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science for a changing world

Success Stories and Challenges contributed to the CDI-Theme Mapping Innovation Workshop

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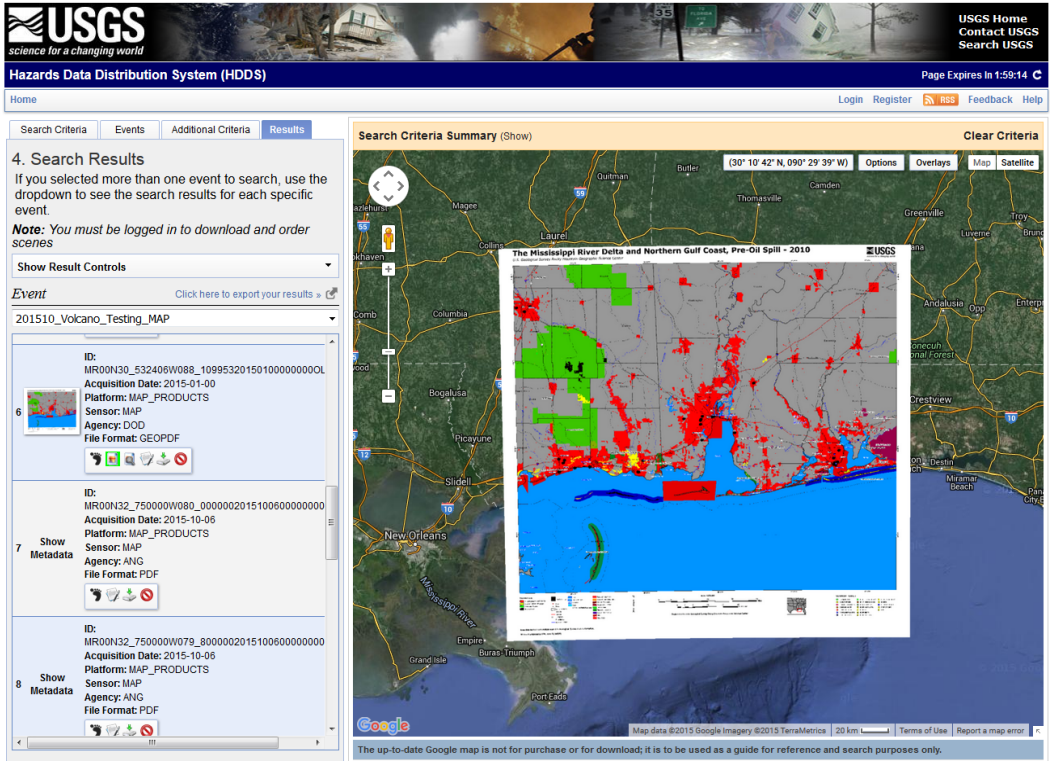
U.S. Department of the Interior
U.S. Geological Survey

Web-enabled Visualization and Access of Value-added Disaster Products (CDI FY15)

POC: Brenda Jones, USGS

- http://hddsexplorer.usgs.gov
- **The HDDS system was modified to support map and vector ingest, which allows user discovery and visualization of disaster mapping products.**
- **One of the biggest challenges is handling the variety of product formats and metadata while maintaining a consistent look and feel to the HDDS map interface.**



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Find-by-click and the National Biogeographic Map

POC: Sky Bristol, USGS

- https://my-beta.usgs.gov/biogeography/
- **People like to click on maps and have something happen. Rather than provide complicated navigation features, we are trying to simply show what we know about the biogeography of any click point.**
- Usability Challenge - People are often interested in and think about things in terms of political boundaries or similar areas of interest; we are trying to help them understand the ecologically significant area that intersects with their frame of reference.
- Technical Challenge - We are working to fully separate map-based representations from the underlying content and configuration details, presenting what we call “Synthesis Compositions” of “Analysis Packages” – scientific workflows that interact with data services to provide reports and visualizations in maps and other venues.

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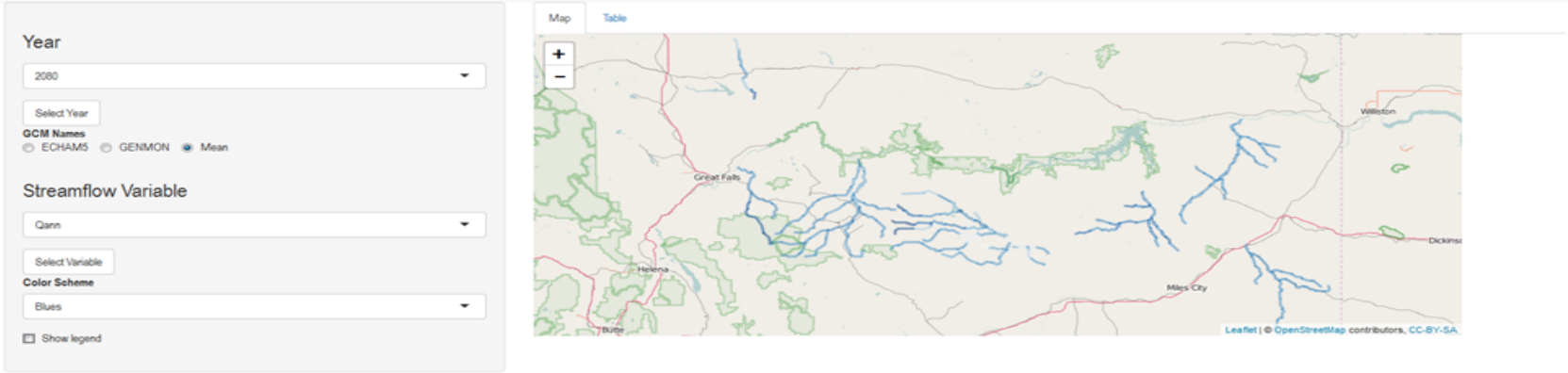
ScienceBase and Interactive Maps – Workflow and Publishing Options for U.S. Geological Survey Scientists (CDI FY16)

