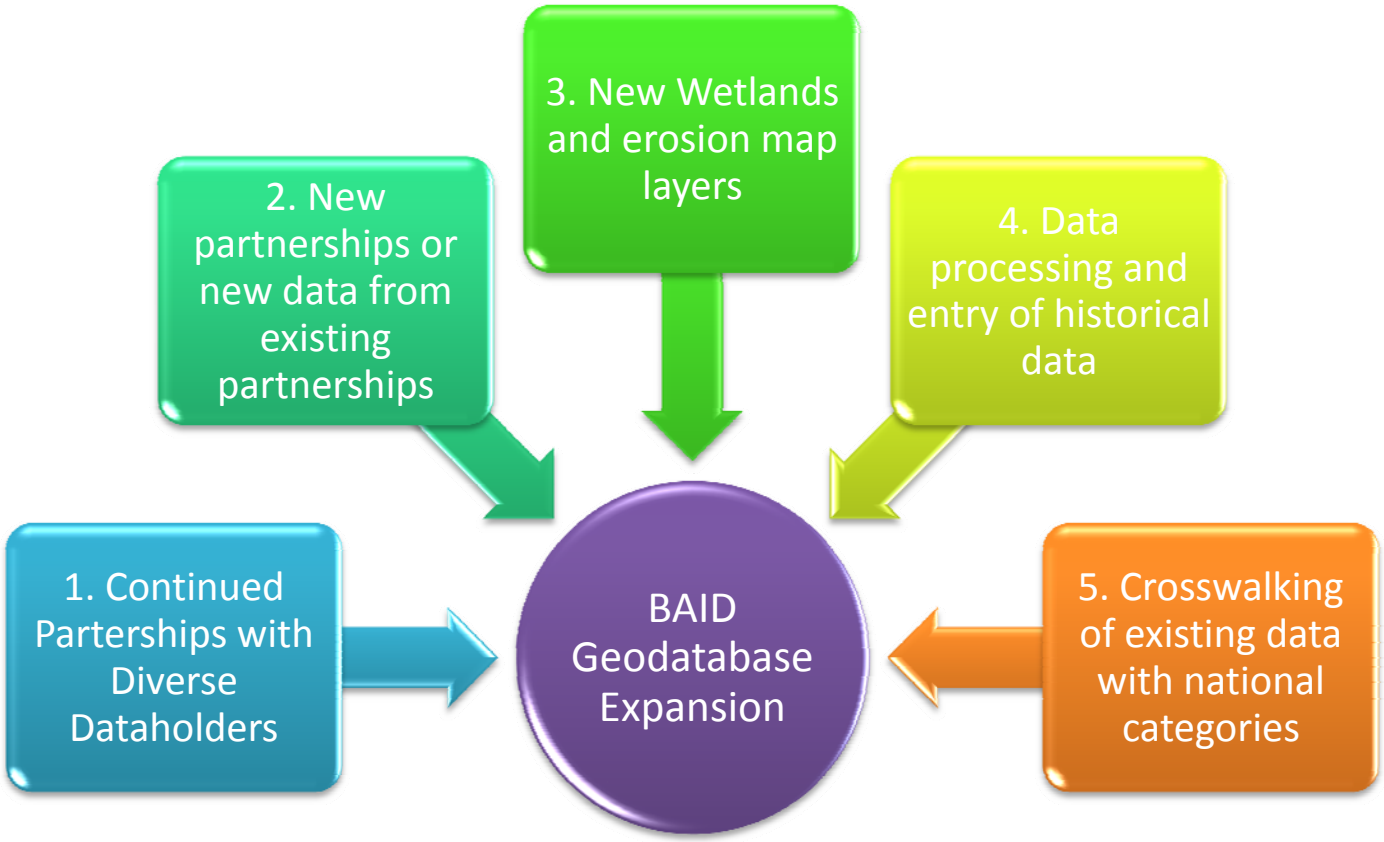
University of Alaska Anchorage

State University of NY

Alfred Wegener Institute

Max Plank Institute

MN-8 p1 BAID Geodatabase Expansion



1. Partner List

NSB, UIC, USFWS, USGS, NSF, NSSI, AOOS, Department of Energy, NASA, Geographic Information Network of Alaska, Alaska Satellite Facility, NSIDC, Earth Observing Laboratory, plus over 40 academic institutions actively conducting research in the Barrow

MN-8 p2 BAID Geodatabase Expansion

area including: UAF Floating Ice Group, Institute of Arctic and Alpine Research, San Diego State University, University of California Berkeley, University of Florida, University of Michigan, State University of New York, University of Cincinnati, etc.

2. Coastal Erosion on Alaska's North Slope
http://alaska.usgs.gov/science/geography/coastalerosion.html

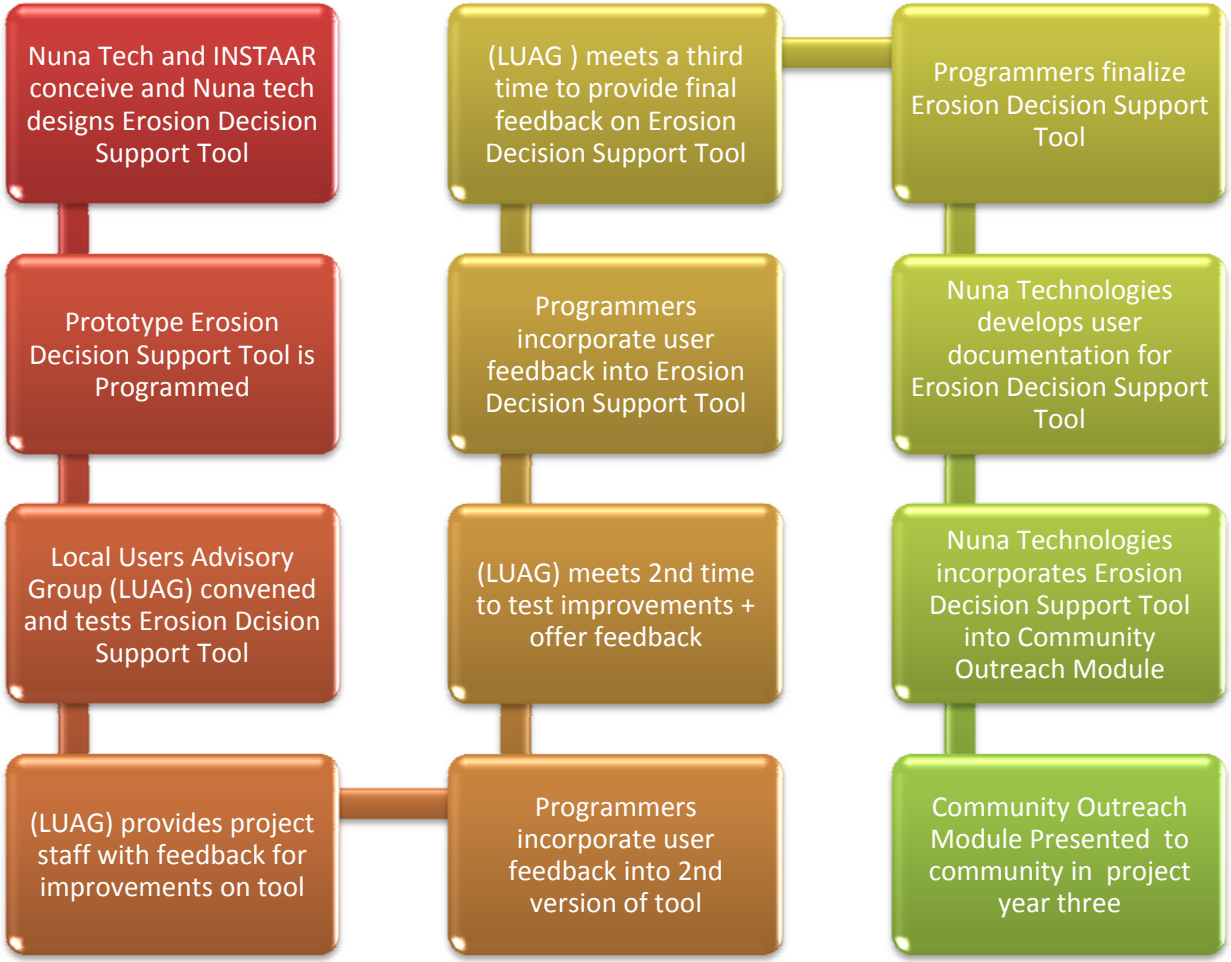
National Assessment of Shoreline Change Project, Alaska
http://alaska.usgs.gov/portal/project_details.php?project_id=131

3. Project deliverable
Additional time series imagery (aerial and satellite); digitized coastline layers (from proposed surveys and past research); wetlands data layers and derived analysis; all layers with FGDC metadata; data archived with Earth Observing Laboratory and North Slope Science Initiative.

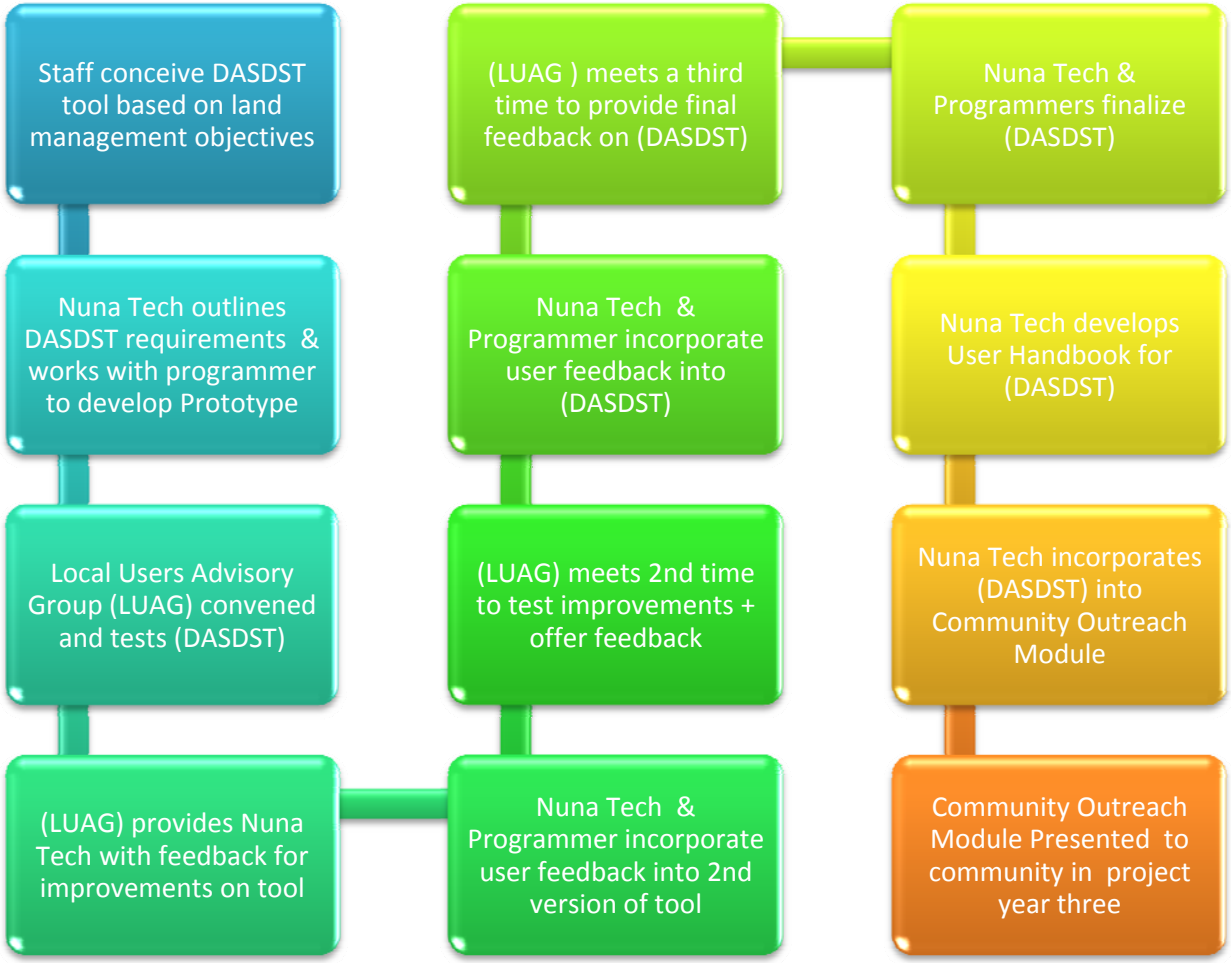
4. Project deliverable
Collection and processing of historical survey and aerial photo data used among other things to extrapolate rates of erosion

5. Project deliverable
Alignment/classification of wetlands data layer with nationally recognized categories, to increase database ease of use and overlay with federal entities.

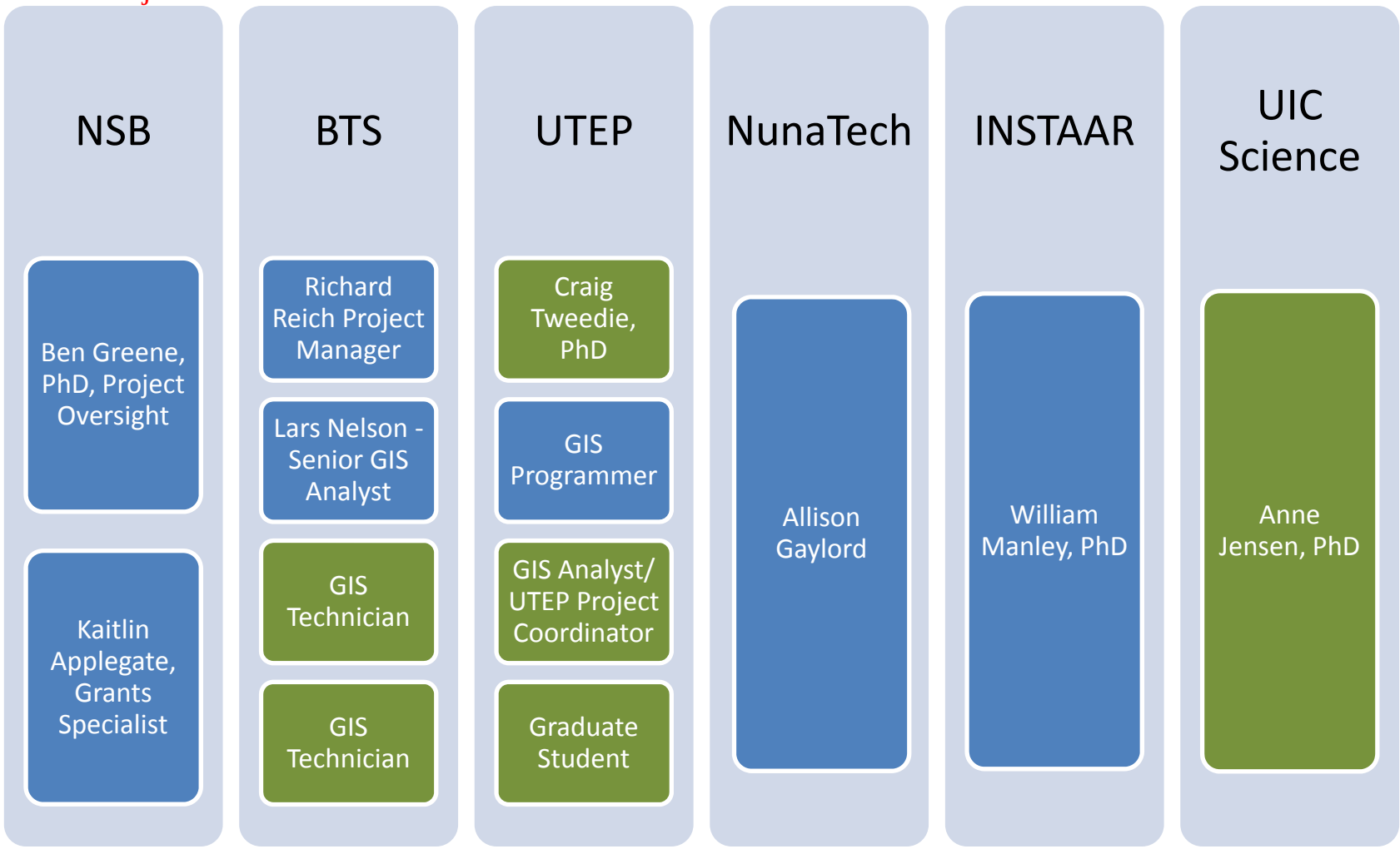
MN-9 Erosion Decision Support Tool Development



MN-10 Development Activities Situation Decision Support Tool (DASDST) Iterative Agile Software Development Process led by Nuna Technologies

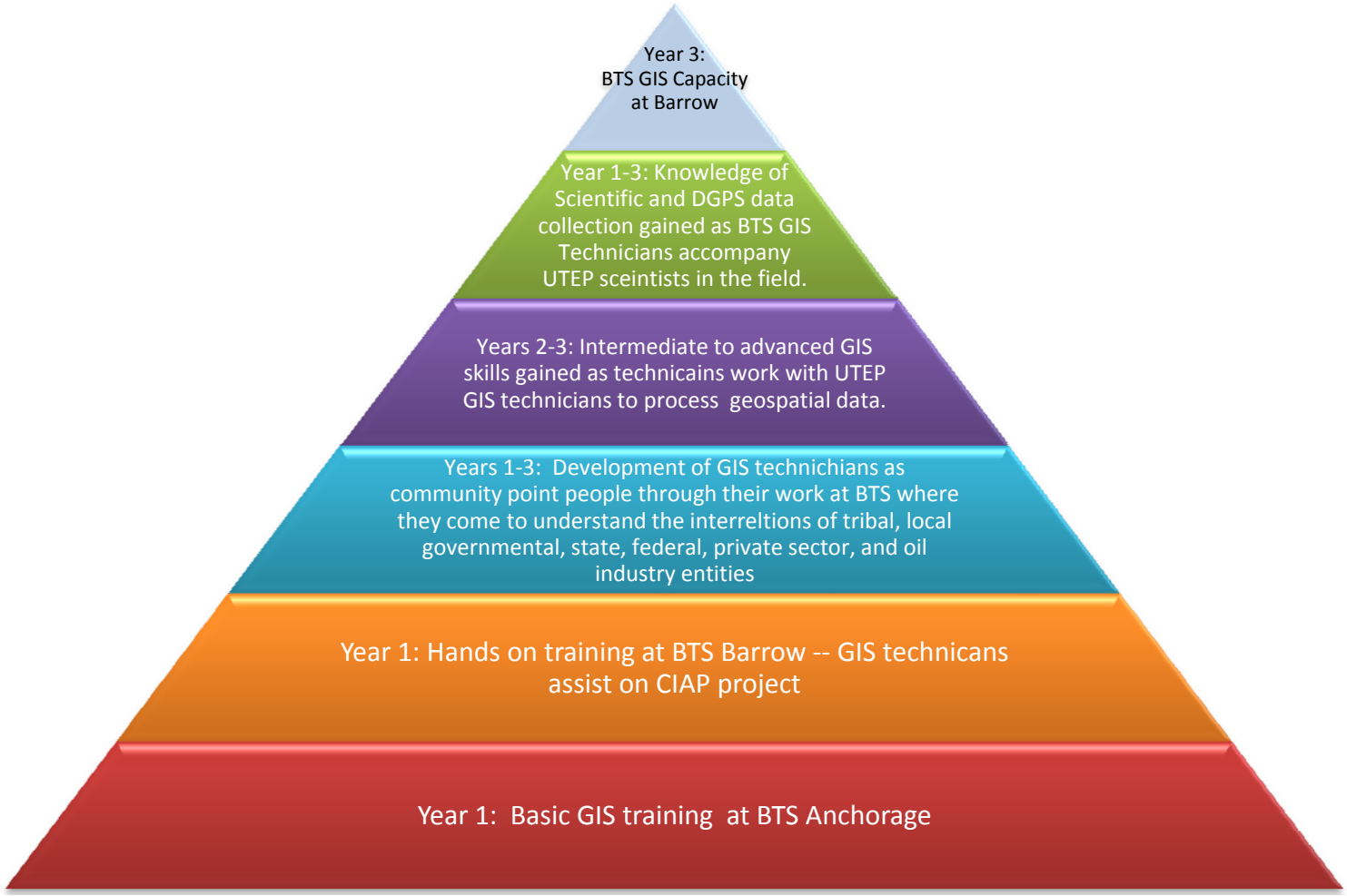


MN-11 Project Personnel



Personnel in green shapes will spend all or part of project summers on the field data collection team. The rest of the year they will process data, with the exception of Craig Tweedie, PhD and Anne Jensen PhD who will be involved in higher level analyses and project tasks.

MN-12 Progression of Knowledge / Training of Locally Recruited GIS Technicians



Once local technicians are trained, the information the Decision Support Tools, Handbook and community outreach module will be presented to Barrow stakeholders, including Planning and Community Services Department, Planning Commission and Borough Assembly. This will increase community-wide independent use of BAID Decision Support Tools during the planning and permitting process.

North Slope Science Initiative

www.northslope.org

North Slope Borough
Minerals Management Service
Alaska Department of Natural Resources
Alaska Department of Fish and Game
National Marine Fisheries Service
National Weather Service
U.S. Arctic Research Commission

U.S. Fish and Wildlife Service Bureau of Land Management National Park ServiceU.S.Geological Survey
ArcticSlope Regional Corporation
U.S. Department of Energy

c/o Alaska State Office
(910) Bureau of Land Management
222 West Seventh Avenue, #13
Anchorage, Alaska 99513-7504

January 11,
2010

Craig E. Tweedie,
Ph.D. Assistant
Professor Department
of Biology
The University of Texas at El Paso (UTEP)
500 West University
Blvd. El Paso, Texas
79968-0513

Dear Dr. Tweedie,

I'm writing on behalf of the North Slope Science Initiative to express support of the ongoing development of the Barrow Area Information Database (BAID.) NSSI and BAID are synergistic efforts based on Alaska's North Slope with a different yet complimentary focus. Both efforts strive to increase collaboration, but at different levels. Both NSSI and BAID include project tracking systems, yet these compile data at different scales and level of detail. The BAID effort fills a niche at local levels that can extend the reach of NSSI amongst the NSF research community.

The NSSI is an intergovernmental effort to increase collaboration at the local, state, and federal levels to address the research, inventory, and monitoring needs as they relate to development activities on the North Slope of Alaska. NSSI primarily works with land management agencies and industry to consolidate data via the NSSI web portal.

The BAID is a grassroots effort driven largely by university researchers (from over 40 institutions) funded by the National Science Foundation via input through science advisory groups. BAID also strives to increase collaboration and prevent duplication of effort by increasing access to commonly requested geospatial data and via a project tracking system which documents prioritized research

activities back to the 1940s for the hubs of Barrow, Atqasuk and Ivotuk. BAID is focused on requirements for logistics support and science management in terms of establishing long term monitoring activities and observatory networks.

BAID plays a role in contributing data resources to support the NSSI initiative. These include: (1) Support for the development of a regional vegetation map. BAID includes hundreds of plot level vegetation monitoring and ground truth sites around Barrow, Atqasuk and Ivotuk which will be valuable to the NSSI in vegetation mapping; (2) Science infrastructure mapping of roads, power poles, towers, snow fences, buildings, etc.; (3) Field mapping support which generates detailed differential GPS coordinates of project plots which could be generalized for use in the NSSI project tracking system; (4) USFWS survey grids and important habitat for monitoring migratory birds (5) coastal erosion data and associated monitoring transects; and, (6) the establishment of additional meteorological stations which would extend the existing coverage.

NSSI could enhance BAID via the promotion of web services. In 2009, the BAID team demonstrated a willingness to improve the interoperability of the BAID project tracking system with NSSI via the creation of Open Geospatial Consortium (OGC) services. NSSI is supportive of the creation of additional BAID related services (OGC, REST, SOAP XML) and could play a role in increasing the discoverability of those services via the NSSI portal.

NSSI looks forward to increased collaboration between our efforts. Sincerely,

John F. Payne
Executive Director

Cox, Sally A (CED)

From: Fogels, Edmund J (DNR)
Sent: Thursday, May 13, 2010 9:52 AM
To: Cox, Sally A (CED)
Cc: Lefebvre, Richard A (DNR); Black, Michael L (CED); Jollie, Tara L (CED)
Subject: RE: North Slope Borough mapping project submitted through CIAP Public Solicitation

Sally—it looks like this proposal would complement the Statewide Digital Mapping Initiative's efforts, and would not be duplicative. The imagery would be of higher resolution than the statewide coverage we are acquiring, and would actually help us orthorectify our data.

Also, the SDMI Executive Team member, Tom Heinrichs at UAF, has an excellent working relationship of many of the key players listed in this proposal. Please let me know if you need more information.

Thanks for keeping me in the loop on this,

Ed

Ed Fogels, Director
Office of Project Management and Permitting
Alaska Department of Natural Resources
550 West 7th Avenue, Suite 1400
Anchorage, AK 99501-3561
(907) 269-8431
fax: (907) 269-8918

From: Cox, Sally A (CED)
Sent: Wednesday, May 12, 2010 3:07 PM
To: Fogels, Edmund J (DNR)
Cc: Lefebvre, Richard A (DNR); Black, Michael L (CED); Jollie, Tara L (CED)
Subject: North Slope Borough mapping project submitted through CIAP Public Solicitation

Hi Ed,
DCCED is wrapping up the review of projects submitted through the Coastal Impact Assistance Program Public Solicitation. Following a review of the ranked projects by the Oceans Policy Subcabinet, Deputy Commissioner Lefebvre recommended that we check with you as to whether the attached proposal submitted by the North Slope Borough in any way duplicates work being conducted by the Alaska Statewide Digital Mapping Initiative (or any other effort)

A copy of the full proposal submitted by the Borough is attached. To provide a brief summary of the project, the Borough plans to update, streamline and add decision support tools to the Barrow Area Information Database (BAID). High-resolution, multispectral satellite imagery will be used to map wetlands and other vegetation types in detail, guided and validated by field data collections to provide a comprehensive inventory of wetlands and erosion features about the project area. The BAID interface will be upgraded and interactive mapping tools will be developed to enable online visualization and decision support for environmental problem solving in the region. Two BAID decision support tools -- an Erosion Monitoring Tool and a Development Activities Situation Tool -- will be developed.

Are you aware of any project(s) that the Borough's proposal would duplicate?

Thanks very much,
Sally Russell Cox

Sally Russell Cox | Program Manager | Community Coastal Impact & Climate Change Programs
Division of Community & Regional Affairs | AK Dept of Commerce, Community, & Economic Development
550 West 7th Avenue, Suite 1770 | 907.269.4588 | 907.269.4539 | sally.cox@alaska.gov

1

STATE OF ALASKA
COASTAL IMPACT ASSISTANCE PROGRAM

Great Land Trust

This project will be conducted on behalf of the State of Alaska. It was selected through an open competitive procurement process and in accordance with 3 AAC 196.

PROJECT TITLE: Campbell Creek Estuary CIAP Project

PROJECT CONTACT

Contact Name: Phil Shephard
Address: 619 E Ship Creek Ave, Ste 321, Anchorage, Alaska 99501
Telephone Number: (907) 278-4992
Fax Number: (907) 278-4997
Email Address: phil@greatlandtrust.org

PROJECT LOCATION

The Campbell Creek Estuary CIAP project is 60 acre land acquisition project located in the Campbell Creek Estuary between Campbell Lake and Cook Inlet in the Municipality of Anchorage, Alaska. The project location is within the Municipality of Anchorage Coastal Zone and is designated as "Important Habitat" in the Anchorage Coastal Management Plan. Please see the attached map located at the end of the document.

PROJECT DURATION

The project will take three years. 2009 - 2011.

ESTIMATED COST

The total project cost is $6.5 million. The property has been appraised at $6.125 million.

Spending Estimate ($)				
TOTAL	**Year 1**	**Year 2**	**Year 3**	**Year 4**
$1,300,000	0	0	$1,300,000	0

Funding per Allocation Year of CIAP ($)				
TOTAL	**FY 07**	**FY 08**	**FY 09**	**FY 10**
$1,300,000	0	0	0	$1,300,000

PROJECT DESCRIPTION

The Campbell Creek Estuary CIAP Project will fund Great Land Trust to acquire fee simple title and secure permanent protection through a conservation easement of 60 acres of Campbell Creek Estuary and upland buffer. The property is adjacent to the Anchorage Coastal Wildlife Refuge (ACWR) located in Anchorage, Alaska in the upper Cook Inlet. The acquisition of this property will protect sensitive coastal wetlands, an anadromous fish stream and estuary, and foster wildlife oriented recreation adjacent to Southcentral Alaska's most popular state game refuge. When acquired, the parcel will be transferred to the Municipality of Anchorage with the Great Land Trust holding a conservation easement to assure that the property will be protected in perpetuity. The acquisition and conservation easement will conserve

declining coastal wetlands and valuable fish and wildlife habitat, eliminate a pending development threat, and avoid the introduction of contaminants into the estuary.

The preservation of this biologically rich stream, salt marsh and estuarine system is essential to maintain biodiversity and provide habitat for anadromous fish and numerous resident and migratory bird species. Conservation of these lands will protect feeding habitat for Cook Inlet beluga whales, listed as endangered under the Endangered Species Act.

Federal, State, and Local Partnerships

The project involves multiple federal, state and local government and non profit partners and it is part of a regional interagency partnership to protect, restore and educate the public about the remaining functioning anadromous fish systems within the State's largest city.

Project Readiness

The property was appraised in March 2009 at $6,150,000. This appraisal was conducted to Uniform Standards of Professional Appraisal Practices (USP AP) and Uniform Appraisal Standards for Federal Land Acquisition (UASFLA). In addition the appraisal was reviewed and approved by a State of Alaska approved review appraiser. A summary of the appraisal and the appraisal review are attached. Full copies are available upon request. The title search and a Phase I environmental hazard assessment was completed during summer 2009. As of the date of the application $3.5 million has been secured for the project. The combined CIAP funds will complete the necessary fundraising for the project.

Ecological Importance

The Campbell Creek Watershed drains approximately 78 square miles, stretches roughly 112 miles, including the forks and major tributaries. Campbell Creek starts from an alpine source high in the Chugach Mountains and flows relatively undisturbed through Bicentennial Park. It then flows through many of Anchorage's residential neighborhoods, with some diversions through commercial areas west of the Seward Highway, before spilling into the marine waters of Cook Inlet.

Campbell Creek Estuary is the last, unprotected functional estuary in Anchorage. It is critical to conserve the high degree of functionality of this estuary to support current population levels of anadromous fish that inhabit the estuary and the watershed. Campbell Creek estuary is surrounded by the 32,500 acre state-owned Anchorage Coastal Wildlife Refuge of Cook Inlet. Large numbers of anadromous fish, including all five species of North Pacific salmon, migrate through the offshore waters of the ACWR, as well as Campbell Estuary. The intact nature and size of the estuary make it particularly valuable providing physical and functional linkage for coupling salmonid life cycle activities from spawning/rearing habitats in upper Campbell Creek watershed to estuarine nearshore habitat within the ACWR. Conserving the estuary would enhance the integrity of the ACWR and the greater Campbell Creek watershed. The Campbell Creek watershed (Campbell and Little Campbell Creeks) is the most intact, ecologically functional watershed in Anchorage in relation to salmon habitat.

The Anchorage Coastal Wildlife Refuge is used by more than 130 species of waterfowl, shorebirds, and other migratory birds, including nesting bald eagles, trumpeter swans, snow geese and peregrine falcons. More than 60 of these species nest in the refuge and adjoining lands and use nearby parcels including Campbell Creek estuary for nesting, feeding and resting.

The Beluga whale, found in Cook Inlet, Alaska, was recently listed as endangered under the Endangered Species Act. Upper Cook Inlet has experienced and will continue to experience rapid growth with consequential effects on Beluga. Research has shown that Beluga are sensitive to noise and may abandon and/or restrict use of habitats where noise reaches a threshold level. At the same time, noise studies

conducted in response to development in Upper Cook Inlet illustrated increasing overlap of noise signatures reducing the amount of "quiet habitat" in Upper Cook Inlet. Campbell Creek Estuary, if preserved from development, could provide refuge habitat (avoidance of shipping and associated noise) for Beluga using the Northeast shore of Upper Cook Inlet.

Both adult and young beluga whales use the estuary for feeding on anadromous fish. There are also reports of Beluga occasionally swimming up the creek, through the project parcels in pursuit of salmon.

MEASUREABLE GOALS AND OBJECTIVES

Conservation in perpetuity of the 60 acre Campbell Creek Estuary property through fee simple acquisition and a conservation easement.

PROJECT CONSISTENCY WITH CIAP AUTHORIZED USE

The Campbell Creek Estuary CIAP project is consistent with authorized use # 1 which is stated as "Projects and activities for the conservation, protection, or restoration of coastal areas, including wetlands." The Campbell Creek Estuary CIAP Project will protect and permanently conserve the Campbell Creek Estuary through fee simple acquisition and a conservation easement. The project will directly conserve coastal and estuarine habitat for five species of salmon, beluga whales and migratory and resident bird species. The project will directly mitigate coastal development projects.

The landowner is proceeding with plans to develop a 70 home subdivision and a high-density condominium development on the project parcels. This development will occur if the parcels are not purchased for conservation.

The parcels identified in the Campbell Creek Estuary CIAP Project face strong development pressures. Alaska's population is projected to grow by 100,000 new residents in the next 25 years. Residential neighborhoods and industrial development are rapidly occurring resulting in fragmentation of wildlife habitat and natural open spaces. Remaining natural open spaces are diminishing in south-central Alaska, a trend no more visible than in Anchorage, Alaska's largest metropolitan area. A corollary to this development pressure is a loss of critical wetlands. The private landowners for the parcels in question in Campbell Creek Estuary are currently willing to sell the parcel for development if the Municipality of Anchorage and the Great Land Trust are unable to fund the acquisition. Thus, if the parcels are not purchased for conservation now, it is highly likely these valuable coastal properties will be developed.

The area has been surveyed for ecological benefit. The landowners have signed a willingness statement to document their readiness to work with the Great Land Trust. We have had the property appraised and the appraisal has been reviewed by a State authorized review appraiser (See attached).

Brief example of a past project of GL T: *The Fish Creek Estuary Conservation Project*

The Great Land Trust succeeded in raising $1,070,000 in 2002 to conserve over 30 acres in the Fish Creek Estuary, the only other undeveloped estuary of the original seven salmon streams in Anchorage. The Project protects Fish Creek's lower reaches, including the Estuary, and its critical tidal marsh habitat. The Trust safeguards this important waterway by ensuring that no further commercial or other development will take place on this ecologically significant land. Nearly a mile of creek is now buffered by a natural corridor, with connecting natural parkland and designated natural open space. If these purchases had not taken place, development along Fish Creek's bank would compromise its ecological integrity, negatively impact water quality in the creek and eliminate the special wild character of this place that tens of thousands of Anchorage residents enjoy every year.

COORDINATION WITH FEDERAL RESOURCES OR PROGRAMS

The U.S. Fish and Wildlife Service's Cook Inlet Coastal Program supported site work and landowner research for the local fish conservation projects. The Service is concerned about severe and increasing threats to coastal wetlands in Anchorage and upper Cook Inlet and strongly supports this project as evidenced by the recent award of a $1 million National Coastal Wetland Conservation Program grant that will be also provide funding towards the $6.5 million needed to acquire the Campbell Creek Estuary.

The Municipality of Anchorage has submitted a $1 million grant to the FY2011 NOAA Coastal and Estuarine Land Conservation Program (CELCP) for additional funding for the acquisition. Projects funded under this program are expected to be announced in December 2010.

The CIAP funds will not be used as matching funds for the FWS or NOAA programs nor will they duplicate their efforts. The CIAP funding will directly complement the other federal programs.

COST SHARING OR MATCHING OF FUNDS

The total budget for this project is $6.9 Million. The $1,300,000 CIAP funds will be used for a portion of the total purchase price needed to acquire the estuary parcels. As previously mentioned FWS National Coastal Wetlands Conservation Grant for $1 million has been recently awarded for this project. Great Land Trust has successfully raised an additional $3 million. There are $2.7 million in outstanding requests. If we are not able to receive all the funds for the project prior to the closing for the property on Nov 30, 2010, we will work with the landowners to phase the project over 12 months. Thus, we anticipate completing the purchase of the entire 60 acre property by Nov 30, 2011. Letters of support for the NOAA and FWS grant proposals are attached. While many funding sources will be used for completion of this project, at this time CIAP funds will not be used as a matching requirement for those funds. If, in the future, they are needed to be used in this manner, a letter will be added from the other Federal agency (the agency charged with administering the program that includes the cost sharing or matching requirement) indicating that the other agency's program allows the use of Federal funds to meet cost sharing or matching requirements.

Attachments

- **Property Photos**
- **Property Locator Map showing the Coastal Zone**
- **Parcel Map Showing Aerial Photo, Parcel Boundaries, and Protected Areas**
- **Resolution in Support of the Project from the Governing Body of the Community**
  - **Sand Lake Community Council**
  - **Municipality of Anchorage**
- **Letter from landowners showing commitment to work on the project**
- **Letters of Support**
  - **Municipality of Anchorage Department of Parks and Recreation**
  - **Great Land Trust Board of Directors**
  - **State of Alaska Department of Fish and Game**
  - **National Oceanic and Atmospheric Administration (NOAA) National Marine Fisheries Service**
  - **Anchorage Waterways Council**
  - **Audubon Alaska**
- **Letter from Alaska State Historic Preservation Office**
- **Alaska Sustainable Salmon Grant Award Letter and Reviewer Comments**

Project Location: Photos

Photo: Campbell Creek Estuary Project Site and the Anchorage Coastal Wildlife Refuge.

