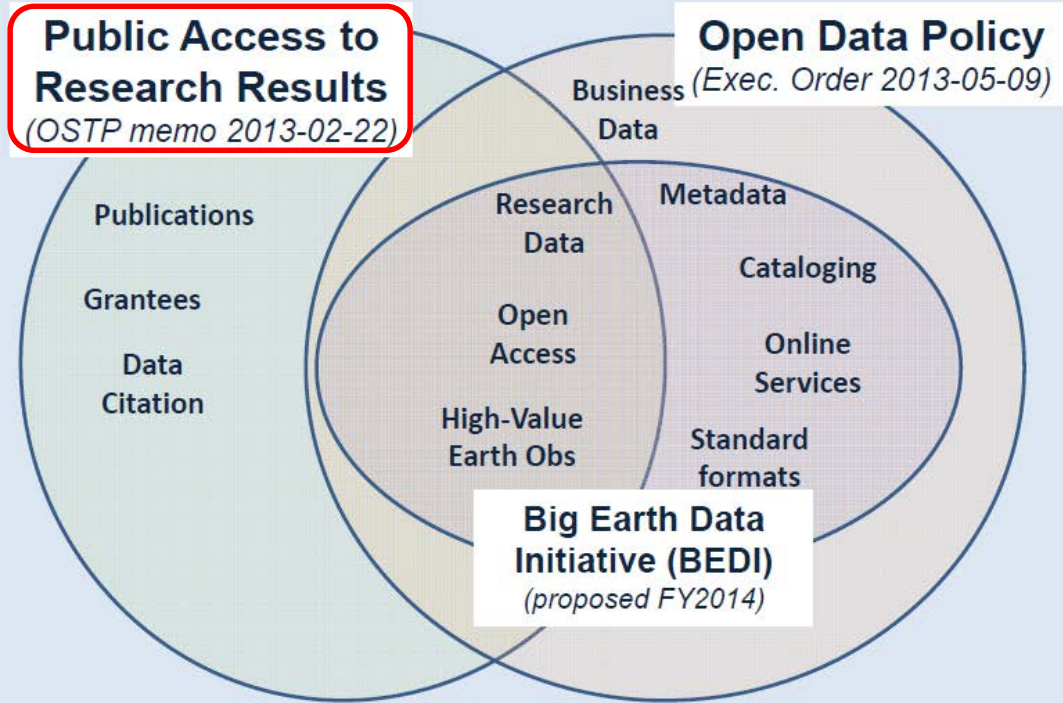


PARR for the Course: GIS and Public Access to NOAA Fisheries Research Data

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NOAA

Recent Federal Initiatives



Public Access to Research Results (PARR)

- **Publications** and **Digital Data** must be freely available.
- Does have embargo period for journal publications
- Memo from White House Office of Science and Technology Policy (OSTP) - "Increasing Access to the Results of Federally Funded Scientific Research"

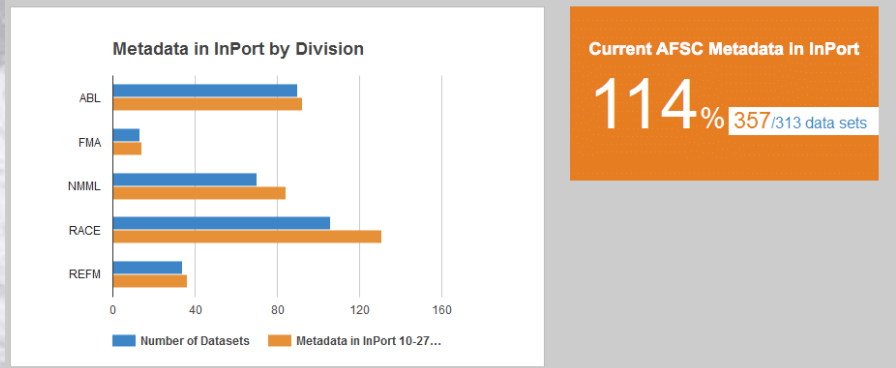
http://www.whitehouse.gov/sites/default/files/microsites/ostp/ostp_public_access_memo_2013.pdf

Metadata, InPort, and scorecards galore

- First goal is to make data discoverable
- NMFS InPort to generate metadata and data management documents
- Primarily, and increasingly, a management tool
- Does not create ISO 19115 metadata

