Hydrography TWG - September 14, 2017

- Attending
    - Danielle Favreau
    - Linda Davis
    - Missy Harris
    - Kimberlee Shulsen
    - Matt Hoffman
    - Mike Poulos
    - Mike Tinker
    - Tom Carlson
    - Doug Green
    - Kent Allen
    - Kelly Green
- NHDPlus HR and Demo – Tom Carlson, USGS Geospatial Liaison for ID, OR, WA
    - The National Map Liaisons Map
        - Located on the NHD website
        - Shows all the support people for each region
    - NGTOC NHD/WBD Stewardship Support Map
        - Shows the Region support Stewards
    - NHDPlus HR
        - A data set that is a US high resolution map
        - Beta will be available in 2018
            - All datasets will be available
            - All users are invited to try it
    - Downloading data from the National Map site
        - Region 16 and Region 6 were used
            - Use the link in the presentation to download the data
            - Site has been slow due to heavy activity
            - New web design
            - Go to download data icon and download the data
            - Click on datasets in table of Contents
            - Click for down load tab
            - There are lots of attributes, but there isn't a guide yet, so the attributes might be confusing
        - There is a handout that lays out the all the steps for the data
    - Stream Flow
        - Add all flowlines to map
        - Join flowlines to NHDPlusEROMMA table
            - Join on NHDPlusID
            - This keeps all attributes of both
        - Symbolize on FlowEstARunoffMA
            - Use Quantities with the units cubic Feet/second
        - Visibility Filter

            - Generalizes the dataset at different scales
                - Full set of data in a bigger area can be too dense
                - Filters out the smaller scales
                - 8 different map scales to choose from
            - How to use Visibility Filter
                - Go to Properties – Definition Query
                - Query builder
                - Click on VisibilityFilter >=
                - Click unique values
                - Choose a scale (ex. 1:24,000)
            - Cleans up maps for viewing purposes
            - The algorithm is not based on Flow but an amalgam of many contributing factors including roughness of terrain and surface runoff to create an unweighted raster layer used to select flowlines
    - River Miles
        - To calculate river miles, you will have to generate points along a line
            - Query GNIS Name and select by attribute a specific river or stream
            - Export to database
            - Use the toolbox function Dissolve
                - Click on GNIS name
                - Creates a new feature class
                - Create a new point feature class in Catalog
                - Right click on dissolved line layer and turn on editing
                - Construct points at 1 mile intervals
                - See handout for more precise instructions
    - Rasters that come with NHDPlus HR
        - There is no guide to the attributes
        - Provided rasters
            - Elevation terrain model
            - Shaded relief
                - Good for a base map
            - Fill depth
            - Aspect and slope
            - Flow Direction grid
            - Catchments
                - Good for research and modeling
- Hydrography Services – Mike Tinker for Ariel Doumbouya
    - ESRI Feature Service
        - Can edit features
    - ESRI Map Service
        - Just for mapping, no editing of features
        - Rasters are cached and only update about once a year
        - NHD and WBD are updated quarterly
    - HEM SOE (Service Object Extension)

        - Allowed to edit and add features
        - Used to build tools
        - HEM Services are building a tool to index and edit events on NHD
            - Building from scratch this year
    - NHDPlus v. 2.1 (100K scale)
        - Is now served by ArcGIS Online
        - Can see catchments
        - Being served by EPA as well
    - NLDI Services (Network Linked Data Index)
        - Start at the water quality portal and enter a position on a stream
        - Ca go upstream or downstream to find events/hydro observations
        - Isn't ready yet for public use
        - Consumes services/ data hosted on Science Base
    - Future Hydro Services
        - NHD HR – geometry
        - NLDI – indexing tool for data
        - Web interface - use the data and manipulate your own data and tools on top of NHD data
        - Send any recommendations to your POC or liaison for future requirements
- National Hydrography Dataset; Linked Data Registry – Mike Tinker
    - NHD Events
        - Types of events
            - Dams
            - Stream gauges
            - Hydrologic events
            - Diversions
            - Water quality stations
            - Flow alterations
        - Events native to NHD will now be served separate from NHDPlusHR
    - Science Base
        - Now using Science Base to share what are formerly known as NHD Events (now called Hydro Linked Data)
        - Builds tools for all USGS
            - Google will link to it
        - Uploading Data
            - Need good metadata in an XML
                - The metadata will automatically populate if there is an xml present with the shapefile
            - Upload data to a community
            - National Hydrography Dataset Linked Data Registry
                - Add tags
                - Use template for upload located in the community
                - Link to external resources
                - Very limited amount of people are allowed to edit

            - Can link to other communities
        - NHD is using Science base to hold Events
            - Renamed to Hydro Linked Data.
            - Moving away from the phrase “event”
        - Uploaded data can be viewed on a webservice map
        - Caveat
            - If you don’t have a USGS email, you need to be sponsored by a USGS Scientist
                - Once sponsored, you can create your own communities
        - Science Base is a good tool to share your data with other agencies
- Other Updates – Danielle Favreau
    - Region 17 is closed for editing because NHD Plus data is being generated
        - Should be done around 1st quarter of 2018
        - Beta products can provide input as soon as it is available
        - If you must make edits to the NHD, contact Danielle and she will consult with USGS
    - NHD and WBD database is being updated to ArcGIS 10.5
        - Might cause issues with older versions of ArcGIS
    - NHD Editor tools have been moved to ArcGIS 10.5
        - WBD will be upgraded soon
        - HEM has been updated to 10.5
        - Other tools will be soon

Hydrography TWG

Sept. 14, 2017

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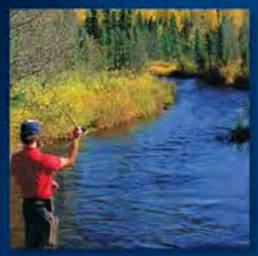

Hydrography TWG

Sept. 14, 2017

AGENDA

- **NHDPlusHR Update**
  - Tom Carlson, USGS
- **NHD/WBD Web Services**
  - Ariel Doumbouya, USGS
- **Science Base**
  - Mike Tinker, USGS
- **Other Updates**
- **Other Business**
- **Upcoming Events**
- **Next TWG**

  March 15, 2018

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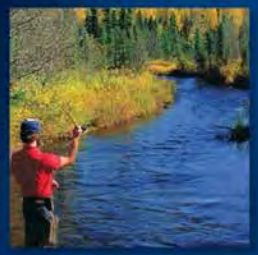
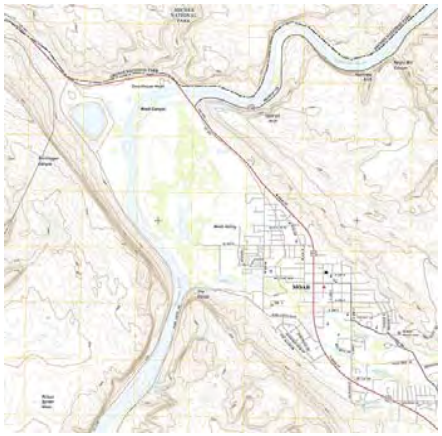
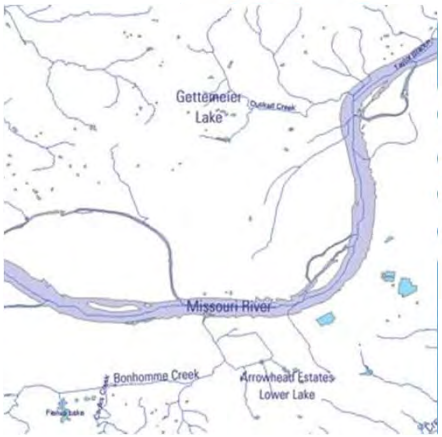


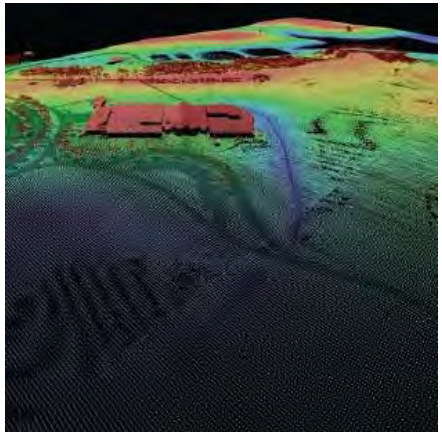
NHDPlusHR Update and Demo

- Tom Carlson, USGS

NHDPlusHR





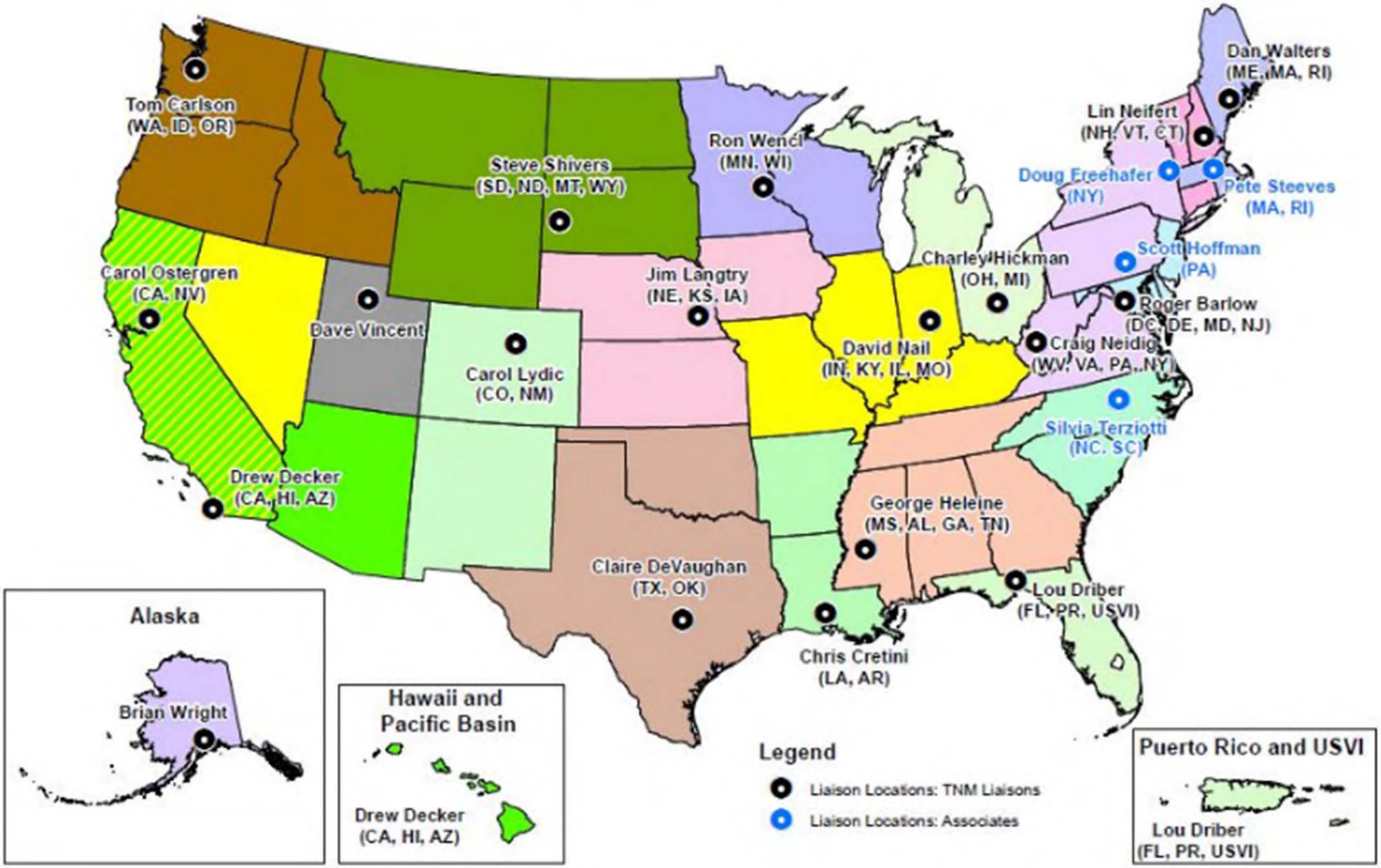


Tom Carlson
USGS Geospatial Liaison for Idaho, Oregon and Washington
Office: 934 Broadway, Suite 300 Tacoma WA 98402
tcarlson@usgs.gov
9.14.2017 Idaho Hydro TWG meeting

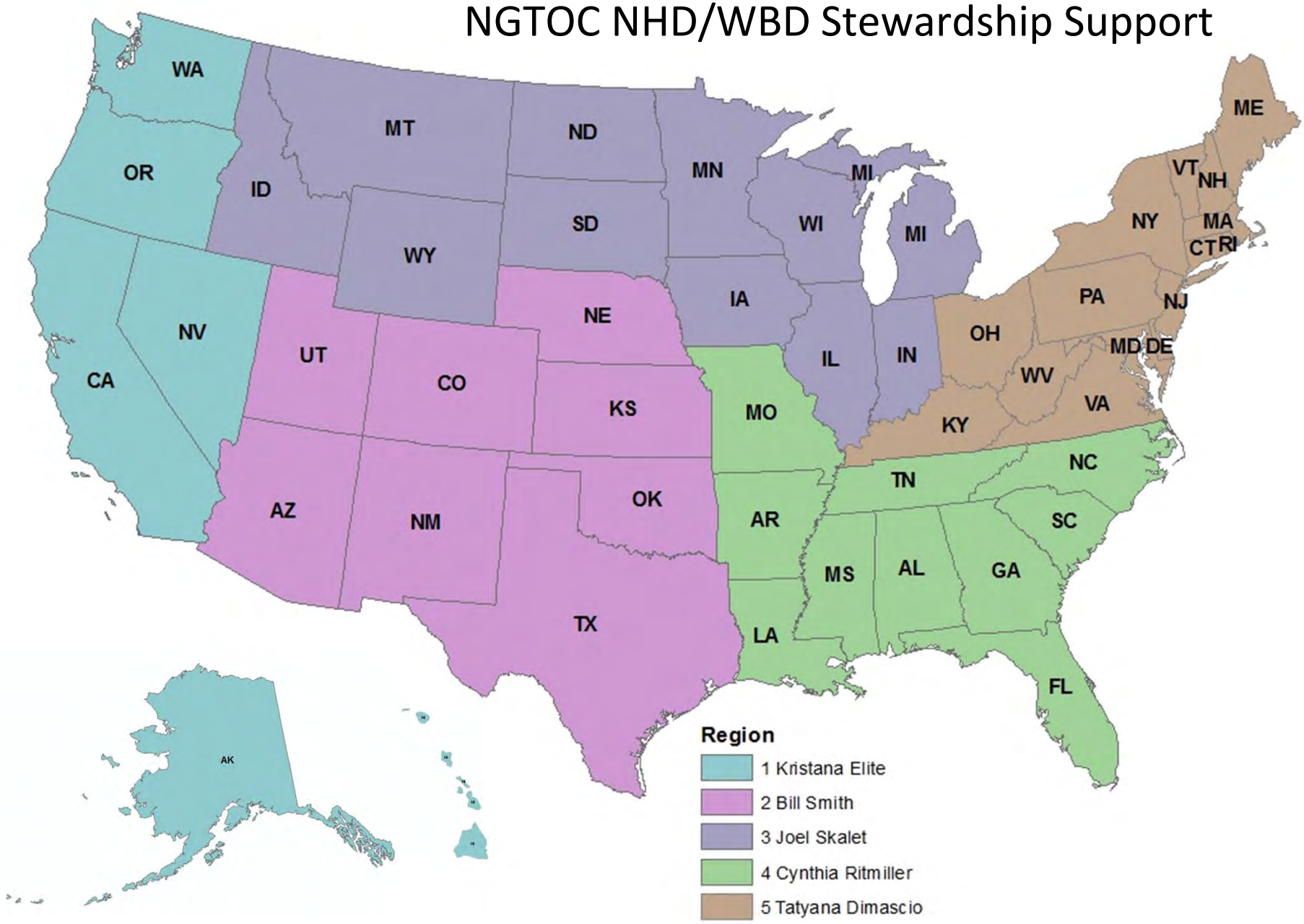
The National Map Liaisons and Associate Liaisons

State Points of Contact

as of February 9, 2017



NGTOC NHD/WBD Stewardship Support



Elizabeth Stevens-Klein – National WBD Support

Mike Tinker - National HEM support
David Anderson – National Conflation Support

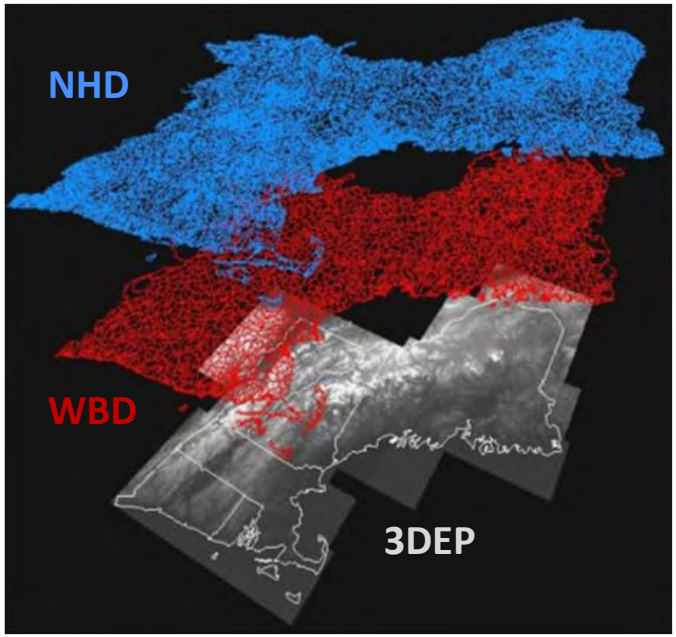
USGS National Hydrography Datasets

National Hydrography Dataset (NHD)

Watershed Boundary Dataset (WBD)

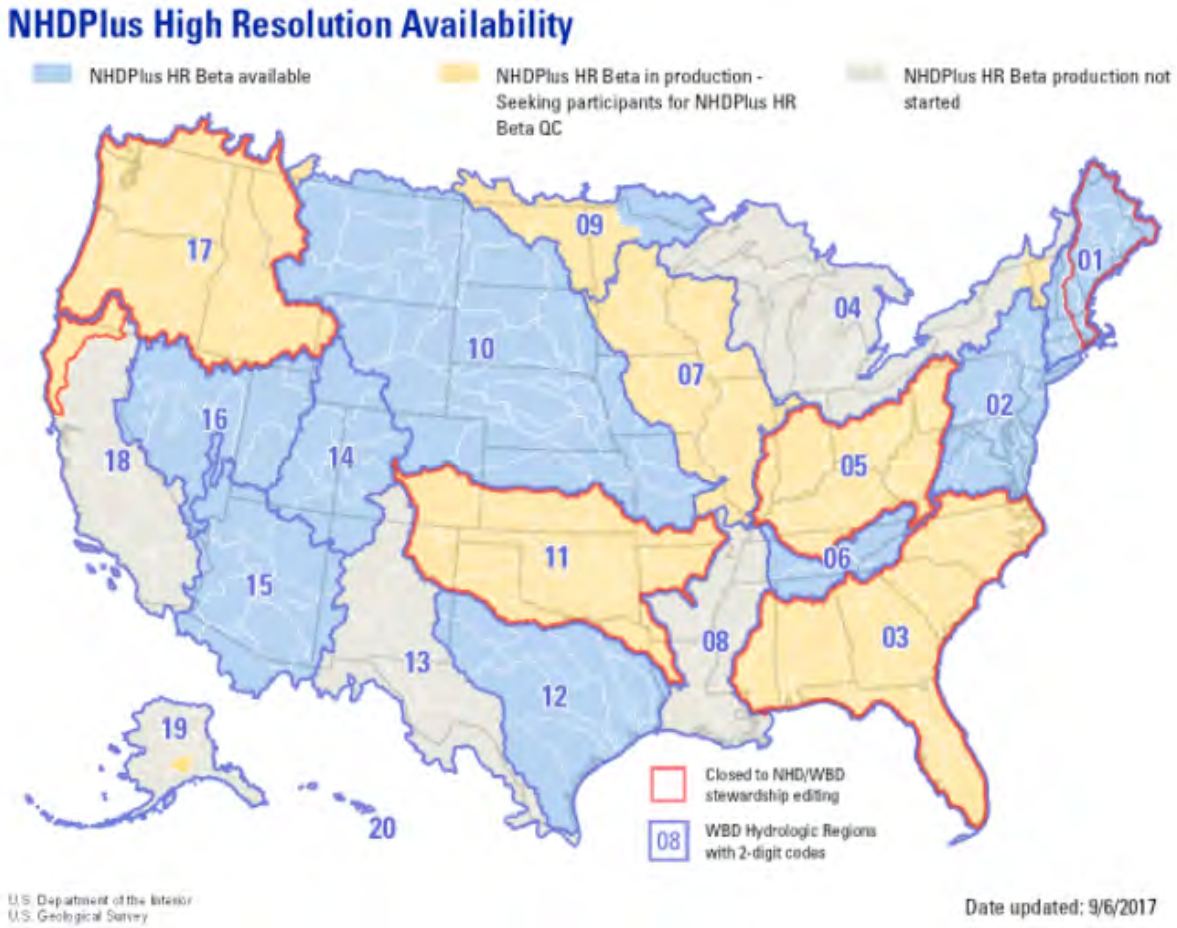
NHDPlus High Resolution (NHDPlus HR)

- Incorporates many of the best features of the NHD, WBD and 3D Elevation Program (3DEP) data to extend the hydro network across the landscape and enhance modeling
- Catchment areas create a seamless, scalable hydrologic framework
- Map and model the flow of water and related attributes across the landscape
- Can be generalized to many different scales
- NHDPlus HR Beta completed for CONUS in 2018



NHDPlus HR Beta Status

- First Beta datasets released in April, 2017
- Beta completed in 2018 for CONUS, followed by AK, HI, and territories
- Users invited to QC Beta datasets
- QC feedback used to update and improve the next dataset release

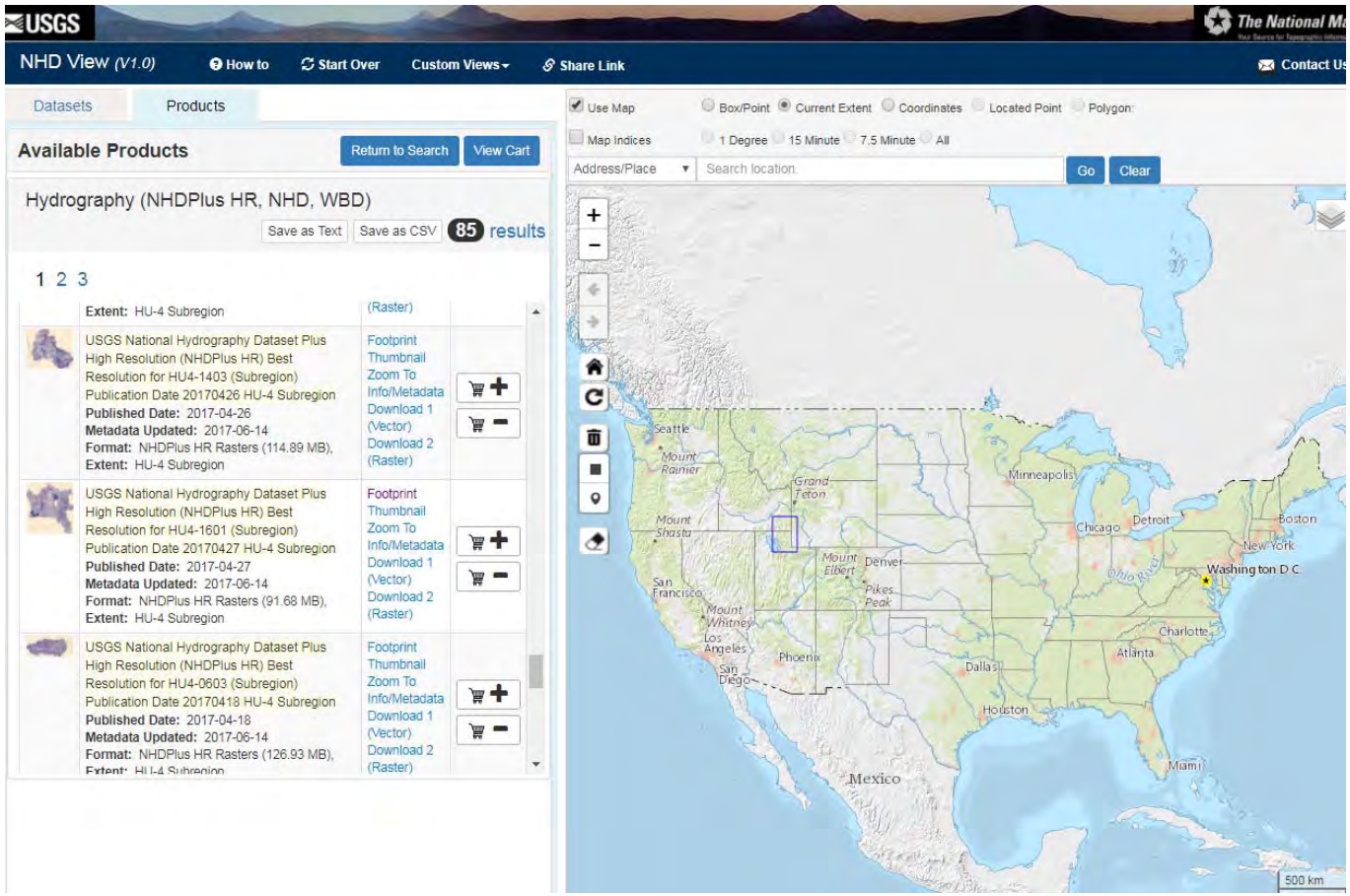


https://nhd.usgs.gov/NHDPlus_HR.html

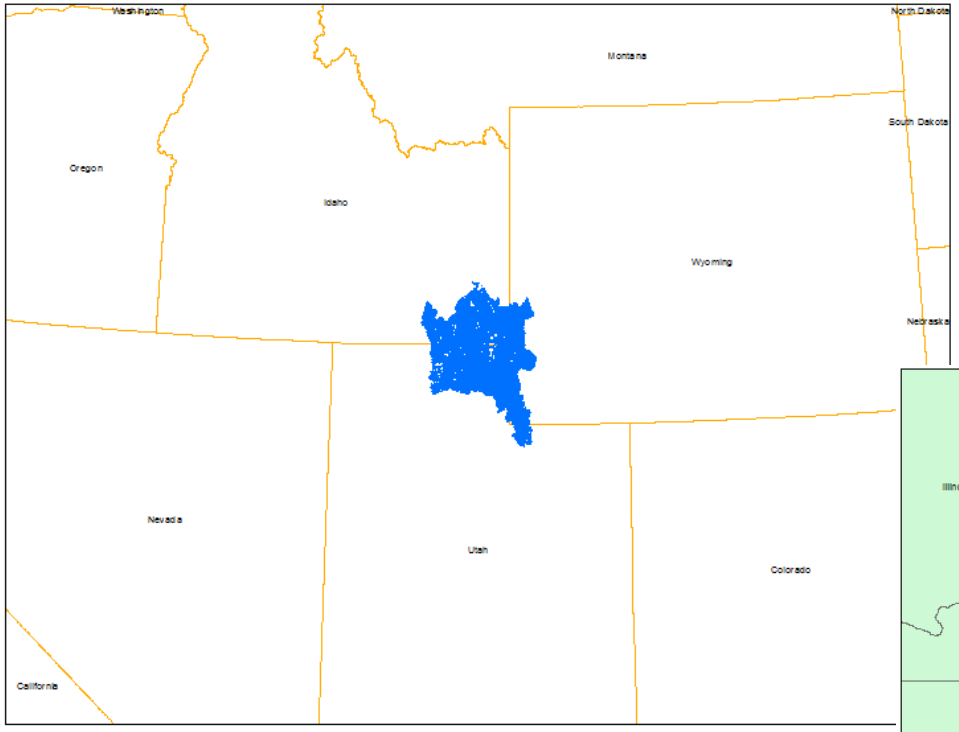
As of Sept 9, 2017

Downloading the data

- https://viewer.nationalmap.gov/basic/?basemap=b1&category=nhd&title=NHD%20View#productSearch



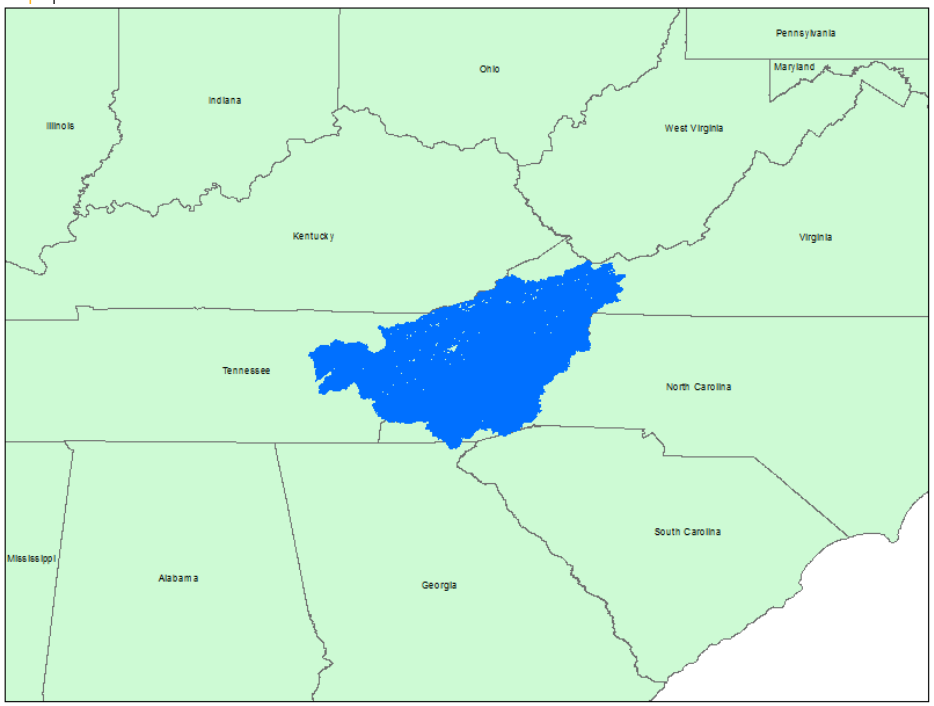
Our two demo areas for today…

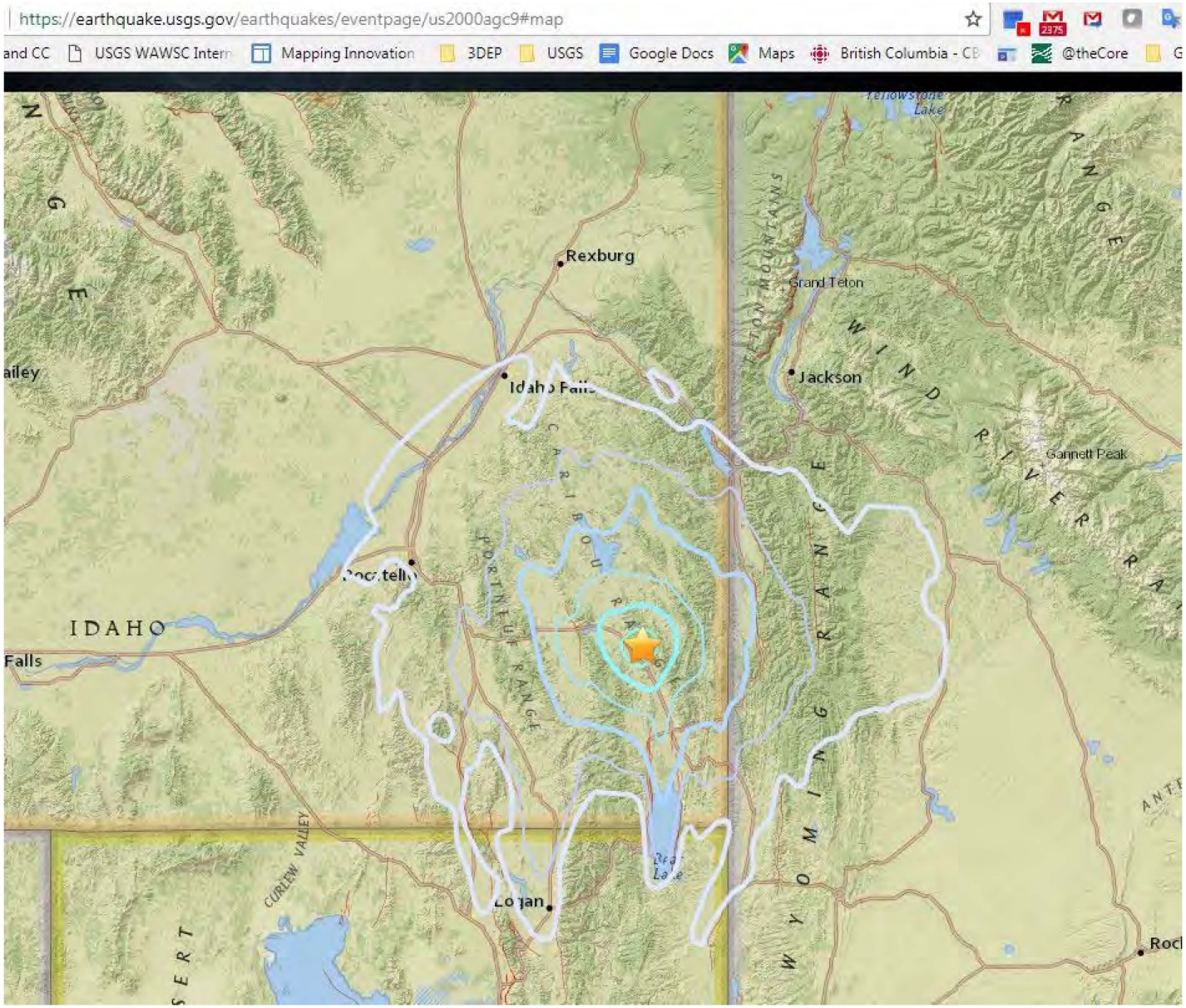


Region 16, Subregion 1601,
Bear Lake, Idaho and Utah

-We will look at symbolizing flow
-possibly calculating river miles

Region 6, subregion 601, NHDPlus_H_0601
-**We will look at using the Visibility filter**




https://earthquake.usgs.gov/earthquakes/eventpage/us2000agc9#map
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Mapping Innovation
3DEP
USGS
Google Docs
Maps
British Columbia - CB
@theCore
Rexburg
Grand Teton
Jackson
Gannett Peak
IDAHO
Falls
CURLEW VALLEY
WYOMING RANGE
WIND RIVER RANGE
CARIBOU RANGE
PORTNEUF RANGE
Logan

NHD Plus HR Demo: Region 16, Subregion 1601, Bear Lake, Idaho and Utah

To check NHDPlusHR status: https://nhd.usgs.gov/NHDPlus_HR.html

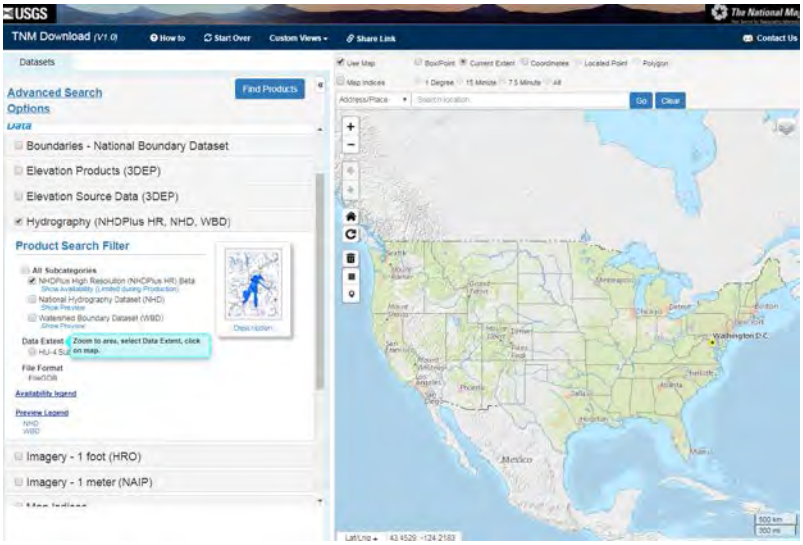
ID Hydro TWG requested demo of new NHD Plus HR data. Task 1 was to demonstrate the using Mean Annual Flow to symbolize stream flow and Task 2 was to demonstrate the use of the VisibilityFilter on a dataset.

