

PROJECT PROGRESS SUMMARY FY08

Summary

The following report details progress regarding the EVOSTC project titled: Herring data and Information Portal which received funding for the FY08 fiscal year. The report addresses project status and progress by objective. The objectives listed below are those which were detailed in the FY08 project proposal. This progress report reflects the work accomplished as of September 1st, 2008. There will be additional progress on these objectives through the FY08 fiscal year.

Objectives and Corresponding Progress

Objective 1. Consolidate herring data sets, metadata and other electronic resources to publicly accessible web portal for herring information.

Objective 2. Provide web accessible map based visualization of geospatially enabled herring data.

Considerable progress has been made regarding these two objectives. A widespread survey was conducted to document and isolate existing herring specific data resources which are specific to the Prince William Sound geographic area in FY07. These data sets were processed into a standardized geospatially enabled database (SQL Server 2008) when possible during this fiscal year. The following section details those datasets which were addressed in FY08 and their current status. Existing data visualizations can be downloaded here <http://www.pwsherringportal.org/Visualizations/index.cfm>.

Linear Extent of Spawn in PWS (1973 – 2008) – This dataset represents a long term continuous survey effort by the Alaska Department of Fish and Game to document herring spawn events in PWS. This dataset contains 5400 independent spawn observations over the past 35 years. The spawn events are recorded as arcs (linestrings) using GIS technology in standard consistent manner. Figure 1 shows a visualization of a small subset of the dataset, each red arcing line denotes an independent spawn observation.

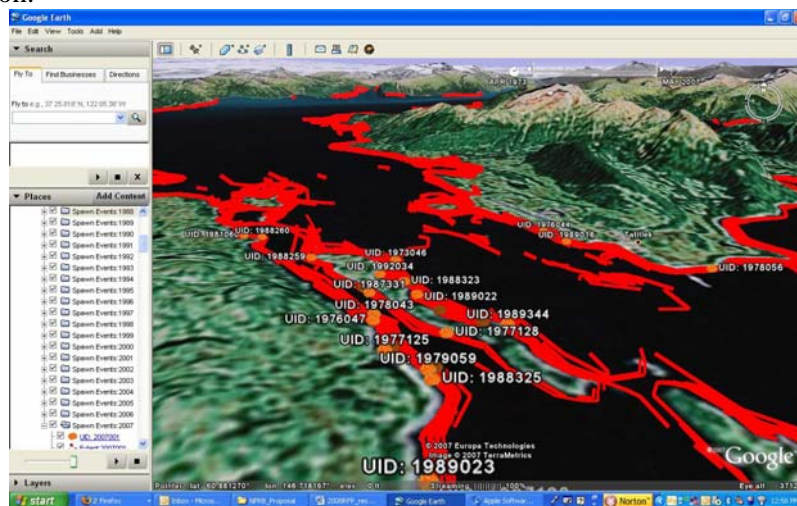


Figure 1: Example of visualization (Google Earth) of geospatially enabled herring spawn data via the Prince William Sound Herring Data Portal.
Herring Data and Information Portal – FY08 Progress Report

ADF&G Aerial Survey Dataset (1973-2008) – This dataset includes aerial survey tracks, linear extent of spawn, PWS Index Areas and individual herring school biomass observations. There are no GIS data for surveys tracks prior to 2001. The PIs have developed a strategy to extrapolate survey tracks for years 1973 – 2001 by analyzing the occurrence of biomass observations in ADF&G index areas and constructing flight routes from this information. This dataset is incomplete in the biomass observation component. Data processing has been complete for years 1973-1982 and 1989-current. The lead technician for this data salvage component, Jim Vasant, was killed in an accident in Cordova in late August. This missing data component will still need to be addressed in order to complete the data salvage process and to create interpolated track lines. Figure 2 shows a Google Earth visualization of this data.

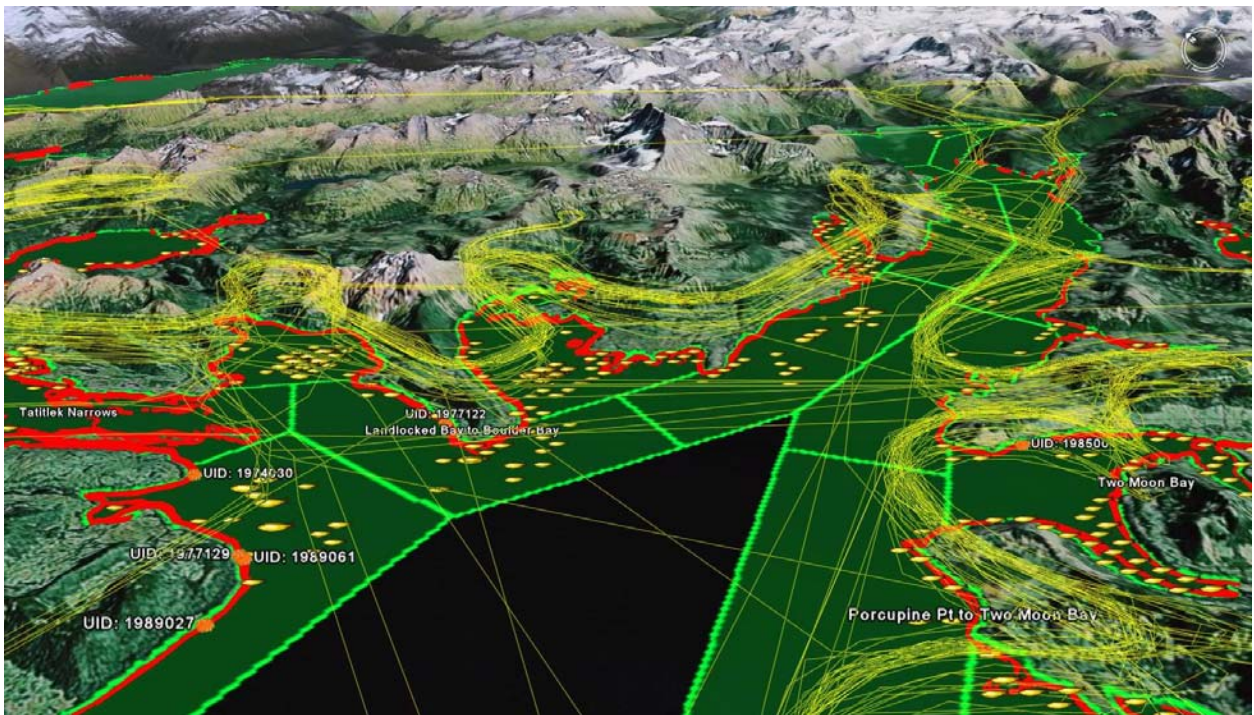


Figure 2: Google Earth Visualization of ADF&G Aerial Survey dataset. Herring Spawn observations are red arcs, ADF&G Index Areas are in green polygons, Biomass Observations are yellow dots. Aerial survey tracks are in yellow arcs.

