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.

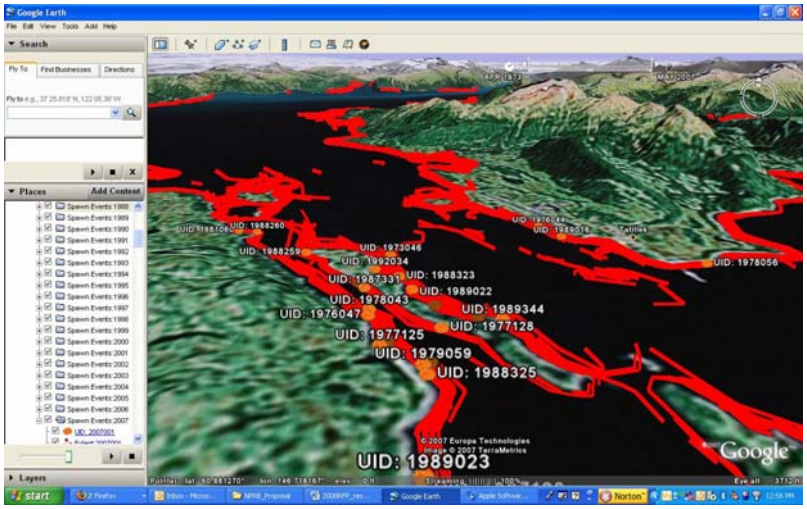

Figure 1: Example of visualization (Google Earth) of geospatially enabled herring spawn data via the Prince William Sound Herring Data Portal.

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 ADGF&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 Vansant, 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.