Photo: Campbell Creek as it flows through the estuary on the project site.

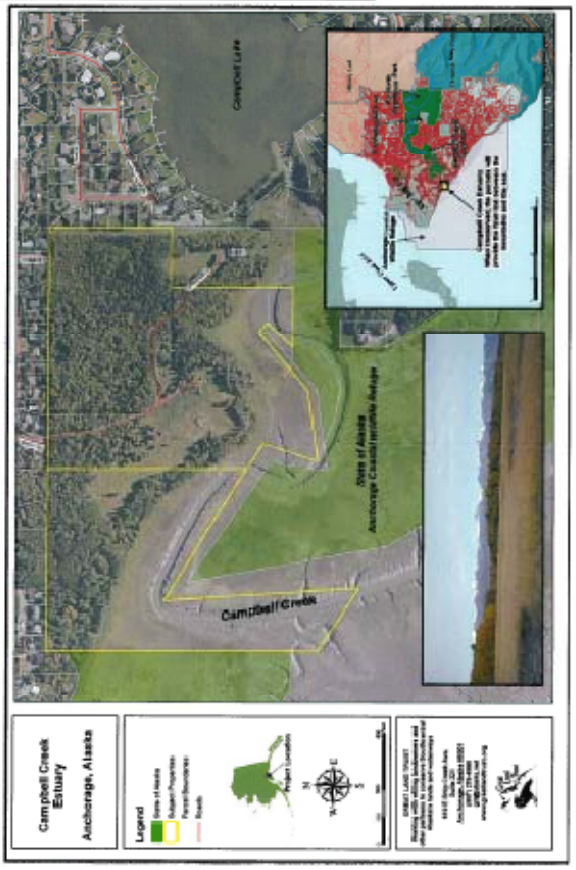
Brandt Eagleton and his Dad, Matthew with a 45 pound Campbell Creek Chinook Salmon caught during the 2007 annual Campbell Creek Kids Fish Day.

Project location: Campbell Creek Estuary, Anchorage, Alaska

Anchorage Waterways Council's Little Campbell Creek restoration project. The future of Campbell Creek Estuary will directly impact restoration efforts throughout the watershed.

Project Location: Coastal Zone Map

Project Location: Aerial Photo and Parcel Boundaries



STATE OF ALASKA

DEPARTMENT OF FISH AND GAME
Division of Sport Fish

SARAH PALIN, GOVERNOR

333 Raspberry Road
Anchorage, AK 99518-1565
PHONE: (907) 267-2277
FAX: (907) 267-2464

February 11, 2009

Jeff Dillon
Director
Municipality of Anchorage Department of Parks and Recreation
P.O. Box 196650
Anchorage, AK 99519-6650

Dear Mr. Dillon:

The Alaska Department of Fish and Game (ADF&G) supports your effort to preserve important fish and wildlife habitat at Campbell Creek estuary in the Anchorage Coastal Wildlife Refuge.

The Anchorage Coastal Wildlife Refuge is a unique urban wildlife refuge that supports over 100 species of birds, four species of anadromous fish, and several species of mammals including brown and black bears, moose, coyotes, lynx, red fox, mink, weasel, beaver and muskrat. In addition to its fish and wildlife values, the refuge serves an important community function for residents and visitors that birdwatch, hike, ski, hunt and pursue other forms of recreational opportunities within its boundaries.

One of the greatest threats to the integrity of the refuge and its important fish and wildlife values is surrounding urban development and related impacts. The property you are trying to protect provides a vitally important buffer to the estuary and adjacent salt marsh.

We look forward to working with the you to complete this important project and implement effective management strategies that will provide lasting conservation benefits.

If you have any questions, please do not hesitate to contact me. Thank you.

Sincerely,

Mark N. Kuwada
Habitat Biologist
Alaska Department of Fish and Game

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Marine Fisheries Service
222 W. 7th Avenue, #43
Anchorage, Alaska 99513-7577

June 19, 2008

To Whom It May Concern:

The National Marine Fisheries Service (NMFS) enthusiastically endorses the application by the Greatland Trust for a NOAA CELCP (Coastal and Estuarine Land Conservation Program) grant to acquire and preserve Campbell Creek Estuary in Anchorage, Alaska. The Campbell Creek Estuary is located within the Municipality of Anchorage (MOA) in Upper Cook Inlet, an area experiencing rapid development, including permanent loss of intertidal and subtidal habitat. The Campbell Creek Estuary, part of the greater Upper Cook Inlet Estuary, supports 24 species of marine fish, including large runs of all five species of North Pacific salmon. Additionally, Cook Inlet supports a small population of belugas that has been shown to be geographically isolated and genetically distinct from other Alaskan beluga stocks. The Cook Inlet beluga population was designated as depleted under the Marine Mammal Protection Act in 2000 (65 FR 34590). NMFS received a petition to list Cook Inlet belugas as endangered under the Endangered Species Act (ESA) (71 FR 44614, August 7, 2006). After a second Status Review, NMFS proposed listing the Cook Inlet beluga stock as endangered under the ESA (72 FR 19854, April 20, 2007).

The Campbell Creek watershed (Campbell and Little Campbell Creeks) is the healthiest in the MOA, and supports wild runs of Chinook, coho, and sockeye salmon. It is also the focus of several conservation initiatives, including: purchase of riparian parcels, stream habitat restoration, juvenile fish studies, water quality monitoring, and environmental education and outreach. Campbell Creek is an integral part of the Anchorage community, and is the focus of an annual Kid's King Salmon Fishing Day and an annual Creek Cleanup Day.

The Campbell Creek Estuary Protection Project is an outstanding example of a collaborative effort by private and public entities to realize a critical conservation goal. NMFS places the preservation of estuarine habitat as a primary conservation goal in Upper Cook Inlet, and is pleased to partner with the State of Alaska, the MOA, Great Land Trust and local community groups to complete this important project to protect diverse estuarine habitat for marine and anadromous fish.

The purchase of this parcel (Phase 1), adjacent to the Anchorage Coastal Wildlife Refuge, is part of a muliti-phase effort to purchase a total of 61 acres of estuarine habitat and upland buffer at the mouth of Campbell Creek, as well as the aforementioned conservation efforts in the upper watershed. Current landowners have indicated a desire to sell to interested buyers, including proponents of residential development. In addition, Phase 2 of the Campbell Creek Estuary Protection Project is being considered for funding via compensatory mitigation from the Port of Anchorage Expansion Project; a project four miles north of Campbell Creek that will permanently fill 130 acres of estuarine habitat at the mouth of Ship Creek.

We look forward to working closely with you on this project. Erika Ammann is the NMFS contact for this project and can be reached at 907 271-5118 or erika.ammann@noaa.gov.

Sincerely,

Jeanne Hanson
Acting Assistant Regional Administrator,
for Habitat Conservation

ANCHORAGE WATERWAYS COUNCIL

P.O. Box 241774 • Anchorage • Alaska • 99524-1774 • Phone 907-272-7335 • Fax 907-277-9207
www.anchoragecreeks.org • awc@anchoragecreeks.org

February 10, 2009

NOAA Coastal and Estuarine Land Conservation Program (CELCP)

To Selection Committee:
The Anchorage Waterways Council (AWC) would like to voice our strong support for the proposal to acquire and conserve the Campbell Creek Estuary.

The AWC is a nonprofit 501(c)3 membership organization dedicated to the protection, restoration, and enhancement of Anchorage's waterways. The Campbell Creek project is a tremendous opportunity to involve both private landowners and numerous Anchorage residents. The permanent conservation of this area will secure important anadromous fish habitat. The estuary also provides important habitat for waterfowl, moose, and other mammals.

The AWC has spent a considerable amount of time and money each year since 1984 towards the protection of Campbell Creek and its watershed through our creek protection and outreach efforts. The AWC enthusiastically supports this proposal which will conserve one of the last remaining estuaries in Anchorage.

Sincerely,

Holly Kent
Executive Director

Audubon Alaska

715 L St. Suite 200
Anchorage, AK 99501
June 9, 2008

To Whom It May Concern:

We would like to strongly recommend the funding of the Campbell Creek Estuary Conservation Project. The State of Alaska's interest in acquiring in-holdings within the Anchorage Coastal Wildlife Refuge provides an exciting opportunity to protect the most productive coastal estuary in the Municipality of Anchorage.

As the U.S. Partner for BirdLife International, the National Audubon Society is working to identify a network of sites known as Important Bird Areas (IBA), which provide essential habitats for birds. (http://www.audubonalaska.org/BirdSci_IBAs.html). The IBA program is a global effort to identify areas that are most important for maintaining bird populations, and it focuses conservation efforts at protecting these sites. Two IBAs, the Anchorage Coastal IBA and the Campbell Creek IBA, have been identified that include the Campbell Creek estuary. The Anchorage Coastal IBA is of continental significance providing habitat to thousands of migrating snow geese as well as over 220 bird species. The Campbell Creek estuary is of statewide significance and includes habitat for numerous bird species of concern, including several on Audubon's WatchList (http://www.audubonalaska.org/pdfs/WatchList2005.pdf).

The Campbell Creek estuary is a highly productive coastal and wetland area and merits protection, particularly in light of the rapid urbanization of many forested and wetland habitat areas in the Anchorage bowl area. Audubon Alaska would be pleased to assist in anyway we can to advance this worthwhile project.

Pat Pourchot
Senior Policy Representative
Audubon Alaska

STATE OF ALASKA
COASTAL IMPACT ASSISTANCE PROGRAM

School of Fisheries and Ocean Sciences
University of Alaska Fairbanks

This project will be conducted on behalf of the State of Alaska. It was selected through an open competitive procurement process and in accordance with 3 AAC 196.

PROJECT TITLE: Arctic Ecosystem Integrated Survey

PROJECT CONTACT

Contact Name: Dr. Franz Mueter
Address: School of Fisheries and Ocean Sciences, University of Alaska Fairbanks
17101 Point Lena Loop Rd, Juneau, AK 99801
Telephone Number: (907) 796-5448; Fax Number: (907) 796-5446
Email Address: fmueter@alaska.edu

PROJECT LOCATION

Project location is the northeastern Bering Sea to Chukchi Sea (Figure 1).

PROJECT DURATION

3 year duration (Jan 2012 to Dec 2014)

ESTIMATED COST:

Spending Estimate ($)				
TOTAL	**Year 1**	**Year 2**	**Year 3**	**Year 4**
$3,000,000	$1,111,938	$1,286,179	$601,883	

Funding per Allocation Year of CIAP ($)				
TOTAL	**FY 07**	**FY 08**	**FY 09**	**FY 10**
$3,000,000				$3,000,000

PROJECT DESCRIPTION:

The proposed project provides a comprehensive assessment of the northeastern Bering Sea and Chukchi Sea (NEBS/CS) ecosystems from the physical environment through the primary and secondary producers that support Arctic marine food webs to the numerous fish species utilizing the area. The study will provide an unprecedented baseline for understanding Arctic marine and coastal communities and for assessing the potential effects of future development and climate changes on fisheries resources and the marine environment in the region. This information is required to manage fisheries resources of the NEBS/CS region, to assess the impacts on fish and shellfish populations in the NEBS/CS from potential exploitation, oil and gas development, and climate change, as well as to develop appropriate mitigation measures.

The study allows us to compare the response of the NEBS/CS ecosystem to climate variability across several years to help predict future responses to climate change. Global temperature increases have been most pronounced in Arctic and subarctic regions, including the northeastern Bering Sea and Chukchi Sea (ACIA 2004, IPCC 2007). Associated changes in these ecosystems, most notably continuing declines in summer sea ice (Richter-Menge et al. 2007, Overland et al. 2008), have sparked interest in the region and its marine resources, including oil and gas, fish, shellfish, and marine mammals. Changes in sea ice have direct effects on biological systems. For

example, as ocean temperatures rise, marine communities adapted to seasonal sea ice are retreating, while subarctic communities are expanding northward. In the eastern Bering Sea, 15 subarctic marine fish species moved significant distances northward between 1982 and 2006 (Mueter and Litzow 2008). Similarly, the northern Bering Sea system has experienced a shift from Arctic to more subarctic conditions, most notably a decrease in benthic production (Grebmeier et al. 2006). In response, gray whale (*Eschrichtius robustus*) foraging locations have changed (Moore et al. 2003) and the calls of this species were detected near Point Barrow during winter 2003-2004. Apparent range extensions of several fish species have also been reported; e.g., anecdotal evidence suggests range extensions of salmon into the Arctic (Alaska Climate Impact Assessment Commission 2008) and a recent small-scale survey found five species never before documented in the Beaufort Sea, including Pacific cod, *Gadus macrocephalus*, and walleye pollock, *Theragra chalcogramma* (Libby Logerwell, AFSC, pers. comm.). Addressing such shifts is not only critical for fisheries management because nationally important fisheries (>40% of the U.S. catch) are located primarily within the Bering Sea, but also for successful co-management of marine mammals, which at least 30 Alaska Native communities depend on.

Recognizing the potential for commercial fishing activities to expand into the northern Bering Sea and into the Arctic, and the lack of baseline information from these areas, the North Pacific Fishery Management Council (NPFMC) has taken several proactive measures to prevent the northward expansion of commercial fishing without prior assessment of fisheries resources. These measures include a ban on non-pelagic trawling in the Northern Bering Sea Research Area until a research plan can be developed and a ban on all commercial fishing in offshore waters of the Alaskan Arctic under the recently adopted Arctic Fishery Management Plan (Arctic FMP, available at http://www.fakr.noaa.gov/npfmc/fmp/arctic/ArcticFMP.pdf). Implementation of the management plan requires baseline surveys to assess the status of fisheries resources in the Arctic. Very few surveys have been conducted to date due to logistical challenges and high costs. A partnership between the University of Alaska and the Alaska Fisheries Science Center such as proposed in this study provides the most effective way of collecting the information required for implementation of the FMP. This information will be used by NOAA, specifically NOAA Fisheries and the NPFMC, to meet the objectives of the Arctic FMP and to implement the plan in accordance with the Magnuson-Stevens Fishery Conservation and Management Act (See letter of support from NPFMC and 'Measurable Goals and Objectives' section).

We propose conducting a 2-year field study with fisheries and oceanographic surveys in the data-poor NEBS/CS region to obtain urgently needed baseline data on the structure and function of these ecosystems and on the ecology of important fish species utilizing these vulnerable habitats. Species of interest include commercial subarctic species that may expand northward in response to warming (juvenile salmon (*Oncorhynchus* spp.), juvenile walleye pollock), forage fish species that serve as important prey resources for fish and marine mammals [capelin (*Mallotus villosus*), Pacific sand lance (*Ammodytes hexapterus*), Pacific herring (*Clupea pallasii*), and prickleback (Stichaeidae)], and Arctic species that have the potential to support future fisheries, such as Arctic cod (*Boreogadus saida*) and saffron cod (*Eleginus gracilis*). The proposed study will improve our understanding of the implications of future climate changes on fish populations, and of the potential impacts on the marine ecosystems of the NEBS/CS from oil and gas development, fishing, and other anthropogenic influences. Without this information, gradual changes in abundance, productivity, and condition of fish and shellfish species may not be detected before significant changes have already occurred, precluding the opportunity to address those changes. In order to mitigate potential impacts on marine fish and shellfish we must be able to identify when impacts have occurred and what their causes might be.

This study benefits the natural coastal environment by providing information needed to (1) ensure that fisheries resources utilizing the coastal environment are sustainably managed in the long-term,

(2) assess and help mitigate potential impacts on fisheries resources from potential exploitation, oil and gas development, and climate change. These and other benefits to the coastal environment are further detailed in section *"Direct Benefits to the Coastal Environment"* beginning on page 6.

Methods

To address project goals, UAF scientists will collaborate with the Alaska Fisheries Science Center (AFSC) and the Alaska Department of Fish and Game (DFG) to collect, process, and analyze fisheries and oceanographic data collected during the project.

Data/Sample Collection (Years 1 and 2)

We propose collecting fisheries and oceanographic data during annual September to mid-October (2012 and 2013) surface trawl (top 20-m of the water column) surveys of the northeastern Bering Sea shelf (north of 60N) and Chukchi Sea. We will use standard grid surveys with sampling stations every 30 nautical miles along longitudinal lines (Figure 1). Data collection will include fish, physical, and biological oceanographic samples.

Near-surface Survey – Near surface fish will be captured using a Cantrawl 400-580, rigged to fish from near surface to 20-m depth. Similar AFSC surveys using this trawl gear during September 2002 to 2007 and 2009 in the northeastern Bering Sea indicated that Chinook (*O. tshawytscha*), coho (*O. kisutch*), pink (*O. gorbuscha*), and chum salmon (*O. keta*) from the Yukon River and Norton Sound watersheds and several forage fish species (capelin, Pacific sand lance, Pacific herring, walleye pollock, sandfish (*Trichodon trichodon*), and rainbow smelt (*Osmerus mordax*)) use the shelf environment in this region. An AFSC survey during early September 2007 (Moss et al. 2009b) in the Chukchi Sea indicated pink and chum salmon from the Arctic region and several marine/forage fish species (Pacific sand lance, Pacific herring, saffron cod, Arctic cod, and pricklebacks) utilize the nearshore habitats.

Midwater Survey – The abundance of midwater fish, jellyfish, and zooplankton (e.g., euphausiids) will be measured using acoustics. Acoustic backscatter will be continuously measured along the vessel track and the identity of acoustic scatterers will be confirmed using a pelagic trawl and optical measurements from a drop camera. The underway measurements will be supplemented with multi-frequency acoustic measurements to increase taxonomic information (for example zooplankton abundance) from the acoustic measurements. The acoustic results will be directly comparable to pelagic surveys conducted by NOAA's Alaska Fisheries Science Center over the eastern Bering Sea shelf (e.g. Honkalehto et al, 2005). Preliminary analysis of opportunistically collected acoustic records indicates that there may be a large biomass of midwater fish in the study area (Figure 2), although identity of the organisms remains unknown.

Oceanography - We will collect vertical profiles of conductivity, temperature, depth (CTD), light transmission, chlorophyll-a fluorescence, dissolved oxygen, pH, photosynthetic available radiation (PAR), and possibly nitrate concentration, as well as surface along-track measurements of temperature and salinity. Biological oceanographic samples at trawl stations will also be collected, including zooplankton samples and nutrients and chlorophyll-a samples. These data will be used to characterize the ecosystem (pelagic habitat and prey availability) and to feed into models to determine the effect of climate change on the health and status of pelagic fish taxa.

Data/Sample Processing (Years 2 and 3)

Fish – Biological characteristics to be measured on fish include catch per unit effort (relative abundance), length, weight, caloric content (energy density; Moss et al. 2009a), fatty acid (lipid content; Litzow et al. 2006) , isotopic composition (C/N ratio; trophic status; Kline et al. 2008), and stomach contents. We also plan to perform genetic analyses (microsatellite and SNP; Smith et al. 2007; Beacham et al. 2008) to determine stock structure, age and growth analyses on scales (Farley et al. 2007; Martinson et al. 2008) to examine growth histories in freshwater, estuarine, coastal, and offshore environments, and otolith analyses (Saito et al. 2007) to determine freshwater age,

outmigration timing (freshwater to coastal zones), daily growth rates, and possibly river of origin of juvenile and immature Chinook, sockeye (*O. nerka*), and chum salmon. The abundance of midwater organisms will be classified using echosign characteristics, trawl catches, drop camera images, and the relative frequency response (Korneliussen and Ona 2003). We will determine the abundance, vertical distribution, and environmental associations of the dominant midwater organisms.

Oceanography - The University of Washington, Marine Chemistry Laboratory will be contracted to analyze nitrate, nitrite, ammonium, phosphate, and silicate following standard protocols (UNESCO 1994). Chlorophyll-a samples will be analyzed at AFSC following protocols developed by Parsons et al. (1984). Zooplankton samples will be processed and analyzed at UAF following standard processing protocols (Coyle et al. 2008).

Data Analyses (Years 2 and 3)

To meet the project goals, we will: 1) statistically and graphically summarize data on fish and oceanographic variables, 2) create GIS maps of habitat quality and fish distributions to provide community-based assessments, and 3) model the impact of temperature variability on fish distribution, feeding success, condition, growth, and ecosystem structure.

Agency and Public Collaboration or Support

Overall project coordination will be the responsibility of Dr. Franz Mueter, University of Alaska Fairbanks (UAF). Collaborators include DFG and AFSC, Ted Stevens Marine Research Institute in Juneau, Alaska. The AFSC will provide in-kind support for scientist labor during surveys and data analyses associated with salmon genetic analyses and publication, salmon age and growth analyses and publication, and oceanographic data analyses and publication. The DFG will provide in-kind support for scientist labor for data analyses associated with salmon genetics analyses and publication and salmon age and growth analyses and publication. Support for this project also comes from the North Pacific Fisheries Management Council and from western Alaska organizations including Bering Sea Fisherman's Association, and the Yukon River Drainage Fisheries Association.

MEASUREABLE GOALS AND OBJECTIVES:

Goals:

1) Collect baseline fisheries and oceanographic data to enable resource managers to better predict effects of climate and human impacts on ocean productivity and on the ecology of marine and anadromous fish species within the northeastern Bering Sea and Chukchi Sea;
2) Assess the distribution, relative abundance, diet, energy density, size, and potential predators of juvenile salmon, other commercial fish, and forage fish within the northeastern Bering Sea and Chukchi Sea;
3) Evaluate the effect of climate change on the health and status of pelagic fishes within the northeastern Bering Sea and Chukchi Sea.

Measurable Outcomes

Baseline Data (Year 3) - Fish and oceanographic data from these surveys will be processed, quality control checked, and entered into a database. Upon completion of the project, these data will be archived at the National Ocean Data Center (NODC) and Census of Marine Life/Ocean Bio-geographic Information System (CoML/OBIS). This information will be useful to State and federal agencies, to other researchers, and to the private sector. It will be used by NOAA fisheries and the NPFMC to help determine the potential for the Arctic to support fisheries (see next paragraph). This information will very likely also be used by BOEMRE to develop Environmental Impact Statements for future oil and gas leases and for other development activities. Similarly, oceanographic data from this study will be

invaluable in calibrating and ground-truthing circulation and oil-spill trajectory models developed for Arctic waters. Such models are being developed with funding from BOEMRE (see http://alaska.boemre.gov/ess/) and their development is often hampered by lack of adequate data (Jia Wang, UAF, pers. comm., Wang et al, 2008).

Acoustic Estimation of Fish Biomass (Year 3) - Based on previous biomass estimates (1990 and 1991) for fish species in the Arctic, the target species in the Arctic FMP include Arctic cod and saffron cod (Page 16 and 17; Table 3-3; Arctic FMP). The new biomass estimates generated through this project will be used by the NPFMC to determine whether Arctic cod and saffron cod or other marine fish species should be classified as "target species" for potential commercial fisheries, as "ecosystem component species" for continued monitoring, or as non-target species (as defined in the Magnuson-Stevens Fishery Conservation and Management Act). These estimates will also be used to assess total allowable catch for potential target species as defined in Chapter 3 of the Arctic FMP.

Publications and presentations (Years 2 and 3) - Results from the analyses will he presented at the Annual Marine Science Symposium in Anchorage. We also anticipate one or more peer-reviewed papers submitted for publication covering each of the following topics: Marine fish ecology (UAF lead); Stock-specific distributions of salmon (AFSC/DFG); General oceanography (AFSC); Fish distributions relative to water mass structure (AFSC); Zooplankton distributions relative to water mass structure (UAF); Fish prey and trophic structure (UAF); Identifying stocks of origin of salmon using otolith microchemistry (UAF); Modeling climate effects on marine fish distribution and movement (UAF lead); modeling climate effects on salmon movement (AFSC/DFG); and climate effects on salmon growth rate potential (AFSC/DFG).
Annual outcomes are listed in Table 1.

PROJECT CONSISTENCY WITH CIAP AUTHORIZED USE:
This project addresses CIAP authorized use #4: Implementation of a federally approved marine, coastal, or comprehensive conservation management plan. The primary federally approved management plans for fisheries resources in the northern Bering Sea and in the Arctic are the 1990 Salmon Fishery Management Plan (FMP), the Arctic FMP, the FMP for the Bering Sea and Aleutian Islands (BSAI) King and Tanner Crabs, and the BSAI Groundfish FMP (see http://www.fakr.noaa.gov/npfmc for most recent updates). The Arctic FMP was approved by the Secretary of Commerce on August 17, 2009 and is most relevant to our study region and to the proposed project. Like all federal FMPs, the Arctic FMP conforms to the Magnuson-Stevens Fishery Conservation and Management Act (16 U.S.C. 1801 et seq.) and must be consistent with its provisions, including ten national standards for fishery conservation and management. The National Marine Fisheries Service (NMFS) issued a final rule that implements the Fishery Management Plan for Fish Resources of the Arctic Management Area (Arctic FMP). Regulations implementing the FMP appear as 50 CFR parts 679 and 680. A critical part of implementing the FMP is continued research into the fish resources of the Arctic Management Area to understand the Arctic marine environment and fishery resources. This study contributes needed surveys to meet these objectives of the FMP as described below.

The Arctic FMP governs fishery management north of the Bering Strait, including the Chuckchi Sea and Beaufort Sea. Current policy as articulated in the plan is "to prohibit commercial harvests of all fish resources of the Arctic Management Area until sufficient information is available to support the sustainable management of a commercial fishery." Therefore, implementation of the plan requires the collection of such information. The NPFMC has identified ten management objectives to carry out its management policy (page 5, Arctic FMP). The proposed project addresses 3 of the 10 objectives relating to Biological Conservation (Obj. 1), Habitat (Obj. 4), and Research and Management (Obj. 7). This project meets the needs identified by the NPFMC through

conducting an integrated ecosystem assessment in support of ecosystem-based management (Obj. 1), identifying and characterizing habitat requirement for marine and anadromous fishes in support of essential fish habitat provisions (Obj. 4), and by collecting data and conducting fisheries research in support of management decisions (Obj. 7). Results from the proposed study will be used by NOAA fisheries and the NPFMC in the management of fisheries resources in the Arctic. Specifically, data will provide biomass estimates of mid-water fishes such as Arctic cod to assess their role in the ecosystem and determine appropriate management measures. The baseline habitat data will further provide information to the Council and to NOAA on the nearshore and offshore habitat of various fish species to meet the Essential Fish Habitat provisions of the Arctic FMP.

Baseline information provided by this study is likely to impact decision making by the NPFMC. For example, the NPFMC decision to prohibit fishing for Arctic cod and other species in the Arctic was in part based on limited information from a joint UAF/AFSC survey conducted in the early 1990s. The proposed survey would be the first comprehensive survey of the region that would provide critical information for authorizing any future fisheries. Information from the survey would also contribute to decision-making by BOEMRE by contributing critical information to EIS documents that are the basis for decisions regarding oil and gas development in the Arctic. While we have no commitment from the agencies that the information from this study will be used, NPFMC provided a strong letter in support of the study (attached) and is likely to use any available information from the comprehensive survey proposed here. Similarly, BOEMRE personnel have contacted the principal investigators in the past for information on the distribution, abundance, and ecology of fish species in the Chukchi Sea and would likely utilize any new information collected under the proposed project in developing EIS documents.

In addition, this project supports research objectives identified in several other FMPs. The BSAI Crab FMP includes snow crab and red king crab stocks that either extend into (snow crab) or occur entirely in the proposed study area (e.g. Norton Sound red king crab). The FMP identifies several research objectives including "defining oceanographic conditions important to maximizing productivity of crab stocks." Snow crab support a major commercial fishery, but have been declared overfished and are currently under a rebuilding plan. They are an Arctic species and little is known about their productivity in northern waters. This project addresses the above research objective by sampling early pelagic life stages of snow crab in the NEBS/CS and results will be useful to crab stock assessment scientists at the AFSC and DFG.

Under the Bering Sea/Aleutian Islands groundfish FMP, which covers groundfish stocks that extend into the NEBS/CS during all or part of their life, the NPFMC has identified a number of objectives including several that are relevant to this project. To address these objectives, the NPFMC in 2009 identified five-year research priorities, including several priorities with a direct focus on the Arctic (see http://www.fakr.noaa.gov/npfmc/Research_priorities09.pdf). This project was developed in direct response to these research priorities and clearly meets the identified need for assessing baseline conditions by extending surveys into the Arctic. Information from the project will therefore be useful to the NPFMC in support of the sustainable management of fisheries resources in the Arctic.

Direct Benefits to the Coastal Environment

Our proposed project covers the nearshore and offshore regions of the NEBS/CS with more than 90% of the sampling occurring in waters less than 50 m deep. The study area is relatively pristine and we view the region holistically as a single large ecosystem with strong linkages between the coastal and offshore areas. The primary benefits from this project are long-term benefits that help maintain the continued health of the ecosystem and benefit the natural coastal environment by:

1) Establishing a baseline on the health and status of pelagic fishes against which to assess any future changes and as a basis for developing appropriate mitigation measures. Such changes

may occur as a result of proposed oil and gas development in the Chuckchi Sea, increased shipping activities in the NEBS/CS, effects of global warming on the marine environment, and other anthropogenic activity. It is essential to establish a baseline so that future impacts can be documented and mitigated if needed. Without a baseline, it is difficult to justify appropriate mitigation efforts that will protect coastal areas. The initial baseline assessment will consist of the products and outcomes described under 'Measurable Goals and Objectives' and will be completed by the principal investigators and collaborators. Additional studies will be needed to assess future changes.

2) While much of the proposed sampling takes place in offshore waters, the offshore marine environment is closely linked to the coastal environment because the early life stages of many marine species utilize the coastal environment (including Arctic cod, saffron cod, Pacific sandlance, Pacific herring, and others), while many coastal species, most notably salmon, migrate to the open ocean for part of their life. For example, our project will develop growth rates for salmon in the nearshore/coastal environment by examining daily growth rings on otoliths (ear bones). Early marine growth rates are related to marine survival of salmon (Farley et al. 2007) and are linked to ocean environment and climate. These baseline data could be used to determine the effect of contaminants in the coastal zone on salmon early marine growth rates and marine survival.

3) Physical oceanographic parameters will be used to establish water mass characteristics in nearshore and offshore waters. These can be utilized to determine ocean current structure and advection between nearshore and offshore waters, thus providing a means to determine where oil or other contaminants may travel in the event of a spill. Such information is needed to plan and execute a coordinated response to a spill and to identify and protect sensitive areas. The long Arctic coastline and limited facilities along the coast require a targeted response to any spill and will only be effective if both adequate information on potential spill trajectories and sufficient response capabilities are in place.

4) Biological oceanographic parameters will be used to establish baseline productivity for nearshore and offshore locations. Lower trophic level organisms (phytoplankton and zooplankton) are the cornerstone for fish growth. Contaminants in the nearshore and offshore environments could affect these organisms in profound ways, thus baseline data are necessary to compare species composition and biomass in pristine conditions to those that may involve oil or other contaminants from nearshore development.

COORDINATION WITH FEDERAL RESOURCES OR PROGRAMS:

Our proposal is in partnership with the Alaska Fisheries Science Center MACE and ABL divisions. The AFSC anticipates funding for separate surface trawl and acoustic mid-water trawl surveys in the southeastern Bering Sea during 2010, thus this project will extend both surveys further north and into the Chukchi Sea providing opportunities to compare these large marine ecosystems during a single year. In addition, the AFSC received MMS funding to survey the North Aleutian Basin region during 2010. This proposal will coordinate efforts with the AFSC/NAB project, extending similar surveys north.

COST SHARING OR MATCHING OF FUNDS:

No CIAP funds will be used to meet cost sharing or matching requirements.

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Table 1: Milestone Chart

Date	Task/Product
2011	
Nov 2011	Award
Nov 2011	Recruitment for AFSC Fisheries and Oceanographic position
2012	**YEAR 1**
Jan 2012	Hire AFSC Fish/Ocean position / Identify Graduate students
Jan 2012	Submit charter solicitation
Jan 2012	Begin purchasing survey supplies and equipment/Fishing gear, ocean gear, acoustic gear
Apr 2012	Ship supplies and equipment to Dutch Harbor, Alaska
May 2012	Select charter vessel
Aug 2012	Conduct Fish/Ocean survey in the NEBS and Chukchi Sea (40 days)
Oct 2012	Ship samples, gear and equipment from Dutch Harbor to Juneau, Alaska
Nov 2012	Begin Fish and Oceanographic sample and data processing
2013	**YEAR 2**
Jan 2013	Participate in Alaska Marine Science Symposium
Feb 2013	Begin purchasing survey supplies and equipment/Fishing gear, ocean gear, acoustic gear
Mar 2013	Finalize 2012 fish catch data processing and QC
Mar 2013	Complete 2012 fish distribution maps for surface and midwater
Apr 2013	Ship supplies and equipment to Dutch Harbor, Alaska
Jun 2013	Complete 2012 salmon genetics and energetics, physical oceanographic data processing and QC, zooplankton sample processing, acoustic data processing, and nutrient processing
Jul 2013	Complete 2012 biological and physical oceanographic maps
Aug 2013	Conduct Fish/Ocean survey in the NEBS and Chukchi Sea (40 days)
Oct 2013	Ship samples, gear and equipment from Dutch Harbor to Juneau, Alaska
Nov 2013	Begin Fish and Oceanographic sample and data processing
2014	**YEAR 3**
Jan 2014	Present results at Alaska Marine Science Symposium
Mar 2014	Finalize 2013 fish catch data processing and QC
Mar 2014	Complete 2013 fish distribution maps/surface and midwater
Jun 2014	Complete 2013 salmon genetics and energetics, physical oceanographic data processing and QC, zooplankton sample processing, acoustic data processing, and nutrient processing
Jul 2014	Complete 2013 biological and physical oceanographic maps
Aug 2014	Finalize modeling efforts and draft manuscripts
Sep 2014	Present results at national meeting of the American Fisheries Society
Dec 2014	Submit manuscripts to journals for publication/submit datasets to National Ocean Data Center (NODC) and Census of Marine Life/Ocean Biogeographic Information System (CoML/OBIS)

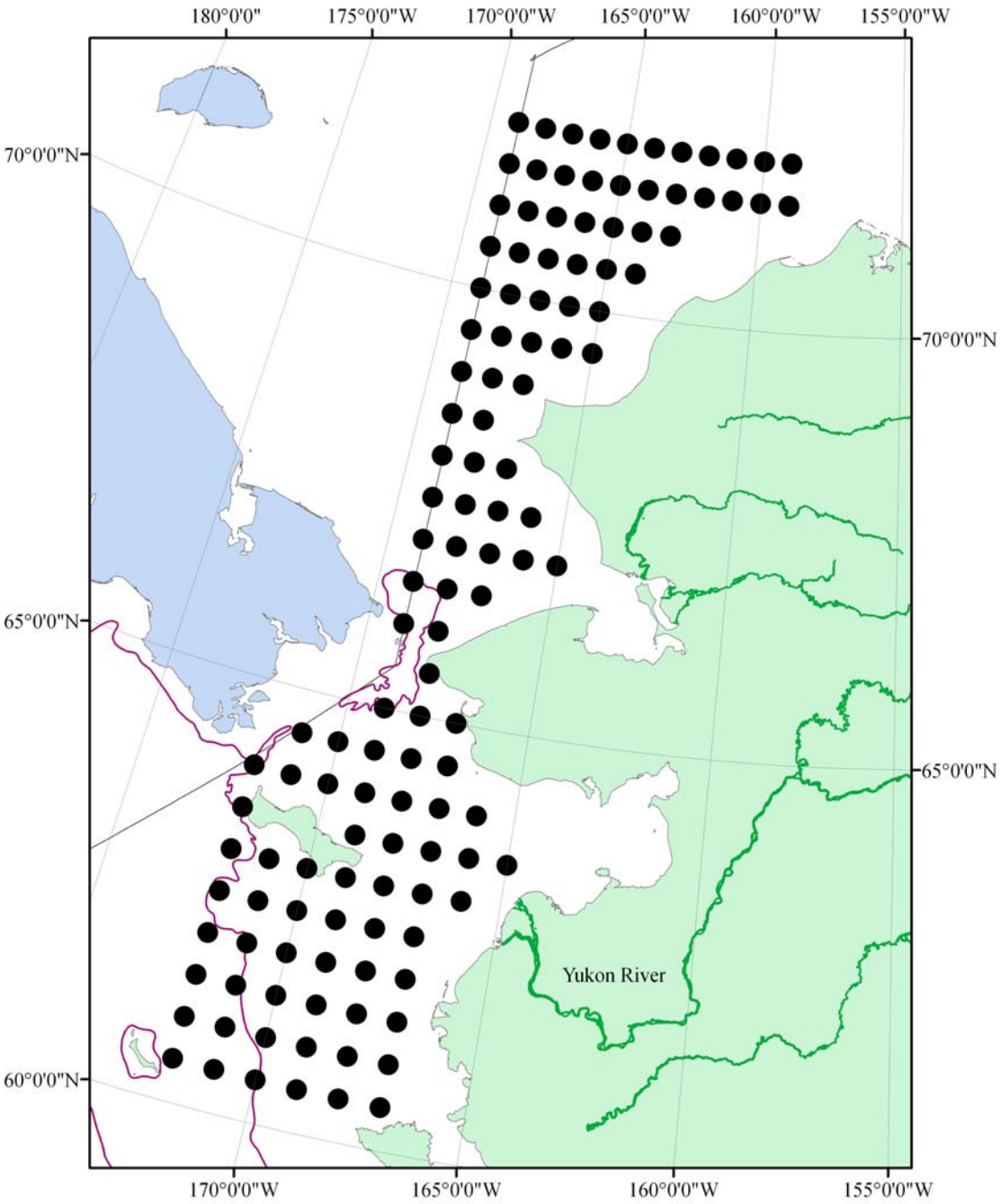

Figure 1. Proposed station locations during 2010 and 2011 for the Arctic Ecosystem Integrated Survey.