Herring Age, Sex, Length, Weight PWS (1973 – 2008) – This dataset is an amalgamation of approximately 500 separate sampling events and involves approximately 250,000 individual herring ASLW records collected over 35 years. Herring ASLW records provide insight into the age class stratification of herring and their overall health. These sampling efforts were performed routinely in PWS for the herring fishery and combined together form a rich description of the life history of herring in PWS. ASLW data can be analyzed to determine what herring age classes are dominant in the local population and to determine the overall health of the various age populations across years. Table 1 provides a summary of the ASLW data for the 1990 sampling effort.

1990 - Summary

Number of Sample Events: 36
Total Number of Samples: 9685

Age Class Statistics for 1990

Age Class	Average Length (mm)	Average Weight (g)	% of Population	% of Biomass
Age 1	142	36	0.78 %	0.23 %
Age 2	161	58	17.51 %	8.5 %
Age 3	175	76	2.51 %	1.59 %
Age 4	194	100	1.8 %	1.51 %
Age 5	208	118	8.84 %	8.73 %
Age 6	216	131	52.51 %	57.55 %
Age 7	223	143	6.2 %	7.42 %
Age 8	233	163	3.95 %	5.38 %
Age 9	238	177	3.6 %	5.33 %
Age 10	241	183	1.68 %	2.58 %
Age 11	240	183	0.34 %	0.52 %
Age 12	243	168	0.15 %	0.2 %
Age 13	250	210	0.08 %	0.15 %
Age 14	252	208	0.06 %	0.11 %

Table 1: Herring ASLW data summary for the 1990 sampling effort. The percentage of the population and biomass are unweighted calculations.

This dataset has been successfully processed, there currently exists a Google Earth visualization. Gonad/fecundity information for this dataset has not yet been processed and standardized.

Oiled ShoreZone Surveys in EVOS Affected Area (1989 – 1992) – This dataset details five separate sampling efforts to detect both surface and subsurface oil on beaches in the spill affected area. All four efforts adhere to the same standard operating procedure, and the results from the five independent efforts were integrated into a single data structure. The dataset details survey effort (beaches sampled) and degree to which ShoreZone segments were oiled (Heavy, Medium, Light and Very Light). These oiled ShoreZone classifications (Heavy, Medium, Light and Very Light) correspond to quantitative measurements denoting level of observed oiling.

Oiling	Oiling Description
HEAVY_IMPACT	Represents a band of surface and/or subsurface oil greater than 6 meters wide, or more than 50 percent coverage of the intertidal zone.
MEDIUM_IMPACT	Represents an oil band three to six meters wide or 10 percent to 50 percent coverage of the intertidal zone.
LIGHT_IMPACT	Represents less than a three meter band or 10 percent coverage of intertidal zone.
VLIGHT_IMPACT	Represents a band less than one meter wide or a beach having less than 1% oiling coverage. This category was later added to represent intermittent oiling.
NO_IMPACT	Represents no oil impact.

Table 2: Oiled Shoreline Classifications.

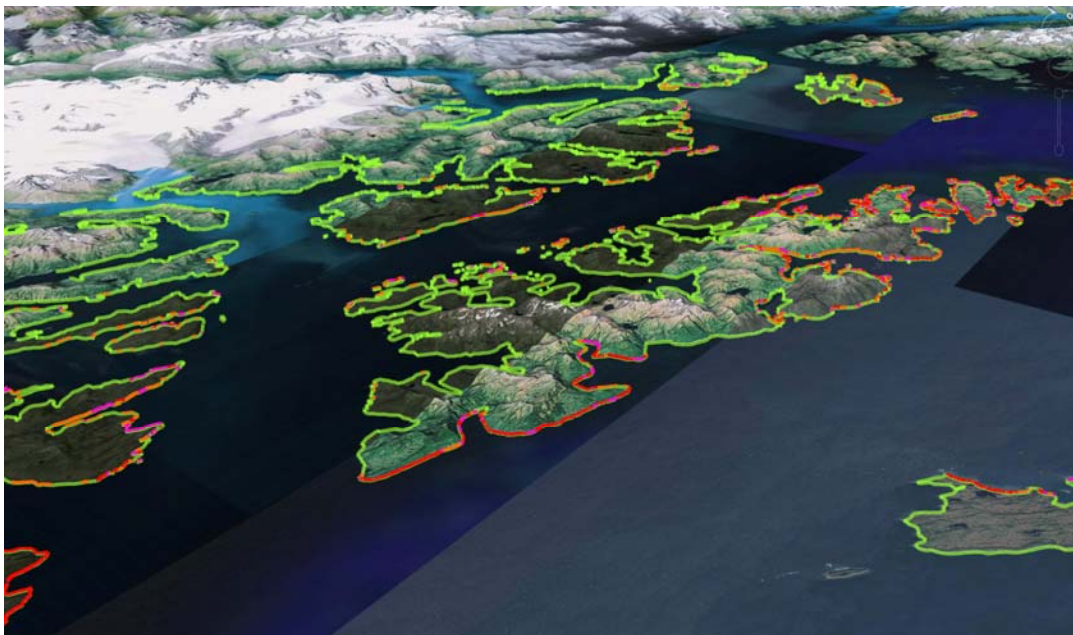


Figure 3: Visualization of Oiled Shoreline surveys.

Lingering Oil Point Source Datasets (1989 -2000) – Both the EVOSTC lingering oil database and the Mark Carls’ mussel database were acquired and processed. Data points for these sampling efforts are available as a Google Earth visualization for the Mussel Subset. Graphical representations of the contaminants (analyte histograms) were not produced in order to reduce misinterpretation by users (recommendation from NOAA, Auke Bay)

