ISSUE 1 | SPRING | 2007

QUARTERLY NEWSLETTER

Herring focus

PRINCE WILLIAM SOUND HERRING MODELING & SYNTHESIS PROJECT

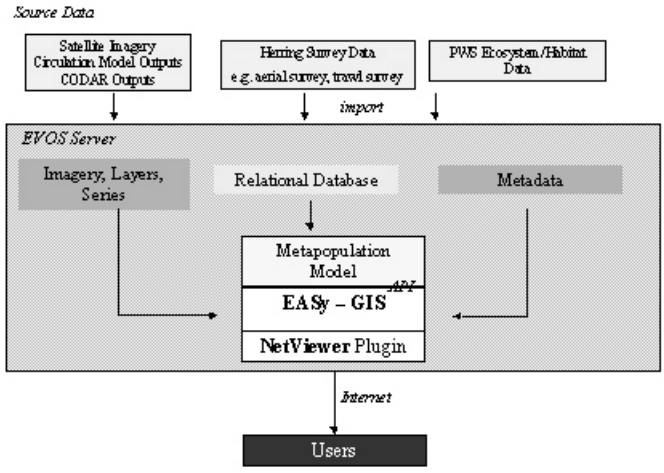
Funded by: Exxon Valdez Oil Spill Trustee Council (Grant Number: 070810)

The main goal of this project is to produce a spatially-explicit, life-stage compartmentalized and ecosystem-based herring model that will simulate intrinsic and extrinsic effects on herring survival and mortality for fishery management and ecological intervention.

Modeling herring ecology in Prince William Sound

Pacific herring (*Clupea pallasi*) are an ecologically critical component of the Prince William Sound (PWS) ecosystem and food web. Fisheries for this forage fish species have also historically been integral to the economic sustenance of local communities in the area. The crash of the herring stock in 1993 and its subsequent failure to recover despite the moratorium on fishing remains an issue of utmost concern. This has prompted the development of a PWS herring restoration plan initiative by the Exxon Valdez Trust Council (EVOSTC) and an appointed steering committee comprised of scientists, resource managers, fishers, and other community stakeholders. Central to these restoration efforts and the ultimate objective of the three-year project described here is the undertaking of a synthesis of available research results and data to drive the development of a spatially explicit, stage-structured population dynamics model for PWS herring.

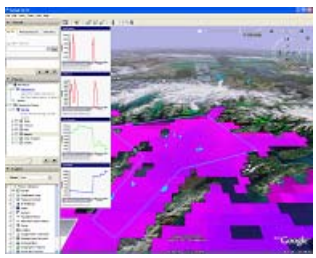
More on page 2 …



Above: Components and information flow within the PWS Herring Information System

Below: Screenshot of Google Earth Visualization Demo of the PWS Herring project

Visualization demo with Google Earth



Run through dynamically and interactively view our Herring project using Google Earth (GE) in 4-D space! We have just successfully ported a framework model to GE (we don't have the data or the full model yet – remember this is Issue 1). We are excited about how nice it is to visualize our project on GE.

Check it out at: http://smbay.usc.edu/Herring/GoogleEarth.asp

Bracing for the herring modeling challenge

Investigator Dale Kiefer shares with us the key challenges for this comprehensive modeling project

Fisheries and ecological literature on herring is extensive and includes both field work and modeling. Although we have not completed a systematic review of this literature, we feel that promise and challenges of building the model are clear:

1. Both the life history and physiology of *Clupea pallasi* has been well studied. In particular the recent herring bio-energetics model that has been developed by Megrey and co-authors (Ecological Modeling (2007)# 202: 144-164 and 184-195) provides a detailed and sound foundation for assembling the model this component of the model.
2. On the other hand detailed studies of predation and disease are limited. SEA and APEX projects provide insights into trophic interaction within PWS; however, information on predation prior to the spill and recently is spotty.
3. Finally, knowledge of the spatial structure and spatial dynamics of herring is limited, and a new conceptual approach to addressing the importance of metapopulations on the population dynamics of PWS Herring will likely be required. Again the SEA and APEX project provide exceptional coverage only during the 90s. We believe that the incorporation of the one-dimensional model that we will develop during the first year of our project into our PWS geographic information system will greatly help guide the development of the spatial model.

Ongoing activities

- Population dynamics model development
- IBM model development
- Literature review and library development
- Assimilation of archived herring and oceanographic survey datasets into EASy-GIS and development of Web-GIS application
- Survey data assimilation into relational database and development of associated meta-database with dataset documentation (USC/SSA)
- Provision of relevant biological & physical datasets in support of the PWS Herring modeling project (ADFG/ PWSSC/ Flying Fish LTD / IMS)

For editorial comments, please contact -

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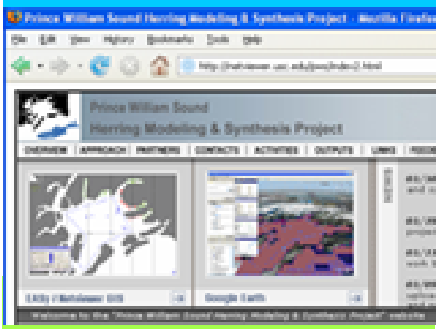
Project Website

Just Launched!!



Our project website is now available at:
http://smbay.usc.edu/pws

It provides a concise description of our project and a home for our on-going developments and collaborative work among scientists. Be sure to check it out!

Modeling (continue from p.1)

Both the models and associated geographic information system that will be developed as part of this modeling activity will provide a quantitative synthesis of existing knowledge and data on the status of PWS herring and reveal possible gaps in our knowledge or information-base to guide future studies. They will promote improved understanding of possible fundamental factors underlying the regulation of the herring population in PWS and implicated in its distinctive lack of recovery over time that will facilitate the formulation of sensible mitigation strategies. Ultimately, they will also serve as decision support tools for assessing the efficacy of proposed herring restoration measures via simulation of alternative management scenarios.

Our project team:

- Dale Kiefer (USC/ SSA)
- Evelyn Brown (Flying Fish Ltd)
- Vardis Tsontos (USC)
- Vince Patrick
- Frank O'Brien (SSA)

Learn more about the project on our **website**

During the 3rd week of May, our PWS herring and modeling team will meet in Los Angeles for a 3-day workshop. The workshop will examine data sources for development of the model, co-ordinate plans of the Portal and Modeling teams, and review concepts and the current status of the model that we have begun to assemble. If you are interested in attending the workshop, please contact Dale Kiefer at kiefer@usc.edu or at (213)740-5814.

1ST Project Workshop – *An Invitation*

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