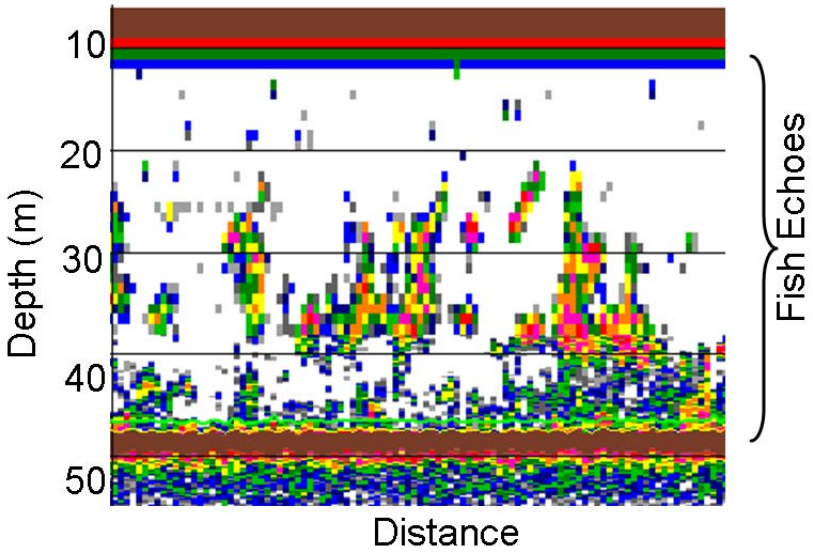

Figure 2. Echogram showing likely midwater schools of fish recorded in Chukchi Sea lease sale 193. The strong reflection at ~ 47m is the bottom echo. Warmer colors indicate stronger acoustic reflections.

STATE OF ALASKA
COASTAL IMPACT ASSISTANCE PROGRAM

Oceans Alaska

This project will be conducted on behalf of the State of Alaska. It was selected through an open competitive procurement process and in accordance with 3 AAC 196.

PROJECT TITLE: Net and Debris Removal in Key Locations in the Waters Associated with the Ketchikan Gateway Borough

PROJECT CONTACT

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PROJECT LOCATION

The net and debris removal will take place in the waters off of the Ketchikan Gateway Borough (See Figure 1).

PROJECT DURATION

This project will last approximately 2 years in duration.

ESTIMATED COST

Spending Estimate ($)				
TOTAL	**Year 1**	**Year 2**	**Year 3**	**Year 4**
$61,500	$53,500	0	0	0

Funding per Allocation Year of CIAP ($)				
TOTAL	**FY 07**	**FY 08**	**FY 09**	**FY 10**
$61,500	0	0	0	$61,500

PROJECT DESCRIPTION

Marine debris and discarded netting is an environmental problem-it presents a risk to the viability of biological resources of the area.

Ketchikan, Alaska's waterfront has a long history of over 100 years of commercial fishing and marine-related activities. A significant amount of fishing gear, marine-related commercial equipment, and commercial and residential Ketchikan debris has been discarded or lost to the waterfront.

We propose to conduct a program designed to remove netting and debris in areas within the Ketchikan Gateway Borough that pose the highest risk to the fisheries resource and biology of the

area. An educational component will be integrated with the project, with Ketchikan High School students as participants in the effort that will contribute to their maritime skills, marine science understanding and will foster good marine stewardship practices. In addition, we will include an educational display of the project at Oceans Alaska Marine Science Center, including a video presentation of the project.

The project will be conducted in three phases:
1. Survey, assessment, and evaluation of risk to fisheries resources
2. Removal of debris and netting and evaluation of success
3. Educational community outreach of project with display and video presentation

Phase 1: Survey, assessment and evaluation of risk to fisheries resources. This phase of the project will survey and assess the areas on the Ketchikan waterfront that pose high risk to the biology and fishery resources resulting from accumulations of debris and netting. The sites or locations will be prioritized according to potential impact by type and concentration of debris and netting. This information will then be used to prioritize the removal of the debris and netting.

The educational objective with students will include content in boat handling, navigation, safety, scientific observation and the use of a Remotely Operated Vehicle (ROV). It is important for local students and their families that live and depend on the marine environment to learn these skills and to develop good practices that promote good stewardship of the marine environment.

The survey locations will first be categorized by areas that have the potential for discarded debris and netting. These areas include:

High potential
- Harbors
- Waterfront industry
- Waterfront processing businesses
- Transient dock

Medium Potential
- Personal Residents
- Businesses on waterfront but not marine-related
- Deep water adjacent to High potential areas
- Uninhabited Shoreline

Low Potential These areas will be identified using the above criteria and also areas of interest resulting from local and traditional knowledge gained by interviewing marine-related businesses and longtime citizens of Ketchikan. Figure 1 (attached to end of application) shows what we currently believe to be the high risk area on the waterfront.

The survey of the sites will be conducted aboard the Ketchikan Gateway Borough School District (KGBSD) vessel Jack Cotant which is a 45 foot vessel (Coast Guard inspected Subchapter T vessel, carries up to 25 people) designed for training students in navigation, boat safety, and seamanship skills. With the direction of the maritime teacher from the Ketchikan High School, Rick Collins, students will be required to present the navigation and boat handling skill to take the boat to the locations that have been identified. Once on site, the proposed "SeaBotix" Remote

Operated Vehicle (ROV) will be deployed and will survey the location with its underwater camera and recorder system for problem debris. The debris will be recorded and precisely located using GPS coordinates. This data will be entered into a database that includes the following fields

1. Date
2. Time
3. Latitude
4. Longitude
5. Description
6. Associated marine life (live and dead)
7. Disposition (i.e. removed, left in place for later removal)
8. Photo file Risk to fisheries will be based on several criteria: Debris considered having High Risk to fishery recourses include: -Net, line and Trap entanglement. -Including portions of netting or nets that have been lost or discarded, discarded coils or entangled balls of line, and lost or discarded traps without escape openings. -Hazardous metals and chemicals -Including old lead batteries, copper tubing, corroding fuel containers, and refrigeration units. -Objects implicated in impact to marine resources -Including discarded automobile tires, and large mesh screen and grating.

Phase 2 Debris removal and exhibit development

Without knowing what debris will be encountered in phase one of the project it is difficult to describe how debris will be removed. The ROV will have a basic manipulator arm that will be capable of attaching retrieval gear such as grappling hooks to the more easily removed debris. Large debris that is entangled to rock or pilling will require more sophisticated equipment and will be handled in future projects that utilize larger vessels and commercial diving services. After removal debris will be cataloged, photographed and evidence of fishery related mortality will be documented. Disposal of the debris will be at the Ketchikan Landfill. The survey and assessment information will be incorporated into the resource and inventory section of Ketchikan's Coastal Zone Management Plan.

The ROV will be important to this project in several ways. First, the ROV will not have depth and bottom time restrictions that traditional underwater techniques, such as scuba diving, do. The ability to maintain surveying at great depths is especially efficient considering the mobilization of people, vessel, and resources on each outing. The ROV will also be able to handle hazardous and dangerous materials with less caution than divers. Additionally, the students are able to be part of the project first-hand, with live video feeds on the vessel. The use of the ROV and its ability for debris removal can make it an invaluable part of future projects using the same technique. The ROVs ability to test and survey for various marine life and oceanographic indicators will also make it a valuable resource for other coastal projects after this project ends, making it a resource that will continue to benefit the coastal communities in Southeast Alaska. Potential uses include marine research, invasive species monitoring, search and rescue, and continuation of marine debris surveys.

Phase 3 Educational community outreach of project with display and video presentation

The project also has a role for educating the public about the harmful impacts discarded debris has on the marine fishery resources. Because discarded debris into the sub tidal marine areas is for

all intensive purposes out of sight, the general public seldom has an understanding of these impacts. This project will present us with a great opportunity to develop an exhibit showing underwater video of this out of sight debris, the educational opportunities that a clean-up program has for students interested in careers in the maritime industry, and to educate the public to take steps to reduce the discarding and loss of harmful debris into the marine environment. Housing this exhibit at the Oceans Alaska Marine Science Center will result in a educational experience to local residents and visitors about the issues surrounding discarded marine debris.

MEASUREABLE GOALS AND OBJECTIVES

Project Goal 1: The survey and assessment phase has a goal of identifying the areas on the Ketchikan waterfront that pose high risk to the biology and fishery resources by accumulations of debris and netting. This risk of sites or locations will be prioritized according to potential impact by type and concentration of debris and netting. This information will then be used to prioritize the removal of the debris and netting. Incorporated into this goal is an educational component that will result in a field training program associated with the Ketchikan Gateway Borough School district maritime training classes.

Outcome: Debris that pose risk to fishery resources will be identified in the high risk areas and locations recorded using precision GPS coordinates. Navigation, and boat and safety handling skills will be taught to approximately 70 first and second-year maritime students from the Ketchikan High School during the survey, and their learning experience will be evaluated by the Maritime teacher. Although not directly related to identification of high risk areas, the students being taught the navigation, boating and safety handling skills are the future deck hands, captains and mariners for the Ketchikan waterfront. These students will have a higher probability of reducing new discarded marine debris to this area. Exposing these students to the risk to the biological resources of discarding equipment and gear will help provide these individuals with better stewardship skills of the marine environment.

Project Goal 2: After debris and netting is prioritized, we will remove as much debris as possible in phase two of the project using the Ketchikan Gateway Borough School Districts vessel Jack Cotant. For debris too large for this vessel to handle we will contract with professional diving services to remove the debris in a future phase 3 of the project. In phase 3 of the project, we will seek a funding opportunity to build off the results of this project. We anticipate that a significant amount of disposed debris in the high risk area will be of a size and nature that is outside the capability of the resources associated with the first two phases of this project. If funding is secured for phase three it will have the objective of debris removal by contracting with commercial services with the expertise to remove the larger and more difficult debris identified in this project.

PROJECT CONSISTENCY WITH CIAP AUTHORIZED USE

The project is consistent with CIAP authorized use number 1. The project falls under the first two authorized uses, but has the strongest connection with the first. Under the first use this project results in the restoration of the coastal waterfront by removing debris that has been discarded into the sub-tidal habitat resulting in a degraded level of suitability of the habitat to provide a healthy environment for the marine life utilizing the coastal pelagic and benthic environment. This project also provides a mitigation result for some of the human-induced mortality of the fisheries resources by removing the responsible discarded gear.

The educational component will also benefit the natural coastal environment by providing students and those exposed to the outreach component with an understanding of the harm that disposed marine debris causes to the biological resources of an area. This education will be structured to foster behavior that reduces future discarding of marine debris.

COORDINATION WITH FEDERAL RESOURCES OR PROGRAMS

Oceans Alaska is coordinating the Sea Grant Marine Advisory Agent in Ketchikan, Gary Freitag.

COST SHARING OR MATCHING OF FUNDS

This project will leverage local funds and services to complete the project, but the funding request is not part of a mandated match for another grant.

STATE OF ALASKA
COASTAL IMPACT ASSISTANCE PROGRAM

The Nature Conservancy in Alaska
This project will be conducted on behalf of the State of Alaska. It was selected through an open competitive procurement process and in accordance with 3 AAC 196.

PROJECT TITLE: Bristol Bay Anadromous Waters Research and Protection

PROJECT CONTACT

Contact Name: Tim Troll
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PROJECT LOCATION

This project is located in the coastal area of Bristol Bay in Southwestern, Alaska. The project will take place in the coastal area of the Bristol Bay Coastal Resource Service Area and the Lake & Peninsula Borough. However, the results of the project will benefit watersheds in coastal areas throughout Alaska

PROJECT DURATION

It is expected the project can be completed within three years of the receipt of funds.

ESTIMATED COST

Spending Estimate ($)				
TOTAL	**Year 1**	**Year 2**	**Year 3**	**Year 4**
$834,350	$281,116	$281,116	$281,116	#

Funding per Allocation Year of CIAP ($)				
TOTAL	**FY 07**	**FY 08**	**FY 09**	**FY 10**
$834,350				$834,350

Note: The Applicant has secured more than $900,000 in funding to understand and protect fish habitat in SW Alaska over the last three years, including funding to initiate and carry out this project through 2010. The estimate of costs provided here does not reflect these funds that the applicant has raised for the project. The applicant expects most if not all of the funds raised to date for the project will be exhausted before CCIAP funds become available.

PROJECT DESCRIPTION

Goal 1: The first goal of this project of The Nature Conservancy (TNC) is directed to achieving lasting protection for anadromous water bodies in the Kvichak watershed of Bristol Bay under Alaska's Anadromous Fish Act (AS 16.05.871). Protection is currently achieved by on-site surveys of potentially anadromous waters by fisheries biologists using accepted scientific methods, and nomination of waters in which anadromous fish have been found for inclusion in Alaska's Anadromous Waters Catalog (AWC). TNC will assemble a team of biologists to survey streams within the Kvichak watershed for the purpose of adding as many waters as possible to the AWC.

The selection of waterbodies for survey will be made using a fish assemblage and distribution model currently under development by the USGS and the University of Washington. In 2010 TNC with USF&WS funding allocated to the Southwest Alaska Salmon Habitat Partnership will be conducting fish distribution surveys in the Tikchik Lakes within the BBCRSA coastal district to collect additional data for completion of the model. A secondary purpose of the survey project for the Kvichak watershed will be to test whether this model can help determine which waterbodies are anadromous and the assemblage of fish communities within those waterbodies. A proven model can help reduce the uncertainly of selecting likely anadromous waters for fish distribution surveys.

The Alaska Department of Fish and Game is also planning to undertake fish distribution surveys in Southcentral and Southwest Alaska during the same time frame. This project will be coordinated with that effort to maximize the number of streams surveyed in the Kvichak watershed. The coordinated effort will also provide an opportunity to test whether the model is more efficient than traditional methods for determining the location of anadromous waterbodies.

Goal 2: Like the number of water bodies that await inclusion in the AWC there are many that are not protected by adequate reservations of water for the fish that live within them. This project also seeks to provide permanent statutory protection under Alaska Water Law for the Mulchatna, Stuyahok and Kaskanak watersheds in Bristol Bay. Each of these systems are important for spawning and rearing salmon in the Nushagak and Kvichak River drainages, and each may be affected by the development of mineral claims. The main stems of these rivers are included within the A WC. Protection for water quantity is achieved by the filing, perfection and adjudication of instream flow reservation applications with the Alaska Department of Natural Resources. Five years of low data must be collected to perfect an application. The Alaska Department of Fish and Game prepared and filed instream flow applications on these stream systems for the SW Alaska Salmon Habitat Partnership. TNC has taken on the task of collecting the flow data necessary and is doing so through a technical services agreement with the US Geological Survey (USGS), t. The USGS has installed gauges on each of these drainages and has been collecting data. The cost for this service is approximately $180,000 per year. TNC secured funding the SW Alaska Salmon Habitat Partnership and the Village of New Stuyahok to support the project in 2009, 2010 and 2011. CIAP funds are requested to help complete the instream flow data collection in 2012 (Project Year 2) and 2013 (Project Year 3) and the filing of perfected in- stream flow applications (project Year 3).

In addition, one of TNC's partners, Bristol Bay Native Association, is completing data collection for an instream flow reservation on the Koktuli River in the Nushagak watershed. The gauges used to collect the data will be available for installation on another stream system. A survey of other

potentially important stream systems will be undertaken as part of the second goal for future installation sites for these gauges.

MEASUREABLE GOALS AND OBJECTIVES

Goal 1: The intended product of this proposal is the survey, nomination and inclusion of several hundred miles of anadromous waters in the Kvichak watershed of Bristol Bay in the AWC. All of the streams to be surveyed are within the coastal area of the Bristol Bay Coastal Resource Service Area and the Lake and Peninsula Borough. The measureable goal will be the number of stream miles and number of waterbodies nominated for inclusion with the AWC at the end of the project.

A second measureable goal or product will be a field tested model that can be used to predict which other water bodies in Southwest and other parts of Alaska that are not in the A WC would likely meet the criteria for inclusion in the AWC and accorded the protections of the Anadromous Fish Act.

In the 2010 field season, TNC, University of Washington and partners will use sophisticated network-based statistical tools to examine the diversity and distribution of fish life stages, species, and assemblages. We will relate these patterns to both landscape variables (e.g., terrain, vegetation, climate, geology, hydrogeomorphology) and to biological and geomorphic evolutionary processes. From these associations, we will develop a model that will allow us to predict the probability of occurrence of species and life stages at unsampled points throughout stream networks. The model will also incorporate estimates of precision. The model should be ready for application in 2011.

Potential applications of this research for the Alaska Department of Fish and Game, the U.S. Fish and Wildlife Service and other organizations concerned about fish habitat protection include: (1) planning conservation management and resource development; (2) establishing restoration priorities and selecting restoration strategies appropriate for landscape potential; (3) selecting monitoring sites and estimating long-term species distributional trends; (4) developing more efficient field sampling designs; (5) understanding the relations between distributional patterns and life history strategies; (6) quantifying influences of large-scale ecological processes on dynamics of stream fish habitat utilization; and (7) estimating the potential dispersal of invasive species and impacts to extant fish assemblages.

The Alaska Department of Fish and Game on its website estimates that the Anadromous Waters Catalog (AWC) currently contains about 16,000 streams, rivers or lakes around the state that have been specified as being important for the spawning, rearing or migration of anadromous fish. Based upon thorough surveys of a few drainages it is believed this number represents less than half of the streams, rivers and lakes actually used by anadromous species. ADF&G estimates at least 20,000 or more anadromous water bodies in Alaska have not been identified.

Field surveys are particularly expensive. In 2009 The Nature Conservancy surveyed fish distribution in several headwater streams in Bristol Bay and nominated 66 miles of stream reaches for inclusion in the AWC. The cost was approximately $1000 per stream mile nominated. It would cost untold millions of dollars to survey all of the waterbodies remaining in Alaska that are likely

eligible for inclusion in the AWC.

Goal 2: Flow data collection for the Stuhahok, Mulchatna and Kaskanak watersheds in Project Years 1 and 2 and submission of the data to the Alaska Department of Natural Resources in Project Year 3 to perfect the applications for the purpose of eventual adjudication of water reservation rights. The measureable outcome is the perfection of instream flow applications for these stream systems. An additional outcome is the location, and installation of a stream gauge on another stream system within the coastal district and the filing of an application for that system.

PROJECT CONSISTENCY WITH CIAP AUTHORIZED USE

The activities outlined in this proposal meet the authorized use of protecting coastal areas, authorized use # 1. This project is located in the coastal area of Bristol Bay in Southwestern, Alaska. The project will take place in the coastal area of the Bristol Bay Coastal Resource Service Area and the Lake & Peninsula Borough. However, if the model described above proves useful the results of the project may benefit watersheds in coastal areas throughout Alaska.

A water body that is included in the AWC receives a higher level of legal protection. Development activities cannot disturb a water body listed in the catalog without a permit from the Habitat Division of the Alaska Department of Fish & Game. These permits, if issued, often contain conditions that are directed to minimizing impact to anadromous fish. If a stream is anadromous but not listed in the catalog, development can proceed without a permit and without regard for the potential short term or long term impact to the anadromous fish that use the water in that stream. In order for a stream to be eligible for protection there must be site-specific, direct, unambiguous observations of anadromous fish by a qualified observer. TNC will be required to get a permit from ADF&G to use electro-shock or other capture methods to survey fish. As part of that application, TNC must establish to the satisfaction of the ADF&G that the persons undertaking the survey are “qualified.” All of TNC previous surveys have been conducted by qualified persons, familiar with the equipment and with ADF&G protocols for conducting fish distribution surveys. Once surveys have been conducted nomination of waterbodies for inclusion in the AWC must be submitted by October 1 on forms provided by ADF&G. Nominations must also contain information required by ADF&G. ADF&G’s does have a statutory directive to catalog Alaska’s anadromous waters. Although nominations are not automatically listed it is unlikely a properly submitted nomination would be rejected. ADF&G practice has been to accept nominations that comply with its standards and practices. TNC is familiar with those standards and practices and has never had a nomination rejected.

That greatest protection that can be afforded the anadromous fish species that migrate to and spawn and rear in Alaska coastal waters is to include these waters in Alaska's Anadromous Waters Catalog (AWC) and to reserve enough flow in these waters under Alaska water law to protect spawning and rearing habitat.
This project, in addition to adding coastal waters to the AWC, is directed to perfecting a method to predict the location of anadromous waters and make it more cost effective in the future to survey waters for potential inclusion in the AWC. Perfection of the model will require testing how well it predicts anadromous fish distribution in a watershed that has not been sampled. Field testing in

Alaska is often in waters that are remote and only accessible by boat or helicopter. As a result mobilization efforts for remote camp locations are expensive. Reduced costs would allow for larger stretches of streams to be surveyed, submitted for inclusion in the AWC and protected under the Anadromous Fish Act.

A provision unique to Alaska water law is the right of any citizen or organization to petition the State for a reservation of water in the public interest to protect fish, recreation and other public activities. A complicated and expensive five year data collection process is required to prove-up the claim of reservation before a priority water right is granted. The costs are particularly high because most streams in Alaska are remote and not accessible by road. The Stuyahok, Mulchatna and Kaskanak river systems that are the subject of TNC's protection efforts can only be accessed by boat in the summer and by helicopter in the winter. The funds requested in this proposal will help with the last two years of data collection in these systems and help with covering the costs of an hydrologist to assemble the data into a perfected application to the Alaska Department of Natural Resources.

All of the waters gauged for instream flow reservations are within the coastal waters as those waters are defined for the Bristol Bay Coastal Resource Service Area and the Lake and Peninsula Borough. Once these flow reservations are perfected and adjudicated by the Alaska Department of Natural Resources the fish within these systems will in effect have a priority reservation of water quantity for their needs. Any water withdrawals for human activities will be limited to quantities of water over and above what is reserved for fish. The natural coastal environment of Bristol Bay whether in the estuaries or in the furthest headwater streams is inseparable from the fish, both resident and anadromous, that inhabit it. Unfortunately Alaska law does not provide for the automatic reservation of water quantity in its coastal area rivers, lakes and streams. The best we can do under Alaska law is reserve enough water on a case by case basis for the river, lake and stream systems that support fish. The stream systems that are the subject of this project were selected because mineral exploration in the watersheds of these systems may result in development that could diminish water flow.

COORDINATION WITH FEDERAL RESOURCES OR PROGRAMS

The applicant was a founding member of the Southwest Alaska Salmon Habitat Partnership formed in 2001 and recognized in 2008 by the National Fish Habitat Board as a fish habitat partnership under the National Fish Habitat Initiative. The partnership is a collaboration among federal and state agencies, conservation organizations and Native non-profit organizations and Native corporations. Membership currently includes representatives from USF&WS, NOAA, National Park Service, BLM, Alaska Department of Fish and Game, Alaska Department of Natural Resources, University of Alaska, Bristol Bay Campus, The Conservation Fund, The Nature Conservancy, The Nushagak-Mulchatna / Wood-Tikchik Land Trust, Bristol Bay Native Association and Bristol Bay Native Corporation. Including streams within the A WC and filing in stream flow reservations are key strategies that have been identified by the Partnership for protection of anadromous waters in Bristol Bay. The Partnership has provided $300,000 of its allocated funds under the National Fish Habitat Initiative to TNC to carry out this project. Also the New Stuyahok and Ekwok Tribal Councils have provided approximately $300,000 in tribal funding for this project. The applicant TNC has also raised private funding for this project. All of these funds, however, have been used in 2009 and are expected to be expended before CIAP funds are

available. The receipt of CIAP funds will enable the Southwest Alaska Salmon Habitat Partnership to bring this project to completion.

The Project Manager for this project, Tim Troll, is currently Chairman of the Steering Committee for the Southwest Alaska Salmon Habitat Partnership.

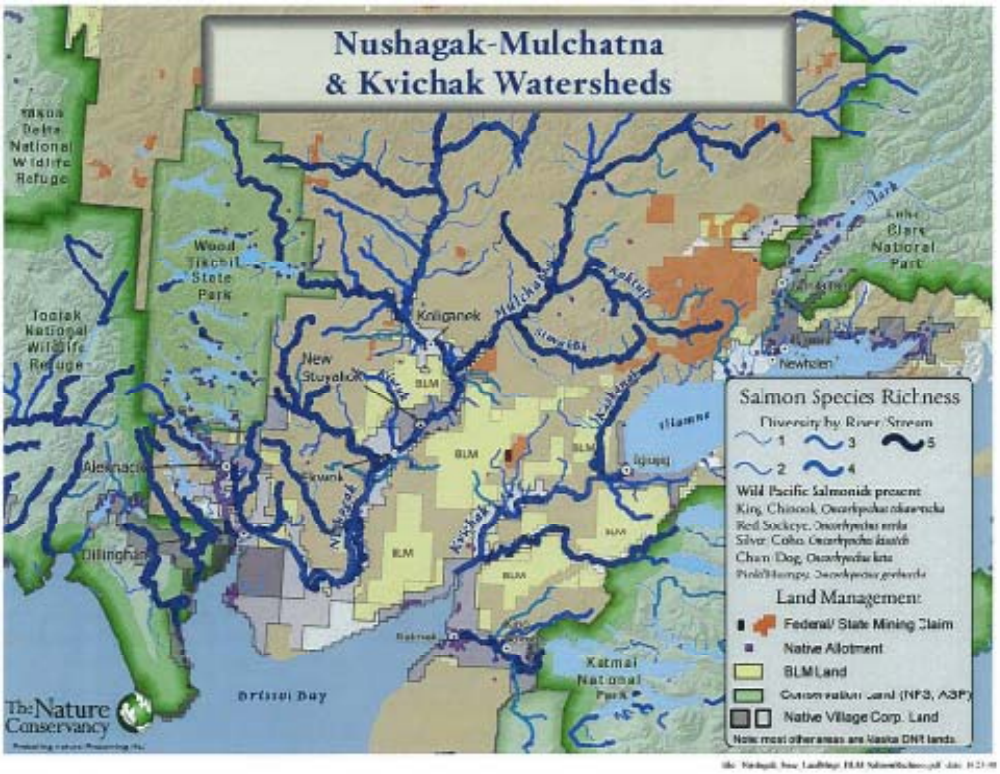
As noted above, this project will also be coordinated with anticipated efforts of the Alaska Department of Fish and Game to survey streams in Southcentral and Southwest Alaska for potential inclusion in the AWC. The project of ADF&G will likely entail the use of some federal funds

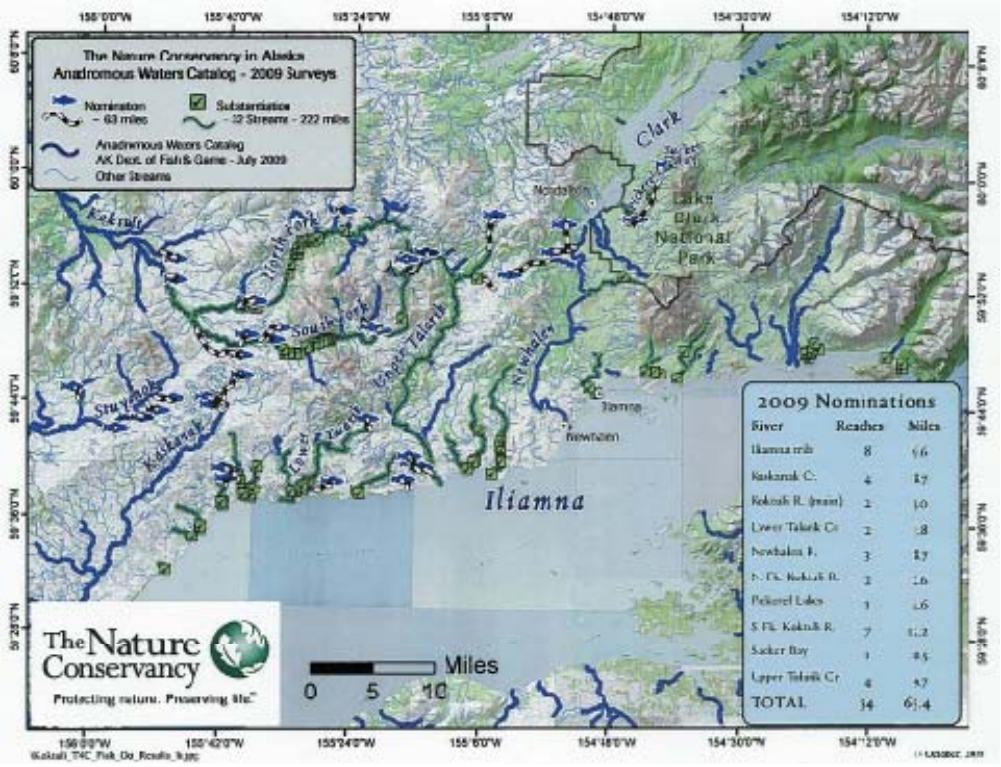
Coordination on this project is further demonstrated by the fact that the in stream flow reservation applications on the Stuyahok and Mulchatna Rivers were prepared and filed by the Alaska Department of Fish and Game on behalf of the Southwest Alaska Salmon Habitat Partnership.

COST SHARING OR MATCHING OF FUNDS

As noted above, other sources of funds have and are being used by TNC to implement the project and carryout necessary activities of the project in 2008, 2009 and 2010. TNC expects that most of these other funds will be exhausted before CIAP funds become available. In that regard CIAP funds are not expected to be used as match, but are being used to help bear future costs of the project, and bring the project to conclusion.

Note: Attached is the proposal of the University of Washington that was funded by the Southwest Alaska Salmon Habitat Partnership with USF&WS support in 2010. It includes a description of the model the USGS and University of Washington expects to have completed in 2010 to apply and test during the 2011 – 2012 surveys in the Kvichak Watershed proposed for CIAP funds.


Nushagak-Mulchatna
& Kvichak Watersheds
Wood Tikchik State Park
Togiak National Wildlife Refuge
Koliganek
New Stuyahok
Aleknagik
Dillingham
Bristol Bay
Katmai National Park
Lake Clark National Park
Newhalen
Iliamna
Salmon Species Richness
Diversity by River Stream
1
2
3
4
5
Wild Pacific Salmonids present:
King, Chinook, Oncorhynchus tshawytscha
Red Sockeye, Oncorhynchus nerka
Silver, Coho, Oncorhynchus kisutch
Chum, Dog, Oncorhynchus keta
Pink/Humpy, Oncorhynchus gorbuscha
Land Management:
Federal/ State Mining Claim
Native Allotment
BLM Land
Conservation Land (NPS, ASP)
Native Village Corp. Land
Note: most other areas are Alaska DNR lands.
The Nature Conservancy


The Nature Conservancy in Alaska
Anadromous Waters Catalog - 2009 Surveys
Nomination
~ 63 miles
Substantiation
~ 32 Streams ~ 222 miles
Anadromous Waters Catalog
AK Dept. of Fish & Game - July 2009
Other Streams
Clark
Lake Clark National Park
Nondalton
Kokrines
North Fork
South Fork
Upper Talarik
Newhalen
Iliamna
Lower Talarik
Koktuli
Newhalen
Iliamna
2009 Nominations
River
Reaches
Miles
Iliamna trib
8
6
Koktuli R. (main)
2
10
Newhalen R.
3
7
Pickerel Lakes
1
6
TOTAL
34
61.4
The Nature Conservancy
Protecting nature. Preserving life.
Miles
0
5
10

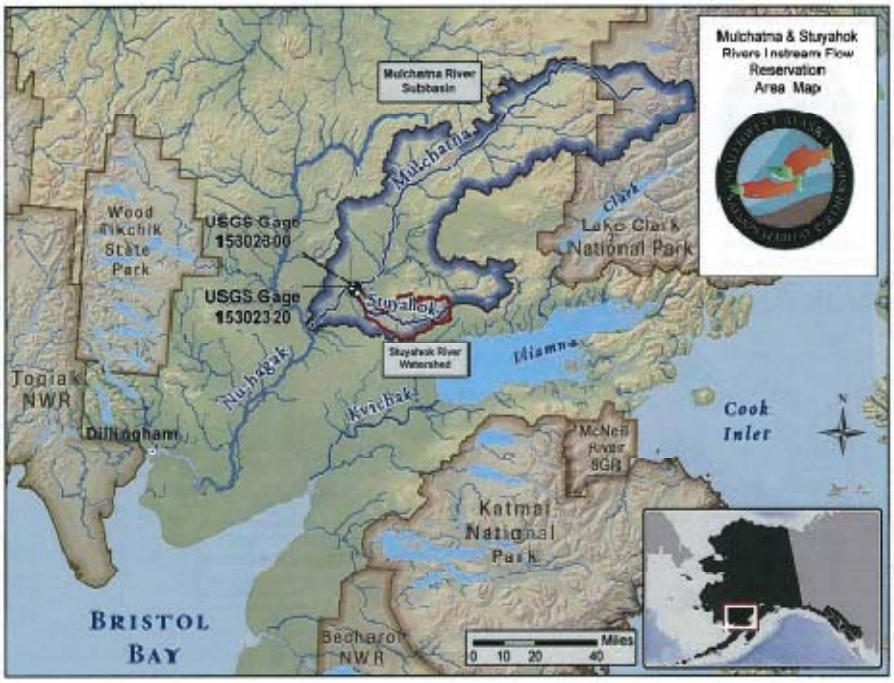
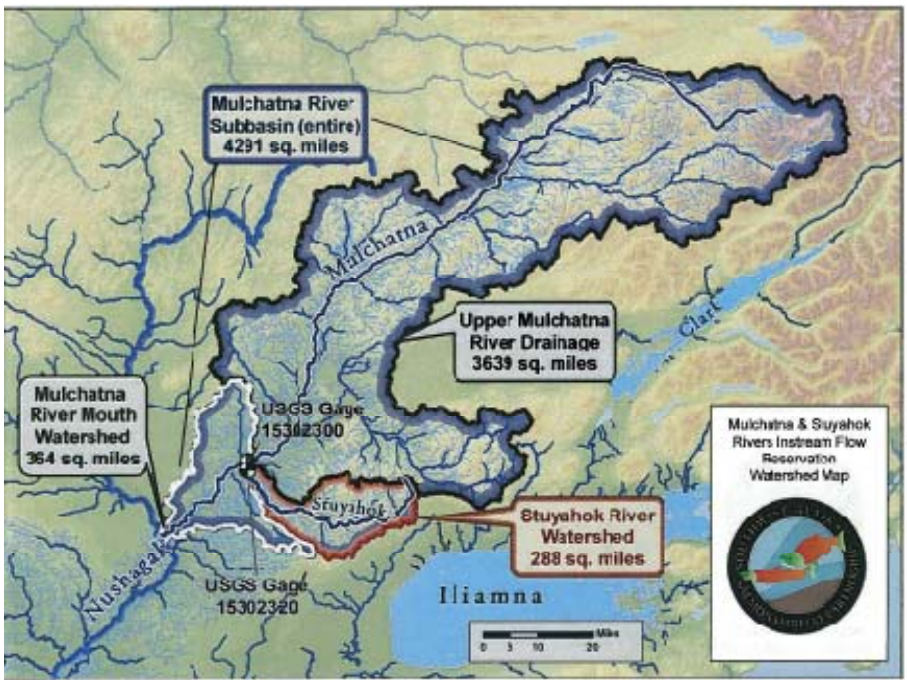


Figure 1: Area Map, Mulchatna and Stuyahok Rivers, near Dillingham, Southwest Alaska



Watershed Map, Mulchatna and Stuyahok Rivers, near Dillingham, Southwest Alaska

Figure 2: Reservation reach boundaries, Stuyahok River, near Dillingham, Southwest Alaska

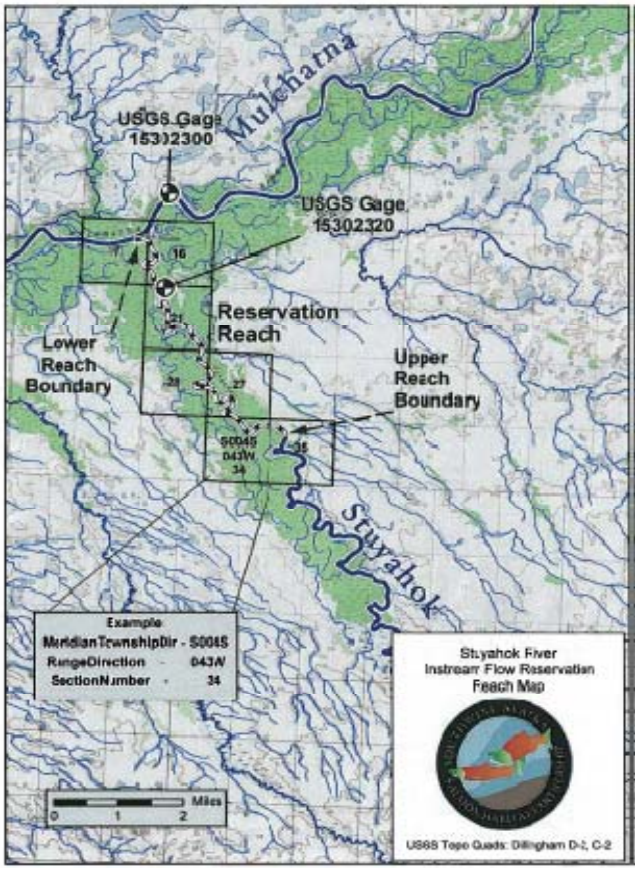


Figure 3: Reservation reach boundaries, Mulchatna River, near Dillingham, Southwest Alaska