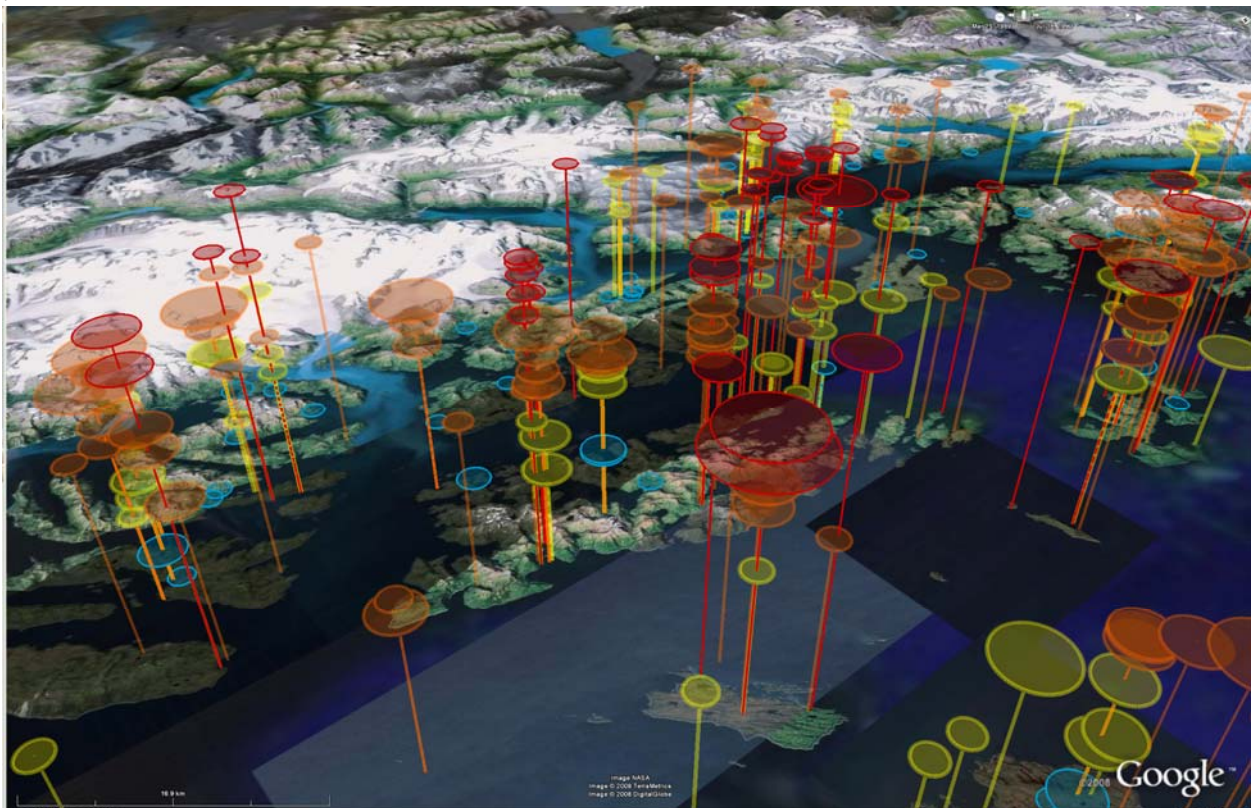


Figure 4: Visualization of point source hydrocarbon permeated mussel. The height and color of the vertical bar details comparative hydrocarbon densities sampled in mussel tissue. The disk size denotes comparative total sample size.

ShoreZone habitat -The ShoreZone dataset is available for the Western portion of PWS continuing all the way around Cook Inlet to Kamishak Bay. The Eastern PWS shorezone classification dataset was collected during the summer of 2007 by Dr. John Harper (Coastal and Ocean Resources Inc.) and will be available for public access by the winter of 2008. This dataset is composed of a series of ESRI Shapefiles, an access database, and both digital photo and video files. The dataset is highly descriptive and details specific classification of shore zone biological zones in addition to geological characteristics. The access database is in a normalized form and contains explicit FGDC metadata.

The dataset delineates biological sections of the ShoreZone into the following theme areas: Splash Zone, Marsh Grass + Herbs + Sedges, Dune Grasses, Sedges, Barnacles, Rockweed, Green Algae, Bleached, Red Algae, Blue Mussels, Red Algae, Kelp, Soft Brown Kelps, Dark Brown Kelps, Eelgrass, Dragon Kelp, Giant Kelp and Bull Kelp. Additionally, the dataset delineates the following geological characteristics of the shore zone: Dominant Morphology, Sediment Type, Wave Exposure, Oil Residence Index and Shore Modifications. More information can be accessed regarding these classifications and the methodology used by reviewing the Alaska ShoreZone Protocol (http://www.coastalaska.net/pdf_files/protocol.pdf).

Processing of the available ShoreZone data has already commenced and when the Eastern PWS data becomes available it will be easily integrated into the existing database. Figure 5 displays a visualization of the ShoreZone habitat dataset for the Western PWS region. The various colors represented there correspond to different substrate types. This visualization extends all the way around Cook Inlet to Kamishak Bay. A Google Earth file of this visualization can be downloaded here <http://www.pwsherringportal.org/Shorezone.kmz>

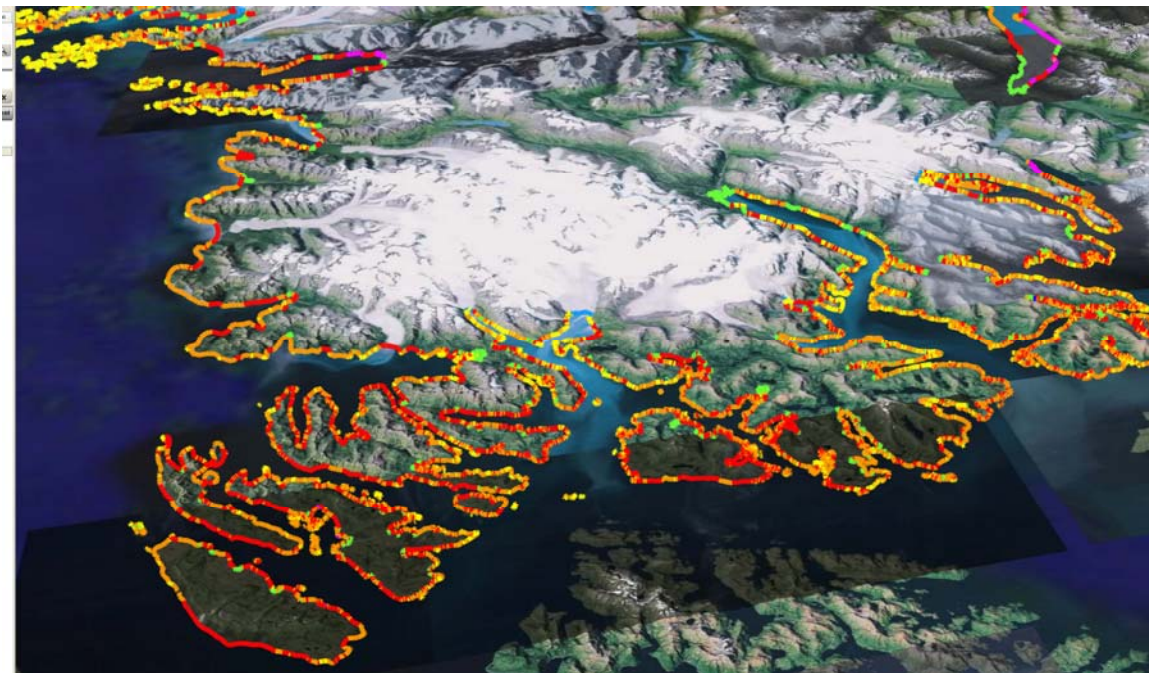


Figure 5: Visualization of ShoreZone Habitat Substrate type for Western Prince William Sound

Hearing Disease Data –Herring Disease Data has been acquired from Gary Marty and has been assessed and processed. Gary is waiting to publish results based upon this data and as a result the PIs of this study are not making this data public until authorized by Gary Marty.

Acoustic Herring Survey data –Acoustic data has been processed from the SEA and APEX programs into a geo-database. Additional acoustic data will be available from ADF&G during late 2008. The Prince William Sound Science Center has complimentary acoustic data also which will be incorporated into this combined acoustic survey data structure in late 2008.

Spawn Deposition Surveys –Spawn deposition surveys are expected to finish processing from ADF&G in late September 2008.

Zooplankton Datasets–Zooplankton datasets from the hatchery system in PWS have been acquired and processed. Additional zooplankton datasets were discovered at the PWSSC in addition to SEA and APEX program datasets. These are currently being worked into a combined data structure.

Herring Commercial harvest data for PWS –ADF&G Cordova has geospatially enabled and processed all historical harvest information for herring in PWS. The processing of this data will be complete by Mid September and is expected to rapidly be absorbed in the portal.