POC: Katherine J. Chase



- Chase, K.J. Haj, A.E. Regan, R.S. and Viger, R.J., 2016a, Potential Effects of Climate Change on Streamflow in Eastern and Central Montana: in Journal of Hydrology Regional Studies, Volume 7, September 2016, Pages 69 – 81, published online August 5, 2016, http://dx.doi.org/10.1016/j.ejrh.2016.06.001.
- USGS OFR documenting current (2016) work flow and options for U.S. Geological Survey scientists to organize and share data through interactive maps using ScienceBase .
- Biggest challenge is formatting and publishing data in a way that allows easy access/efficient programming.

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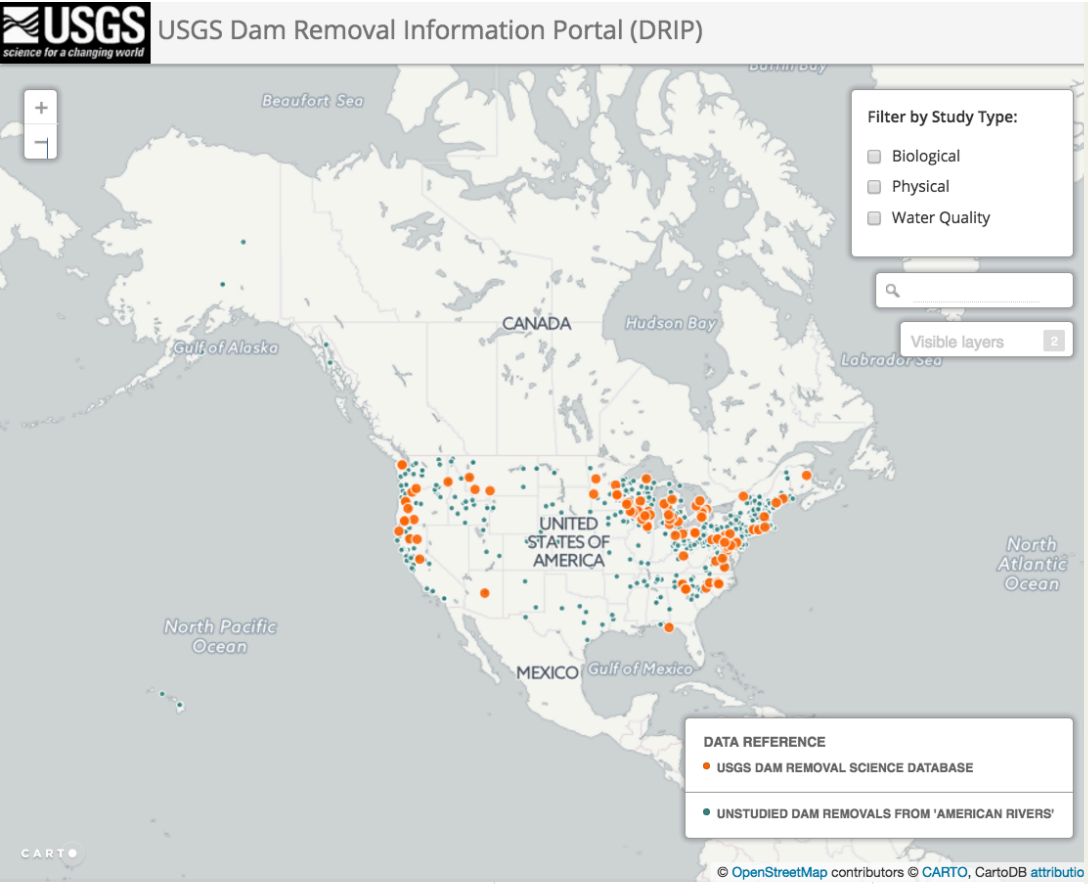
USGS Dam Removal Information Portal (CDI FY15)

POC: Jeff Duda, USGS



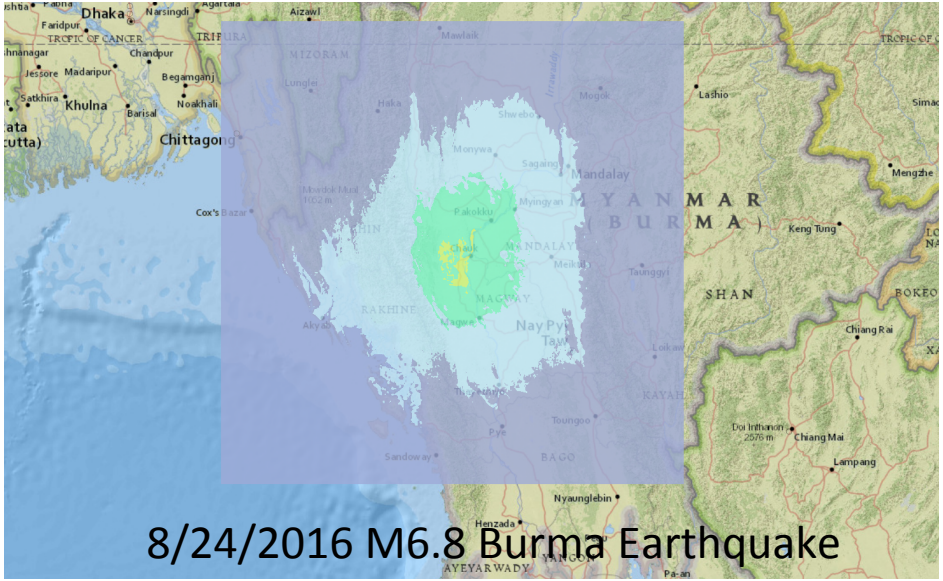
- https://www.sciencebase.gov/drip/
- **An online, map-based visualization tool, DRIP represents a bibliographic database of scientific studies associated with dam removal projects in the US.**
- **Challenge: Adding additional capabilities to the interface to take advantage of linkage to the NHDPlusV2 and other USGS mapping assets desired for stage II of the project.**

Duda, J.J., Wieferich, D.J., Bristol, R.S., Bellmore, J.R., Hutchison, V.B., Vittum, K.M., Craig, L., and Warrick, J.A., 2016, Dam Removal Information Portal (DRIP)—A map-based resource linking scientific studies and associated geospatial information about dam removals: U.S. Geological Survey Open-File Report 2016-1132, 14p. http://dx.doi.org/10.3133/ofr20161132.

Geologic Hazards Science Center: Near Real-time ShakeMap GIS Service

POC: Greg Smoczyk, USGS

- http://earthquake.usgs.gov/arcgis/rest/services/eq/sm_ShakeMap30DaySignificant/MapServer
- **Near real-time GIS Service feed containing significant ShakeMap event data for earthquakes in the last month.**
- **Creating a near "real-time" GIS service was difficult for a variety of reasons including data size, system architecture, and varying formats within source information.**



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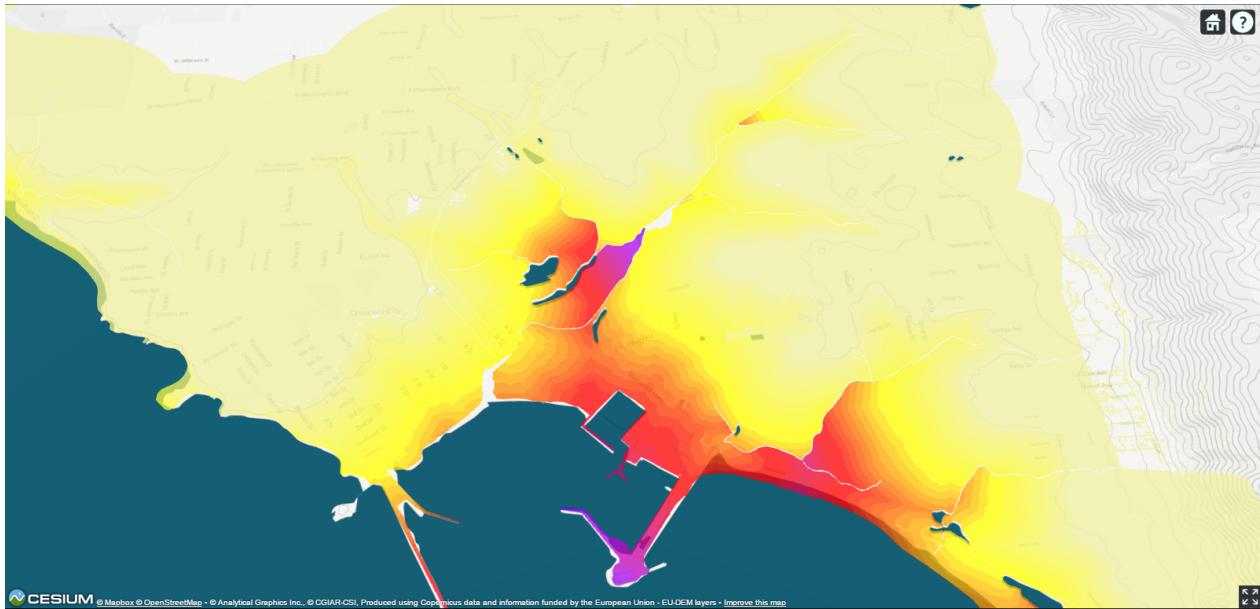
A data management and visualization framework for community vulnerability to hazards (CDI FY16)

POC: Jeanne Jones, USGS

- https://www.sciencebase.gov/catalog/item/56d87ebde4b015c306f6cff2
- The project uses up-and-coming 3d map visualization platforms and modern geospatial data formats to explore novel methods to present existing scientific information.
- Due to the large size of geospatial data, unconventional methods for browser-based visualization were used, employing data formats such as topoJSON and custom application behavior built upon existing javascript visualization libraries.



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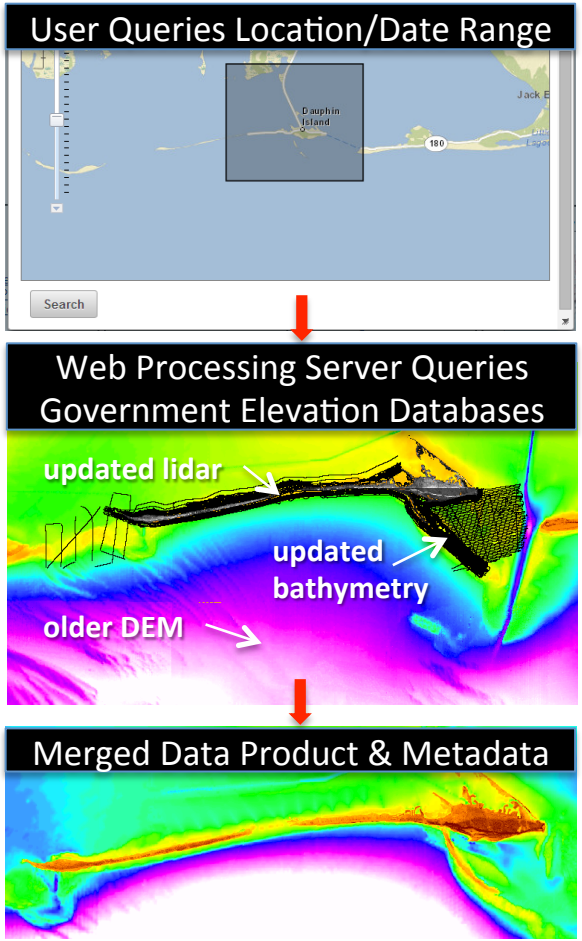
Online Merging and Gridding of Topographic and Bathymetric Data Sources (CDI FY14)

POC: Joseph Long, USGS

- https://www.sciencebase.gov/catalog/item/53208d1fe4b0224be0a979e8

- **Objective: Develop a web processing service and geospatial interpolation algorithms to generate merged coastal DEMs from multiple published datasets covering different spatial and temporal scales.**

- **Challenge: Completed initial implementation of interpolation algorithms but progress was stalled by the inability for on-demand query and download of large data files (e.g. lidar).**



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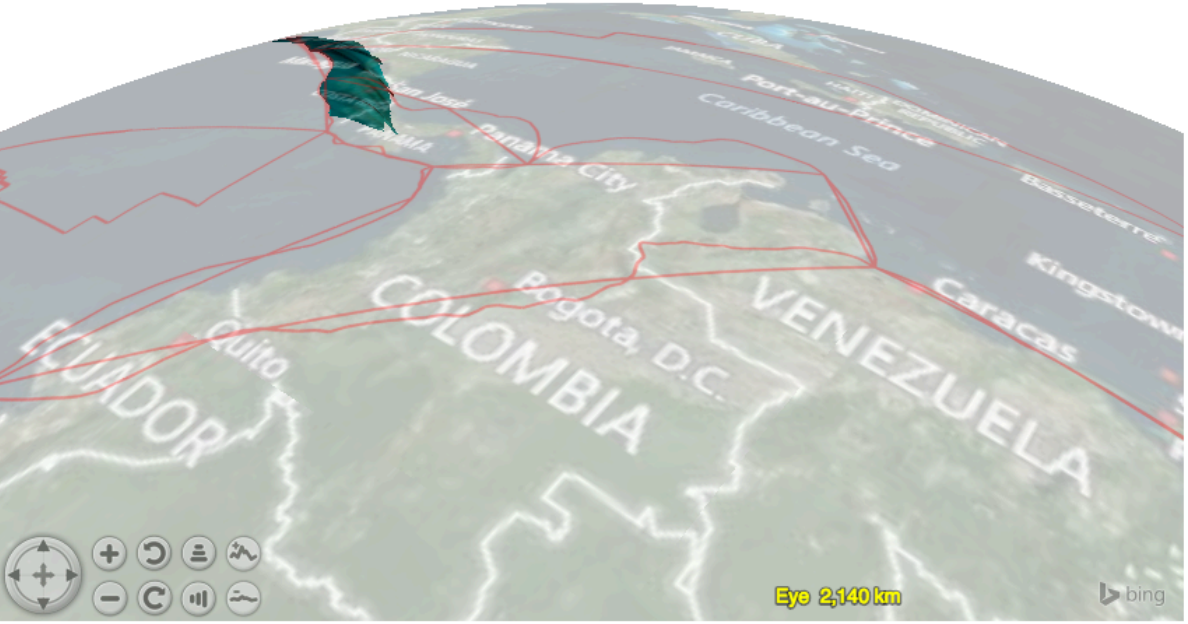
Subsurface Cocos tectonic plate in NASA WorldWind Digital Globe, *POC: Geoff Phelps, USGS*

- http://worldwindserver.net/webworldwind/apps/USGSSlabs.html
- http://worldwind.arc.nasa.gov/quakehunter/

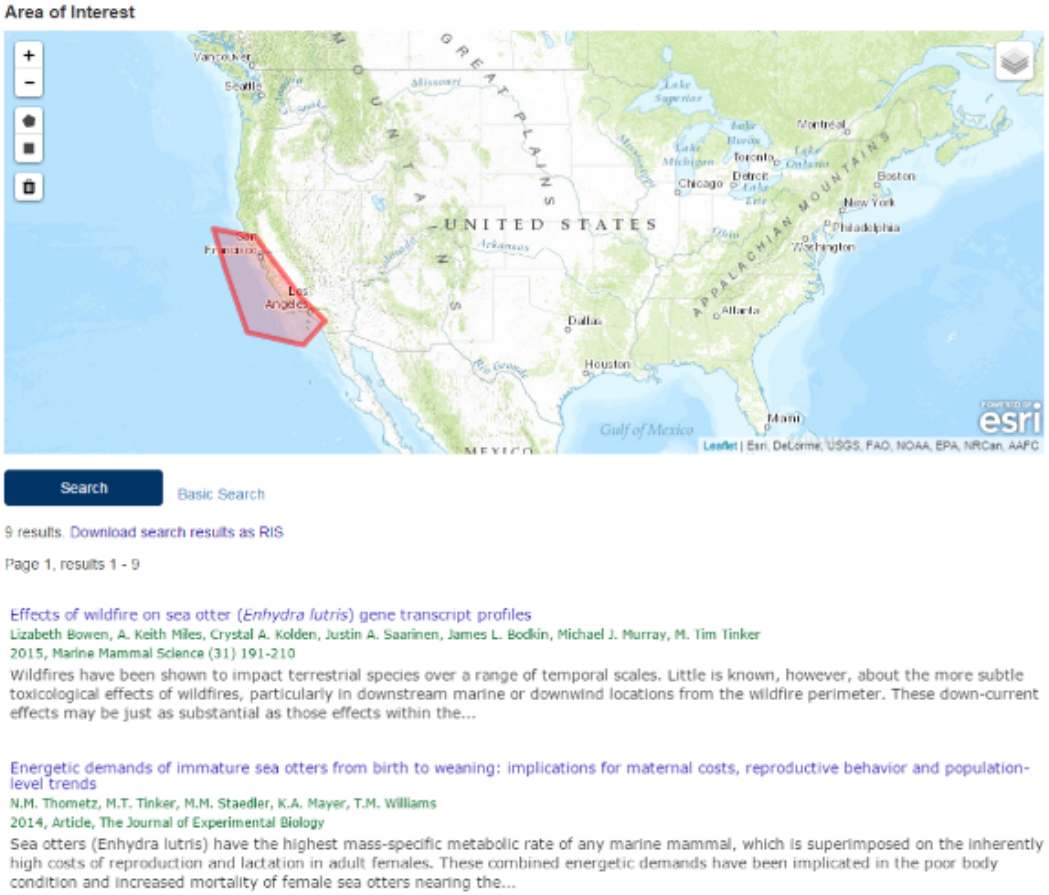


- NASA WorldWind is currently ***the only*** virtual globe capable of rendering data in Earth's subsurface, including tectonic plates and earthquake hypocenters.
- The biggest challenge is finding seasoned Javascript programmers willing to work on programming challenges: converting data to appropriate data types, rendering the data types with appropriate graphic primitives, working around software limitations, etc.

Geographic Searches for USGS Publications (CDI FY14-15)

POC: Rex Sanders, USGS

- https://www.sciencebase.gov/catalog/item/5320a651e4b0224be0a97a20
- **Improves the USGS Publications Warehouse so that you can search for USGS publications by geographic region in addition to existing search criteria.**
- **Challenge: The immense number of legacy publications to assign a geographic area. Dealing with globally-relevant publications in search results.**



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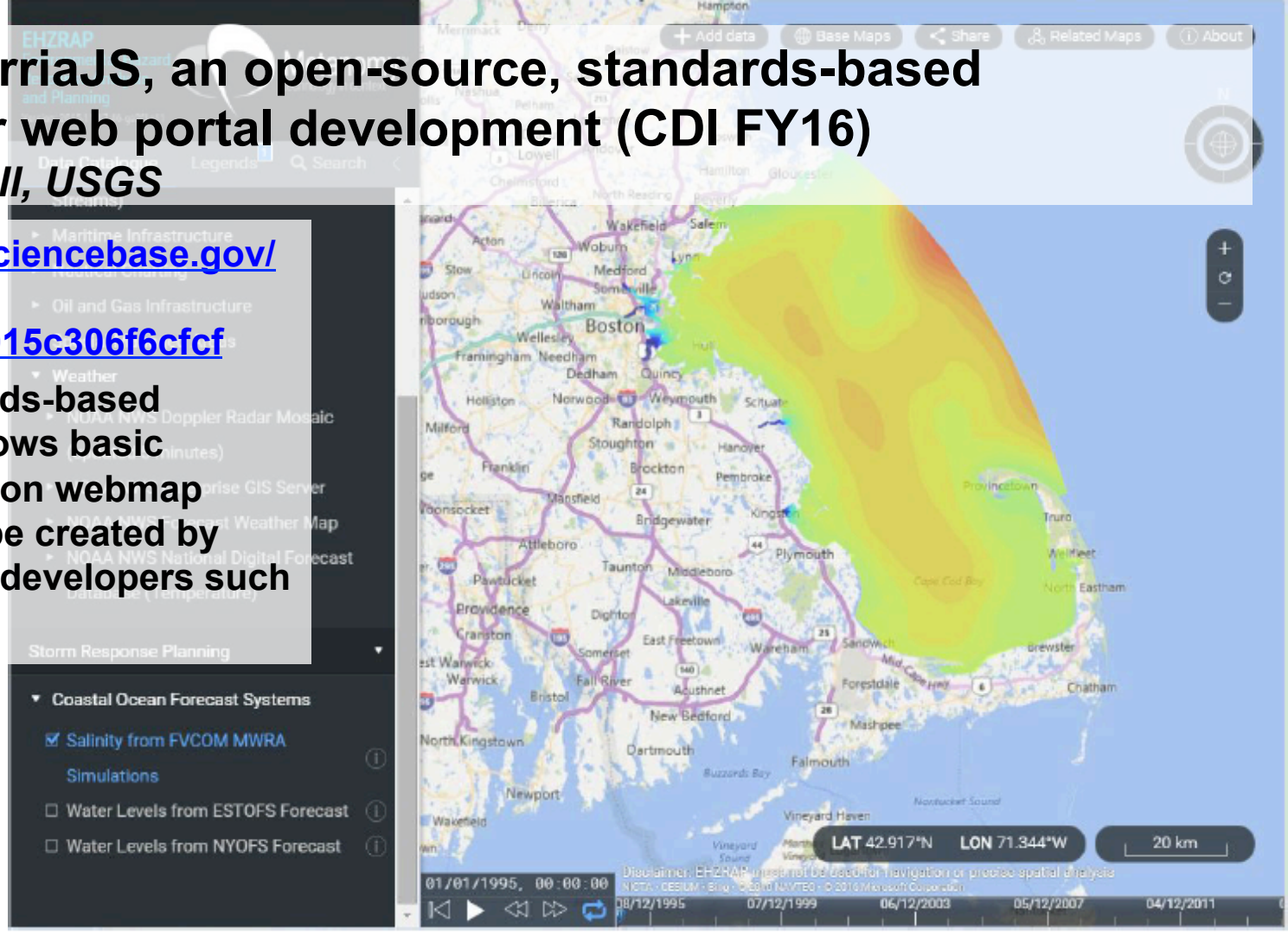
Evaluating TerriaJS, an open-source, standards-based framework for web portal development (CDI FY16)

POC: Rich Signell, USGS

- https://www.sciencebase.gov/catalog/item/56d87a7de4b015c306f6cfcf
- **Open, standards-based framework allows basic portals based on webmap services can be created by nonjavascript developers such as scientists.**



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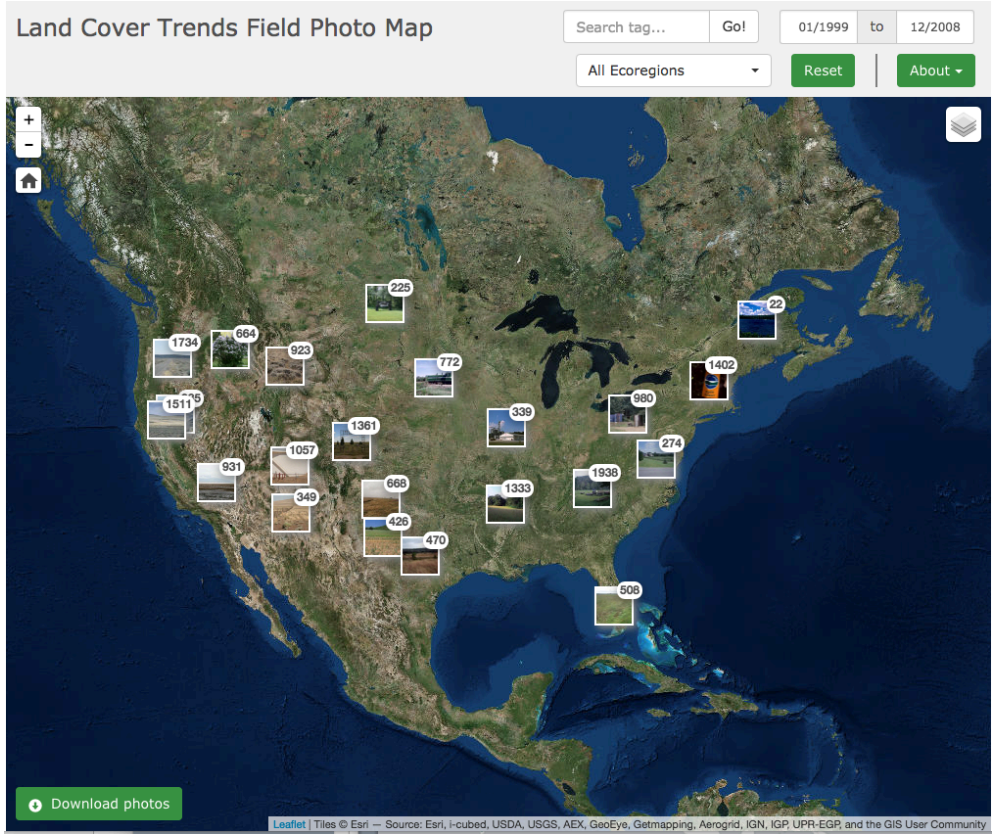
Integration of Land Cover Trends Field Photos with an Online Map Service (CDI FY15)

POC: Chris Soulard, USGS

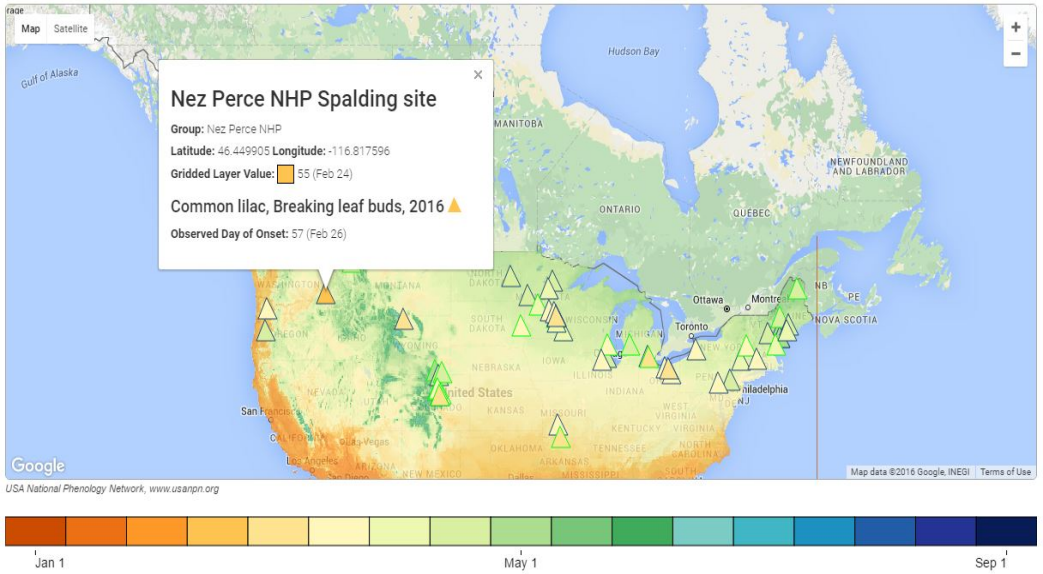
- http://landcovertrends.usgs.gov/fieldphotomap/
- **A national repository of geographically referenced USGS field photographs is being made publicly available.**
- **The two greatest challenges are controlling the quality of photographic data and identifying a long term solution to file storage.**



Integration of Phenological Forecast Maps for Assessment of Biodiversity: An Enterprise Workflow (CDI FY16)

POC: Jake Weltzin, USGS

- **Explore, visualize, and analyze USA National Phenology Network organismal (observed and modeled) phenology data and data products.**
- **Observational and modeled data are dynamic and real-time, plus 6-day forecasts**
- **Greatest challenge has been understanding and meeting requirements for FSP**



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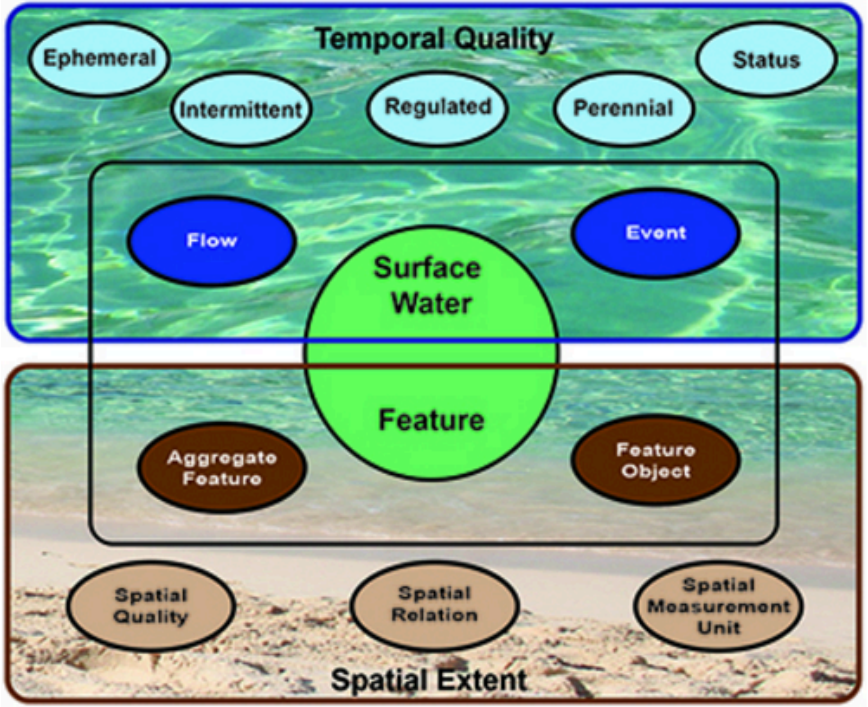
https://www.usanpn.org/data/visualizations

Title: A Map as a Knowledge Base (CEGIS)

POC: Dalia Varanka, USGS

- http://cegis.usgs.gov/ontology.html
- **Formal logic reflecting knowledge statements govern the use of graph-based data. Expressing the graph cartographically enables the map to store logical knowledge in addition to its visualization**
- **Challenge: To demonstrate how the map is an expression of all the logical data information rules involved in its design**



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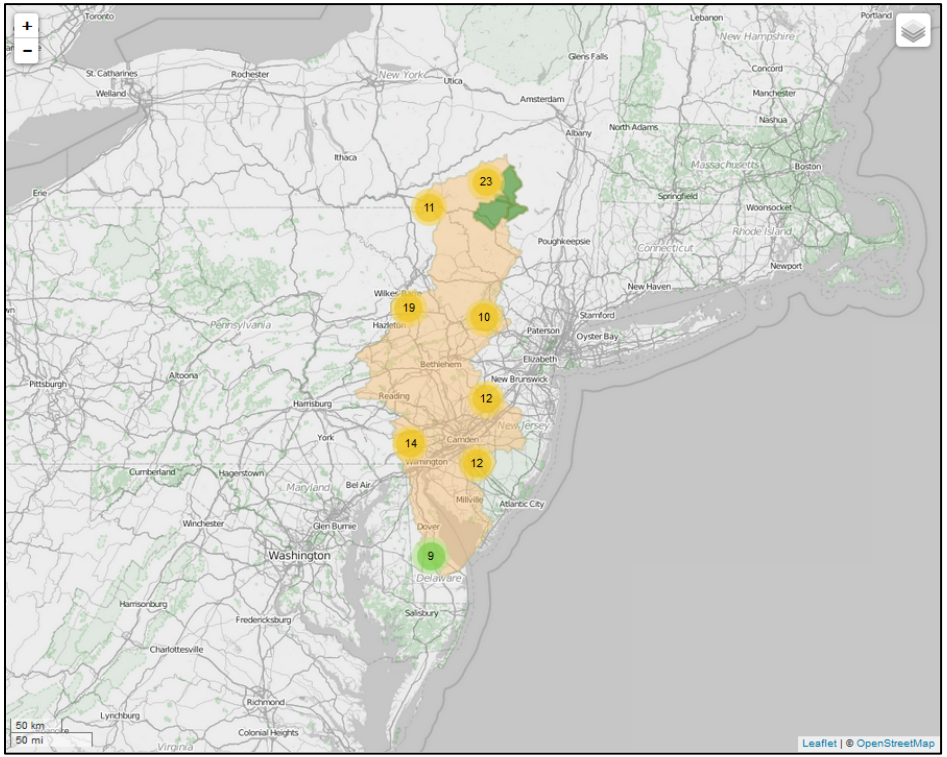
Leaflet Interactive Web-based Maps

POC: Jeremiah Lant, jlant@usgs.gov

- http://jlant.github.io/delaware-river-basin-map-leaflet/
- Leaflet is a free, open-source, web-based, and mobile-friendly interactive mapping library that is easy to use, customize, and share.
- Challenge: Where can maps be hosted? GitHub, Bitbucket?



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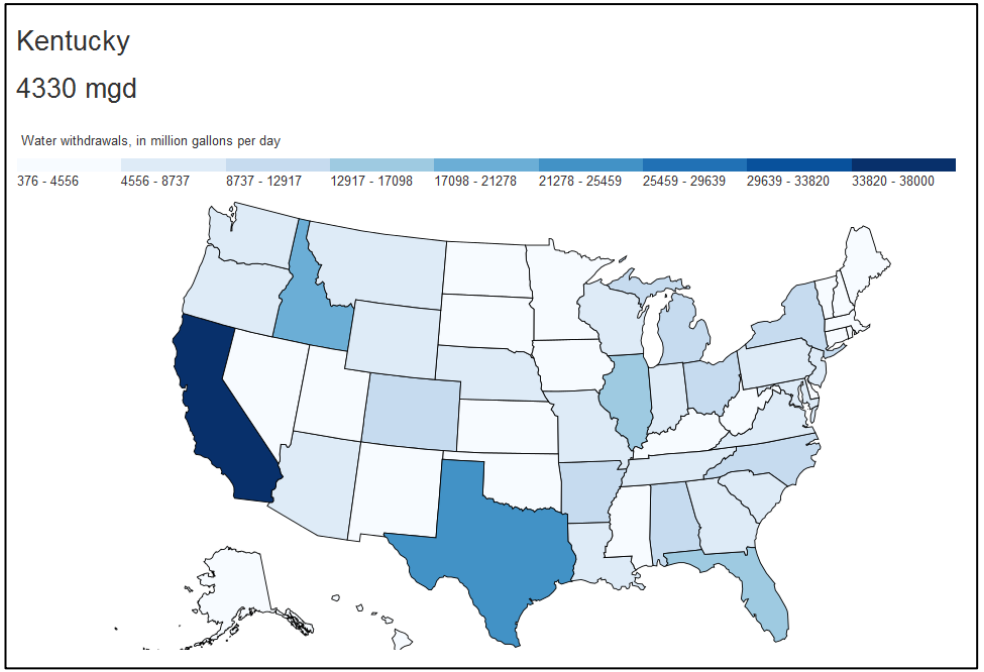
D3 Interactive Web-based Maps

POC: Jeremiah Lant, jlant@usgs.gov

- http://jlant.github.io/wateruse-map-d3/
- D3 is a free, open-source, web-based, and mobile-friendly interactive data visualization library that can be used for mapping.
- Challenge: Where can maps be hosted? GitHub, Bitbucket? There is a learning curve.
- Another example - http://staging-ky.water.usgs.gov/appalachianplateaus/



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