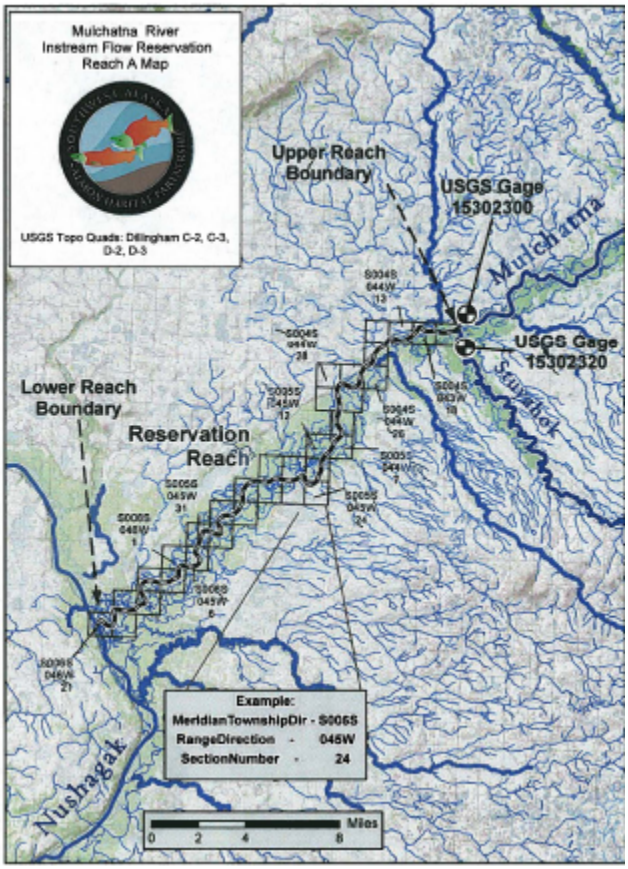
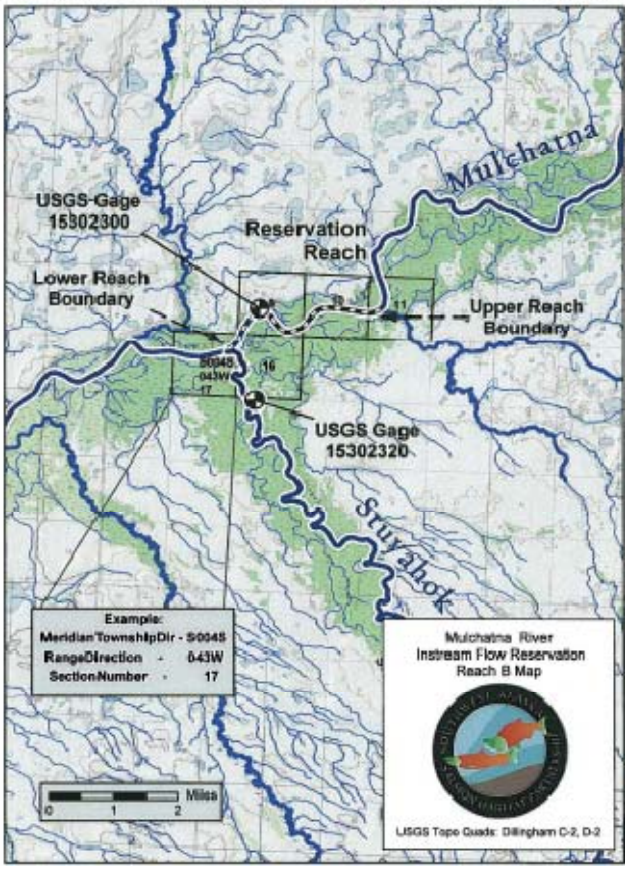
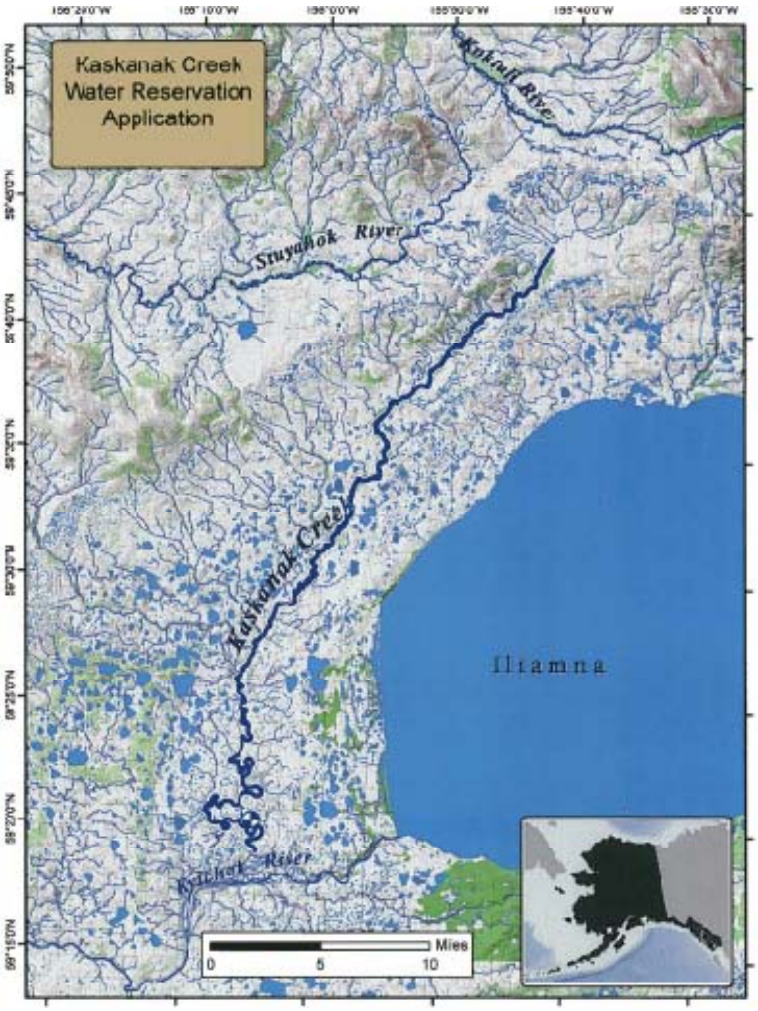


Figure 4: Reservation reach boundaries, Mulchatna River, near Dillingham, Southwest Alaska




Kaskanak Creek
Water Reservation
Application
Kuskokwim River
Stuyahok River
Kaskanak Creek
Iliamna
Miles
0
5
10

STATE OF ALASKA
COASTAL IMPACT ASSISTANCE PROGRAM

Seward Association for the Advancement of Marine Science, dba Alaska SeaLife Center
This project will be conducted on behalf of the State of Alaska. It was selected through an open competitive procurement process and in accordance with 3 AAC 196.

PROJECT TITLE: Walrus Diets in Bristol Bay: Conservation Concerns and Environmental Monitoring

PROJECT CONTACT

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PROJECT LOCATION

The project will be undertaken in Bristol Bay, southeastern Bering Sea, Alaska. Maps of the region are attached as Appendix A.

PROJECT DURATION: 2.5 years

ESTIMATED COST

Spending Estimate ($)				
TOTAL	**Year 1**	**Year 2**	**Year 3**	**Year 3.5**
$454,253	$309,628	$89,115	$55,510	$0

Funding per Allocation Year of CIAP ($)				
TOTAL	**FY 07**	**FY 08**	**FY 09**	**FY 10**
$454,253	0	0	0	$454,253

PROJECT DESCRIPTION

Problem and Need

The walruses that reside along the shores of Bristol Bay are an important, traditional cultural resource of area residents (Wilson and Evans 2009, and documents from Qayassiq Walrus Commission (QWC), Bristol Bay Native Association (BBNA), and others contained therein). QWC and BBNA are concerned over possible disturbance to walruses, their foraging areas, and prey resources by the commercial trawl fishery that operates in Bristol Bay, and has asked the North Pacific Fishery Management Council for additional protections of critical habitat.

Trawling is not the only factor that is a potential threat to Bristol Bay walruses. Proposed oil and gas lease sales in southern Bristol Bay are of great concern to coastal residents and others because

of affects that disturbance from development activities or accidents could have on numerous critical resources, including walruses and their prey. Indeed, the proposed tracts lie near Cape Seniavin, a walrus haulout that has grown considerably in the past two decades and is now the largest haulout in Bristol Bay (Fink et al. 2008). Circulation patterns in Bristol Bay would distribute oil spilled there throughout the Bay. Although no development activities will occur in the Bristol Bay lease sale area until 2018 at the earliest, it is reasonable to believe that industry will maintain its interest in this area and seek to have leases authorized for exploration in the future.

Climate change and its effects on marine environments looms as potentially the greatest long term threat to the Bering Sea ecosystem. Warming waters and dwindling sea ice both have direct and indirect roles in altering the structure of marine communities, including the abundance, productivity, and distribution of many marine forage species, among which are those important to walruses (Grebmeier et al. 2006, Mueter and Litzow 2008, Sheffield and Grebmeier in press).

Thus, it is time to establish contemporary baseline information on walrus feeding ecology in Bristol Bay so that impacts that may occur due to environmental change forced by trawl fisheries, future oil and gas exploration and development, and climate change can be quantified and mitigated to conserve walruses in their own right, and their values in the lives of coastal residents.

Most of the walruses that haul out in Bristol Bay (Appendix A, Map 1) forage in Bristol Bay (Maps 2, 3). Historical information on diets of walruses in the vicinity of Bristol Bay comes from Traditional Ecological Knowledge (TEK) of residents who hunt walruses (H. Chythlook pers. com.); from animals collected in the southeastern Bering sea well east of Bristol Bay on three occasions in winter-spring between 1962 and 1976 (Map 4); and from 184 animals that were collected in February-April 1981 (Fay and Lowry 1981), only four of which actually came from Bristol Bay, while the rest were taken also far to the east of Cape Newenham (Map 5). Elsewhere, diets of walruses are known to differ substantially across spatial scales comparable to these (Sheffield and Grebmeier in press). Thus, we have only a vague understanding about the prey resources that support walruses in Bristol Bay at any time during the year, and no information on diets during summer.

An additional limitation to our knowledge of walrus diets, including in the southeastern Bering Sea, is that most walruses that have been shot have had no food in their stomachs—e.g., prey were recovered from stomachs of just 19 of 184 animals in the 1981 sample (Fay and Lowry 1981). Furthermore, the analytical methods used in the past, including TEK, likely biased the information on diets towards overestimates of prey with robust body parts that digest slowly (Sheffield et al. 2001, Sheffield and Grebmeier in press), a problem inherent in stomach content analysis that can never be adequately overcome. Moreover, as noted above, diet estimates based on stomach contents represent just the most recent meal an animal consumed. Our approach to estimating diets using fatty acids eliminates these problems (Budge et al. 2006).

Methods

We will employ two techniques to estimate diets of walruses: 1) the traditional method of enumerating stomach contents (Sheffield et al. 2001, Sheffield and Grebmeier 2009) of animals taken in the subsistence harvest; and 2) a powerful, proven method, Quantitative Fatty Acid Signature Analysis (QFASA), which has been widely used to estimate diets of a variety of marine mammals and seabirds (e.g., Iverson et al. 2004, 2006, 2007, Budge et al. 2006, Thiemann et al. 2008, 2009). In general, QFASA is a major improvement over the analysis of stomach contents for many reasons: 1) it does not require sacrificing animals; 2) information is obtained from all

animals, whereas many animals that are killed have empty stomachs (see below); 3) estimates of diet are not biased by different rates of digestion of soft-bodied prey compared to firm-bodied prey or prey with hard parts; and 4) the estimate of diet represents an integrated mean diet over weeks to months, rather than simply the last meal that an animal consumed. QFASA models the diet of a predator using the composition of fatty acids (FA) in its blubber or other adipose tissue and the FA composition of its prey.

We will use individual FA biomarkers, in addition to the full FA signatures, to further describe diets and food web relationships of walrus in Bristol Bay, as we have done with walruses and other pinnipeds in the northern Bering and Chukchi Seas (Cooper et al. 2009, Budge et al. 2007, 2008a). We will also employ a sophisticated method we pioneered that determines stable isotope ratios of individual FA and can discriminate between carbon sources in food webs, e.g., between ice algae and water column phytoplankton (Budge et al. 2008b). Such distinctions will be ever more important to our understanding of ecosystem dynamics if climate warming continues and sea ice extent and duration continue to decline in the Bering Sea. The suites of FA, individual FA, and isotope ratios of particular FA will constitute an extremely valuable dataset of molecular biomarkers for monitoring change in ecosystem function in the future.

We will obtain blubber for FA analysis and stomach contents from walruses in two ways. We will collaborate with QWC, BBNA, and local hunters in Bristol Bay to develop a biosampling program to collect blubber and stomachs from animals taken in the traditional harvest. A maximum of 20 blubber samples and 20 stomachs will be obtained from the harvested animals in Years 1 and 2, for totals of 40 blubber and 40 stomach samples. We will also take biopsies from live walruses using crossbows with bolts tipped with biopsy heads, a technique that has been used successfully on walruses in the northern Bering and Chukchi Seas (C. Jay, USGS pers. com.). Fifty live walruses in northern Bristol Bay will be biopsied in early and late summer of Year 1 for a total of 100 samples, and 50 more in southern Bristol Bay will be biopsied in late summer of Year 1. In this way we will obtain an initial sample size sufficient to determine the magnitude of variability in diet between individuals, seasons, and years, and a comparison of diets estimated from FA and stomach contents of the same animals.

Stomach samples will be analyzed in the traditional way to serve as a methodological comparison to the results we obtain from QFASA – such a comparison has never been made before. Stomach contents will also allow us to identify prey species we will need to include in our prey library (see below).

Quantitative estimates of predator diets using QFASA require a library of the FA signatures of known or suspected prey (Iverson et al. 2004). We will obtain walrus prey by collaborating with the National Marine Fisheries Service (NMFS) observer program for the Bering Sea/Aleutian Islands trawl fishery in Bristol Bay and the eastern Bering Sea (M. Leofflad, NMFS pers. com.) and with individuals in the fishery (J. Gauvin, Best Use Cooperative pers. com). That fishery takes as bycatch many of the species known to be common in diets of walruses in the eastern Bering Sea and elsewhere (Fay and Lowry 1981, Sheffield and Grebmeier 2009, Wilson and Evans 2009). Fifteen individuals of each taxon of prey (approximately 22 taxa) will be obtained for the prey library.

Stomach content samples will be analyzed by G. Sheffield. Analysis of FA samples and QFASA modeling of diet will be undertaken by S. Iverson, S. Budge, and A. Springer. A. Springer will

oversee the project and will be responsible for obtaining all prey. H. Chythlook and A. Springer will coordinate fieldwork and biosampling.

References can be found in Appendix B.

MEASUREABLE GOALS AND OBJECTIVES

Goals

- Develop a biosampling program for walrus hunters in Bristol Bay (Year 1).
- Describe contemporary diets of walruses in Bristol Bay (Year 2).
- Establish a library of molecular biomarkers in walruses and their prey for evaluating future changes in the benthic food web and ecosystem of Bristol Bay (Year 2).
- Produce reports and presentations of scientific information on the biology of walruses and the ecosystem of Bristol Bay for local residents to incorporate with TEK in their natural history knowledge base, and reports and publications in the scientific literature for the benefit of residents, the public, management agencies, and other researchers.

PROJECT CONSISTENCY WITH CIAP AUTHORIZED USE

This project is consistent with **CIAP Authorized Use #1: Projects and activities for the conservation, protection, or restoration of coastal areas, including wetlands.**

To conserve, protect, or restore any area of importance, one must know what it is that is being conserved, protected, or restored. **In all ways, the importance of an area is defined by the biotic component**. However, in the case of Bristol Bay there are major gaps in our understanding of the factors that make this marine area so highly productive. Walruses are a conspicuous element of the ecosystem, which includes coastal residents who have a long cultural history in association with them. They also are intimately connected to the rich benthic community of Bristol Bay, and thus provide a window through which to view food web structure and marine production processes. By describing their diets, which serve as proxies for benthic communities, we can identify a suite of species that play major roles in the contemporary ecology of Bristol Bay and rank their importance to the transfer of material and energy to higher trophic levels. By identifying and quantifying individual fatty acid and stable isotope biomarkers in walruses and their prey, we can make inferences about primary production processes and connectivity in food webs important to a healthy coastal zone.

To conserve, protect, or restore an area of importance, we also must be able to determine if change occurs in key biotic components over time—change that can be gradual like that forced by long term climate change, or abrupt like that following acute disturbances such oil spills. The use of walruses, through their diets, to monitor change in populations of benthic fauna would be efficient and economical compared to the principal alternative of bottom trawl surveys. Analysis of chemical biomarkers in walruses will allow us to effectively do so; in addition, these biomarkers will provide a means to monitor other levels of the food web. For example, we have shown that yearly variation in bowhead whale blubber fatty acids reflects change in fatty acid compositions of phytoplankton, and likely in the composition of the floral community at the base of the food web, in response to climate variation (Budge et al. 2008a). Walruses also feed very near the base of the food web and we anticipate a similar preservation of phytoplankton fatty acid signatures in walrus blubber and in their prey. Such data are vital in monitoring the effects of climate change on lower

trophic levels and marine production processes. More specific applications involve measuring stable carbon isotopes of specific algal-derived fatty acids that will allow us to trace the relative contributions, and variation over time, of various classes of phytoplankton (e.g., ice algae, phytoflagellates, diatoms) to higher trophic levels in Bristol Bay (Budge et al. 2008b). These plants have distinct carbon isotopic signatures and their contributions to productivity and biomass will vary with yearly ice conditions and other physical conditions such as water temperature and nutrient levels. Walrus blubber fatty acids will incorporate that overall isotopic signal and serve as another important indicator of climate change.

In aggregate, our project will provide valuable information on many aspects of the present state of the ecosystem in this important area, and will establish an effective means to detect and monitor change in the future. The participation of local residents, who strongly desire to become more actively engaged in research concerning issues of cultural and economic importance to them, such as the project we propose here, will allow them to be more fully informed about the ecosystem of which they are a part: with that knowledge, combined with their TEK, they will be able to better understand and anticipate impacts that may alter the coastal ecoregion and their traditional lifestyles. The results of this project will also be presented to state and federal regulatory agencies in Alaska for their use in resource management decisions.

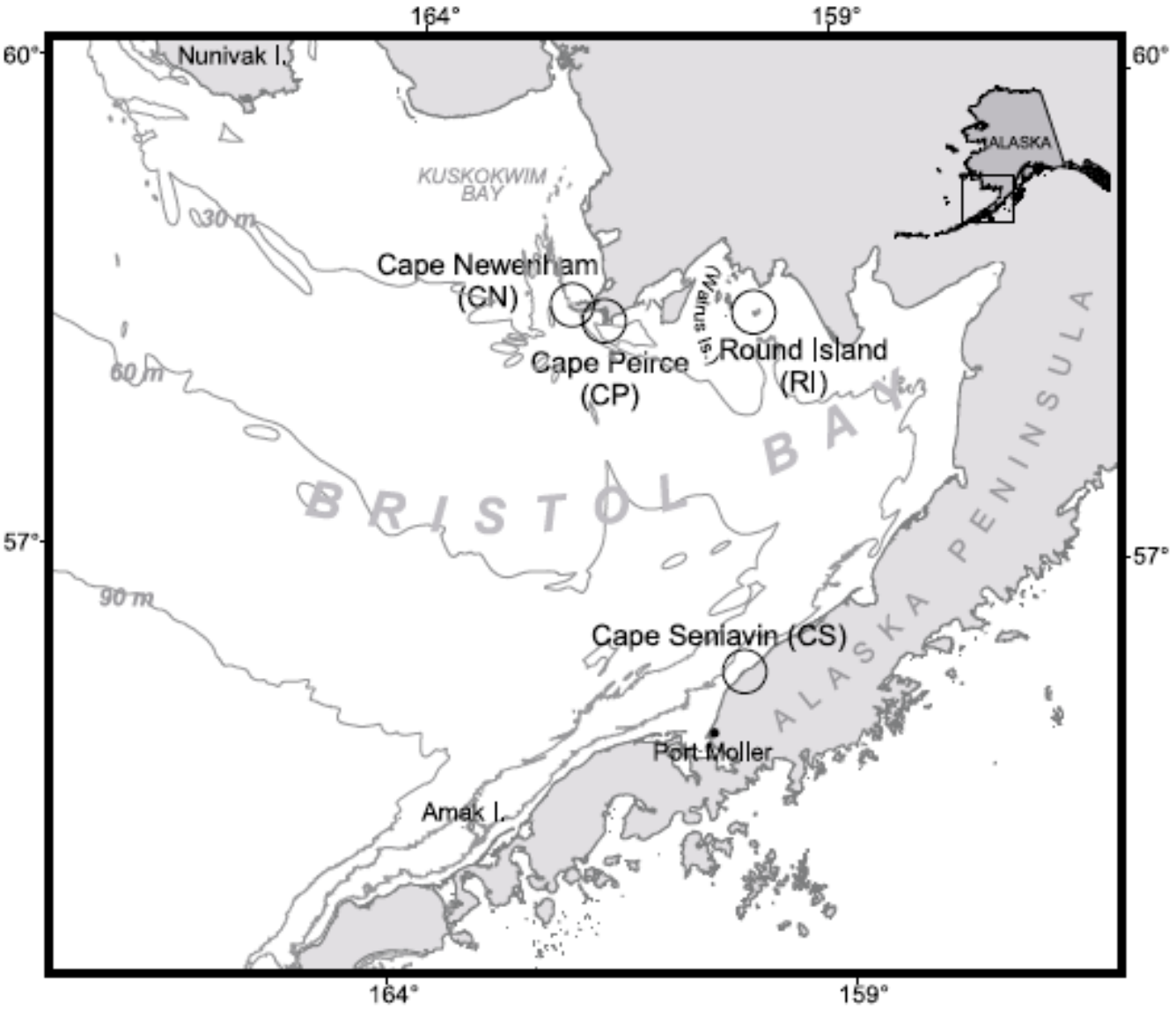
COORDINATION WITH FEDERAL RESOURCES OR PROGRAMS

This project is a collaboration among the Alaska SeaLife Center, two universities (University of Alaska Fairbanks and Dalhousie University, Canada), the Alaska Department of Fish and Game, the Qayassiq Walrus Commission of Bristol Bay, and the Bristol Bay Native Association. It has the support of the U.S. Fish and Wildlife Service, which has management authority over walruses, and from the National Marine Fisheries Service, which will assist in collecting walrus prey samples through the trawl fishery observer program (see letters of support in Appendix C).

COST SHARING OR MATCHING OF FUNDS

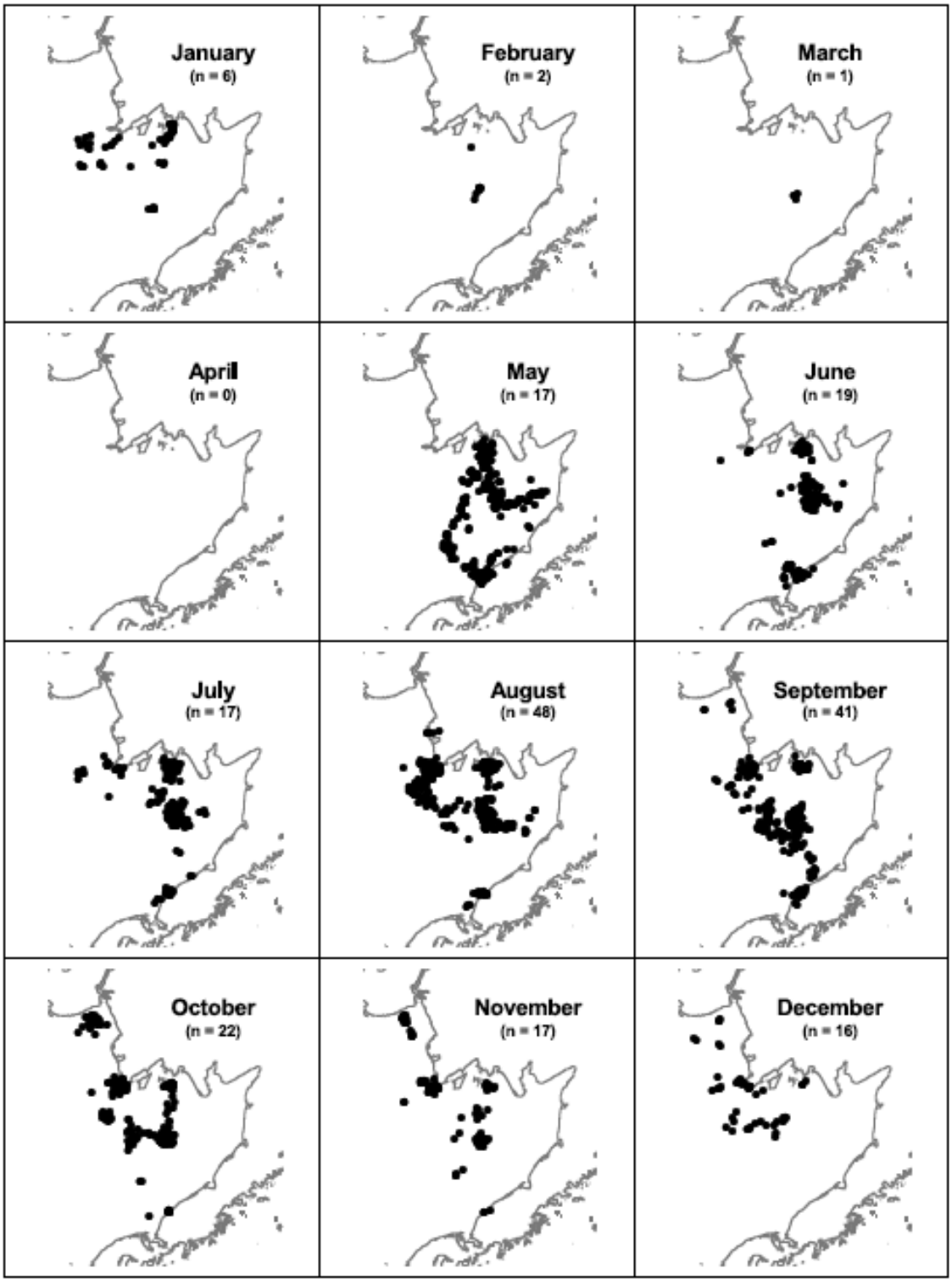
We do not intend to use these CIAP funds for cost sharing or matching purposes.

Appendix A
Locations of walrus haulouts in Bristol Bay, foraging locations, and locations where walruses have been collected in Bristol Bay and the southeastern Bering Sea.



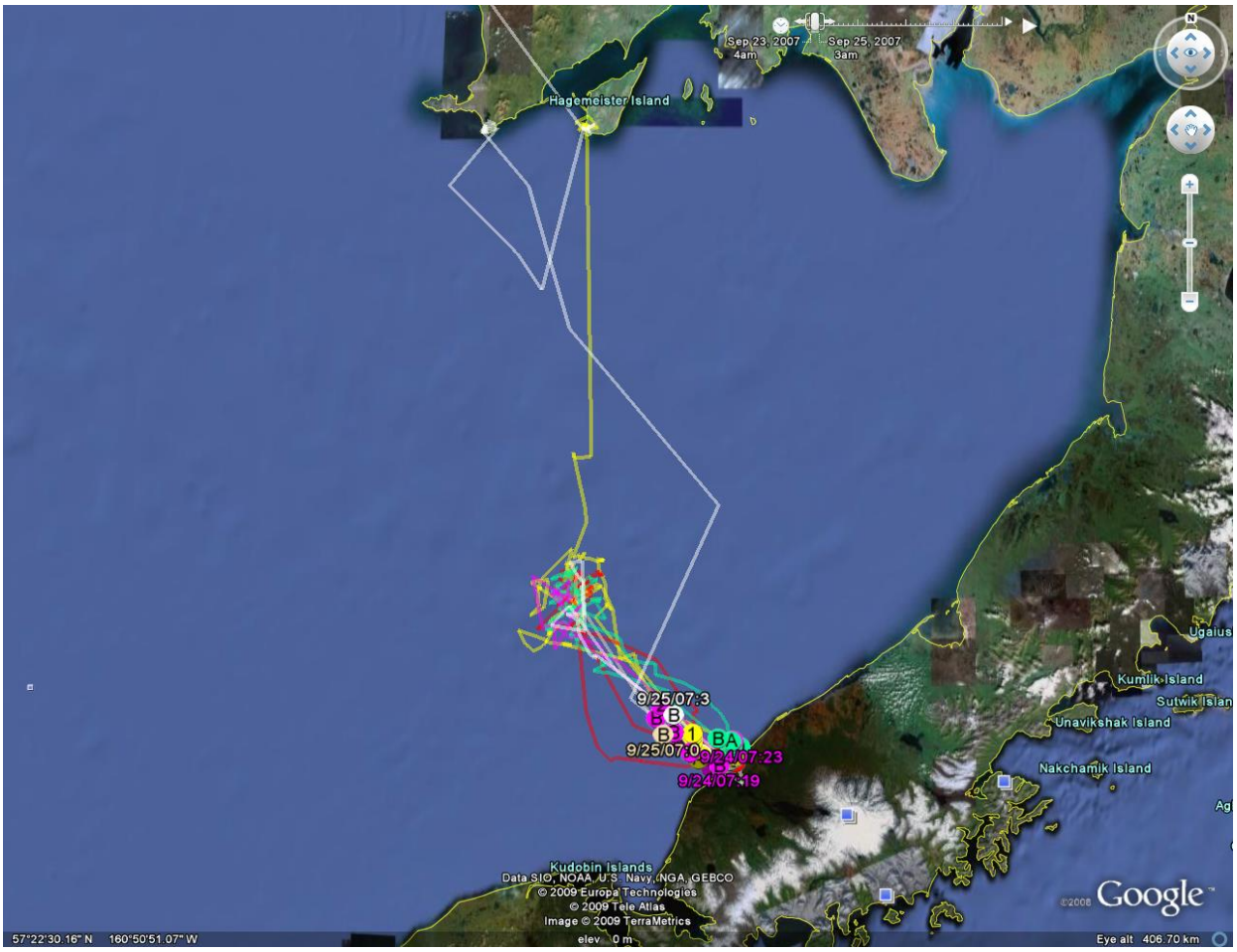
Map 1. Locations of walrus haulouts in Bristol Bay. Figure 1 in Jay and Hills (2005).

Appendix A



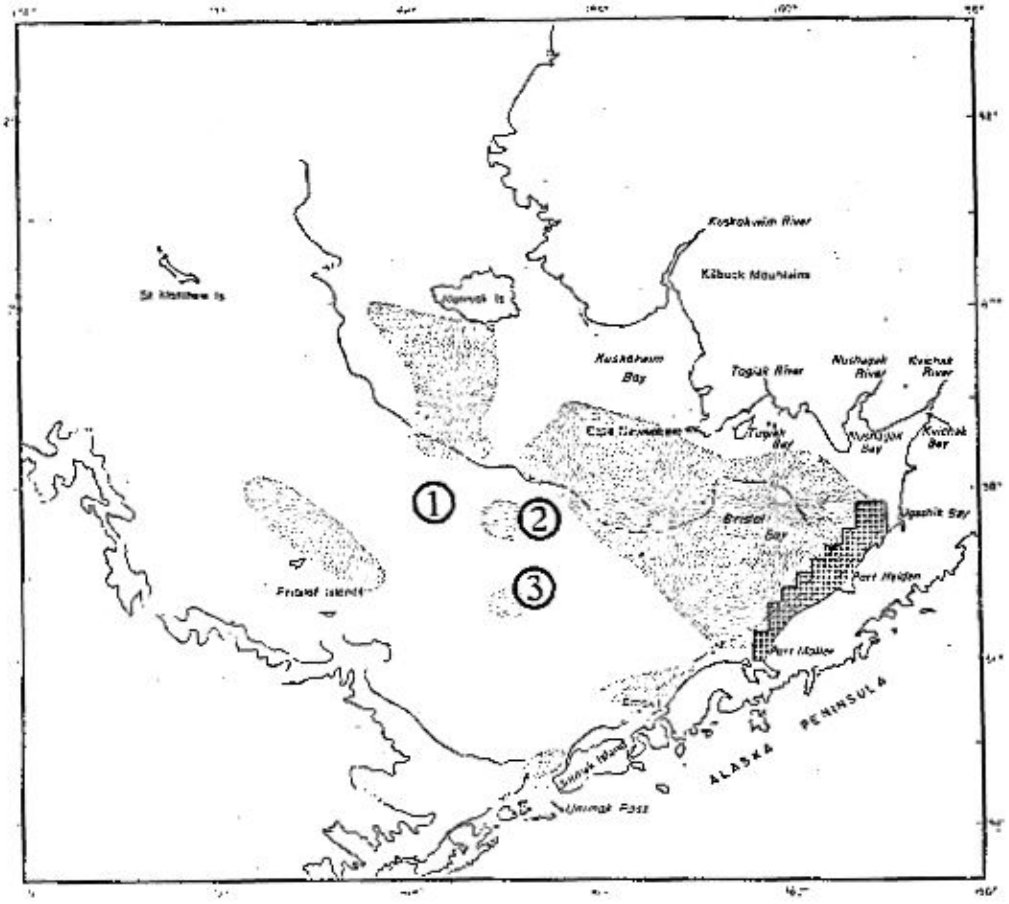
Map 2. Monthly locations of walruses from northern Bristol Bay showing inferred foraging locations from at sea distribution. Figure 4 in Jay and Hills (2005).

Appendix A



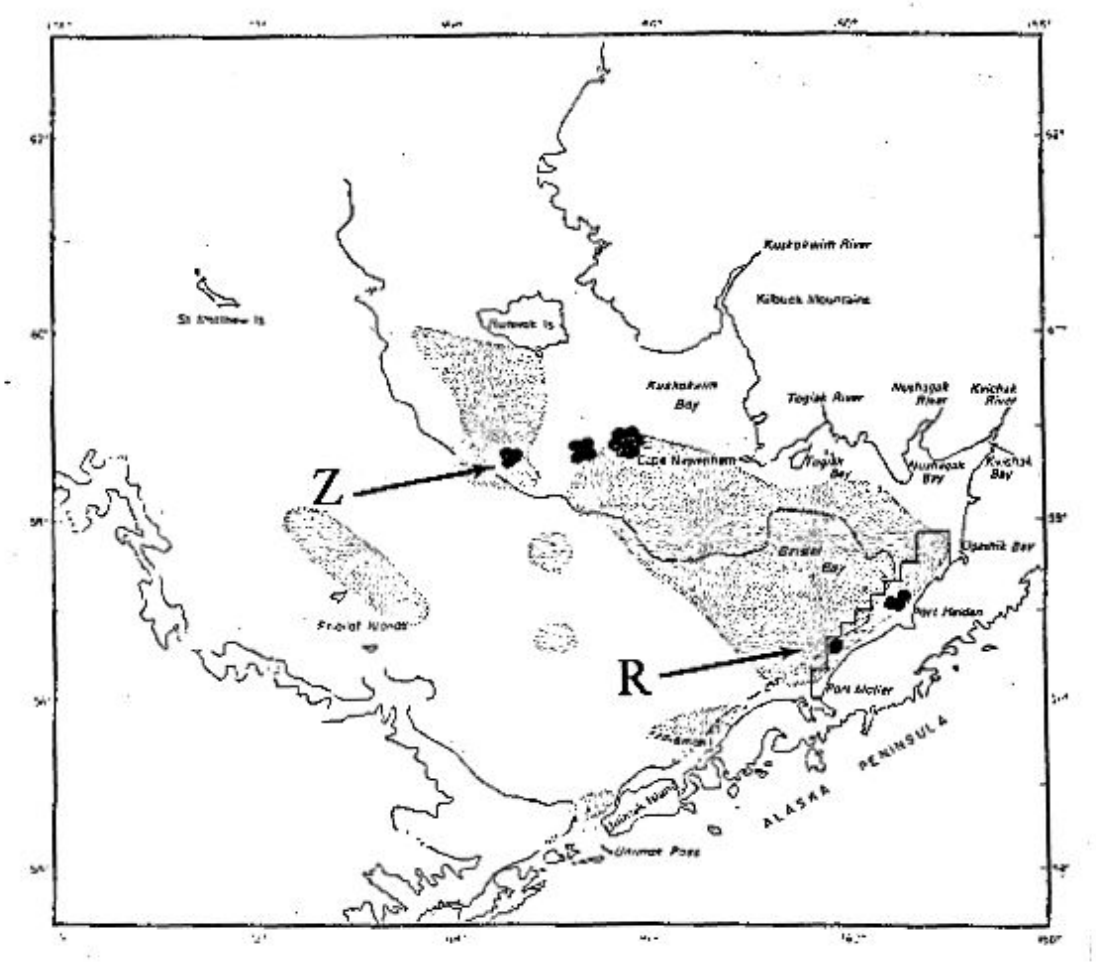
Map 3. Foraging locations inferred from at sea distribution of walruses from Cape Seniavin in Bristol Bay. From J. Garlich-Miller and C. Jay unpubl. data.

Appendix A



Map 4. Locations where walruses were collected in 1) March 1962, 2) January 1970, and 3) March-April 1976. Figure 4 from Fay and Lowry (1981).