Objective 3. Develop Standard Operating Procedures (SOPs) for the absorption of additional herring datasets, metadata and information to the centralized herring data system. Provide system architecture documentation.

Standard Operating procedures have been developed to expedite and standardize the data salvage activities undertaken by this project. This effort has adhered to the following data and metadata standards.

- Open Geospatial Consortium (OGC) Simple Feature Specification
- Federal Geospatial Data Committee (FGDC) metadata standard

This project does not propose to collect measurements; rather, it geospatially enables and analyzes already-existing data layers. This involves the creation of FGDC compliant metadata for those herring-related electronic resources which do not currently have metadata. Datasets were upscaled in their data structures to ensure that information contained within the resource can be understood by and available to other scientists and the public. Methods such as standard-based naming conventions and normalization of relational database structures were utilized whenever appropriate. GIS information has been structured into a geospatial database following Open GIS Consortium standards to ensure longevity and usability of the geospatial database.

Objective 4. Develop Arcpad application to automate herring spawn data collection.

A second version of the Prince William Sound Arcpad Aerial/Boat Survey application has been created which provides an automated and standard way to document herring specific physical and biological observations. The current version of the Arcpad application is being tested by ADF&G staff and user interface issues are being documented. Version 2.0 of the application will be issued to EVOS as a deliverable for this project. The following screenshot (Figure 6.) provides a view of what the biologist interfaces with when using the Herring Survey Application.

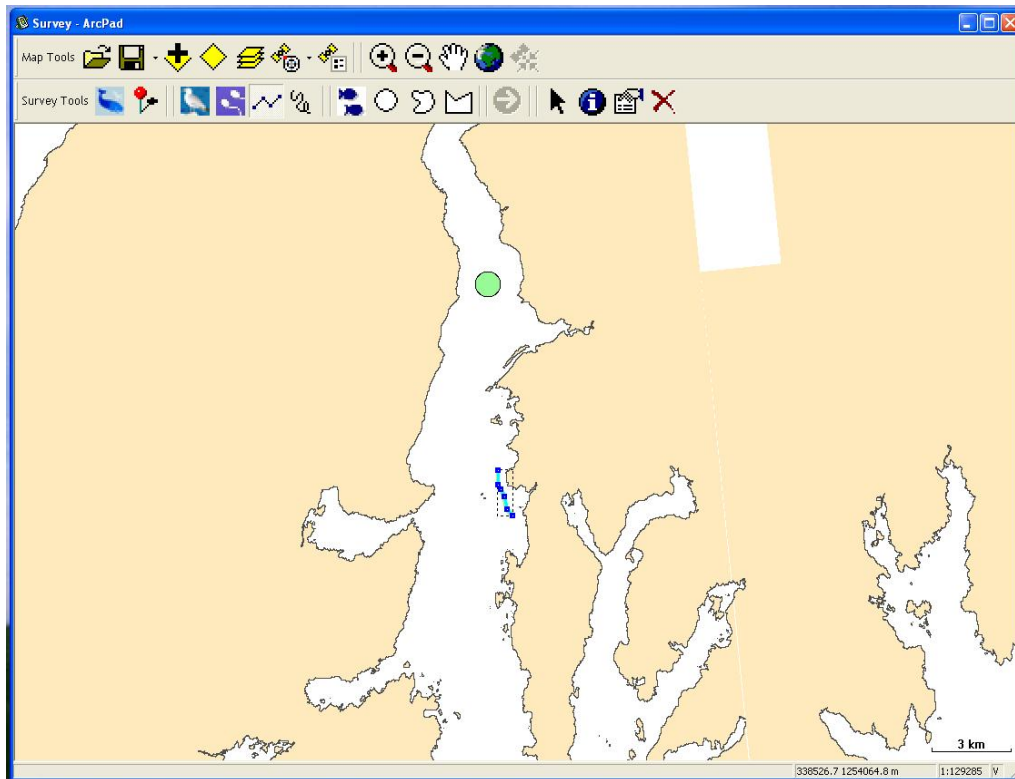


Figure 6. ARCPAD Survey Application.

The survey application provides automated and standard data collection for herring spawn extent (spawn class, polyline location), marine mammal observation (species, number, point location), Seabird (species, number, polyline location), fish school (species, biomass, polygon location) and other periphery observations. The application also stores GPS tracklog information for flight/cruise routes.

Objective 5. Develop Web Mapping Service.

Herring portal staff met with Rob Cermac, data manager of the Alaska Oceanographic Observing System (AOOS), to develop computer to computer data communication techniques. These meetings isolated key requirements for such data transfer. These include the ability to transfer data in an efficient manner via one of the following standards

- Geographic Markup Language (GML)
- Encoded Polyline format

Though the GML specification is currently the standard for transferring geospatial data between computer systems there are very obvious problems to this approach. Spatial data is extremely verbose in terms of its size. Transferring large spatial objects via GML may simply take too long for usability. The polyline encode method provides a mechanism which is 25 times less verbose than the GML method. Some work has been accomplished to implement both specifications.

In addition, service calls were isolated which would be required components of the data access objects. This would include the ability to remote query the data system to determine data holdings with the remote system taking the correct action based upon the response of the data storage system. Serious progress on this objective has been made in FY08 but an actual Web Mapping Service Node has not been implemented on the portal yet.

PROPOSAL SIGNATURE FORM

THIS FORM MUST BE SIGNED BY THE PROPOSED PRINCIPAL INVESTIGATOR AND SUBMITTED ALONG WITH THE PROPOSAL. If the proposal has more than one investigator, this form must be signed by at least one of the investigators, and that investigator will ensure that Trustee Council requirements are followed. Proposals will not be reviewed until this signed form is received by the Trustee Council Office.

By submission of this proposal, I agree to abide by the Trustee Council's data policy (*Trustee Council Data Policy**, adopted March 17, 2008) and reporting requirements (*Procedures for the Preparation and Distribution of Reports***, adopted June 27, 2007).

PROJECT TITLE: Herring Data and Information Portal (CLOSEOUT)

Printed Name of PI: **Rob Bochenek**

Signature of PI: _____ Date _____

Printed Name of co-PI: _____

Signature of co-PI: _____ Date _____

Printed Name of co-PI: _____

Signature of co-PI: _____ Date _____

* Available at www.evostc.state.ak.us/Policies/data.htm

** Available at www.evostc.state.ak.us/Policies/guidelines.htm

Trustee Council Use Only

Project No: _____

Date Received: _____

PROPOSAL SUMMARY PAGE
(To be filled in by proposer)

Project Title: Herring Data and Information Portal (CLOSEOUT)

Project Period: FY09

Proposer(s): Rob Bochenek, rob@axiomdms.com

Abstract: This project will consolidate, document, and enter data sets, metadata, and other electronic resources into a web portal. The web portal will provide public access to information, data, and GIS visualizations. Scientist and researchers will utilize the web portal as a resource to assist in consolidating, accessing and synthesizing herring data. This project will also develop an ArcPad application for collecting herring aerial survey data directly into a GIS format. The project was conceived during an EVOS sponsored workshop in April 2006 that was tasked to identify Prince William Sound herring data gaps and develop restoration or research projects to help herring recovery. Participants indicated that knowledge of the spatial and temporal aspects of herring related data sets, e.g., herring spawn, lingering oil, and shore zone habitat was necessary to understand how restoration activities might affect herring abundance trajectories. Many herring related data sets that were are not easily accessible to restoration researchers and managers have been made available through the actions of this project in FY07 and FY08. This project will finish the work started in FY07 and FY08 and complete the process of data salvage for those data sets which were addressed in previous years. Several restoration options proposed at the Integrated Herring Restoration Program meetings will require spatial and temporal knowledge of herring related data as a tool for planning, input to a model or as a measure of the success of a restoration action. This project would provide easier access and visualization of selected herring data sets and other electronic resources.