Green: Value Present (Counted for Completion)	Red: Value Missing (Counted against Completion)	Yellow: Value Missing (Not Counted against Completion)	Management Resources Present	Budget Present	Access Enabled Present	Access Working Present	Hosting Needed Present	Dissemination Delay Present	
17370	Alaska Fisheries AFSCANM	Southeast Alaska Catfish Survey, 1991 - 20	66.00%	75.95%	78.57%	Y	Y	Y	Y
20713	Alaska Fisheries AFSCANM	Video Analysis for Group Count and Call Priority of C	66.00%	75.95%	82.14%	Y	Y	Y	Y
17370	Alaska Fisheries AFSCANCEcoFOCI	2010 BOST and EODDP Study	66.00%	0.00%	32.14%	N	N	N	N
17389	Alaska Fisheries AFSCANCEcoFOCI	2010 Chukchi Acoustics, Oceanography, an	66.00%	0.00%	32.14%	N	N	N	N
17392	Alaska Fisheries AFSCANCEcoFOCI	2010 Eastern Bering Sea Juvenile Survey	66.00%	0.00%	32.14%	N	N	N	N
17110	Alaska Fisheries AFSCANCEcoFOCI	2010 Eastern Bering Sea Juvenile Survey	66.00%	0.00%	32.14%	N	N	N	N
17381	Alaska Fisheries AFSCANCEcoFOCI	2011 Chukchi Sea Cruise M511-01UNVBI1	66.00%	0.00%	32.14%	N	N	N	N
17387	Alaska Fisheries AFSCANCEcoFOCI	2011 Fall Devry Sea Mearns Cruise D111c	66.00%	0.00%	32.14%	N	N	N	N
17395	Alaska Fisheries AFSCANCEcoFOCI	2011 OCS-ERP A General Line TST11	66.00%	0.00%	32.14%	N	N	N	N
17399	Alaska Fisheries AFSCANCEcoFOCI	2011 Gulf of Alaska ERP Cruise T055DTT	66.00%	0.00%	32.14%	N	N	N	N
17388	Alaska Fisheries AFSCANCEcoFOCI	2011 Gulf of Alaska Lark Lane Survey D111	66.00%	0.00%	32.14%	N	N	N	N
17388	Alaska Fisheries AFSCANCEcoFOCI	2011 Gulf of Alaska Lark Lane Survey D111c	66.00%	0.00%	32.14%	N	N	N	N
17390	Alaska Fisheries AFSCANCEcoFOCI	2011 Spring Bering Sea Mearns Cruise D111	66.00%	0.00%	32.14%	N	N	N	N
17387	Alaska Fisheries AFSCANCEcoFOCI	Chikofsky	65.95%	0.00%	32.14%	N	N	N	N
17389	Alaska Fisheries AFSCANCEcoFOCI	Chikofsky groundtruth data for chlorophyll	52.33%	0.00%	20.57%	N	N	N	N
17390	Alaska Fisheries AFSCANCEcoFOCI	Chikofsky variability in spring chlorophyll	52.33%	0.00%	20.57%	N	N	N	N
20713	Alaska Fisheries AFSCANCEcoFOCI	Fish diet analyses performed in support of FC	100.00%	90.36%	96.42%	Y	Y	Y	Y
20650	Alaska Fisheries AFSCANCEcoFOCI	Genetics analyses performed in support of FC	100.00%	90.36%	96.42%	Y	Y	Y	Y
20714	Alaska Fisheries AFSCANCEcoFOCI	Interpretation data collected in support of FC	100.00%	100.00%	100.00%	Y	Y	Y	Y
20714	Alaska Fisheries AFSCANCEcoFOCI	Otolith cross sections and analyses performed	100.00%	100.00%	100.00%	Y	Y	Y	Y
20575	Alaska Fisheries AFSCANCEcoFOCI	Physical oceanographic data collected in support of FC	100.00%	100.00%	96.42%	Y	Y	Y	Y
20571	Alaska Fisheries AFSCANCEcoFOCI	Trawl catch data collected in support of FC	100.00%	100.00%	96.42%	Y	Y	Y	Y
20598	Alaska Fisheries AFSCANCEcoFOCI	Walleye Pollock tissue condition data mesoz	100.00%	100.00%	96.42%	Y	Y	Y	Y
20513	Alaska Fisheries AFSCANCEcoFOCI	Zooplankton data collected in support of FC	100.00%	100.00%	100.00%	Y	Y	Y	Y
20523	Alaska Fisheries AFSCANCEcoFOCI	Interpretation data collected in support of FC	100.00%	100.00%	100.00%	Y	Y	Y	Y
20513	Alaska Fisheries AFSCANCEcoFOCI	Contracting coastal and shelf nursery habitat	100.00%	100.00%	100.00%	Y	Y	Y	Y
20513	Alaska Fisheries AFSCANCEcoFOCI	Distributional patterns of Bering Pacific	100.00%	100.00%	100.00%	Y	Y	Y	Y

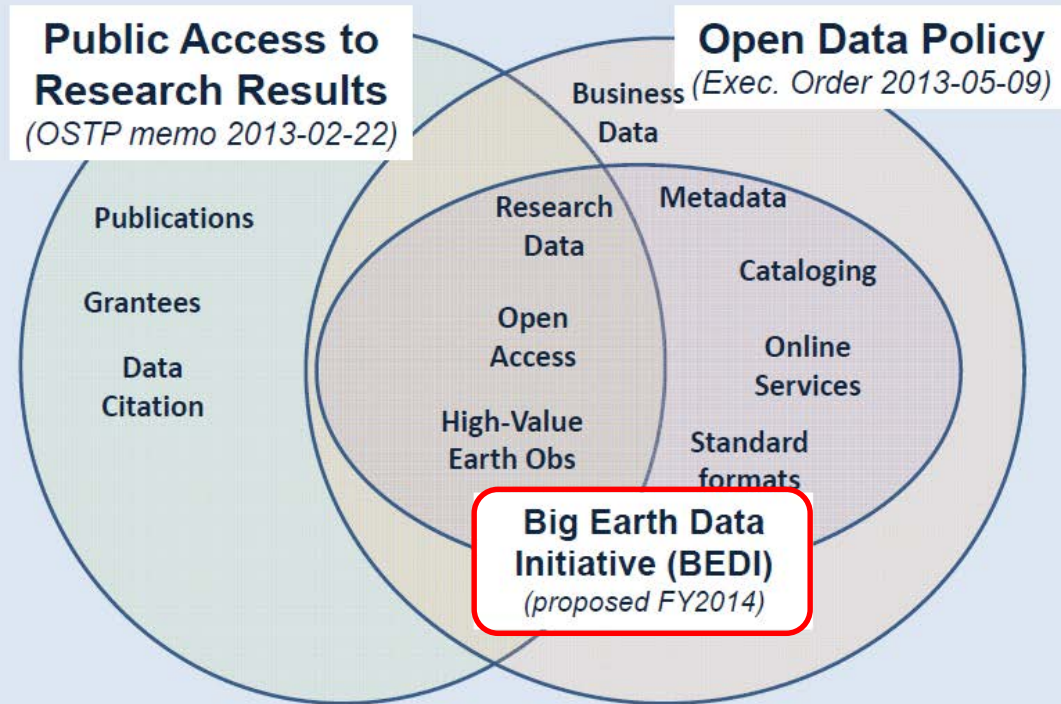
PARR Activity Dashboard



How can GIS help?

- Gathering data and doing QA/QC
- Metadata for input to InPort – at least a beginning
- ArcServer to create web interfaces for public access
- AGOL to make data available to the public
- Map services and machine to machine communication

Recent Federal Initiatives



Big Earth Data Initiative (BEDI)

- Multi-agency activity coordinated through US Group on Earth Observations (USGEO)
 - Goal: Improve **discoverability, accessibility, & usability of data**
 - Focus on "**high value**" datasets, e.g. from:
 - OSTP Earth Observations Assessment
 - USGCRP National Climate Assessment
 - NOAA Observing Systems of Record

NOAA internal Call for Proposals – funded 1-year projects on:

US Coastal Bathymetry-Topography Models

MASAM2: Daily 4 km Arctic Sea Ice Concentration

Historical (late 1940s to early 1990s) Biological Data

World Ocean Database

CFSRR, GFS, NDFD Model Outputs

Bio & Env data from Fishery Independent Monitoring

Physical Oceanographic data from Bering, Beaufort, Chukchi, Gulf of Alaska

Ocean Monitoring data from fisherman & turtles

Sea Level Data Synthesis

National Benthic Inventory (NBI)

National Coral Reef Monitoring Program (NCRMP)

