Dynamic ocean management for salmon: integrating environmental and fishery datasets

Jordan Watson, Rob Ames, Camille Kohler, Robert Nigh, Robert Ryznar, Jenny Suter
19 May 2019 IYS Workshop
ERDDAP

ERDDAP is a data server that gives you a simple, consistent way to download subsets of gridded and tabular scientific datasets in common file formats and make graphs and maps. This particular ERDDAP installation has oceanographic data (for example, data from satellites and buoys).

Please change to https now! Access to this ERDDAP is now https only. Attempts to use http will be redirected to https, but that redirect may fail in some scripts. Please change your bookmarks and scripts to https now to avoid trouble.

Easier Access to Scientific Data

Our focus is on making it easier for you to get scientific data.

Different scientific communities have developed different types of data servers.

For example, OPeNDAP, WCS, SOS, OBIS, and countless custom web pages with forms. Each is great on its own. But without ERDDAP, it is difficult to get data from different types of servers:

- Different data servers make you format your data request in different ways.
- Different data servers return data in different formats, usually not the common file format that you want.
- Different datasets use different formats for time data, so the results are hard to compare.

Start Using ERDDAP:
Search for Interesting Datasets

- View a List of All 1,436 Datasets
- Do a Full Text Search for Datasets

Search for Datasets by Category

Datasets can be categorized in different ways by the values of various metadata attributes. Click on an attribute (cdm_data_type, institution, ioos_category, keywords, long_name, standard_name, variableName) to see a list of categories (values) for that attribute. Then, you can click on a category to see a list of relevant datasets.

- Search for Datasets with
Advanced Search

Coastwatch.pfeg.noaa.gov
Dynamic ocean management increases the efficiency and efficacy of fisheries management

Daniel C. Dunn1,2,3*, Sara M. Maxwell4, Andre M. Boustany5, and Patrick N. Halpin6

*Marine Geospatial Ecology Lab, Nicholas School of the Environment, Duke University, Durham, NC 27708, and 5Department of Biological Sciences, Old Dominion University, Norfolk, VA 23529

In response to the inherent dynamic nature of the oceans and increase management efficiency across both ecological

Dynamic ocean management: Defining and conceptualizing real-time management of the ocean

Sara M. Maxwell1,2,3*, Elliott L. Hazen4, Rebecca L. Lewis5on 6, Daniel C. Dunn6, Helen Bailey1, Steven J. Bograd1, Dana K. Briscoe2, Sabrina Fossette6, Alistair J. Hobday9, Meredith Bennett5, Scott Benos1, Margaret R. Caldwell11, Daniel P. Costa2, Heidi Dewar1, Tomo Eguchi1, Lucie Hazen1, Suzanne Kohin1, Tim Sippel1, Larry B. Crowder6,8

Dynamic ocean management increases the efficiency and efficacy of fisheries management

A dynamic ocean management tool to reduce bycatch and support sustainable fisheries

Elliott L. Hazen1,2,3*, Kylie L. Scales4, Sara M. Maxwell5, Dana K. Briscoe2, Heather Welch2, Steven J. Bograd1,2, Helen Bailey6, Scott R. Benson1,2, Tomo Eguchi1, Heidi Dewar1, Suzy Kohin1, Daniel P. Costa2, Larry B. Crowder8, Rebecca L. Lewis9

Dynamic Ocean Management: Identifying the Critical Ingredients of Dynamic Approaches to Ocean Resource Management

Rebecca Lewison, Alistair J. Hobday, Sara Maxwell, Elliott Hazen, Jason R. Hartog, Daniel C. Dunn, Dana Briscoe, Sabrina Fossette, Catherine E. O’Keeffe, Michele Barnes, Melanie Abecassis, Steven Bograd, N. David Bethoney, Helen Bailey, David Wiley, Samantha Andrews, Lucie Hazen, and Larry B. Crowder

Fit to predict? Eco-informatics for predicting the catchability of a pelagic fish in near real time

Kylie L. Scales1,2,3*, Elliott L. Hazen1,2, Sara M. Maxwell5, Heidi Dewar3, Suzanne Kohin3, Michael G. Jacox1, Christopher A. Edvardson1, Dana K. Briscoe2, Larry B. Crowder8, Rebecca L. Lewis9, and Steven J. Bograd2

RESEARCH ARTICLE

Practical considerations for operationalizing dynamic management tools

Heather Welch1,2,3*, Elliott L. Hazen1, Steven J. Bograd1, Michael G. Jacox1, Stephanie Brodie1,2, Dale Robinson1,2, Kylie L. Scales3, Lynn Dewitt2
Experimental product

Oct 11 2018

Species weightings
Blue sharks weighting = -0.1
Sea lions weighting = -0.85
Leatherbacks weighting = -0.9
Swordfish weighting = 0.9

Environmental data
Sea surface temperature is from 2018-10-11
Chlorophyll a is from 2018-10-11
Eddy kinetic energy is from 2018-10-11
Sea surface height is from 2018-10-11
Surface wind is from 2018-10-11
Kernel densities of fishing effort in Palau EEZ

Towards a Fishing Pressure Prediction System for a Western Pacific EEZ

Megan A. Cimino, Mark Anderson, Travis Schramek, Sophia Merrifield & Eric J. Terrill
Kernel densities of fishing effort in Palau EEZ

Towards a Fishing Pressure Prediction System for a Western Pacific EEZ

Megan A. Cimino, Mark Anderson, Travis Schramek, Sophia Merrifield & Eric J. Terrill
Can we use environmental data to predict where illegal salmon fishing is occurring?
Data courtesy: Andy Seitz & Michael Courtney (University of Alaska Fairbanks)
Satellite environmental data (e.g. Temperature, Chlorophyll)

Fishery spatio-temporal data

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Data courtesy: Andy Seitz & Michael Courtney (University of Alaska Fairbanks)
Side note about data integration – Imagine that these points were vessel locations...For the entire Pacific Ocean. That would be neat, right?
Data courtesy: Andy Seitz & Michael Courtney (University of Alaska Fairbanks)
About 95% of records occurred < 8 °C
Chinook Size

- <65 cm (N=2)
- >65 cm (N=19)

Number of observations vs. In Chlorophyll (mg*m^3)
Sea Surface Temperature from 5 May 2019
Predicted Chinook Abundance based on SST from 5 May 2019

More salmon

Less salmon
Can we predict where IUU fishing will occur?

Unlikely. But hopefully we can reduce our search areas for enforcement.
What will it take to make this operational?

You! And any data you might have.

Like any models, this approach is only as good as the data that go into it.

More data will help to build better models.
Questions

Contact me with more questions or comments. Jordan.Watson@noaa.gov

Thank you to:

Andy Seitz and Michael Courtney (University of Alaska Fairbanks) for Chinook tag data

Sabrina Larsen (Alaska Department of Fish and Game) for data support
Predicted Chinook Abundance based on SST and Chlorophyll from 5 May 2019