Funding: EVOS Funding Requested: FY 09 \$ 77.8
(must include 9%GA) TOTAL: 77.8

Non-EVOS Funds to be Used: FY 09 \$ 77.5
OSRI – 25K, Copper River Knowledge System 30K, ADF&G 22.5K
TOTAL: 77.5

Date: 09/01/08

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PROJECT PLAN

I. NEED FOR THE PROJECT

A. Statement of Problem

This project was conceived at an EVOS Trustee Council sponsored workshop on Prince William Sound (PWS) Pacific herring *Clupea pallasii* restoration in April 2006 and was funded by the EVOS Trustee Council in FY07 and FY08. As of this writing, this project has made considerable progress in salvaging, creating metadata for and providing access to PWS herring related data and information. Attached as an appendix to this proposal is the FY08 Progress Report for this study which provides an in depth description of the various data sets and their current status. These data sets were salvaged from efforts expended in FY07 and FY08 of this project. Though major progress has been made, there exists a serious need for the completion of these data salvage efforts. Initially, many existing PWS herring related research and monitoring data sets were dispersed and data were not easily accessible to researchers and managers. Additionally, the spatial and temporal relationships were not readily apparent because much data were not in a spatially enabled format. During FY07 and FY08 this project spatially enabled a series of key herring data sets (annual biomass estimates, spawn observations, Age Sex Length Weight, commercial harvest, acoustic surveys and egg deposition data) under the stewardship of the Alaska Department of Fish and Game (ADF&G) Cordova. In addition, this project acquired, spatially enabled and standardized multiple relevant herring data sets outside of the stewardship ADF&G Cordova. These datasets include: Lingering Oil, ShoreZone Habitat, Oiled Beach Surveys, Herring Disease datasets, Zooplankton Abundance and acoustical surveys of herring and herring predators. Though major successes in data salvage of these critical datasets have been realized by the PIs, there still exists a serious need to finalize the data salvage process. Certain datasets under the stewardship of ADF&G Cordova will have just finished being spatially processed by ADF&G staff by the close of FY08. These data will need to be integrated into the geospatial/temporal database developed during this project and will also require standardized metadata to be drafted in early FY09. Also, data collected by ADF&G during the FY09 field season will not be processed and made available to the herring restoration community unless this project is continued into FY09. In addition, the data that has been centralized and up scaled during FY07 and FY08 is complex in nature and will require technical support from the PIs to interpret, utilize and ultimately transfer the data to the EVOSTC office in FY09. Work performed in FY09 will ensure that the EVOSTC office will receive a standardized and thoroughly documented series of data sets deemed critical to the herring restoration effort.

Many of the restoration project ideas from the April 2006 workshop and recent Integrated Herring Restoration Plan (IHRP) workshops require knowledge of the temporal and spatial relationships of past herring related data to assess possible future restoration actions. For example, updating the circulation and larval drift model requires spatial and temporal herring spawn data as an input. ADF&G has been estimating the linear extent of herring shoreline spawning and spawning biomass since 1973 (e.g., Brady 1987 and Biggs et al. 1992). Additionally, there are data sets on herring biomass from spawn

deposition surveys, and acoustics surveys (e.g., Willette et al. 1998); herring disease data (Marty et al. 2004); and other data sets, literature, and metadata that could be made available to researchers and managers. In addition, other data sets which describe lingering oil, oil spill affects and general coastal morphology and biological habitat will prove indispensable for all herring restoration activities.

B. Relevance to 1994 Restoration Plan Goals and Scientific Priorities

This project would support the 1994 Restoration Plan's Monitoring and Research category of general restoration actions by making PWS herring data available on the web for researchers working on restoration projects. Additionally, this project would directly support the recovery goals of herring, an injured biological resource, and indirectly support recovery of commercial fishing, a lost or reduced service. In order to design and evaluate restoration projects, an understanding of past spatial and temporal relationships of herring data is required. This project would consolidate and prioritize herring data sets, metadata, and other electronic information. The data salvage effort that is at the core of this project provides a basis for the launch of Integrate Herring Restoration Program.

II. PROJECT DESIGN

A. Objectives

Objective 1. Complete data salvage, standardization and geospatial enablement for all data sets acquired by the Herring Data portal project in FY07 and FY08.

Objective 2. Provide finalized data sets in the following formats for all data: raw native format, Google Earth visualization, SQL Server 2008 Geospatial Database Format and metadata in FGDC format.

Objective 3. Provide support for researchers involved in the herring restoration effort and EVOSTC staff in accessing, interpreting and utilizing data resources produced from this project. This objective also includes transitioning the data over to the EVOSTC office and provided EVOSTC staff with the technical resources and knowledge to fully utilize and assimilate the data.

Objective 4. Redevelop Arcpad application to further automate and standardize herring spawn data collection and increase data collection precision and quality.

B. Procedural and Scientific Methods

Data Processing/Data Management Methodology

Existing herring data sets and electronic resources will be assessed, documented with metadata and centralized to a common access point for distribution and public access. Data sets will be documented via the Federal Geographic Data Subcommittee (FGDC) metadata standard. The metadata document will assist users of the system in utilizing, locating and interpreting the dataset posted on the web portal. Data sets will be stored in their native file formats and corresponding FGDC metadata will be stored as a XML document. Both the data set and corresponding metadata document will be available for download.

In order to efficiently integrate the various data sets required to perform the data salvage required by this study, a standard geospatial data framework must be adhered to by the study team. The following section of this proposal details the specific data management methods that will enable the principal investigators to efficiently manage the diverse datasets required to perform the activities of this project. This section is broken into two parts.

- Geospatial Data Model
- Data Standards

Utilizing the above data management framework provides an efficient method for processing the relevant data for this study and ensures that efforts expended during this project can live on to be utilized by future research efforts.

Geospatial Data Model

Data integration efforts undertaken by this project will utilize an existing geospatial data structure developed during 2007 and 2008. The data structure to be utilized has been engineered using Online Analytical Processing (OLAP) data warehousing specifications. This type of data structure is inherently designed to store data and information that is in a static and finalized state. The OLAP database schema is optimized for analysis and rapid data access. Figure 1 (below) provides a diagram of the OLAP data structure to be utilized by the study team. This data warehouse shown below has the ability to store a wide array of scientific measurements associated with any type of vector geo-spatial object (point, line, polyline and polygon). The geospatial storage mechanism adheres to the Open Geospatial Consortium (OGC) simple features specification. This specification ensures that industry GIS analysis and visualization tools (ESRI software, mapserver, Google Earth) can easily access, manipulate and utilize the geospatial information contained within this data structure.