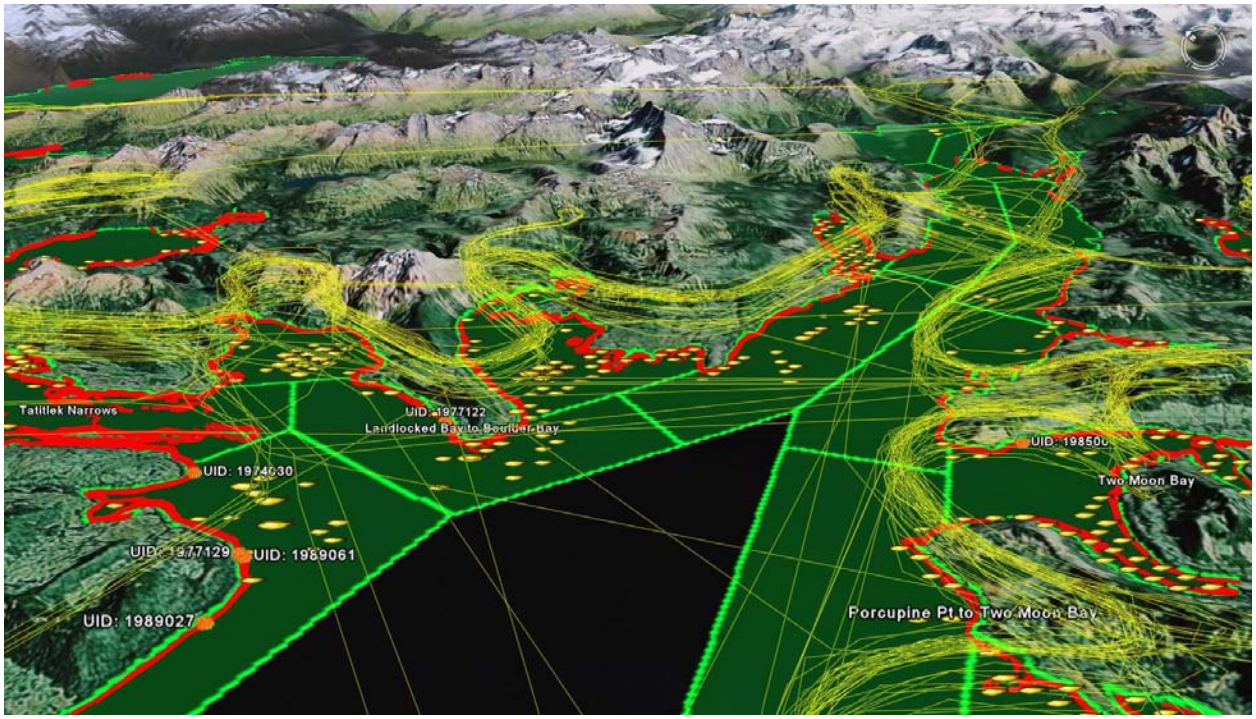

Figure 2: Google Earth Visualization of ADF&G Aerial Survey dataset. Herring Spawn observations are red arcs, ADF&G Index Areas are in green polygons, Biomass Observations are yellow dots. Aerial survey tracks are in yellow arcs.

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.

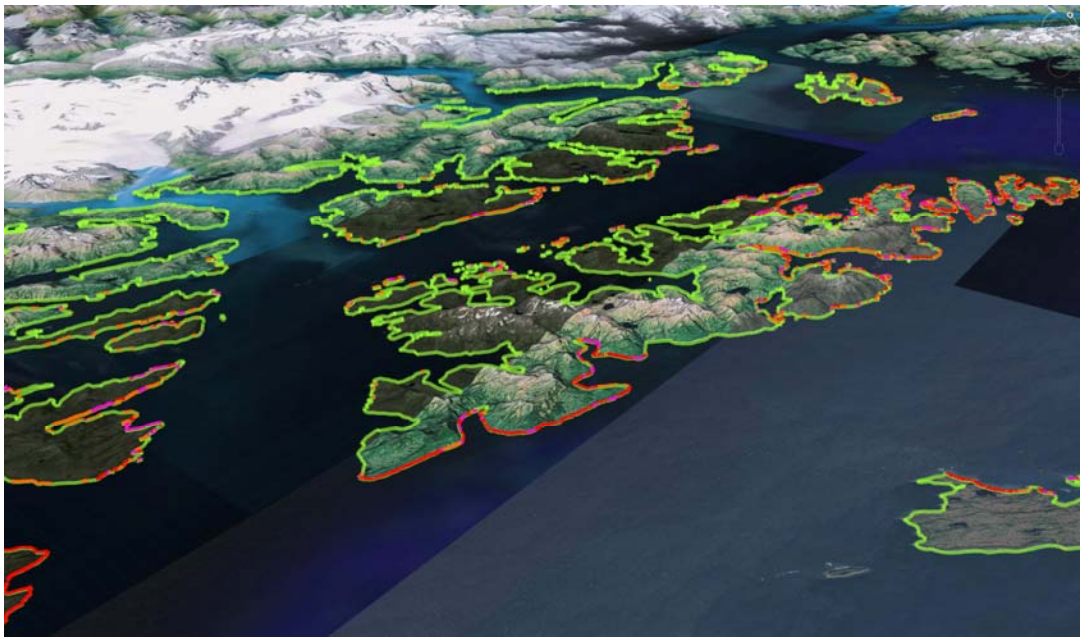

Figure 3: Visualization of Oiled Shoreline surveys.

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)