At the time this demo was created, a Beta version of NHDPlusHR available for only two regions in the US. One of them happens to be Region 16, the Bear Lake region in SE Idaho/Utah border.

Task 1, symbolize annual flow:

The first task was to acquire the data needed. We can do this with the National Map. Have the site open already….https://viewer.nationalmap.gov/basic/

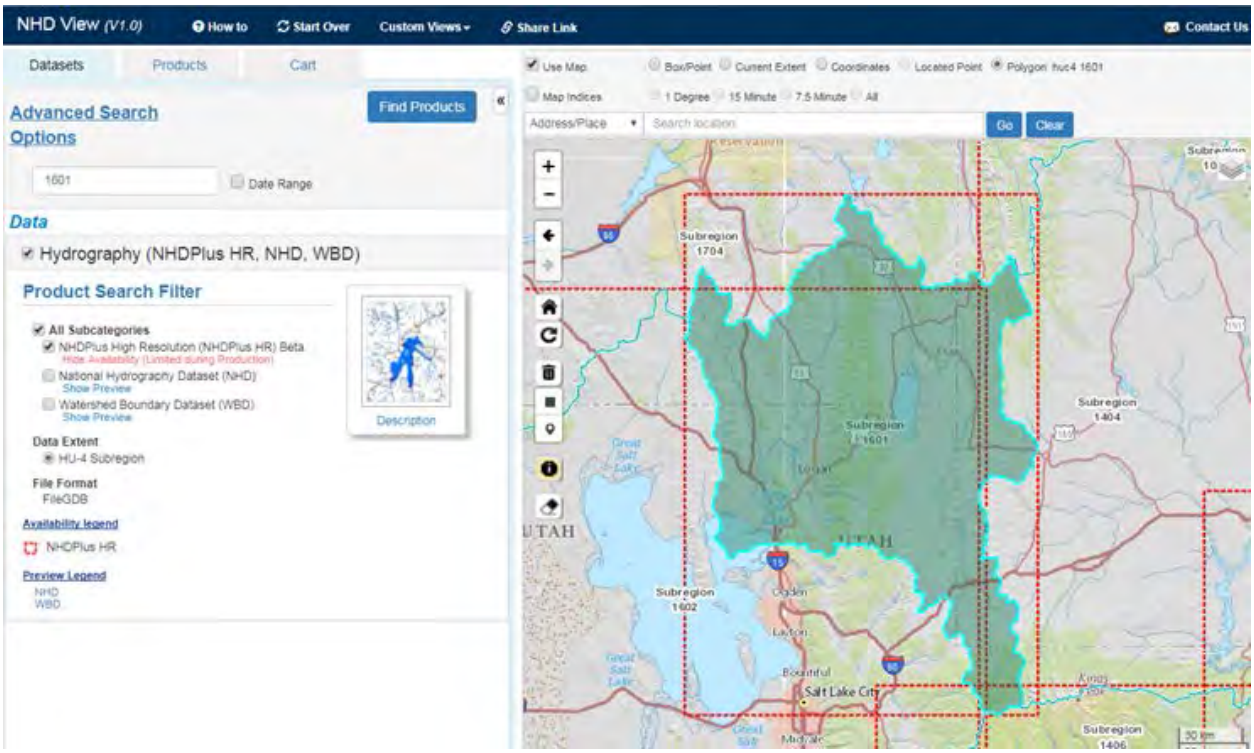
Go to the map and select Hydrography (NHDPlus HR, NHD, WBD) under find products:

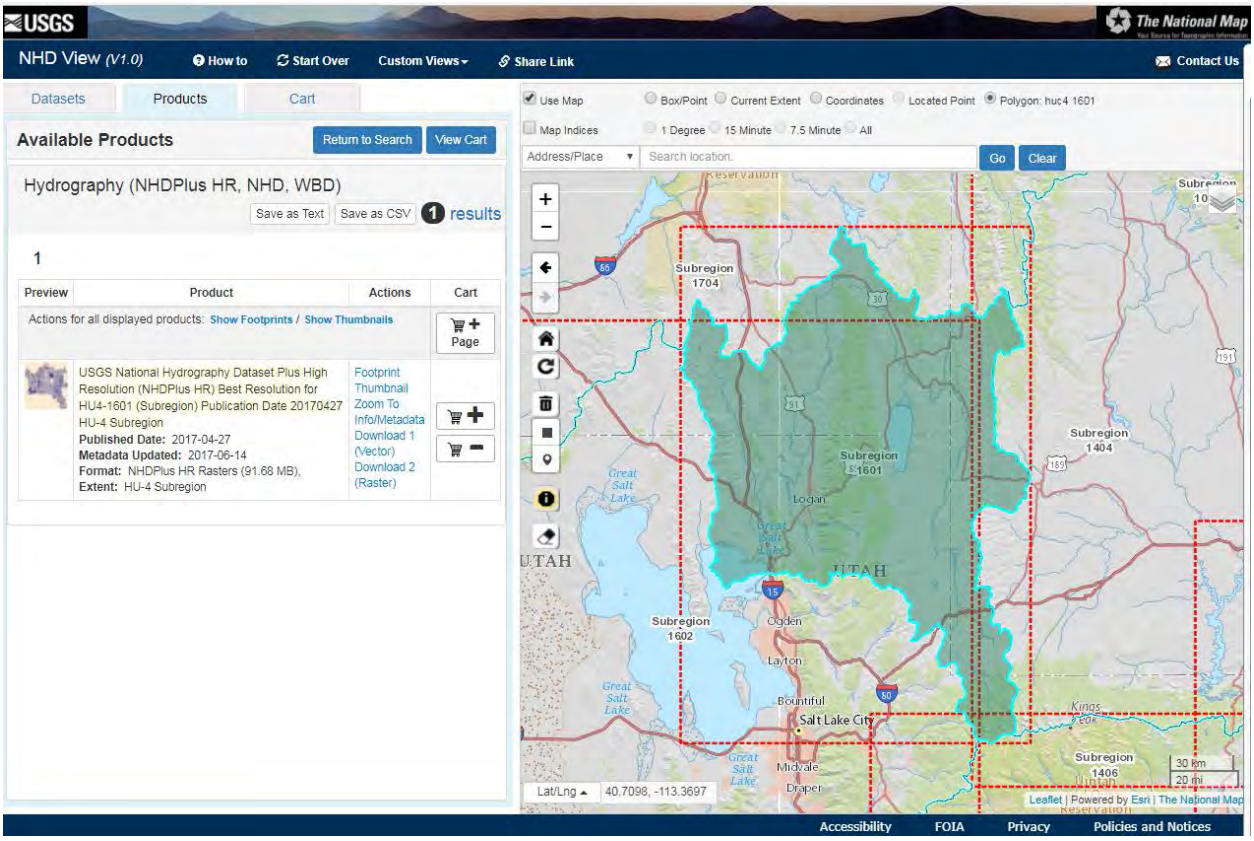


The results return several choices and down on the list was HU4-1601, the Bear lake region:

https://viewer.nationalmap.gov/basic/#productSearch

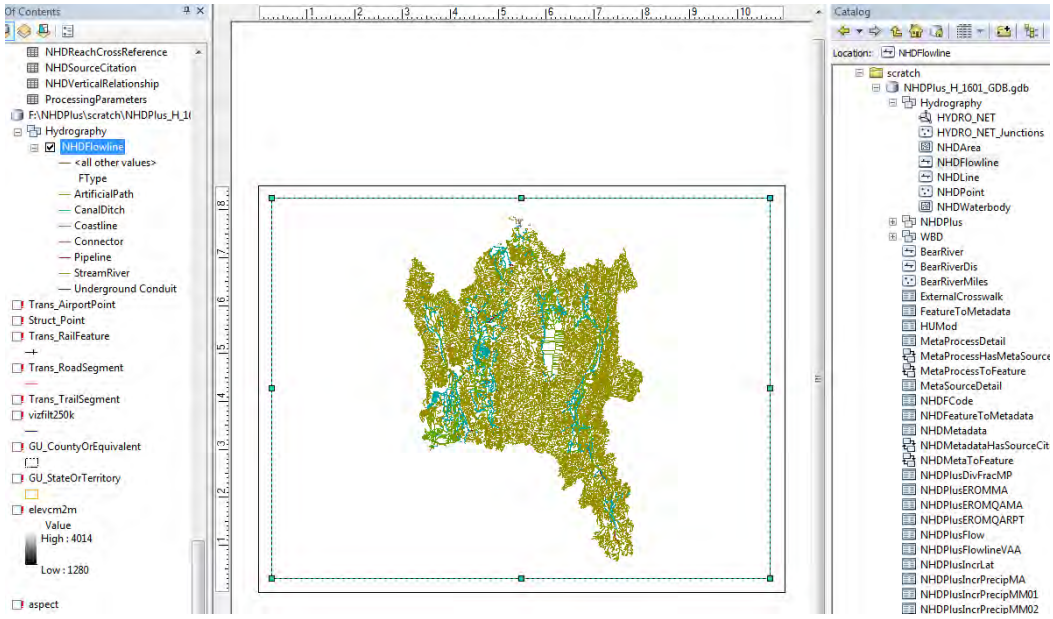
You can also access the data at https://nhd.usgs.gov/data.html





Once you find your data the next step is to download it. It may take a while depending on how fast of a connection you have, internet traffic, etc. The data sets are large with around 500mb for the vector and about 1.5 GB for the rasters.

Once the data is unzipped to your workspace you can start. You should find flowlines under the hydrography icon in the NHDPlus_H_1601_GDB.gdb



In order to symbolize flow we will need to join the NHDFlowline with a table that has flow amount information. According to the best information that I have it would be the NHDPlusEROMMA table that is included in the geodatabase. In that table there is a column called FlowEstARunoffMA. That will be the information we want to use to eventually symbolize the dataset. At the time of this writing, the data dictionary for NHDPlusHR was in development.

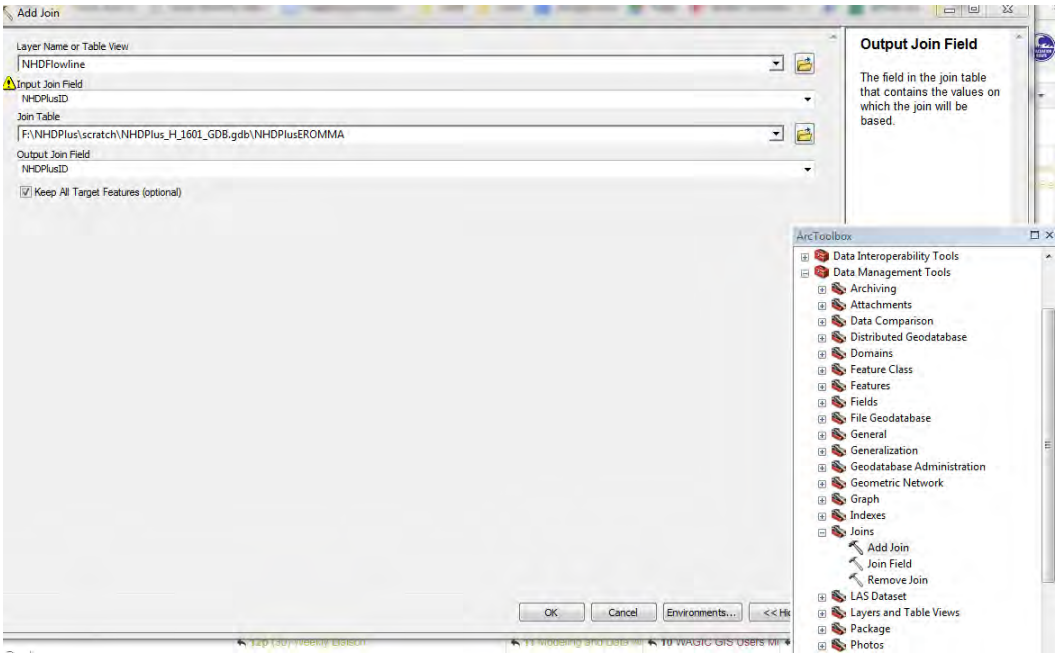
NHDPlus_H_<vpuid>_GDB.gdb\NHDPlusEROMMA (table)

Description: *Extended Unit Runoff Method (EROM) mean annual flow estimates for NHDFlowline features in the NHDPlus HR network. These flow estimates reflect the 1971 to 2000 time period. The best EROM flow and velocity estimates are the gage adjusted values, QE and VE, respectively. Table 2 of the EROM QA report (NHDPlusEROMMAQA table) provides an estimate of how good these flow estimates are as compared to gage flows. For "natural" flows and velocities, the best estimates are the Reference Gage Regression values, QC and VC, respectively. The "RefGage Reg" column in Table 3 of the EROM QA report (NHDPlusEROMMAQA table) provides an estimate of how good these flow estimates are as compared to gage flows.*

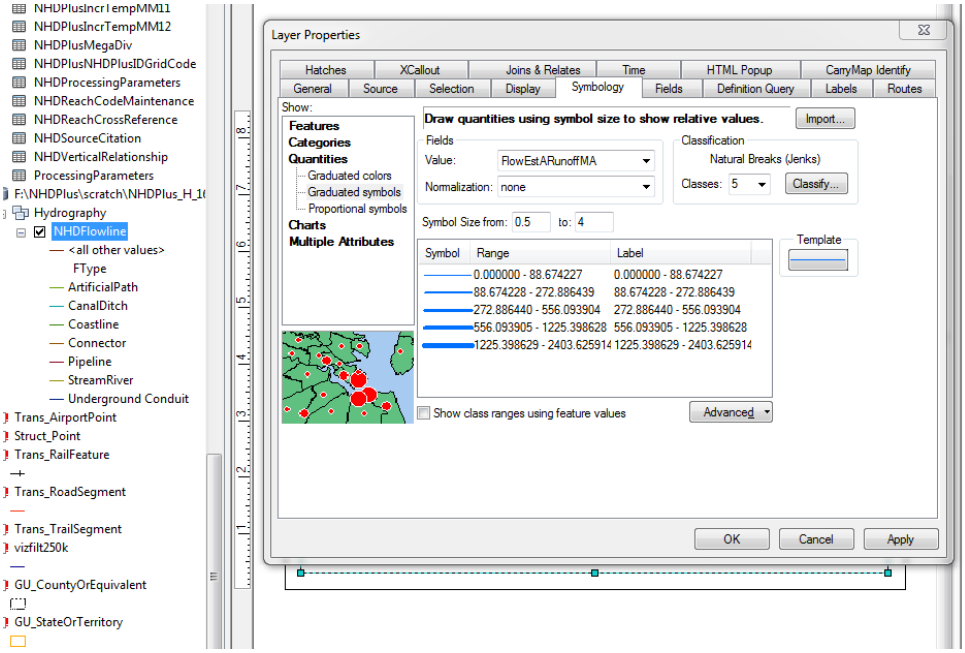
All Flow estimates are in cubic feet per second (cfs) and represent the flow at the bottom (downstream end) of the NHDFlowline feature.

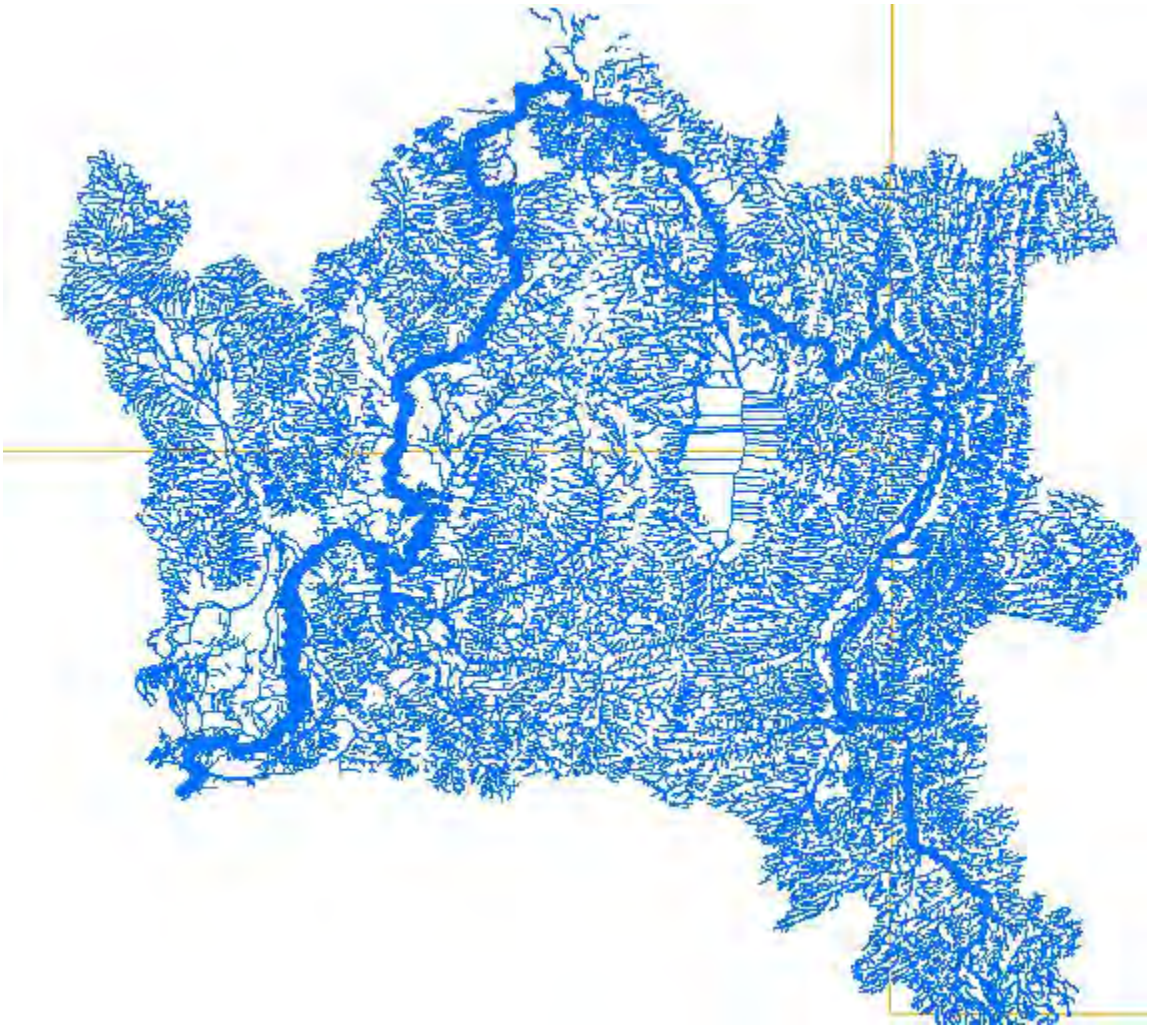
All Velocity computations are in feet per second (fps) using the Jobson Method (1996) and represent the velocity at the bottom of the NHDFlowline feature.

To do a join we need a common field to join to. We will do a join of NHDFLowline with NHDPlusEROMMA using NHDPlusID field as the join link. I used toolbox – data management tools – joins - add join. Then I could symbolize NHDFlowline as different width of steams depending on flow.



To symbolize the dataset. Open properties on that data – symbology tab – under quantities select graduated symbols – under value field select FlowEstARunoffMA – I used 5 natural breaks but you could use whatever you want. Set symbol size from .5 to 4, or what you like. I used a blue template, because its water. You could select different symbol sizes and colors depending on your needs.





You should get something that looks like this flowmap….

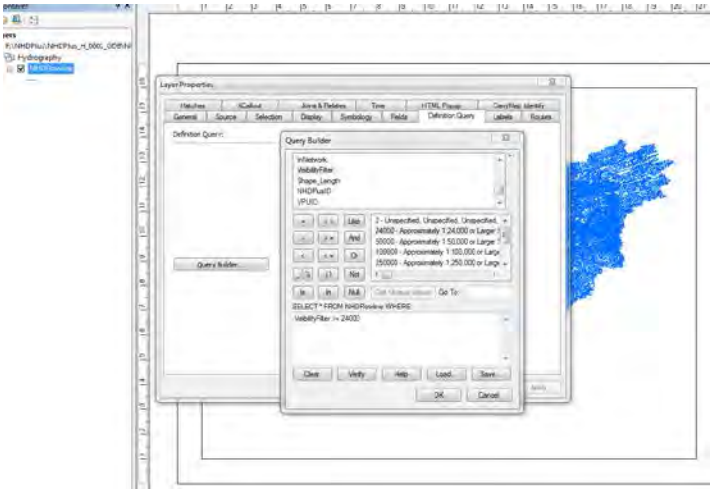
Task 2, using the Visibilty Filter/VisibilityFilter:

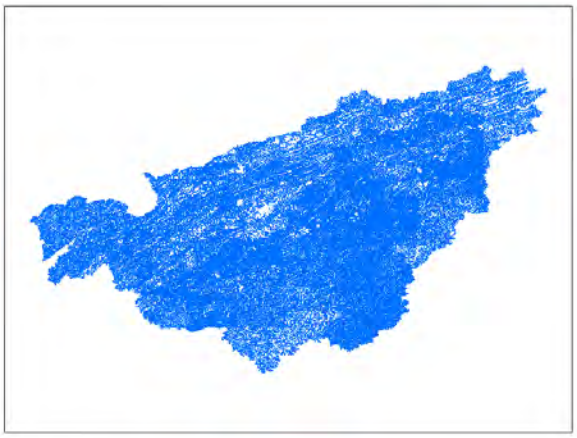
Please note: At the time the demo was created, the VisibilityFeature attribute currently was only available for NHDPlus HR Regions 1 and 6. After a period of testing, it will be included in all NHD and NHDPlus HR data as datasets are produced.

The VisibilityFilter is an attribute in the attribute table that enables representation of NHD vector features in the NHDPlus HR at eight different map scales. Using an algorithm, each feature is assigned a VisibilityFilter value, indicating the approximate appropriate map scale, and all larger scales, for representing the features. This attribute is available for the NHDFlowline, NHDWaterbody, NHDArea, and NHDLine feature classes. Details on methods for using the VisbilityFilter attribute, information on known issues, and citations for determining the map scale levels are available on the Scale Representation using the VisibilityFilter Attribute page.

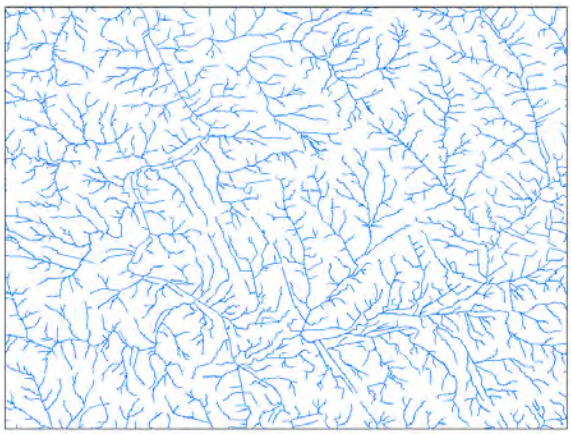
To view features at a desired scale or using the filter:

1. First, select a scale and zoom the page into an area of interest and set that scale. In this case we're using 1:24k. this way you can easily compare the differences.
2. Open the Layer Properties and go to the "Definition Query" tab
3. Select the "Query Builder" button
4. Double click the "VisibilityFilter" field and then click the ">=" operator
5. Select "Get Unique Values" for a list of available scales
6. Double click on the desired scale and click "OK." The desired definition query should be visible in the "Definition Query" field
7. Click "OK" to apply the query and close the Layer Properties

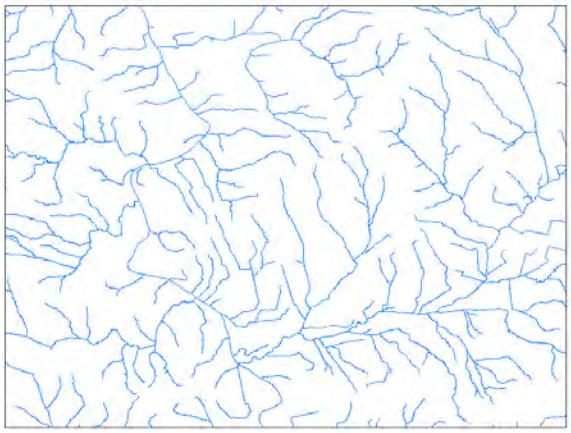




Data with no scale filter

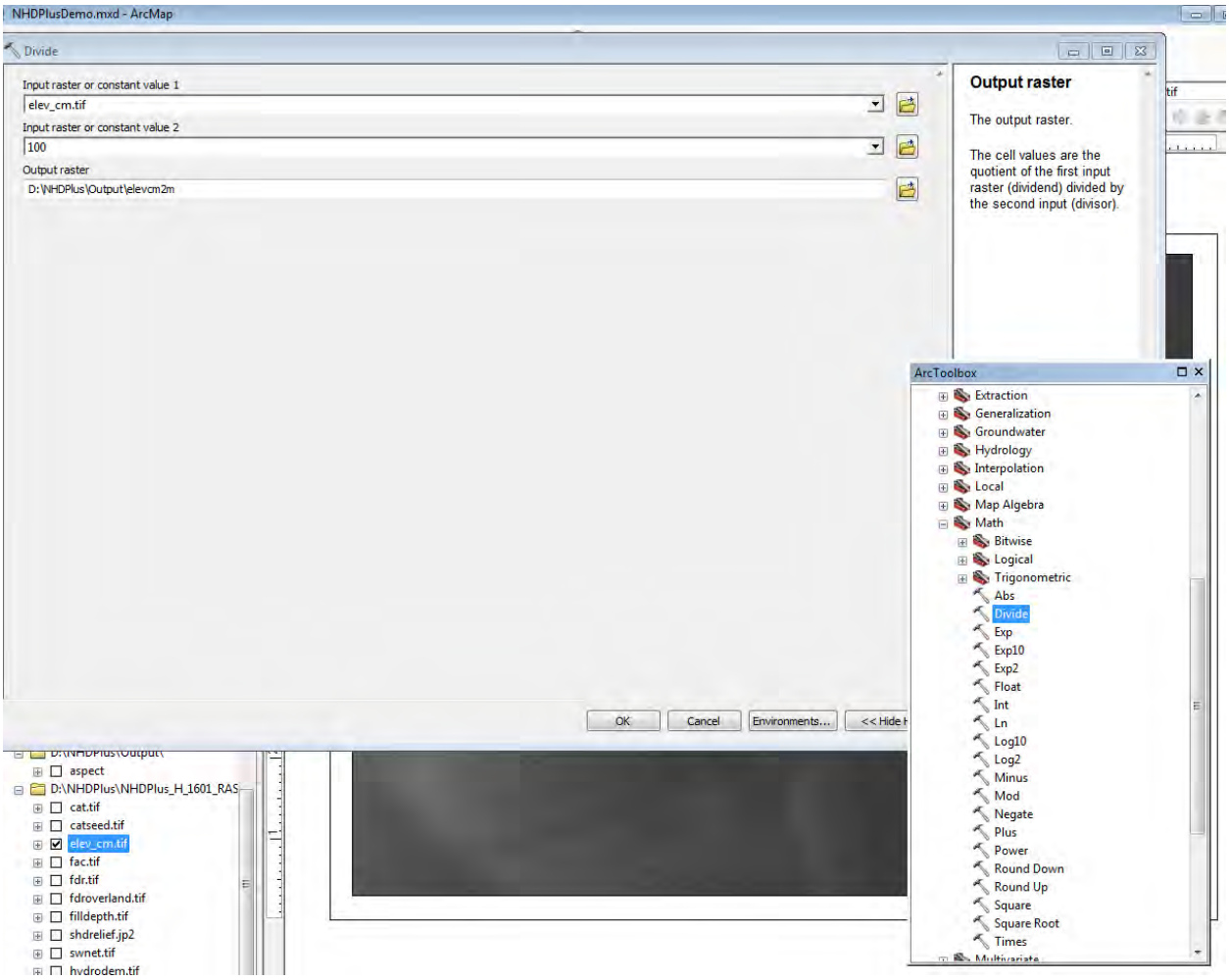


Zoomed into 1:24k, no scale filter



Zoomed into 1:24k, scale filter set to 1:24k

Question on Rasters found in the new NHDPlusHR datasets… You will need a little storage space and time to download these. They appear to be derivatives for the most part of generating hydro from a DEM/DTM. There is also a Hillshade, called shadrelief. The Hillshade would make a good backdrop to various maps. The elevation raster/DTM appears to be in cm as units. If you want to use this for any calculations it's easy to convert to Meters. Take elev_cm.tif, which is a DEM/DTM in centimeters and used toolbox divide tool found under math, divided by 100 to convert or create a raster DTM in meters.



Q: What can you do with the rasters/grids in the NHD HR dataset? Take catchments, get land cover, create habitat models. Or do land suitability analysis. With more time I can come back and demo how to do these sorts of analysis.

- https://landcover.usgs.gov/
- https://landcover.usgs.gov/uslandcover.php
- https://www.mrlc.gov/
- https://landsat.usgs.gov/

Model Elevation-slope, precip, landcover, soil type, thickness, porosity, baseflow =runoff modelling, etc.

NRCS soils data - - - https://www.nrcs.usda.gov/wps/portal/nrcs/main/id/soils/

Download soils here: https://datagateway.nrcs.usda.gov/

https://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm

- Impervious surface/land cover mapping of the watershed or catchment
- Generate contours with the bare earth model for visualization
- Land cover laid over slope grid 1+1= type of lc by slope type
- Or land cover within a certain distance of streams, then graph it

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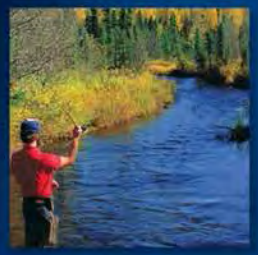
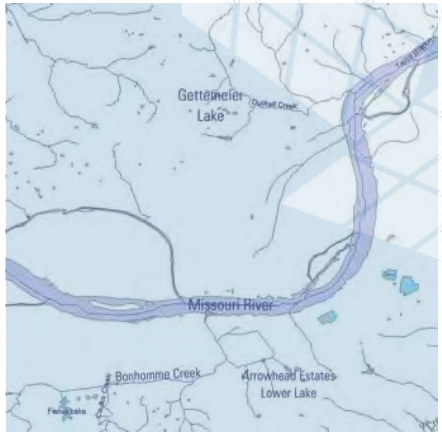
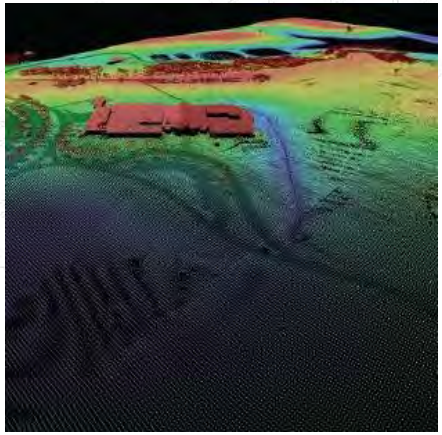


NHD/WBD Web Services

- Presented by Mike Tinker, slides by Ariel Doumbouya

Hydrography Services





USGS science for a changing world

The National Map
Your Source for Topographic Information

Ariel Doumbouya - USGS NGTOC
September 14, 2017
Idaho Technical Work Group

Overview

- Types of Services
- Which Services Do I Use for What?
- Current Hydrography Services
- Future Hydrography Services

Overview

- Types of Services
- Which Services Do I Use for What?
- Current Hydrography Services
- Future Hydrography Services

Types of Services

ESRI Feature Service

What is a Feature Service?

- Allow you to serve features over the Internet and provide the symbology.
- Can execute queries to get features and perform edits that can be applied to the server.
- Provide templates that can be used for an enhanced editing experience on the client.
- Data from relationship classes and nonspatial tables can also be queried and edited using feature services.

Types of Services

ESRI Map Service

What is a Map Service?

- The way that you make maps available to the web using ArcGIS.
- You'll make the map in ArcMap, then publish the map as a service to your ArcGIS Server site.
- Internet or intranet users can then use the map service in web applications, ArcGIS for Desktop, ArcGIS Online, and other client applications.
- Can be used for dynamic maps or layers as well as cached.
- Can be used for network analysis.

Types of Services

Additional Considerations

- Open Geospatial Consortium (OGC) Standards
  - Web Map Service (WMS)
  - Web Feature Service (WFS)
  - Web Map Tile Service
  - Web Map Processing Service
  - ……..

Overview

- Types of Services
- Which Services Do I Use for What?
- Current Hydrography Services
- Future Hydrography Services

Which Service Do I Use?

WMS or WFS?

- Web Feature Service (WFS)
  - Editing
- Web Map Service (WMS)
  - Dynamic Maps
  - Dynamic Layers
  - Cached Maps
  - Serve Features
  - Network Analysis
  - Read-only feature information (attributes)

Overview

- Types of Services
- Which Services Do I Use for What?
- Current Hydrography Services
- Future Hydrography Services

Current Hydrography Services

https://nhd.usgs.gov/data.html

Map Services

Hydrography web-based map services are available from The National Map Service Endpoints page as cached and dynamic services.

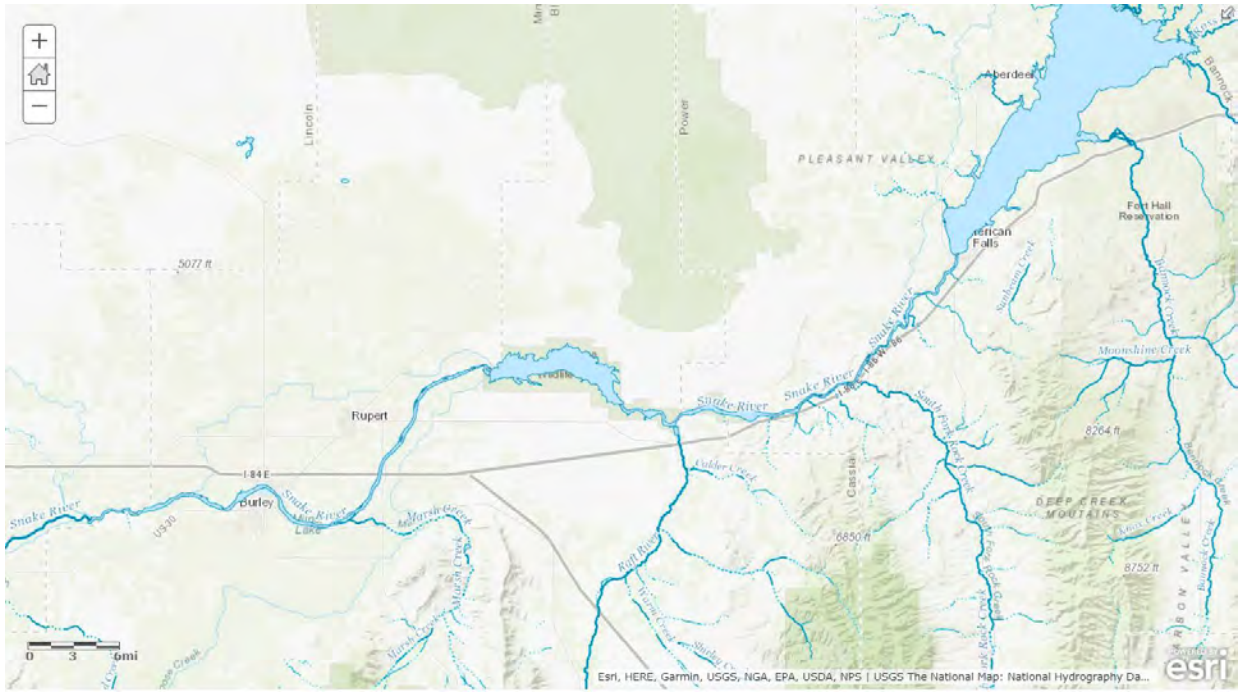
On occasion, maintenance will be performed on these map services causing limited access. Contact nhd@usgs.gov if you encounter service-related issues or need assistance with these services.

Full Name	Service Name	Category	Type	Data	Scale	Update
Hydrography - Cached (Tiled)	USGSHydroCached	Base Maps and/or Overlay	Raster Tile Cache	NHD High Resolution	Down to 9K (Level 17 in Google map tiles)	Annual
National Hydrography Dataset	NHD	Theme Overlays	Dynamic	NHD High Resolution	1:288K and larger	Quarterly
Watershed Boundary Dataset	WBD	Theme Overlays	Dynamic	WBD	1:18M and larger	Quarterly

Current Hydrography Services

USGSHydroCached

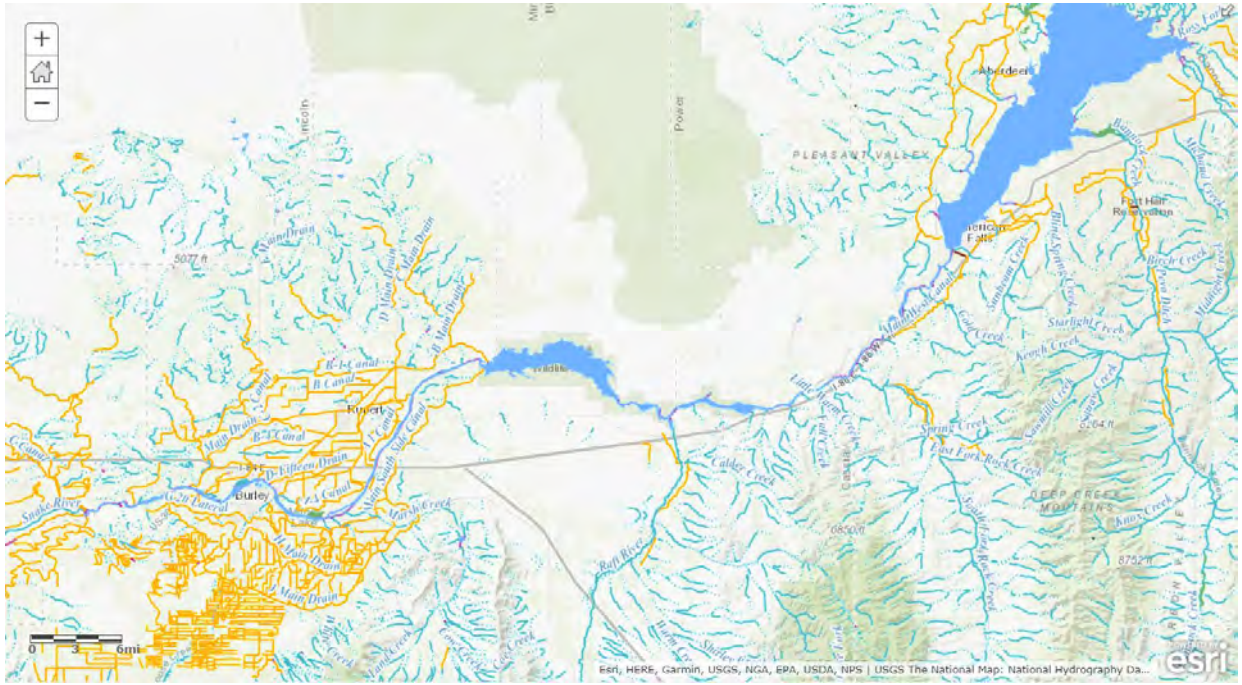
- Goes down to 1:9,000
- Fastest
- Updated once per year
- Cannot change style or view attributes



Current Hydrography Services

NHD

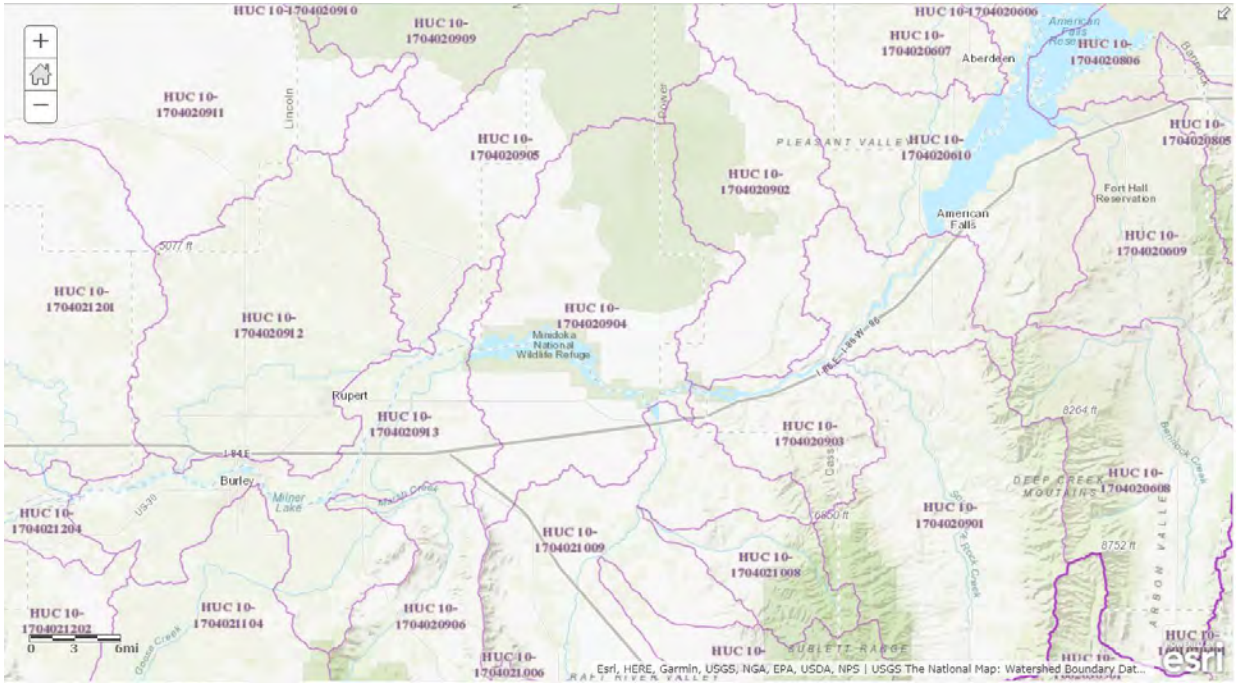
- 1:288K and below
- Hydrography Symbology (flow direction arrows)
- Not as fast as cached
- Data updated quarterly
- Access attributes and style



Current Hydrography Services

WBD

- WBD Only
- 1:18M and below
- Show all WBD levels or just at set scales
- Data updated quarterly
- Access attributes and style



Recommendation - Use This Link

https://nhd.usgs.gov/data.html

Map Services

Hydrography web-based map services are available from The National Map Service Endpoints page as cached and dynamic services.

On occasion, maintenance will be performed on these map services causing limited access. Contact nhd@usgs.gov if you encounter service-related issues or need assistance with these services.

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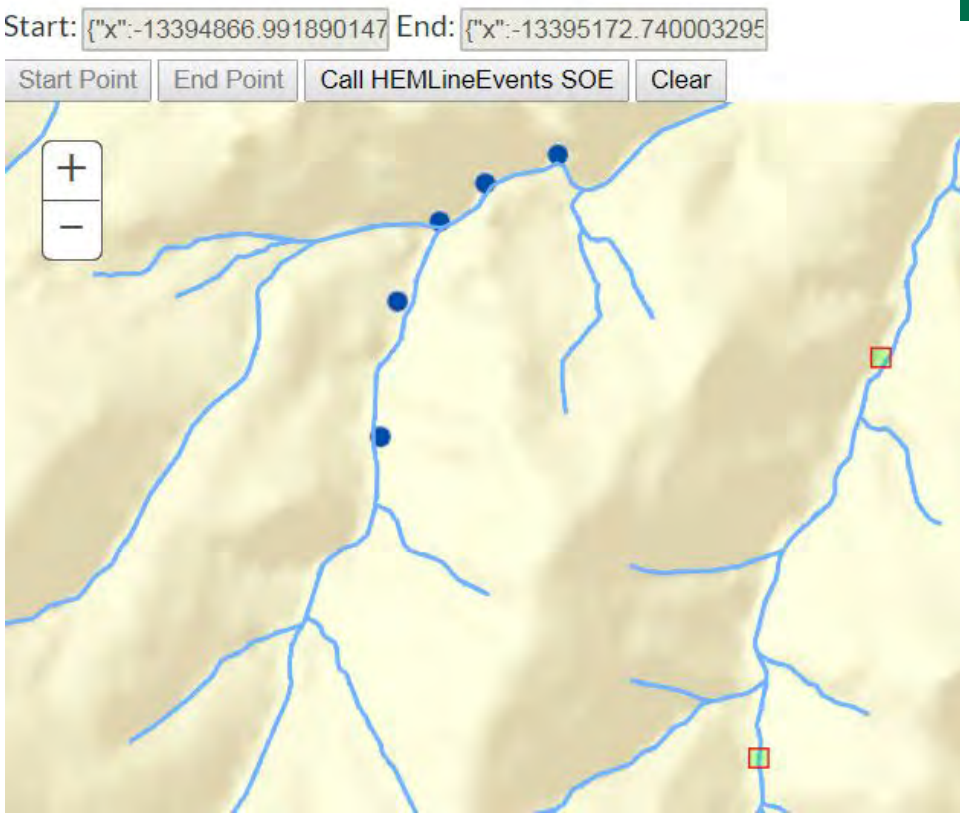
Hydrography - Cached (Tiled)	USGSHydroCached	Base Maps and/or Overlay	Raster Tile Cache	NHD High Resolution	Down to 9K (Level 17 in Google map tiles)	Annual
National Hydrography Dataset	NHD	Theme Overlays	Dynamic	NHD High Resolution	1:288K and larger	Quarterly
Watershed Boundary Dataset	WBD	Theme Overlays	Dynamic	WBD	1:18M and larger	Quarterly

Other Hydrography Services

HEM Developer Sample

- REST Endpoint
- Includes SOEs in support of HEM linear referencing.
  - See the HEM SOE Documentation for how to use the services to manage events

***Not intended as a public NHD Map Service!**

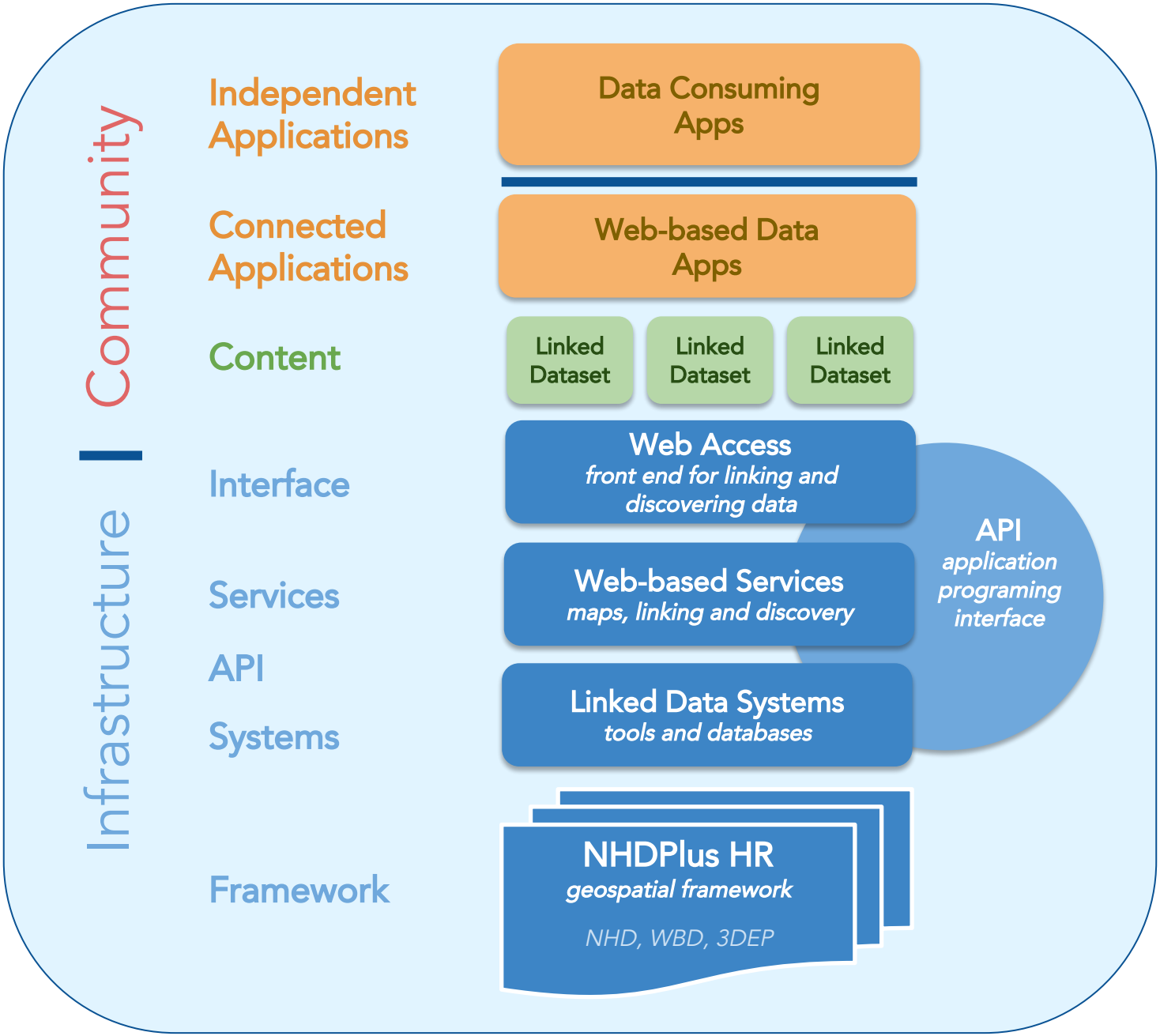


Other Hydrography Services

- NHDPlus V2:
  - Services in a web map: http://arcg.is/2cRsjgK
- Network Linked Data Index (Service & API information):
  - https://cida.usgs.gov/nldi/about
  - https://owi.usgs.gov/blog/nldi-intro/
- Water Quality Portal (WQP):
  - https://www.waterqualitydata.us/

Overview

- Types of Services
- Which Services Do I Use for What?
- Current Hydrography Services
- Future Hydrography Services


Community
Infrastructure
Independent Applications
Connected Applications
Content
Interface
Services
API
Systems
Framework
Data Consuming Apps
Web-based Data Apps
Linked Dataset
Linked Dataset
Linked Dataset
Web Access
front end for linking and discovering data
Web-based Services
maps, linking and discovery
Linked Data Systems
tools and databases
API
application programing interface
NHDPlus HR
geospatial framework
NHD, WBD, 3DEP

Hydrography Services Requirements

What do we really need for Hydrography Services?

Requirements!

- Map Services
- Feature Services
- NHD
- WBD
- HR NHDPlus
- Flattened schema
- Use cases
- Intended audience/users
- Performance expectations

Network Linked Data Index (NLDI)

Example Use Case

Network Linked Data Services: As a user of network linked data, I need a service that allows me to search for network linked data, so I can find my own and others' data on the network.

Actors: Network linked data clients / users.

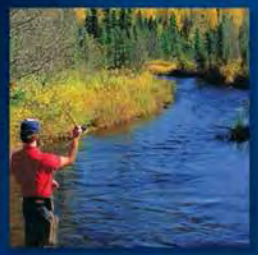
Information: An external application passes in a stream reach or a location near a river and additional information to configure the desired features and other characteristics of the request.

Computation: The network linked data service traverses the network according to the passed-in query, performs the query and formats the result to send back to the user.

Thank you!

Questions?

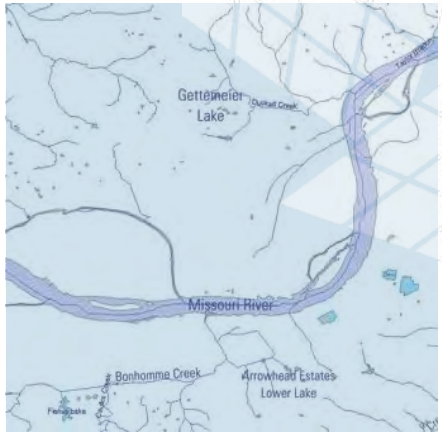
Ariel Doumbouya
atdoumbouya@usgs.gov

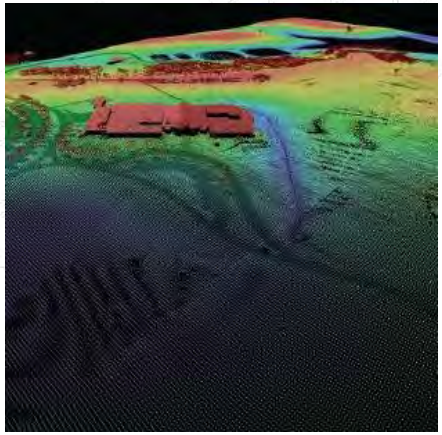


Science Base

- Mike Tinker, USGS

National Hydrography Dataset Linked Data Registry



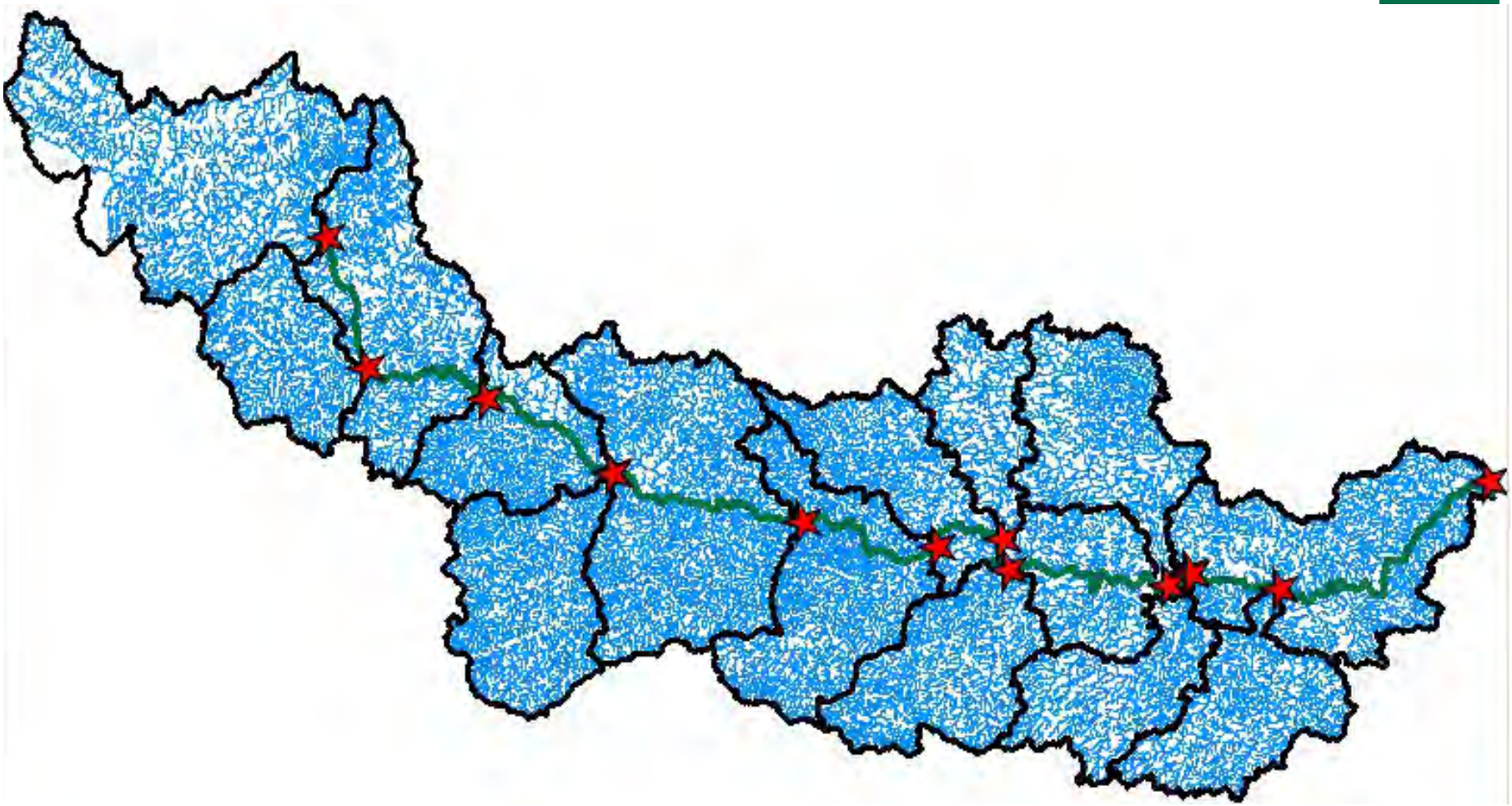


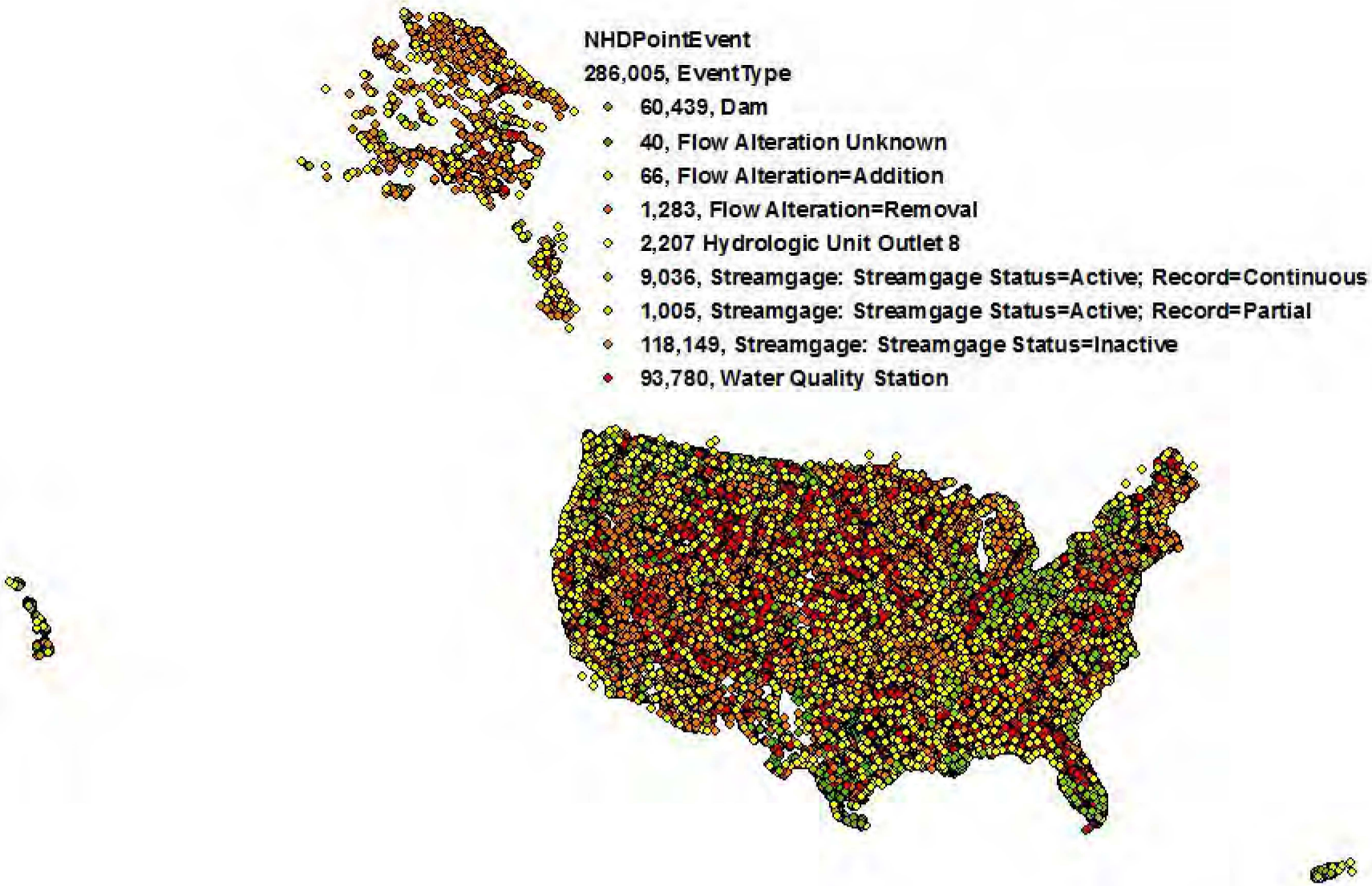
Michael Tinker
U. S. Geological Survey, National Geospatial Technical Operations Center

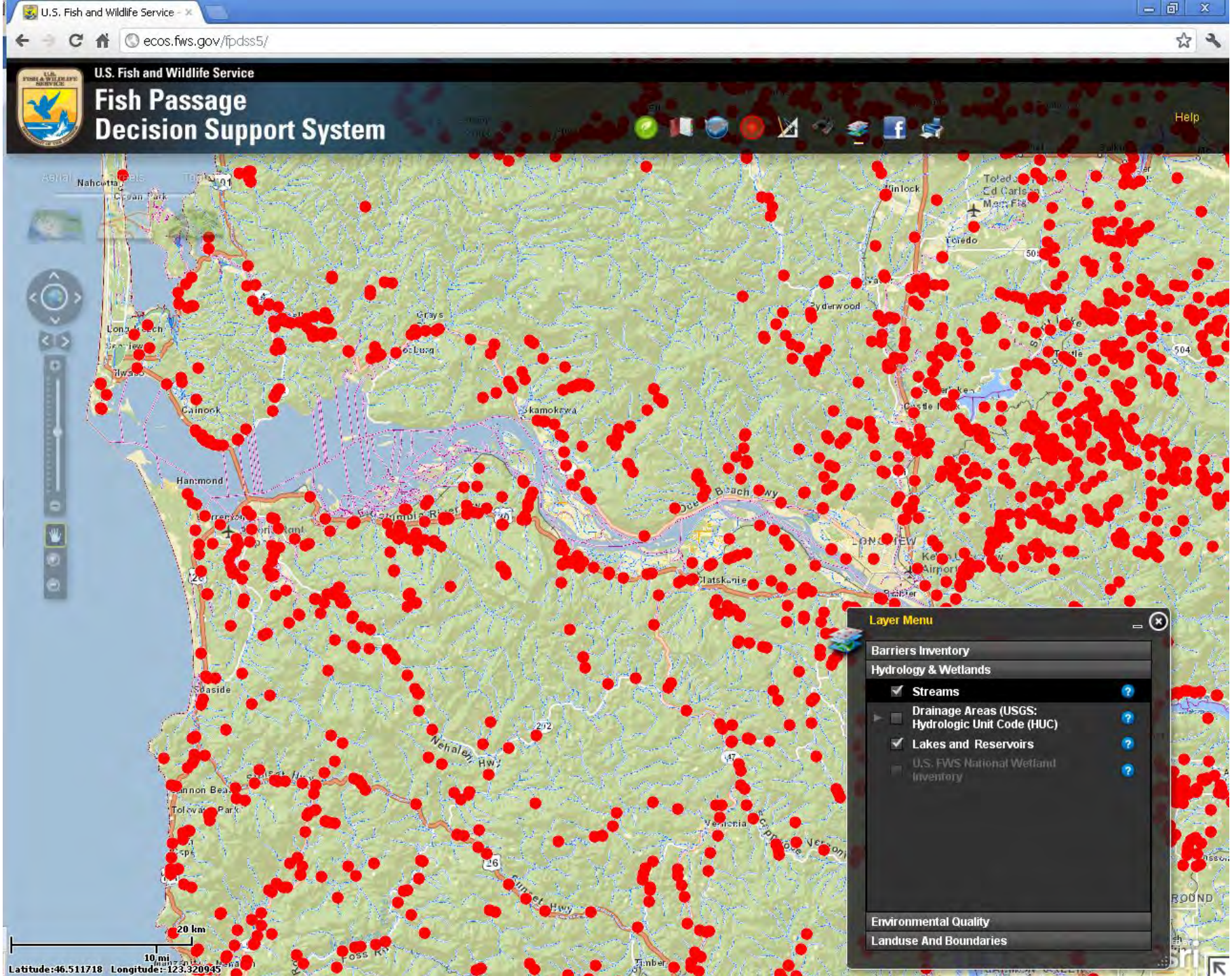
Agenda

- Network Linked Data 101
  - aka hydro linked data, events
  - NHDPointEvents
- ScienceBase
  - An easy place for users to share NHD hydro-linked data
  - Features of ScienceBase
  - Hydro Linked Data Registry

Hyrologic Unit 8 (HU8) Outlets "Pour Points"




NHDPointEvent
286,005, EventType
60,439, Dam
40, Flow Alteration Unknown
66, Flow Alteration=Addition
1,283, Flow Alteration=Removal
2,207 Hydrologic Unit Outlet 8
9,036, Streamgage: Streamgage Status=Active; Record=Continuous
1,005, Streamgage: Streamgage Status=Active; Record=Partial
118,149, Streamgage: Streamgage Status=Inactive
93,780, Water Quality Station


U.S. Fish and Wildlife Service
ecos.fws.gov/fpdss5/
U.S. Fish and Wildlife Service
Fish Passage
Decision Support System
Help
Layer Menu
Barriers Inventory
Hydrology & Wetlands
Streams
Drainage Areas (USGS: Hydrologic Unit Code (HUC)
Lakes and Reservoirs
U.S. FWS National Wetland Inventory
Environmental Quality
Landuse And Boundaries
20 km
10 mi
Latitude:46.511718 Longitude:-123.320945

NEVADA
Lake Mead
Colorado River
Las Vegas
Hoover Dam
CALIFORNIA
Davis Dam
ARIZONA
Parker Dam
Colorado River Aqueduct
Los Angeles
Palo Verde
Diversion Dam
Central Arizona Project Aqueduct
Phoenix
Coachella Canal
Salton
Sea
San Diego
Imperial Dam
All American Canal
MEXICO
Tucson
N
0
25
50
100
Miles

The Problem

- NHD does not contain line or polygon events
- NHD accepts point events from customers,
  - but only “USGS –sanctioned” domains
  - e.g. gages, dams, divergences, pour points
- Q: How can I share my events ?
- A: The Hydro Linked Data Community on ScienceBase!

ScienceBase Catalog Home

https://www.sciencebase.gov/catalog/

Apps | Happy | sugar | finan aid | Google News | EPA | usgs | news | Jira | News | Bookmarks | PRO | USGS Confluence | Quicktime

USGS
science for a changing world

ScienceBase-Catalog | Communities | Help | Log in

Type some text to search... | Search | Advanced Search

I want to:
- Login
- Add Data
- Access Help
- Report a Problem

Browse by Category
- Map
- Data
- Physical Item
- Project
- Publication
- Web Site
- USGS Data Release Products

Browse by Tag
- Animal Behaviour
- Biogeochemistry
- Ecosystems
- Hazard Mitigation
- Hydrology
- **All tags...**

Browse by Location

View USGS data releases in ScienceBase

Instructions for completing a data release in ScienceBase

Featured Item

Boat ramp locations within the Columbia River Basin with associated recreational use, water quality measurements, and risk assessment data for zebra and quagga mussels

Aquatic invasive species are often transported between water bodies on boats or boat trailers, thus they are considered one of the primary vectors for new introductions of invasive species to a water body. This data set contains geographic positioning system locational data for boater access points, use data (i.e. recreational, fishing), water quality measurements (e.g. calcium concentrations, pH), risk assessment data, and other physical attributes (i.e. size, elevation) where available within the Columbia and Snake Rivers and throughout the Columbia River Basin. This work builds on an earlier body of work by Wells et al. 2011, Prioritizing Zebra and Quagga Mussel Monitoring in the Columbia River Basin (PDF link...

Categories: Data, Publication; **Types:** ArcGIS REST Map Service, ArcGIS Service Definition, Citation, Downloadable, Map Service; **Tags:** Boat ramps, Columbia River, Columbia River Basin, Dreissenids, access points, ***All tags...***

What is ScienceBase?

- Creation of USGS Core Science Analytics Synthesis and Libraries group
- Platform for sharing data
- Metadata catalog
- Workspace for collaboration and networking
- Script accessible location for data
  - Offers APIs
- Content management system for websites and other downstream applications
  - Offers web services

Science Base – The Big Picture

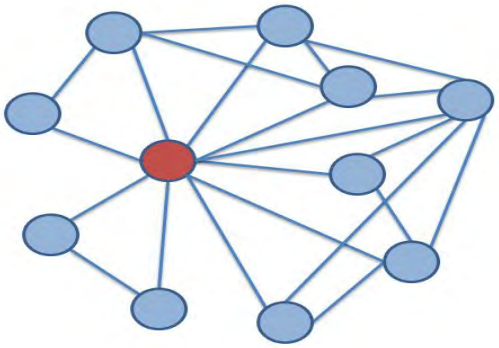
Communities

ScienceBase item

Data

Documentation:
Additional information, relationships, etc.

- Item exists independently at a URL endpoint.
- Can be related to other ScienceBase resources
- Can be connected to other processes and systems.



ScienceBase is for Collaborating

- Organizes data into communities
- Share data and metadata publicly
- Search and discover both internally and externally hosted data
- Generates web services automatically for all data

How is the NHD using ScienceBase?

- To offer a place for NHD users to share and store hydro linked data
  - Any kind of linked data, point, line or polygons
  - Not just NHDPointEvents
- To model a hydro linked data community
  - Sample Metadata
  - Recommended hydro linked tags
- To support our partners requirements
  - Web Services

ScienceBase Catalog Home

https://www.sciencebase.gov/catalog/

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ScienceBase-Catalog | Communities | Add Item | My Items | More | Help | mdtinker@usgs.gov

Folders

hydro linked data | Search | Advanced Search

I want to:
- Logout
- Add Data
- Access Help
- Report a Problem

Browse by **Category**
- Map
- Data
- Physical Item
- Project
- Publication
- Web Site
- USGS Data Release Products

Browse by **Tag**
- Animal Behaviour
- Biogeochemistry
- Ecosystems
- Hazard Mitigation
- Hydrology
- **All tags...**

Browse by **Location**

View USGS data releases in ScienceBase

Instructions for completing a data release in ScienceBase

Featured Item

The Effects of Heterospecifics and Climatic Conditions on Incubation Behavior within a Mixed-Species Colony

This U.S. Geological Survey Data Release contains the data and metadata associated with the journal article. Parental incubation behavior largely influences nest survival, a critical demographic process in avian population dynamics, and behaviors vary across species with different life history breeding strategies. Although research has identified nest survival advantages of mixing colonies, behavioral mechanisms that might explain these effects is largely lacking. We examined parental incubation behavior using video-monitoring techniques on Alcatraz Island, California, of black-crowned night-heron Nycticorax nycticorax (hereinafter, night-heron) in a mixed-species colony with California gulls Larus californicus...

Types: Citation; Tags: Alcatraz Island, Black-crowned night herons, San Francisco Bay, incubation behavior, video monitoring

Browse Folders

hydro linked data - Science

https://www.sciencebase.gov/catalog/items?q=hydro%20linked%20data

Apps | Happy | sugar | finan aid | Google News | EPA | usgs | news | Jira | News | Bookmarks | PRO | USGS Confluence | Quicktime

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hydro linked data | Search | Advanced Search

37 results (25ms)

Filters

Date Range

- Past year (33)
- Past month (27)
- Past week (26)
- Past day (0)
- Custom range...

Extensions

- BASIS Plus (18)
- Citation (5)
- Shapefile (5)
- Project (4)
- ArcGIS Service Definition (3)
- Budget (1)
- Community (1)

Types

- BASIS+ Task (14)
- OGC WFS Layer (10)
- Citation (9)
- Downloadable (7)
- Map Service (7)
- More...

Categories

- Project (20)
- Data (12)
- Publication (5)

Contacts

- U.S. Geological Survey, National Geospatial Technical Operations Center
- Cynthia Miller-Corbett
- U.S. Geological Survey
- U.S. Geological Survey, National Geospatial Program
- Jones, Susan P.
- More...

Tag Types

National Hydrography Dataset Linked Data Registry

The National Hydrography Dataset (NHD) and Watershed Boundary Dataset (WBD) are used to portray surface water on The National Map. The NHD represents the drainage network with features such as rivers, streams, canals, lakes, ponds, coastline, dams, and streamgages. An important use of the NHD is the analysis of surface-water systems. This analysis is possible because many types of location information can be linked to the NHD, such as flow-volume, velocity, temperature, water chemistry, pollution control classifications, aquatic species habitat, recreation designations, or water rights. Such network-linked data is typically maintained by various organizations at Federal, State, and local levels, as well as research,...

Tags: Catchment indexing, Linear referencing, NHDPLus, Polygonal event, Polygon event, *All tags...*

National Recreation Rivers Database

Categories: Data; Types: ArcGIS Service Definition, Downloadable, OGC WFS Layer, OGC WMS Service, Shapefile; Tags: Recreational, Rivers, Linear referenced, Hydrographically linked data, Linear event, *All tags...*

Wild and Scenic Rivers (Snapshot from 12/15/15)

This polyline feature class depicts the classification of each wild and scenic river segment designated by Congress and the Secretary of the Interior for the United States and Puerto Rico. This layer was created by a multi-agency effort including the US Forest Service, National Park Service, Bureau of Land Management and the Fish and Wildlife Service. The spatial data were referenced to the latest High Resolution National Hydrological Data Layer (NHD 1:24,000 Scale or better), published by United States Geological Survey (USGS)."Wild" rivers are free of dams, generally inaccessible except by trail, and represent vestiges of primitive America. "Scenic" rivers are free of dams, with shorelines or watersheds still...

Categories: Data; Types: ArcGIS REST Map Service, OGC WFS Layer, OGC WMS Service; Tags: Rivers, Linear referencing, Scenic, Linear referenced, Hydrographically linked data, *All tags...*

NHD Point Events (Snapshot from 4/12/2016)

The NHD is a national framework for assigning reach addresses to water-related entities, such as industrial discharges, drinking water supplies, fish habitat areas, wild and scenic rivers. Reach addresses establish the locations of these entities relative to one another within the NHD surface water drainage network, much like addresses on streets. Once linked to the NHD by their reach addresses, the upstream/downstream relationships of these water-related entities--and any associated information about them--can be analyzed using software tools ranging from spreadsheets to geographic information systems (GIS). GIS can also be used to combine NHD-based network analysis with other data layers, such as soils, land use...

Categories: Data; Types: ArcGIS Service Definition, Downloadable, OGC WFS Layer, OGC WMS Service; Tags: Linear referencing, Linear referenced, Hydrographically linked data, Linear event, NHD, *All tags...*

Gage Locations (GageLoc.shp) indexed to the NHDPlus Version 2.1 stream network

The locations of approximately 26,000 current and historical U.S. Geological Survey (USGS) surface-water monitoring gaging stations have been indexed to the NHDPlus Version 2.1 stream network. Part of the USGS National Water Information System (NWIS), these gaging stations measure water flow and water levels in streams and lakes. The NHDPlus V2 stream network locations for these gaging stations differ from stations' latitude/longitude provided in NWIS. The NWIS coordinates are frequently not coincidenet with the NHDPlus stream network.

Categories: Data; Types: Citation, Downloadable, Map Service, OGC WFS Layer, OGC WMS Layer, Shapefile; Tags: hydrographic structures, structure, NHD, HEM, Hydro linked data, *All tags...*

Coastal geomorphology and vulnerability to sea level rise at the National Hydrography Dataset Coastline

Coastal Mean High Water (MHW) is contoured in intertidal zones open to oceans, behind barrier coasts in bays, lagoons, and estuaries, and sometimes where tidal currents reach upstream (landward) of the embayed foreshore water bodies. In the National Geospatial Program (NGP) surface water hydrography maintained in the Nation Hydrography Dataset (NHD) Flowline Network projects Mean High Water level (MHW) as the linear-referenced 1:24,000-scale resolution NHD Coastline (http://nhd.usgs.gov/). NHDCoastline Geomorphology and associated Risk line-event feature classes that rank the relative risk of horizontal erosion on a scale of 1 to 5 (least to most risk, respectively) have been developed using the Hydrography Event...

National Hydrography Dataset Linked Data Registry

Go to View Manage

Dates

Start Date : 2002
End Date : 2016

Citation

National Hydrography Dataset, U.S. Geological Survey, Reston, Virginia. 2002-2016

Summary

The National Hydrography Dataset (NHD) and Watershed Boundary Dataset (WBD) are used to portray surface water on The National Map. The NHD represents the drainage network with features such as rivers, streams, canals, lakes, ponds, coastline, dams, and streamgages. An important use of the NHD is the analysis of surface-water systems. This analysis is possible because many types of location information can be linked to the NHD, such as flow-volume, velocity, temperature, water chemistry, pollution control classifications, aquatic species habitat, recreation designations, or water rights. Such network-linked data is typically maintained by various organizations at Federal, State, and local levels, as well as research, conservation, academic, and industry organizations. USGS encourages organizations who link their data to the NHD to share their data. To that end, we now encourage organizations to post their network-linked data to the USGS *ScienceBase, National Hydrography Dataset Linked Data Registry.*

Child Items (6)

- Coastal geomorphology and vulnerability to sea level rise at the National Hydrography Dataset Coastline
  - Gage Locations (GageLoc.shp) indexed to the NHDPlus Version 2.1 stream network
- National Recreation Rivers Database
- NHD Point Events (Snapshot from 4/12/2016)
- WBD HU12 Pour Points derived from NHDPlus
- Wild and Scenic Rivers (Snapshot from 12/15/15)

Map »

Spatial Services

ScienceBase WMS :
https://www.sciencebase.gov/catal

Associated Items

- *related to* MetadataWizard
- *related* National Wild and Scenic Rivers in the U.S.

View Associated Items
Associate an Item

Tags

Theme : Area event, Catchment based indexing, Catchment indexing, Gaging station, HEM, Hydro linked data, Hydrographically linked data, Hydrologically linked data, Line event, Linear event, Linear referenced, Linear referencing, Linked data, NHD, NHDPLus, National Hydrography Dataset, Point event, Polygon event, Polygonal event, Stream gages

Provenance

Data source : Input directly

National Hydrography Dataset, U.S. Geological Survey, Reston, Virginia. 2002-2016

National Hydrography Dataset Linked Data Regis...

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Contacts

Contact : Alan H Rea, Michael D Tinker
Editor : Michael D. Tinker

Attached Files

Click on title to download individual files attached to this item or download all files listed below as a compressed file.

HydroLinkedStarterTemplate_FGDC.xml "Suggested Tags for Hydro Linked Data Metadata; Sample FGDC metadata template XML" *Original Metadata*	View	2016-07-03 12:28	mdtinker@usgs.gov	3.33 KB
suggested hydro linked data tags.txt		2016-07-03 12:58	mdtinker@usgs.gov	385 Bytes

Related External Resources

Type: Web Link

USGS Online Metadata Editor (OME)	https://www1.usgs.gov/csas/ome/editor.htm

Purpose

U.S. Geological Survey has placed these hydro linked datasets here in to demonstrate use of FGDC compliant metadata and searchable tags suitable for other hydro linked datasets. If you have data linked to the NHD or NHDPlus, we suggest that you tag your data with keyword themes in the item's metadata similar to how we have tagged the datasets in this community. There are several ways to create metadata for your items for use in ScienceBase: 1) Directly enter the tags in ScienceBase as free text. 2) The Esri metadata editor native to ArcCatalog. 3) The USGS Online Metadata Editor at <https://www1.usgs.gov/csas/ome/editor.htm>, 3) The USGS MetadataWizard, a python script with graphical user interface that can be used in ArcCatalog. This tool is downloadable from ScienceBase, and also linked to this community as an associated item. 4) Other commercial XML editors, such as XML Notepad. 5) Finally, we have attached a text file with suggested hydro linked data tags, as well as a metadata template, HydroLinkedStarterTemplate_FGDC.xml.

Additional Information

Community Extension

Theme : Area event, Catchment based indexing, Catchment indexing, Gaging station, HEM, Hydro linked data, Hydrographically linked data, Hydrologically linked data, Line event, Linear event, Linear referenced, Linear referencing, Linked data, NHD, NHDPLus, National Hydrography Dataset, Point event, Polygon event, Polygonal event, Stream gages

Provenance

Data source : Input directly

National Hydrography Dataset, U.S. Geological Survey, Reston, Virginia. 2002-2016

Audit History

Created : *by* nlatysh@usgs.gov *on* Tue Feb 25 13:46:13 MST 2014
Updated : *by* mdtinker@usgs.gov *on* Sun Jul 03 13:14:17 MDT 2016

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- USER:ahrea@usgs.gov
- USER:mdtinker@usgs.gov
- USER:saichele@usgs.gov

Gage Locations (GageLoc.shp) indexed to the NHDPlus Version 2.1 stream network

Go to View Manage

Dates

Publication Date : 2015-01-01
Time Period : 2012-01-01

Citation

US Environmental Protection Agency, and US Geological Survey, 20150101, Gage Locations (GageLoc.shp) indexed to the NHDPlus Version 2.1 stream network: .

Summary

The locations of approximately 26,000 current and historical U.S. Geological Survey (USGS) surface-water monitoring gaging stations have been indexed to the NHDPlus Version 2.1 stream network. Part of the USGS National Water Information System (NWIS), these gaging stations measure water flow and water levels in streams and lakes. The NHDPlus V2 stream network locations for these gaging stations differ from stations' latitude/longitude provided in NWIS. The NWIS coordinates are frequently not coincidenet with the NHDPlus stream network.

Contacts

Point of Contact : U.S. Environmental Protection Agency
Distributor : U.S. Environmental Protection Agency
Metadata Contact : U.S. Environmental Protection Agency
Originator : US Environmental Protection Agency, US Geological Survey

Attached Files

Click on title to download individual files attached to this item or download all files listed below as a compressed file

Shapefile: GageLoc.zip

GageLoc.dbf		2016-06-29 16:02	19.55 MB
GageLoc.prj		2016-06-29 16:02	167 Bytes
GageLoc.shp		2016-06-29 16:02	1.18 MB
GageLoc.shp.xml *Original Metadata*	View	2016-06-29 16:02	16.88 KB
GageLoc.shx		2016-06-29 16:02	220.13 KB

Related External Resources

Map »

Spatial Services

ScienceBase WMS : https://www.sciencebase.gov/catal
ScienceBase WFS : https://www.sciencebase.gov/catal

Communities

- National Hydrography Dataset Linked Data Registry

Associated Items

Associate an Item

Tags

Categories : Data
Theme : Gaging station, HEM, Hydro linked data, Linear referencing, Linked data, NHD, NHDPlus, Point event, Stream gages, hydrographic structures, inlandWaters, structure, water quality
Types : Citation, Downloadable, Map Service, OGC WFS Layer, OGC WMS Layer, Shapefile

Provenance

Data source : Input directly

Audit History

Edit Item - ScienceBase-Ca

https://www.sciencebase.gov/catalog/item/editForm/577445bee4b07657d1a991b6

Apps | Happy | sugar | finan aid | Google News | EPA | usgs | news | Jira | News | Bookmarks | PRO | USGS Confluence | Quicktime

USGS
science for a changing world

ScienceBase-Catalog | Communities | Add Item | My Items | More | Help | mdtinker@usgs.gov

Edit: Gage Locations (GageLoc.shp) indexed to the NHDPlus Version 2.1 stream network

What | From | Who | When | Where | How | Tags | Files (5) | Extensions (1) | External Sources

+ Add files...

Name	Type	Status	Preview Image			Title
GageLoc.dbf		failed		Remove	Retry	
GageLoc.prj		failed		Remove	Retry	
GageLoc.shp		failed		Remove	Retry	
GageLoc.shp.xml	text/xml	failed		Remove	Retry	
GageLoc.shx		failed		Remove	Retry	

Found FGDC Metadata...

An FGDC metadata file was found among the uploaded files. Base the ScienceBase item record on this data?

Load Item from FGDC Metadata - Replacing Existing Values

Update Missing Item Data from FGDC Metadata | Cancel

Save | Cancel | Delete Item

Accessibility | FOIA | Privacy | Policies and Notices

U.S. Department of the Interior | U.S. Geological Survey
URL: https://www.sciencebase.gov/catalog/item/editForm/577445bee4b07657d1a991b6
Contact Information: sciencebase@usgs.gov
Page Last Modified: Wednesday, June 29, 2016

ScienceBase-Catalog Version: 2.112 | Feedback | Support | ScienceBase Notify
Build Version: v2.112-0-g10c694c-0 (2016-06-29 15:38)

USA.gov

Edit Item - ScienceBase-Ca

https://www.sciencebase.gov/catalog/item/editForm/577445bee4b07657d1a991b6

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Edit: Gage Locations (GageLoc.shp) indexed to the NHDPlus Version 2.1 stream network

What | From | Who | When | Where | How | Tags | Files (0) | Extensions (1) | External Sources

Title

Gage Locations (GageLoc.shp) indexed to the NHDPlus Version 2.1 stream network

Folder

National Hydrography Dataset Linked Data Registry

Current

Look Up

Search for an item...

Select from Tree

Subtitle

Body

The locations of approximately 26,000 current and historical U.S. Geological Survey (USGS) surface-water monitoring gaging stations have been indexed to the NHDPlus Version 2.1 stream network. Part of the USGS National Water Information System (NWIS), these gaging stations measure water flow and water levels in streams and lakes. The NHDPlus V2 stream network locations for these gaging stations differ from stations' latitude/longitude provided in NWIS. The NWIS coordinates are frequently not coincidenet with the NHDPlus stream network.

Citation

US Environmental Protection Agency, and US Geological Survey, 20150101, Gage Locations (GageLoc.shp) indexed to the NHDPlus Version 2.1 stream network: .

Purpose

The purpose of this dataset is to provide the locations of USGS gaging stations indexed to the NHDPlus Version 2.1 linear stream network. Considerable review and revision has gone into the NHDPlus locations provided in this dataset. For each USGS gaging station, the station ID, and the NHDPlus Reachcode and Measure are provided. The ComID (common identifier) of the NHDFlowline feature of the gage location is also given. These linkages to the NHDPlus linear stream network enable the use of these gaging stations for a variety of hydrologic analysis applications. Examples include the development of regional or national statistical models of streamflow and water-

Rights

Edit Item - ScienceBase-Ca

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Edit: Gage Locations (GageLoc.shp) indexed to the NHDPlus Version 2.1 stream network

What | From | Who | When | Where | How | Tags | Files (0) | Extensions (1) | External Sources

Tag Type: optional...

Tag Vocabulary: optional...

Tag Term: Type tag name...

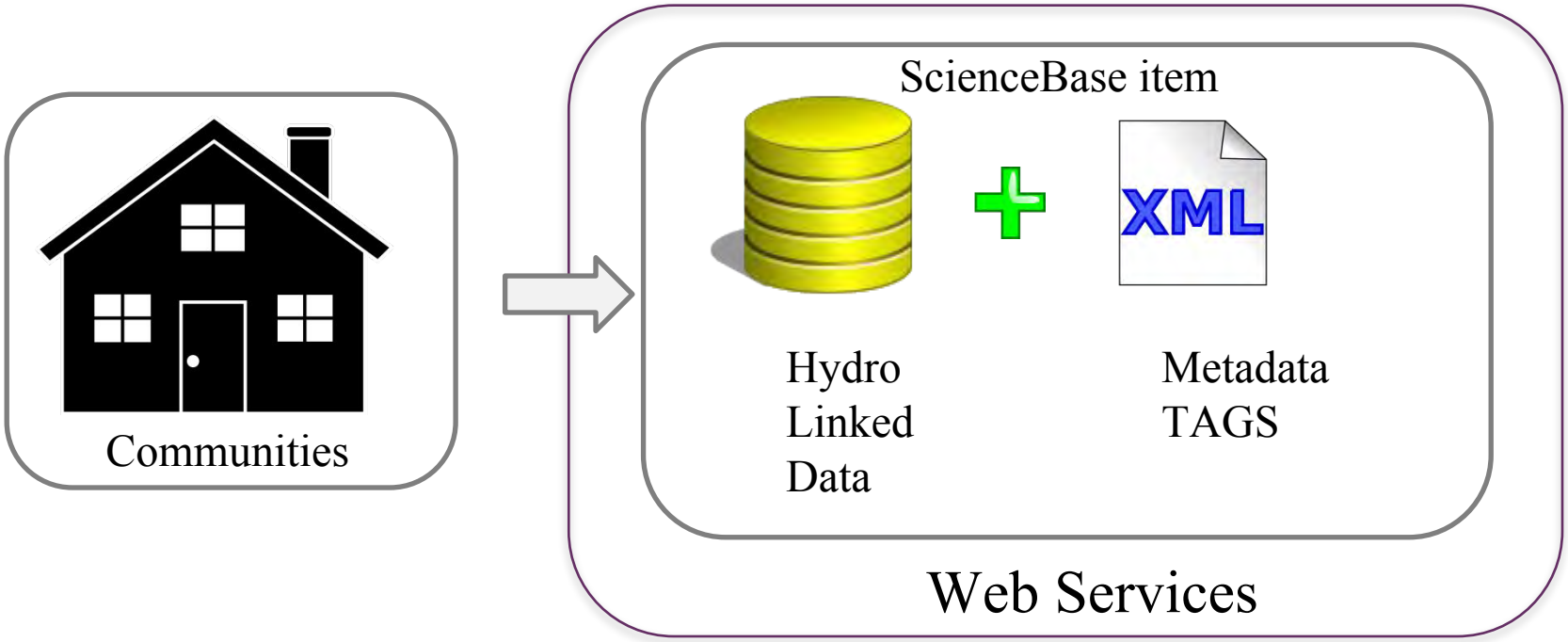
Add Tag

Tags by Type

- Browse Category
  - Data [X]
- Browse Type
  - Citation [X]
  - Shapefile [X]
  - Downloadable [X]
  - Map Service [X]
  - OGC WMS Layer [X]
  - OGC WFS Layer [X]
- Theme
  - water quality (i) [X]
  - hydrographic structures (i) [X]
  - structure (i) [X]
  - inlandWaters (i) [X]
  - Point event (i) [X]
  - NHD (i) [X]
  - Gaging station (i) [X]
  - Hydro linked data (i) [X]
  - Stream gages (i) [X]
  - Linear referencing (i) [X]
  - Linked data (i) [X]
  - HEM (i) [X]
  - NHDPlus (i) [X]

Save | Cancel | Delete Item

Build a Community!



Summary of benefits of ScienceBase

- Web services for downstream applications
- Honors FGDC-compliant metadata
- ScienceBase data can be accessed by scripts
- ScienceBase offers a place for you to store and share NHD hydro linked data

WE WANT YOU TO SHARE HYDRO-LINKED DATA

www.says-it.com/unclesam/

Questions? Feedback?

USGS ScienceBase

https://www.sciencebase.gov/catalog/

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U. S. Geological Survey
National Geospatial Technical Operations Center
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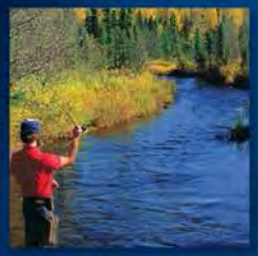
303-202-4476

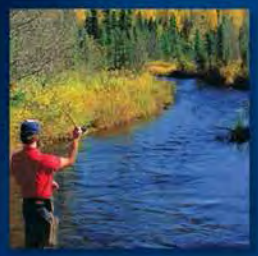


Other Updates

NHD and WBD

- Expect to upgrade to new database version with rest of National Map Databases as early as Nov. 2017

IDAHO Department of Water Resources



Other Updates

NHD/WBD Tools Status

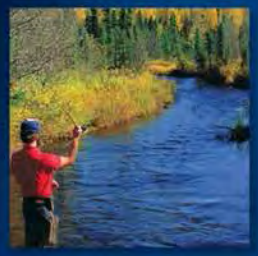
Editor Tools: Now at ArcGIS 10.5

- NHD: version 6.4.0.1
- WBD: Very Soon
- HEM: version 2.9.0.1
- Other Tools: Soon

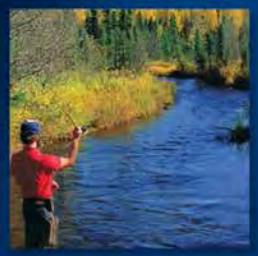
New Stewardship Website now in Beta.

- Danielle Favreau, IDWR

IDAHO Department of Water Resources



Other Business?



Upcoming Events

- **IGC-EC Meeting**
  - Sept. 28, 2017 Boise, ID
- **Northwest GIS Conference**
  - October 9-13, 2017 Boise, ID
- **AWRA Annual Conference**
  - Nov. 5 – Nov. 9, 2017 Portland, OR
- **IWUA Annual Convention**
  - Jan. 16 – Jan. 18, 2018 Boise, ID

Contact Information:

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Linda Davis, Idaho Principal Data Steward Linda.Davis@idwr.idaho.gov

NHD.WBD@idwr.Idaho.gov

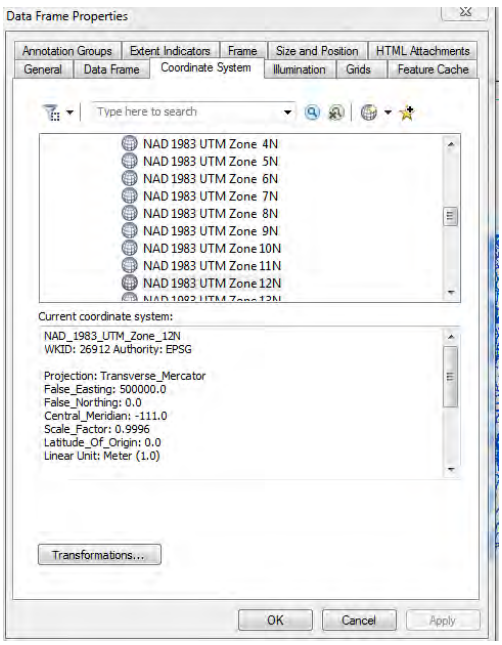
Website Information: http://idwr.idaho.gov/GIS/NHD/

NEXT TWG MEETING: March 15, 2018

Create a river miles layer from NHD HR:

A common question I am asked in regards to hydro data is how to calculate river miles, so this is a way to do that:

1. Since USGS distributes NHD in Geographic Coordinates, NAD 83, you'll have to give your data a projection if you want to measure with it. I like UTM but you can use whatever projection your state uses. So following my lead, you'll want to set your map coordinate system to UTM Zone 12, NAD 83 so you can measure in meters (the demo is for a place in Idaho). I just do this in the map frame's coordinate box but you could reproject all of your data…

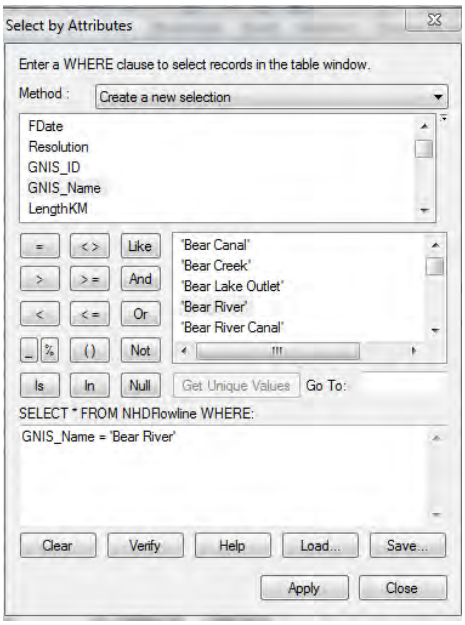


2. Next, set up your NHD data.

a. Open the attribute table of the NHDFlowline layer.

b. Open the Table Options menu and choose Select by Attributes.

c. Create a query to search for all reaches identified as the Bear River: "GNIS_Name" = 'Bear River'



d. In the attribute table, you should see 39087 features selected.

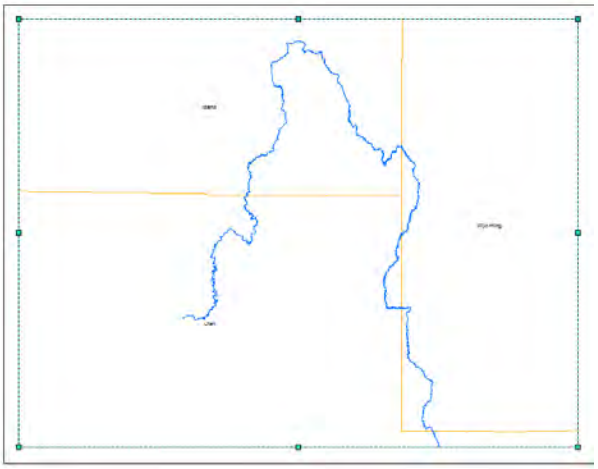
3. Right-click on the NHDFlowline layer and select Export Data.

a. Navigate to the GDB and save the selected features as a new feature class called BearRiver.

b. Add the exported data to the map as a layer.

4. Clear selected features and close the attribute table

5. Zoom to the extent of the BearRiver and turn off all other features.



6. Let's dissolve the 39087 segments to create a single flowline.

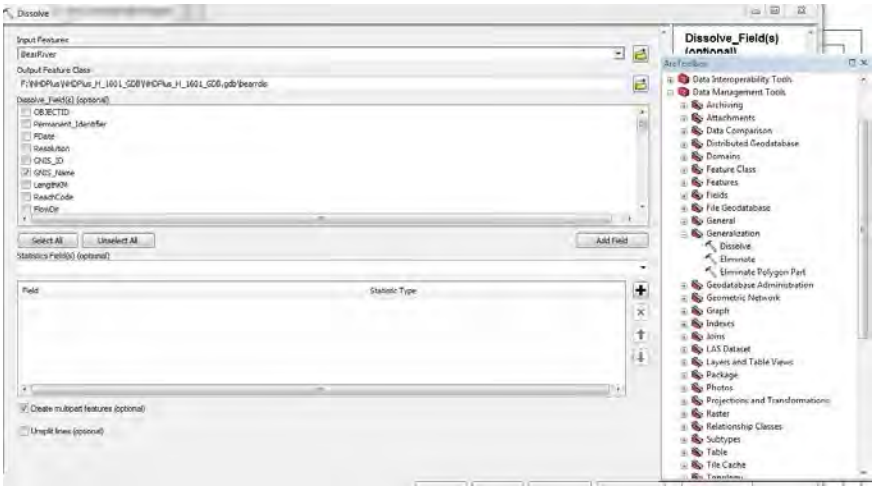
a. From the toolbox, we will use the Dissolve tool, which is found under Data Management Tools-Generalization.

b. Select the BearRiver layer for Input Features.

c. Navigate to the NHDPlus_H_1601_GDB. and name the new feature class BearRivDis.

d. Check the box next to GNIS_Name under the Dissolve_Field(s) field.

e. Click OK to run the tool.



7. Right-click the NHDPlus_H_1601_GDB in ArcCatalog and select New>Feature Class.

a. Create a *point feature* class called BearRivMiles.

b. Select Geographic Coordinate System:GCS_North_American_1983, Datum: D_North_American_1983, Prime Meridian: Greenwich, Angular Unit: Degree

c. Click through the rest of the dialog and click Finish. Right click on your geodatabase and do a refresh.

8. Right-click BearRivDissolve and select Edit Features>Start Editing.

9. Right-click BearRivDissolve and choose Selection>Select All.

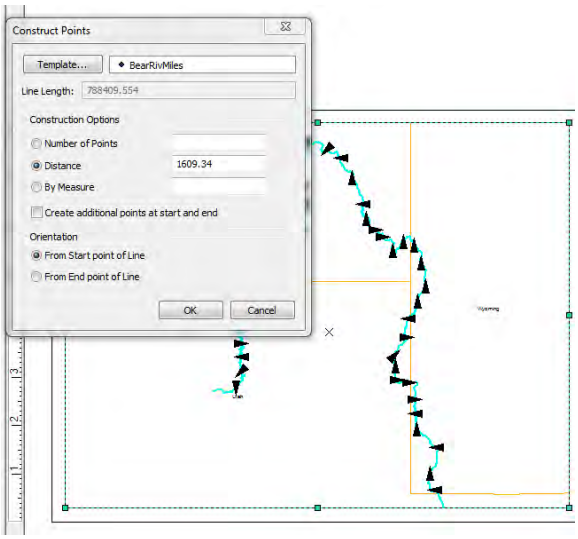
10. From the Editor dropdown menu, select Construct Points.

11. In the Construct Points dialog, confirm that BearRivMiles is the Template.

a. Under Construction Options, choose Distance.

b. Enter 1609.34 (this is how many meters are in a mile). The data frame is in meters.

c. Check the box next to Create additional points at start and end.



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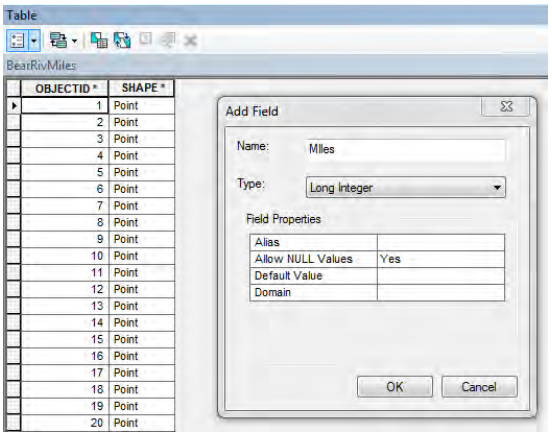
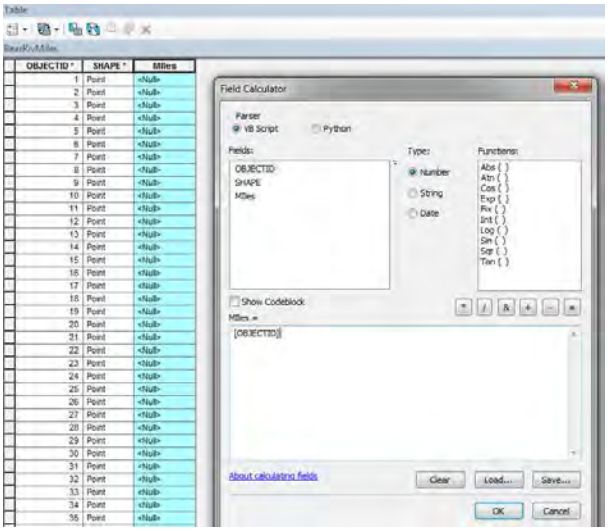
d. Click OK.

e. Save edits. Stop editing.

12. If you zoom into the BearRivDissolve layer, you can see that there are points every mile along the Bear River. If you wanted to be able to identify which mile is which, you can add a field to the BearRivMiles layer called Miles , Type Long Integer.



a. Use Field Calculator to populate Miles with the contents of OBJECTID.



b. You can then label each point with its river mile number.
I think you get about 490 miles.

Alternatively, you could look at the attribute table for flowlines and find the LengthKM column, this represents length in kilometers. If you want miles you have to divide length in KM by 1.609344 to get river miles. Add a new column and call it RMiles or something like that. Go into an edit session on this layer, then use the field calculator to make this string "LengthKM/1.609344" and it will give you miles in that column. Then select by attributes, for Bear River, save the selection as a separate file, then do the same thing.