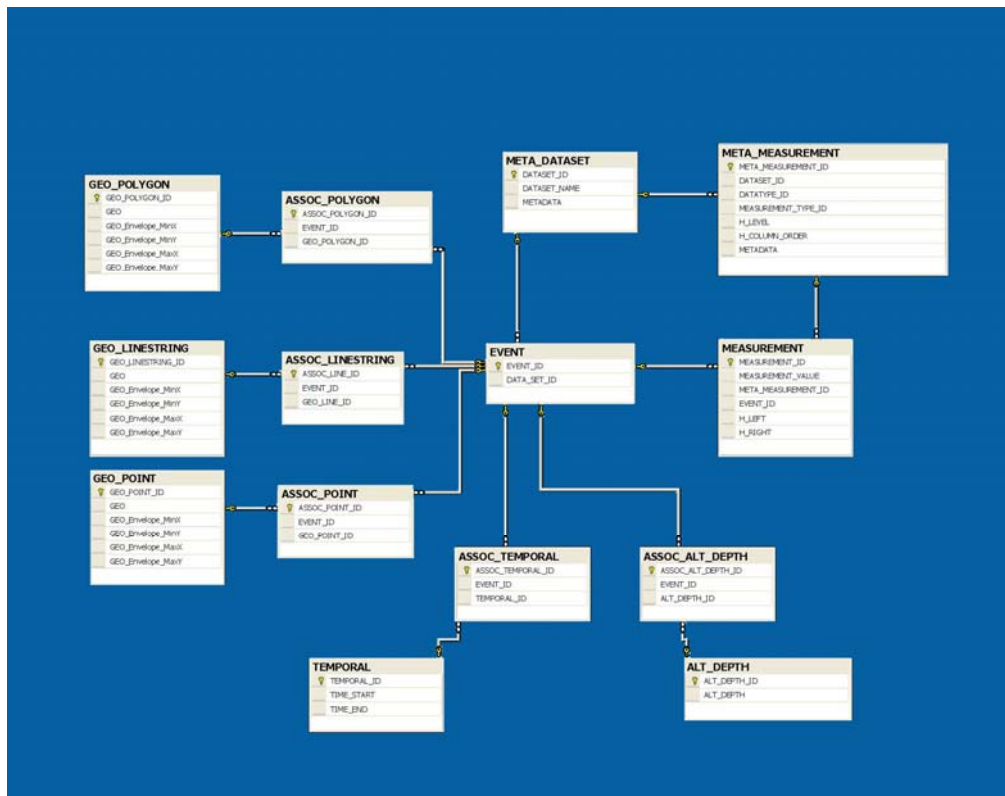


Figure 1: Geospatial OLAP Data Structure.

The above database schema has been implemented in MS SQL Server 2008 which is natively geospatially explicit. The SQL Server 2008 storage mechanism for spatial information conforms to the Open Geospatial Consortium Simple Feature Specification which ensure data interoperability with other GIS tools.

Data Standards

This effort will adhere to the following data and metadata standards.

- Open Geospatial Consortium (OGC) Simple Feature Specification
- Federal Geospatial Data Committee (FGDC) metadata standard

This project does not propose to collect measurements; rather, it geospatially enables and analyzes already-existing data layers. This will involve the creation of FGDC compliant metadata for those herring-related electronic resources which do not currently have metadata. Data sets will also be upscaled in their data structures to ensure that information contained within the resource can be understood by and available to other scientists and the public. Methods such as standard-based naming conventions and normalization of relational database structures will be utilized whenever appropriate. GIS information will be structured into a geospatial database following Open GIS Consortium standards to ensure longevity and usability of the geospatial database.

Four Dimensional Data Visualizations

A core strategy of the PWS Herring Portal project was to create 4 dimensional (x,y,z,t) visualizations of salvaged data sets. These 4 dimensional visualizations allow users to view spatial and temporal aspects of the data set. Users can filter by location or time span. The following images (Figure 2) provide examples of these types of visualizations using Google Earth. Existing data visualizations can be downloaded here <http://www.pwsherringportal.org/Visualizations/index.cfm>.

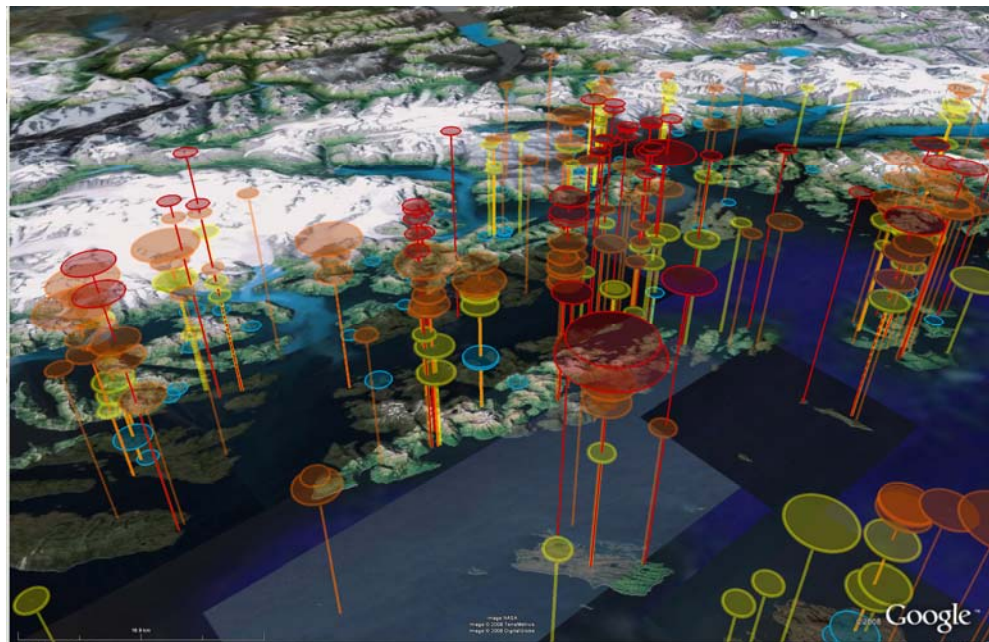
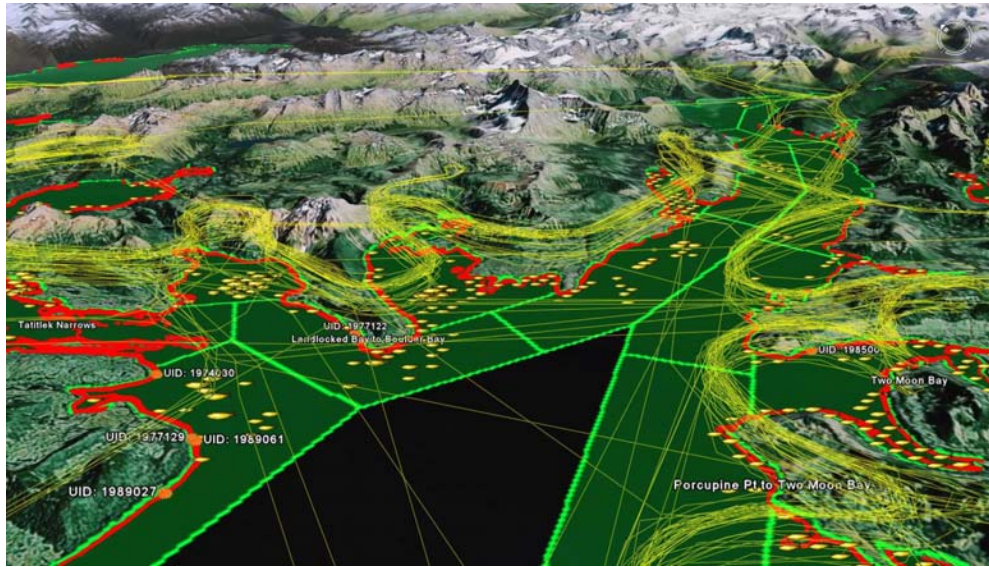