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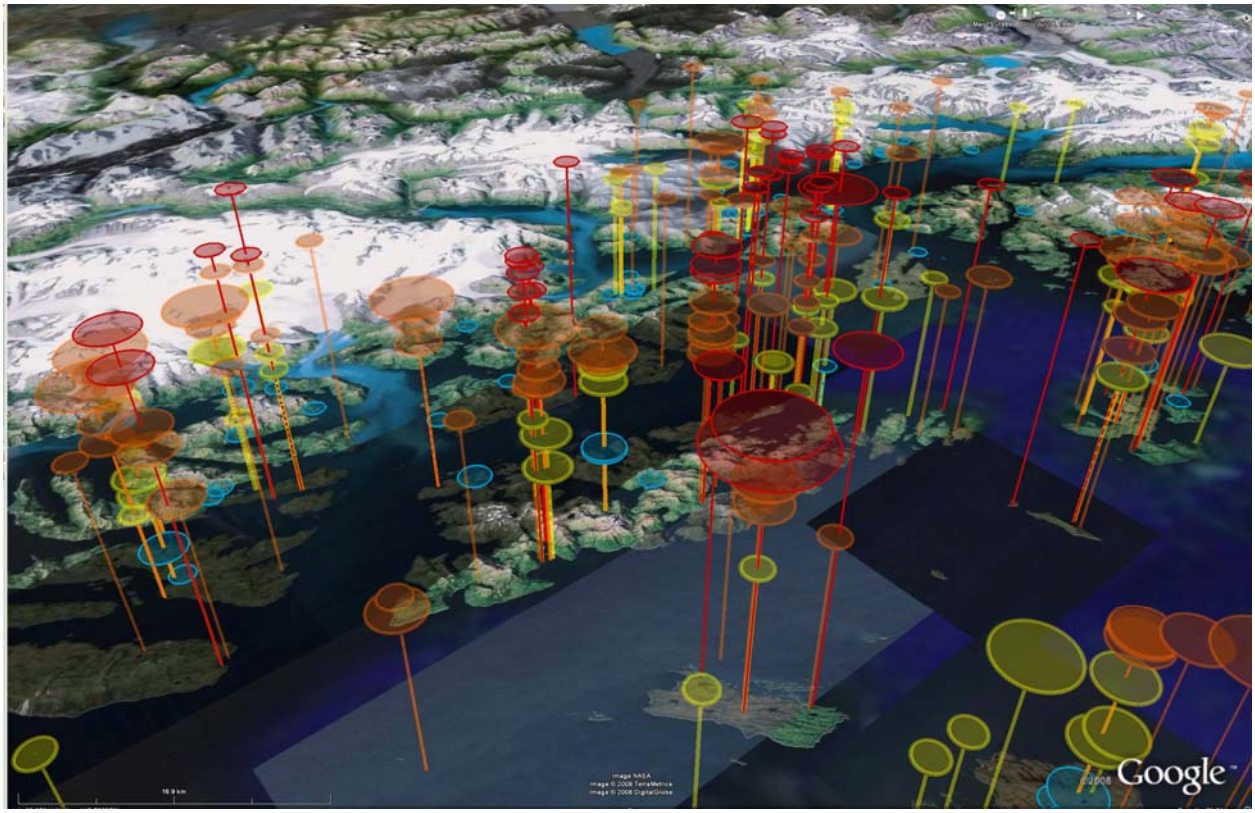

Figure 4: Visualization of point source hydrocarbon permeated mussel. The height and color of the vertical bar details comparative hydrocarbon densities sampled in mussel tissue. The disk size denotes comparative total sample size.

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

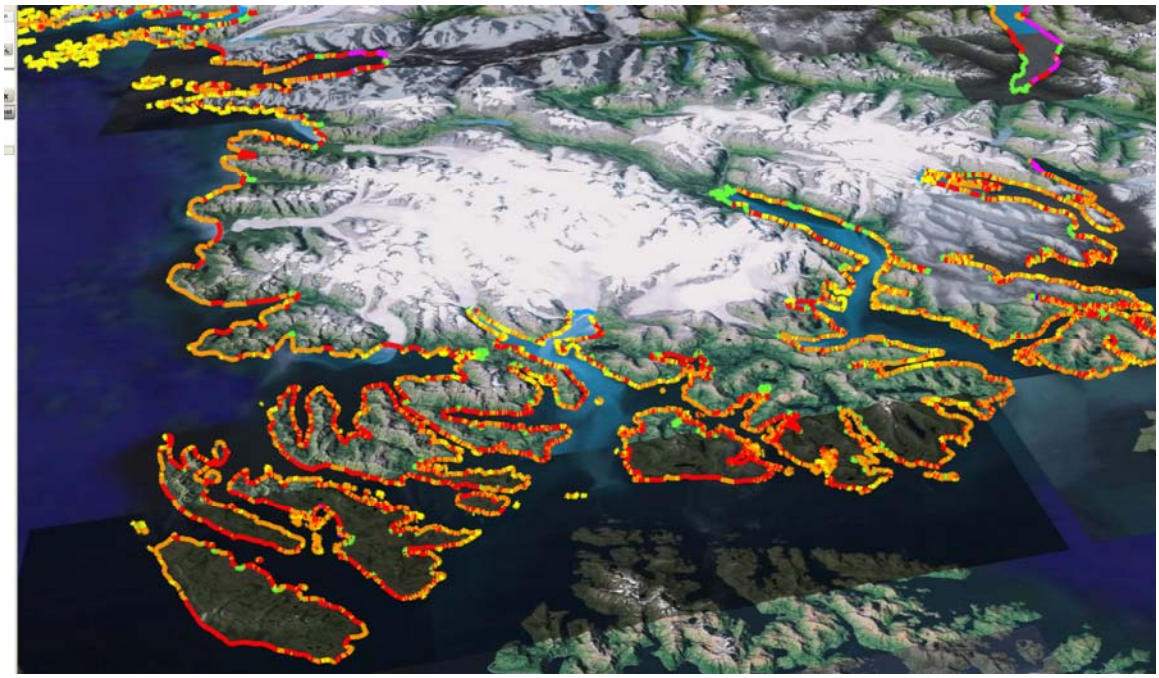

Figure 5: Visualization of ShoreZone Habitat Substrate type for Western Prince William Sound

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 compete 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.

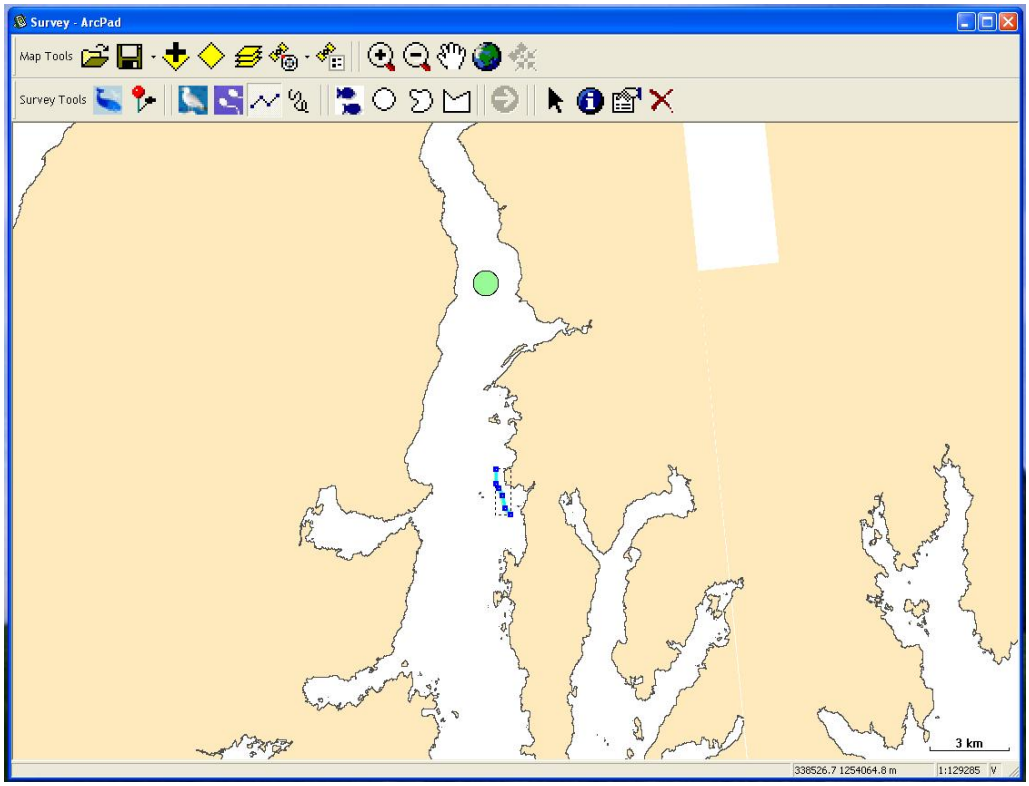

Figure 6. ARCPAD Survey Application.

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 that 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.