NOAA Tsunami Forecast Model Grids

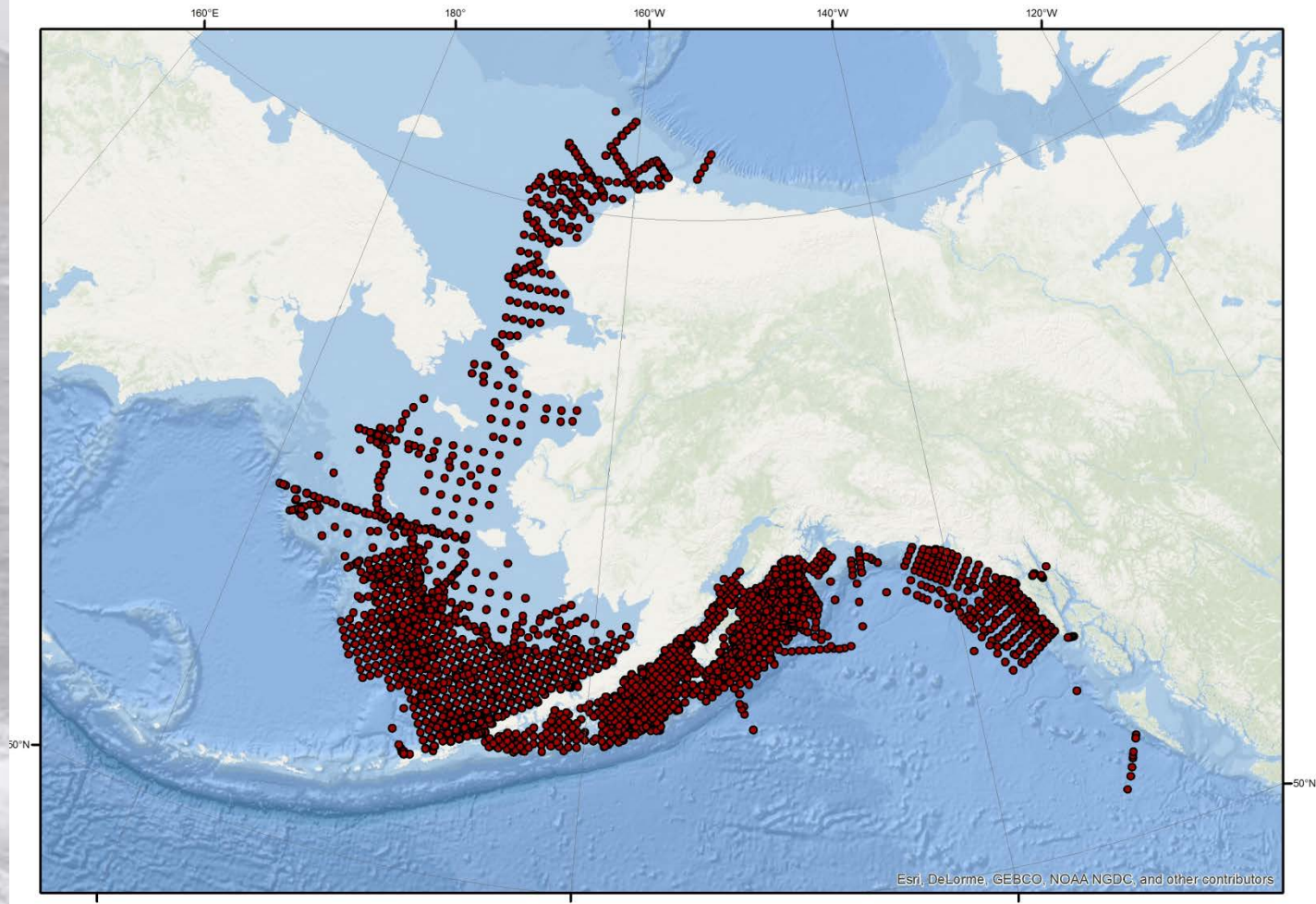
20th Century Reanalysis

OER Underwater Video

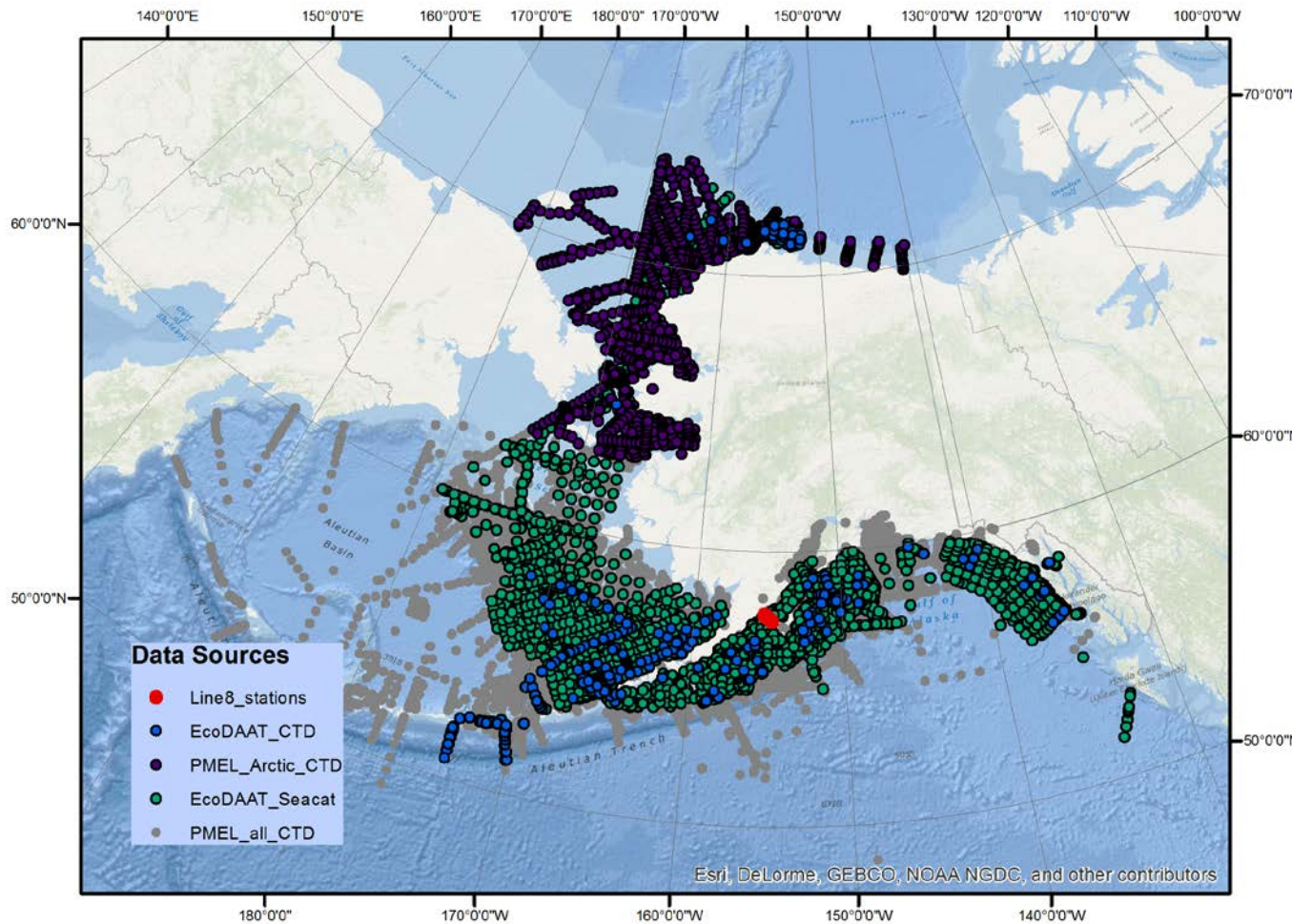
GOES Space Weather

Environmental
data collected
coincident with
biological
sampling 1995 to
2015

Convert to
netCDF CF files
and serve via an
ERDDAP server
at AOOS



Physical oceanographic data – convert to netCDF CF files and serve via an ERDDAP server at PMEL



ERDDAP – data server and explorer

- Is a web application and a web service. Has REST- and ROA-style links to make its services available to computer programs.
- Offers several ways to search for interesting datasets. Lets you request data in a standardized way. Requests for gridded data can be made in user units.
- Makes different types of data servers (OPeNDAP, OBIS, SOS, WMS, ...) interoperable.
- Sends results in common data file formats - .html table, ESRI .asc and .csv, Google Earth .kml, OPeNDAP binary, .mat, .nc, ODV .txt, .csv, .tsv, .json, and .xhtml.
- Can add or modify metadata.

<http://coastwatch.pfeg.noaa.gov/erddap/index.html>

Environmental Data Connector

- Allows connection to ERDDAP and THREDDS servers from within ArcGIS
- Need to download and install in ArcGIS
- Access to model data, radar data, station data and satellite data
- Joint NOAA and RPS/ASA project

<http://www.pfeg.noaa.gov/products/EDC/>

SWFSC 2001 CTD data accessed via EDC

The screenshot shows the Environmental Data Connector (EDC) interface. At the top, there are four radio buttons for different connection methods: Catalog URL, Direct Access URL, Sensor Obs Service, and ERDDAP Server. The ERDDAP Server option is selected, with the URL <http://coastwatch.pfeg.noaa.gov/erddap> entered. Below this is a search box containing the text "SWFSC".

The main area is divided into two panes. The left pane, titled "Dataset Listing", shows a list of datasets. The selected dataset is "SWFSC Protected Resources Division CTD Data". The right pane, titled "Dataset Info", provides details for this dataset.