Figure 2: Screen Captures of 4 dimensional visualizations of data stored in the Herring Portal. The first image shows a composite view of ADFG&G Aerial Survey program. The second image displays hydrocarbon densities and sample sizes for oiled mussel populations in PWS.

Re-Develop ArcPad application to automate herring spawn data collection (Objective 4)

The Aerial Survey ArcPad application will be re-developed to assist scientists in efficiently and accurately collecting hearing spawning location information. The first version the Arcpad Application was developed and tested in May of FY07. The second version was released for use in May, 2008. Though the deployment of the initial application was a success, it was determined that additional application functionality could greatly augment the accuracy of measurements and data collection. It is proposed that a third version of the Arcpad application be developed for FY09 which focused on the lacking functionality of the current application. This lacking functionality is listed below and was isolated by ADF&G, Cordova staff.

- More space for comments and better form layout for data collection in cramped airplanes.
- More granular control over herring school biomass observations. Surveyors often see multiple small and medium schools right next to each other. Create a number box that allows staff to list the number of these schools.
- Better real time reporting. Staff would like current time and lat/long displayed on the ArcPad application and the lat/long of an observation when opening up the Properties of an observation.
- More access to base layer data. Staff would like to be able to quickly turn on/off map layers such as stream names, topographical features, Bay names, etc. Staff often need to land in an area that is covered in herring spawn and do not know if there are hidden rocks or reefs there. The topographical features of the land would be helpful in figuring out exactly where the spawn is occurring.

C. Data Analysis and Statistical Methods

Data will not be produced from this project. Data and information will be up scaled into relational and geospatial databases if possible. In order for these relational and geospatial databases to be robust, methods of normalization and standards based database development will be employed. Geospatial data structures will be created with compliance to Open Geospatial Consortium (OGC) standards. Computer programming code will be written in an object oriented fashion to increase the potential for code reuse.

D. Description of Study Area

The majority of this project will involve consolidating existing data, metadata, and other electronic resources related to herring in PWS. The Arcpad application will require testing in ADF&G's Registration Area E. Area E is described in regulation (5AAC 27.300 Description of Prince William Sound Area): The Prince William Sound Area has as its western boundary a line extending south from Cape Fairfield, as its eastern boundary a line extending south from Cape Suckling and as its southern boundary 59° N. lat. The north, east, south, and west bounding coordinates of this area are 61.295, -143.880, 59.000, and -148.8710.

E. Coordination and Collaboration with Other Efforts

Due to the substantial progress of this project in 2007 and 2008, regional organizations have provided funds to extend certain aspects of this project. The Copper River Knowledge System (CRKS) has provided \$30K to develop web based access/analysis tools to interface with the data holding of the CRKS coupled with the data salvaged by the PWS Herring Data Portal Effort. This funding will compliment and augment the efforts of this project and will provide an additional analysis/access interface to the Herring Portal and CRKS data repositories. In addition, the Oil Spill Recovery Institute (OSRI) is providing \$60K to correlate herring age class dynamics with habitat information from the ShoreZone data set. A portion of this \$60K (~\$25K) will directly support the activities of the Herring Portal Effort by providing funding for the salvaging of PWS ShoreZone habitat data set. The project funded by OSRI will probe the data contained within the PWS herring data portal for statistical correlation between herring spawn in proximity to ShoreZone habitat type and the resulting effects upon recruitment and age class stratification. The OSRI project will expand the functional scope of the PWS Herring portal to include frameworks for advanced geospatial and statistical analysis.

This project was conceived during a PWS herring restoration workshop held in Anchorage on 24 and 25 April, 2006. This workshop was attended by local fishers and researchers from the University of Alaska, University of Washington, National Oceanic and Atmospheric Administration, Alaska Department of Fish and Game, United States Fish and Wildlife Service, Prince William Sound Science Center, and the Oil Spill Recovery Institute, and others. One of the objectives of the workshop was to utilize the results of the workshop to focus the 2007 Invitation for Proposals. This project will collaborate with an ongoing ADF&G funded project to enter historical ADF&G aerial survey data into ArcView. Herring Data Portal staff are also working with researchers of the Kiefer Herring Modeling project to coordinate data management efforts concerning relevant information resources.

III. SCHEDULE

A. Project Milestones

Objective 1. Complete data salvage, standardization and geospatial enablement for all datasets acquired by the Herring Data portal project in FY07 and FY08.

To be met by May 30th, 2009

Objective 2. Provide finalized data sets in the following formats for all data: raw native format, Google Earth visualization, SQL Server 2008 Geospatial Database Format and metadata in FGDC format.

To be met by August 31th, 2009

Objective 3. Provide support for researchers involved in the herring restoration effort and EVOSTC staff in accessing, interpreting and utilizing data resources produced from this project. This objective also includes transitioning the data over to the EVOSTC office and provided EVOSTC staff with the technical resources and knowledge to fully utilize and assimilate the data.

To be met by September 30th, 2009

Objective 4. Redevelop Arcpad application to further automate and standardize herring spawn data collection and increase data collection precision and quality.

To be met by April 30th, 2009

B. Measurable Project Tasks

FY09, 1st quarter (Oct 1, 2008 – December 31, 2008)

October: Project funding approved by Trustee Council

October: Transfer of geospatially enabled data from ADF&G

FY09, 2nd quarter (January 1, 2009 – March 31, 2009)

February 1st: Attendance and presentation at Marine Science Symposium

March 1st: Aerial Survey Arcpad Application Version 3 (Beta) released

FY09, 3rd quarter (April 1, 2009 – June 30, 2009)

April 30th: ArcPad Herring Spawn application redevelopment completed.

May 30th: All data sets absorbed into geospatial database and transfer of data to EVOSTC initialized.

FY09, 4th quarter (July 1, 2009 – September 30, 2009)

September 1st Metadata generation finalized for all datasets and visualizations complete.

September 30th All data, metadata and data products transferred to EVOS.