Appendix A



Map 5. Locations where walruses were collected for diet studies in February-March 1981 (Z) and in April 1981 (R). Only 4 animals were collected in the R group. Figure 20 in Fay and Lowry (1981).

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Appendix C

Qayassiq Walrus Commission
c/o: Bristol Bay Native Association
P.O. Box 310
Dillingham, AK 99576
Phone: 907-842-5257
Fax: 907-842-5932
QWC Chair Phone: 907-493-5003

April 17, 2009

Alan Springer, Research Professor
Institute of Marine Science
University of Alaska Fairbanks
Fairbanks, AK 99775-7220

Dear Alan:

The Qayassiq Walrus Commission (QWC) is in support of your proposed project, "Diets of Walruses in Bristol Bay," as there is a need for walrus biomonitoring to see whether walrus are healthy and to study their foraging habits. At the North Pacific Fishery Management Council, QWC recommended the Council for research studies related to walrus foraging and clambed habitat projects. This will be an excellent collaborative project between the Qayassiq Walrus Commission, and the Bristol Bay Native Association Marine Mammal Program. It will provide excellent biological, scientific, and additional local traditional ecological knowledge (TEK) information of the Pacific walrus in the Bristol Bay area.

The Qayassiq Walrus Commission would like to recommend your fieldwork does not occur during the annual traditional Fall Qayassiq hunt which is from September 10 to October 20. The QWC would recommend including local expertise involving walrus hunters, and elders knowledgeable in Native knowledge of walrus. We support the potential expansion of this project to include studying the walrus foraging habitats, mainly identifying clambed habitats in the Round Island and other Walrus Island haulout areas, including Cape Peirce and Cape Newenham area.

We look forward in collaborating with you on this project.

Sincerely,

Qayassiq Walrus Commission

Frank Logusak, Sr.
Chairman

Appendix C

BRISTOL BAY NATIVE ASSOCIATION

PO Box 310
Dillingham, Alaska 99576-0310
Tel: (907) 842-5257
Fax: (907) 842-5932

April 17, 2009

Alan Springer, Research Professor
Institute of Marine Science
University of Alaska Fairbanks
Fairbanks, AK 99775-7220

Dear Alan:

The Bristol Bay Native Association (BBNA) is in support of your proposed project, "Diets of Walruses in Bristol Bay," as there is a need for walrus bimonitoring studies to see whether walrus are healthy as well as to study their foraging habits. At the North Pacific Fishery Management Council (NPFMC) meeting, the Qayassiq Walrus Commission (QWC) recommended the Council for research studies related to walrus foraging and clambed habitat projects. This will be an excellent collaborative project between, the University of Alaska Fairbanks, Alaska Department of Fish and Game, Qayassiq Walrus Commission, Togiak Traditional Council, and the Bristol Bay Native Association. It will provide excellent biological, scientific, and additional local traditional ecological knowledge (TEK) information of the Pacific walrus in the Bristol Bay area.

We look forward in collaborating with you on the proposed two-year project.

Sincerely,

Bristol Bay Native Association

Ralph Andersen
Chief Executive Officer

STATE OF ALASKA
COASTAL IMPACT ASSISTANCE PROGRAM

Kenai Watershed Forum

This project will be conducted on behalf of the State of Alaska. It was selected through an open competitive procurement process and in accordance with 3 AAC 196.

PROJECT TITLE: North Road pipeline Extension, Crossings for Salmon Streams

PROJECT CONTACT

Contact Name:	Robert Ruffner
Address:	PO Box 2937 Soldotna AK 99669
Telephone Number:	(907) 260-5449
Fax Number:	(907) 260-5412
Email Address:	robert@kenaiwatershed.org

PROJECT LOCATION

Otter Creek crossing of N. Kenai Pipeline route 60.8071179 , -150.824892
Besser Creek crossing of N. Kenai Pipeline route 60.927021, -150.720528
Seven Egg Creek crossing of N. Kenai Pipeline route 60.935391, -150.704990

We can provide a map of the N. Cook Inlet coastline including the pipeline upon request.

PROJECT DURATION

Design, permitting and construction of 3 bridges including bank restoration is expected to take 2.5years upon written notice to proceed.

ESTIMATED COST

On the Spending Estimate table note how much will be spent each year of the project, regardless of when it is initiated.

Spending Estimate ($)				
TOTAL	**Year 1**	**Year 2**	**Year 3**	**Year 3.5**
$647,689	$70,000	$570,000	$7,689	#

All of the funding will be with FY 10 funding.

Funding per Allocation Year of CIAP ($)				
TOTAL	**FY 07**	**FY 08**	**FY 09**	**FY 10**
$647,689	0	0	0	$647,689

PROJECT DESCRIPTION

An unmaintained, but dedicated coastal access route along the shared oil and gas pipeline has come to receive heavy recreational traffic in the past decade. The route crosses 4 salmon bearing streams with no vehicle infrastructure over three of the four streams. Vehicles, permitted and unpermitted, crossing these streams have eroded and damaged the banks of the three un-bridged crossings. In addition, impromptu structures have, at times, been placed in the creeks to facilitate vehicles crossing the creeks, creating fish passage barriers.

The applicant in partnership with several other entities constructed a bridge over the first crossing in 2006/ 2007. That first project has proven to be both popular with people and successful for the environment. The local government in partnership with the applicant would like to see the remaining 3 crossings bridged to mitigate damage to anadromous fish passage and to directly restore the stream banks. The local government passed a resolution authorizing the purchase of raw bridge materials and the desire to partner with other entities to realize these bridge crossings. This application would realize that desired partnership and would benefit the resources.

Year 1 – Design and permitting
Year 2 – Bridge construction
Year 2.5 – post construction environmental monitoring

MEASUREABLE GOALS AND OBJECTIVES

Year 1 – Design and permitting

Year 2 – Construction of bridges
Measureable goals and objectives would all occur in year two with the construction of the bridges and bank restoration. If and when fish passage is blocked at these crossings, 9+ miles of documented upstream Coho habitat is compromised. Bridging these creeks would eliminate the need for stream modifications to facilitate vehicle crossings.

In addition to addressing potential habitat fragmentation, we have budgeted for 480’ of direct bank reconstruction and re-vegetation that is necessary to mitigate for damage already done to the banks of these 3 streams.

Year 2.5 – Post construction monitoring

PROJECT CONSISTENCY WITH CIAP AUTHORIZED USE

This project is consistent with authorized use #2; *Mitigation of damage to fish, wildlife, or other natural resources.*

This project will get tracked and wheeled vehicles out of salmon bearing streams where no bridge alternative presently exists. Wheeled vehicles crossing the salmon bearing streams

within ¼ mile of the Cook Inlet tide water causes turbidity and siltation that clogs juvenile salmon gills and fills in gravels suitable for spawning with fine grained sediment that is not suitable for salmonid reproduction.

Present conditions for people to access nearly 700 remote properties along this right-of-way require that ATVs and other vehicles must drive through the salmon streams, there is no other ground access. Most of the crossings occur without authorizing permits.

COORDINATION WITH FEDERAL RESOURCES OR PROGRAMS

This project will mitigate the remaining 3 crossings of salmon bearing streams along the N. Kenai pipeline corridor. The 1st crossing was completed in 2006/ 2007 in cooperation with NOAA, the US Fish and Wildlife Service and Natural Resource Conservation Service. All 3 federal partners are available to consult and support a similar effort to complete these crossings.

COST SHARING OR MATCHING OF FUNDS

At the time of this proposal, we are not considering using this funding as match against any other cost sharing or matching proposal, we have requested funding sufficient to complete the project in conjunction with support from the local government.

STATE OF ALASKA
COASTAL IMPACT ASSISTANCE PROGRAM

City of Homer

This project will be conducted on behalf of the State of Alaska. It was selected through an open competitive procurement process and in accordance with 3 AAC 196.

PROJECT TITLE: Beluga Slough Trail Reconstruction to Restore Wetlands

PROJECT CONTACT

Contact Name:	Carey Meyer, Director
Address:	City of Homer Department of Public Works
	3575 Heath Street
Telephone Number:	(907) 435-3124
Fax Number:	(907) 235-3145
Email Address:	cmeyer@ci.homer.ak.us

PROJECT LOCATION

Trail construction will occur along Beluga Slough, located in the coastal zone within the City of Homer, Alaska (Latitude 59° 38" 21.63" N, Longitude 151 0 32 17.55"W).

The area is within the state-designated Kachemak Bay Critical Habitat Area and the Kachemak Bay National Estuarine Research Reserve, and is part of the international Western Hemisphere Shorebird Reserve network.

PROJECT DURATION

One year.

ESTIMATED COST

Spending Estimate ($)				
TOTAL	**Year 1**	**Year 2**	**Year 3**	**Year 4**
$448,116	$448,116	#	#	#

Funding per Allocation Year of CIAP ($)				
TOTAL	**FY 07**	**FY 08**	**FY 09**	**FY 10**
$448,116	0	0	0	$448,116

PROJECT DESCRIPTION

The proposed project will restore habitat and provide environmentally responsible visitor access to Beluga Slough by replacing 1050 feet of pre-engineered surface supported trail with 850 of new elevated trail and 200 feet of gravel trail. The existing trail through wetlands immediately adjacent to the Beluga Slough (critical wildlife habitat) has damaged the wetlands and impedes surface water movement. Construction of the elevated portion of the proposed trail (pier supported trail with surface grating) will allow for the restoration of the damaged wetlands by not impeding sunlight and surface drainage under and

immediately adjacent to the trail corridor. The short section of gravel trail (constructed within City right-of-way) will provide access to an existing major storm drain outfall as well as provide for trail access. The outfall is located in wetlands and requires large construction equipment to enter the wetlands to complete long-term maintenance. The proposed short section of gravel trail will provide a pad from which construction equipment can complete outfall maintenance without damaging wetlands or impacting critical Beluga Slough wildlife habitat.

Figure 1 - - Deteriorated Trail Damaging Wetlands

Figure 2 – Existing Trail Along Slough

The original Beluga Slough trail material, installed in 1997, was designed to float with the tide. However, it does not work properly, and instead over the years has become mired in the mud, interfering with the natural flow of water and destroying the plant life that once existed where the trail is now. In the summer of 2006, the U.S. Fish and Wildlife Service removed 162 feet of the plastic trail. Until it is replaced, trail users are forced to walk through an often muddy area to reach the remaining constructed trail. There is a natural tendency for trail users to try to sidestep wet areas, thus widening the path and disturbing more vegetation as a result. The new trail will be constructed as an 8-foot wide elevated walkway built on a foundation of helical piers, which are specifically designed for use in wetlands and other environmentally sensitive areas. (The galvanized steel anchors are engineered to transfer projected loads to bearing-capable strata below weak soils, and eliminate the need for treated wood pilings that can leach toxins.) The trail surface will be

grated galvanized steel that will allow light and precipitation to pass to the ground below, thus encouraging restoration of native saltwater marsh plants.

The City of Homer is collaborating with the U.S. Fish and Wildlife Service on the trail reconstruction project. US F&S has engaged in discussions with the City about trail design and routing and will provide in-kind support to remove remaining plastic trail segments. The Kenai Peninsula Borough has pledged $66,562 in financial support. The Homer City Council has authorized the expenditure of $30,000 to complete the design of the trail project. The City of Homer Public Works Department will provide bidding assistance, construction inspection and contract administration.

All of the work will take place in Year 1. (Preconstruction engineering, permitting and design will be accomplished and contributed by the City of Homer prior to grant award.)

MEASUREABLE GOALS AND OBJECTIVES
Measurable objectives include:

- *Remove existing surface-supported plastic trail - 680 feet.*
- *Complete 1070 feet of new trail, allowing regrowth of vegetation* where the old plastic trail and dirt/mud trail used to be. (Some sign of regrowth should be visible before the end of the project year.)
- *Improvement of wetland wildlife habitat; reduces degradation and protects water quality* by accommodating thousands of trail users (including those on guided nature tours) with no adverse impact to the critical coastal wetlands and slough wildlife habitat.

PROJECT CONSISTENCY WITH CIAP AUTHORIZED USE
The proposed project is consistent with Authorized Use # 1: Projects and activities for the conservation, protection, or restoration of coastal areas, including wetland.

Beluga Slough Trail is heavily used by residents and visitors to Homer, connecting a major destination (Alaska Islands and Ocean Center) with a popular beach park (Bishop's Beach). It is also used for guided nature tours sponsored by the Kachemak Bay Research Reserve and Center for Alaskan Coastal Studies.

By constructing an elevated trail designed for sensitive wetland areas, the project will restore slough habitat damaged by the existing heavy plastic trail and by foot travel along the section of trail where the plastic trail has already been removed. The design of the trail will encourage users to remain on it (since stepping off an elevated trail is not easy), thus helping to conserve and protect the slough environment.

COORDINATION WITH FEDERAL RESOURCES OR PROGRAMS
The City of Homer is collaborating with the U.S. Fish & Wildlife Service (Alaska Maritime National Wildlife Refuge) on the Beluga Slough Trail Reconstruction Project. The trail will be constructed on City land and a City trail easement through U.S. Fish & Wildlife property. The completed trail will connect the Alaska Islands and Ocean Visitor Center (federal facility) with Bishop's Beach Park (owned and maintained by the City of Homer). U.S. Fish and Wildlife has pledged in-kind support for the project, to deconstruct

and remove the remaining sections of plastic trail. U.S. Fish and Wildlife personnel have also worked with the City to determine optimum trail design and routing.

COST SHARING OR MATCHING OF FUNDS

The City of Homer will not be using CIAP funds for cost sharing or matching purposes.

STATE OF ALASKA
COASTAL IMPACT ASSISTANCE PROGRAM

University of Alaska Fairbanks
This project will be conducted on behalf of the State of Alaska. It was selected through an open competitive procurement process and in accordance with 3 AAC 196.

PROJECT TITLE: Circulation Studies of Kachemak Bay, Alaska Using Satellite-tracked Drifters.

PROJECT CONTACT

Contact Name:	Mark Johnson
Address:	P.O. Box 757220, School of Fisheries and Ocean Sciences University of Alaska Fairbanks, Fairbanks, AK 99775-7220
Telephone Number:	(907) 474-6933
Fax Number:	(907) 474-7204
Email Address:	johnson@ims.uaf.edu

PROJECT LOCATION

Kachemak Bay is a highly productive, tidally-influenced estuary located off of lower Cook Inlet and the Gulf of Alaska (GOA) [Fig 1]. It has over 540 kilometers of coastline, an area of 1,500 km^2, and an 8-meter maximum tidal range. In 1999, the bay was designated as a National Estuarine Research Reserve, creating the foundation for long-term research and monitoring to better understand the area's natural resources. Extending four miles into the bay, the Homer Spit divides Kachemak Bay into inner and outer bays and creates a narrow passageway along the southern shore for water exchange between the two parts of the bay. Water flowing from outer into inner bay is more marine and water flowing out of the inner bay is more estuarine due to the input of freshwater from glacial melt (particularly in the summertime) (Abookire et al. 2000, Burbanks 1977). Seawater intrusion into the inner bay occurs primarily through deep-water currents that rise to the surface near the inner bay entrance.

PROJECT DURATION

The proposed circulation study duration is three years. Drifters will be purchased in November 2011 and drifter deployments will commence in May 2012. The final reporting and conclusion of this study is anticipated for June 2014.

ESTIMATED COST

Spending Estimate ($)				
TOTAL	**Year 1**	**Year 2**	**Year 3**	**Year 3.5**
$196,437	$115,133	$55,147	$26,156	0

Funding per Allocation Year of CIAP ($)

TOTAL	FY 07	FY 08	FY 09	FY 10
$196,437	0	0	0	$196,437

PROJECT DESCRIPTION

This proposal seeks support for a satellite-tracked drifter study within Kachemak Bay to develop accurate and reliable circulation maps for this region. Previous drifter and physical oceanographic studies have focused on current patterns within the main body of Cook Inlet, but a major gap exists in our understanding of tidal- and buoyancy-driven exchange between Kachemak Bay and lower inlet/northern GOA waters. Particularly lacking is an understanding of the exchanges between the smaller side embayments and the inner bay.

Better knowledge of circulation in this area is critical because Kachemak Bay is a rich, biodiverse habitat that provides excellent spawning and larval rearing habitat for both marine invertebrate and fish species. Distribution, survival, and successful recruitment of these larval stages are critically influenced by local hydrography and circulation patterns. In addition to larval transport, knowledge of the tidal and non-tidal current patterns in Kachemak Bay is essential for determining and predicting transport trajectories of pollutants, hot spots for coastal erosion, and patterns for sediment transportation.

Being one of the most biologically productive estuaries on the globe (Sambrotto and Lorenzen 1986), it is necessary to understand ocean circulation and potential pollutant pathways to minimize detrimental effects to this area's natural resources. The valuable natural resources within Kachemak Bay are vulnerable to outer continental shelf oil and gas development within the GOA and Cook Inlet through disturbance generated by recovery activities of oil and gas and by indirect and direct contamination of food sources and habitat delivered by pollutant pathways. Kachemak Bay has already experienced impacts of oil as it was included in the 1,300 miles of coastline affected by the Exxon Valdez Oil Spill in 1989. In order to develop accurate numerical circulation simulations for Kachemak Bay, the following precise spatial and/or temporal representations are required: (1) freshwater discharge into the bay, (2) temperature and salinity fluxes, (3) bathymetry, (4) tidal forcing, (5) solar insolation, and (6) wind forcing factors (Pegau et al. 2008). The deployment of surface and drogued satellite drifters within Kachemak Bay proposed here will provide necessary temporal and spatial representations of tidal and wind forcing [#4 and # 6 above], augmenting studies of lower Cook Inlet and GOA hydrography, and facilitating the expedient creation of circulation maps.

Methodology

Eighteen drifters [nine drogued at 1m depth and nine drogued at 20m depth] will be purchased in November of 2011 and then deployed and tracked in a staggered manner [6 drifters deployed in May, an additional 6 will be deployed in July, and the final 6 will be deployed in September 2012] at both outer and inner bay locations. The best-case scenario would have 6 drifters identifying local circulation patterns in May-June, 12 drifters identifying circulation patterns in July-August, and 18 drifters simultaneously identifying circulation patterns in September-October. While it is unlikely that all drifters will remain within Kachemak Bay and that drifter escapement is anticipated, the staggered drifter deployments will guarantee that drifter data collection within Kachemak Bay will occur throughout the May-October timeframe. In October of 2012, all accessible drifters will be collected and redeployed in a similar manner during May through October 2013.

Additional opportunities for recovery and redeployment of stranded or grounded drifters will be enhanced by access to the Kachemak Bay Research Reserve (KBRR) boat, the use of vessels of opportunity [see correspondence with Homer Harbor Master, Bryan Hawkins], and the availability of the University of Alaska Fairbanks (UAF) vessel stationed at Kasitsna Bay, all of which are large enough to traverse the entire Kachemak Bay.

Telemetry of drifter locations will be provided hourly by the Argos satellite system and analyzed to illustrate drifter movements over time. In conjunction with other ancillary data [water-level gauge, meteorology, and ocean temperature and salinity] from monitoring studies and bathymetric mapping efforts by NOAA [2008 and 2009 Hydropalooza, see correspondence], these drifter-created water transport maps will reduce uncertainty, providing much needed data on currents for model validation.

Milestones

Year 1:

- purchase drifters in November 2011
- deploy 6 drifters in May 2012, 6 drifters in July 2012, and 6 drifters in September 2012
- retrieve accessible drifters in October 2012 for redeployment in Year 2
- produce circulation maps from hourly drifter data
- analyze data and establish deployment locations for Year 2
- present Year 1 results at AK Marine Science Symposium and to Kasitsna Bay Research Reserve (KBRR) and local community

Year 2:

- deploy 6 drifters in May 2013, 6 drifters in July 2013, and 6 drifters in September 2013
- produce circulation maps from hourly drifter data
- finalize data retrieval by October 2013 and data analysis by November 2013

Year 3

- present final results at AK Marine Science Conference and to local and science communities in January 2014
- provide final reports to DNR (CIAP) and share report with KBRR, Cook Inlet Regional Citizens Advisory Council (CIRCAC), Oil Spill Recovery Institute (OSRI), and Seldovia Village Tribe (SVT) by April 2014
- provide information to NOAA for circulation modeling efforts in April 2014
- submit manuscript to peer-reviewed scientific journal by May 2014
- submit data to a national data center such as NODC at the completion of study by June 2014

Highlighting the desirability for the data proposed here, the Cook Inlet Regional Citizens Advisory Committee (CIRCAC) and the Oil Spill Recovery Institute (OSRI) will both contribute to this project by providing support for additional drifter purchases and/or loans and for logistical coordination of drifter deployment. The KBRR will provide boat use for drifter recapture and redeployment, laboratory space and other logistical support, and will facilitate educational outreach activities for this study. The City of Homer Harbor Office will support this project by facilitating communication with local fishermen that are in the position to recapture escaped drifters.

MEASUREABLE GOALS AND OBJECTIVES

The tangible products from this study will be the observed data set with current speed and direction from over 2 years of data as well as the resulting maps depicting seasonal circulation patterns within inner (including exchange with adjacent smaller embayments) and outer Kachemak Bay and lower Cook Inlet. This will significantly enhance current knowledge of local circulation patterns, which still are largely based on a 1970's drift card study (Burbank 1977).

PROJECT CONSISTENCY WITH CIAP AUTHORIZED USE

The CIAP authorized use most connected with this project is (1) Projects and activities for the conservation, protection, or restoration of coastal areas, including wetlands. The proposed circulation mapping project would provide baseline physical environmental information that would support numerous applications of the aforementioned authorized use, particularly understanding pollutant and planktonic invasive species trajectories and land-sea interactions related to coastal erosion. This information will be used by several government agencies as a management tool to protect, conserve and restore coastal areas in Kachemak Bay, including the city of Homer Port and Harbor Department, the Alaska Department of fish and Game, the Kachemak Bay Research Reserve, Cook Inlet Regional Advisory Council and the Coast Guard.

Understanding the physical environment within a coastal area, particularly the State Critical Habitat Area of Kachemak Bay, provides an essential context for understanding how the living and non-living parts function within this environment. Circulation patterns established by drifter locations will support the development of circulation models for Kachemak Bay, thus contributing an integral layer to the physical context and furthering our ability to effectively conserve and protect the region's coast.

The circulation maps produced by this study will provide foundational information for the coast's protection both within Kachemak Bay as well as within greater Cook Inlet. For example, these maps inform resource management and invasive species monitoring efforts by agencies such as the Alaska Department of Fish & Game and the Kachemak Bay Research Reserve (refer to attached letters from these and other organizations that will be using this information). The Kachemak Bay Research Reserve will use information on circulation in Kachemak Bay to inform marine navigation, emergency response to distressed vessels and to oil spill response, and to assist in tracking harmful algal bloom pathways and Paralytic Shellfish Poisoning avoidance. The City of Homer Port and Harbor Department will use information from this project to monitor and make decisions about sedimentation and erosion and for navigation support.

Invasive species that travel in the water column as larvae, such as the European green crab and the tunicate, *Corella eumyota*, can have detrimental impacts to the biodiversity of coastal ecosystems. Selection of appropriate monitoring stations and early detection/response are greatly enhanced by accurate circulation maps and knowledge of the circulation such as produced by the work proposed here. These maps and validated models additionally support protection of valuable coastal areas and resources by informing oil-spill response efforts by organizations such as the Cook Inlet Regional Advisory Council and the Coast Guard. As a final example, accurate circulation maps demonstrate land-sea interactions, thus supporting Kenai Peninsula Borough and local government decision-making on land-use issues such as local erosion.

COORDINATION WITH FEDERAL RESOURCES OR PROGRAMS

Agency partnership with NOAA has been established for collaboration on this project and would continue through project completion. NOAA will provide logistical support for deployment and recapture of drifters by providing space and equipment at the Kasitsna Bay Laboratory, situated within Kachemak Bay. The information gathered from this proposed study will be given to NOAA to provide ground-truthing for circulation modeling efforts.

COST SHARING OR MATCHING OF FUNDS

The CIAP funds awarded for this project will not be utilized for cost sharing or matching purposes.

References

Abookire, AA, JF Piatt, and MD Robards (2000) Nearshore fish distributions in an Alaskan estuary in relation to stratification, temperature, and salinity, *Estuarine, Coastal and Shelf Science*, 51, 45-59.

Burbank, CD (1977) Circulation studies in Kachemak Bay and Lower Cook Inlet. In: LL Trasky, LB Flagg, and DC Burbank (eds.) Vol. III, Alaska Depart of Fish & Game, Anchorage, AK, 207 pp.

Pegau S, S Okkonen, and S Saupe (2008) Seasonality of Boundary Conditions for Cook Inlet, Alaska. University of Alaska Coastal Marine Institute, University of Alaska Fairbanks and USDOI, MMS, Alaska OCS Region, 24 pp.

Sambrotto, RN and CJ Lorenzen (1986) Phytoplankton and primary productivity. In *The Gulf of Alaska Physical Environment and Biological Resources*. DW Hood and ST Zimmerman ed(s). vol OCS Study 86-0095 USDOC, NOAA, NOS, and USDOI, MMS, Alaska OCS Region. Anchorage, AK. p 249-282.

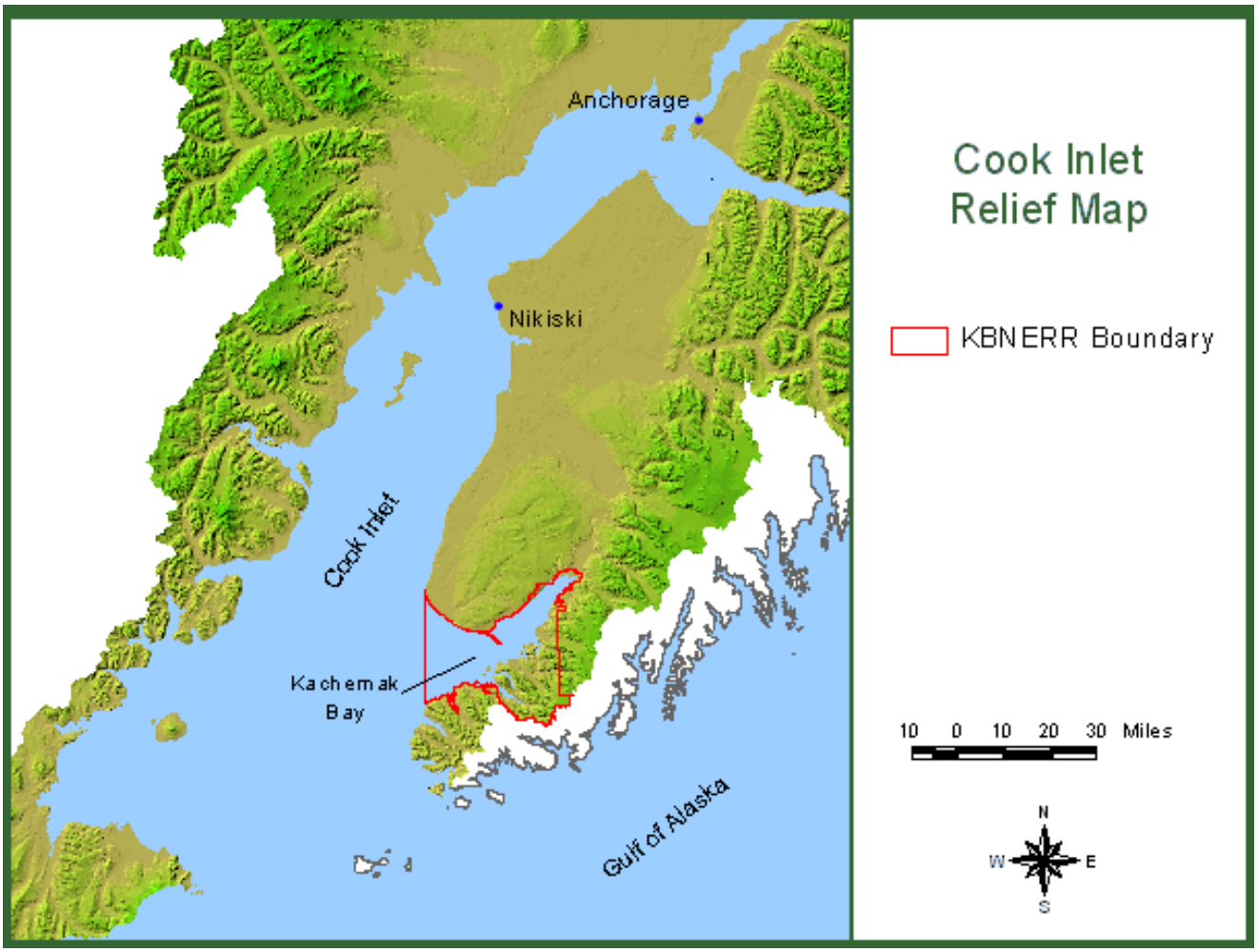


Figure 1. Map showing Cook Inlet, Northern Gulf of Alaska, and Kachemak Bay (taken from KBRR's Kachemak Bay Ecological Characterization [KBEC]). Red line marks boundary for Kachemak Bay National Estuarine Research Reserve where this study is focused.

KACHEMAK BAY RESEARCH RESERVE

A Unit of the National Estuarine Research Reserve System

95 Sterling Highway, Suite 2
Homer, Alaska 99603
Phone (907) 235-4799
Fax (907) 235-4794
www.kbayrr.org

10 March 2010

Mark Johnson
University of Alaska Fairbanks
PO Box 757220
Fairbanks, Alaska 99775-5910

Re: **Circulation studies of Kachemak Bay, AK using satellite-tracked drifters.**

Dear Mr. Johnson –

This is a letter of commitment to collaborate on the proposed satellite-tracked drifter study to be undertaken within Kachemak Bay in 2011-2014. Please see our attached budget details which show our contractual costs to successfully complete the project tasks required. These costs will cover the salaries for Megan Murphy, biological oceanographer and project assistant, and Steve Baird, GIS analyst and research technician. Megan will be responsible for the project's logistical planning, data analyzing, and report-writing. Steve will be responsible for the deployment and recapture of drifters, the maintenance of drifter data-uploads, and will assist with the creation of communication products (such as maps). Both will contribute to communication efforts to outreach the results of this study. Additional information is included in the CIAP application.

Sincerely,

Megan Murphy

Enhance understanding and appreciation of the Kachemak Bay estuary and adjacent waters to ensure that these ecosystems remain healthy and productive.

.STATE OF ALASKA
COASTAL IMPACT ASSISTANCE PROGRAM

Cook Inletkeeper
This project will be conducted on behalf of the State of Alaska. It was selected through an open competitive procurement process and in accordance with 3 AAC 196.

PROJECT TITLE: Alaska Clean Harbors: Educating for Long-term Pollution Reduction for Alaska's Harbors

PROJECT CONTACT

Contact Name: Rachel Lord
Address: 3734 Ben Walters Ln., Ste. 201, Homer, AK 99603
Telephone Number: (907) 235-4068 x29
Fax Number: (907) 235-4069
Email Address: rachel@inletkeeper.org

PROJECT LOCATION
Alaska Clean Harbors will work with harbor facilities and boaters statewide (see attached map)

PROJECT DURATION
CIAP funds will be used for this project over the course of 3 years, ending by December 31, 2014.

ESTIMATED COST
On the Spending Estimate table note how much will be spent each year of the project, regardless of when it is initiated.

Spending Estimate ($)				
TOTAL	**Year 1**	**Year 2**	**Year 3**	**Year 3.5**
$282,615	$106,555	$95,080	$80,980	-

Funding per Allocation Year of CIAP ($)				
TOTAL	**FY 07**	**FY 08**	**FY 09**	**FY 10**
$282,615	0	0	0	$282,615

PROJECT DESCRIPTION

Alaska's harbors are the gateway through which hundreds of thousands of recreational and commercial boaters access Alaskan waters every year. These 100+ harbors (nearly all owned by local municipalities) also pose some of the most vexing pollution and environmental protection issues facing the state, including spills of boat-based oils and fuels, dumping of batteries and plastics, and unregulated boat maintenance activities that contaminate coastal habitats with potentially toxic bottom paints. During the 2009-2010 pilot phase of the Alaska Clean Harbors program, it was evident that there are

numerous and basic pollution-prevention steps that need to be implemented in many (if not all) of Alaska's harbors. Even among our large commercial fishing-based harbors there is an evident lack of basic pollution-prevention measures in place to prevent oil and hazardous material spills, improper sewage disposal practices, and environmentally damaging boat work. This project will work directly with harbors throughout the state to address these issues and begin making changes to protect Alaska's coastal environment with an understanding of the importance of our commercial and recreational fisheries to our communities and our economy.

Areas for improvement that are directly addressed through this project include: harbor-specific labeling and proper storage of hazardous wastes (including used anti-freeze and lead-acid batteries), reducing the environmental impacts of common in-water boat work done in Alaska's harbors (including spray painting and paint grinding), and educating harbor users to change behaviors associated with environmentally damaging (and in some instances illegal) common practices, such as the widespread use of detergents to disperse oil in bilge water after pumping. In response to these and many other environmental challenges facing Alaska's harbors, the primary goals of this project, funded by CIAP and under the Alaska Clean Harbors program (ACH) are: 1) To provide the necessary tools and assistance for Alaska's harbor staff to implement and monitor best management practices and waste stream reduction through ACH Clean Harbor certification, creating direct action towards better management of harbor activities, increased compliance with state and federal environmental regulations, and reduction of pollution to the marine environment, and 2) To educate boaters on pollution reduction strategies and alternatives to 'business-as-usual'. Clean Harbor certification, a primary tool used in this project for pollution reduction, is a voluntary process that encourages the use of best management practices at harbor facilities in order to reduce the production of point and nonpoint source pollution and mitigate environmental effects. A Clean Harbor Pledge is signed by harbors that are actively working towards certification. Alaska Clean Harbors staff and volunteers then work with harbor staff to implement best management practices and monitor pollution reduction through this process.

Through this project, Alaska Clean Harbors will further encourage Clean Harbor certification and cooperation between harbormasters, coastal communities, and the State to decrease the collective effects of commercial and recreational boating activities on the marine environment. The Alaska Association of Harbormasters and Port Administrators signed a resolution in 2009 supporting the scope of work being proposed by Alaska Clean Harbors. The ACH Coordinator works with ACH Regional Partners (see attached map) to conduct harbor site visits, collaborate with harbor staff to identify harbor waste streams, and review and implement best management practices in the course of securing an Alaskan Clean Harbor certification. A Marine Technical Advisory Committee, including individuals from state regulatory agencies, the state association of harbormasters, Alaska SeaGrant, and other stakeholders, reviews final Clean Harbor certifications and provides feedback on program activities. This program will directly benefit Alaska's natural coastal environment through reduction of pollution from routine harbor activities around the state (in some cases dramatically), reduction of boat-based pollution, increased recycling and waste reduction strategies, increased spill response and awareness capacity in harbors, enhanced boaters' awareness of the impacts of routine boat maintenance activities on the coastal environment, and resources made available of alternative methods that will reduce these impacts.

Methods

1. *Technical assistance to harbors:* Through this project, Alaska Clean Harbors staff work directly with harbor staff to implement on-the-ground changes that will reduce pollution from routine harbor activities. Alaska Clean Harbors will provide signage for facilities, reference materials through the Alaska Clean Harbors Guidebook and the "Educating Your Customers" resource manual (to be created through this project), and perhaps most importantly the assistance of the ACH Coordinator. This single staff person is able to communicate in a timely manner to answer questions, provide resources, and connect harbor staff with available funding and ideas from around the state and nationwide on how to address pollution issues at their facilities (through the ACH Newsletter). By attending the Alaska Association of Harbormasters and Port Administrators annual meetings, maintaining the ACH website, and sending outreach materials to Alaskan harbors, the ACH Coordinator will continue productive conversations with harbor staff and contractors to help reduce the pollution entering the coastal environment from Alaska's harbors. Harbor staff statewide will be guided through the process of pollution reduction and assisted with implementation of best management practices through Clean Harbor certification. Clean Harbor Maps, created through this project, will provide harbor users with immediate information on how they can properly dispose of hazardous materials (used batteries, used antifreeze), used-oil and oil filters, on-board sewage and greywater, and solid waste and recycling. Without this information readily available, the default place to throw all wastes is often the solid waste dumpster or the harbor basin itself. This project will start shifting this default to reduce pollution and protect the marine environment at Alaska's harbors.

2. *Direct outreach to harbor user groups, including commercial and recreational fishermen:* Harbor user groups in Alaska have been largely left without many resources to help them decide how to best clean and maintain their vessels in Alaskan harbors. This has led to widespread activities that, while common in Alaska, are illegal or pose high potential risk to the marine environment. Examples of these types of activities include: paint scraping, spraying, and sanding either in-water or on tidal grids (locations within harbor facilities where vessels can go dry during certain tidal cycles for boat work) and without any type of containment, direct pumping of oily bilge water into harbor basins and surrounding waters, and fueling habits that lead to consistent small spills. During the pilot phase of Alaska Clean Harbors, harbor staff have asked repeatedly for more resources to help them communicate best management practices, alternatives to 'business-as-usual', and federal, state, and local regulations to their customers. They have indicated that this is one of the most challenging aspects of implementing best management practices and reducing pollution at their facilities. The 'Educating Your Customers' Resource Manual created through funding from CIAP under this project will provide this resource to harbor staff. Alaska Clean Harbors understands that extensive education efforts are needed to change long-time behaviors of harbor users. This project will provide additional direct outreach to harbor users by attending fisheries trade shows and boat shows, handing out Clean Boating packets, and hosting Clean Boating workshops.

3. *Development of partnerships and networking opportunities with state and local agencies:* While local, state, and federal regulations exist to ensure some measure of environmentally sound practices in Alaskan harbors, state and federal agencies may be

challenged to oversee regulatory compliance. Additionally, there are a suite of unregulated activities in boat harbors - such as components of staging for commercial and recreational fishing, boat repair and maintenance, boat storage, fueling, harbor construction and maintenance - that can be sources of point and nonpoint source pollution. This project includes developing long-term coordinated efforts between the Alaska Clean Harbors Coordinator and representatives from state agencies to facilitate communication, understanding, and better compliance with environmental regulations at all of Alaska's harbor facilities. The infrastructure, staff and user groups at Alaskan harbors are diverse across the state. Alaska Clean Harbors provides an opportunity for harbors to learn from one another through program staff visits, presentations, clean boating workshops, and roundtables at a variety of annual meetings and conferences. Basic educational tools and assistance for pollution prevention and compliance will be readily available through the ongoing maintenance of the ACH website and the availability of a dedicated ACH Coordinator.

Cook Inletkeeper and Alaska Clean Harbors has worked since 2007 with the following national, state, and local entities to meet its goals:

Alaska Department of Environmental Conservation, Water Quality and Spill Response & Prevention
University of Alaska SeaGrant
Alaska Association of Harbormasters and Port Administrators
Cook Inlet Regional Citizens' Advisory Council
US Coast Guard Marine Safety Detachment, Kenai, AK
Kachemak Shellfish Mariculture Association
North Star Stevedores
Borough of Skagway
Petro Marine Services
Kachemak Bay Research Reserve
Nuka Research
Harbormasters and city staff from the cities of: Unalaska, Homer, Cordova, Seward, Juneau, Skagway, Kodiak, Sitka, and Seldovia
URS Corporation
Pacific States/British Columbia Oil Spill Task Force

MEASUREABLE GOALS AND OBJECTIVES

Year 1

- Compile 5,000 Clean Boating packets to distribute at annual outreach events in Years 1-3.5, including the Great Alaska Sportsman Show and ComFish – Alaska's largest commercial fisheries trade show. These will focus largely on dealing with oily bilge water and responsible sewage management practices.
- Develop a Harbor Resource Map template, piloted at the Homer Harbor (see attached examples) and create and distribute at least 5 Maps for certified Alaska Clean Harbors. These maps will be directed at proper hazardous, liquid chemical, and petroleum product waste disposal and sewage/gray water management.
- Draft "Educating Your Customers – A Resource Manual"
- Identify and train ACH Regional Partners for Southwest, Southcentral, and Southeast Alaska

- Have at least 6 harbors in Alaska actively working on reducing pollution, with signed Clean Harbor pledges.
- Certify at least 4 harbors as "Alaska Clean Harbors"

Year 2

- Print 500 oil spill response and prevention signs for use in Alaskan harbors
- Publish "Educating Your Customers – A Resource Manual" to all Alaskan harbors
- Develop a Clean Boating Workshop to be implemented in Year 3 and 3.5
- Create and distribute at least 5 Harbor Resource Maps for certified Alaska Clean Harbors
- Have at least 6 harbors in Alaska actively working on reducing pollution, with signed Clean Harbor pledges.
- Certify at least 4 harbors as "Alaska Clean Harbors"

Year 3

- Hold 3 Clean Boating Workshops for harbor user groups
- Certify at least 4 harbors as "Alaska Clean Harbors"
- Create and distribute at least 5 Harbor Resource Maps for certified Alaska Clean Harbors
- Have at least 20 harbors in Alaska actively working on reducing pollution, with signed Clean Harbor pledges.

PROJECT CONSISTENCY WITH CIAP AUTHORIZED USE

Alaska Clean Harbors will address the first CIAP Authorized Use: *Projects and activities for the conservation, protection, or restoration of coastal areas, including wetlands*. Support for the this project under the Alaska Clean Harbors program directly helps protect the coastal environment and conserve marine ecosystems in and around Alaskan harbors by educating harbor staff and users to better manage vessels and harbor facilities to minimize pollution and better comply with state and federal environmental regulations. While common in coastal states in the Lower 48 U.S., the concepts of "Clean Marinas" and "Clean Boating" are not part of the current Alaskan mind frame. Through this project, ACH staff will work directly with harbors to implement best management practices using the guidance of the Clean Harbors certification process. This project will bring a number of changes to participating harbors, including: proper storage of hazardous materials, better used oil storage and spill response procedures, increased signage and usage of onshore restroom and waste disposal facilities. These changes will provide immediate benefits to the marine environment by reducing, in some cases dramatically, the amount of pollutants entering the waters through Alaska's harbors. This project will also educate and raise much-needed awareness of environmental concerns associated with operations and maintenance activities among Alaskan boaters, while giving harbor staff the tools to communicate effectively with their customers. This raised awareness will translate into changed behaviors that will result in long term protections for marine resources in and around Alaska's coastline. An example of this need is that the use of detergents to disperse oil in bilge water is an incredibly common practice among Alaskan boaters. In many cases this is due to a lack of understanding that the detergents do not make the oil just "go away", and indeed there are heavy fines associated with this activity. Nothing short of a statewide

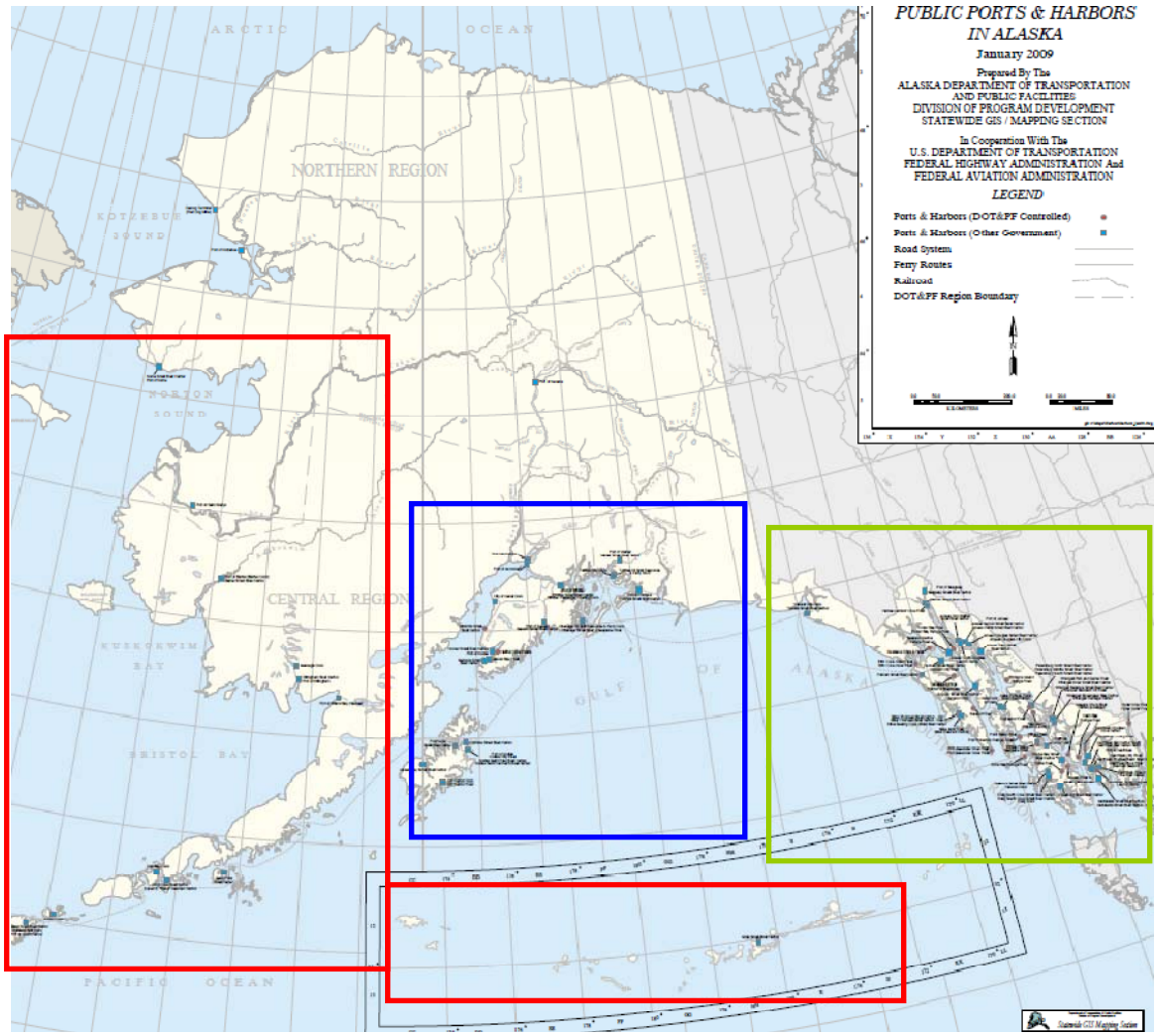
educational campaign, addressed through this project's boater outreach components, is going to begin putting a dent in this common and environmentally-damaging practice.

COORDINATION WITH FEDERAL RESOURCES OR PROGRAMS

This project coordinates with other programs within the Coastal Nonpoint Program and Clean Marina Initiative under the National Oceanic and Atmospheric Association.

COST SHARING OR MATCHING OF FUNDS

The Alaska Association of Harbormasters and Port Administrators, as well as numerous harbormasters around Alaska, have donated their time and expertise to developing the program that will support this CIAP-funded project. Their support will continue throughout the 3 years of this project.

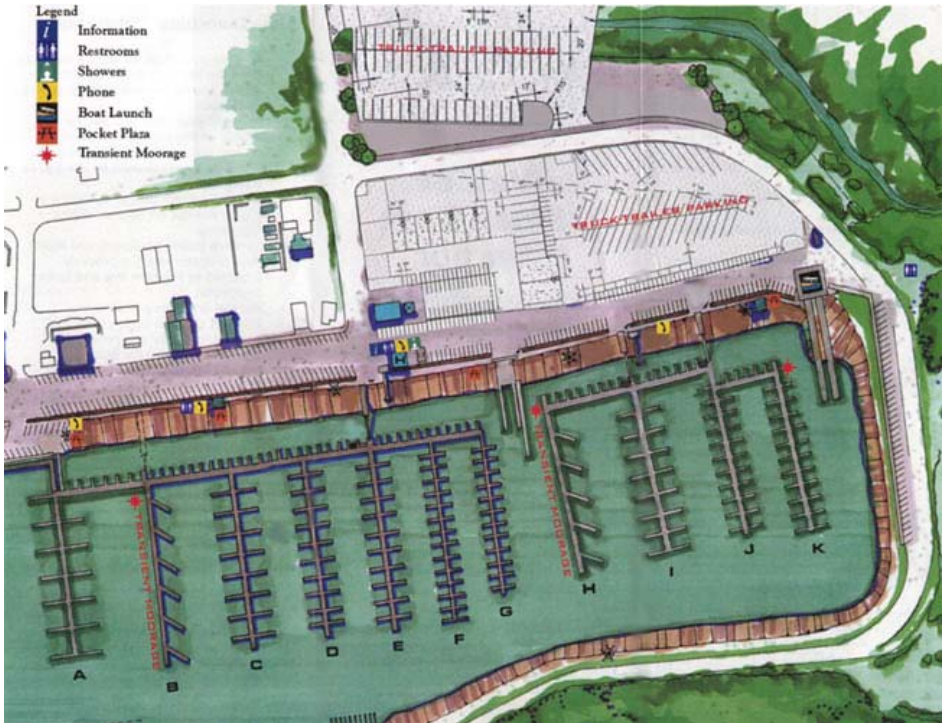


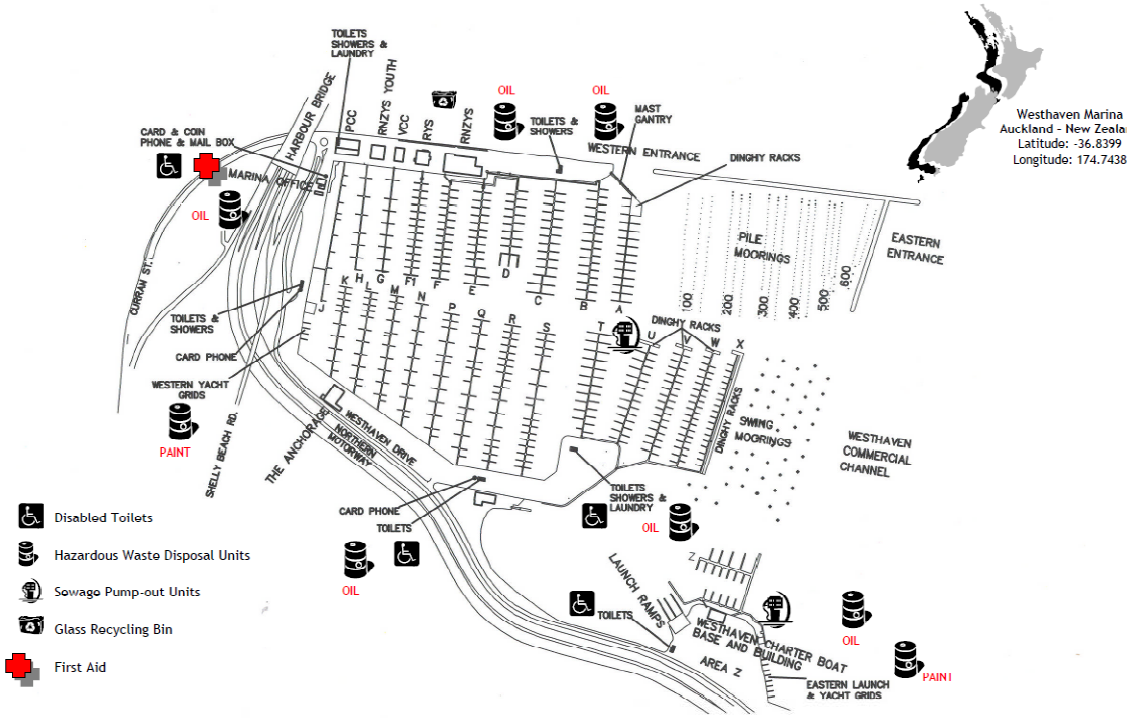
Alaska Clean Harbors Partner Regions: A map from the Alaska Department of Transportation (January 2009) showing all of Alaska's public ports and harbors (Regions are marked by colored boxes: Southwest in red (including the Pribilof Islands and the Aleutian chain), Southcentral in blue, and Southeast in green)

Currently, in-water painting, scraping, and sanding are common vessel maintenance activities in Alaska that pose considerable threats to the coastal environment.

Direct boater education is needed in Alaska to discourage inappropriate dumping of used oil, used antifreeze, and other hazardous wastes (left), and encourage use of used oil recycling facilities (right). Many of Alaska's public harbors need assistance in implementing best management practices, including proper collection of used oil, and communicating these practices and resources to their customers.

Examples of the need for Outreach and Education with Alaskan harbor users to protect the coastal environment





Example need for Alaska Harbor Resource Maps: The current harbor map provided online for the Valdez Small Boat Harbor, Alaska (top). Through this project, Alaska Clean Harbors will work with harbors to create Harbor Resource maps, similar to the map from Westhaven Marina, New Zealand (bottom). While the Valdez map is useful for orientation, there is no information provided on oil disposal, solid waste and recycling facilities, sewage pumpouts, or oil spill clean-up materials. Through this project, Alaska Clean Harbors will create Harbor Resource maps for all of Alaska's certified Clean Harbors.

STATE OF ALASKA
COASTAL IMPACT ASSISTANCE PROGRAM

Marine Conservation Alliance Foundation (MCAF)
This project will be conducted on behalf of the State of Alaska. It was selected through an open competitive procurement process and in accordance with 3 AAC 196.

PROJECT TITLE: Alaska Marine Debris Removal and Assessment

PROJECT CONTACT

Contact Name: David Benton
Address: 431 N. Franklin St. Ste 305, Juneau, Alaska 99801
Telephone Number: (907) 523-0731
Fax Number: (206) 260-3639
Email Address: adminmca@ak.net

PROJECT LOCATION
Statewide throughout Alaska

PROJECT DURATION
Three and a half years. The majority of work will be completed in Year One and Year Two.

ESTIMATED COST

Spending Estimate ($)				
TOTAL	**Year 1**	**Year 2**	**Year 3**	**Year 3.5**
$988,562	$493,811	$294,751	$100,000	$100,000

Funding per Allocation Year of CIAP ($)				
TOTAL	**FY 07**	**FY 08**	**FY 09**	**FY 10**
$988,562	0	0	0	$988,562

PROJECT DESCRIPTION

The United States proclaimed its commitment to healthy oceans in the Marine Debris Research, Prevention, and Reduction Act of 2006 which recognized marine debris cleanup as an important NOAA initiative, consistent with its mission to “protect, restore, and manage the use of coastal and ocean resources.” MCAF also believes that marine debris, including derelict fishing gear, is one of the most pervasive problems plaguing the world's oceans and coastal areas and poses a serious threat to fishery resources, wildlife and habitat, as well as human health and safety. This is especially critical in Alaska where

roughly 33,000 statute miles of coastline provide a uniquely productive ecosystem rich in fish, seabirds and marine mammals, and produces 64% of the nation's domestically harvested seafood.

Since 2003 MCAF has been working with local groups throughout Alaska to clean marine debris from our shoreline. Our program funds local organizations, tribes, community groups, and others to assess, clean-up, remove and dispose of marine debris throughout Alaska. Our partners are diverse, ranging from the small fishing communities and volunteer organizations of Southeast Alaska, to local community groups in Prince William Sound and Kodiak, to tribal organizations and villages in some of Alaska's most remote communities in the Aleutian Islands and along the Bering Sea coast. By partnering and funding local groups to address this problem our program helps build community stewardship of the oceans and Alaska shores.

Our marine debris cleanups are conducted throughout coastal Alaska including many sensitive habitat areas for fish, marine mammals, and sea birds. In selecting projects we give a high priority to projects in areas proximate to endangered marine mammals or bird habitat. We have a proven track record with fifty six field projects funded to date.

The project will consist of the following steps:

1) Marine debris cleanups, and disposal.
2) Aerial and land based surveys to target marine debris concentrations.
3) Public outreach about the hazards of, and solutions for, marine debris. The project results will be made publicly available through the Alaska Marine Debris Database (http://www.mcafoundation.org/googlemap.html). Future planning, outreach and coordination and will occur at the Alaska Forum on the Environment's marine debris session, and at other appropriate fora.

The project will accomplish the goals of:

1) Cleaner beaches and fewer navigational hazards.
2) Improved habitat and protection of threatened/endangered species through reduced threat of entanglement.
3) Improved information of locations and sources of marine debris and greater understanding by the public and members in the seafood industry of these issues through education and outreach.

Since MCAF projects began in 2003, there have been a total of 56 individual projects that have removed over 1,500,000 lbs of debris from 585 statute miles of beach. In addition, four assessments have been completed in order to provide for planning effective future cleanups including the shoreline of the Chukchi Sea and Bristol Bay.

This proposal will generate approximately 15 field projects (cleanups and assessments) and result in the cleanup of an estimated 400,000 pounds of debris. This will result in 150 statute miles or 34,000,000 square feet cleaned of nets, lines, and other debris removing the potential to entangle seals, sea lions, whales, birds and other animals in the uniquely productive ecosystems in Alaska.

Schedule:
The projects in this proposal are ready to hit the ground running as soon as funding becomes available, and weather allows. We expect to conduct the bulk of the field projects over Year One and Year Two. Year Three and Four will be used for the remaining projects as well as debris analysis and reporting.

Permitting:
MCAF is fully aware of environmental, NEPA and Coastal Zone requirements and we have met these requirements in the past. We have a multi-year agreement with the Alaska Coastal Management Program allowing access, and will obtain additional permits as needed.

In Kind
The communities display their support through the extensive in kind contributions. Volunteers are a critical component of the Prince William Sound cleanup effort and also used elsewhere. Partners as diverse as the Yakutat-Tlingit Tribe and the Alaska Brewing Company assisted on one project. In 2009 alone, MCAF had over $167,000 of in kind contributions.

MEASUREABLE GOALS AND OBJECTIVES

With your support, MCAF and our partners would be able to:

1. Remove 400,000 lbs of debris from the Alaska shoreline,
    - Year One 200,000 lbs
    - Year Two 120,000 lbs
    - Year Three 40,000 lbs
    - Year Four 40,000 lbs

2. Clean 150 statute miles of beach, with a footprint of 34,000,000 square feet,
    - Year One 75 miles, 17,000,000 square feet
    - Year Two 45 miles, 10,200,000 square feet
    - Year Three 15 miles, 3,400,000 square feet
    - Year Four 15 miles, 3,400,000 square feet

3. Maintain the Alaska Marine Debris Database displaying project results to the general public.
    - Year One Maintain Database
    - Year Two Maintain Database
    - Year Three Maintain Database
    - Year Four Maintain Database

4. Conduct future planning, outreach and coordination much of which will occur at the Alaska Forum on the Environment's annual marine debris session.

    - Year One Alaska Forum marine debris session

- Year Two Alaska Forum marine debris session
- Year Three none
- Year Four none

PROJECT CONSISTENCY WITH CIAP AUTHORIZED USE

CIAP Authorized Use #1: Projects and activities for the conservation, protection, or restoration of coastal areas, including wetland.

Restoration of the coastline is essential for healthy oceans and provides the basis for a thriving ecosystem. This is essential to the marine mammals living along our shores.

Although all marine debris may be hazardous to animals and humans, MCAF focuses its marine debris cleanup programs where animal populations are listed under the Endangered Species Act (ESA) or under review for protection or special management under the Marine Mammal Protection Act (MMPA). In the North Pacific and Bering Sea there are 11 marine mammals and five seabirds that meet this listing criterion. Four of these animals have documented negative encounters with marine debris including death (Steller Sea Lion, Northern Fur Seal, Short-tailed Albatross and Black-footed Albatross). Eight of the remaining nine marine mammals have known negative encounters with fishing gear, however, it is not clear if the gear was active or was considered marine debris at the time. Seabirds are also subject to entanglement but more often death is attributed to ingestion of plastics. This is a result of plastics often floating and being mistaken for food or accidentally ingested by surface feeding birds such as Albatross.

In an effort to reduce the impacts of marine debris on these animals and improve the overall health of the environment, MCAF started its marine debris program in 2003, and since its inception has collected over 1,500,000 pounds of debris off the Alaska shoreline.

The first MCAF marine debris programs were on St Paul Island, the larger of the Pribilof Islands which are the breeding grounds of the Northern Fur Seal. Projects have taken place every year since 2003 to remove marine debris from the rookeries providing a safe environment for coastal marine mammals. Since then we have expanded to many other environmentally sensitive areas around the state.

Under this project these efforts will continue to remove the nets, lines, plastics and other debris endangering the marine life in Alaska. Maintaining healthy marine life is essential to protecting the diversity and health of coastal areas.

COORDINATION WITH FEDERAL RESOURCES OR PROGRAMS

MCAF has successfully partnered with several agencies since the program began in 2003, and has expanded in recent years to work with agencies to coordinate the premier marine debris conference in Alaska.

We have worked closely with NOAA-National Ocean Service (NOS), NMFS, and the Alaska Coastal Management Program on marine debris cleanup, coordination, education,

outreach and funding. Our program will continue and build on previous work by the MCAF under NOAA federal grants from NOS in FY2004, FY2006, FY2007, FY2008, and NMFS in FY2009 (ARRA).

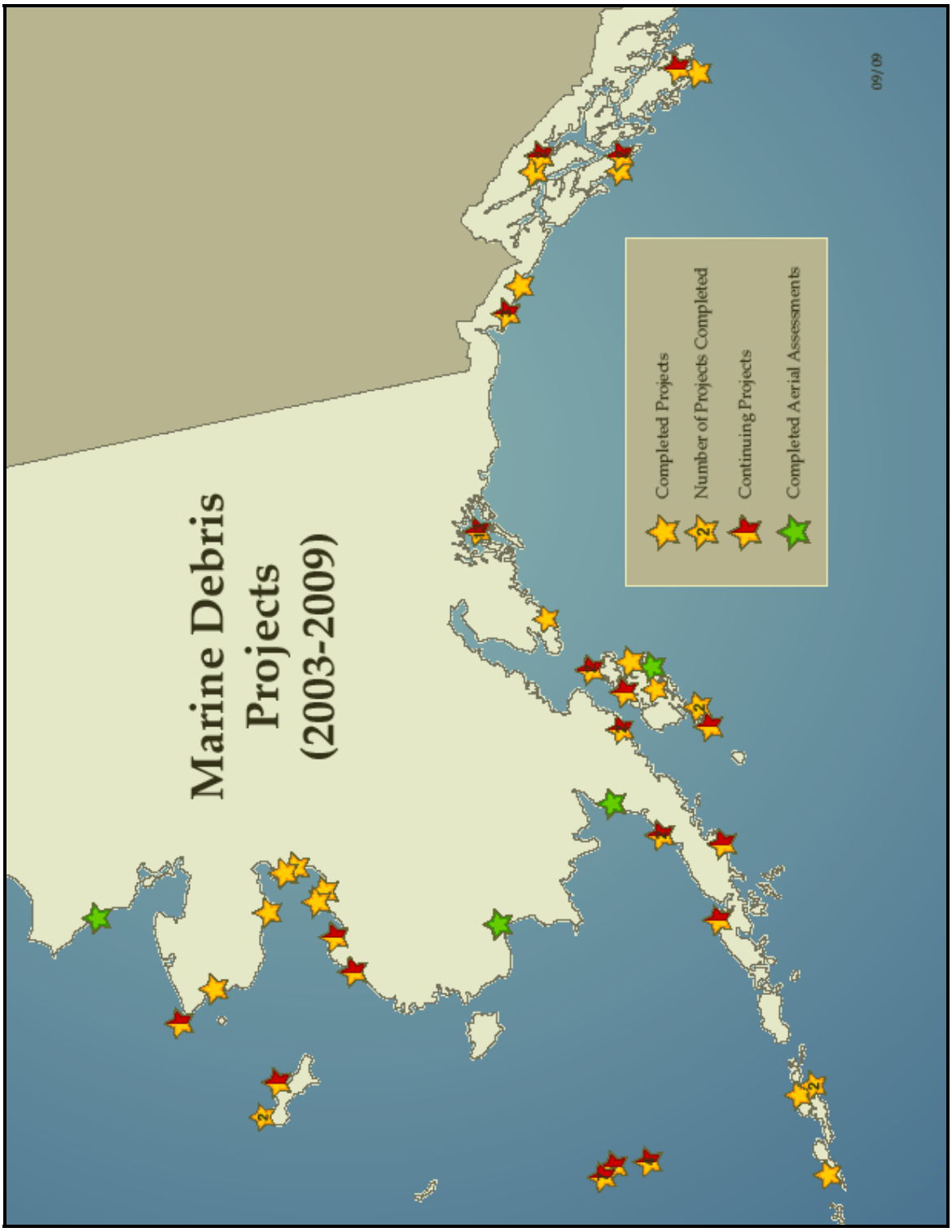
For the past three years MCAF and NMFS Anchorage have partnered to present an annual session on marine debris at the Alaska Forum on the Environment. This has allowed for the exchange of information, the opportunity to meet directly with cleanup contractors, agency representatives and all those involved in marine debris removal and analysis around the state. The conference is used for statewide coordination of projects, funding, lessons learned and public education.

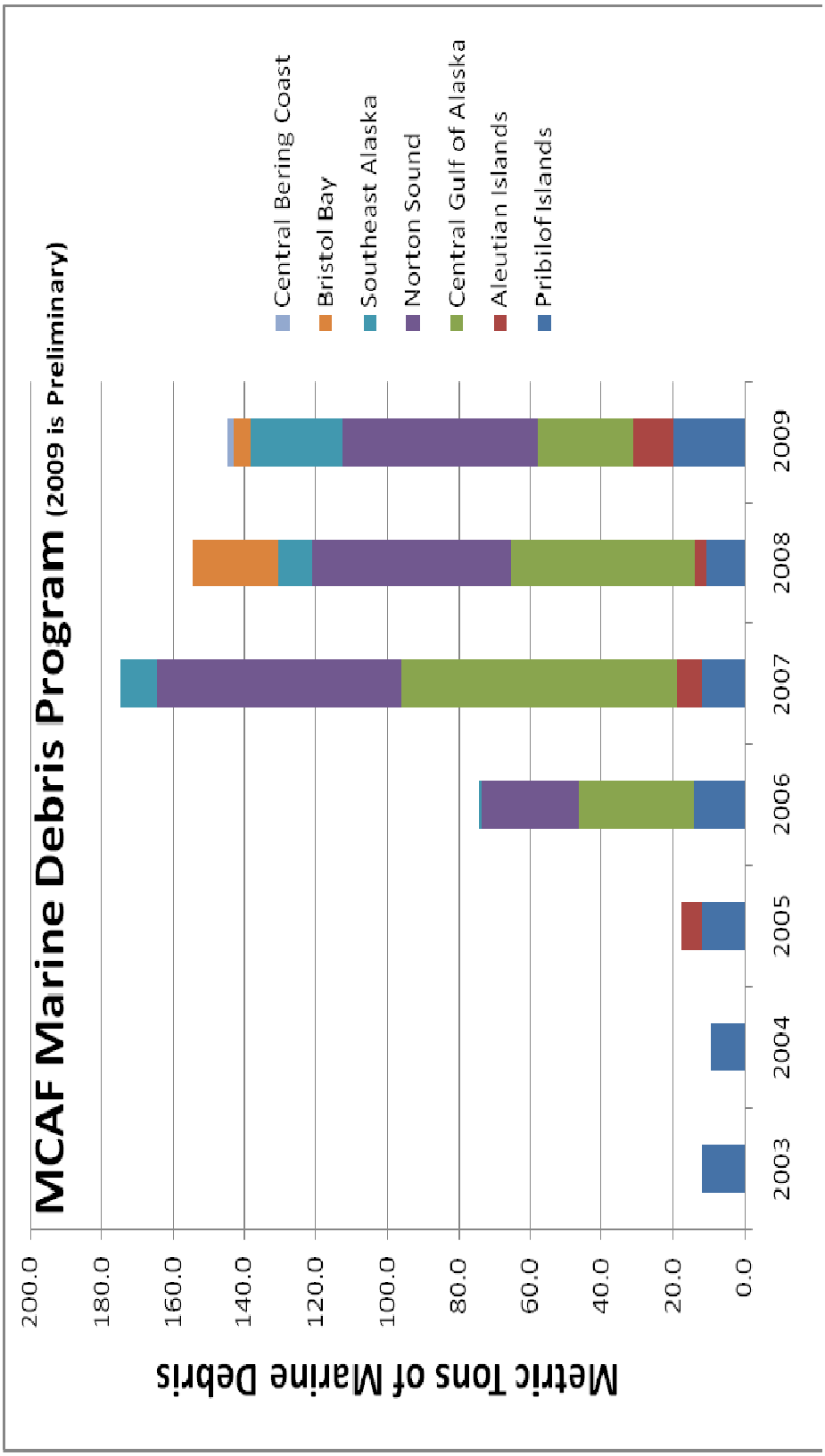
COST SHARING OR MATCHING OF FUNDS

CIAP funds may be used for cost sharing or matching purposes required by another grant. If they are used in this manner, a letter will be included with the CIAP grant application from the other Federal agency (the agency charged with administering the program that includes the cost sharing or matching requirement) indicating that the other agency's program allows the use of Federal funds to meet cost sharing or matching requirements.

Kathy Peavey, Craig AK 2009

Gore Point, AK 2007 – 40 tons of debris cleaned off ½ mile of beach.


Marine Debris
Projects
(2003-2009)
Completed Projects
Number of Projects Completed
Continuing Projects
Completed Aerial Assessments
09/09


MCAF Marine Debris Program (2009 is Preliminary)
Central Bering Coast
Bristol Bay
Southeast Alaska
Norton Sound
Central Gulf of Alaska
Aleutian Islands
Pribilof Islands
Metric Tons of Marine Debris
200.0
180.0
160.0
140.0
120.0
100.0
80.0
60.0
40.0
20.0
0.0
2003
2004
2005
2006
2007
2008
2009

STATE OF ALASKA
COASTAL IMPACT ASSISTANCE PROGRAM

Ketchikan Gateway Borough

This project will be conducted on behalf of the State of Alaska. It was selected through an open competitive procurement process and in accordance with 3 AAC 196.

PROJECT TITLE: South Point Higgins Beach Acquisition

PROJECT CONTACT

Contact Name: Leslie Jackson, Coastal Coordinator
Address: 1900 First Avenue, Ketchikan, Alaska 99901
Telephone Number: (907) 228-6636
Fax Number: (907) 228-6698
Email Address: lesliej@kgbak.us

PROJECT LOCATION

The South Point Higgins Beach is located approximately eleven miles northwest of Downtown Ketchikan at the confluence of Clarence Strait, Behm Canal and Tongass Narrows (see attached map). The 4.5-acre beach is located in a residential neighborhood and provides scenic views of nearby Guard Island and distant Prince of Wales Island. See attached map and aerial photograph.

PROJECT DURATION

The project will take less than one year to complete.

ESTIMATED COST

Spending Estimate ($)				
TOTAL	**Year 1**	**Year 2**	**Year 3**	**Year 3.5**
$778,380	$778,380	n/a	n/a	n/a
Funding per Allocation Year of CIAP ($)				
TOTAL	**FY 07**	**FY 08**	**FY 09**	**FY 10**
$778,380	0	0	0	$778,380

PROJECT DESCRIPTION

The Ketchikan Gateway Borough is applying to the Community Coastal Impact Assistance Program to support the acquisition of a coastal property, locally known as South Point Higgins Beach.

The South Point Higgins Beach property, with its road and utility access, favorable site conditions, and commanding vistas is prime property for public or private enterprise. Instead, the valuable habitat upon which wildlife such as bears, seals, intertidal habitat, sea lions, eagles and birds depend will be preserved in its current condition, through this project. The property is the epitome of the unique Southeast Alaska environment with its

sandy beach, intertidal area, Sitka Spruce/Hemlock/Cedar trees and rocky outcrops. The project helps maintain this pristine environment.

The 4.53-acre parcel, legally described as Survey Number 3089, Lot 123, was long under the stewardship of the Alaska Department of Natural Resources. During the time it was held by the Department of Natural Resources, the Borough encouraged that the property be preserved for conservation purposes and public use. In various planning documents, the Borough Planning Department stated that the parcel should remain in public ownership. However, a 1994 settlement of "State v. Weiss" 706 P.2d 681 (Alaska 1985), reconstituted the 1956 Alaska Mental Health Trust (which in effect, had been dissolved in 1978) and transferred nearly one-million acres of State land, including the South Point Higgins Beach, to the Alaska Mental Health Trust Authority (Trust). The Trust is responsible for managing Trust lands to generate income mental health services within the State of Alaska, including the sale, commercial and residential leasing, and residential and commercial subdivision of such lands. The Borough had no long-term agreements with the Trust for use and/or access to South Point Higgins Beach. In the summer of 2007, Borough officials learned that the Trust Land Office planned to sell South Point Higgins Beach. If the lot was sold during a competitive process, the lot would most likely be subdivided and developed as residential housing. At its meeting of September 4, 2007, the Borough Assembly adopted Resolution 2049 "directing staff to engage the Alaska Mental Health Trust Land Office in negotiations to secure Borough ownership of USS 3089, Lot 123" (the South Point Higgins Beach).

The Borough embarked on a lengthy negotiation process to acquire the property with community support. The question of whether or not the Borough should pursue the purchase was presented to the voters of Ketchikan in the form of a ballot proposition. The voters overwhelmingly supported the acquisition. Since the public input process, negotiations and the purchase and sales agreement have already been established, the monumental milestones have already been accomplished. The project can be completed in less than a year, in Year 1.

In addition to all of the coordination with the Trust there were numerous volunteer coordination efforts from the Ketchikan Beaches Association and Southeast Alaska Land Trust. The beach will be available to all residents and visitors to the Ketchikan area to enjoy. Access to the beach is relatively flat and will be easy to improve with a low impact trail, in order to allow ADA accessibility. Various community groups such as the Rotary Club, Ketchikan Beaches Association, Ketchikan Outdoor Recreation and Trails Coalition and Keep Alaska Beautiful have volunteered to clean up garbage, improve access from the road and supply minimal fire pits to prevent unattended fires from damaging tree roots. Local schools will continue to visit the beach to study tide pool habitat and marine habitat. Residents can continue to enjoy the swimming, clam-digging, kayaking and beach-combing opportunities on the property.

MEASUREABLE GOALS AND OBJECTIVES

Goal #1: The Borough will protect important wildlife habitat through the conservation of this pristine, coastal property.

Measureable Outcome #1: Conservation of the beach property will allow the ecosystem on which the area wildlife (seals, sea lions, whales, starfish, eagles and intertidal habitat) depends continue to thrive.

Goal #2: The Borough will preserve the 4.53-acre parcel from the impacts of development.
Measurable Outcome #2: The South Point Higgins property, with its road and utility access, favorable site conditions, and commanding vistas is prime property for public or private enterprise. Preserving the beach as a natural area will prevent the area from being developed for residential housing and restricting public access.

Goal#3: The project goal is acquisition of a valuable, coastal property (US Survey No. 3089, Lot 123) which will be dedicated as a public, shoreline park in perpetuity.
Measurable Outcome #3: The Borough's 13,174 residents and citizens of the greater Ketchikan area, its million annual visitors, and generations to come will benefit from access to this place and experience.

PROJECT CONSISTENCY WITH CIAP AUTHORIZED USE
The proposed project is consistent with the first (#1) authorized CIAP use: "Projects and activities for the conservation, protection, or restoration of coastal areas." The application is for a beach acquisition project, conserving the 4.53-acre waterfront parcel for public use and protecting the parcel from future development. The coastal area is a valuable ecosystem and home to a variety of plants and wildlife. The property offers various wildlife watching opportunities including viewing of bears, eagles, whales and seals. From the beach, residents and visitors can enjoy spectacular views of Prince of Wales Island, Guard Island, Clover Pass, and the Tongass Narrows. The sandy beach facilitates beachcombing, walking, clam-digging, camping and other outdoor activities. The upland area of the beach is forested with large Sitka Spruce, Hemlock, Red and Yellow Cedar trees.

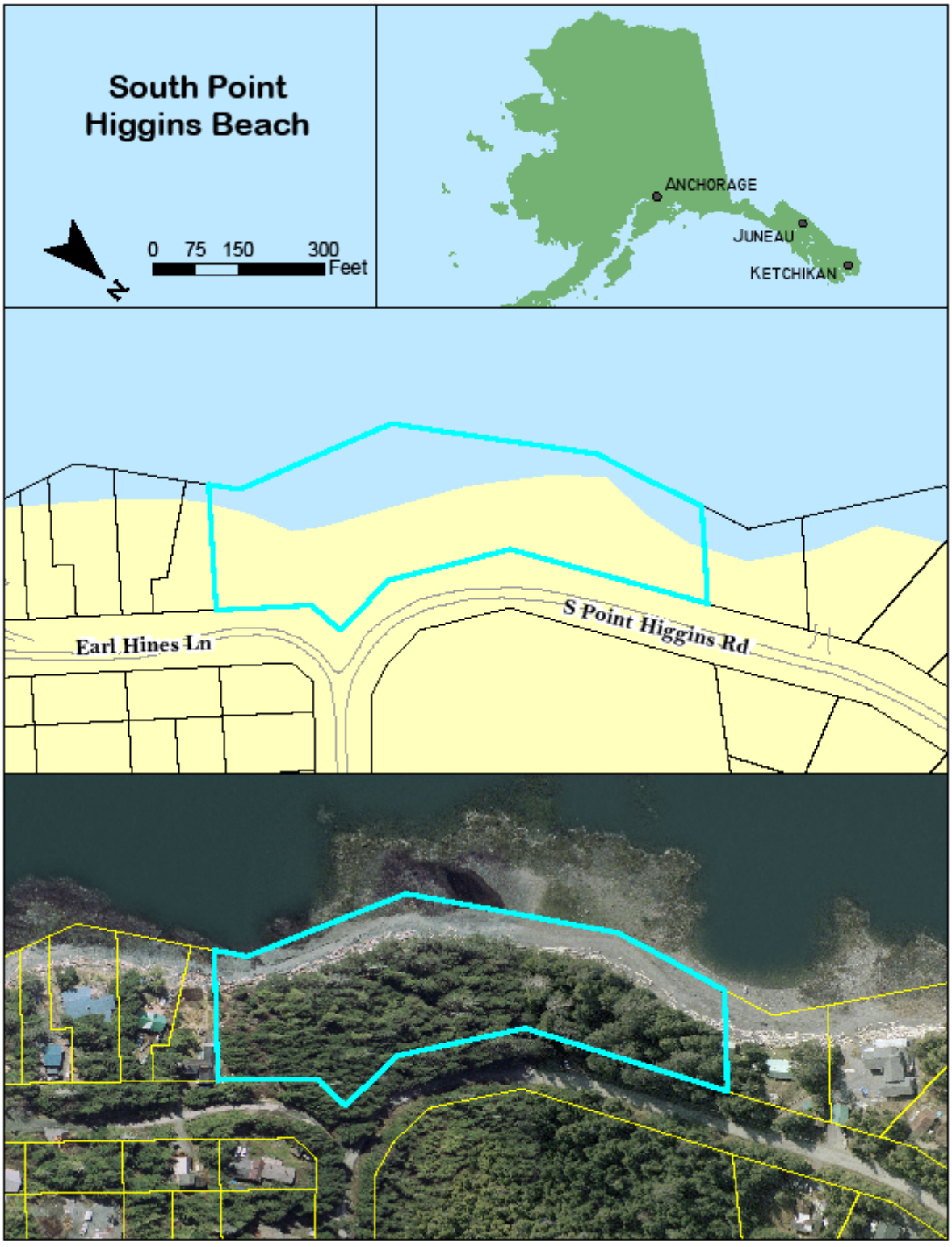
The South Point Higgins Beach property, with its road and utility access, favorable site conditions, and commanding vistas is prime property for public or private enterprise. The property was slated for disposal by the Trust, and would have been sold in a competitive bid process. The property was zoned Low Density Residential and most likely would have been developed as a residential subdivision with a marine outfall for septic services. Development activity would have negatively impacted the wildlife, landscape and natural beauty of the property.

Preserving the beach as a shoreline natural area park has been a priority for the Borough, as indicated in various planning documents such as comprehensive planning documents and the Parks and Recreation Plan. Also, the recently amended Coastal Management Plan references the beach as a designated recreation area, and establishes enforceable policies that address the importance of maintaining public access to coastal waters and designated recreation areas. Sandy marine beaches are surprisingly rare in Ketchikan, with only three being open to the public. Considering that Ketchikan residents endure years with over 18 feet of rain and less than eight hours of sunshine at times during the year, the importance of a publicly accessible beach on the road system is difficult to overstate.

COORDINATION WITH FEDERAL RESOURCES OR PROGRAMS:
There has been no coordination with federal resources or programs for the South Point Higgins Beach project.

COST SHARING OR MATCHING OF FUNDS
There is no plan to use the CIAP funds for cost sharing or matching purposes.

Photos:


South Point
Higgins Beach
0 75 150 300
Feet
N
ANCHORAGE
JUNEAU
KETCHIKAN
Earl Hines Ln
S Point Higgins Rd

STATE OF ALASKA
COASTAL IMPACT ASSISTANCE PROGRAM
School of Fisheries and Ocean Sciences, University of Alaska, February 2009

PROJECT TITLE: Real-time Surface Current Mapping for Conserving and Protecting the Coastal Environment of the Western Alaskan Beaufort Sea.

PROJECT CONTACT

Contact Name: Thomas Weingartner
Address: School of Fisheries and Ocean Sciences, University of Alaska, Fairbanks, AK, 99775
Telephone Number: 907-474-7993
Fax Number: 907-474-7204
Email Address: weingart@ims.uaf.edu

PROJECT LOCATION

The equipment requested can be used throughout coastal Alaska, but the anticipated use is primarily in the Chukchi and Beaufort seas.

PROJECT DURATION

3.5 years.

ESTIMATED COST

Spending Estimate ($)				
TOTAL	**Year 1**	**Year 2**	**Year 3**	**Year 3.5**
$715,715	$343,829	$151,019	$153,771	$67,096

Funding per Allocation Year of CIAP ($)				
TOTAL	**FY 07**	**FY 08**	**FY 09**	**FY 10**
$715,715	0	0	0	$715,715

PROJECT DESCRIPTION

Ocean current measurements are critical for understanding marine ecosystem and coastal processes, delineating critical habitat, designing offshore structures, mitigating impacts from offshore development, search-and-rescue operations, and responding to contaminant spills in the marine environment. Shore-based, high-frequency, surface current mapping radars (HFR) are now a standard instrument that provide real-time maps of the surface circulation for these various purposes. The application of HFR technology is widespread around much of the US coastline http://cordc.ucsd.edu/projects/mapping/maps/] but its use in Alaska has been limited because the radars are costly and electrical power is unavailable along much of Alaska's remote coastline. This proposal has two goals. First, it will expand HFR use in Alaska by increasing the in-state pool of HFR and by constructing a remote power module (RPM) that can power the HFR in remote environments where shoreside power is unavailable. Second, it will expand surface current mapping efforts to include the western Beaufort Sea, where no surface current measurements have been made. This

region, which lies at the junction of the Chukchi and Beaufort continental shelves, has a complex, but poorly understood circulation. It is also a critical fall habitat for foraging bowhead whales migrating south from their eastern Beaufort feeding grounds to the Bering Sea. The need for this information is even more pressing given current interest in exploration (and possible eventual development) of the hydrocarbon potential of the Chukchi and Beaufort seas.

The University of Alaska has developed HFR capability in Alaska by training personnel in its operation, by applying HFR to projects (Figure 1) in Prince William Sound, Cook Inlet, the Beaufort Sea, and currently, the Chukchi Sea and, by designing and constructing the first RPM. In addition to the data collected, Alaska would possess 4 long-range HFRs and 2 RPMs by the end of this project. This equipment has an expected lifetime of 10 – 20 years and could be used in virtually any location along the coast of Alaska. When used in aggregate the 4 HFR would obtain hourly surface currents on a 6 km grid, between the coast and 170 km offshore and along 350 km of coastline, e.g., about half the length of the Beaufort or Chukchi coasts and the approximate distance between offshore Prince William Sound to lower Cook Inlet. Currents in these regions can be swift (~12 or more miles/day) so that the circulation can transport material more than 120 miles in 10 days.

HFR measures surface currents by processing the Doppler spectrum of backscattered radar signals determined from the cross-spectra of the reflected radar waves from ocean waves. The system is manufactured by Coastal Ocean Dynamics Applications Radar (CODAR) Ocean Sensors and it is the only instrument capable of measuring the surface currents synoptically over broad areas. Hourly averaged HFR data has an uncertainty of ~5 $cm\text{-}s^{-1}$ in speed and ~5º in direction. At a minimum 2 HFR systems are required to map the two-dimensional surface current field. Additional HFR units extend the alongshore coverage of the measurements or they can be used in pairs to look at different regions simultaneously.

The RPM reduces operating costs by deriving power primarily from solar and wind energy and is more cost-effective than fossil fuel generators (as the primary power) because generators are costly due to frequent maintenance, limited life expectancies, logistics support, fuel, and permitting issues related to operation and fuel storage. The RPM, which is described in detail at http://www.ims.uaf.edu/hfradar/ARTlab/, consists of off-the-shelf components that have low electromagnetic interference and supply the 11 Kilowatt-hours per day needed for the HFR, communications and monitoring systems. The RPM design is modular so it is easily portable by small cargo planes, boats, four-wheelers (ATVs), and/or snow machines with trailers. The coastal wind and solar potential around Alaska can provide ~90% of the power required. If wind and solar power are temporarily insufficient, the RPM includes a battery bank and a bio-diesel fuel generator. This redundancy ensures reliability and bio-diesel fuel is a benign fuel. The latter issue is significant for it minimizes the costs associated with permitting and mitigation efforts associated with a fuel spill. The RPM monitors its various power generating components continuously and these data are transmitted along with the HFR data stream. Thus, operators can anticipate system problems and design solutions before the power component fails.

The University of Alaska has 3 long-range HFRs and 1 RPM. We seek funds to purchase one HFR unit, to build a second RPM, and to map surface currents in the western Beaufort Sea between August and November. At the end of this 3.5-year project Alaska would then

have 4 HFR systems (2 powered by RPMs) capable of measuring surface currents over ~60,000 km^2 of the coastal ocean. Figure 2 shows the locations of the 2 HFR-RPM systems proposed to study the western Beaufort Sea; one at Pt. Barrow and the other at Cape Simpson. BOEMRE is currently supporting us to operate HFRs in Wainwright and Pt. Lay and they have expressed interest in keeping these systems operational for several years. If these systems are maintained then the four HFR units will map surface currents over the entire area shown in **Figure 2**.

Developing this capacity is straightforward. In Years 1 and 2 we will purchase the HFR and construct the RPM, plan logistics, and ship this equipment to Pt. Barrow and Cape Simpson. (The shipping will be done by truck from Fairbanks to Deadhorse and then by barge from Prudhoe Bay to these sites). The systems will then be setup and operated for 2 field seasons (fall of Year 2 and August – early fall of Year 3 when the systems are dismantled. The last 1.5 years of the project will be devoted to disassembly and data analyses.

MEASUREABLE GOALS AND OBJECTIVES

The goals of this project are twofold. First we will provide the State of Alaska with the infrastructure pertinent to the management of its marine resources by enhancing its HFR measurement capacity in remote settings. In particular at the end of this project the State of Alaska will have 4 surface current mapping radar systems and two autonomous power supplies needed to operate these radars in remote locations. Three of the radar systems and one RPM are already available through prior funding. We request that CIAP fund the purchase and construction of 1 radar unit and 1 RPM. The second task is to map currents in the western Beaufort Sea. Achieving this goal requires the completion of 2 tasks. The first task is to purchase a long-range HFR. The second task is to purchase the components for the 3 RPM and to construct the 3 RPM. At the end of this CIAP project the state of Alaska will have four HFR-RPM systems available for deployment throughout Alaska. The annual outcomes are:

Year 1 (April 2012 – March 2013). Purchase 1 HFR unit and verify its functionality upon delivery. Purchase the components and construct an RPM. Expected outcome: 1 HFR and 1 assembled RPM. Plan logistics and fieldwork.

Year 2 (April 2013 – March 2014): Continue planning and begin field work. Expected outcome: hourly maps of surface circulation in the western Beaufort Sea (September – November). (This would be Region III in **Figure 2**.)

Year 3 (April 2014 – March 2015): Measure surface currents (August – September) and begin disassemble HFR-RPM in fall. Analyze data.

Year 3.5 (April 2015 – September 2015). Complete analyses and submit final report.

PROJECT CONSISTENCY WITH CIAP AUTHORIZED USE

This project will conserve and protect the coastal area of the Beaufort Sea by providing surface current measurements that will inform decisions on critical habitat management, offshore structure design, the mitigation of impacts from offshore development, search-and-rescue operations, and responding to contaminant spills in the marine environment. With the requested instrumentation, this project will provide surface current maps for the period of August through November in the western Beaufort Sea. While the data are applicable to several CIAP Authorized Uses we believe it most pertinent to AU#1: *activities for the conservation, protection, or restoration of coastal areas*. The radar data

are integral to understanding the coastal setting of the western Beaufort Sea coast. This includes understanding pathways by which sediments accumulate or are removed from this coast and coastal locations that are subject to current convergence and divergence. Current convergence leads to the accrual of contaminants that may be transported from elsewhere in the Chukchi or Beaufort Sea. Divergent regions of the ocean are usually biologically productive regions. In either case, the current data obtained from this effort will guide management decisions pertaining to areas that deserve consideration for conservation and protection. Our data sets will provide this information to federal, state, and municipal management agencies, including BOEMRE, ADEC, ADF&G, and the North Slope Borough. In addition, the data collected here are essential for oil spill response planning and for determining potential coastal habitat impacts in the event of a spill. The data are used to estimate statistically water parcel trajectories and for evaluating oil spill circulation models used by BOEMRE and ADEC.

COORDINATION WITH FEDERAL RESOURCES OR PROGRAMS

A variety of previous grants to UAF have allowed us to initiate development of the HFR and RPM infrastructure. This prior support, some provided by federal agencies (including MMS [BOEMRE] and the Office of Naval Research) is estimated to be about $1,900,000 includes:

a) personnel training including formal study with the manufacturer and experience in the field and data analysis having an estimated value of $225,000,

b) the cost of 3 long-range HFR and the central computer site for HFR operation (at UAF) estimated at $475,000, and,

c) the design, construction, and testing of 1 RPM under US Department of Homeland Security funding ($1.2M).

Many of the needs toward which these systems can be applied were identified in the following reports supported by MMS, the North Pacific Research Board, and NOAA:

1) Arctic Ocean Synthesis: Analysis of climate change impacts in the Chukchi and Beaufort Seas with strategies for future research (eds., R. Hopcroft, B. Bluhm, and R. Gradinger), Project report 503 to the North Pacific Research Board, December 2008, 184 p.

2) Recommended Physical Oceanographic Studies in the Alaskan Beaufort Sea, T. Weingartner, R. Pickart, and M. Johnson, Draft Final Report prepared for the US Minerals Management Service, Contract M06PC00030, February 2010, 89 p.

3) Physical Oceanography of the Beaufort Sea, Workshop Proceedings, T. Weingartner, Workshop Chair, OCS Study MMS 2003-045, 2003, 26 p.

4) A Plan to Meet the Nation's Needs for Surface Current Mapping, Prepared for the Interagency Working Group on Ocean Observations, Alliance for Coastal Technologies, September 2009, 64 p.

In addition, the Prince William Sound Regional Citizens Advisory Council and the Cook Inlet Regional Citizens Advisory Council have provided partial support for past HFR measurement efforts in Prince William Sound and Cook Inlet. We have also received endorsements for our prior work from Alaska Clean Seas (Beaufort Sea), Nanwalak Tribal Council and Kachemak Bay Research Reserve (both lower Cook Inlet), and the North Slope Borough, the city councils of Barrow and Wainwright, and the native corporations of both villages (Chukchi Sea) for our past deployments in these areas.

In addition we have shared data from these past deployments with the entities listed above as well as Alaska Department of Fish and Game, the Alaska Department of Environmental Conservation, the National Marine Mammal Laboratory, ConocoPhillips, BP, and Shell, the North Slope Borough Department of Wildlife Management, the office of the NOAA Scientific Support Coordinator for Alaska (NOAA Hazmat; John Whitney, Anchorage), the Prince William Sound Science Center, Pew Charitable Trust, United States Geological Survey, Alaska Ocean Observing System, NOAA International Ocean Observing System, the NOAA Pacific Marine Environmental Laboratory.

As a consequence of the broad interest and our past and present success in obtaining funding to operate these systems in monitoring and research projects in Alaska, we are confident that funding for their use will be available well into the future.

COST SHARING OR MATCHING OF FUNDS

No cost-sharing or matching funds are associated with this program. As stated above prior support from a variety of other agencies has initiated this infrastructure development.

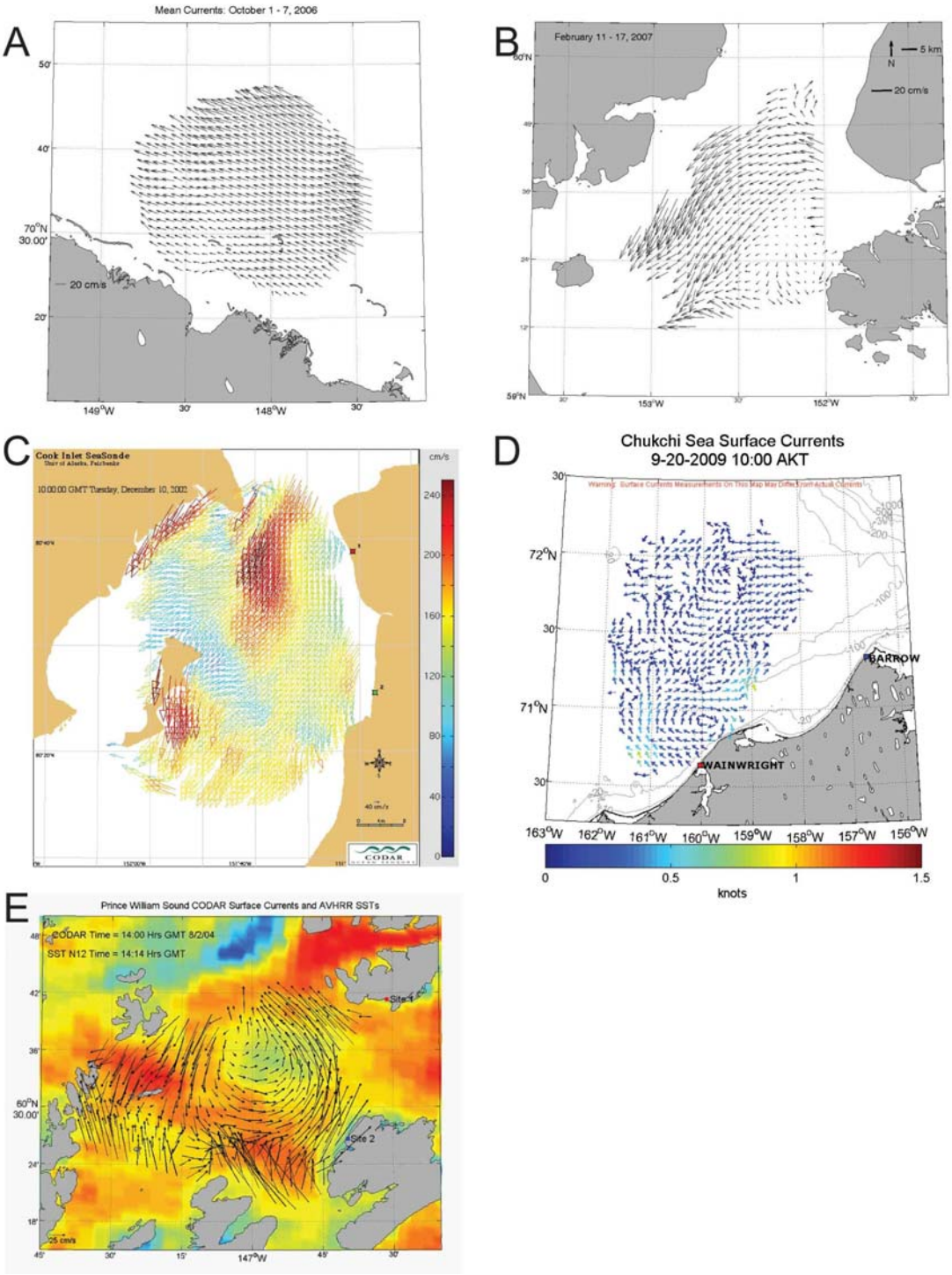


Figure 1. Examples of HFR data obtained by UAF since 2002. A) Mean Oct. 1-7, 2006 the Beaufort Sea (offshore of Prudhoe Bay), B) Mean Feb. 11-17, 2007 surface currents in lower Cook Inlet, C) Surface currents at 1000 Dec. 10, 2002 in middle Cook Inlet, D) Surface currents from a long-range HFR deployed in Barrow and Wainwright at 1000 Sept. 20, 2009, and E) surface currents overlain on a satellite thermal infrared image from Prince William Sound at 1400 on Aug. 8, 2004.

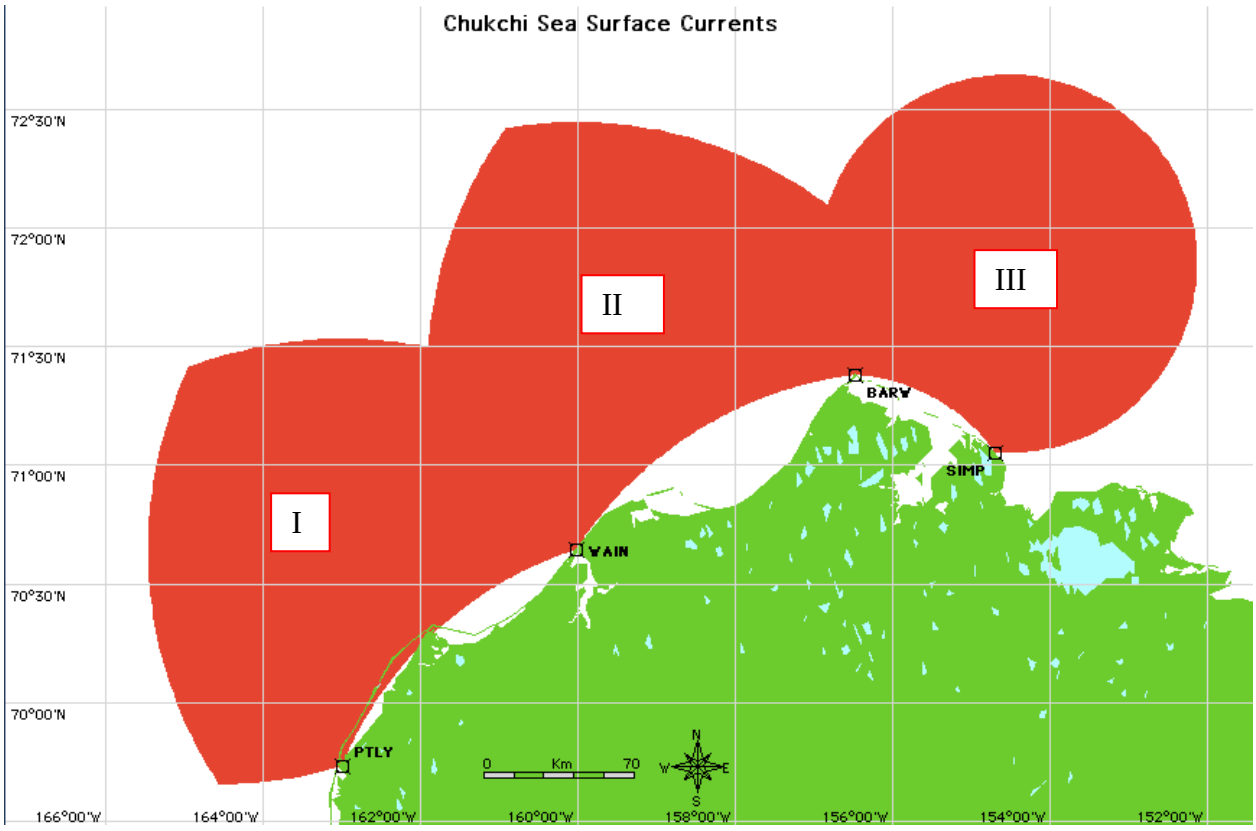


Figure 2. Examples of potential coverage afforded by 4 HFR systems in the region between Pt. Lay and Wainwright (I), Wainwright and Pt. Barrow (II) and Pt. Barrow and Cape Simpson (III). Pt. Lay and Wainwright use shore-based power for the HFR. Cape Simpson and Pt. Barrow use the HFR-RPM system. BOEMRE is contemplating continuing measurements in Regions I and II through 2014. This proposal would make measurements in Region III.

STATE OF ALASKA
COASTAL IMPACT ASSISTANCE PROGRAM

UNIVERSITY OF ALASKA SOUTHEAST

This project will be conducted on behalf of the State of Alaska. It was selected through an open competitive procurement process and in accordance with 3 AAC 196.

PROJECT TITLE: Coastal GIS Module of the Southeast Alaska GIS Library

PROJECT CONTACT

Contact Name: Sanjay Pyare
Address: University of Alaska Southeast, 11120 Glacier Highway, Juneau, AK 99801
Telephone Number: (907) 796-6007
Fax Number: (907) 796-6406
Email Address: sanjay.pyare@uas.alaska.edu

PROJECT LOCATION

This project is housed at the University of Alaska Southeast in Juneau, Alaska. The project serves geospatial data users from Alaska, Canada, and the Lower 48.

PROJECT DURATION

This project will last at just under two years from its inception, March 2012-November 2013

ESTIMATED COST

Spending Estimate ($)				
TOTAL	**Year 1**	**Year 2**	**Year 3**	**Year 4**
$239,966	$128,763	$111,203	-	-

Funding per Allocation Year of CIAP ($)				
TOTAL	**FY 07**	**FY 08**	**FY 09**	**FY 10**
$239,966	0	0	0	$239,966

PROJECT DESCRIPTION

Informed decision-making about the future of Southeast Alaska's productive, coasts, estuaries, and marine systems—and the human livelihoods that depend on them—requires an improved set of data distribution tools in order to better understand the ecological and human use values associated with these systems. The Southeast Alaska Geographic Information System Library (SEAKGIS) is the centerpiece of this effort.

Through a partnership among the U.S. Fish and Wildlife Service (FWS), the Alaska Department of fish and Game (ADF&G), the Tongass National Forest (TNF), the University of Alaska Southeast (UAS), and The Nature Conservancy (TNC), SEAKGIS was created to identify opportunities for regional geospatial data sharing, imagery, and GIS datasets and to provide access to this information to communities, agencies, and planners. Funding for this project will turn an ad-hoc program into a permanent resource ensuring

that the resources that have gone into collecting the data is available and accessible for anyone interested in Southeast Alaska resources.

The intent of the SEAKGIS Library project is to serve as unified GIS resource for education, environmental planning, and resource management activities specifically in the Southeast Alaska region. Thus far, the project has established a foundation that has begun to meet these needs through: 1) establishment of the Library, which incorporates some spatial data from over 10 contributors; 2) a website describing Library content; 3) a preliminary data portal serving agencies, universities, non-governmental organizations, industry, and consultants; 4) an inventory report documenting regional data needs relative to the existing Library datasets; 5) the development of an interagency MOU and Steering Committee; and 6) the hiring of a temporary geospatial Library coordinator.

Increased region-wide use of GIS and mapping in support of community development, regulatory permitting, resource management, monitoring efforts, environmental planning, and research projects, especially as these relate to multi-jurisdictional nature of the coastal zone, has created a critical need among users to access more comprehensive data than is generally available through any single individual entity. The SEAKGIS Library project is now poised to include specific thematic content to help address high-priority coastal resource issues in the region, namely through development of a unified “Coastal GIS Module" within the Library to support coastal management and mapping needs (Attachment A below).

The development of the Library to date has relied upon extensive coordination and collaboration among UAS, the statewide Geographic Information Network of Alaska (GINA) program, ADFG, TNF, and TNC. Near term plans include efforts to engage the Alaska Department of Natural Resources (ADNR), National Oceanic and Atmospheric Administration (NOAA), Alaska Department of Environmental Conservation (DEC), Alaska Department of Transportation, Alaska Department of Commerce, Community, and Economic Development (DCED), and local municipalities to identify potential for regional geospatial data-sharing and Library expansion with existing imagery and GIS datasets.

MEASUREABLE GOALS AND OBJECTIVES

Goal 1: Provide reliable access to coastal geospatial data of Southeast Alaska for University of Alaska students (the future workforce), industry, consultants, researchers, agency resource managers, and the public through the development of the Coastal GIS Module and the refinement of the SEAKGIS Library. This goal fosters region-wide cooperation and collaboration in the sharing, improvement, and acquisition of geospatial data in the coastal zone, a complex and multi-dimensional landscape with many jurisdictions.

Measurable Objectives 1: Establishment of a specific Coastal GIS Module within the SEAKGIS Library that serves as a gateway of coastal-specific geospatial datasets for the public in Southeast Alaska. This will enable the delivery of data to a wide range of users through:

- Website coupled with geospatial technology that will allow users to search, browse, visualize, and download ~40 spatial datasets (Attachment A) that are relevant to coastal systems
- Web mapping services, including a data streaming service that will allow users to incorporate GIS data seamlessly into their GIS projects. This system will also be compatible with the internal mapping systems of collaborating agencies (e.g. ADNR, TNF, and NOAA)
- An interactive web map that will allow users to both interrogate and visualize Coastal GIS spatial data; and a geoportal tool that will allow users to both query and download relevant Coastal GIS spatial datasets
- Supplementary information including FGDC-compliant metadata and a tutorial for the Module

Additional Measurable Outcomes include:
- Type, number, and frequency of coastal-GIS data users that are served by the Library and Module
- Number and coverage of coastal-GIS data sets housed in the Library and Module,
- Number of state, federal, and non-government partners that contribute to the Library and Module

Goal 2: Partner with The Nature Conservancy to conduct a data gap analysis for the Coastal GIS Module, and then develop new coastal datasets for Southeast Alaska.

Measurable Objectives 2:
Deliver ~15 new, high priority coastal datasets to the Coastal GIS Module through the partnership between UAS and TNC.

These data include, but are not limited to:

Habitat
- Data extracted from the Alaska ShoreZone Habitat Mapping and Inventory data: geomorphic characteristics (substrate), intertidal and nearshore vegetation, and derived attributes such as wave exposure and oil residence index.

Nearshore Oceanography and Climate
- Sea surface temperature
- Updated bathymetric data digitized from NOAA NOS charts
- Geology and physiographic setting
- Sea surface temperature
- Ocean salinity
- Weather station data from Southeast Alaska
- Precipitation models

Infrastructure
- Permitted coastal development activities- U.S Army Corps of Engineers
- Marine outfalls
- Existing hydro-power infrastructure

- Shellfish farms
- Hatchery sites
- Log transfer facilities

Goal 3: Fully staff the SEAKGIS Library with a full time Coordinator and a student technician to continue refining the Library and serve a multi-user audience efficiently. Staff will then increase outreach relating to coastal systems to the public though training workshops on how to use the Coastal GIS Module in collaboration with TNC.

Long term funding and support for the Coordinator position, as well as the housing and operation of the GIS Library, including the Coastal GIS Module, is provided for via a formal multi-agency Memorandum of Understanding (Attachment B below; see http://seakgis.alaska.edu/pdfs/MOU.pdf for the full document), which outlines resources and proposed commitments from the various partners. In addition to this MOU, because the GIS Library is an integral and required component of the educational curriculum in geospatial sciences at UAS, UAS will by necessity continue to commit standard resources (e.g. network capacity, servers, backup capability, website maintenance) as needed to faciliate data-dissemination functions of the GIS Library and the Coastal GIS Module in perpetuity.

Measureable Objectives 3: Conversion of the SEAKGIS Library and Coastal Module to a permanent resource serving Southeast Alaska by supporting a permanent Coordinator. The Coordinator will conduct essential Library and Module functions and forge new partnerships with entities to contribute and share coastal geographic data and additional financial support. Two or more workshops will be held to demonstrate the Coastal GIS Module.

Additional Measureable Outcomes include:
- Type, number, and diversity of Workshop attendees
- Number of courses, research projects, and students served by the Library and Coastal Module

In Year 1, we will primarily focus primarily on laying the foundations for the Module. In Year 2, performance metrics will be employed to gauge project success.

PROJECT CONSISTENCY WITH CCIAP AUTHORIZED USE
This project is consistent with CIAP Authorized Use #1, **"Projects and activities for the conservation, protection, or restoration of coastal areas, including wetlands."**

Geospatial imagery, data, and services provided by the Coastal GIS Module of the Southeast Alaska GIS Library will have both direct and indirect benefits to coastal areas. Below we articulate each of these benefits in more detail.

Direct Benefits to Agencies with Coastal Conservation & Management Missions
Coastal areas will be directly benefitted by allowing specific agencies with management jurisdiction to make decisions that impact coastal resources more efficiently, accurately, consistently, and comprehensively. The following agencies have indicated that the Coastal GIS Module will allow them to better achieve coastal-resource conservation objectives and

have expressed the following specific benefits. The following is not a comprehensive list of agencies and benefits. See support letter details in Attachments C1 through C6.

- U.S. Fish and Wildlife Service, Juneau Field Office – Increasing accuracy of mapping applications in coastal areas; and more authoritative use of data to make regulatory decisions
- U.S. Forest Service, Alaska Region – Enhancing land-use decision making in upland areas that impact estuaries and coastal areas; increasing accuracy and consistency in coastal maps used for regulatory purposes; and increasing consistency in use of hydrography data across districts and other subdivisions within the Tongass National Forest.
- U.S. Department of Agriculture Natural Resources Conservation Service, Juneau Office – Conducting more accurate site visits; developing improved natural resource plans in coastal areas; and enhancing cross-jurisdictional and internal communications about coastal geography
- Alaska Department of Fish and Game, Division of Sport Fish – Increasing efficiency and consistency of the mapping of potential impacts in coastal habitats; efficient and accurate retrieval of coastal hydrographical and related resource data; and enhancing responsiveness to public stakeholders in coastal areas
- City and Borough of Yakutat – Providing coastal information (boundaries) accurately; increasing efficiency of information for coastal planning and mapping applications; increasing ability to comment on proposed developmental activities in coastal areas; and enhancing coordination in multi-jurisdiction coastal areas

Direct Benefits to Projects & Activities Enhancing Coastal Resource Conservation

- Oil Spill and Disaster Response -- Oil spill response professionals have expressed the need for improved tools for implementing conservation actions during oil spill emergencies, training session, and response planning. The Coastal GIS Module would provide one place for sharing comprehensive coastal data for these purposes. For example, the Southeast Alaska Petroleum Resources Organization and the DEC need as much information that is available to write geographic response strategies for specific areas. In an emergency response situation, making all data available to stakeholders is a valuable contribution toward understanding what existing coastal resources are in need of protection.
- Permitting: -- The Coastal GIS Module will be available for use in coastal development permitting. For example, the ADFG adheres to policies protecting the furthest reaches of freshwater salmon streams at low tide (Alaska Executive Order 114; AS 16.05.841 (Fishway Act) and Alaska Statute 16.05.871 (Anadromous Fish Act). The Coastal GIS Module will include data to directly inform where the salmon streams flow and where permitting regulations should be enforced. In Alaska, travel costs and the remote nature of Alaska's coastline often impede adequate project review during the permitting process.
- Habitat Conservation and Protection -- The Southeast Alaska Land Trust, The Nature Conservancy, and The Conservation Fund have active voluntary habitat protection programs in Southeast Alaska. The largest parcels protected to date involved the acquisition of State of Alaska Mental Health Trust or University Lands parcels. These acquisition activities required extensive mapping of wetland type and distribution, streams, coastline, ownership, species diversity, and other

attributes. Future proposals will require a similar base of geospatial information in order to characterize, map, and prioritize parcel selections. Development of a coastal geospatial data library would enhance the capability of these organizations to identify and preserve valuable coastal habitat. These ecosystems, habitats, fish and wildlife are managed by a combination of federal, state, and local agencies, authorized by a complex network of state constitutional provisions, federal and state laws, and management plans. While this matrix of management is not unusual, there is a need to digitize the information because complicated jurisdictions and authorities make it difficult to assess conservation values.

- Climate Change Impacts on Coastal Ecosystems -- Coastal GIS Module data sets including precipitation, sea surface temperatures, climate projections from Scenarios Network for Alaska Planning, Alaska ShoreZone, and USFWS Surveys 1997-2002, and others will be used in The Nature Conservancy's conservation assessment of Southeast Alaska's coastal resources to understand habitat conditions, human activities, and climate change impacts in this region.

Indirect Benefits

- Research and Education -- For successful coastal zone management in the future, agencies and organizations – from DNR and DOT to ADFG and TNC – will require a workforce that has a strong understanding of the multi-jurisdictional nature of coastal zones. This workforce also needs to be intimately aware of the geography (and associated challenges) of Southeast Alaska coasts and the multidimensional elements that comprise a coastal system – from infrastructure to coastal wildlife to tidal fluctuations. The University of Alaska provides a potential "pipeline" for such a workforce, and a Coastal GIS Module housed at UAS precisely provides the resource that will educate this workforce. The Coastal GIS Module would form a critical foundation for classroom-based projects that highlight coastal systems in GIS, Remote Sensing, Environmental Science, and Biology classes – as well as two new Programs in Pre-Engineering and Geography -- at UAS. This resource would also be important for (undergraduate and graduate) student research projects. These students would develop a conceptual understanding of the depth of coastal systems and the practical know-how associated with manipulation of geographical data; and furthermore, these students will develop the familiarity *with the same coastal geographical data that they will one day use on the job***.**
- Industry and Community Development -- Coastal Southeast Alaska has significant sustainable energy resources for small and large hydropower generation, windpower generation, and tidal energy research and development. Most, if not all, of these projects occur within multiple ownerships and agency jurisdictions. Minimizing the impacts of these developments on freshwater, wetland, and marine habitats will require access to coastal geospatial data. Models for optimally locating these facilities, and development of mitigation strategies for facility operation, depend vitally on mapping resources and GIS data; and success would be enhanced by multi-dimensional geospatial data (e.g. wind, bathymetry, roads, ports) in the Coastal GIS Module of the SEAKGIS Library. As coastal communities in Southeast continue to develop and expand, the conservation of shoreline, emergent wetlands, and stream corridors will become important land management considerations. As these communities revise their Comprehensive Plans, access to

multi-jurisdictional data increases their ability to identify, map, and preserve important conservation parcels or corridors.

COORDINATION WITH FEDERAL RESOURCES OR PROGRAMS

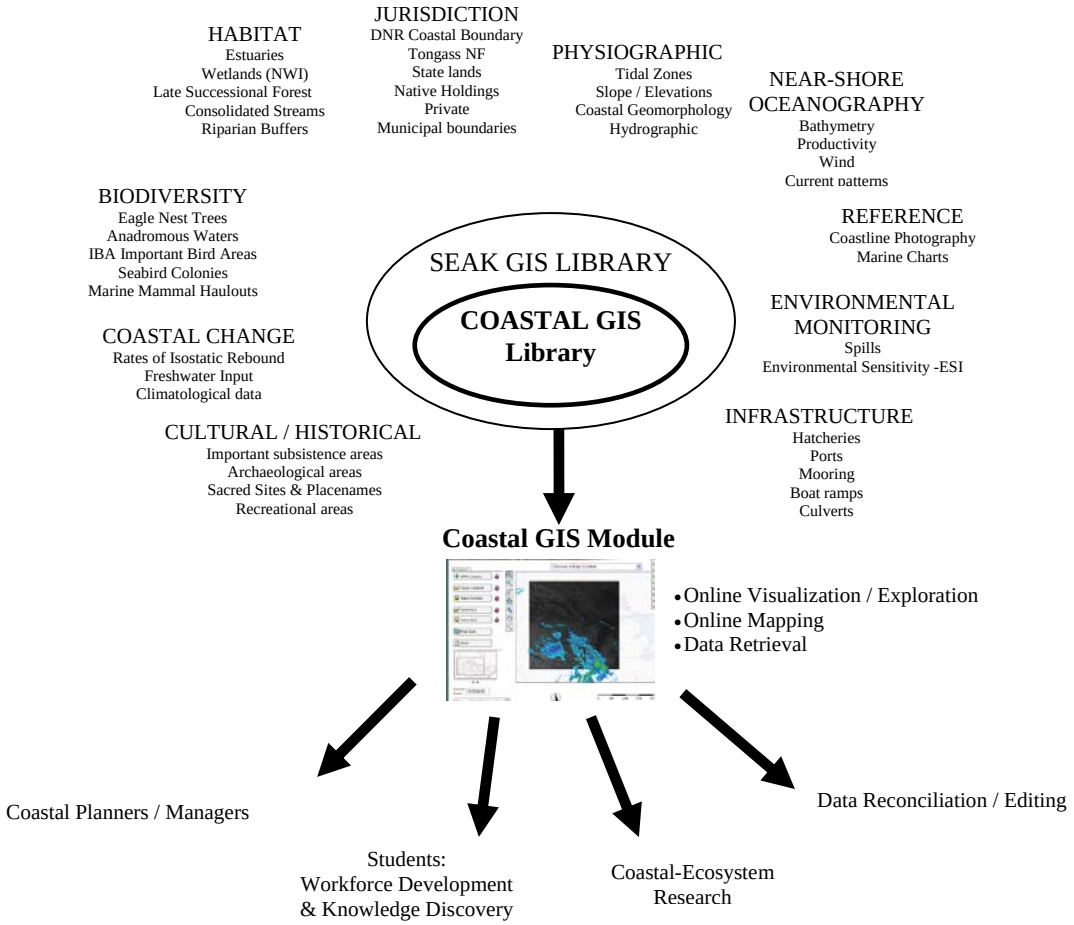
Interagency collaboration will continue to be a cornerstone of this project. To develop, compile and serve coastal GIS data, the University of Alaska Southeast will continue to routinely engage and coordinate with a suite of agencies – both those serving on the GIS Library Steering Committee (Alaska Department of Fish and Game, U.S. Fish and Wildlife Service, Tongass National Forest) as well as the U.S. Geological Survey (collaborative hydrography standardization project) and NOAA (ShoreZone). The project will also coordinate with agencies on technical aspects of data and data-delivery services to ensure compatibility and eliminate redundancy with other geospatial platforms, including Alaska Department of Natural Resources' Alaska Mapper, GINA, and the Statewide Digital Mapping Initiative (SDMI); and adherence to data and metadata standards through coordination with the Alaska Geographic Data Committee (AGDC).

COST SHARING OR MATCHING OF FUNDS

We are not using CCIAP funds for matching purposes. The CCIAP investment in the project is complemented by current and past support from UAS, GINA, USFWS, TNF, and ADFG.

Attachment A. Overview of the Coastal GIS Module

Geospatial data sets that will be collated from a variety of state, federal, and NGO partners; unified under a Coastal GIS Module as part of the Southeast Alaska GIS Library; and distributed to a multi-user audience.



Attachment B. Interagency MOU for the Southeast Alaska GIS Library

(see http://seakgis.alaska.edu/pdfs/MOU.pdf for the full document)

FS Agreement No. 06MU-11100500-019

MEMORANDUM OF UNDERSTANDING BETWEEN THE UNITED STATES DEPARTMENT OF AGRICULTURE FOREST SERVICE TONGASS NATIONAL FOREST, THE UNITED STATES DEPARTMENT OF THE INTERIOR FISH AND WILDLIFE SERVICE, THE ALASKA DEPARTMENT OF FISH AND GAME, THE UNIVERSITY OF ALASKA SOUTHEAST, AND THE NATURE CONSERVANCY OF ALASKA

This Memorandum of Understanding (MOU) establishes a framework for coordination and cooperation between the USDA Forest Service, Tongass National Forest (USFS), the US Fish and Wildlife Service (USFWS), the Alaska Department of Fish and Game (ADFG), the University of Alaska Southeast (UAS) and The Nature Conservancy of Alaska (TNC), and serves as an umbrella for more specific projects and collaboration related to the *Southeast Alaska GIS Library*.

I. PURPOSE

The Southeast Alaska GIS (Geographic Information System) Library project is composed of a group of federal and state resource management agencies and academic educators working toward cost-effective production, ready availability, and greater utilization of geospatial data and applications, and using these tools to further research and improve management of public resources in Southeast Alaska.

The Southeast Alaska GIS Library will provide a framework for coordinating the acquisition and sharing of spatial data between the public, researchers, educators, and managers. It will also provide a forum for discussing regional data standards, future data needs and opportunities for collaboration.

VIII. SIGNATURES

USDA FOREST SERVICE
TONGASS NATIONAL FOREST

6-21-06
FORREST COLE — Date
Forest Supervisor

US DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE

6/7/06
Bruce Halstead — Date
Field Supervisor

STATE OF ALASKA
DEPARTMENT OF FISH AND GAME

MCKIE CAMPBELL — Date
Commissioner

UNIVERSITY OF ALASKA
SOUTHEAST

6/8/06
Brendan Kelly — Date
Dean of Arts and Sciences

THE NATURE CONSERVANCY OF ALASKA

4-3-06
T. David Banks — Date
State Director

Attachment C1: Agency Commitment to Using the Coastal GIS Module

United States Department of the Interior
FISH AND WILDLIFE SERVICE
Juneau Fish & Wildlife Field Office
3000 Vintage Blvd., Suite 201
Juneau, Alaska 99801-7100
(907) 780-1160

March 9, 2010

Sally Russell Cox
Division of Community and Regional Affairs
Community Coastal Impact Assistance Program
Department of Commerce, Community, and Economic Development
550 West 7th Avenue, Suite 1770
Anchorage, AK 99501–3510

Ms. Cox,

We are writing in support of the University of Alaska Southeast (UAS) Coastal Impact Assistance Program project proposal titled "Coastal GIS Module of the Southeast Alaska GIS Library".

We are among the founding members of the ad-hoc interagency effort to establish the Southeast Alaska GIS Library and we have contributed staff time to participate on the Steering Committee since 2002. We also provided modest financial support to the start-up phases of this effort through our Tongass Program and Coastal Program and are strongly supportive of developing and distributing coastal data through the Coastal GIS Module as a subset of the overall Library. With CIAP support, UAS will have the ability to more fully institutionalize the Library, develop the Coastal GIS Module, and enhance its overall role as an authoritative source of geospatial information for public, agency, research, and industry users.

Neil Stichert of my staff is part of the Southeast Alaska GIS Library Steering Committee and maintains an active role in its efforts. Neil may be contacted at (907) 780-1180 for additional information.

Sincerely,

for Bill Hanson
Field Office Supervisor

Attachment C2: Agency Commitment to Using the Coastal GIS Module

United States Department of Agriculture | Forest Service | Alaska Region | P.O. Box 21628 Juneau, AK 99802-1628

File Code: 7140-8
Date: March 8, 2010

Sally Russell Cox
Division of Community and Regional Affairs
Community Coastal Impact Assistance Program
Department of Commerce, Community, and Economic Development
550 West 7th Avenue, Suite 1770
Anchorage, AK 99501–3510

Dear Ms. Cox

I'm writing to confirm my support of the project proposal titled "Coastal GIS Module of the Southeast Alaska GIS Library" which was submitted to the Community Coastal Impact Assistance Program, March 2010. The proposal details a collaborative effort between the University of Alaska Southeast, The Nature Conservancy of Alaska and other partnering agencies who govern the Southeast Alaska GIS Library.

The work program outlined in the proposal is both consistent with and complimentary to current initiatives on the Tongass National Forest pertaining to regional hydrography data. The Tongass NF recognizes that understanding the interface between terrestrial hydrography systems, estuary systems and marine systems is critical to informing certain decision making processes by the Forest Service. The work program identified in the above submission will go a long way towards the provision of consistent and standardized regional data that will support Forest Service initiatives, as well as the initiatives of our collaborators.

Erik Johnson of my staff is a current member of the Southeast Alaska GIS Library steering committee. He will actively participate in the project including 1) participation in planning the development of a coastal mapping application; 2) fostering collaboration with current and potential project stakeholders; and 3) ensuring that resultant data products meet the standard required for an informed decision making process at the federal level. You may contact Erik at (907) 586-7957.

Sincerely,

/s/ James Thomas
JAMES THOMAS
Acting Director, Information Management

cc: Erik Johnson

Attachment C3: Commitment to Using the Coastal GIS Module

The Nature Conservancy
Protecting nature. Preserving life.

The Nature Conservancy in Alaska
Alaska Field Office, Juneau
416 Harris St.
Suite 301
Juneau, AK 99801

tel [907] 586-8621
fax [907] 586-8622
nature.org

Sanjay Pyare
University of Alaska Southeast
11120 Glacier Hwy
Juneau, AK99801

March 3, 2010

Dear Sanjay,

The Nature Conservancy (TNC) wishes to express support for the Coastal GIS Module of the Southeast Alaska GIS Library. TNC wishes to partner with UAS on their Community Coastal Impact Assistance Program (CCIAP) proposal to increase the capacity of the GIS Library. TNC currently participates as members of the steering committee for the Southeast Alaska GIS Library to foster efficient distribution of spatial data for the region.

To that end, we believe the CCIAP provides an opportunity to support the development and distribution of coastal GIS data that TNC has previously acquired as part of the GIS Library. We have been working for the past 2 years in partnership with the Alaska Dept. of Fish and Game, US Fish and Wildlife Service, US Forest Service, NOAA National Marine Fisheries Service and Alaska Fisheries Science Center, and Alaska Dept. of Natural Resources to acquire and analyze information on coastal ecological diversity and condition in relation to human activities throughout the region. We are well positioned to provide a range of important data layers and analytical capacity, identify data gaps and help set priorities for future investment in data acquisition and development.

TNC is proposing to partner with UAS on this proposal, and seeks funding to participate in data development and compilation of existing sources that is compliant with the GIS Library standards. Further, we propose to train and inform community members, coastal managers, agency staff, and watershed councils across the region about the GIS Library Coastal Module, and the use of specific datasets for their individual purposes. To accomplish this, TNC seeks funding to support 1 part time GIS analyst and 1 outreach and training staff. The Nature Conservancy will provide in-kind support for travel and telecommunications. TNC's approved federal overhead percentage is 23.28% (see Attachment A). We are asking for 16% in the sub-award due the CCIAP's guidelines as the budget shows below.

Best Regards,

John Sisk, Director
Coastal Forest and Salmon Program

Attachment C4: Agency Commitment to Using the Coastal GIS Module

United States Department of Agriculture

NRCS

Natural Resources Conservation Service
175 S. Franklin Street, Suite 424
Juneau, AK 99801
(907)586-7220

March 11, 2010

Sally Russell Cox
Division of Community and Regional Affairs
Community Coastal Impact Assistance Program
Department of Commerce, Community, and Economic Development
550 West 7th Avenue, Suite 1770
Anchorage, AK 99501-3510

Dear Ms. Cox,

I am writing in support of the University of Alaska Southeast (UAS) Coastal Impact Assistance Program proposal, "Coastal GIS Module of the Southeast Alaska GIS Library." As the Southeast Alaska Field Office representative of the Natural Resources Conservation Service (NRCS), I work with non-federal landowners and organizations throughout the region, and often utilize geospatial data from a variety of sources.

Landowners/land users, agencies, tribes, municipalities, educational institutions, and nonprofit organizations often depend upon geospatial data for reconnaissance prior to conducting site visits, developing plans to protect or improve natural resources, providing outreach and education services, or facilitating communication between various entities. Having a comprehensive database would greatly improve these entities' ability to engage in conservation efforts and informed community development, and serve as a valuable tool to educate Alaska's future workforce.

Please contact me if you have any questions.

Sincerely,

Samia L. Savell
District Conservationist
USDA-NRCS Juneau Field Office

Helping People Help the Land

An Equal Opportunity Provider and Employer

Attachment C5: Agency Commitment to Using the Coastal GIS Module

STATE OF ALASKA

SEAN PARNELL, GOVERNOR

DEPARTMENT OF FISH AND GAME

DIVISION OF SPORT FISH

P.O. Box 110024
Juneau, AK 99811-0024
PHONE: (907) 465-4270
FAX: (907) 465-2034

TO: Sally Russell Cox
Division of Commuity and Regional Affairs
Community Coastal Impact Assistance Program
Department of commerce, Commuity, and Economic Development
550 West 7th Avenue, Suite 1770
Anchorage, AK 99501-3510

Date: March 10, 2010

FROM: Cecil Rich
Division of Sport Fish,
Alaska Department of Fish and Game,

Subject: Letter of Support - Project Proposal: "Coastal GIS Module of the Southeast Alaska GIS Library" related to the Community Coastal Impact Assistance Program

Dear Ms. Cox

I am writing to exrpess my support of the project proposal titled "Coastal GIS Module of the Southeast Alaska GIS Library" which was submitted to the Community Coastal Impact Assistance Program, during March 2010. The proposal details a collaborative effort between partnering agencies consisting of the University of Alaska Southeast, the United States Forest Service (Tongass National Forest), the United States Fish and Wildlife Service, The Nature Conservancy, and the Alaska Department of Fish and Game, Division of Sport Fish (ADF&G-SF).

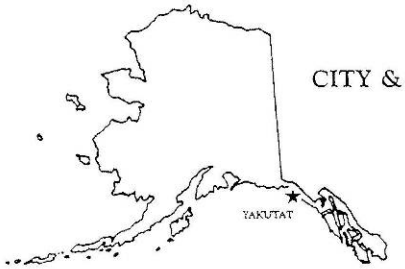
The scope of work and activities outlined in the proposal is consistent with current initiatives and data needs identified by the ADF&G-SF for Southeast Alaska pertaining to regional hydrography data. The ADF&G-SF recognizes the need to better understand the interface between terrestrial ecosystems and the adjacent estuarine and nearshore marine systems which dominate the archipelago landscape of Southeast Alaska. This information is critical for informing decision making processes by resource management agencies throughout Southeast Alaska, including the ADF&G-SF. Providing the infrastructure which houses standaridized and readily available regional datasets pertaining to coastal ecosystems will support research and management functions of the ADF&G-SF as well as those of the collaborators identified above.

Jeff Nichols and Kathy Smikrud are both part of my Southeast Alaska habitat research staff and current members of the Southeast Alaska GIS Library steering committee. Both have and will continue to participate in the project through the following activities: 1) participating in planning the development of a coastal mapping application with appropriate data standards; 2) fostering collaboration with current and potential project stakeholders as warranted; and 3) ensuring that resultant data products meet the standards for informed decision making, relevant to ADF&G-SF management and research priorities. Please contact Jeff Nichols (907-465-8576) or Kathy Smikrud (907-465-8253) if you have any questions or need further information.

Sincerely,

Cecil Rich, Ph.D.
Regional Research Supervisor
Alaska Department of Fish and Game,
Sport Fish Division

Attachment C6: Agency Commitments to Using the Coastal GIS Module



CITY & BOROUGH of YAKUTAT
P.O. Box 160
Yakutat, Alaska 99689
Phone (907) 784-3323
Fax (907) 784-3281

March 12, 2010

Sally Russell Cox
Division of Community and Regional Affairs
Community Coastal Impact Assistance Program
Department of Commerce Community and Economic Development
550 West 7th Avenue, Suite 1770
Anchorage, AK 99501-3510

Ms. Cox

I am writing in support of the University of Alaska Southeast application to the Community Coastal Impact Assistance Program entitled "Coastal GIS Module of the Southeast Alaska GIS Library". As a Coastal District Coordinator, I utilize GIS spatial information on a regular basis. Their effort to pursue a comprehensive regional database will be an invaluable tool for district planners. Geo-spatial information is constantly changing as data collection evolves and it is difficult for district planners to stay abreast of new information spread across agencies and jurisdictions. Having access to a single repository of information, will save time and enhance accuracy when commenting on various projects proposed within each district.

Sincerely,

Bill Lucey
Staff biologist and Coastal Planner
City and Borough of Yakutat

STATE OF ALASKA
COASTAL IMPACT ASSISTANCE PROGRAM

City of Whittier

This project will be conducted on behalf of the State of Alaska. It was selected through an open competitive procurement process and in accordance with 3 AAC 196.

PROJECT TITLE: Shakespeare Creek Restoration Project

PROJECT CONTACT

Contact Name: Lester Lunceford, Mayor
Address: P.O. Box 608, Whittier, AK 99693
Telephone Number: (907) 474-2327
Fax Number: (907) 472-2404
Email Address: llunceford@whittieralaska.gov

PROJECT LOCATION

Shakespeare Creek is located at the head of Passage Canal within the coastal zone of the Whittier Coastal District.

PROJECT DURATION

This project has a three-year duration. First-year activities include development of a habitat assessment, completion of a restoration plan and completion of initial restoration. Second-and third year activities include restoration of the river bed and banks and construction of a viewing platform and trails to protect the salmon stream from further degradation.

ESTIMATED COST:

Spending Estimate ($)				
TOTAL	**Year 1**	**Year 2**	**Year 3**	**Year 4**
$202,250	$73,250	$69,000	$60,000	0

Funding per Allocation Year of CIAP ($)				
TOTAL	**FY 07**	**FY 08**	**FY 09**	**FY 10**
$202,250	0	0	0	$202,250

Budget Narrative Year 1:

Consultant

Facilitation of 6 Work Group meetings (12 hrs @ $110/hr) …… $1,320
Preparation of meeting summaries (8 hrs @110/hr) …… 880
Preparation of draft and final assessment (90 hrs @ $110/hr) ….... 9,900
Preparation of draft and final restoration plan (120 hrs @ $110/hr)...13,200
Permit application and review assistance (120 hrs @$110/hr)…….. 13,200

Preparation of final report (30 hrs @$110/hr) …… 3,300
Travel (3 trips to Whittier) ……..... 1,850
Printing and distribution of assessment and restoration plan ……. 600
Subtotal ……. $44,250

Whittier
Staff time to manage grant, prepare and publish RFPs ……..…….. $1,500
Teleconferences ……...… 1,000
Materials and supplies …… 500

Agency
Travel expenses to Whittier ……..… 8,000

Restoration Contractor
Debris removal from delta and bunker area and repair of culverts..…. 18,000

Total ……. **$73,250**

Budget Narrative Year 2:

Whittier
Teleconferences …….. $1,000

Agency
Travel expenses to Whittier ……..… $8,000

Restoration Contractor
Restoration of creek bed, development of walkways and viewing platforms to protect river banks from damage from human traffic repair of culverts $60,000

Total …… **$69,000**

Budget Narrative Year 3:

Restoration Contractor
Continuation of restoration work from Year 2…… **$60,000**

PROJECT DESCRIPTION:

Introduction: The purpose of this habitat restoration project is to improve the biological productivity of Shakespeare Creek area in an effort to improve its biological productivity. Shakespeare Creek and the two smaller creeks that are part of this project are located at the head of Passage Canal in Whittier just south of the airstrip. The project will accomplish three primary objectives: 1) Complete a comprehensive assessment of the condition of the habitat (year one), 2) evaluate restoration options (year one), 3) develop a restoration plan (year one), 3) remove improperly discarded equipment and refuse (year one), and implement the restoration plan (year two).

An interagency work group will be assembled to provide guidance for the project, and the City of Whittier will be responsible for managing the grant including associated contracts. In addition to the City of Whittier, the following agencies and organizations will be invited

to designate a representative to sit on the work group: Whittier Watershed Council, U.S. Army Corps of Engineers (ACOE), Alaska Department of Fish and Game (ADFG), Alaska Department of Environmental Conservation (ADEC), the Alaska Railroad, and the Alaska Department of Transportation and Public Facilities (DOTFP).

The work group will meet at least 6 times including a site visit early in the project. Other meetings may be held by teleconference or in person. A consultant will be hired to facilitate work group meetings and to prepare the assessment and restoration plan with assistance from work group members. A contractor will be hired to complete the restoration work.

Background: The project area includes Shakespeare Creek and two smaller adjacent unnamed creeks located at the head of Passage Canal in Whittier. The Shakespeare Creek delta is located south of the airstrip, and the first unnamed creek is located immediately south and adjacent to the airstrip. The second unnamed creek is located at the south end of the delta. The creeks cross main roadbed and railroad as well as two other smaller dirt roads. The unnamed creek adjacent to the airstrip is likely spring fed because it does not have the silt load characteristic of the other two glacial-fed creeks.

Shakespeare Creek is listed in the ADFG anadromous stream catalog as supporting pink and coho salmon, although ADFG staff report that the coho salmon are most likely strays from a Prince William Sound Aquaculture Corporation (PWSAC) stocking project. Shakespeare Creek was used as a release site for king salmon during a two-year period by ADFG. As a result of opening the tunnel to car traffic in 2000, the fishing effort in Prince William Sound has increased dramatically. Currently, more than 200,000 angler days of effort are estimated for Prince William Sound. In addition to fish habitat, Shakespeare Creek provides an important feeding area for the kittiwake colony which is located in the vicinity.

The Shakespeare Creek delta is owned by the Alaska Railroad Corporation, and a memorandum of understanding provides the City of Whittier with authority to manage most uses within the area that are nonessential for operation of the railroad. An open lot between the delta and the road is currently used for parking and camping. This area, formerly a dump site, has a parking capacity between 30 – 40 cars.

Most of the habitat degradation of the Shakespeare Creek area results from military and civilian use of the area. The U.S. Army developed a deep water port in Whittier during World War II through its decommissioning in 1960. During the 1950, approximately 1,300 people occupied Whittier, and today about 174 people live within the 17-square mile second class city.

Adverse effects to habitat result from a variety of human activities. Topographic maps and aerial photographs indicate there have been substantial changes to the location of the mouth of Shakespeare Creek. Equipment and other refuse have been improperly disposed of in the delta and as a result of squatters near the bunkers in the upper area of the creek. Before construction of the current bridge near the mouth of Shakespeare Creek, vehicles crossed the creek when the previous bridge failed. The construction of the road and railroad has

also altered fish habitat by affecting drainage patterns. The culverts appear to be inhibiting fish passage to some degree, and water is seeping through some of the bulkheads.

No known contamination exists in the project area, but an area inland of the delta was previously used as a dump site. In addition, part of the tank farm area to the north of the airstrip has been contaminated by fuel oil and aviation fuel.

Known invasive species in the Whittier area include sweet clover and white daisies. Volunteers have worked in the past to remove these species. During the assessment, the project area will be examined to determine if there are additional invasive species.

Natural events have contributed to the degradation of Shakespeare Creek. The 1964 earthquake resulted in the most catastrophic event when the area subsided. Prior to the earthquake, residents report significant populations of salmon. High tides and storm surges have also contributed to the deposition of woody debris in the delta.

Assessment: Staff from the ACOE and ADFG completed site visits to the area in 2008 and 2009, but a more comprehensive assessment of the condition of the habitat and restoration needs. Early in the project, the work group will complete a site visit to complete an initial assessment. The consultant will work with the work group and other experts, as directed, to document the restoration needs and potential solutions. This effort will include a map of the area that catalogs where habitat problems exist including erosion, blockage of fish passage and invasive plant species. The consultant will finalize the assessment after receiving comments from the work group on a draft report.

Restoration Plan: The consultant will work with the work group and others to develop a draft restoration plan. The restoration plan will evaluate options developed during the assessment and include cost estimates. Potential restoration efforts include stream bank improvements, culvert replacements, road drainage improvements, creation of pools, and modifications to the water courses. Restoration may also include improvements to decrease degradation due to current use of the area including development of trails, elevated walkways and viewing platforms. In addition, the plan may include recommendations for a contaminant study if the work group determines further investigations are necessary. The restoration plan will not include initial restoration efforts, discussed in the next section, because those aspects of the restoration will be completed concurrently with development of the assessment and restoration plan.

The restoration plan will include consideration of options proposed by the City of Whittier in other planning efforts. The Whittier Comprehensive Plan includes a proposal for a viewing platform at Shakespeare Creek which will protect the banks of the creek while providing an opportunity to view the salmon and other wildlife in the creek. An effort to plan for future land use of the Head of Passage Canal has resulted in a phased approach to development of the area. This effort includes construction of a fishing lagoon in the small creek just south of the airstrip.

The restoration plan will include cost estimates for completion of the recommended restoration efforts as well as a list of potential funding programs.

Restoration: During Year one, the restoration is project involves limited habitat restoration activities to address known problems that do not need further study. Specifically, initial habitat restoration will include removal of rusting debris and woody debris to improve the habitat in delta. In addition, invasive plant species will be removed, debris around the bunkers in the upper reaches of Shakespeare Creek will be removed, and a collapsed culvert will be replaced. During year two, more extensive restoration work will include stream bed restoration to improve spawning habitat, stream bank restoration and re-vegetation, trail development, and construction of a viewing platform overlooking Shakespeare to control access and reduce future degradation to fish habitat.

MEASUREABLE GOALS AND OBJECTIVES:

Year 1: Complete Habitat Assessment, complete Habitat Restoration Plan, remove invasive plants from 2 acres, remove marine debris from river delta, and repair collapsed culvert.

Year 2: Rehabilitate 800 feet of stream bed, repair stream banks and construct a 10'x20' viewing platform, and construct 300 feet of gravel trail to protect stream from foot traffic.

PROJECT CONSISTENCY WITH CIAP AUTHORIZED USE:

1. Projects and activities for the conservation, protection, or restoration of coastal areas, including wetland.

This project is consistent with Authorized Use #1 because it will result in the restoration of an important salmon stream located in the coastal zone of the Whittier Coastal District. The creek and its two associated creeks have been modified by human use beginning in WWII when the U.S. Army developed the area as a strategic port. The project will reduce stream blockage by removing rusting machinery and replacement of a collapsed culvert. Restoration of the stream bottom will increase spawning habitat. The project will add new fish habitat by restoring eroded banks with vegetation that will provide cover for small fish. Construction of gravel trails and a viewing platform will prevent future degradation of fish habitat by channeling foot traffic to appropriate areas.

COORDINATION WITH FEDERAL RESOURCES OR PROGRAMS:

The City of Whittier has been working with the U.S. Army Corps of Engineers to identify habitat restoration needs and to develop this proposal.

COST SHARING OR MATCHING OF FUNDS:

The City of Whittier will provide in-kind services including staff time to manage project grants and to participate in the work group. Agencies will provide in-kind services through participation in the work group.

Shakespeare Creek is located between the Anton Anderson Memorial Tunnel and the city center. Shakespeare Creek delta is located in the lower right hand corner of the adjacent photograph, and the tunnel is located immediately to the left of the tank farm.

Figure 1: Aerial Photograph of Shakespeare Creek Delta (Source: Ken Rice)

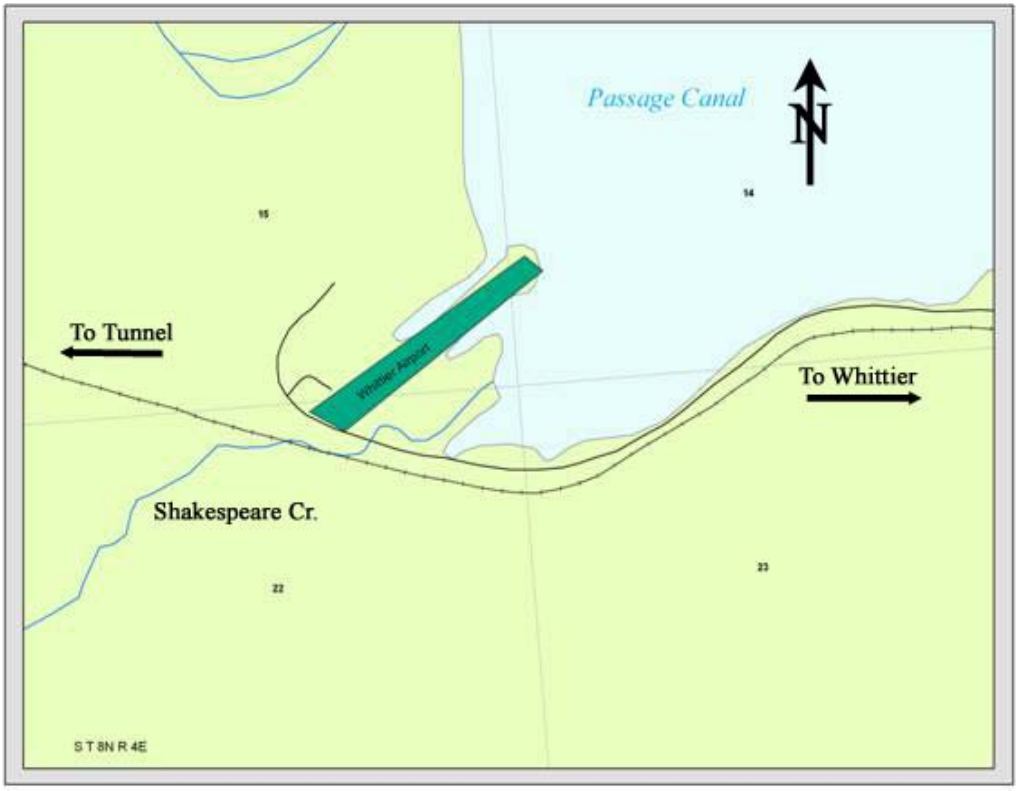


Figure 2: Map of Project Area (Source: Alaska Department of Fish and Game)

Figure 3: Photograph of Debris at Shakespeare Creek Delta

STATE OF ALASKA
COASTAL IMPACT ASSISTANCE PROGRAM

City of White Mountain

This project will be conducted on behalf of the State of Alaska. It was selected through an open competitive procurement process and in accordance with 3 AAC 196.

PROJECT TITLE: White Mountain River/Bay Clean-Up

PROJECT CONTACT

Name:	Amy Titus, City Clerk/Manager
Complete Mailing Address:	P.O. Box 130 White Mountain, AK 99784
Phone:	(907) 638-3411
Fax:	(907) 638-3421
E-mail Address:	wmocity@gci.net

PROJECT LOCATION

White Mountain is located on the west bank of the Fish River, near the head of Golovin Lagoon, on the Seward Peninsula. It is 63 miles east of Nome. The community lies at approximately 64.681390° North Latitude and -163.405560° West Longitude. (Sec. 26, T009S, R024W, Kateel River Meridian.)

PROJECT DURATION

This project would take 5 days to complete, done during the early summer, starting the morning of June 13, 2011.

ESTIMATED COST

Spending Estimate ($)				
TOTAL	**Year 1**	**Year 2**	**Year 3**	**Year 4**
$6,210	$6,210	#	#	#

Funding per Allocation Year of CIAP ($)				
TOTAL	**FY 07**	**FY 08**	**FY 09**	**FY 10**
$6,210	0	0	0	$6,210

PROJECT DESCRIPTION

The City of White Mountain proposes to host the 2010 White Mountain River/Bay Clean-Up project to remove any litter and/or other metals from the water systems in and around White Mountain.

Although the community of White Mountain is self-aware of littering, it does end up in the waterways therefore the City would like to conduct a river/bay clean-up project to address the problem. To carry out this project, the City will hire local community members to collect litter, metals and other materials that do not naturally belong along the river/bay. Boats will be rented for the day and workers will be chosen to help with clean-up efforts.

Any materials found will be brought to the landfill for proper disposal by the landfill manager. This project will take 5 days to complete, done during the early summer, starting the morning of June 13, 2011. The workers will break up the river and bay into sections and spend all day cleaning up that portion of the river/bay.

The tangible products for this project are a cleaner, healthier environment that will be made possible upon project completion. This effort will result in a significant improvement to the environment and make the community more self-conscious of littering and make people more willing to separate their trash and dispose of it properly. This project will benefit and restore the natural coastal environment of White Mountain by cleaning up litter and contaminants from the Fish River, an important salmon stream. The Fish River Delta is an important bird nesting habitat.

MEASUREABLE GOALS AND OBJECTIVES

Goal 1:
The first project goal is to have a cleaner environment along the river and bay, remove any metals along the river and bay and all litter, etc. removed from the river and bay.

Outcome 1:
Once all the litter is cleaned up along the river and bay it will be a healthier, cleaner, safer environment for any travelers/recreational users along the river or bay. Once all the metals are removed from the river and bay it will make the water cleaner and ground safer for plants to grow. Once all litter, metals, etc. is removed from the river and bay it will be properly disposed of by the landfill manager to keep it off the river and bay for a healthier environment.

Goal 2:
The second project goal is to properly dispose of the metals, litter and debris to the proper areas in the landfill located in White Mountain.

Outcome 2:
Once the debris, litter and metals are brought to the landfill the landfill operator will put the materials in the proper segregated areas. By doing this the environment will no longer be affected by the items removed during the clean-up.

Goal 3:
The third project goal is to refine the current and previous river clean up strategies to use for next spring for another river clean up.

Outcome 3:
The community of White Mountain is very proud of our waterway systems and would like to do an annual river/bay clean up every year. If CCIAP funding is approved it will only be the second year in doing a river/bay clean up. Refining methods will be sought to make the annual clean up easier for the employees and the supervisors.

PROJECT CONSISTENCY WITH CIAP AUTHORIZED USE

The project is most consistent with # 1: The project mostly aims at conserving, protecting and restoring the coastal areas and wetlands surrounding our community. The removal of foreign materials from the river will help to restore the coastal riverine environment to its natural condition.

COORDINATION WITH FEDERAL RESOURCES OR PROGRAMS

The City of White Mountain created a resolution, # 10-12, to authorize participation in the State of Alaska, Department of Commerce, Community & Economic Development, Division of Community & Regional Affairs; Community Coastal Impact Assistance Program. Letters of support were received from the Native Village of White Mountain and White Mountain School. The City also is committing administrative capabilities as an in-kind service for the project.

White Mountain Fish River Photos

White Mountain Flats/Bay Area