Dataset Listing

- SWFSC FED Mid Water Trawl Juvenile Rockfish Survey, CTD Data
- SWFSC FED Mid Water Trawl Juvenile Rockfish Survey, Surface Data
- SWFSC Protected Resources Division CTD Data**
- THIS IS ONLY A TEST -- DO NOT USE! NOAA SWFSC, Trinidad Head Line, CTD Data
- SST, Blended, Global, EXPERIMENTAL (5 Day Composite)
- SST, Blended, Global, EXPERIMENTAL (8 Day Composite)
- SST, Blended, Global, EXPERIMENTAL (Monthly Composite)
- SST, Aqua AMSR-E, Near Real Time, Global (3 Day Composite)
- SST, Aqua AMSR-E, Near Real Time, Global (5 Day Composite)
- SST, Aqua AMSR-E, Near Real Time, Global (8 Day Composite)
- SST, Aqua MODIS, NPP, Indonesia, Daytime (3 Day Composite)
- SST, Aqua MODIS, NPP, Indonesia, Daytime (8 Day Composite)
- SST, Aqua AMSR-E, Near Real Time, Global (14 Day Composite)
- SST, Aqua AMSR-E, Near Real Time, Global (Monthly Composite)
- SST, Aqua MODIS, NPP, Indonesia, Daytime (14 Day Composite)
- SST, Aqua MODIS, NPP, Indonesia, Daytime (Monthly Composite)
- SST, POES AVHRR, GAC, Global, Day and Night (3 Day Composite)
- SST, POES AVHRR, GAC, Global, Day and Night (5 Day Composite)
- SST, POES AVHRR, GAC, Global, Day and Night (8 Day Composite)
- SST, POES AVHRR, LAC, Alaska, Day and Night (3 Day Composite)
- SST, POES AVHRR, LAC, Alaska, Day and Night (8 Day Composite)
- SST, POES AVHRR, GAC, Global, Day and Night (14 Day Composite)
- SST, POES AVHRR, GAC, Global, Day and Night (Monthly Composite)
- SST, POES AVHRR, LAC, Alaska, Day and Night (14 Day Composite)
- SST, POES AVHRR, LAC, Alaska, Day and Night (Monthly Composite)
- Fluorescence Line Height, Aqua MODIS, NPP, East US (3 Day Composite)
- Fluorescence Line Height, Aqua MODIS, NPP, East US (8 Day Composite)
- Sea Surface Temperature, Aqua AMSR-E, Near Real Time, Global (Monthly Composite)

Dataset Info

Title: SWFSC Protected Resources Division CTD Data

Dataset ID: erdPrdCtd

Institution: NOAA SWFSC PRD

Background Info: <http://swfsc.noaa.gov/PRD/>

Summary: Data from NOAA SWFSC Protected Resources Division (PRD). cdm_data_type = Trajectory VARIABLES: trajectory ship_station (Ship and Station) longitude (degrees_east) latitude (degrees_north) time (seconds since 1970-01-01T00:00:00Z) chloro (Surface Chlorophyll, ug L-1) phaeo (Surface Phaeophytin, ug L-1) productivity (Integrated Euphotic Zone Productivity, mg Carbon m-2 day-1) sst (Sea Surface Temperature, degree_C)

ERDDAP Provided Web Services:


- DataAccess Web Form:* <http://coastwatch.pfeg.noaa.gov/erddap/tabledap/erdPrdCtd.html>
- Subset Web Form:* http://coastwatch.pfeg.noaa.gov/erddap/tabledap/erdPrdCtd_subset
- Graphing Web Form:* http://coastwatch.pfeg.noaa.gov/erddap/tabledap/erdPrdCtd_graph

EDC Processing:

SWFSC 2001 CTD data accessed via EDC

Environmental Data Connector

Browse Log ERDDAP - Subset & Process



Map showing CTD data points (red dots) in the Pacific Ocean, covering the area from North America to South America. Key features labeled include the Molokai Fracture Zone, Clarion Fracture Zone, Clipperton Fracture Zone, Makassar Strait, North Pacific Ocean, Gulf of California, Gulf of Mexico, Caribbean Sea, and South Pacific Ocean. A 1000 Km scale bar is present.

2D

Start: 1998-08-01 11:17:00 Stop: 2001-12-03 13:35:00

W: -154.477 E: -77.18 S: -18.0

URL: <http://coastwatch.pfeg.noaa.gov/erddap/tabledap/erdPrdCtd.html?table?longitude,latitude,time&time>=1998-08-01&time<=2001-12-03&longitude>=-155.852&longitude<=-77.55&latitude>=-18.037999999999997&>

Submit

Only one value

- Trajectory
- Ship and Station
- Longitude (degrees_east) Geographic variable
- Latitude (degrees_north) Geographic variable
- Time (seconds since 1970-01-01T00:00:00Z) Time variable
- Surface Chlorophyll (ug L-1)
- Surface Phaeophytin (ug L-1)
- Integrated Euphotic Zone Productivity (mg Carbon m-2 day-1)
- Sea Surface Temperature (degree_C)

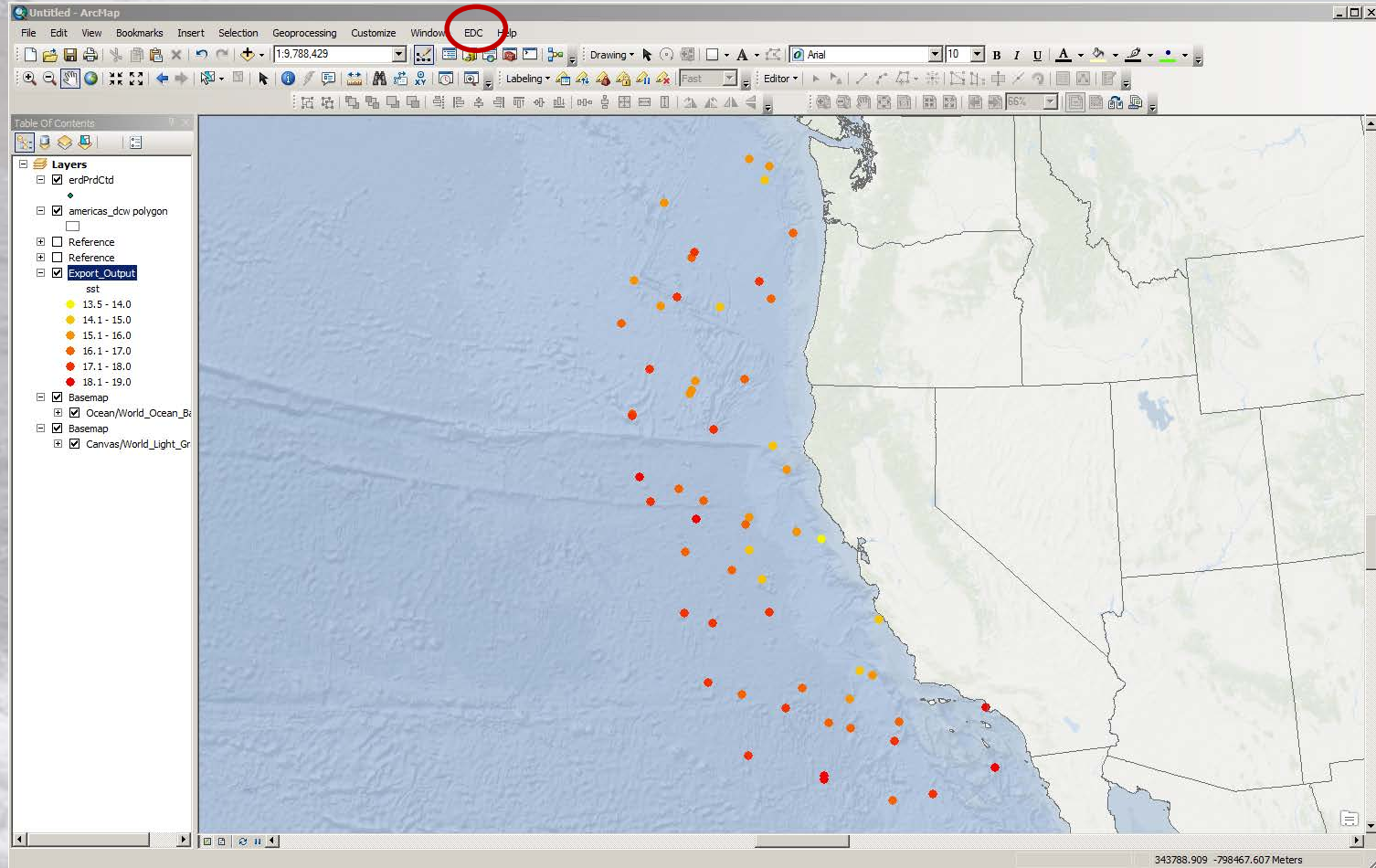
0.001 0.001 6.214

0 0.0 2.203

27.17 27.17 12402.69

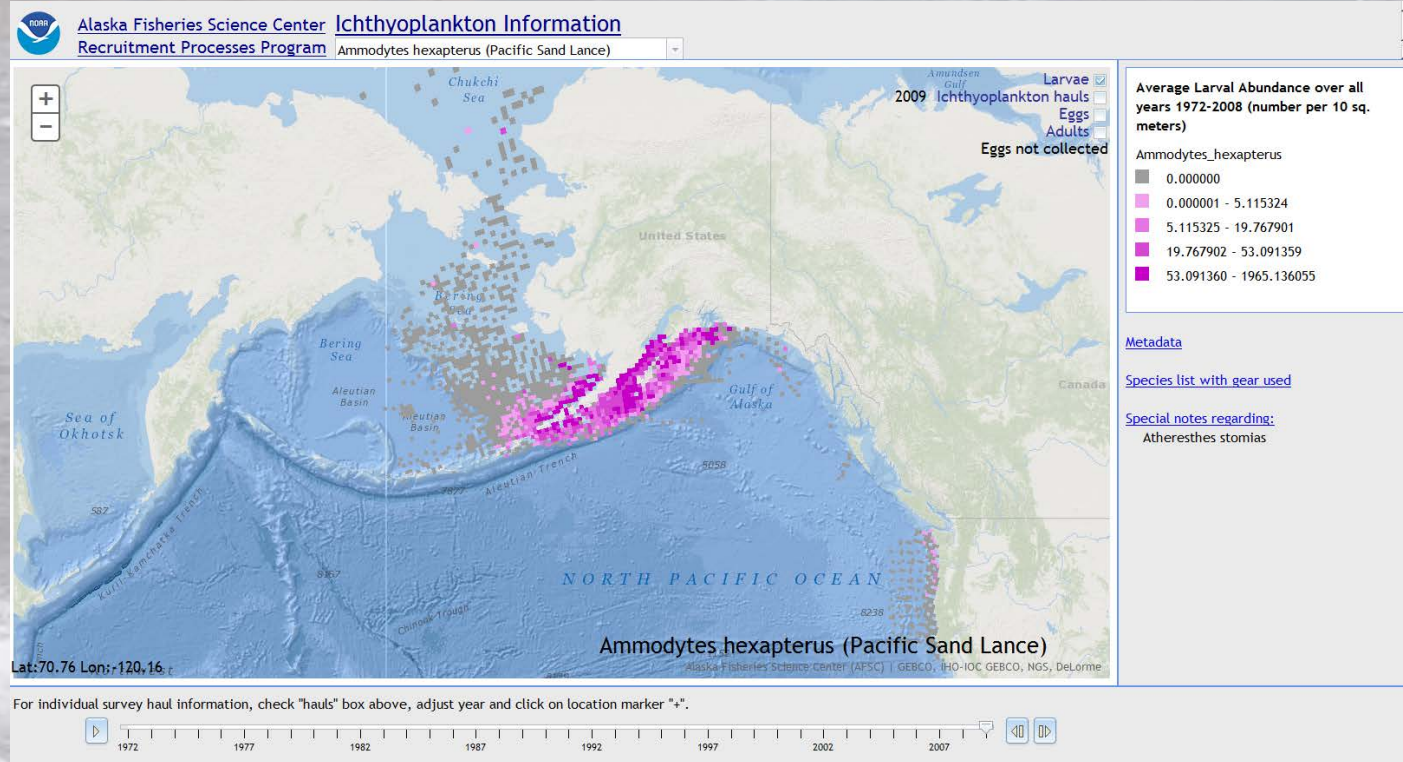
13.5 13.5 30.73

SWFSC
2001 CTD
data
accessed
via EDC



ArcServer and web interface

- Store data in database
- Serve via ArcServer
- Create web page for data selection and display



EcoDAAT – EcoFOCI Data Access and Analysis Tools

- ArcServer-based interface to Oracle database.
- Map-based and forms for data selection.
- Output easily used in ArcGIS
- Tiered access
- Human access but not machine (yet)

Data Query and Selection

Select FOCI Data Group: SPECIMEN RECORDS

Choose Sample Type: Ichthyoplankton Performance

Species Name: Stage:

Cruise: Gear Abbreviation: CAT

Project: Purpose:

Mesh: NET:

Min Bottom Depth(m): 0 Max Bottom Depth(m): 1400 All Depths

MIN (max) Gear Depth (m): 0 MAX (max) Gear Depth (m): 1400 All Depths

HAUL ID: Sample ID:

Geographic Area: Station Name:

*Results will be shown on map and in table.

Define Time Range Search Select Fields Clear Catch w/ Zeros

CRUISE	STATION_NAME	HAUL_NAME	GEAR_NAME	LAT	LON
5MF02	14	4	CAT	58.642	-150.75617
5MF02	52	3	CAT	57.614000000000004	-151.58467
5MF00	43	9	CAT	56.87067	-164.05
5MF00	47	1	CAT	56.08233	-163.59033

How can GIS benefit?

- Rapidly increasing number of datasets available in easily used formats
- Web map services and Machine to machine communication
- Better documentation and metadata
- Use of tools such as Esri's Make OPEnDAP Raster Layer to add data from new sources – need version for ungridded data

A photograph of a boat's wake on a body of water, with snow-capped mountains in the background. The water is dark and choppy, with white foam from the boat's wake in the foreground. The mountains are rugged and covered in snow, under a grey, overcast sky.

Thank you

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