IV. RESPONSIVENESS TO KEY TRUSTEE COUNCIL STRATEGIES

A. Community Involvement and Traditional Ecological Knowledge (TEK)

This project was conceived during a PWS herring restoration workshop held in Anchorage on 24 and 25 April, 2006. This workshop was attended by local fishers and researchers from the University of Alaska, University of Washington, National Oceanic and Atmospheric Administration, Alaska Department of Fish and Game, United States Fish and Wildlife Service, Prince William Sound Science Center, and the Oil Spill Recovery Institute and others. The community of Cordova has been intimately involved in framing the objectives of this project and the information salvaged by this project's activities will prove indispensable.

B. Resource Management Applications

This project will develop technologies to make herring related data and other electronic resources more accessible and improve the timeliness and precision of aerial survey estimates of the length of shoreline used by spawning herring. PWS biomass projections use the total shoreline length of herring spawn ("mile-days) from aerial surveys as one of the abundance indices used to tune the catch-age model. More precise estimates of the shoreline miles of spawn should improve the fit of the model and improve the biomass projection. Local ADF&G area management staff can use improved pre-season projections to help optimize the harvest of PWS herring. Additionally, more precise measures of the extent of shoreline used for spawning will also allow managers to direct wild spawn on kelp fisheries more efficiently.

V. PUBLICATIONS AND REPORTS

Because this project is intended to consolidate data and develop applications, the major products will be a web portal and an ArcPad application. A document describing the Standard Operating Procedures (SOPs) for the absorption of future data sets will be published. In addition, a technical manual documenting the system architecture will also be published.

LITERATURE CITED

Brady, J.A. 1987. Distribution, timing, and relative biomass indices for Pacific Herring as determined by aerial surveys in Prince William Sound 1978 to 1987. Alaska Department of Fish and Game, Division of Commercial Fisheries, Prince William Sound Data Report 87-14, Anchorage.

Biggs Evelyn D., Beth E. Haley, and Jean M. Gilman. 1992. Historic database for Pacific herring in Prince William Sound, Alaska, 1973-1991. Regional Information Report No. 2C91-11. Alaska Department of Fish and Game, Division of Commercial Fisheries, Anchorage, Alaska.

Marty, G. D., T. J. Quinn II, S. A. Miller, T. R. Meyers, and S. D. Moffitt. 2004. Effect of Disease on Recovery of Pacific Herring in Prince William Sound, Alaska, *Exxon Valdez* Oil Spill Restoration Project Final Report (Restoration Project 030462), University of California, Davis, California.

Willette T.M., G.S. Carpenter, K. Hyer, and J.A. Wilcock. 1999. Herring natal habitats, *Exxon Valdez* Oil Spill Restoration, Project Final Report (Restoration Project 97166), Alaska Department of Fish and Game, Division of Commercial Fisheries, Cordova, Alaska.

BUDGET JUSTIFICATION: Fiscal Year: 09

Personnel:

Funds are requested to support a GIS Technician for (4 months, 30.4K). This position will help consolidate, edit, and/or enter herring related data sets, meta data, and other electronic resources into an electronic format that can be consolidated into a geodatabase (*Objective 1-2*). Funds are also requested (3 months, cost \$27.6) to support an Information Architect (Rob Bochenek to supervise the GIS Tech, provide enterprise level data management techniques, process data and develop of the ArcPad application (*Objectives 1, 2, 3, and 4*).

ADF&G will provide an in-kind contribution of 2.0 months of staff time (cost \$10K) to assist with consolidation, editing, and entering of data contained within the Cordova ADF&G Office (*Objectives 1*).

Travel:

Funds are requested for Rob Bochenek to travel from Anchorage to Cordova (2 trips) to work with Cordova ADF&G staff on organizing data sets into a geospatial relational database, creating meta data, developing appropriate web based visualizations, developing SOPs for additional data absorption, and developing the ArcPad application (*Objectives 1,2,3, and 4*).

Contractual:

ADF&G will provide an in-kind contribution of \$10.0 k for air charters used to test the ArcPad application for the collection of herring survey data (*Objective 4*).

Commodities:

Funds are requested (1.8K) to purchase maintenance support an ESRI 9.2 ArcView license, and GIS analytical packages (*Objective 2*).

ADF&G will provide an in-kind contribution of \$2.5 k for an ArcPad application builder license and 2 ArcPad licenses used to develop the ArcPad application (*Objective 4*).

Equipment:

Funds are requested to purchase a Dell PowerEdge Server to host the web portal (*Objectives 2*).

ADF&G will provide the following equipment as an in-kind contribution (*Objectives 1 & 2*):

Dell desktop computers with ArcView 9.2 licenses	\$7.0 K
HP tablet PC for ArcPad application	\$3.0K
GPS for ArcPad application work	\$0.2 K

2008 EXXON VALDEZ TRUSTEE COUNCIL PROJECT BUDGET

October 1, 2007 - September 30, 2008

Budget Category:	Authorized FY 2008	Proposed FY 2009				
Personnel	\$52.2	\$58.0				
Travel	\$0.8	\$1.2				
Contractual	\$134.2	\$0.0				
Commodities	\$0.0	\$1.8				
Equipment	\$0.0	\$0.0	LONG RANGE FUNDING REQUIREMENT			
Subtotal	\$187.2	\$61.0				
Indirect	\$0.0	\$10.4				
Project Total w/o G/A	\$187.2	\$71.4				
G/A	\$16.8	\$6.4				
Project Total w G/A	\$204.0	\$77.8				
Full-time Equivalents (FTE)	1.0	0.6				
Dollar amounts are shown in thousands of dollars.						
Other Resources						

Comments:

Indirect Cost Rate for Axiom Consulting & Design is 17%

\$10 K IN KIND: ADF&G will provide staff time to assist in data salvage and processing of ADF&G Cordova datasets.

\$10 K IN KIND: ADF&G will provide funding for all aerial surveys to test the ArcPad application.

\$1.5 K IN KIND ADF&G will provide a license for ArcPad Application builder to build the application.

\$1.0 K: IN KIND ADF&G will provide 2 licenses for ArcPad 7.0.

\$30 K Matching From Copper River Knowledge System

\$25 K Matching from Oil Spill Recovery Institute

FY09

Project Number:
Project Title: Herring Data and Information Portal
Name: Rob Bochenek, Axiom consulting & Design

2008 EXXON VALDEZ TRUSTEE COUNCIL PROJECT BUDGET

October 1, 2007 - September 30, 2008

Prepared: _____

Personnel Costs:			Months Budgeted	Monthly Costs	Other
Name	Position Description				
Robert Bochenek	Information Architect		3.0	9.2	
Currently Vacant	GIS Tech		4.0	7.6	
Subtotal			7.0	16.8	

Personnel

Travel Costs:		Ticket Price	Round Trips	Total Days	Per
Description					
RT Anchorage - Cordova		0.4	2	2	

Travel

FY09

Project Number:
Project Title:
Name:

2008 EXXON VALDEZ TRUSTEE COUNCIL PROJECT BUDGET

October 1, 2007 - September 30, 2008

Prepared: _____

New Equipment Purchases:		Number of Units
Description		

Those purchases associated with replacement equipment should be indicated by placement of an R.

New Equipment

Existing Equipment Usage:		Number of Units
Description		

FY09

Project Number:
Project Title:
Name: