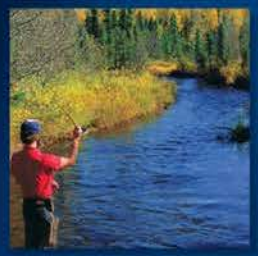
Hydrography TWG

March 9, 2017

IDAHO Department of Water Resources



Hydrography TWG

March 9, 2017

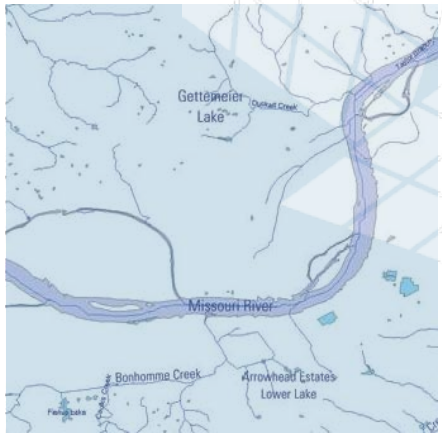
AGENDA

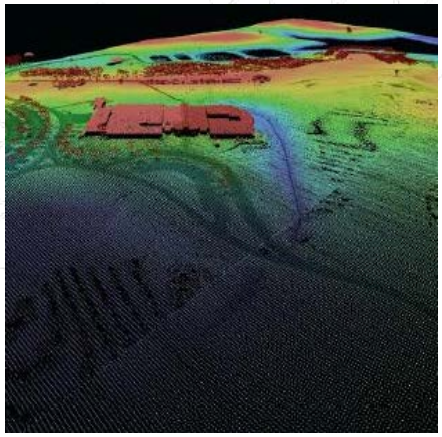
- **USGS Hydro. Related Products**
  - Al Rea, USGS
- **NHD Provisional Name Tool**
  - Mike Tinker, USGS
- **Other Updates**
- **Other Business**
- **Upcoming Events**
- **Next TWG**

  Sept. 14. 2017

The Hydrography Alphabet Soup:

NHD, WBD, 3DEP, NHDPlus, NWIS, HEM, NLDI, and Ele-Hydro





USGS science for a changing world

The National Map
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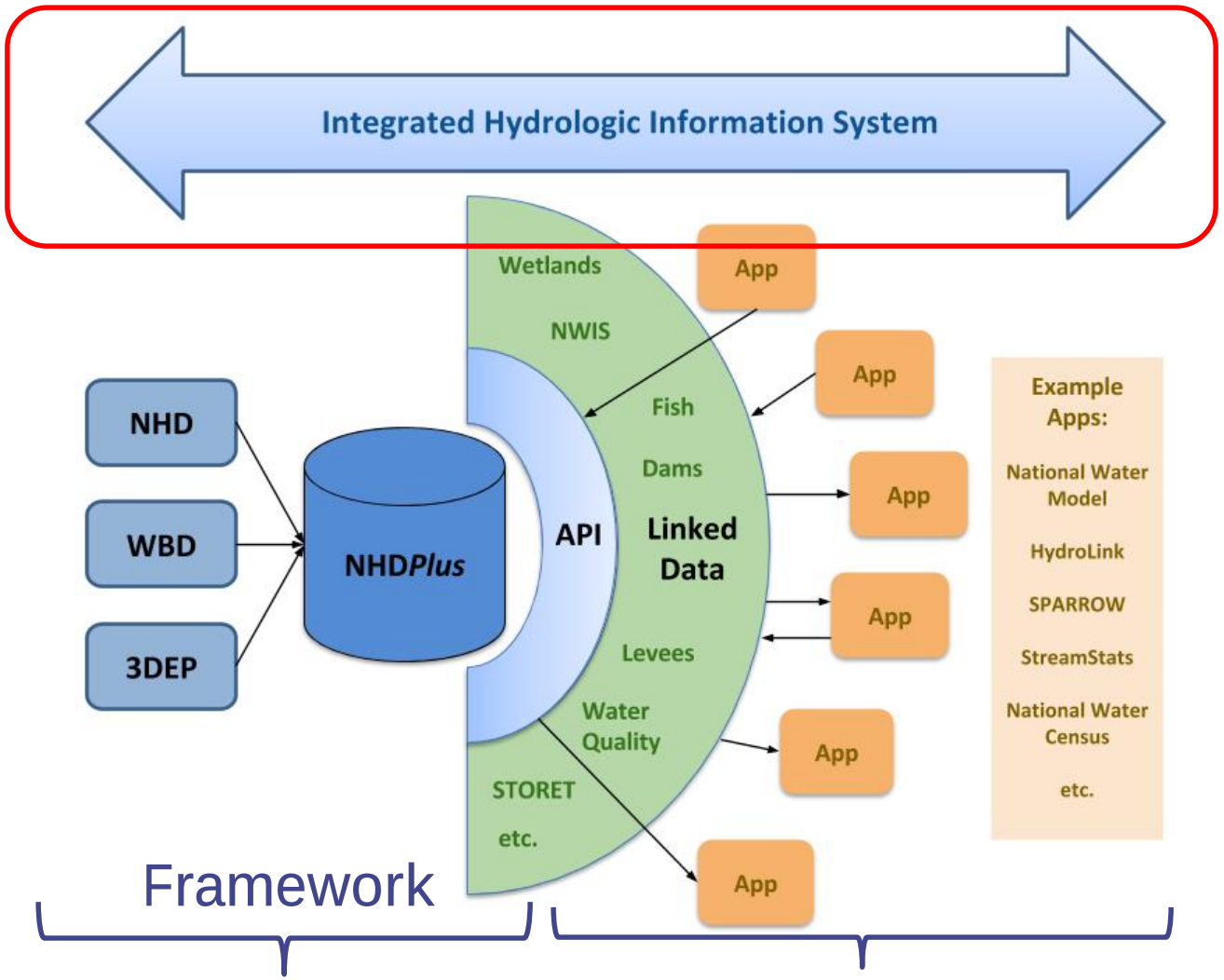
Al Rea
USGS National Hydrography Co-Lead
March 9, 2017

National Hydrography Mapping



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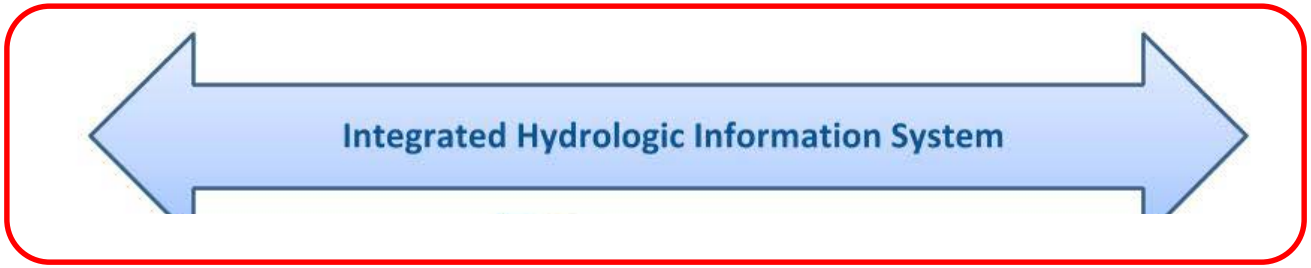

- Provides a networked foundation for **Big Data** analysis of water information
- Analogous to the **street addressing system** used to deliver a package
- Similarly, we need **one standard** addressing system for all water in the nation that is:
  - Non-proprietary, Public domain, Authoritative = **Open for Everyone**
  - Usable by and useful for **government, businesses, citizens**
- **Data can be linked** to the framework
- **Applications** can be built on the framework
- Tools can **navigate the framework** to discover related data

National Hydrography Mapping

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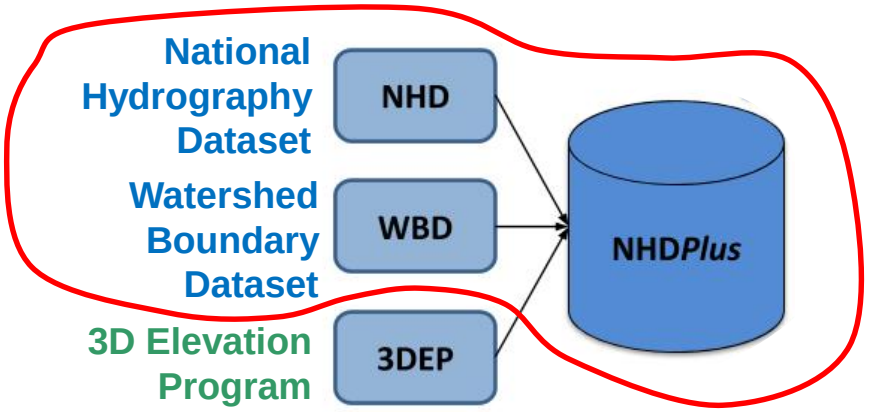
National Geospatial Program

- **Topographic Data Services**
- **National Geospatial Technical Operation Center**



Hydrography Program

FGDC.GOV
FEDERAL GEOGRAPHIC DATA COMMITTEE

- **NGDA Water Inland Theme (NHD, WBD, NWI, Dams, Levees)**
- **Subcommittee on Spatial Water Data**
  - **Open Water Data Initiative**

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National Hydrography Mapping

Who is who?

The Core National Hydrography Team

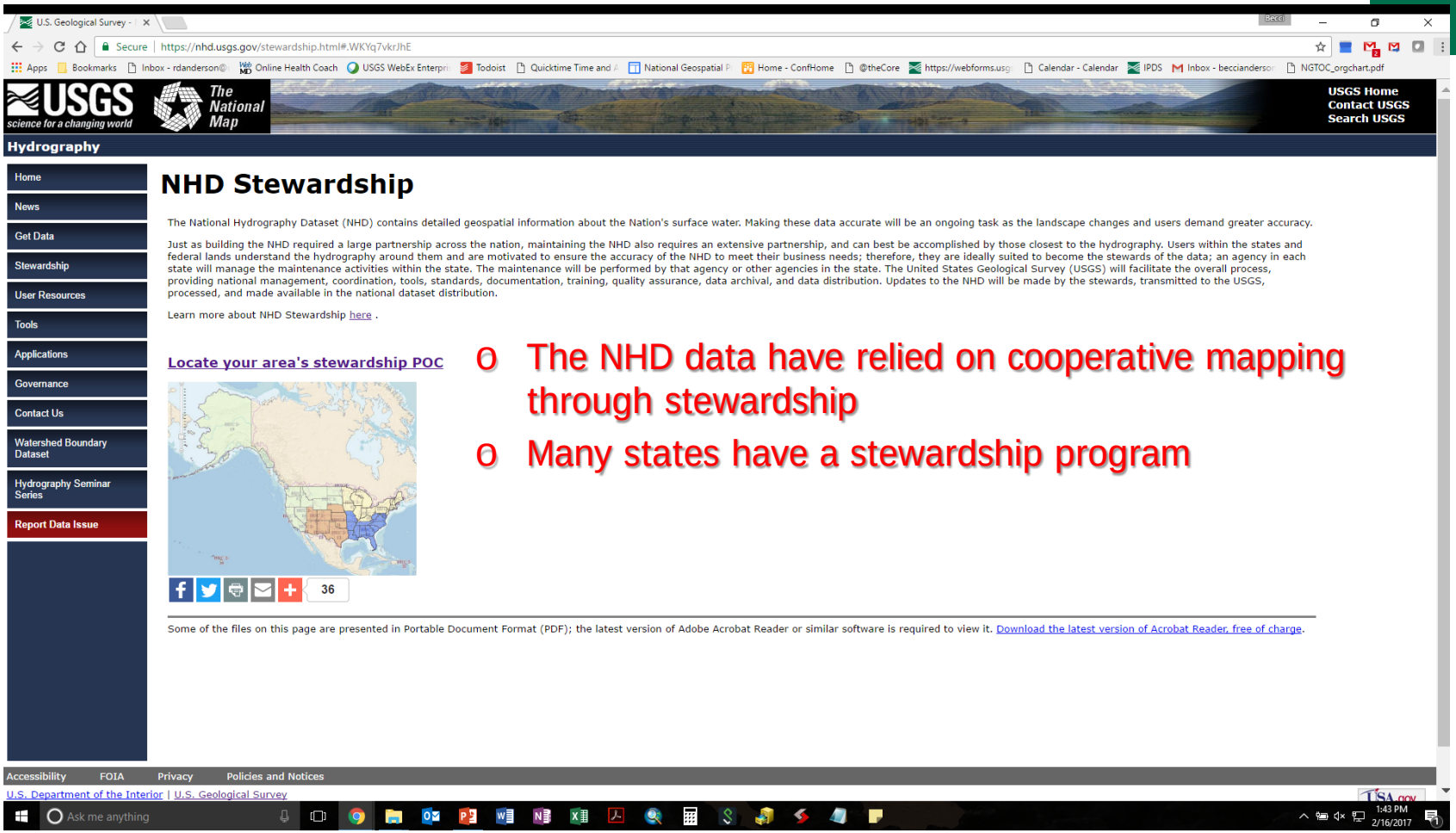
Co-manage hydro data

Becci Anderson – National Hydrography Co-Lead (NHD)
Al Rea – National Hydrography Co-Lead (NHD)
Sue Buto – National WBD Team Lead
Steve Aichele – Water COU Lead / HRBS Data needs and req
Ellen Finelli – Technical Operational Lead Making the data
Paul Kimsey – Partner Support Section Chief Supporting the data

Stewards!

National Hydrography Mapping

Stewardship



NHD/WBD Stewardship

2007 Totals	**5,874,622**
USGS	5,843,504
Stewards	31,118
2008 Totals	**7,181,651**
USGS	6,734,423
Stewards	447,228
2009 Totals	**4,400,029**
USGS	3,875,399
Stewards	524,630
2010 Totals	**2,302,403**
USGS	1,740,244
Stewards	562,159
2011 Totals	**2,993,610**
USGS	2,457,811
Stewards	535,799
2012 Totals	**3,258,054**
USGS	2,330,993
Stewards	927,061
2013 Totals	**3,561,570**
USGS	772,152
Stewards	2,789,418
2014 Totals	**5,828,657**
USGS	1,859,958
Stewards	3,968,699
2015 Totals	**2,502,973**
USGS	1,136,268
Stewards	1,366,705
2016 Totals	**3,544,313**
USGS	2,404,210
Stewards	1,140,103
Grand Total	**41,447,882**

2007 - Three partner agencies editing
2008 - Nine partner agencies editing
2009 - Thirteen partner agencies editing
2010 - Eighteen partner agencies editing
2011 - Sixteen partner agencies editing
2012 - Twenty partner agencies editing
2013 - Twenty Five partner agencies editing
2014 - Twenty Six partner agencies editing
2015 - Twenty Two partner agencies editing
2016 - Twenty Six partner agencies editing

Why is this important?

Partner contributions 2007-present 12,292,920 accounting for (30%) of the total feature edits. Maintaining and improving a national dataset requires the combined resources of many agencies

USGS edits 2007-present 29,154,962 (70%)

.005%

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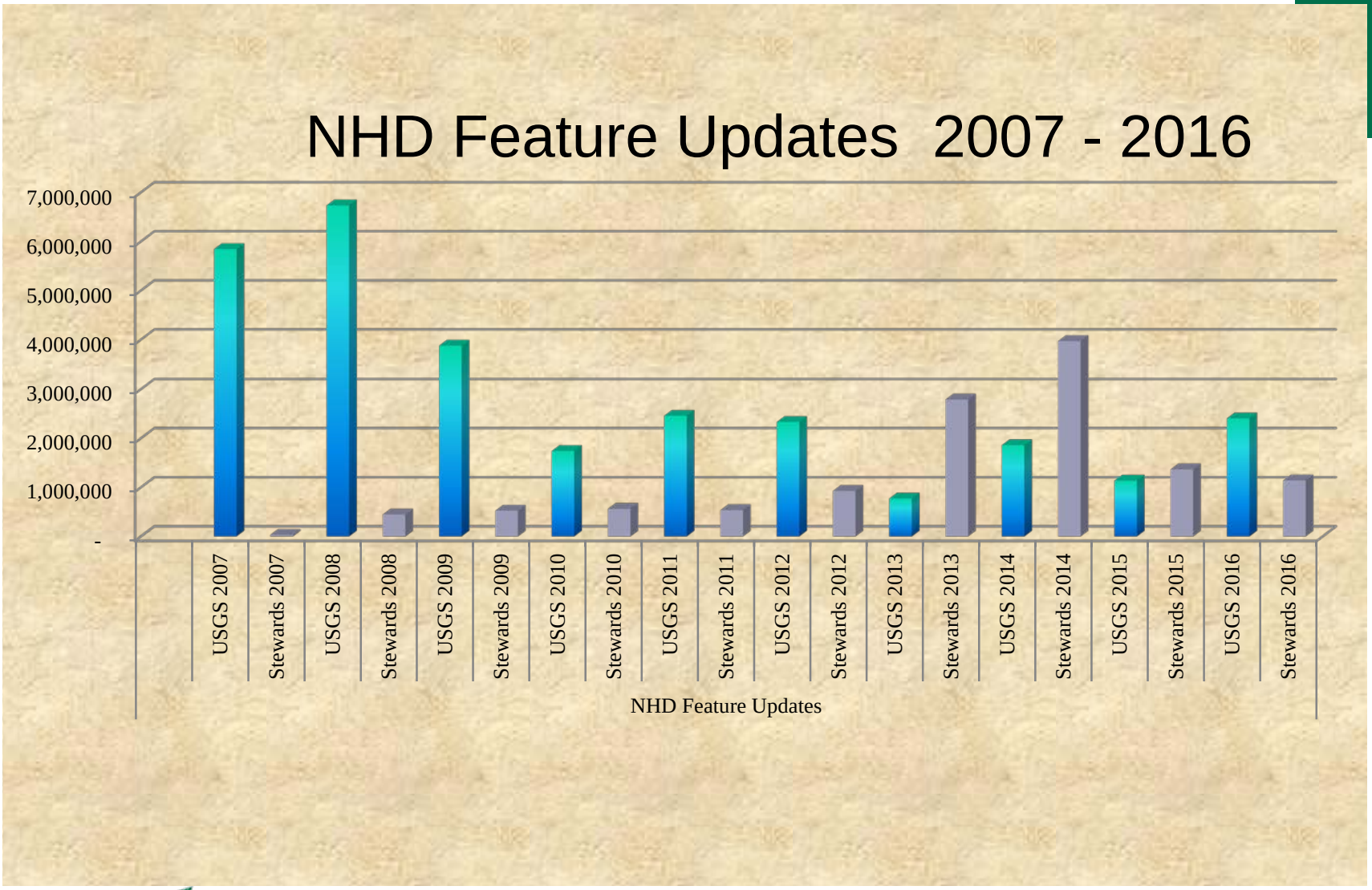
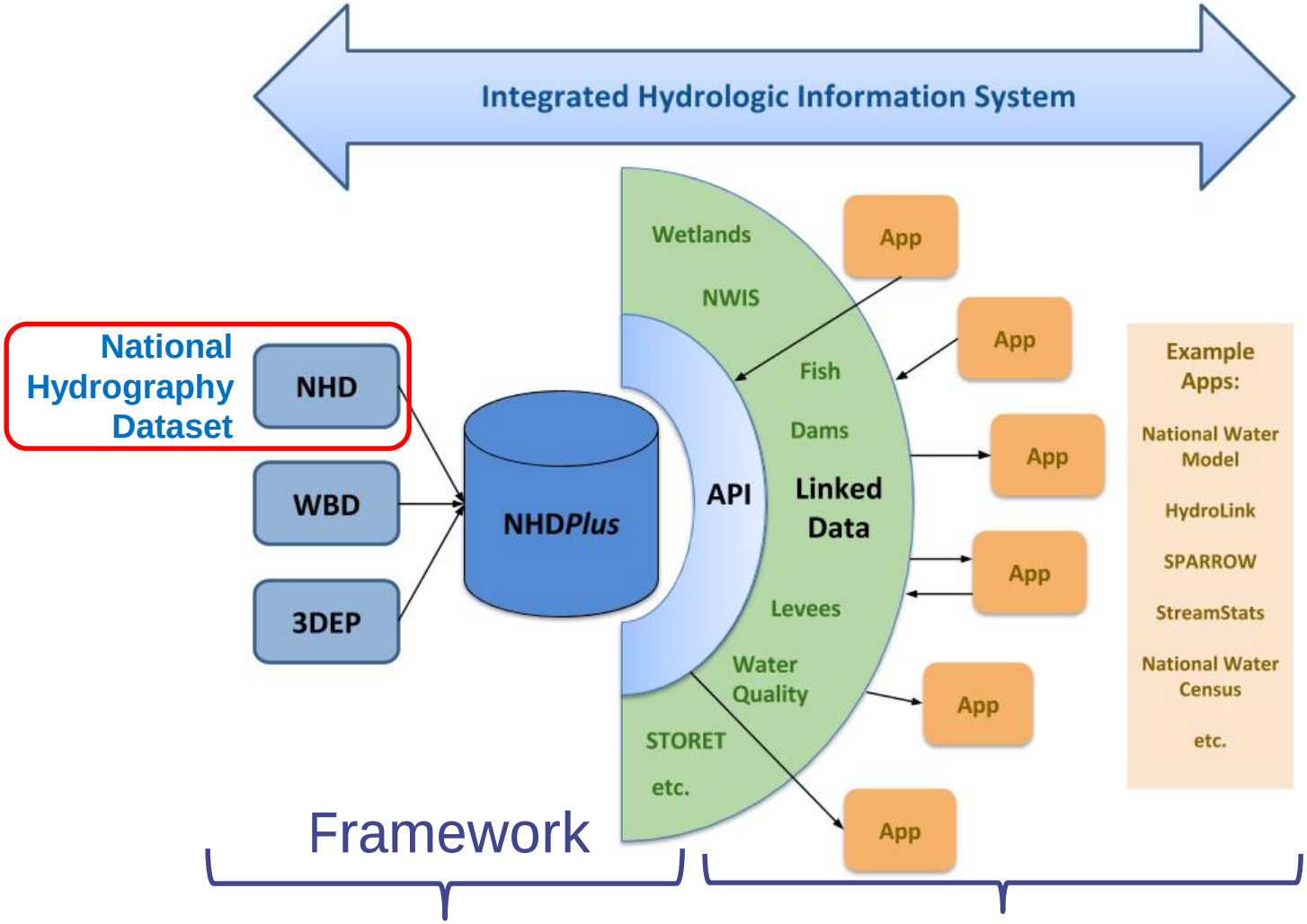
NHD/WBD Stewardship



National Hydrography Dataset



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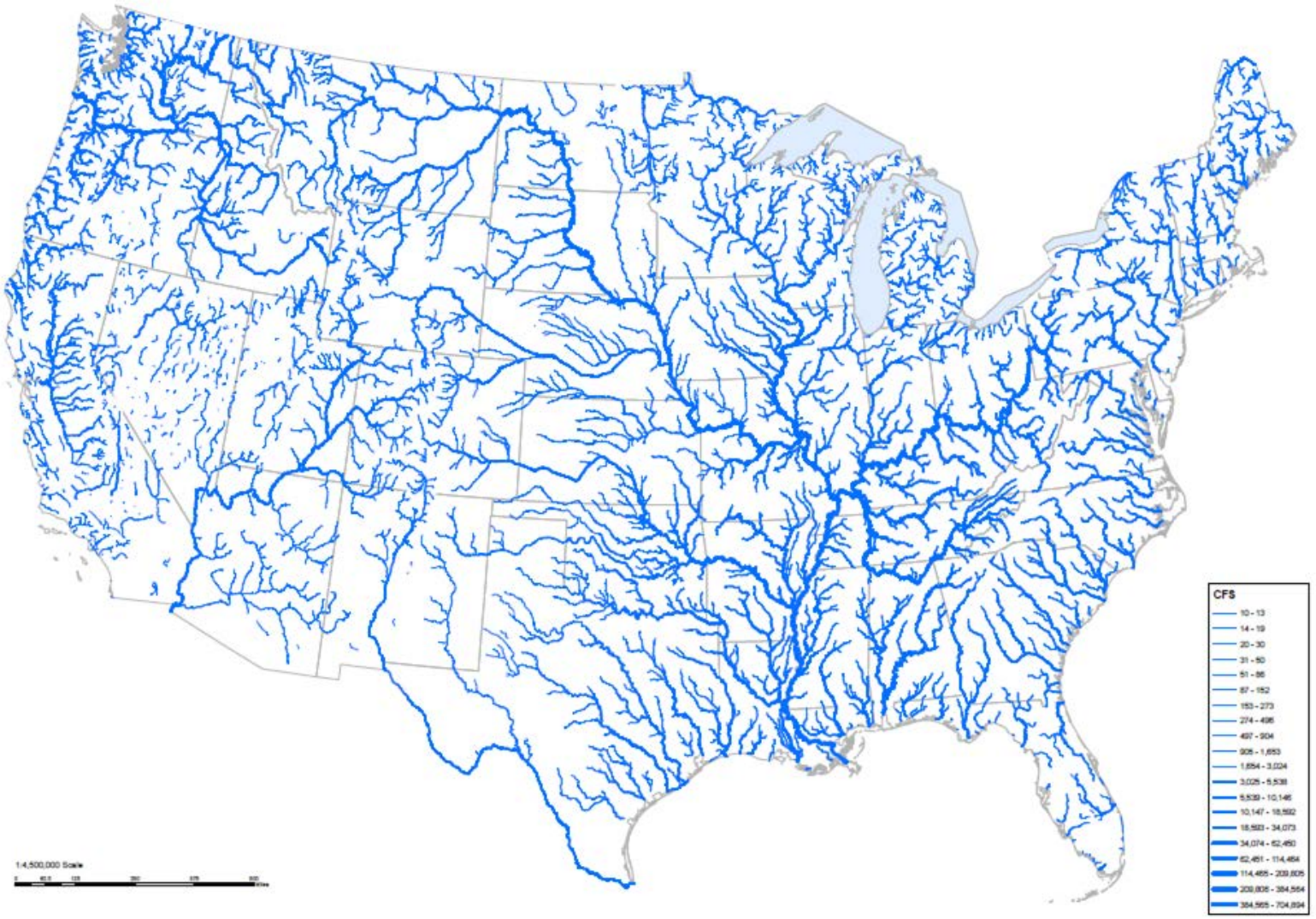
National Hydrography Dataset



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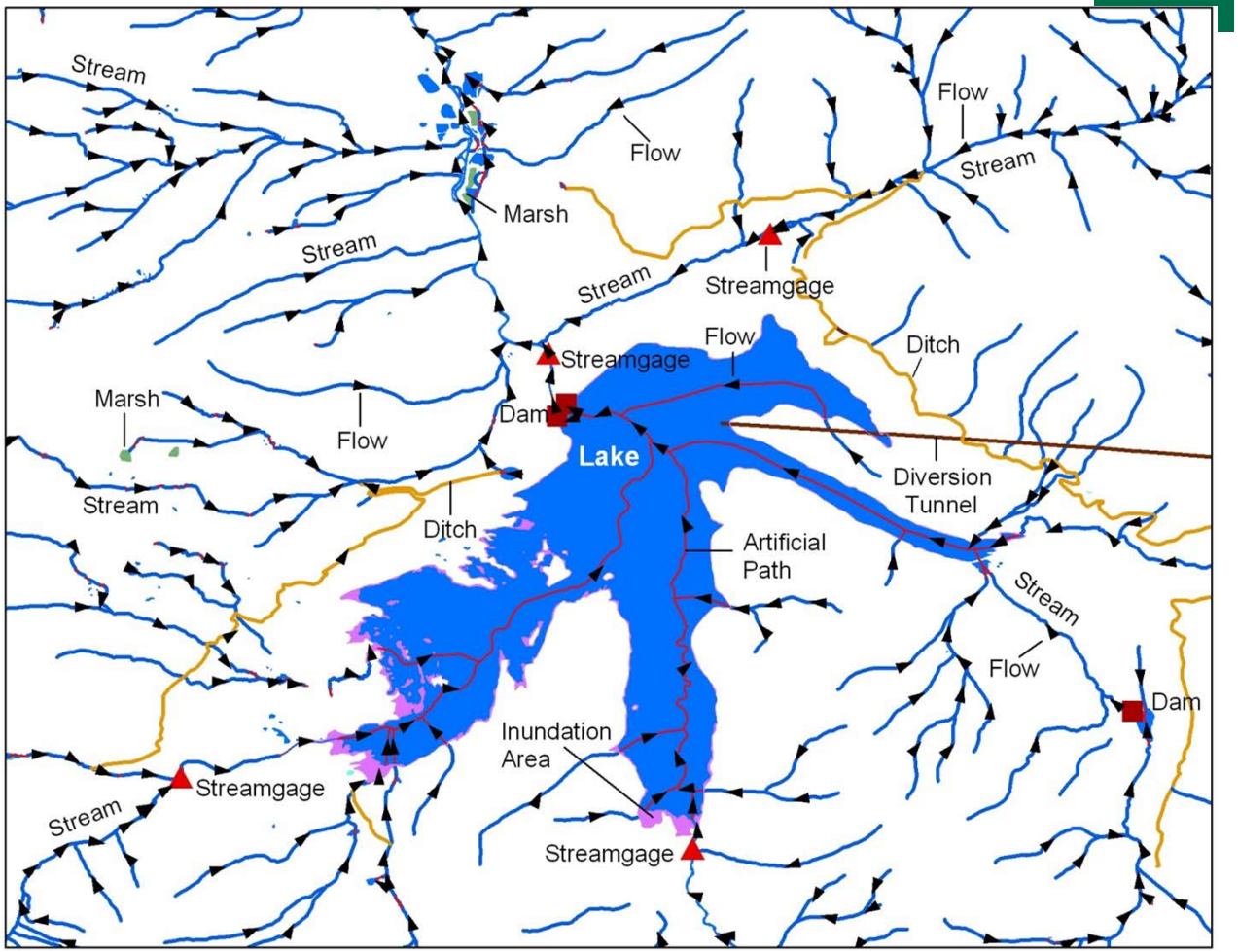
What is the National Hydrography Dataset?

Surface water features found on topographic maps

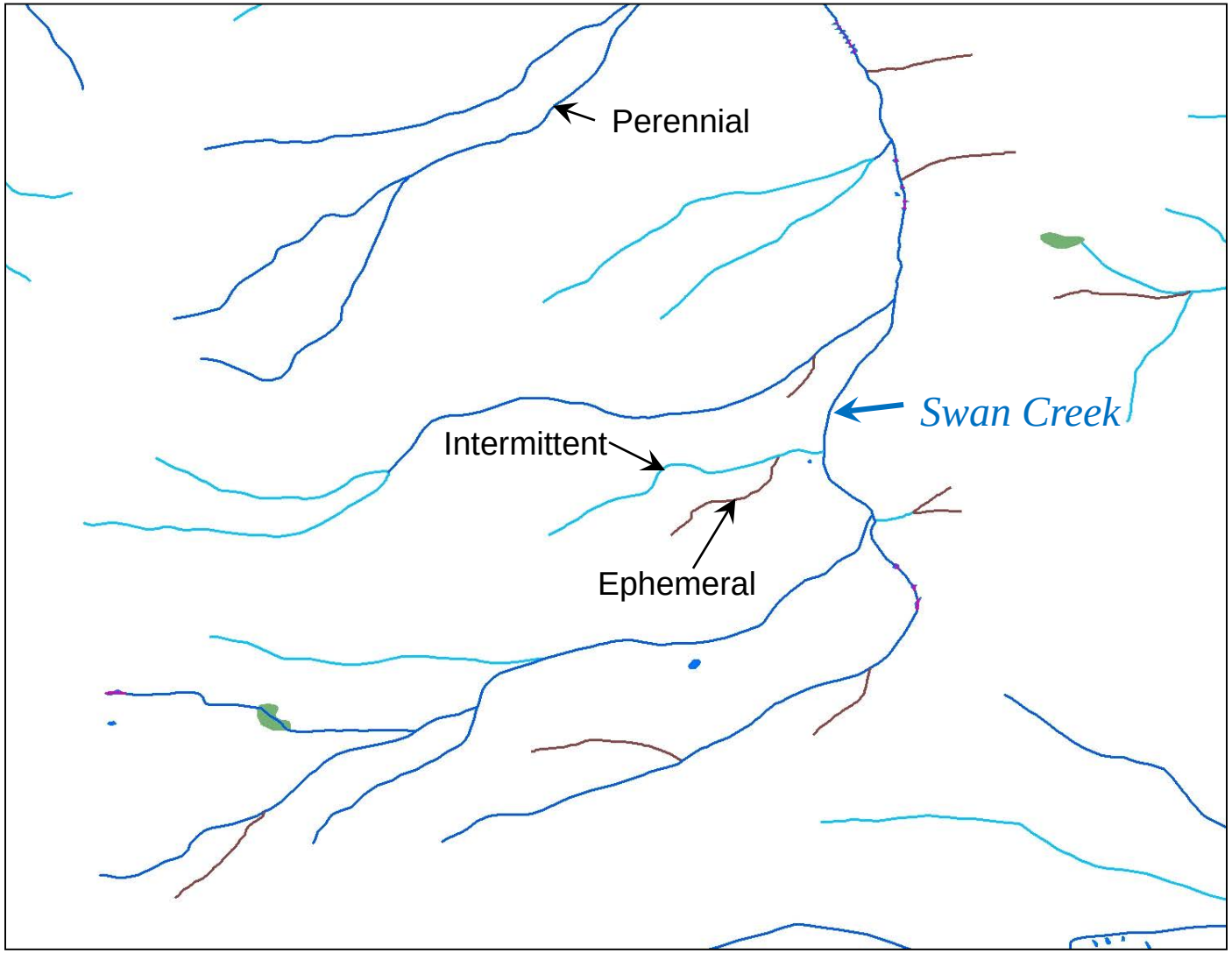
National drainage network of rivers and streams, plus other hydro info

Currently maintain 24k – Local Res Version (63k – 24k in AK)

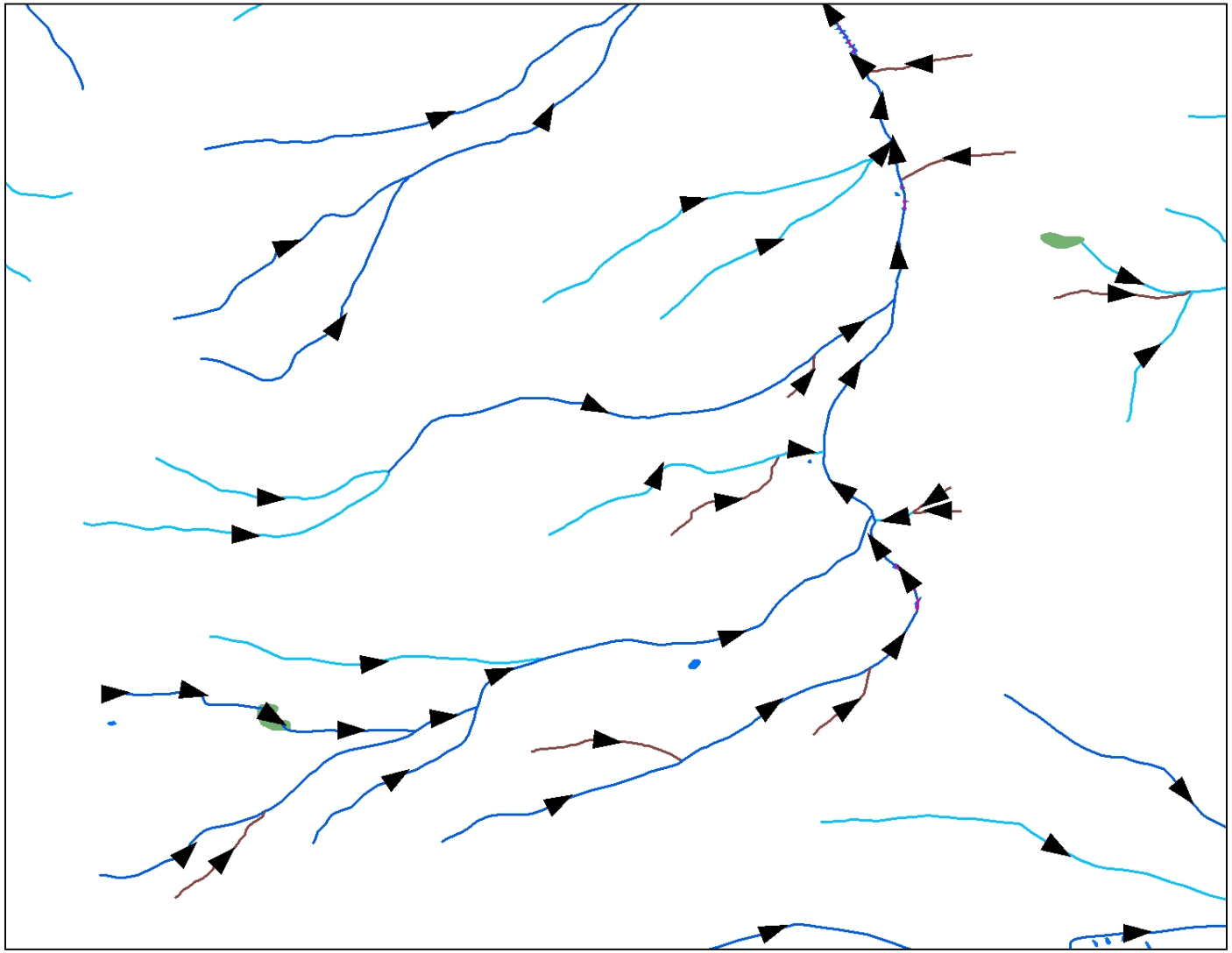
Shapefile and GDB downloads plus services



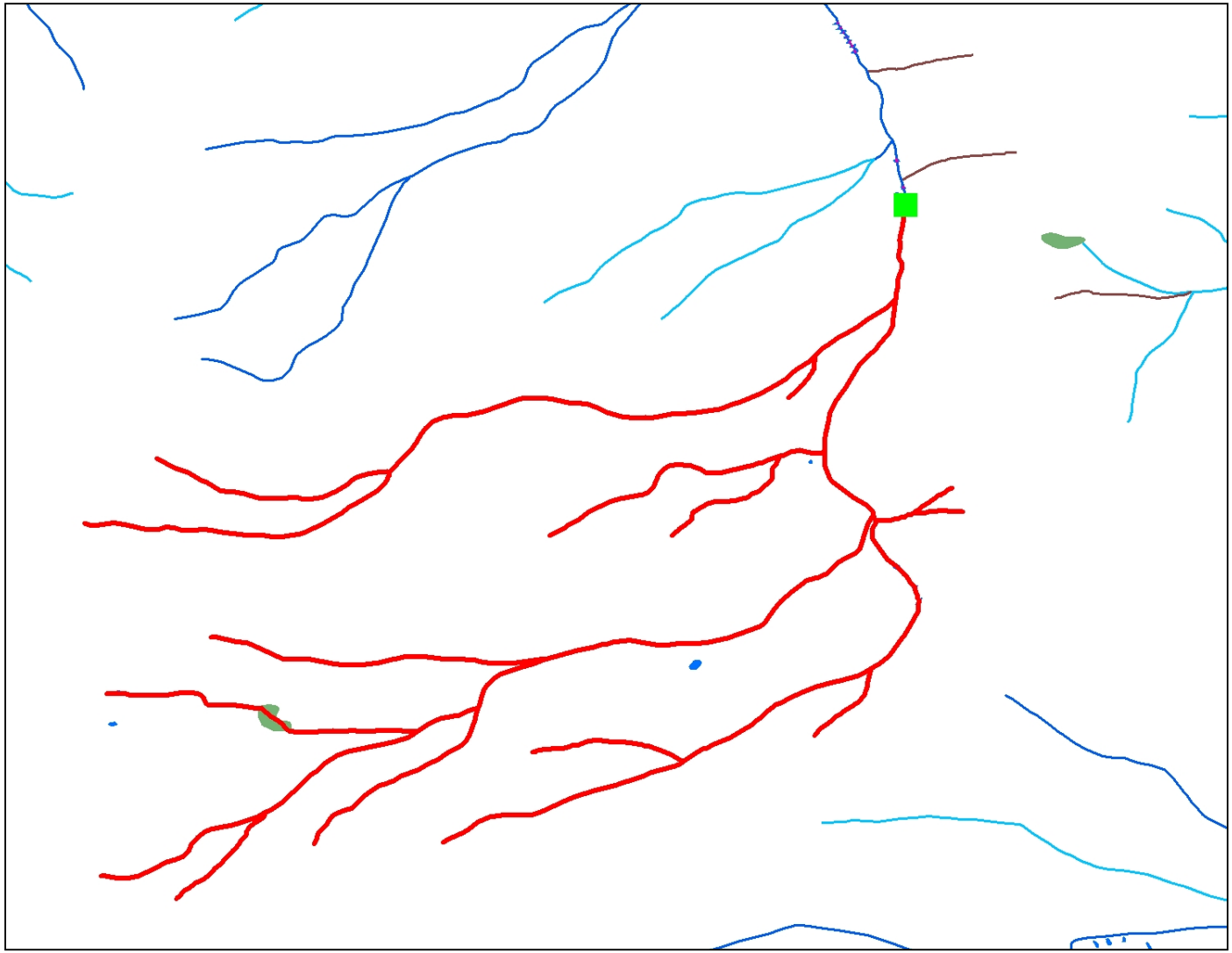
Attributes Provide Basic Intelligence



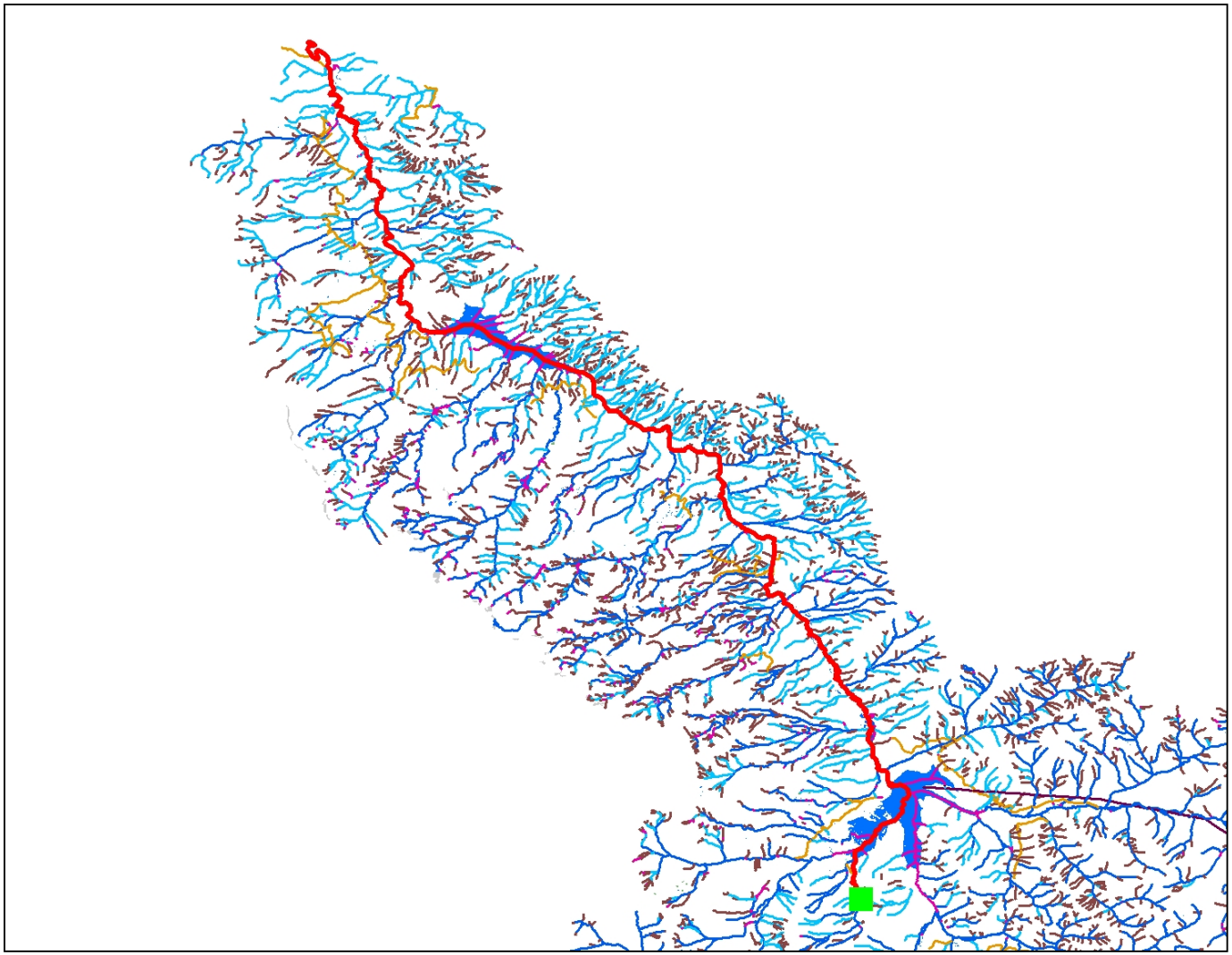
Flow Direction – A Key Piece of Intelligence



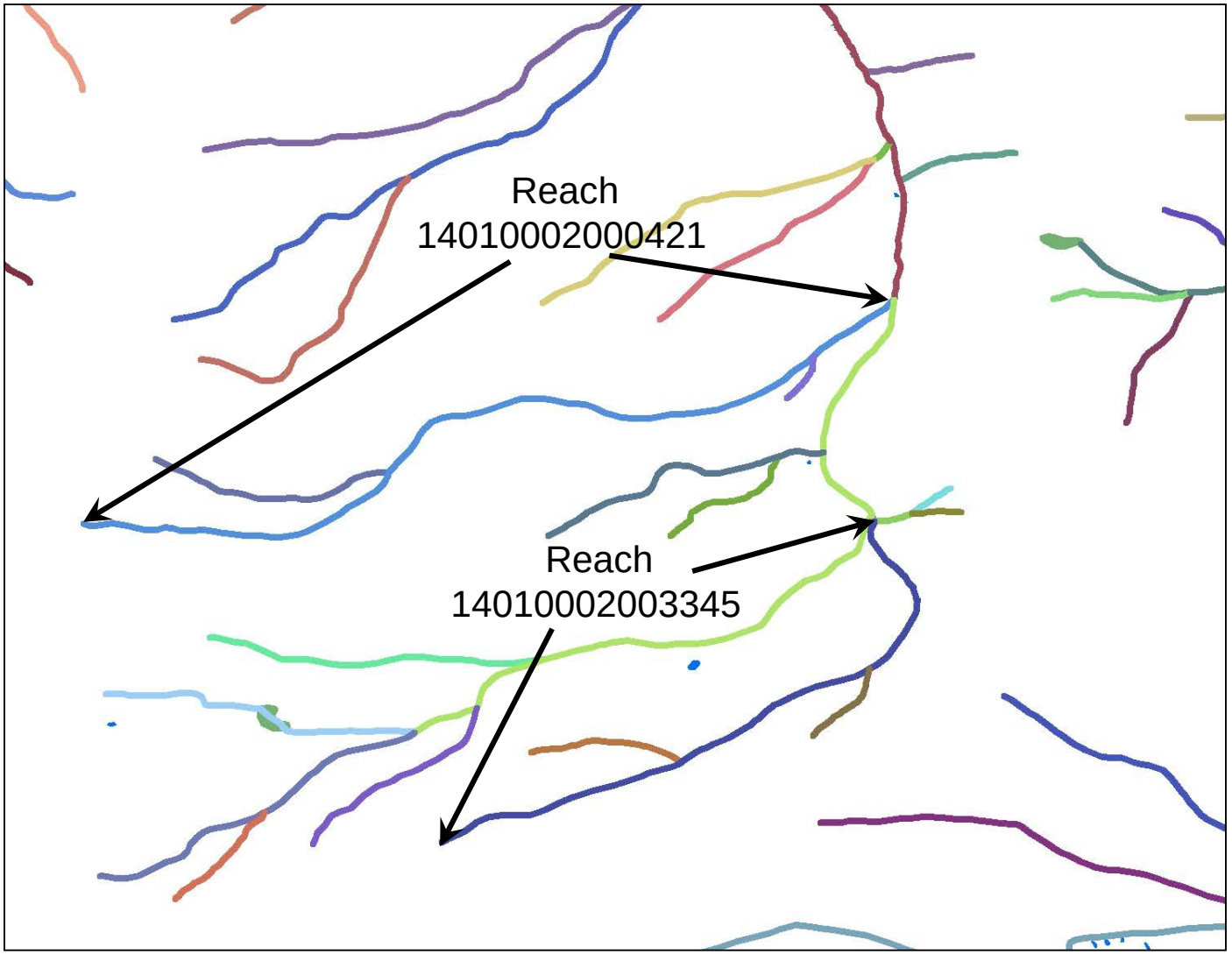
Navigation – The Basis for Analysis



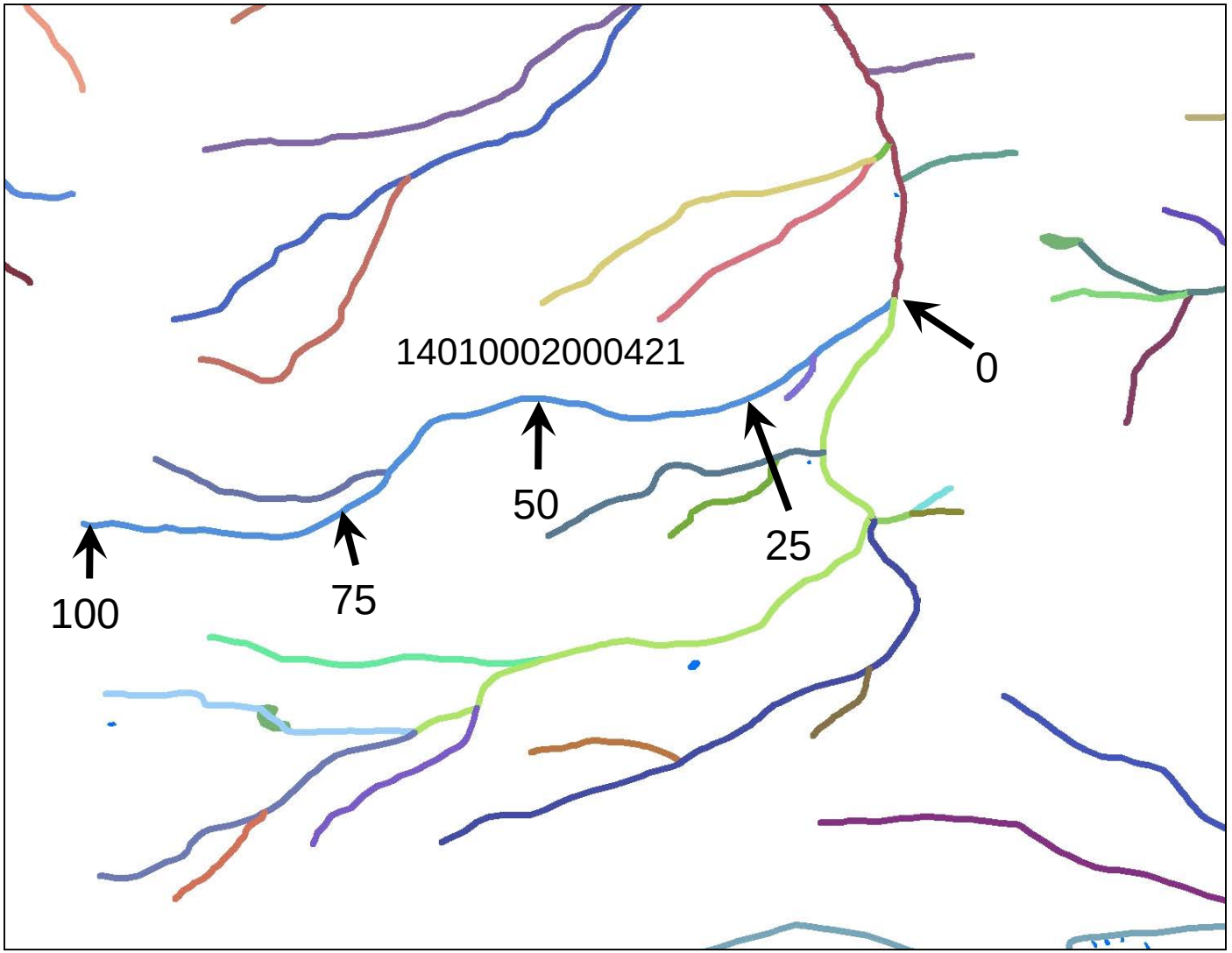
Navigation – Where Does a Toxic Spill Go?



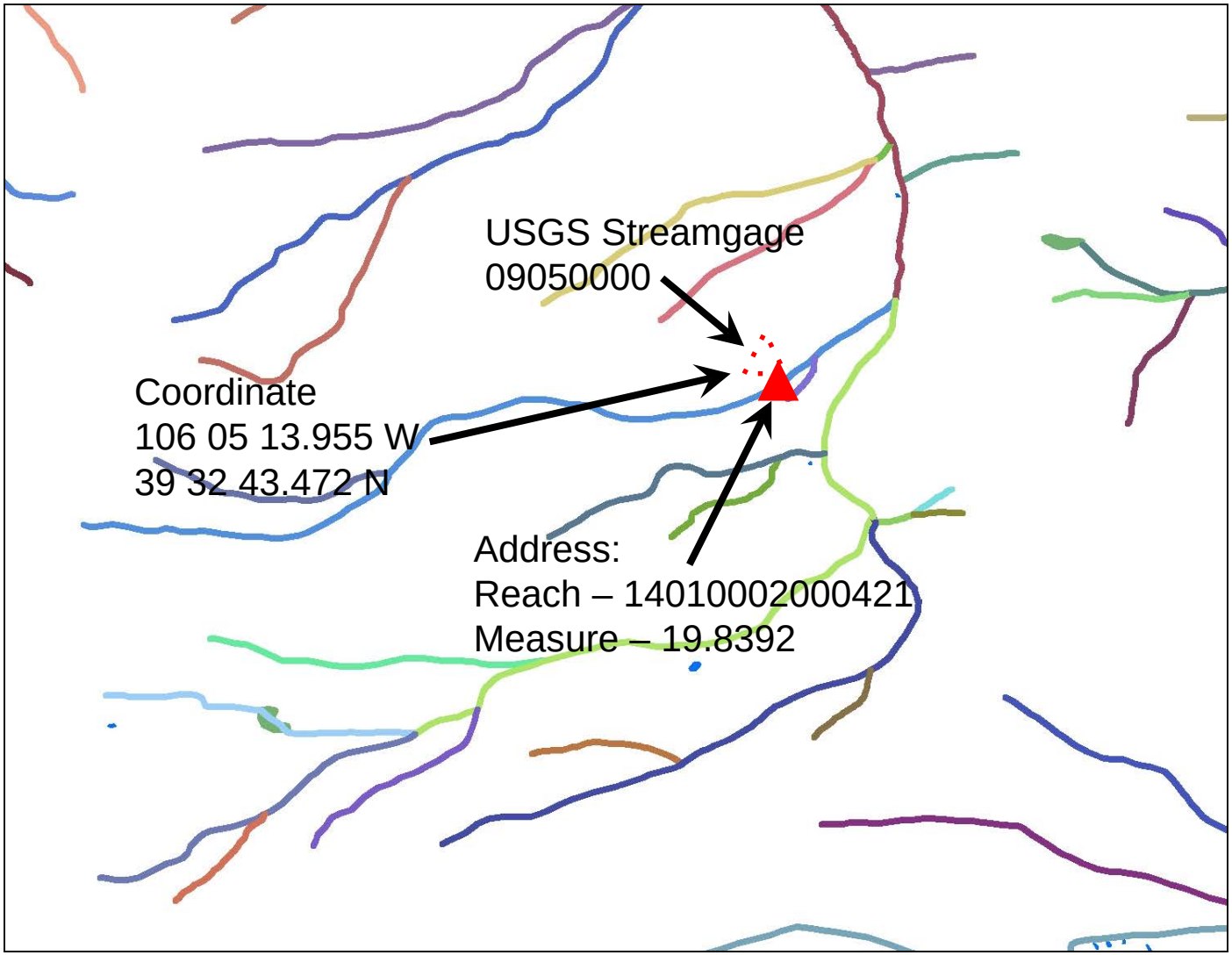
Linear Referencing – Stream “Reaches”



Linear Referencing – Stream Addresses

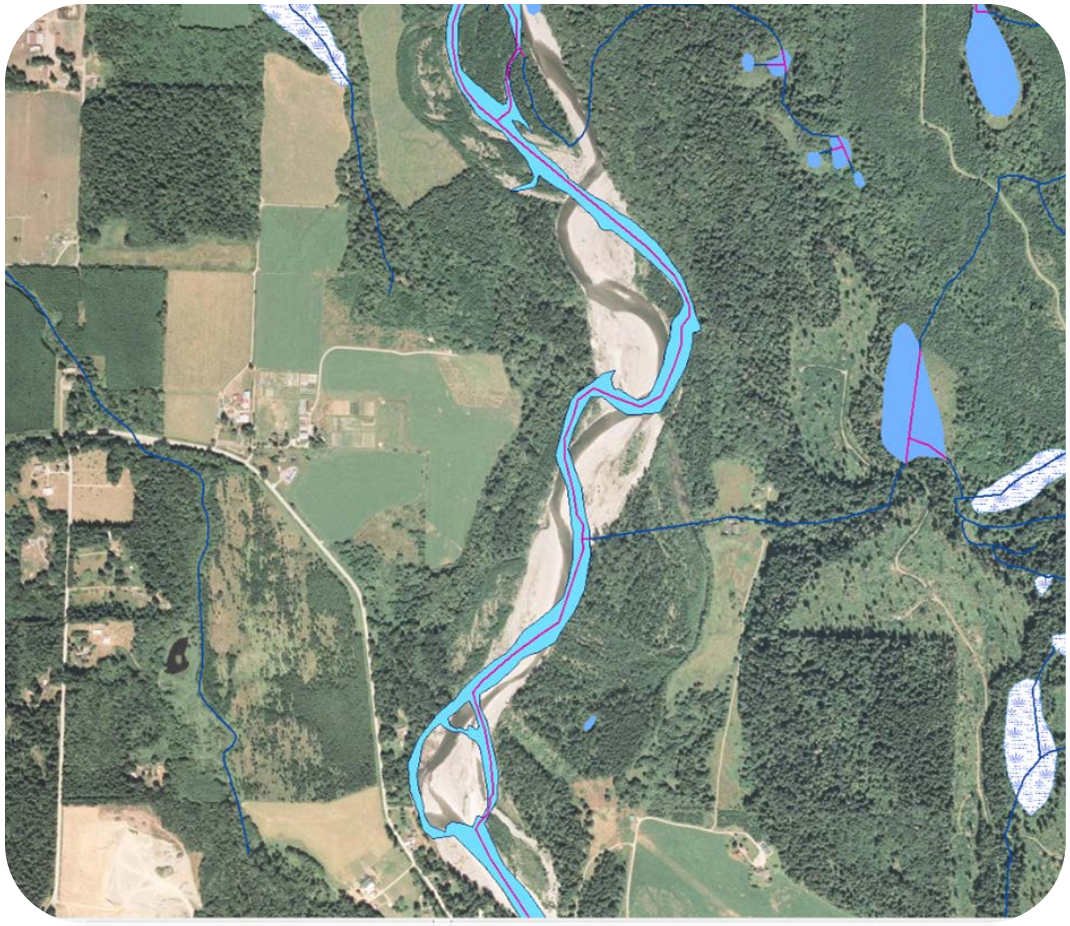


Linear Referencing – Data "Events"

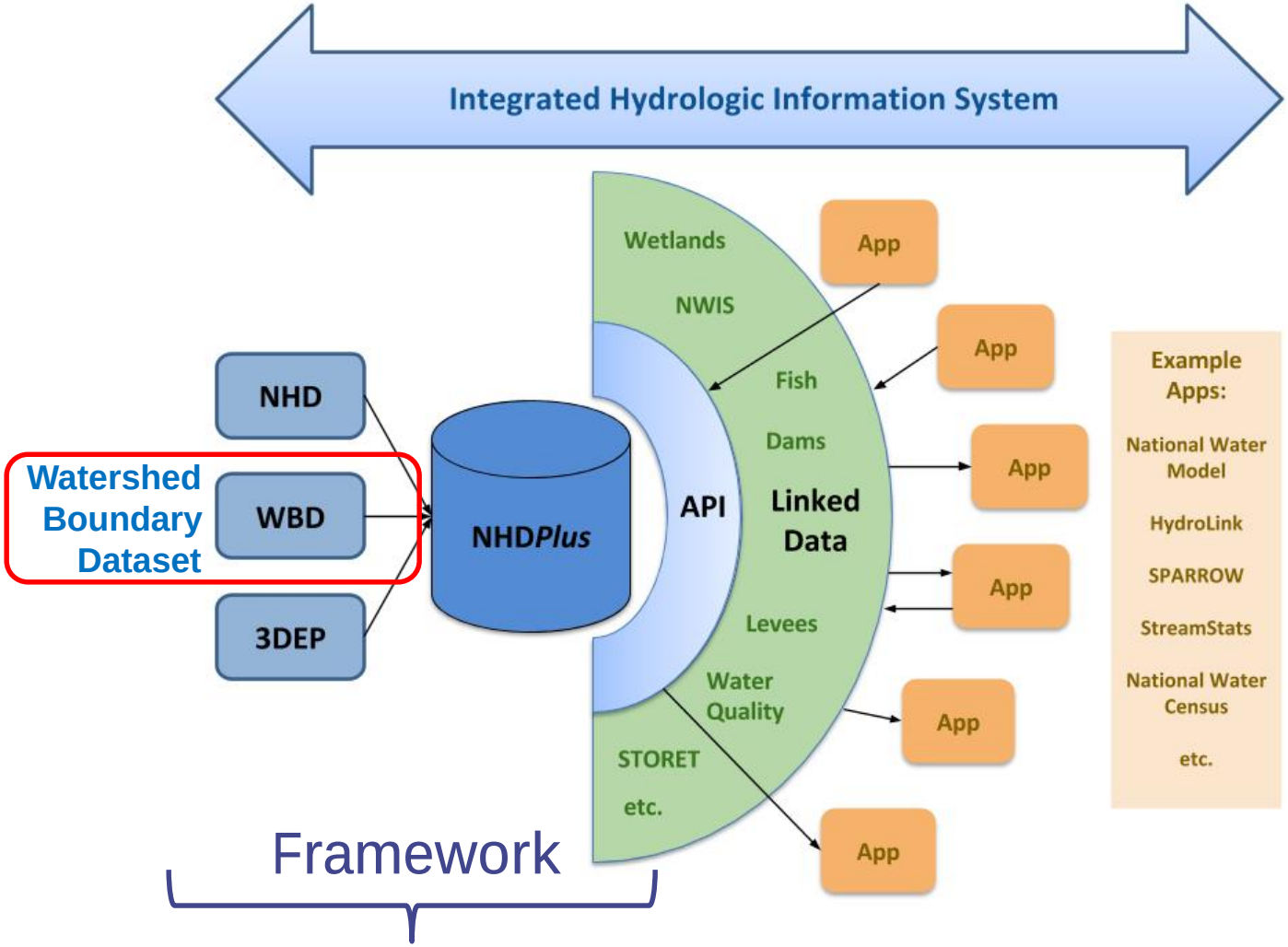


Editing the NHD to Keep Up with Change

Maintaining constantly changing features in the NHD



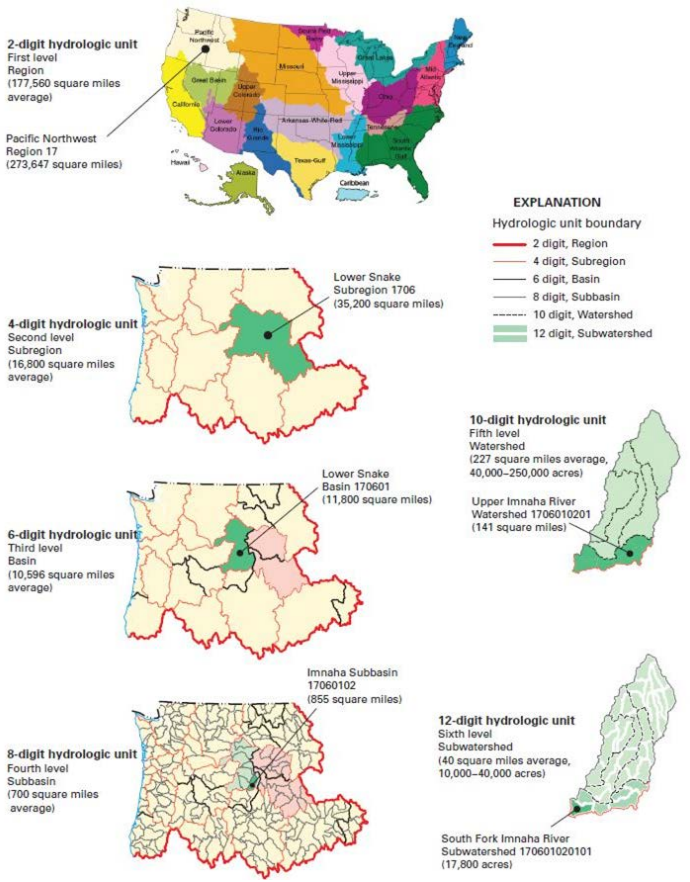
National Hydrography Mapping



Watershed Boundary Dataset

Overview

- WBD is a seamless baseline drainage area framework for the Nation
- Boundaries are defined by hydrographic and topographic criteria with no regard for administrative boundaries
- Delineated in a nested multi-level, hierarchical drainage system.
- Each level assigned a progressive 2-digit Hydrologic Unit Code (HUC) which describes where the unit is in the country and the “level” of the unit



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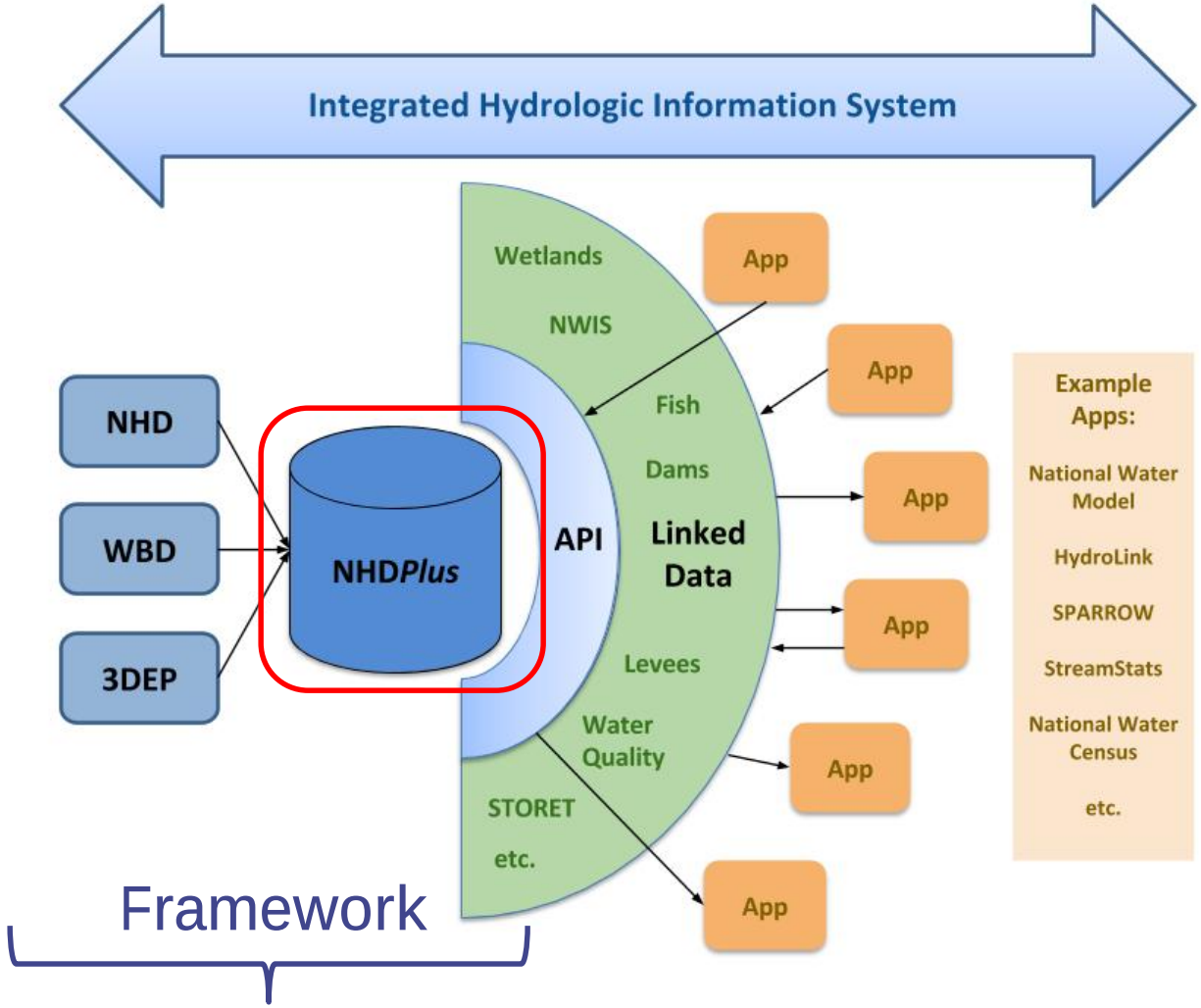
What's Next for WBD?

Current and Future WBD Line Source

- Hand delineated, dated source material
- The WBD team is evaluating how and where WBD and NHDPlusHR catchments don't align
- Lessons from automated delineation work in MatSu
- **HUs that are defined as an accumulation or collection of whole catchments**

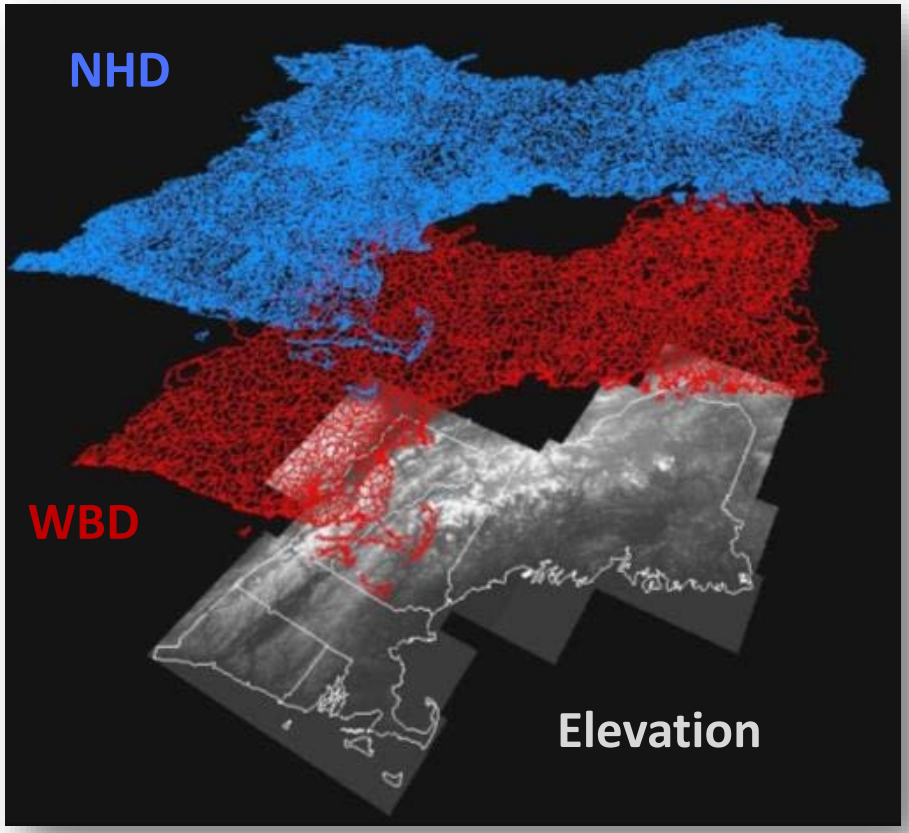
National Hydrography Mapping

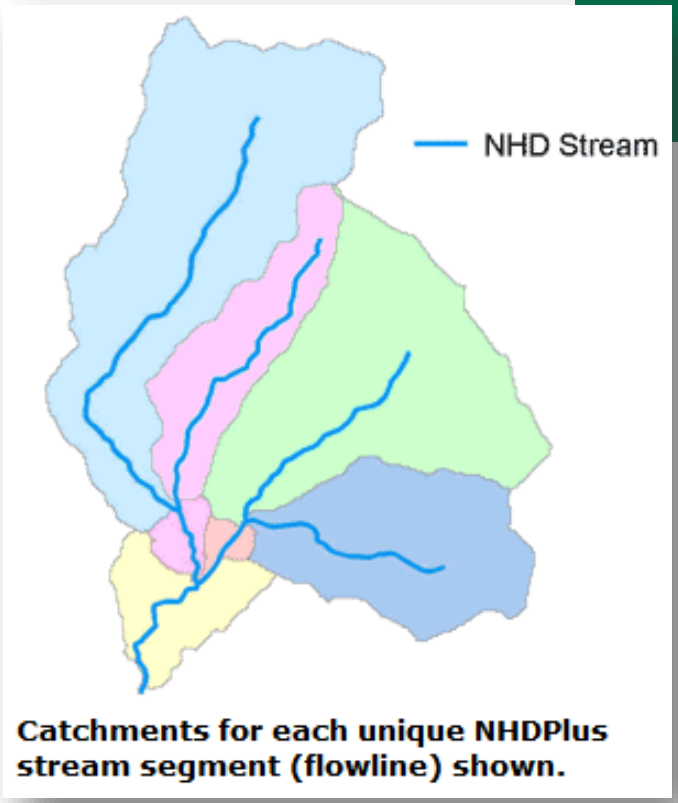


National Hydrography Dataset Plus - NHDPlus

Medium Resolution created for CONUS

High Resolution in work for CONUS and AK





Catchments for each unique NHDPlus stream segment (flowline) shown.

Incorporates

- Hydrography
- Boundaries
- Elevation

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NHDPlus v2 (Medium Resolution)

Components

- Greatly improved 1:100K National Hydrography Dataset (**NHD**)
- Greatly improved 1 arc-second (approximately 30 meter ground spacing) National Elevation Dataset (NED)
- Nationally complete Watershed Boundary Dataset (**WBD**)
- A set of value added attributes (**VAA**) to enhance stream network navigation, analysis and display (inc. stream order)
- An elevation-based **catchment** for each flowline in the stream network
- Catchment characteristics
- Headwater node areas
- Cumulative drainage area characteristics
- **Flow direction, flow accumulation and elevation grids**
- Flowline min/max elevations and slopes
- Flow volume & velocity estimates for each flowline in the stream network
- Catchment attributes and network accumulated attributes
- Various grids from the hydro-enforcement process including the hydro-enforced DEM

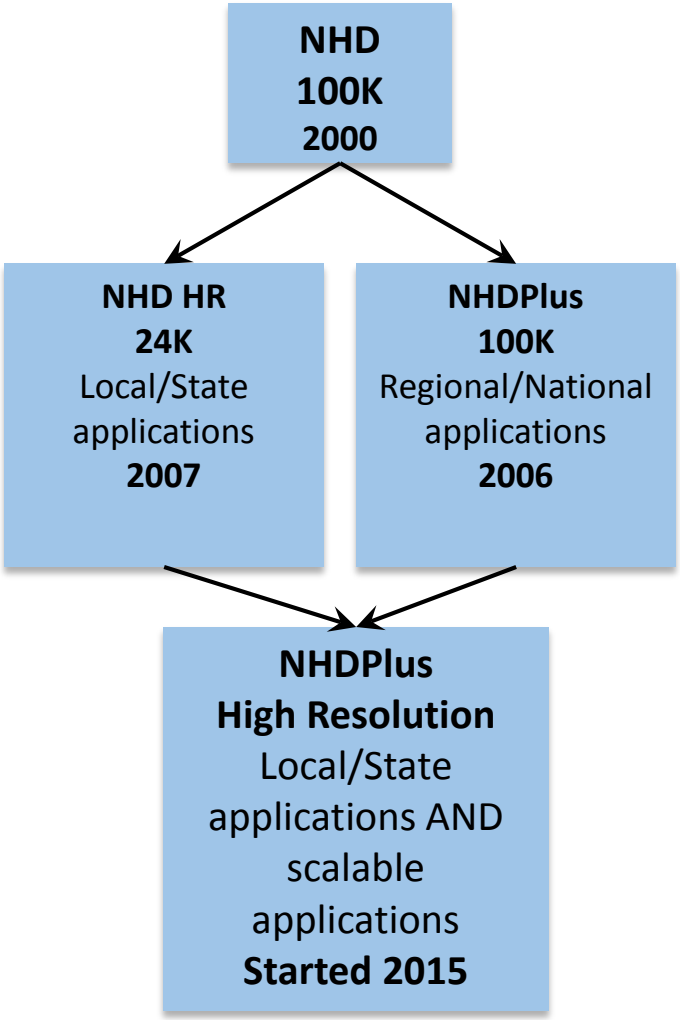
NHDPlusHR

Taking NHDPlus v2 (MedRes) to a new level

The best of 24K+ data and NHDPlus

Addresses the need for a single hydrographic frame of reference

Link data to one network and generalize to many different scales



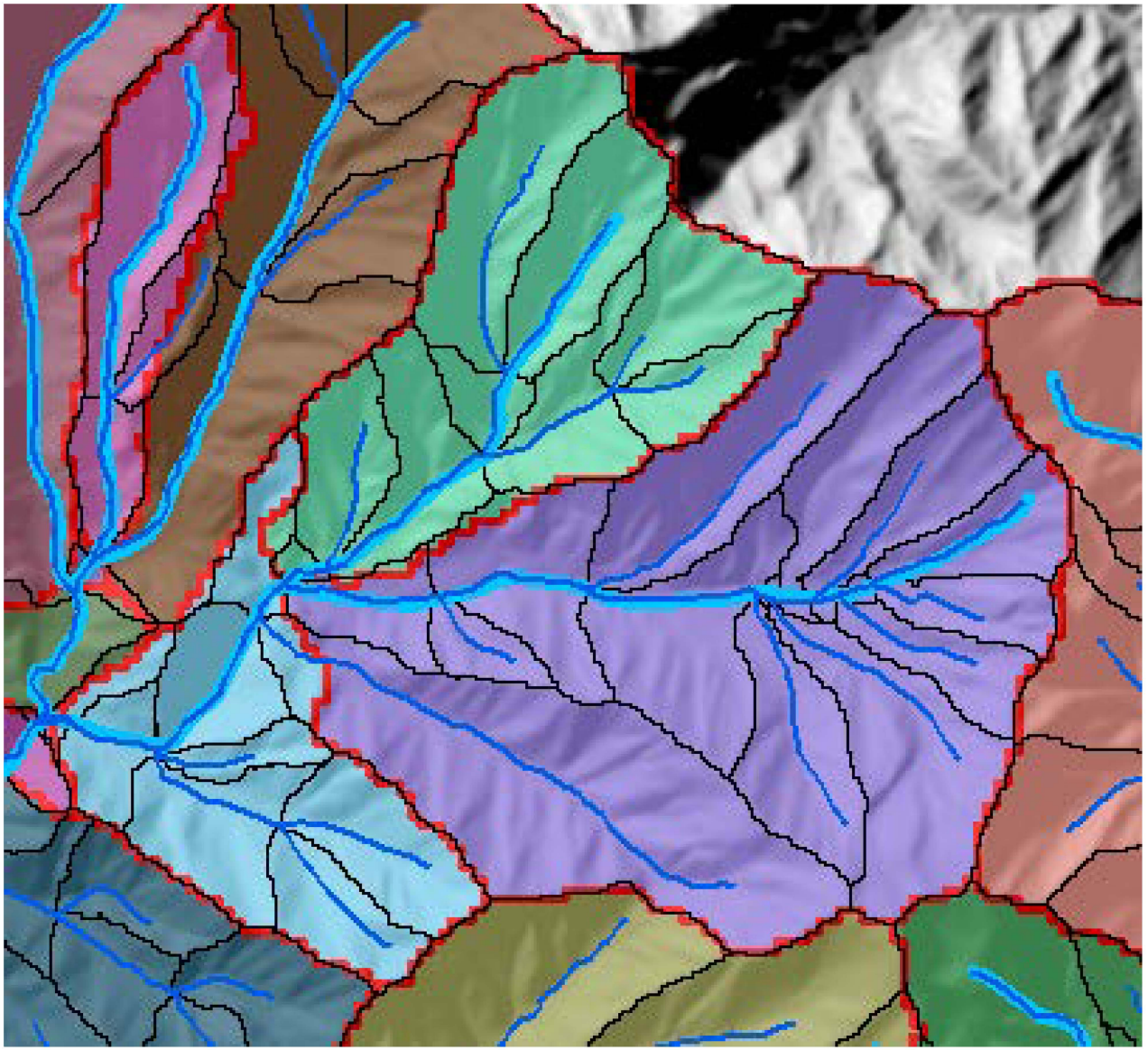
NHD Data Suite Comparison

- NHDPlus (both resolutions) is made from the combination of elevation data, hydrography data (NHD), and watershed boundaries (WBD)

- NHDPlusHR uses higher resolution input data

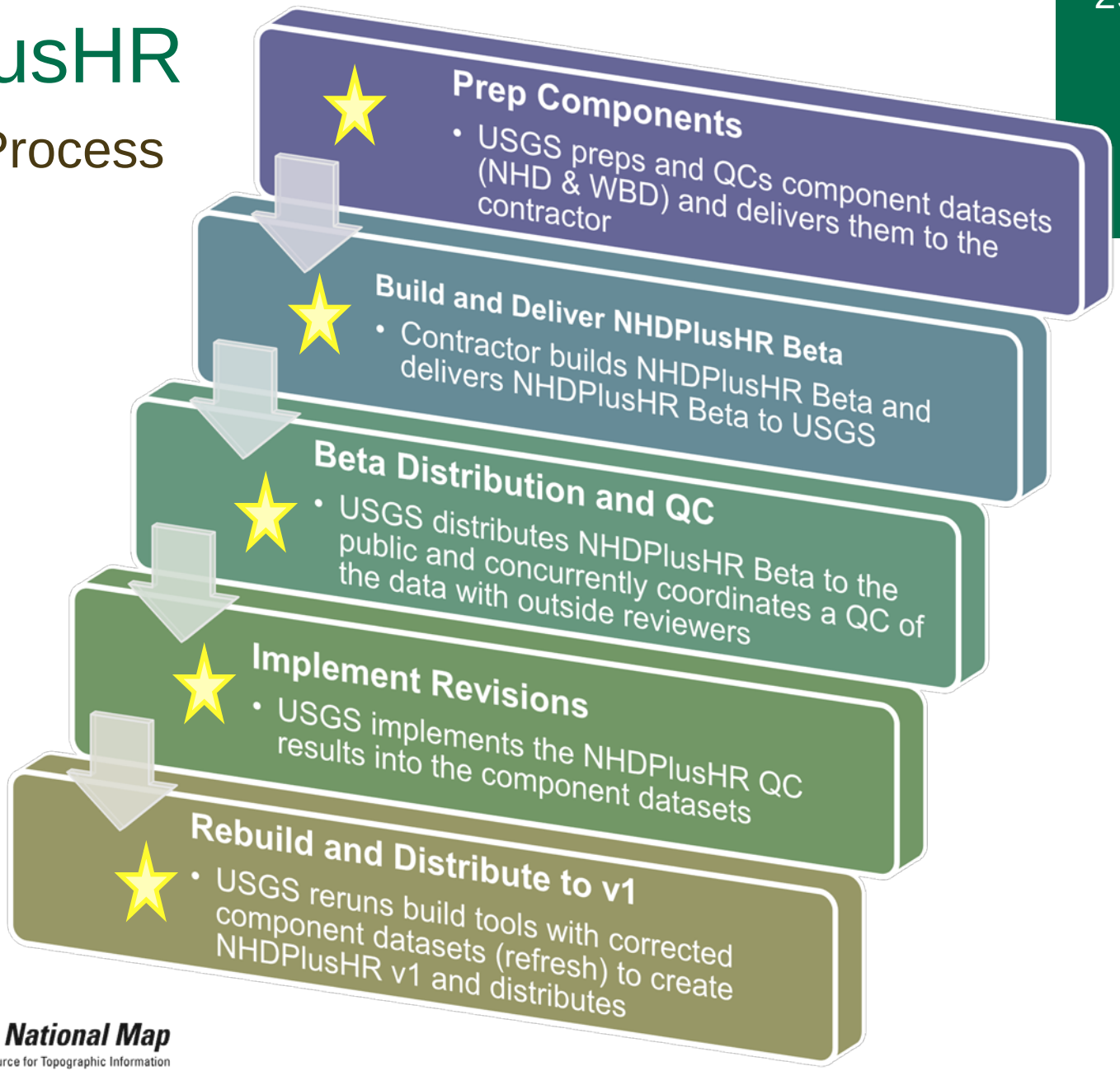
		NHDPlus v2 (Med Res)	NHDPlus - High Res
	Number of features	3 Million nationally	33 Million nationally
Component Datasets	**Elevation Input**	National 1 Arc-Second Seamless DEM (30 meters)	National 1/3 Arc-Second Seamless DEM (10 meters)
	NHD Input	Medium Resolution NHD 100K	High Resolution NHD 24K - Local
	WBD Input	Composite 2010-2012	Updated WBD
	Tile size	HUC-2 (with exceptions) (avg. XX square miles)	HUC-4 (avg. XX square miles)
	Flow estimates	Mean annual, mean monthly	Mean annual
	File Formats	Shapefile and ESRI Grid	File Geodatabase and TIFF

+ NHDPlusHR Adds Local Detail



NHDPlusHR

Workflow Process

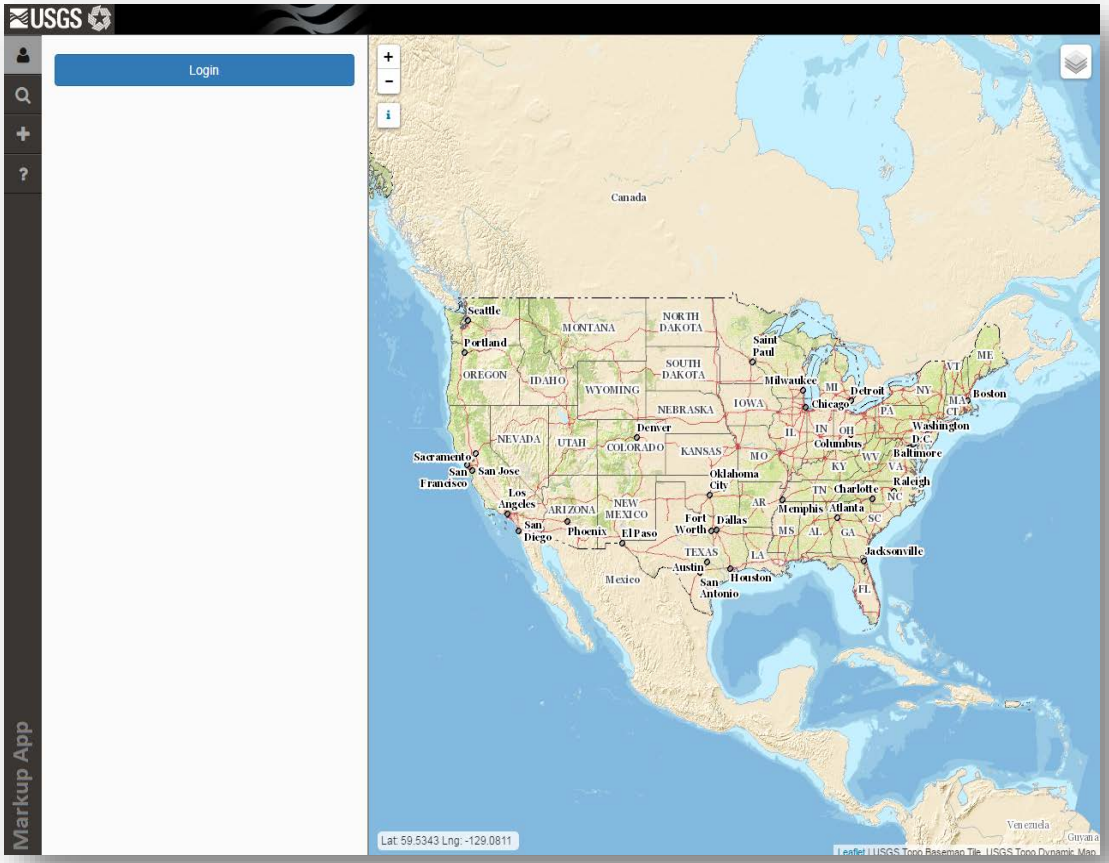


QC Markup Application

User friendly web communication tool for reporting data errors

Will play a key role in

- BetaQC of NHDPlusHR by partners
- Data corrections by stewards, partners, and general public
- Ensuring integration of edits between NHD, WBD and NHDPlusHR



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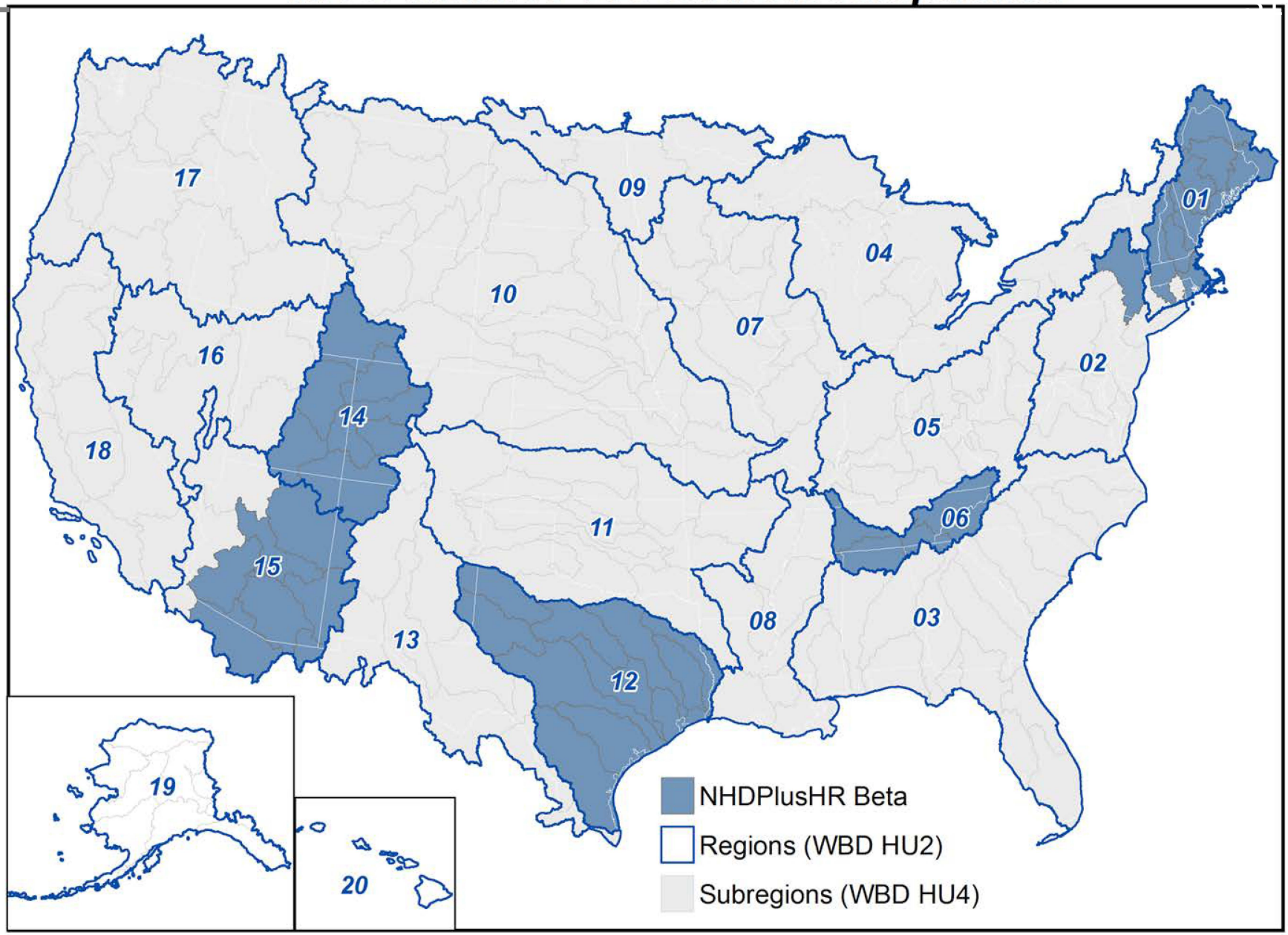
NHDPlusHR FY16 Goal Accomplished



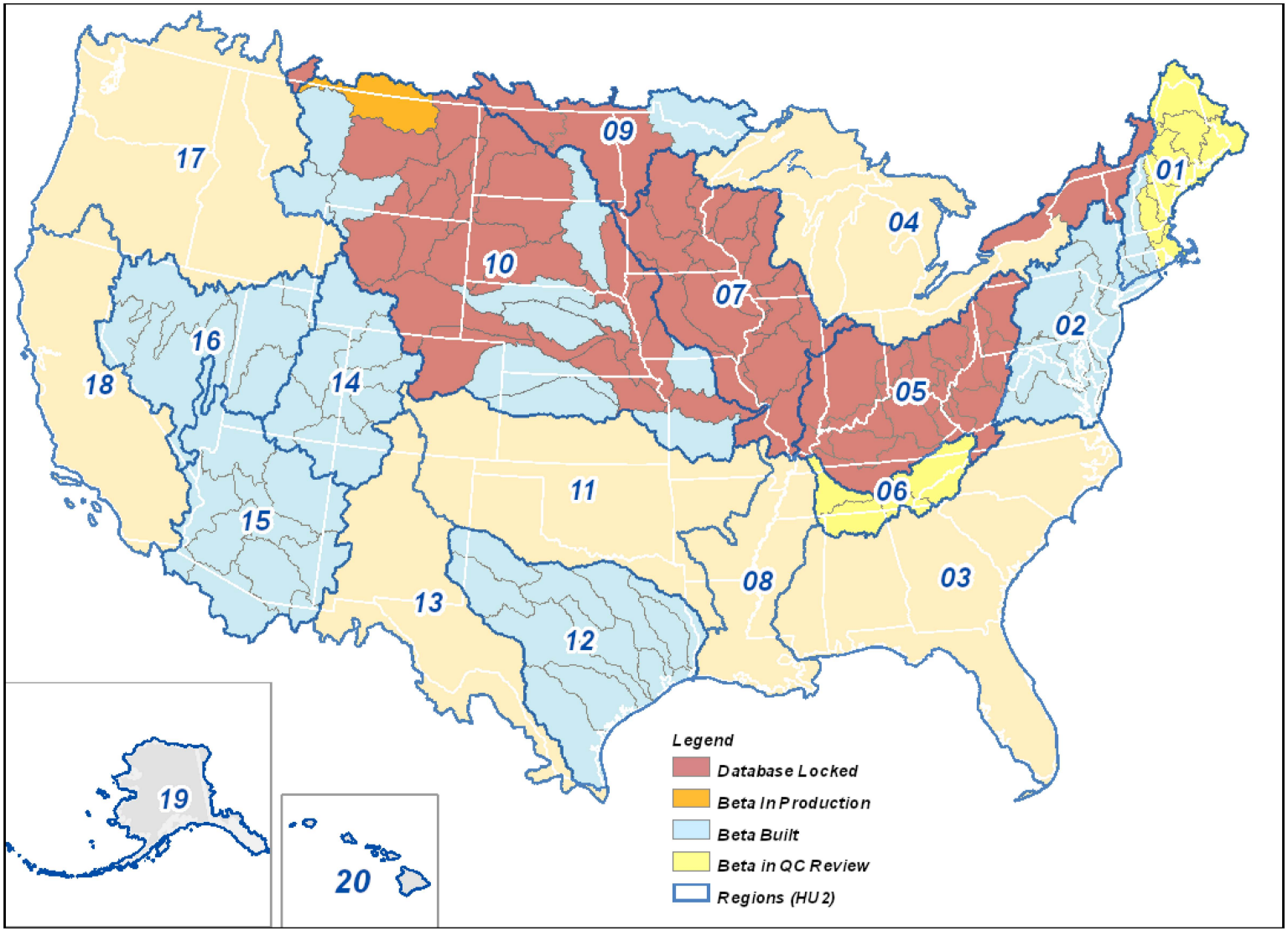
Goal = 1/4 CONUS (4.5 Hydrologic Regions) Complete
Accomplished = 4.8 Hydrologic Regions

USGS

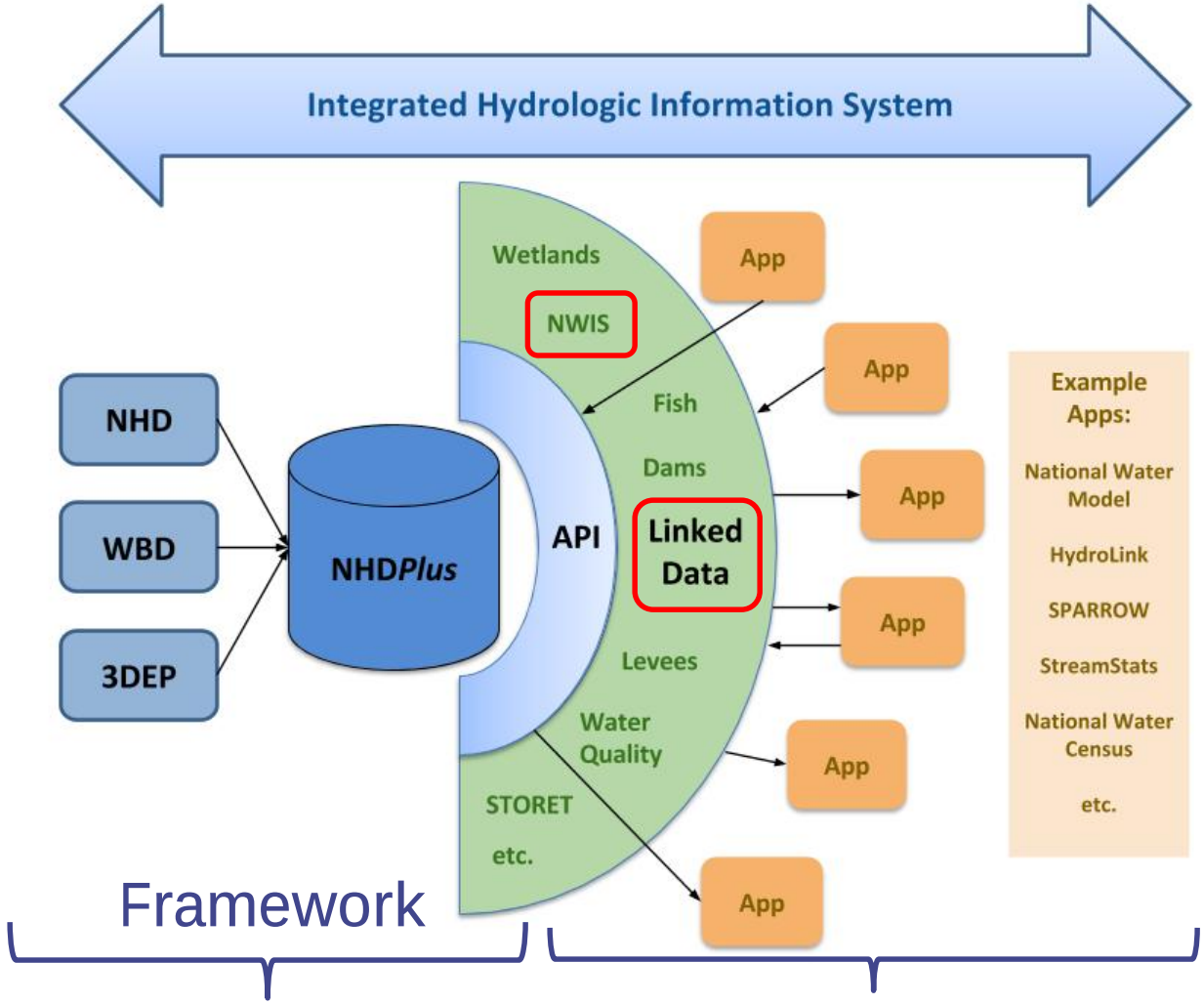
NHDPlusHR Prioritization

Region	Hydrologic Region	Sequence	Hydrologic Network	# of HU4s	Data Delivery	NHDPlus BETA	USGS Refresh
06	Tennessee	1	Mississippi 1 of 6	4	FY16	FY16 - Q2	FY17-Q2
01	Northeast	2	Complete Drainage Area	10	FY16	FY16 - Q2	FY17-Q3
12	Texas	3	Complete Drainage Area	11	FY16	FY16 - Q3	FY17-Q3
14	Upper Colorado	4	Colorado 1 of 2	8	FY16	FY16 - Q4	FY17-Q4
15	Lower Colorado	5	Colorado 2 of 2	8	FY16	FY16 - Q4	FY17-Q4
02	Mid-Atlantic	6	Complete Drainage Area	6	FY16	FY17-Q1	FY18
09	*Canadian Pilot (0903)*	7	Pilot (Rainy River Lake of the Woods)	1	FY17-Q1	FY17-Q1	FY18
10	Missouri	8	Mississippi 2 of 6	29	FY17-Q1	FY17_Q2	FY18
07	Upper Mississippi	9	Mississippi 3 of 6	14	FY17-Q2	FY17-Q3	FY18
16	Great Basin	10	Complete Drainage Area	6	FY17-Q2	FY17-Q3	FY18
04	*Canadian Pilot (041504)*	11	Pilot (Lake Champlain)	1	FY17-Q2	FY17-Q3	FY18
09	Souris, Red, Rainy	12	Complete Drainage Area (less pilot)	3	FY17-Q2	FY17-Q3	FY18
05	Ohio	13	Mississippi 4 of 6	14	FY17-Q3	FY17-Q4	
1902	*Alaska Pilot (1902)*	14	Pilot (MatSu)	1	FY17-Q3	FY17-Q4	
11	Arkansas, Red, White	15	Mississippi 5 of 6	14	10 FY17-Q4 4 FY17-Q4	5 FY17-Q4 9 FY18-Q1	
03	South Atlantic	16	Complete Drainage Area	18	FY17-Q4	FY18	
17	Pacific Northwest	17	Complete Drainage Area	12	FY18	FY18	
13	Rio Grande	18	Complete Drainage Area	9	FY18	FY18	
04	Great Lakes	19	Complete Drainage Area	15	FY18	FY18	
8	Mississippi	20	Mississippi 6 of 6	9	FY18	FY18	
18	California	21	Complete Drainage Area	10	FY18	FY18	
19	Alaska	22	Alaska	TBD	FY18		
20	Hawaii	TBD	Complete Drainage Area	TBD	TBD		
21 & 22	VI, PR	TBD	Complete Drainage Area	TBD	TBD		

NHD+HiRes Status 3/7/17



National Hydrography Mapping



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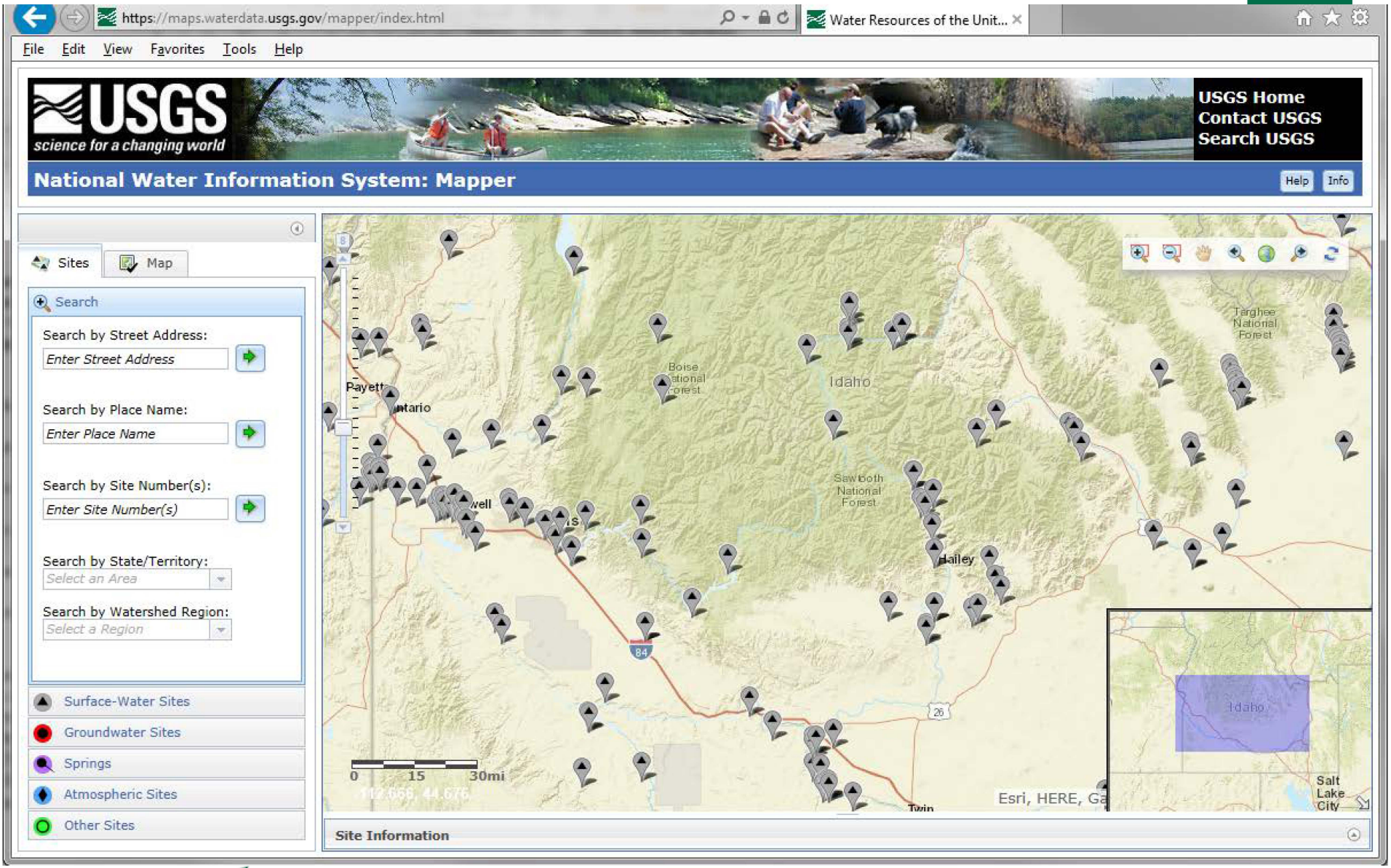
https://maps.waterdata.usgs.gov/mapper/index.html
Water Resources of the Unit...
File Edit View Favorites Tools Help
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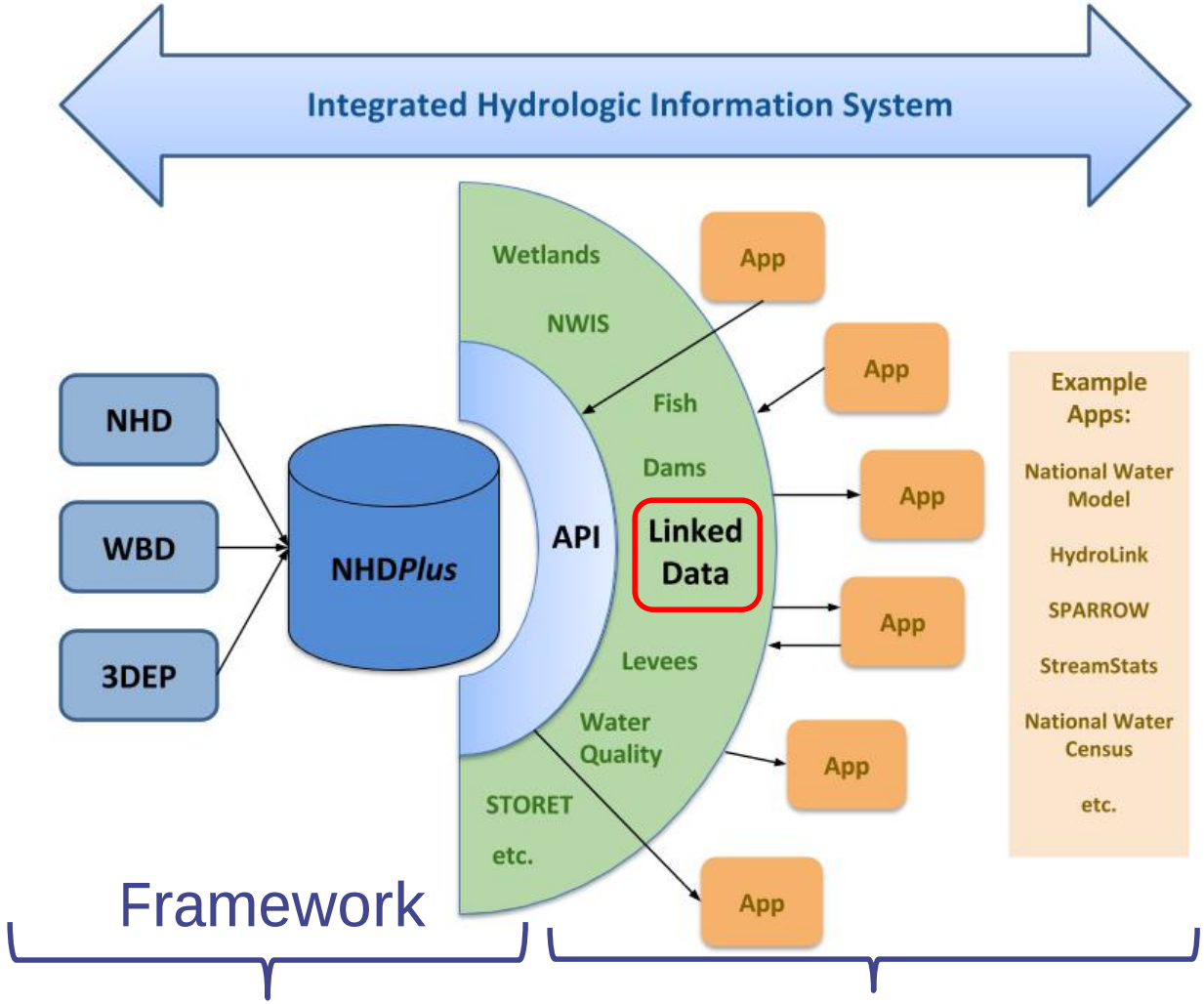
Contact USGS
Search USGS
National Water Information System: Mapper
Help
Info
Sites
Map
Search
Search by Street Address:
Enter Street Address
Search by Place Name:
Enter Place Name
Search by Site Number(s):
Enter Site Number(s)
Search by State/Territory:
Select an Area
Search by Watershed Region:
Select a Region
Surface-Water Sites
Groundwater Sites
Springs
Atmospheric Sites
Other Sites
Idaho
Boise National Forest
Sawtooth National Forest
Targhee National Forest
Hailey
Payette
Ontario
Twin
Salt Lake City
0 15 30mi
Esri, HERE, Ga
Site Information

National Hydrography Mapping



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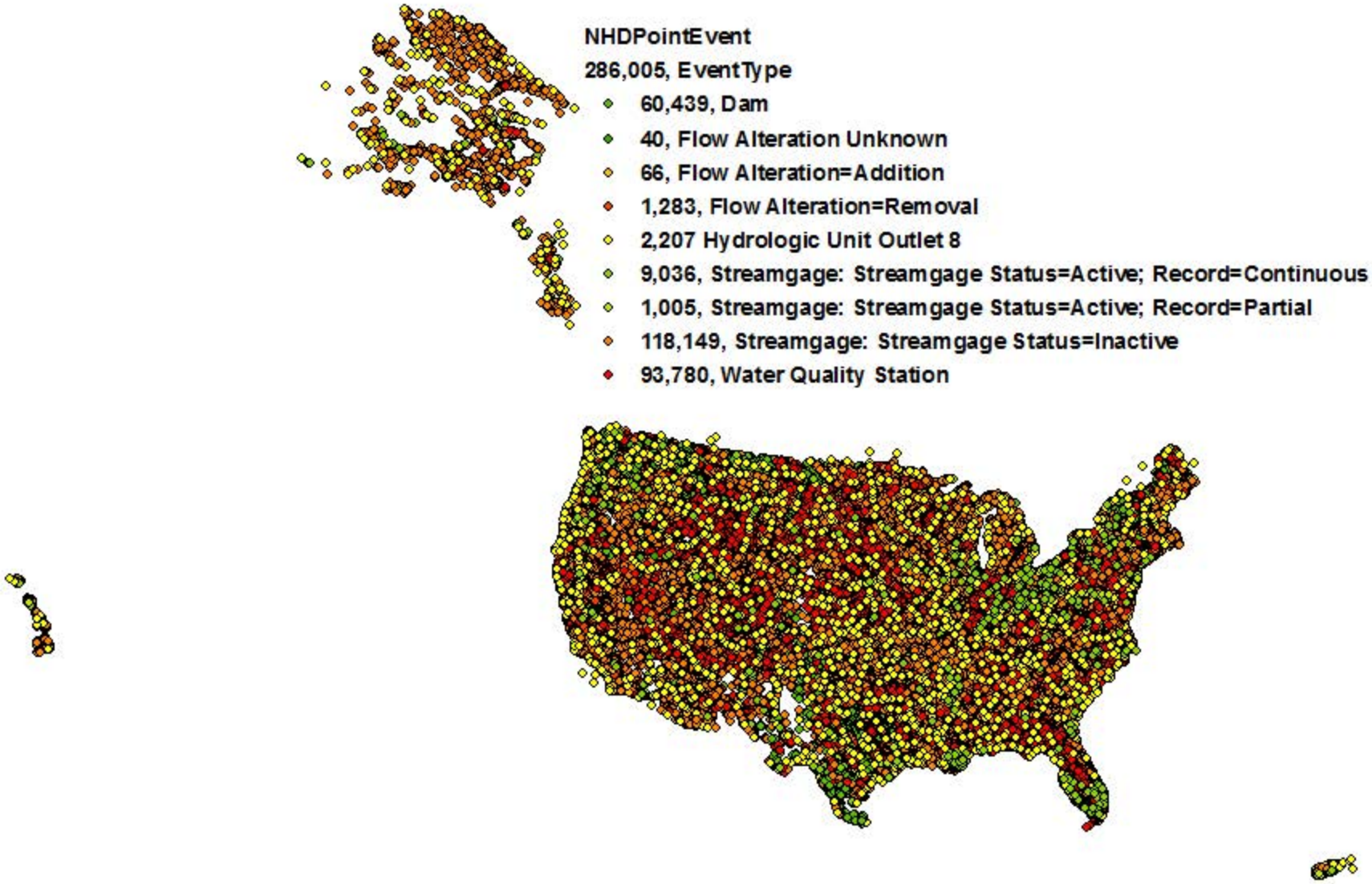
Linking Data to NHD

- Hydrography Event Management (HEM) Tool
  - Desktop ArcGIS tool
  - Point, Line, Area “Events” (hydro linked data)
  - Batch mode
  - “Sync” of events linked to NHD Flowlines that have been edited
- “Built in events” in NHD
  - Dams
  - HUC-8 outlets
  - Streamgages
  - Water Quality Stations
- USGS ScienceBase for sharing linked data
  - “NHD Linked Data Registry“
  - Can host linked data services
  - Can reference your linked data services
  - Contact mdtinker@usgs.gov for info


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

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)

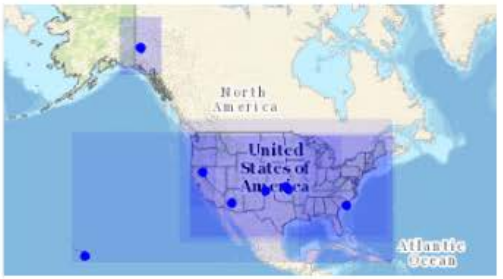
Contacts

- 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 s a national framework for assigning reach addresses to water-related entities, such as industrial discharges, drinking water supplies, fsh 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…

Go to ▾ View ▾ Manage ▾

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.*

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- WBD HU12 Pour Points derived from NHDPlus
- Wild and Scenic Rivers (Snapshot from 12/15/15)

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.

HydroLinkedStarerTemplate_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 n 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

Permissions

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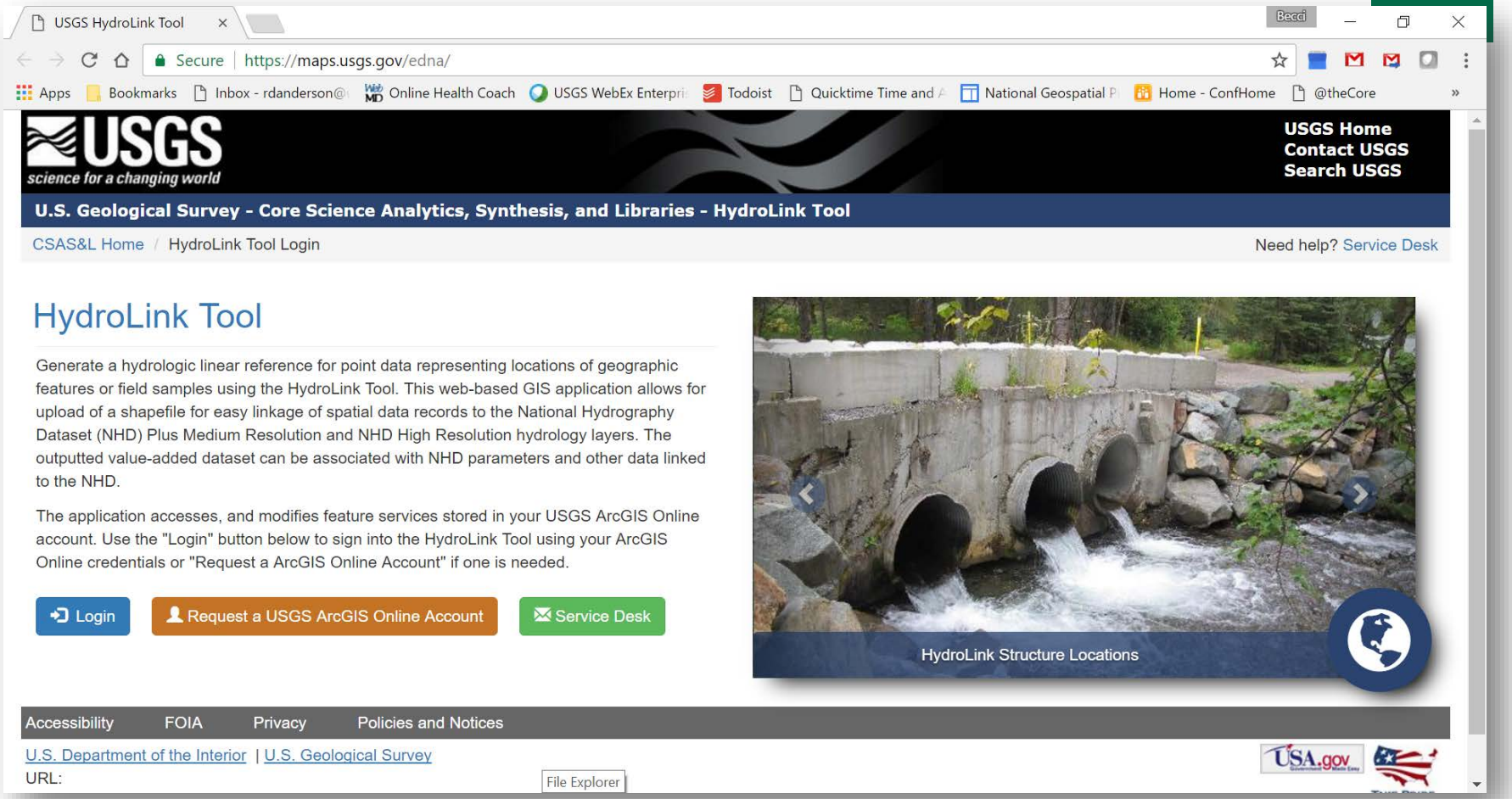
- ROLE:NHDEvents_Authors
- USER:ahrea@usgs.gov
- USER:mdtinker@usgs.gov
- USER:saichele@usgs.gov

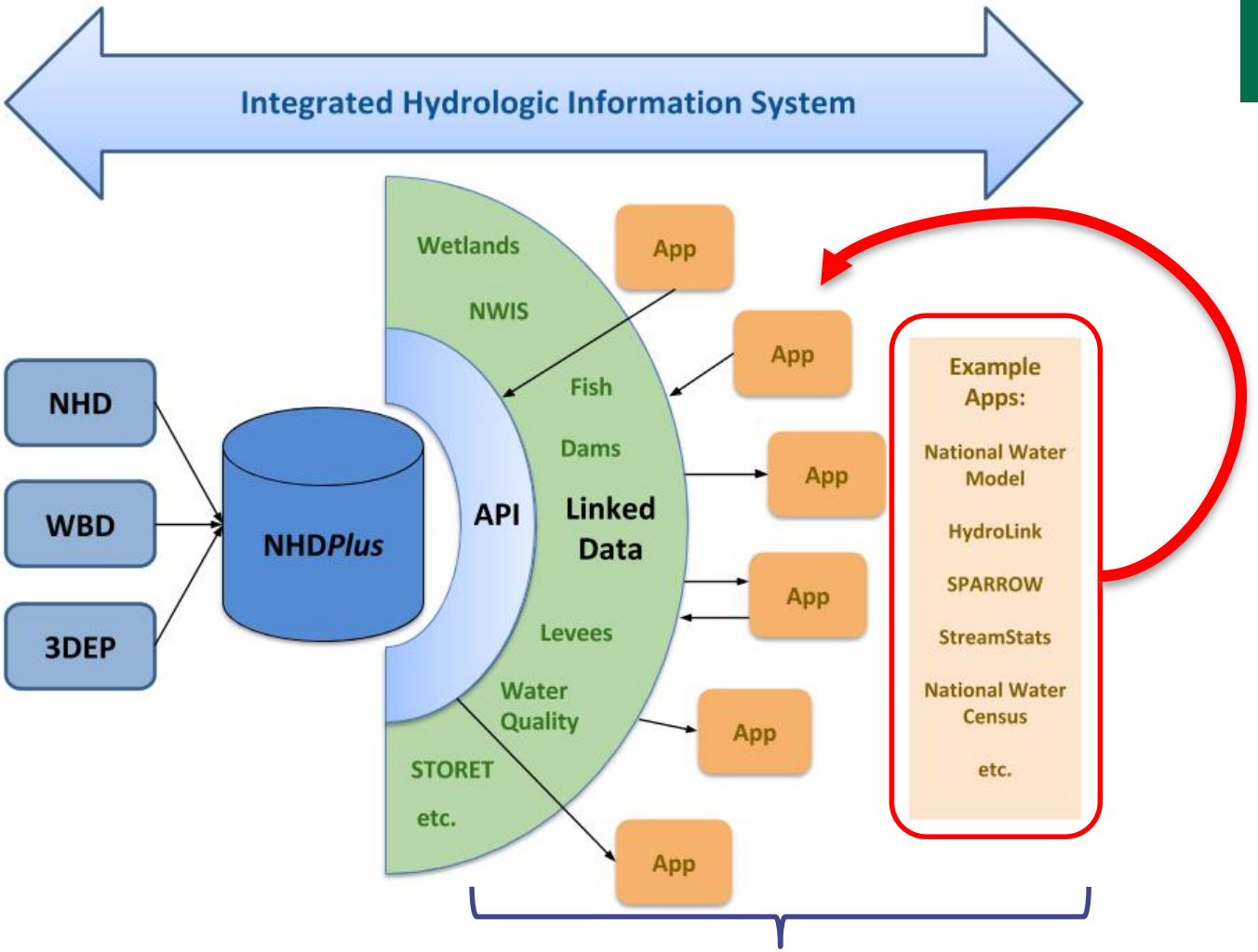

WE WANT YOU
TO SHARE
HYDRO-LINKED
DATA
www.says-it.com/unclesam/

Linking Data Online

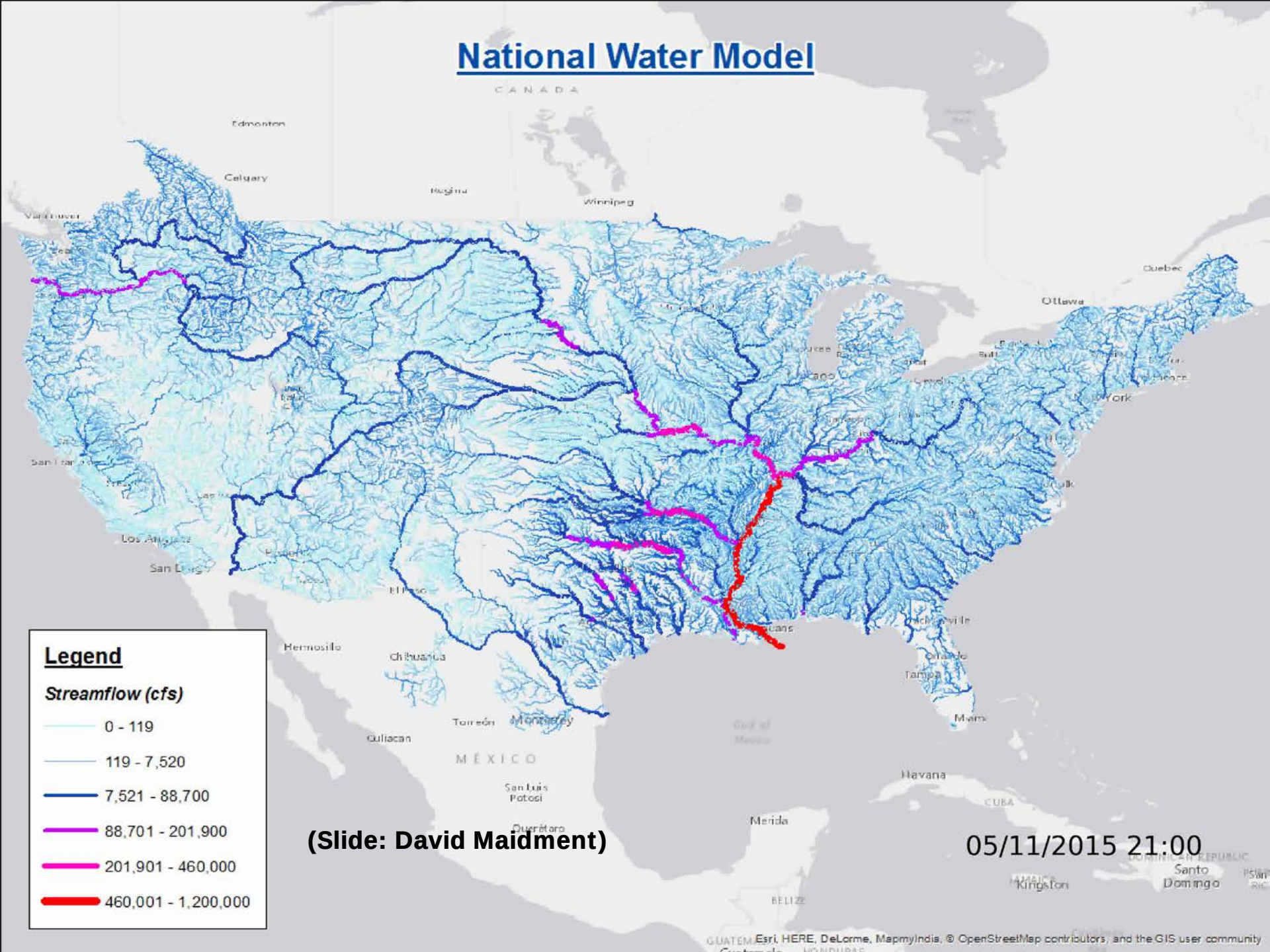
HydroLink Tool – future "Web-HEM"



National Hydrography Mapping



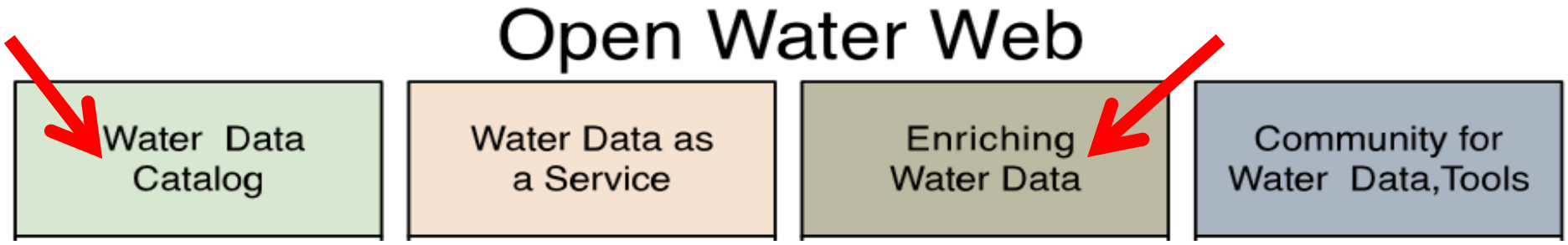
National Water Model



(Slide: David Maidment)

What is NLDI?

- Network Linked Data Index
- It's a search engine for hydro network-linked data (like Google, but more powerful!)
- Queries using stream network (NHDPlus)
- Extensible design—any surface-water data can be linked and shared via web services
- Developed by USGS, in collaboration with EPA, as part of the Open Water Data Initiative (OWDI)
- Open source: **https://github.com/ACWI-SSWD**

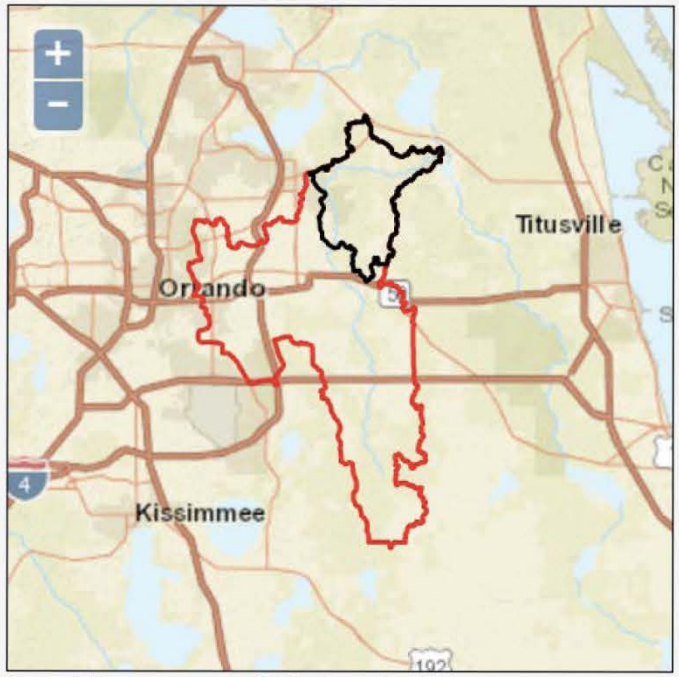


https://cida.usgs.gov/nldi/huc12pp/030801011008

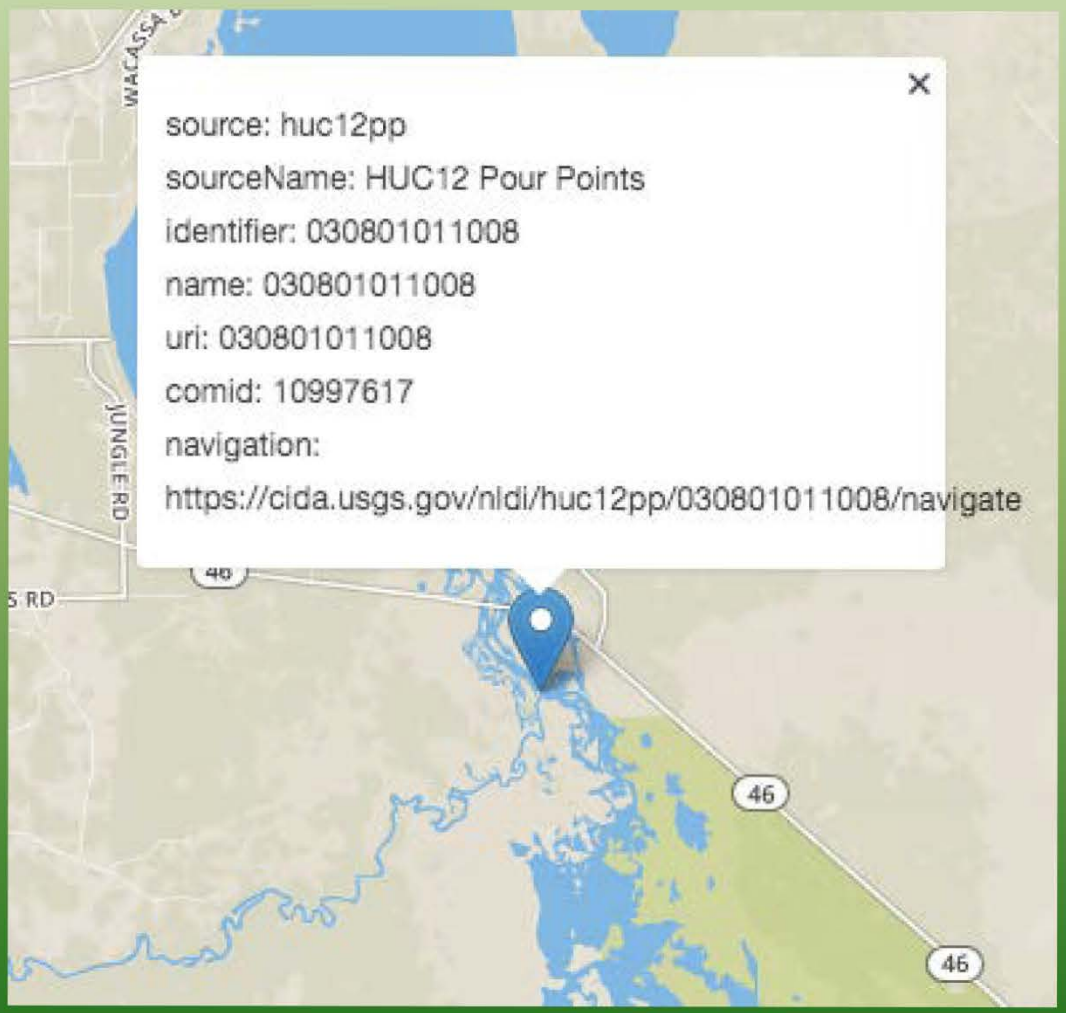
Hydrologic Unit Code
030801011008

Watershed Name
Lower Econolockhatchee River

HUC Watershed Drainage Area (km²)
Local Incremental: 138.05
Total Upstream: 691.64



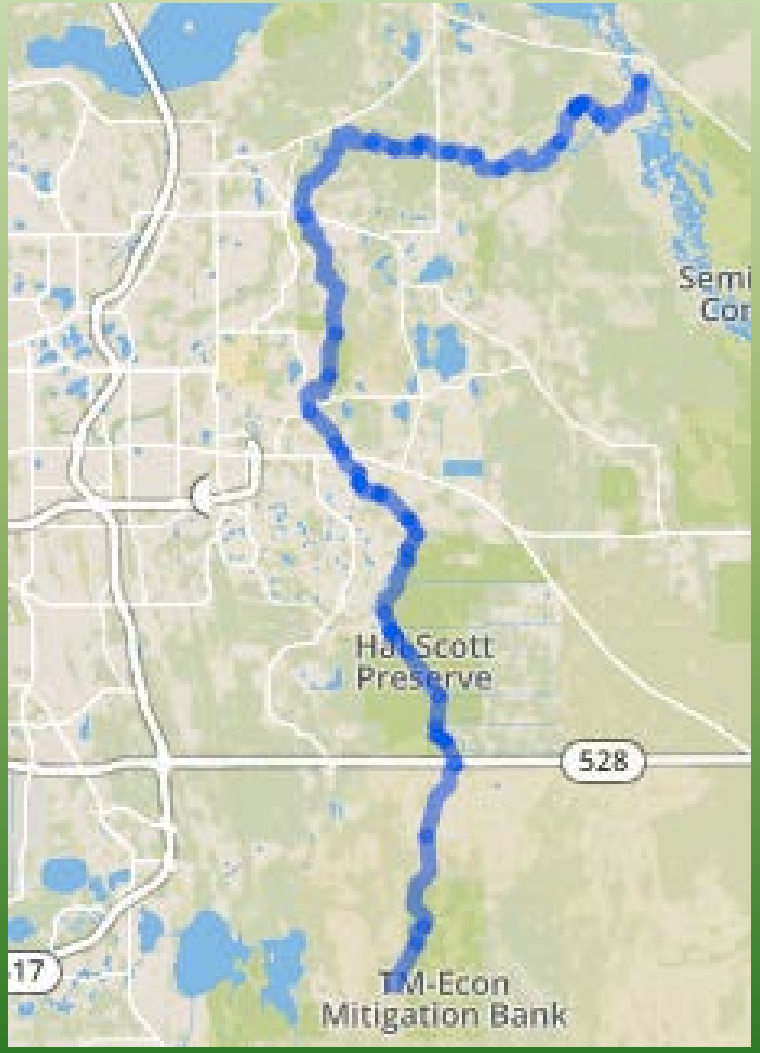
Local Incremental Watershed: —
Total Upstream Watershed: —



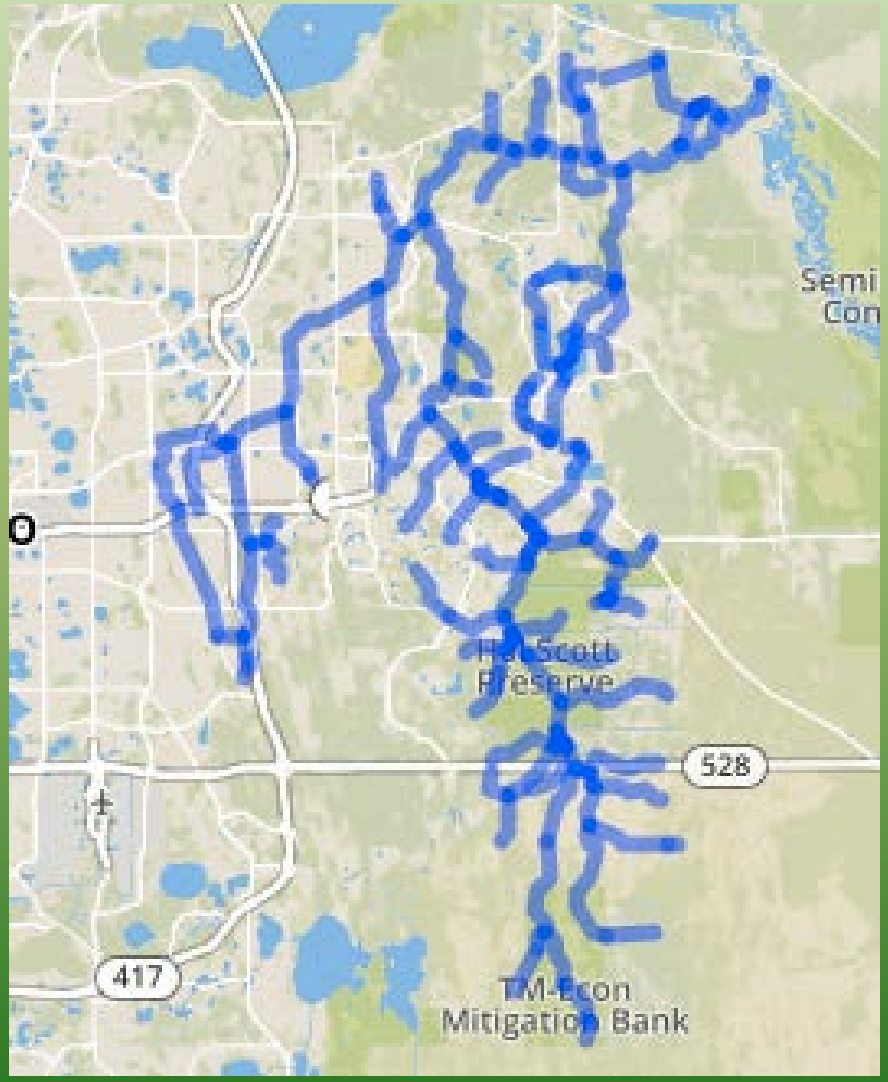
(Slide: Dave Blodgett)

https://cida.usgs.gov/nldi/huc12pp/030801011008

… navigate/UM



… navigate/UT

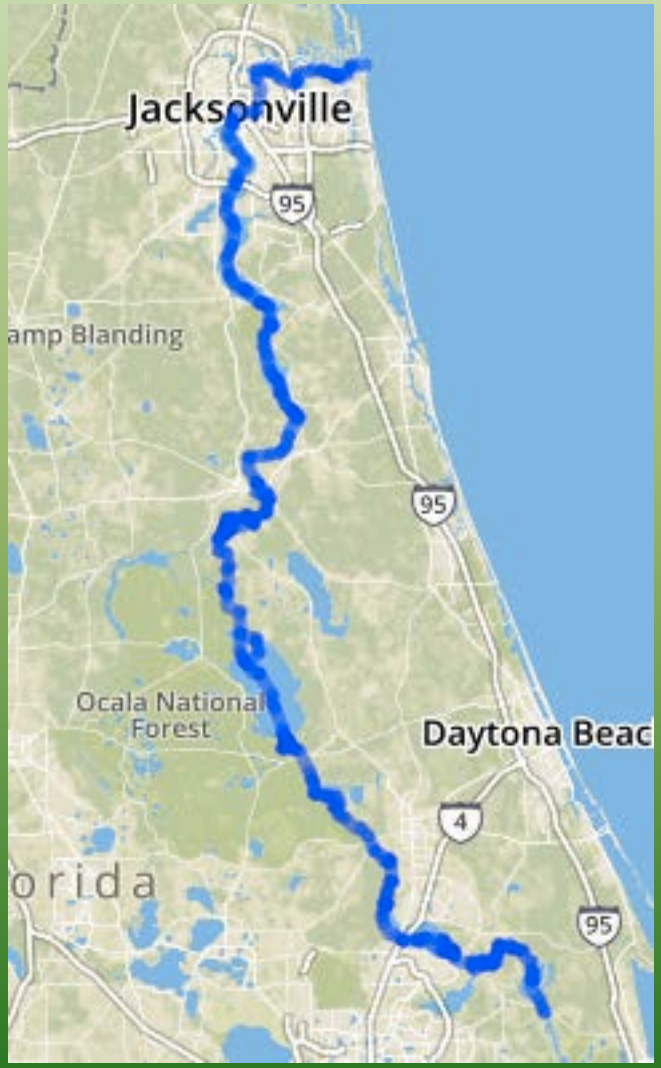


USGS

(Slide: Dave Blodgett)

https://cida.usgs.gov/nldi/huc12pp/030801011008

… navigate/DD



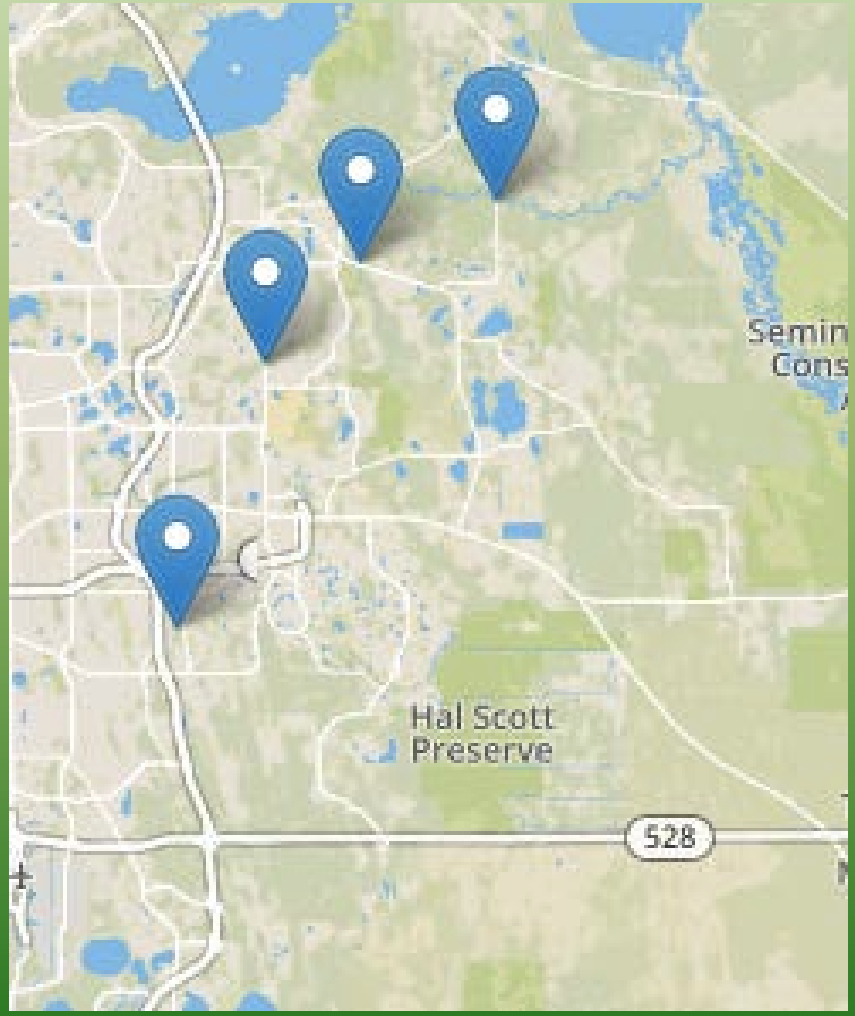
Zoomed In

USGS

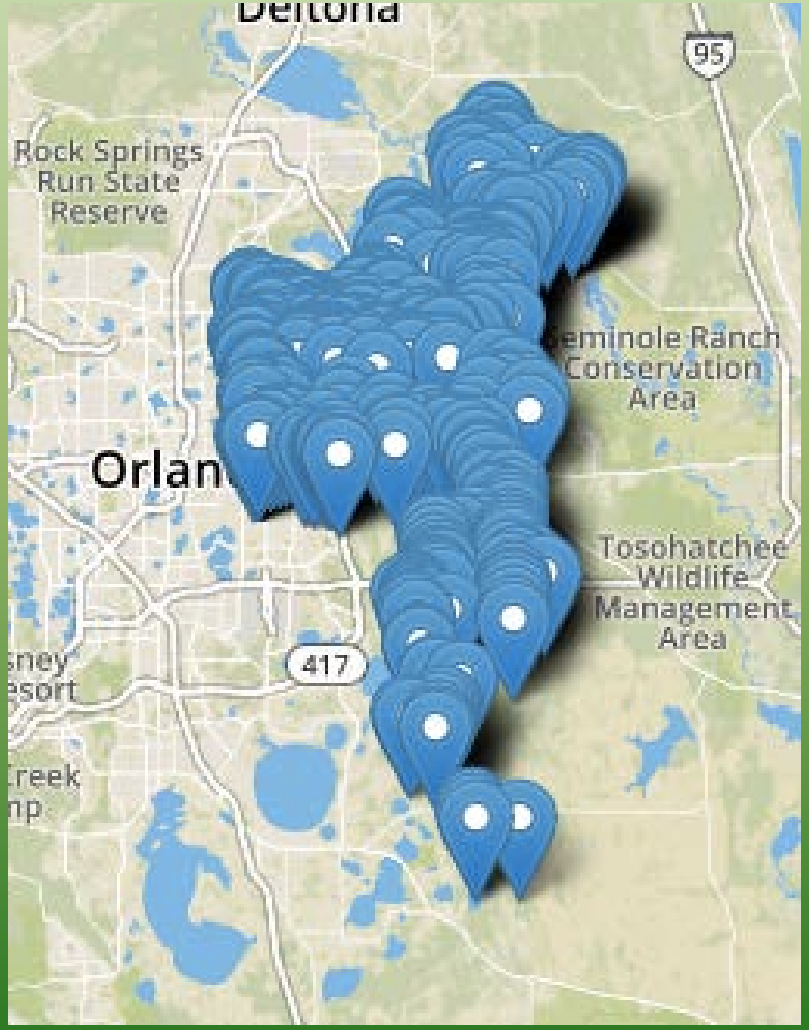
(Slide: Dave Blodgett)

https://cida.usgs.gov/nldi/huc12pp/030801011008

… navigate/UT/nwissite



… navigate/UT/wqp

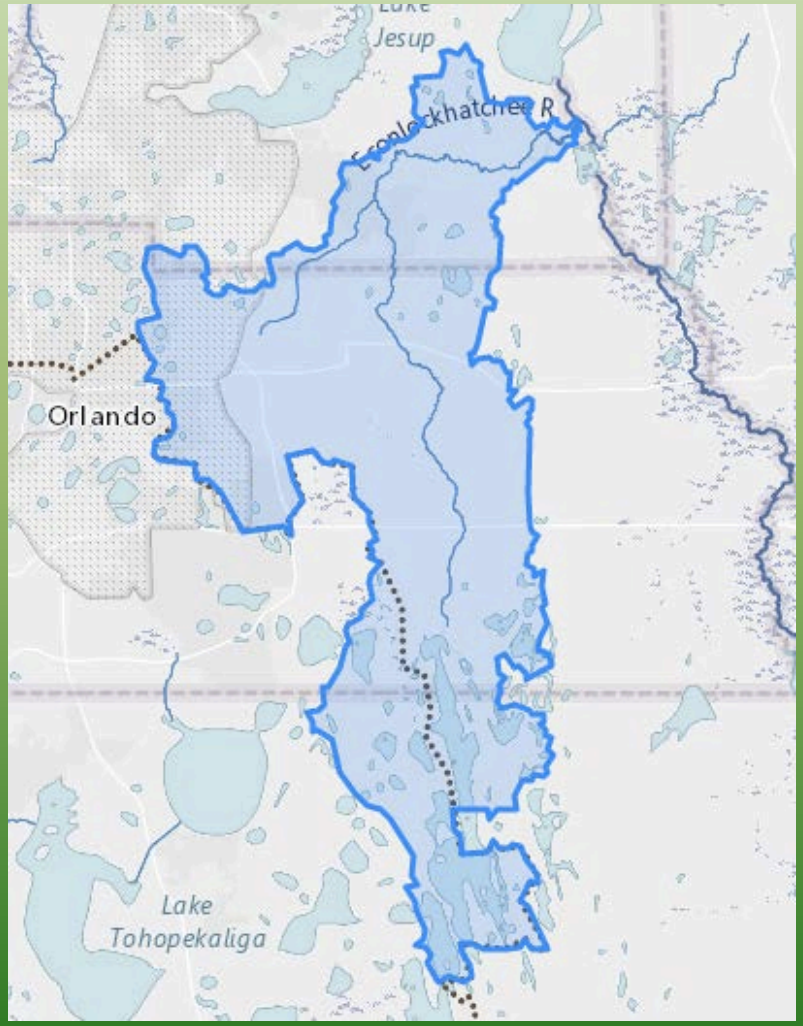


USGS

(Slide: Dave Blodgett)

https://DEV/nldi/huc12pp/030801011008

… navigate/UT/basin



Future possibilities…

…/navigate/UT/characteristics

Local and accumulated catchment characteristics!

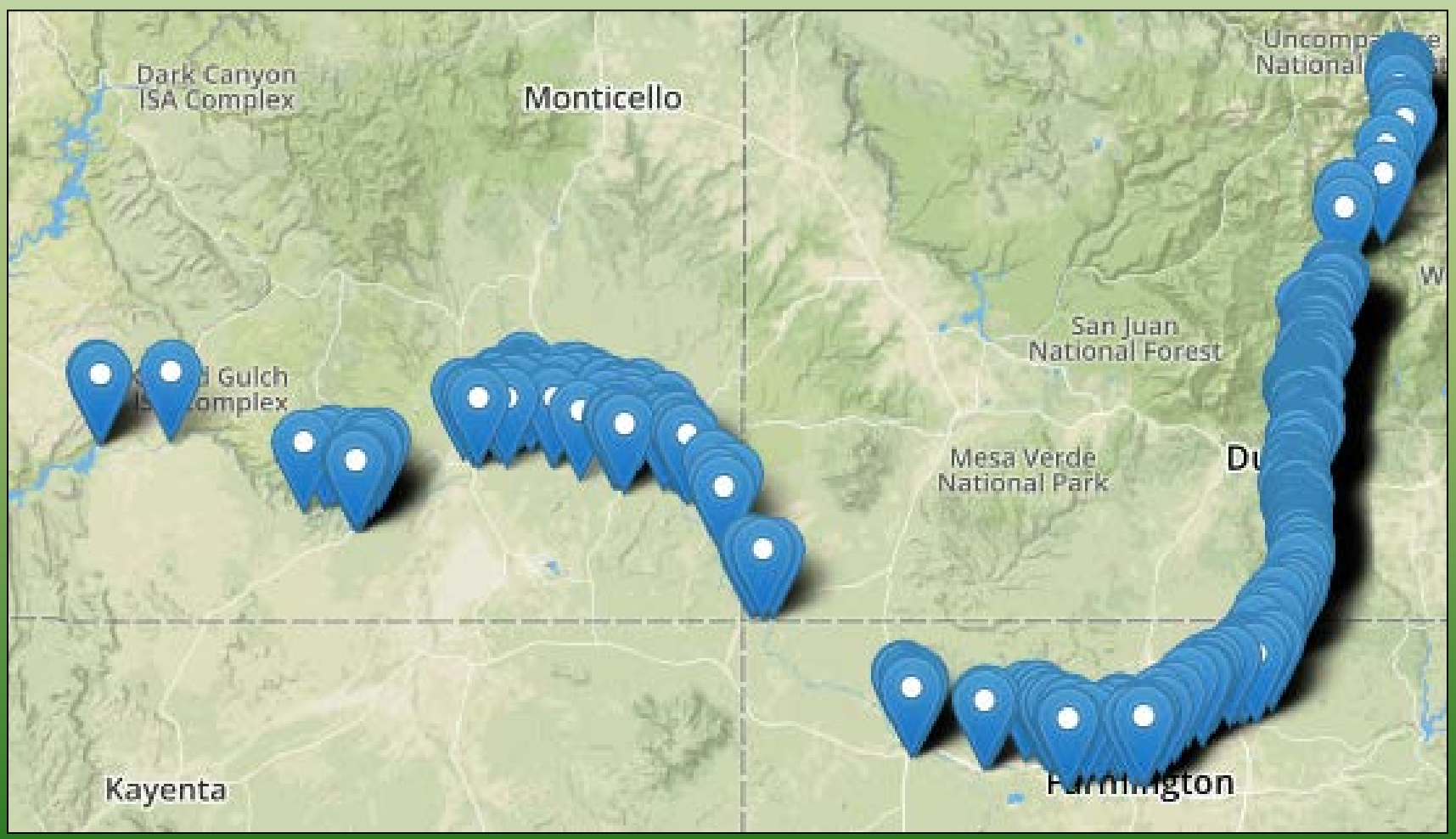
…/navigate/UT/nwm

URL to NWM forecasts and other information products!

USGS

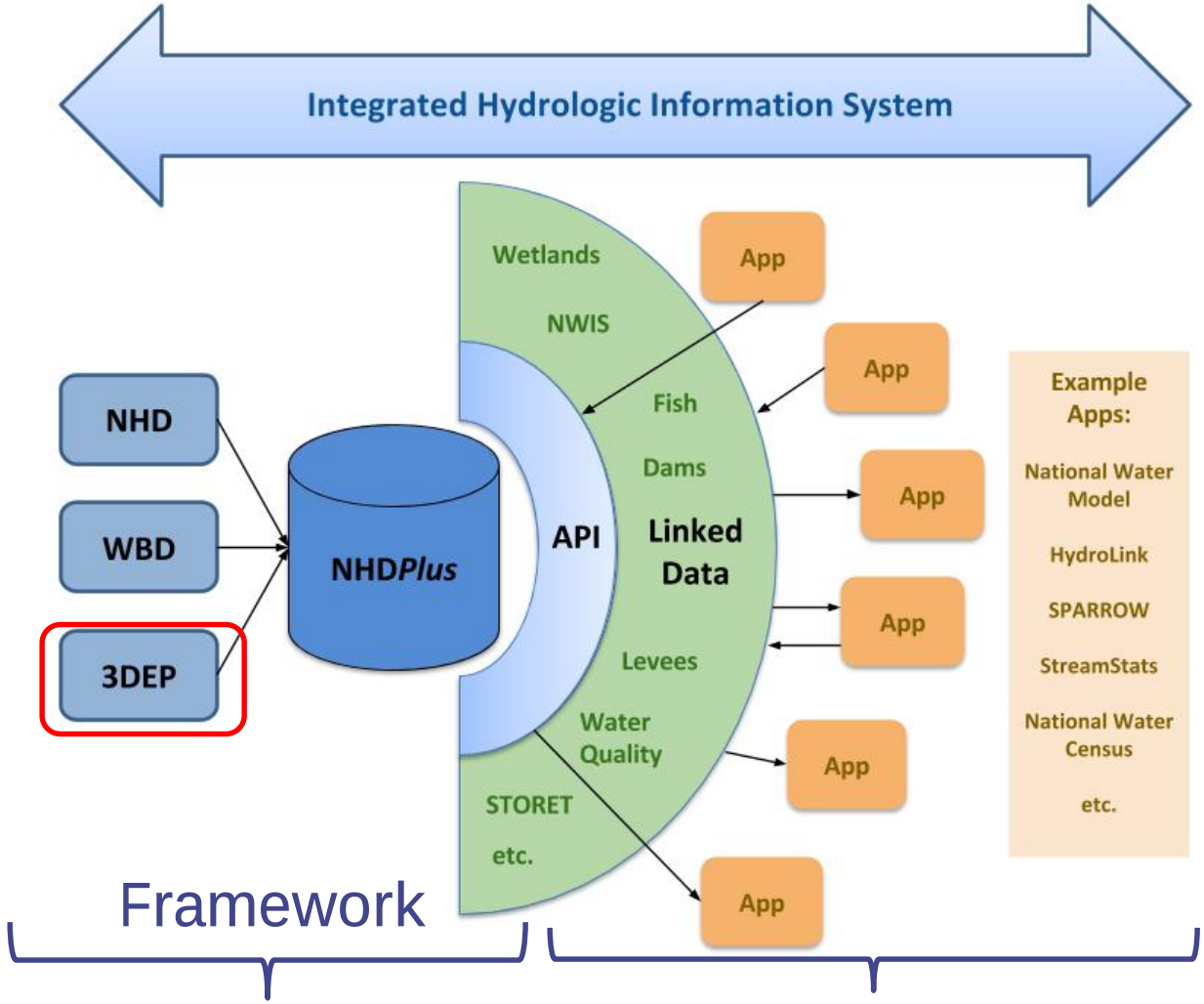
(Slide: Dave Blodgett)

https://cida.usgs.gov/nldi/huc12pp/140801040102/navigate/DD/wqp?distance=500
(WQP sites 500 km downstream of Gold King Mine)



USGS

National Hydrography Mapping



USGS science for a changing world

The National Map
Your Source for Topographic Information

What is the 3D Elevation Program?

3DEP is a call for community action to…

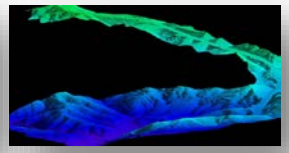
- Accelerate the acquisition of high quality light detection and ranging (lidar) data in the conterminous U.S., Hawaii, and the U.S. Territories; and interferometric synthetic aperture radar (ifsar) data in Alaska
- Increase the overall investment in 3D elevation from about $50 million to $146 million annually to return more than $690 million annually in new benefits
- Leverage collaboration among Federal, states, local and tribal partners to systematically complete national 3D elevation data coverage in eight years


Natural Resource Conservation


Infrastructure Management


Flood Risk Mitigation

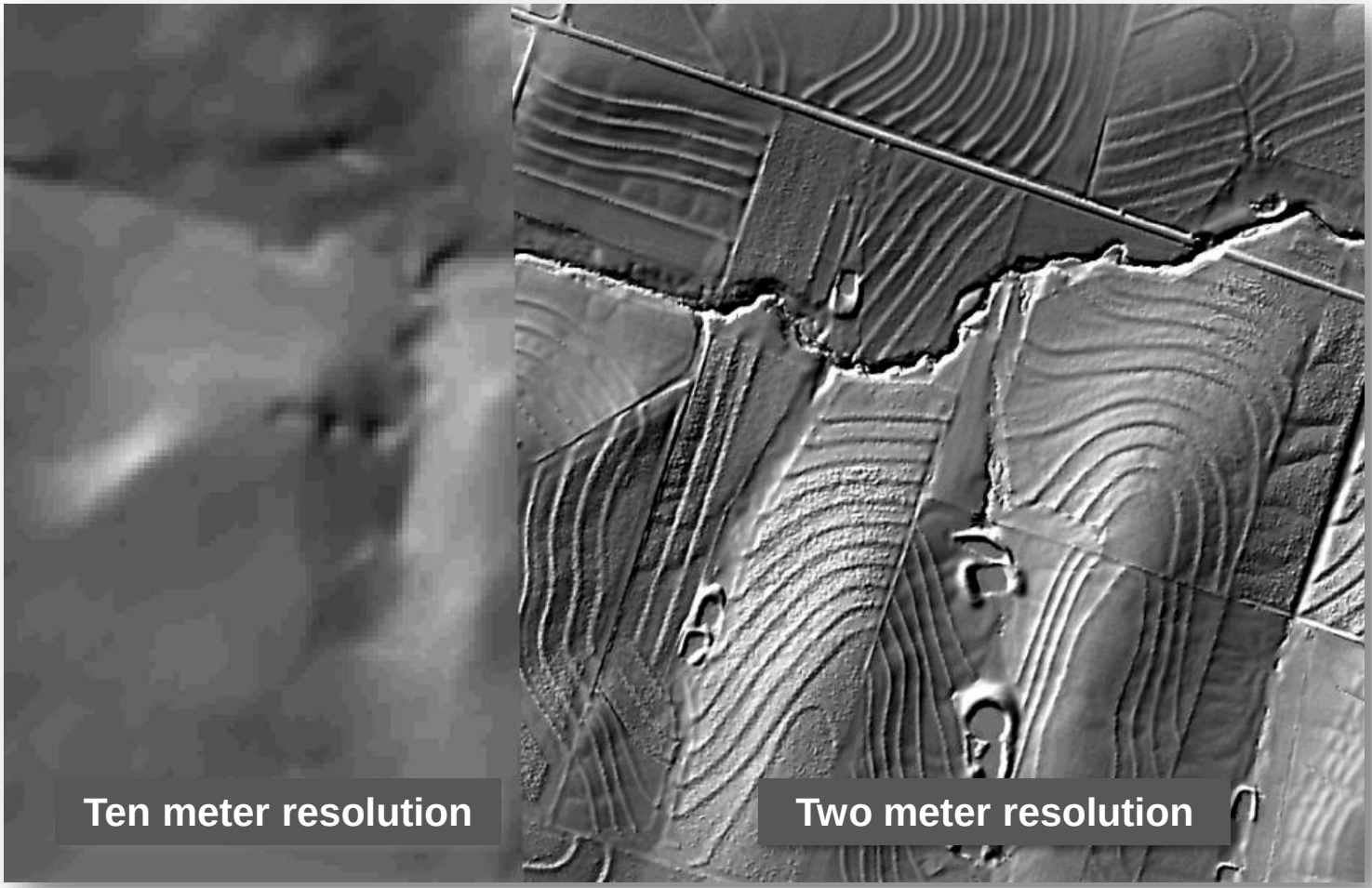

Precision Farming


Land Navigation and Safety


Geologic Resources and Hazards Mitigation

USGS science for a changing world

Lidar Improves Data Quality



Courtesy of NRCS

3DEP: The Next Generation

3DEP is designed to…

- Address the mission-critical requirements of 34 Federal agencies, 50 states, and a sampling of local governments, tribes, private and not-for profit organizations documented in the **National Enhanced Elevation Assessment (NEEA)**
- Increase the quality level of lidar data being acquired to meet 58% of the documented needs instead of the 10% of needs being met with lower quality data
- Achieve a 25% cost efficiency gain by collecting data in larger projects
- Provide more consistent data through standardized data specifications
- Completely refresh the National Elevation Dataset (NED) with new lidar and ifsar elevation data products and services

3D Elevation Program

Quality Levels – A New "Floor"

Quality Level	Source	Vertical Accuracy RMSEz	Nominal Pulse Spacing (NPS)	Nominal Pulse Density (NPD)	DEM Post Spacing
QL1	Lidar	10 cm	0.35 m	8 points/sq. meter	1 meter
QL2	Lidar	10 cm	0.7 m	2 points/sq. meter	1 meter
QL3	Lidar	20 cm	2.0 m	0.7 points/sq. meter	3 meters
QL4	Imagery	139 cm	5 m	0.04 points/sq. meter	5 meters
QL5	Ifsar	185 cm	5 m	0.04 points/sq. meter	5 meters

3DEP

Before 3DEP

3DEP Alaska

USGS
science for a changing world

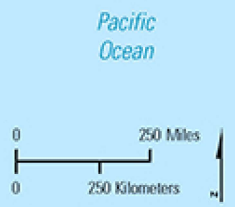
The National Map

As of 7/01/2016

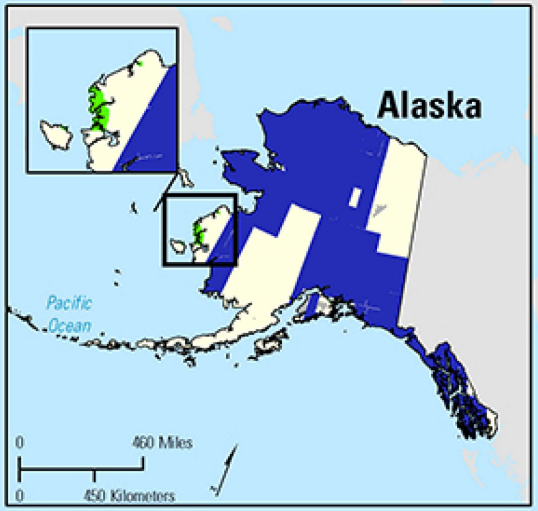
3D Elevation Program - FY16 Partnerships

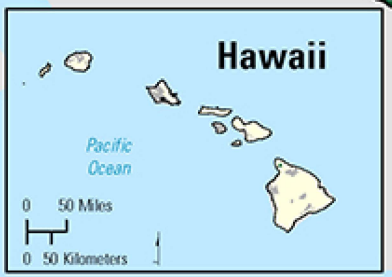
For more on the 3D Elevation Program (3DEP) visit: http://www.nationalmap.gov/3DEP

Visit the US Interagency Elevation Inventory (USIEI) at: http://coast.noaa.gov/inventory/



Sources:
3DEP FY15/16 Broad Agency Announcement
USIEI data from October 2015





CANADA
MEXICO
Pacific Ocean
Atlantic Ocean
Gulf of Mexico

Map shows geographic extent of existing and on-going data acquisition projects that meet current 3DEP Specifications. FY16 projects are the result of partnership projects awarded through the FY16 3D Elevation Program (3DEP) Broad Agency Announcement (BAA) and through ongoing Federal coordination via the 3DEP Working Group (rechartered NDEP) as of July 2016.

3DEP Specifications:
- Quality level 2 or better lidar data (ifsar in AK)[2]
- Publicly available
- 8 years old or newer as of 2016

[2]as defined in USGS Lidar Base Specification v1.2

EXPLANATION

In Progress and Existing Data that Meet 3DEP Specification
- FY16 partnership projects
- lidar
- ifsar (Alaska)

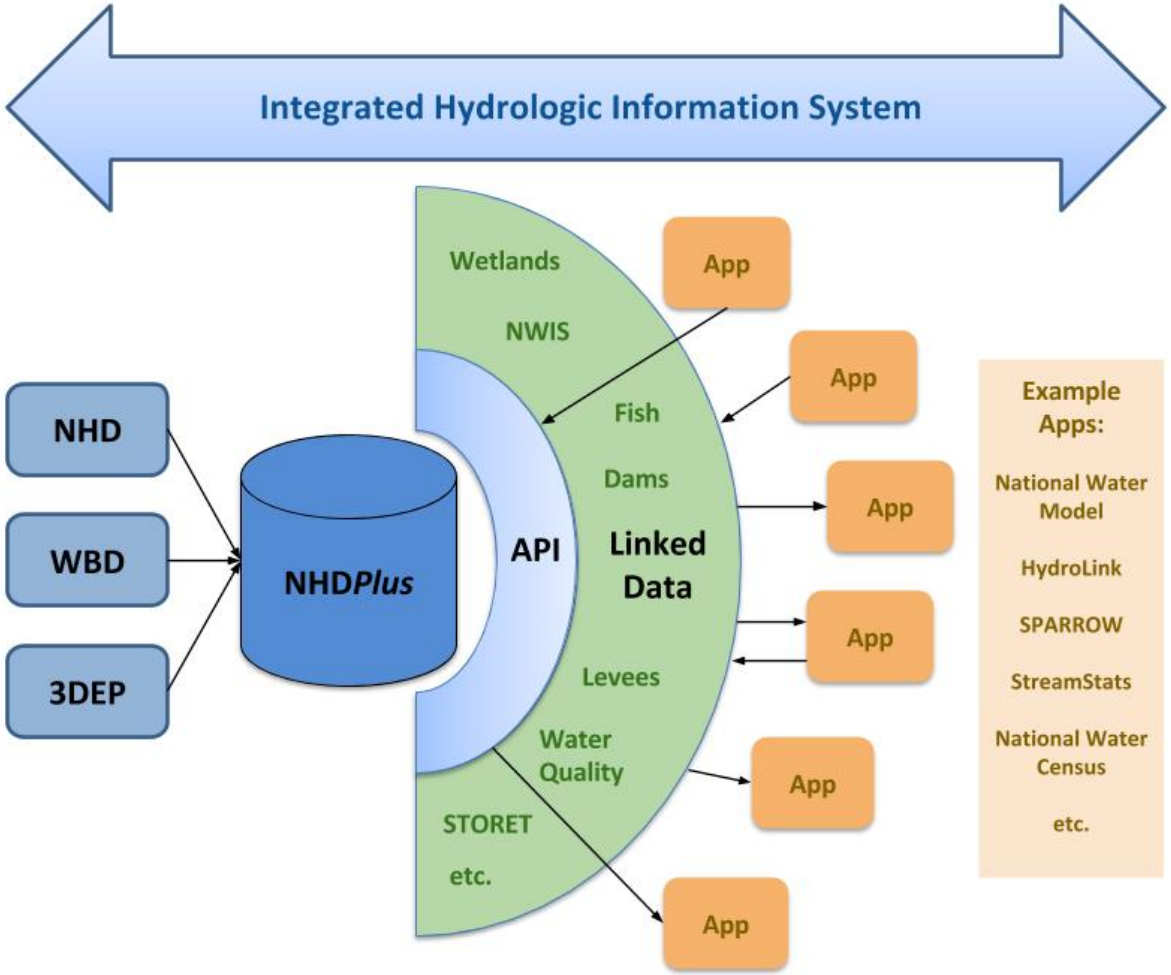
Data that Do NOT Meet 3DEP Specification
- Other lidar data
- No publicly available lidar data (ifsar in Alaska)

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

National Hydrography Mapping

What's coming next?

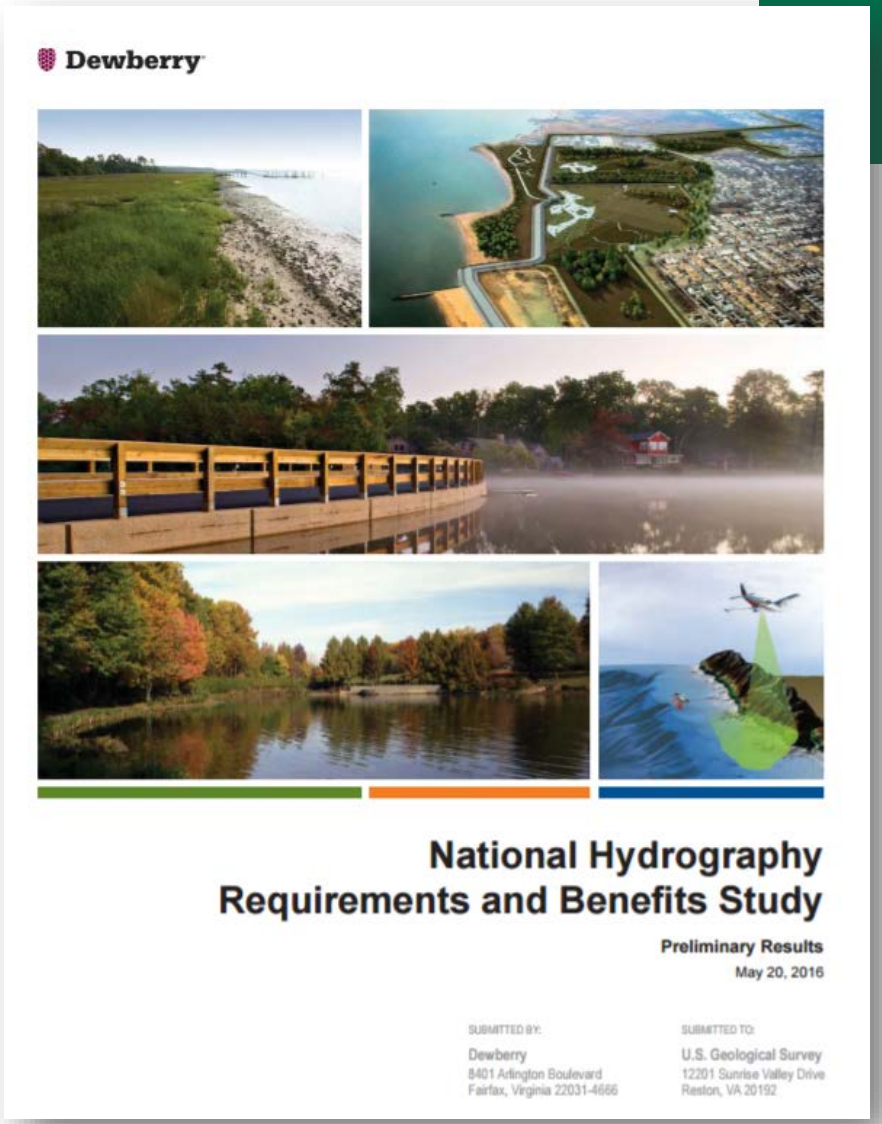
- HRBS and Program Plan
- Visibility Filter (Generalization)
- Data Model
- Cloud Computing



Documented Requirements and Benefits

Ingredients for Success

- Critical for gaining acceptance and active support
- Defines value to each agency and their executives
- Helps us to link to Administration, Department and stakeholder priorities
- Provides a tool for executive outreach



Hydrography Requirements and Benefits Study

We asked users what they need to know about water in order to accomplish their missions

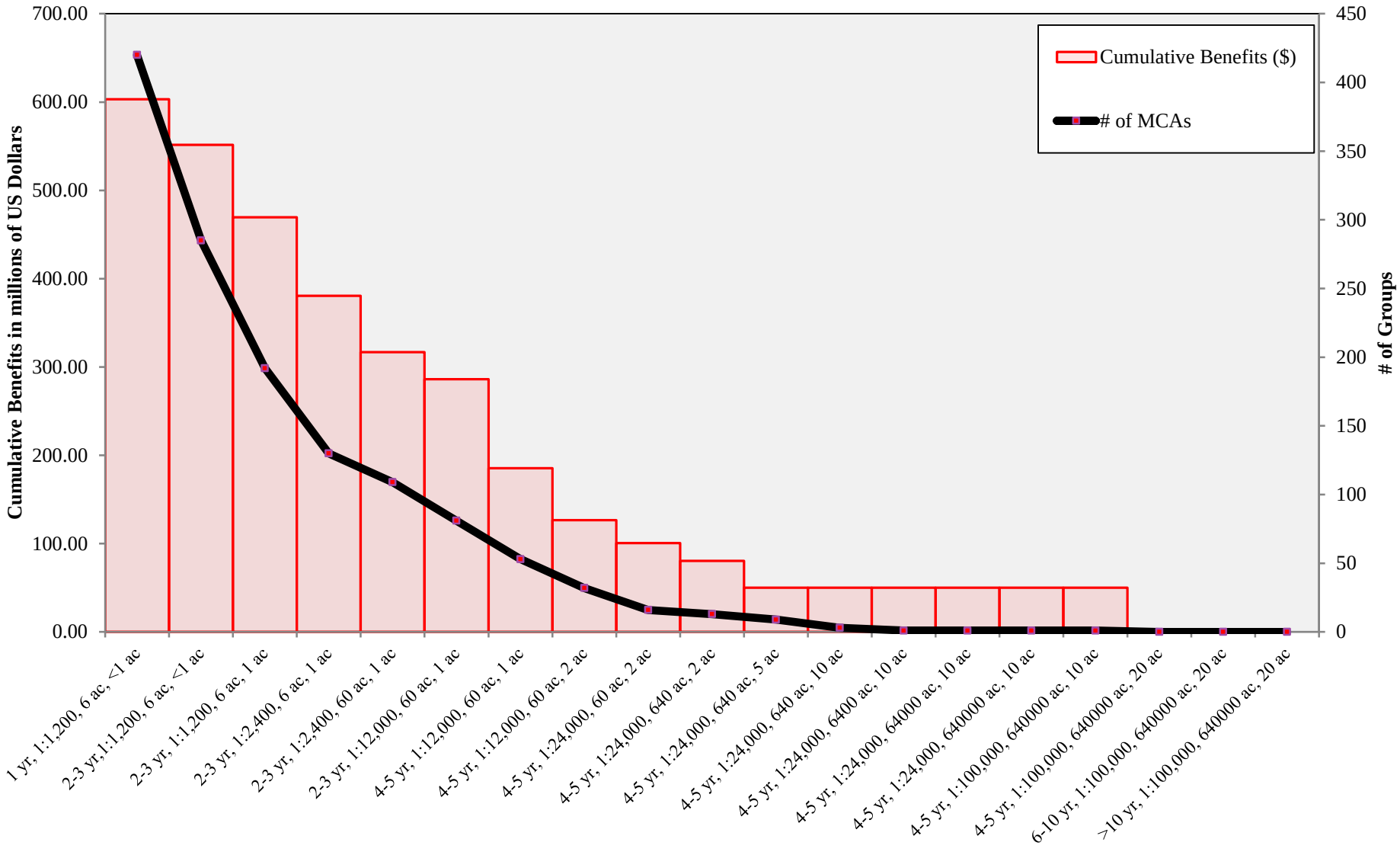
We asked what the benefits would be in terms of efficiency or better customer service if they had data that met their needs.

Results available at http://www.nationalmap.gov/HRBS

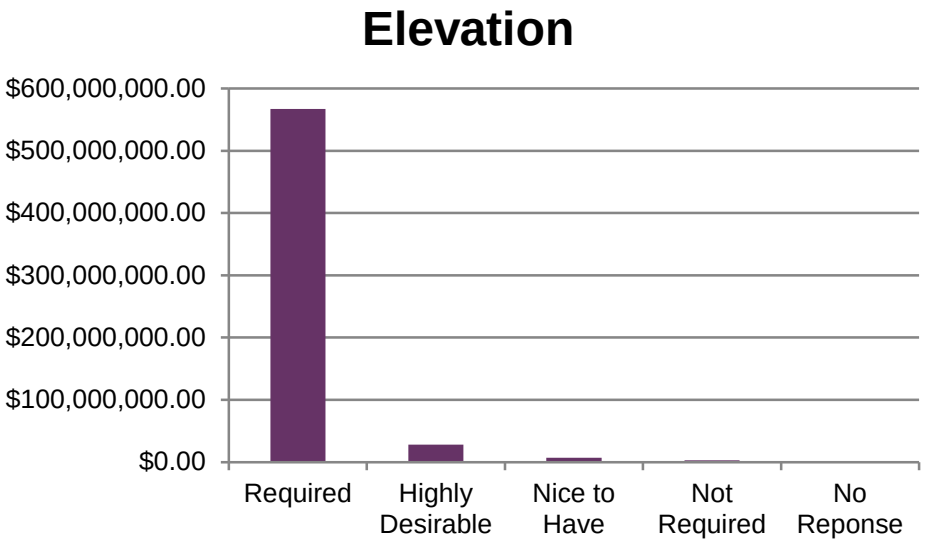
Benefits by Business Use

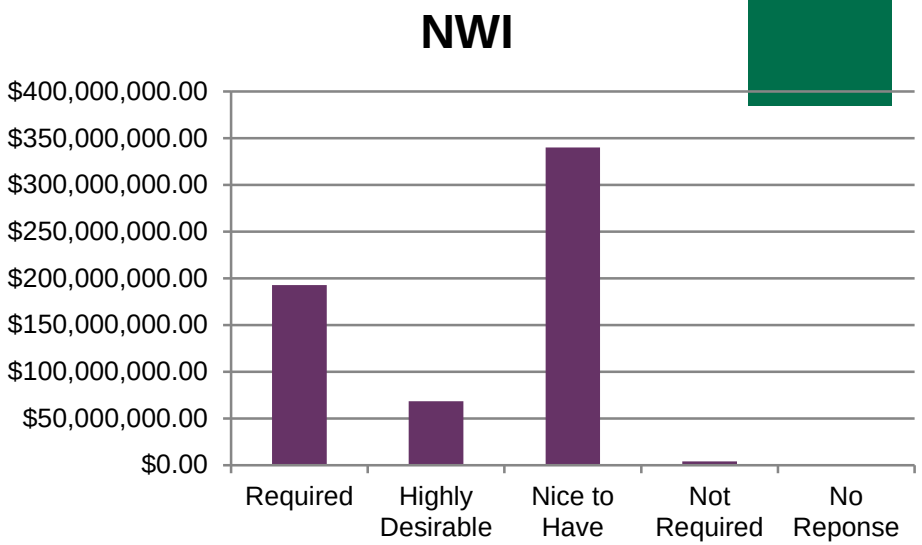
BU	Business Use	Estimated Annual Program Budget	Estimated Current Annual Benefits	Estimated Future Annual Benefits	Weighted Qualitative Benefits
BU 1	River and Stream Flow Management	$763,580,000	$220,070,000	$154,730,000	243
BU 4	Water Quality	$1,672,410,000	$115,460,000	$121,480,000	511
BU 3	Water Resource Planning and Management	$988,880,000	$98,110,000	$115,880,000	393
BU 15	Flood Risk Management	$636,110,000	$56,130,000	$75,860,000	425
BU 5	River and Stream Ecosystem Management	$1,000,720,000	$13,960,000	$67,000,000	214
BU 2	Natural Resources Conservation	$6,956,800,000	$10,170,000	$17,760,000	214
BU 9	Wildlife and Habitat Management	$1,041,450,000	$180,000	$10,080,000	58
BU 20	Infrastructure and Construction Management	$1,088,720,000	$1,650,000	$8,730,000	139

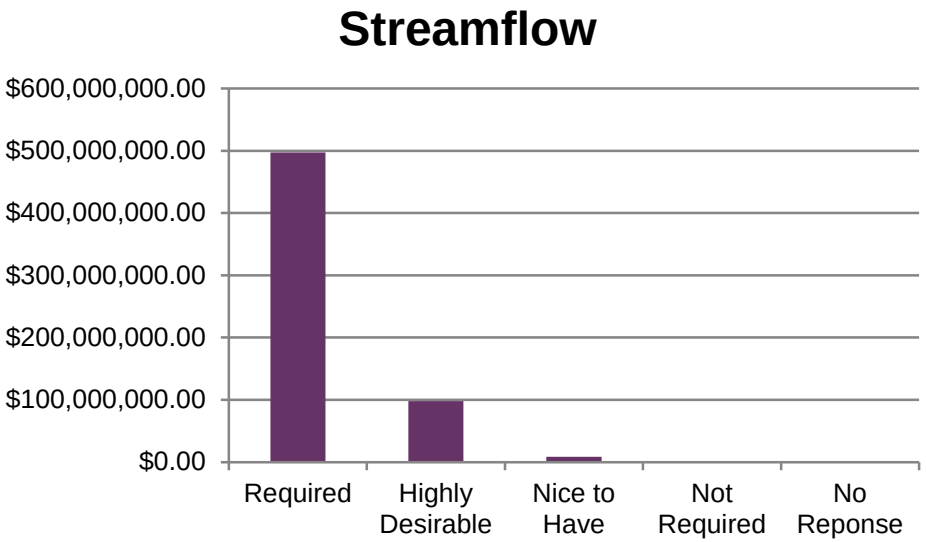
Potential annual benefits by requirement suite

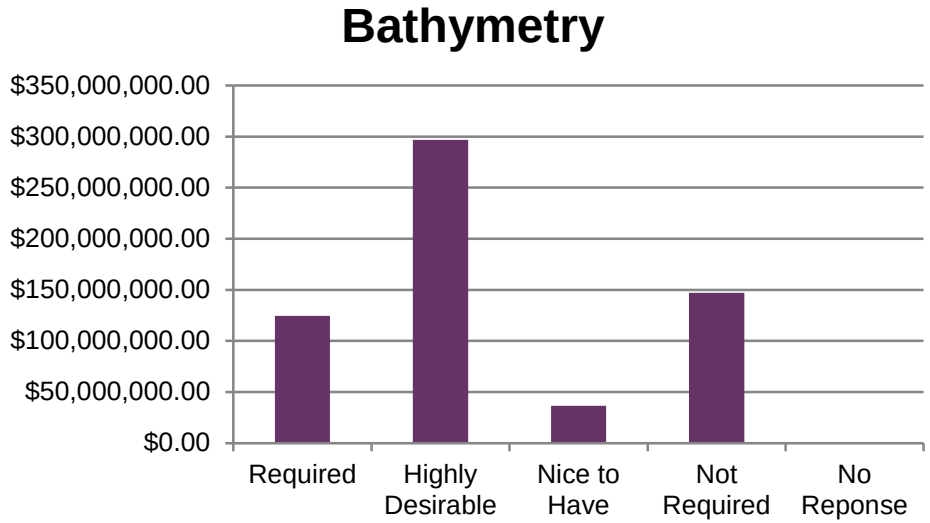


Integration with specific data sets



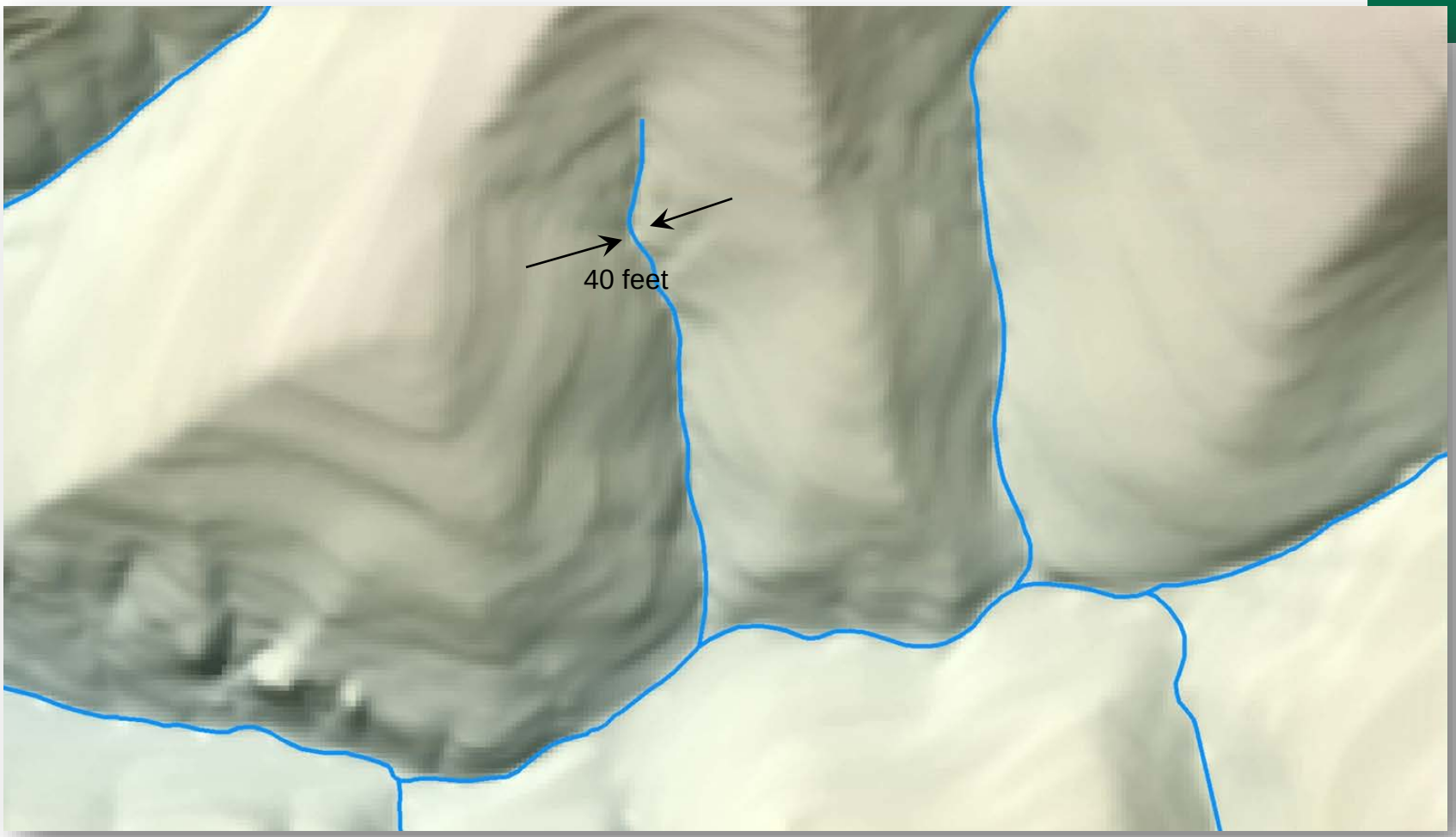






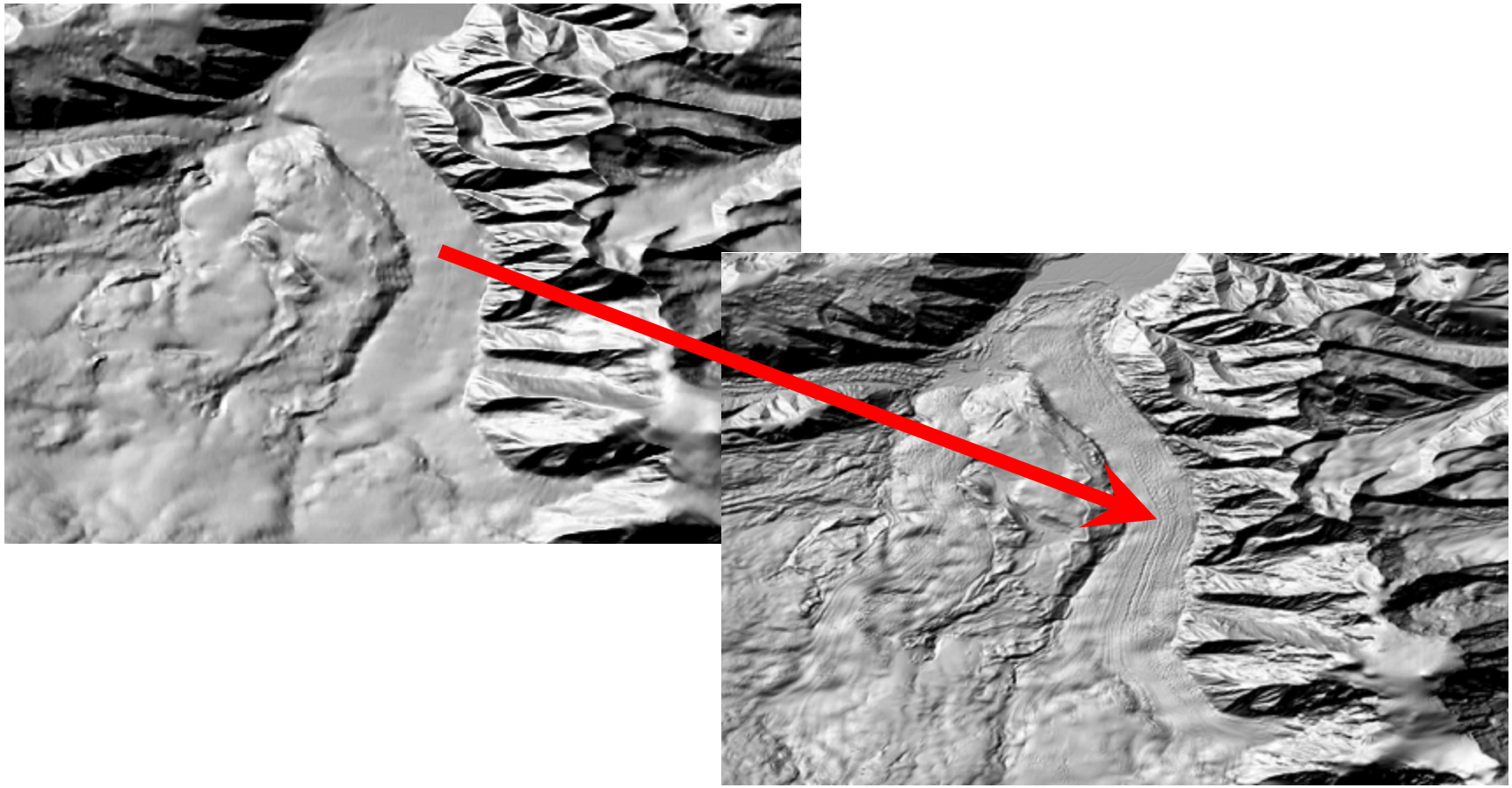
Data with 24K Mapping Origins

Integration error is in the 40 foot range



3D Elevation Program

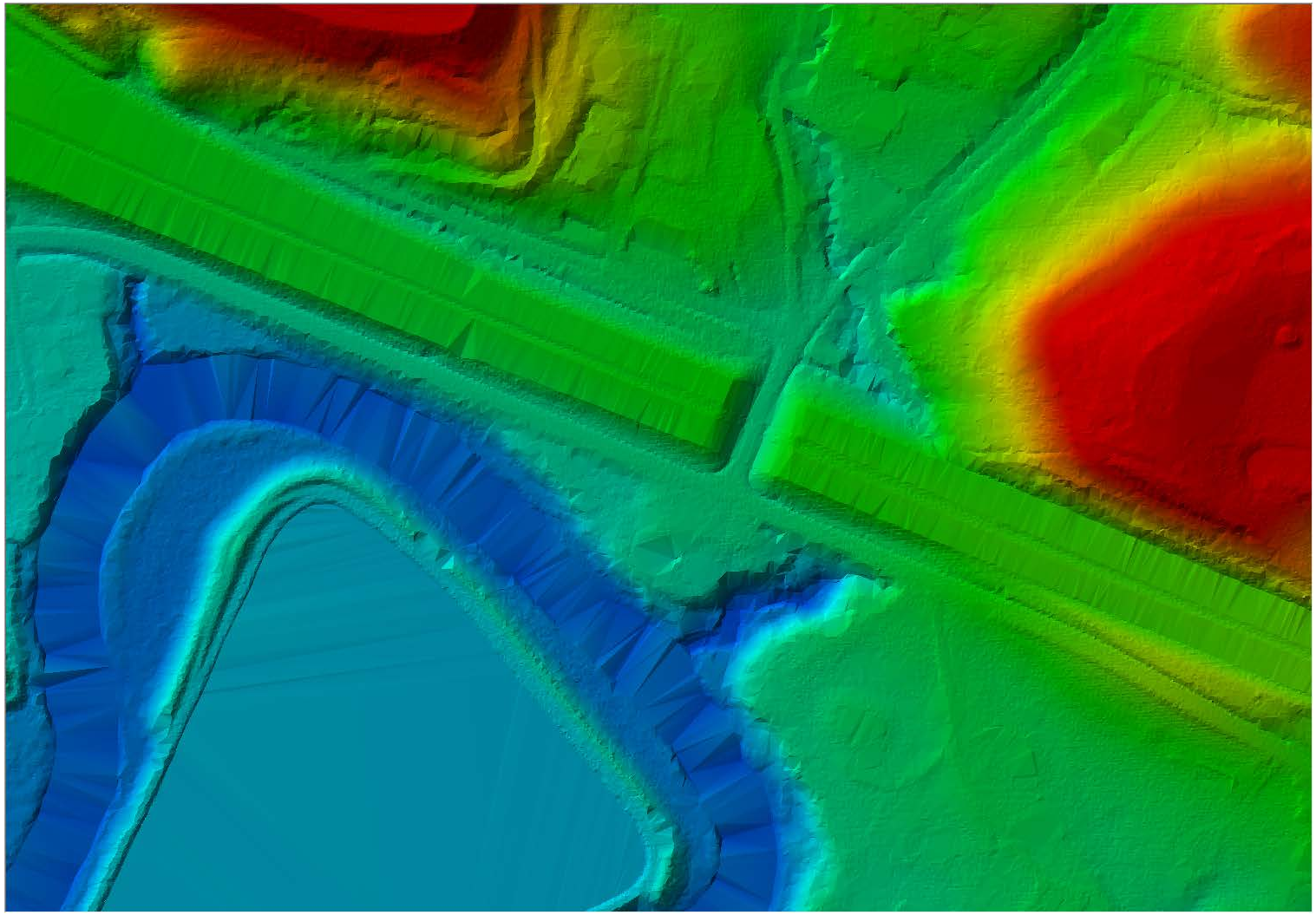
No longer a 40-foot paradigm!



The “Ele-Hydro” Concept

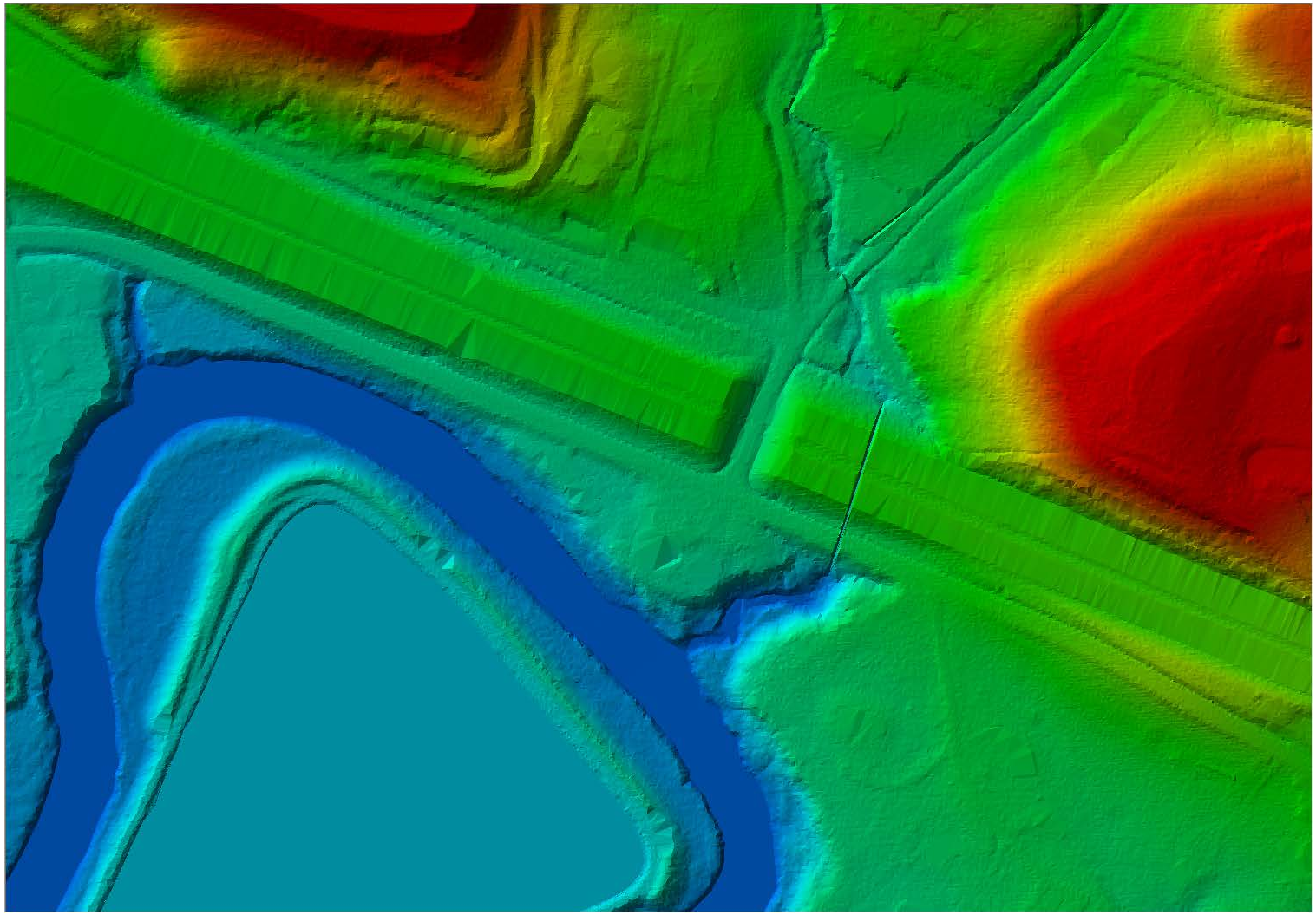
- Lidar is coming
- Lidar will be the standard against which hydrography is judged
- Therefore – Derive hydrography from lidar
- Issues:
  - Culverts
  - Processing speed
  - Conflation with NHD
  - Frequent replacement of lidar/hydrography
- Solutions:
  - GeoNet, BotHat, others
  - Cloud/Cyber GIS computing platforms

Lidar Topographic Surface



USGS
science for a changing world

Hydro-Enforced



USGS
science for a changing world

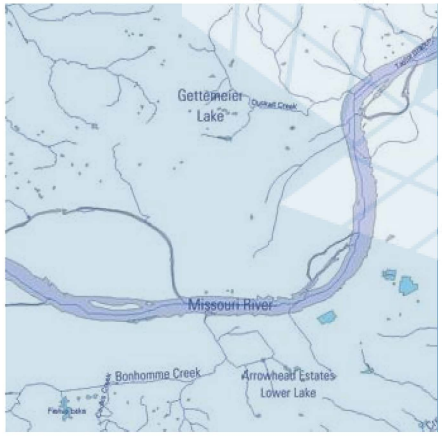
Questions….

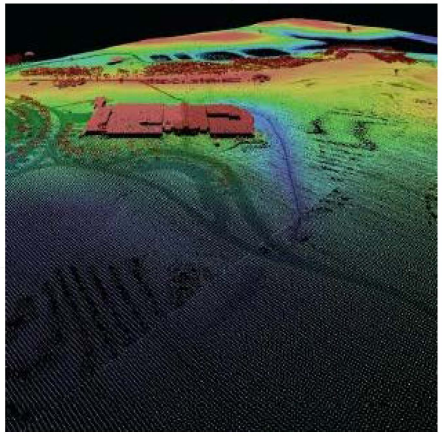
Alan Rea, P.E., Hydrologist
National Hydrography Dataset

National Geospatial Program
U.S. Geological Survey
Boise, Idaho
(208)387-1323 ahrea@usgs.gov

Provisional Names Tool

California NHD/WBD Training
September 2016





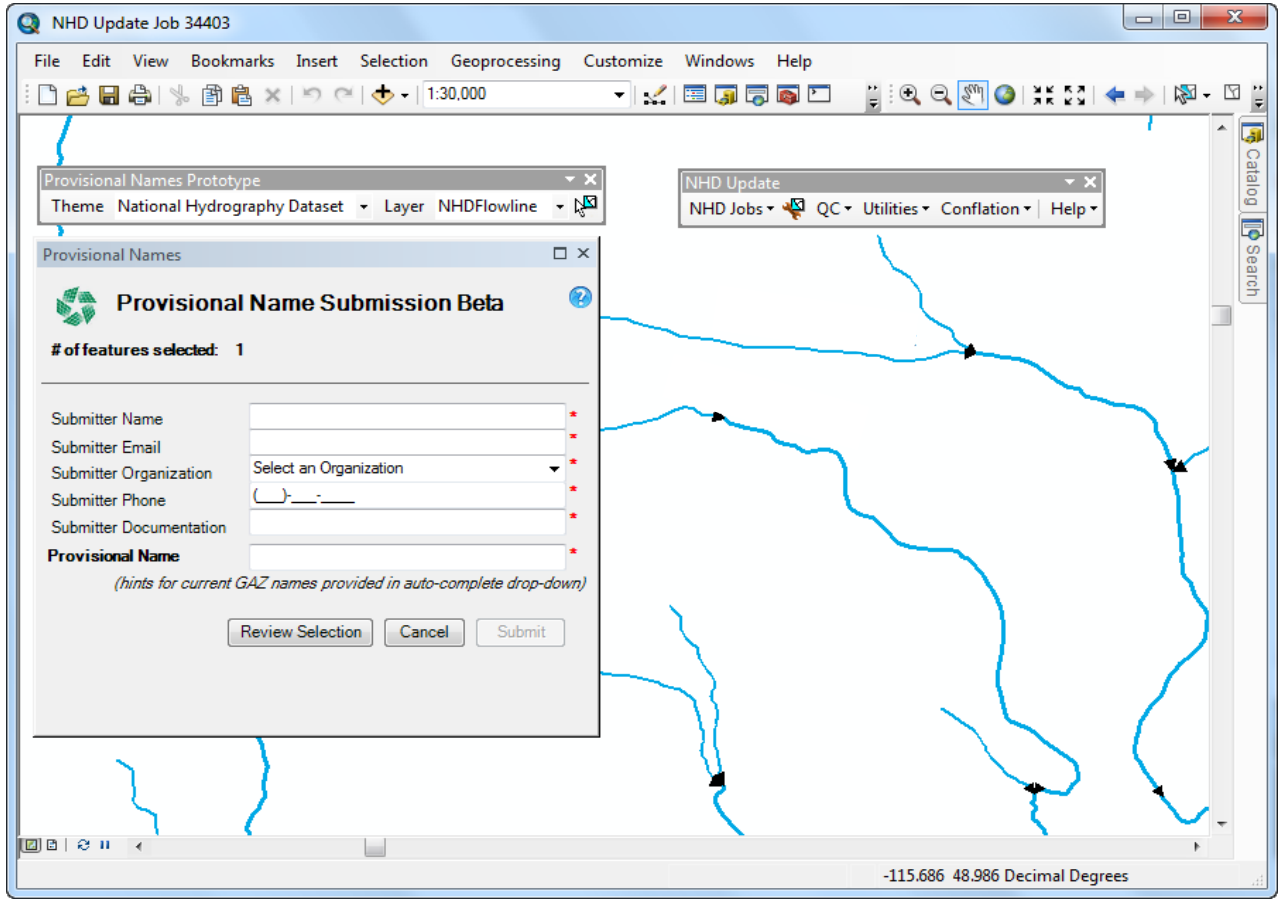
Kristiana Elite, Michael Tinker
National Geospatial Technical Operations Center (NGTOC)

Presentation Overview

1. Provisional Names Tool
2. The National Map (TNM)
3. U.S. Board on Geographic Names (BGN)
4. Geographic Names Information System (GNIS)
5. Current process to add a new geographic name
6. New process via the Provisional Names tool
7. DEMO!
8. Additional functionality

Provisional Names tool

Streamlined mechanism that will enable state NHD stewards to bring provisional geographic names into the NHD

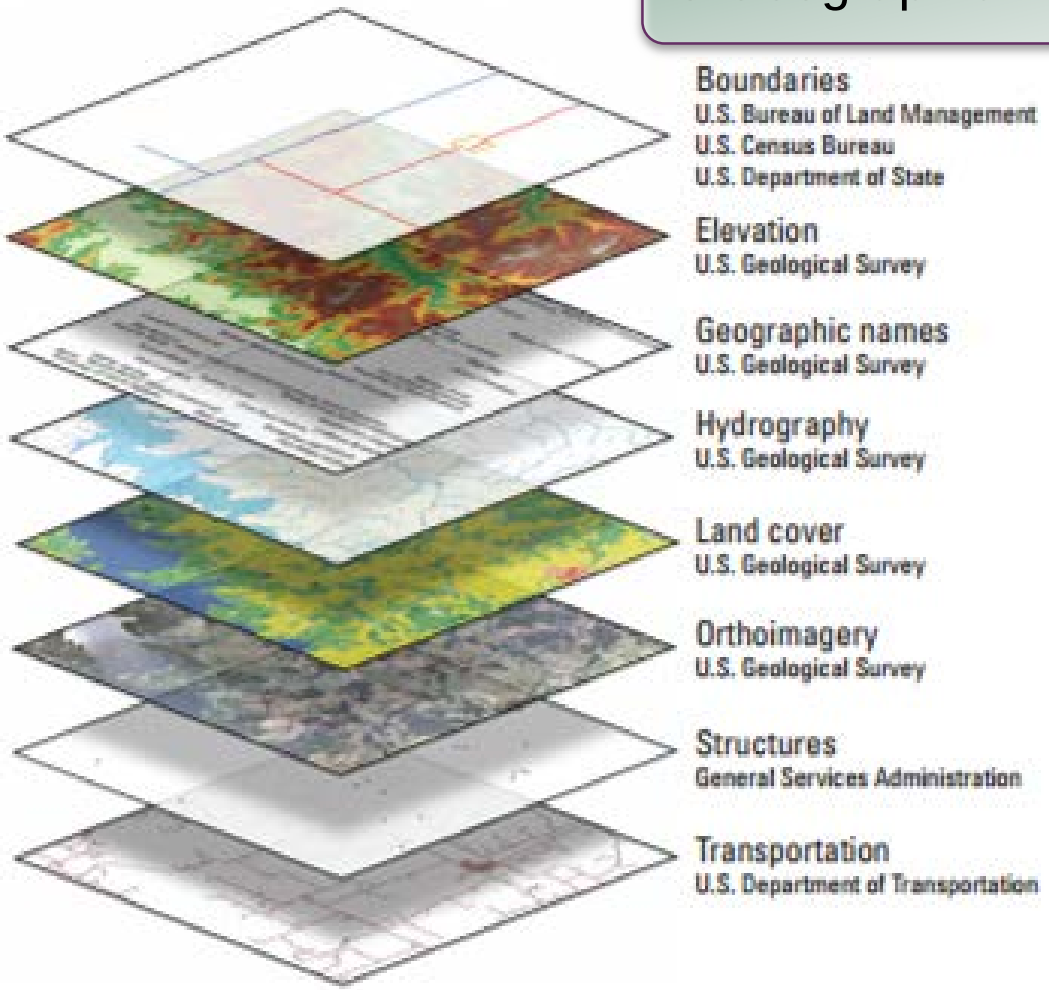


The National Map (TNM)

A collaborative effort among the USGS and other Federal, State, and local partners to improve and deliver topographic information for the Nation.

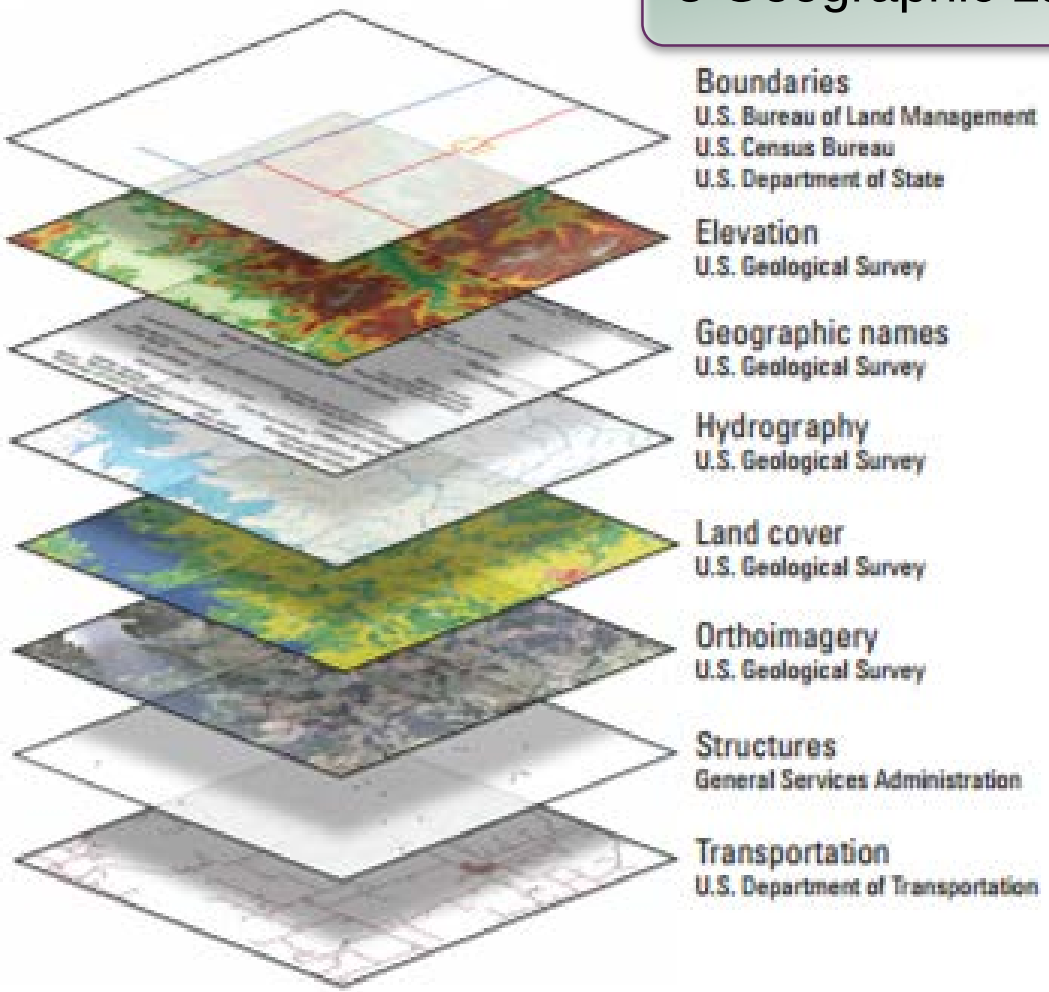
The National Map (TNM)

8 Geographic Layers:



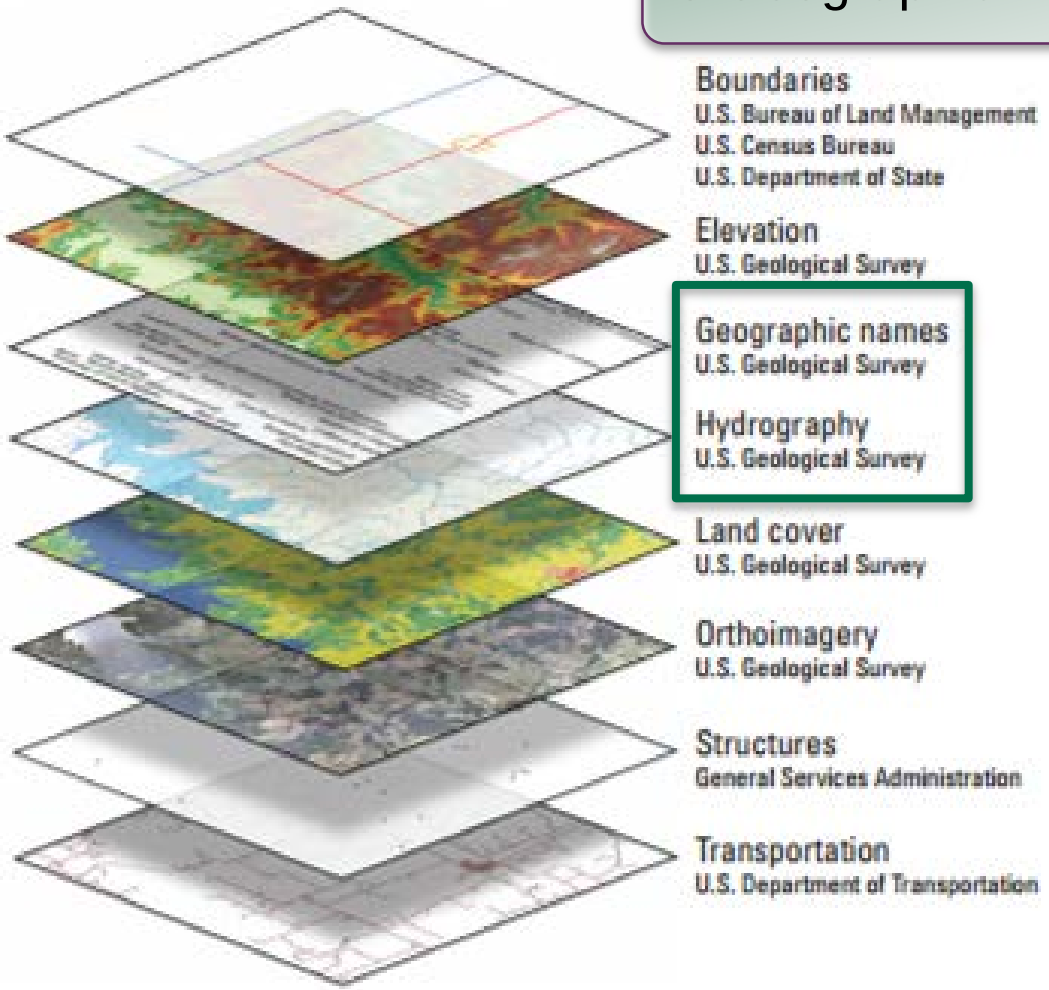
The National Map (TNM)

8 Geographic Layers:

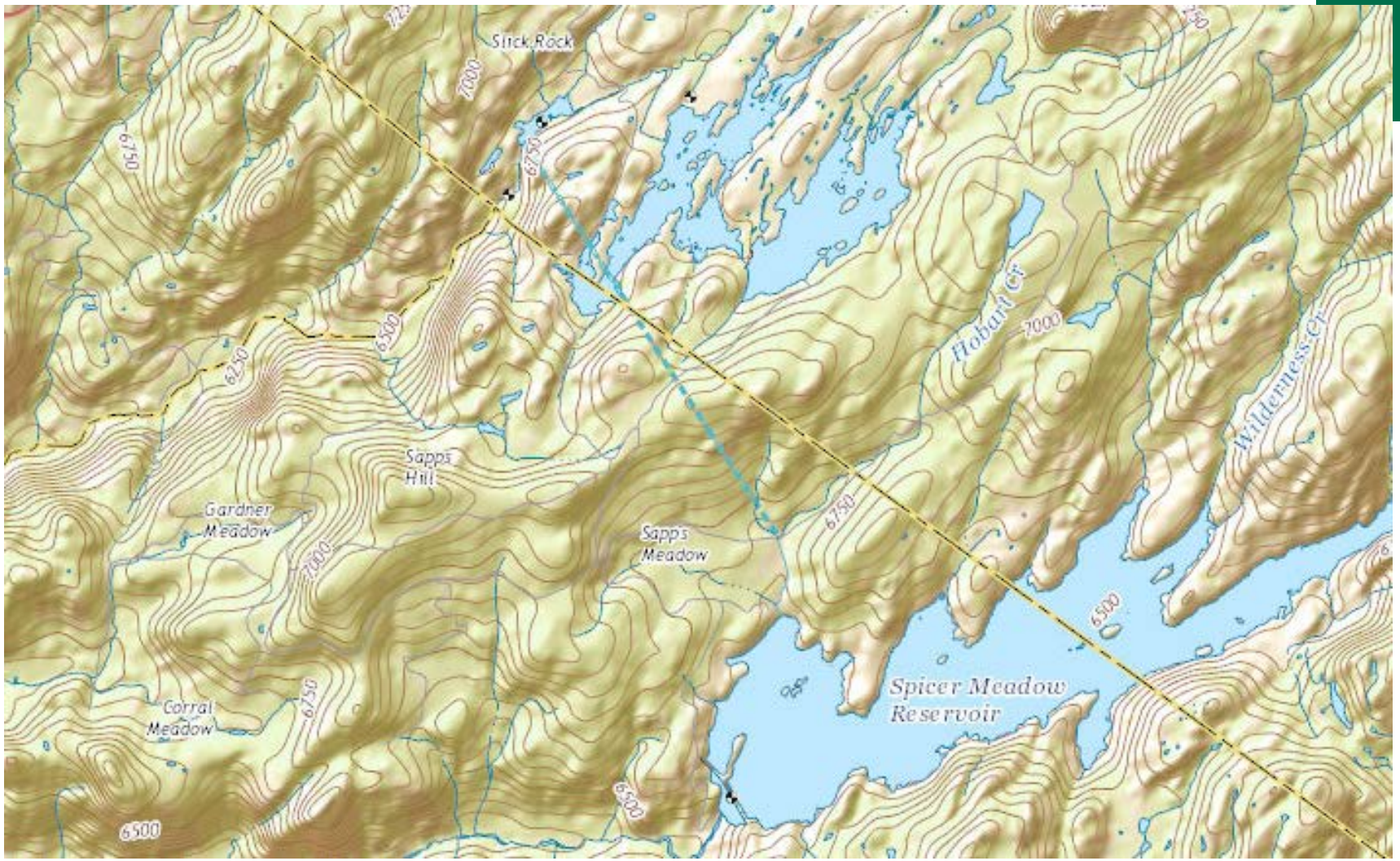


The National Map (TNM)

8 Geographic Layers:



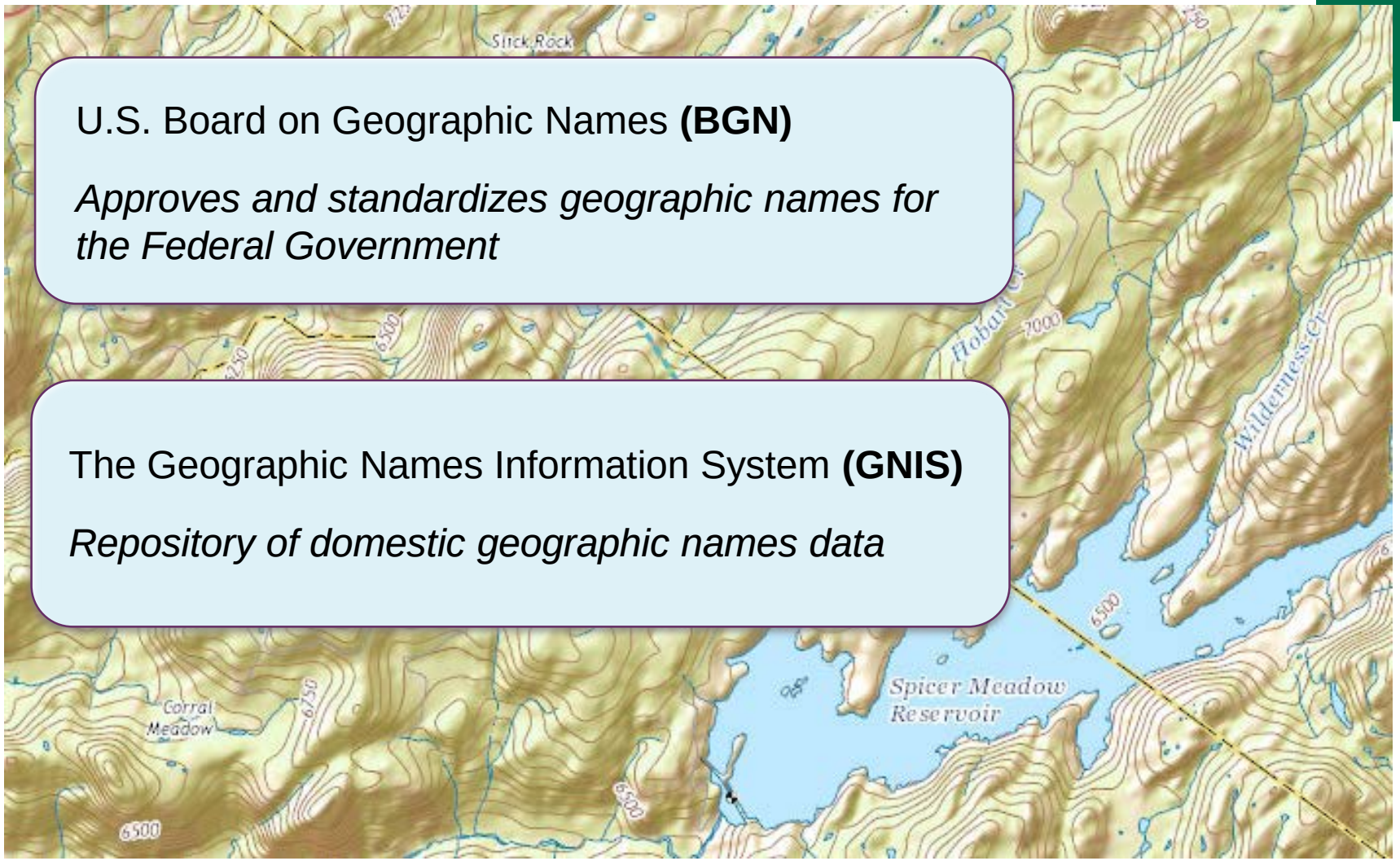
Geographic Names



USGS science for a changing world

The National Map
Your Source for Topographic Information

Geographic Names – BGN & GNIS



U.S. Board on Geographic Names **(BGN)**

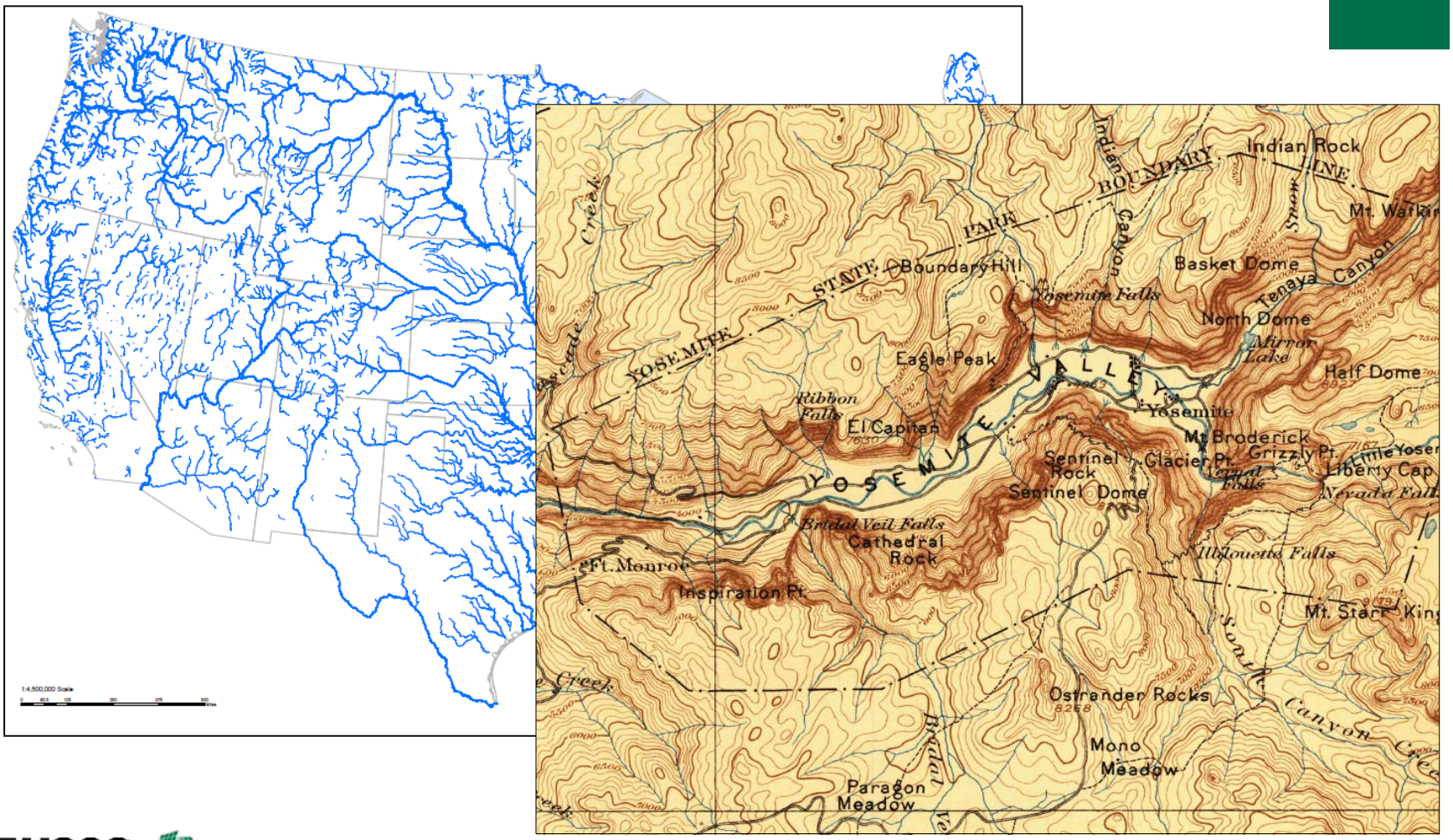
Approves and standardizes geographic names for the Federal Government

The Geographic Names Information System **(GNIS)**

Repository of domestic geographic names data

NHD and GNIS

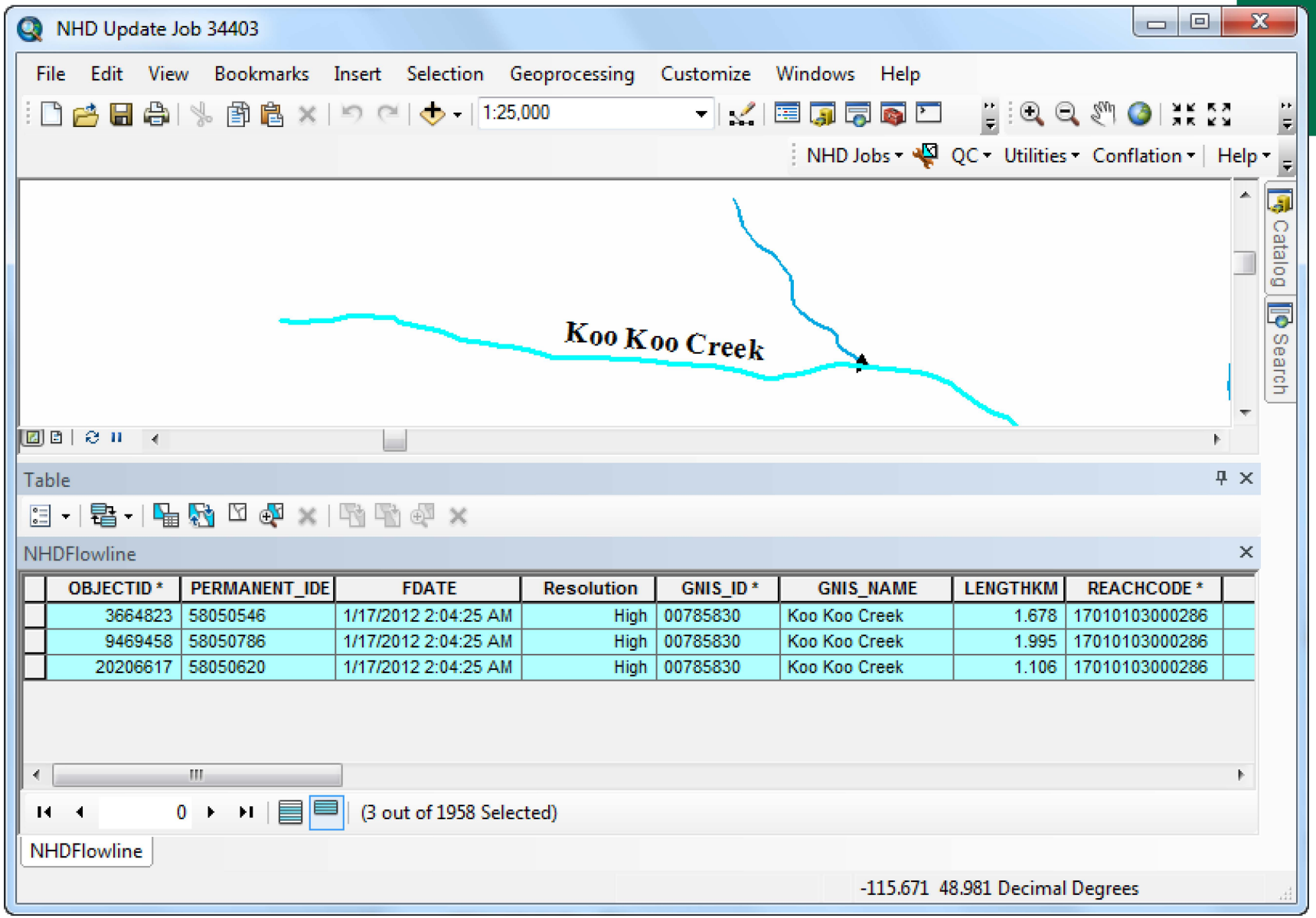
USGS owns and manages both NHD and GNIS



USGS science for a changing world

The National Map
Your Source for Topographic Information

All named features in NHD are already in GNIS

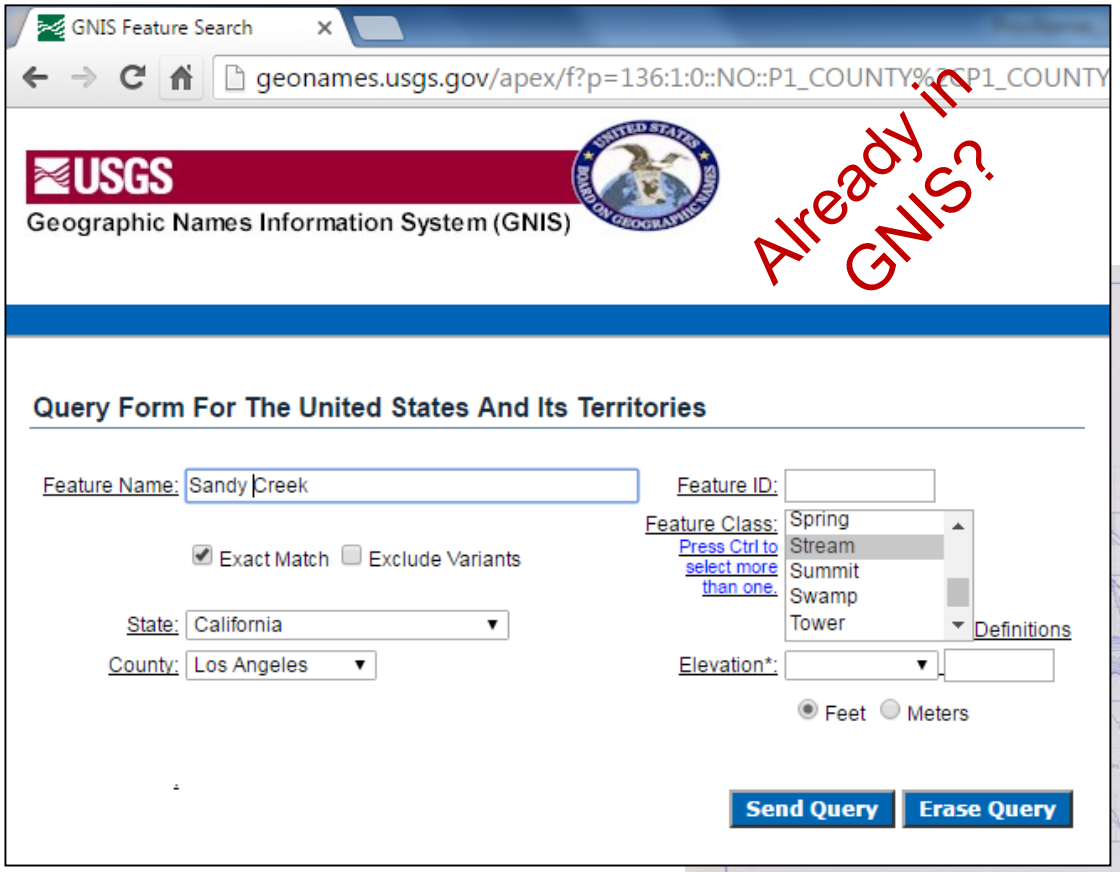


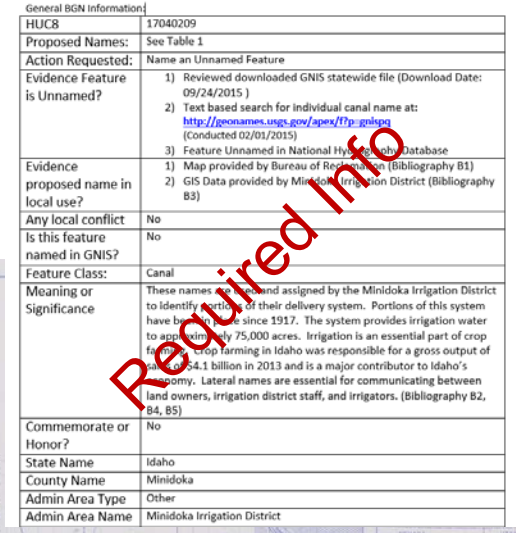
1. Research & Create Documentation
2. Submit Documentation
3. Wait for Approval
4. Add name to NHD features

Current process for new names

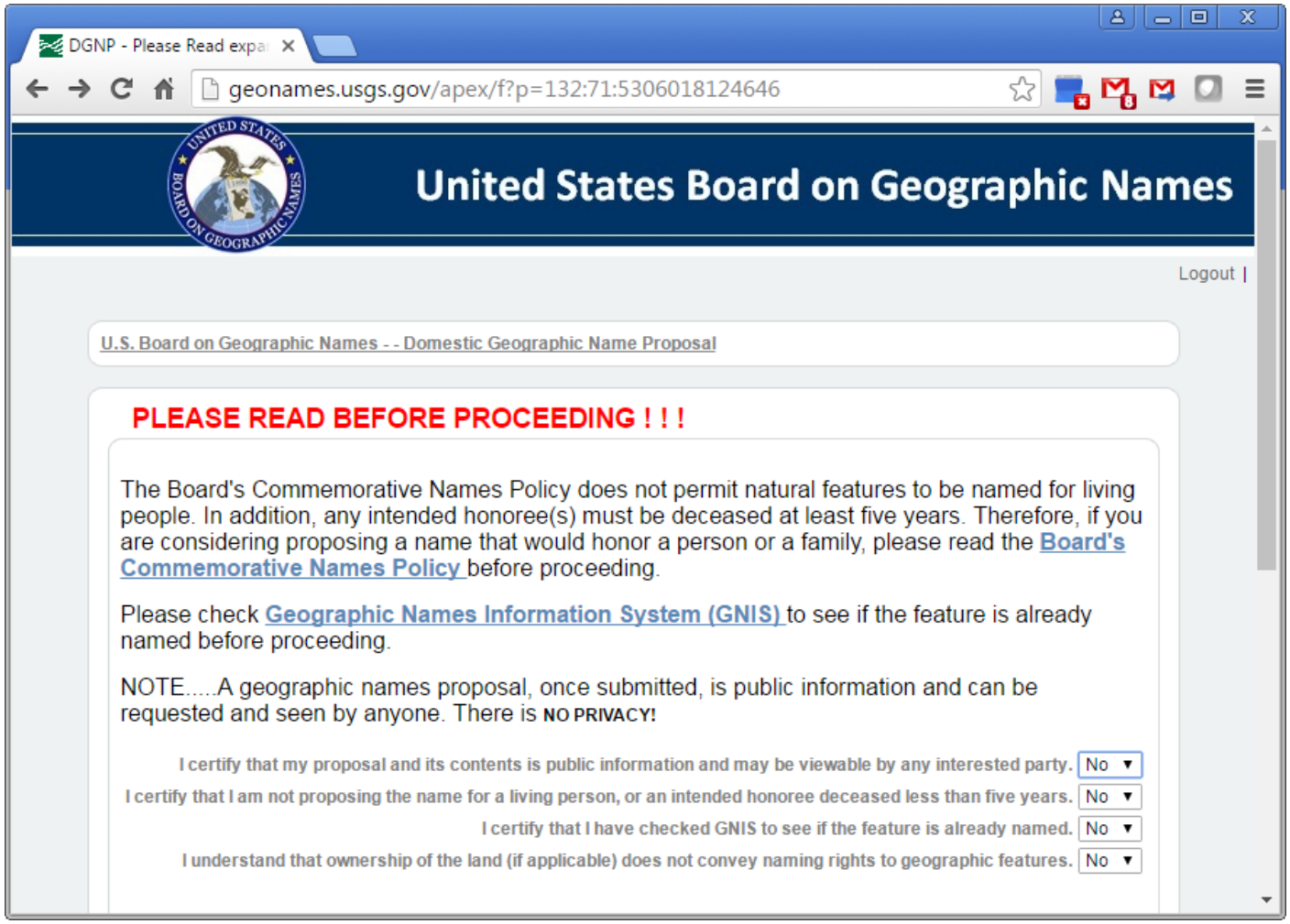
4 Steps Process

1. Research & Create Documentation
2. Submit Documentation
3. Wait for Approval
4. Add name to NHD features





1. Research & Create Documentation
2. Submit Documentation
3. Wait for Approval
4. Add name to NHD features



1. Research & Create Documentation
2. Submit Documentation
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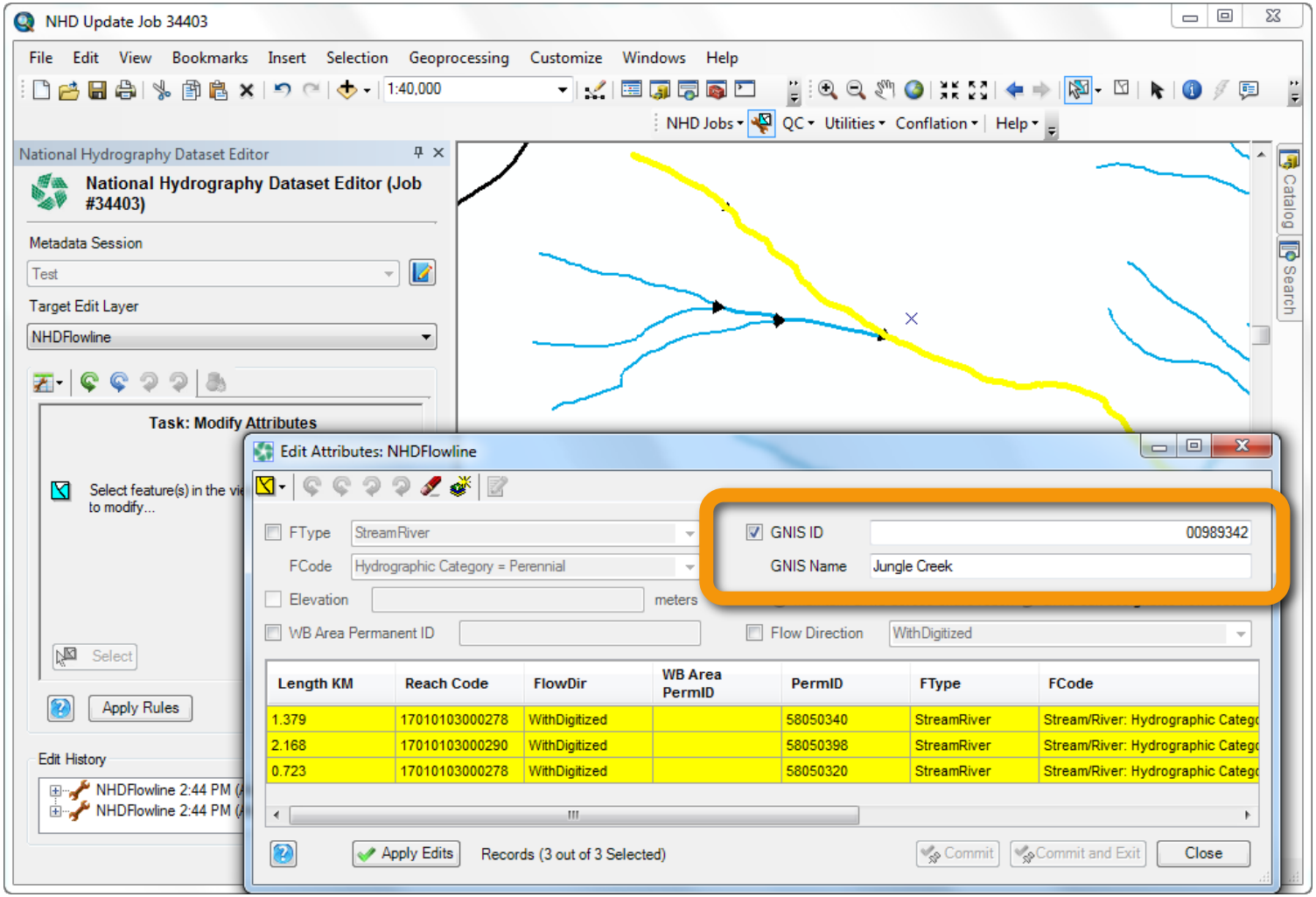
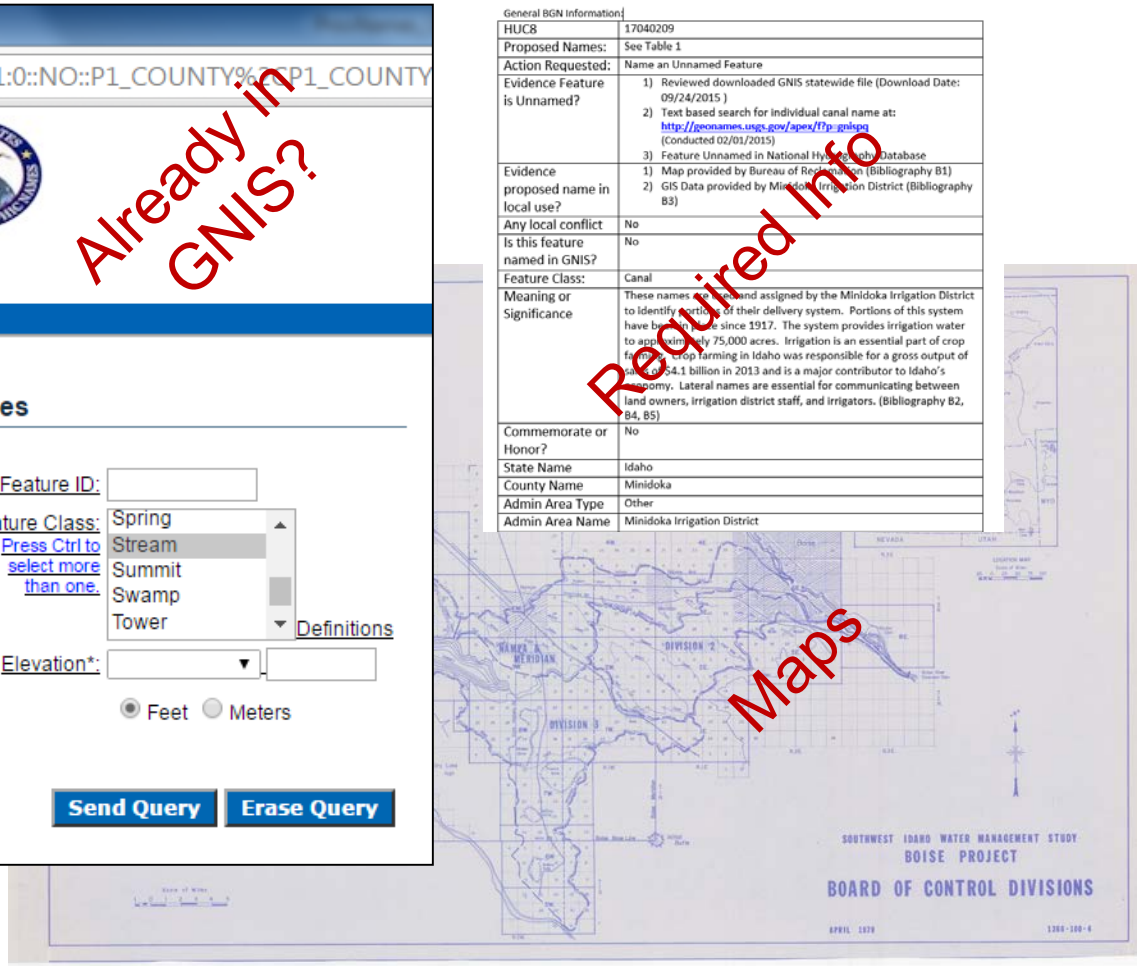
4. Add name to NHD features

1. Research & Create Documentation
2. Submit Documentation
3. Wait for Approval
4. Add name to NHD features



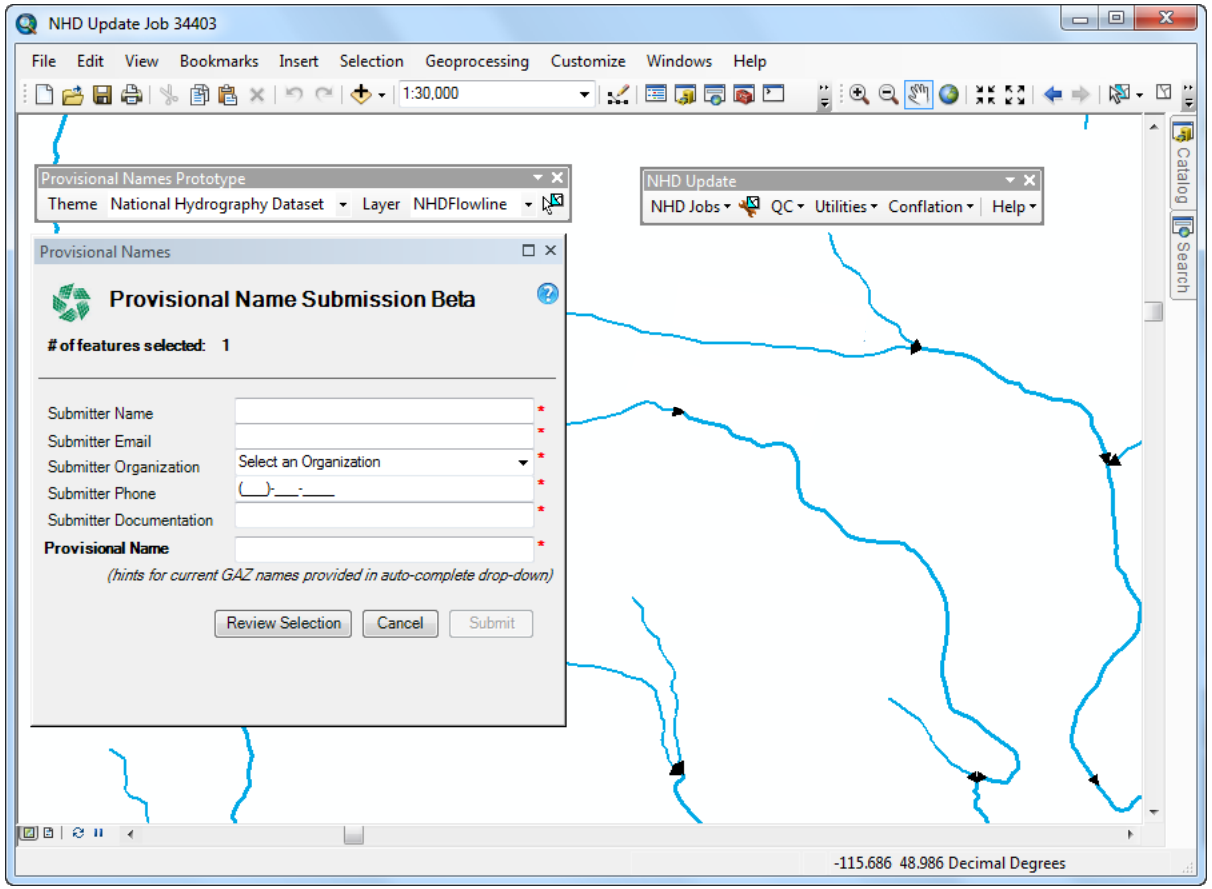
Provisional Names tool process

1. Research & Create Documentation
2. Create Provisional Names
3. Approval Process
4. Name added to GNIS



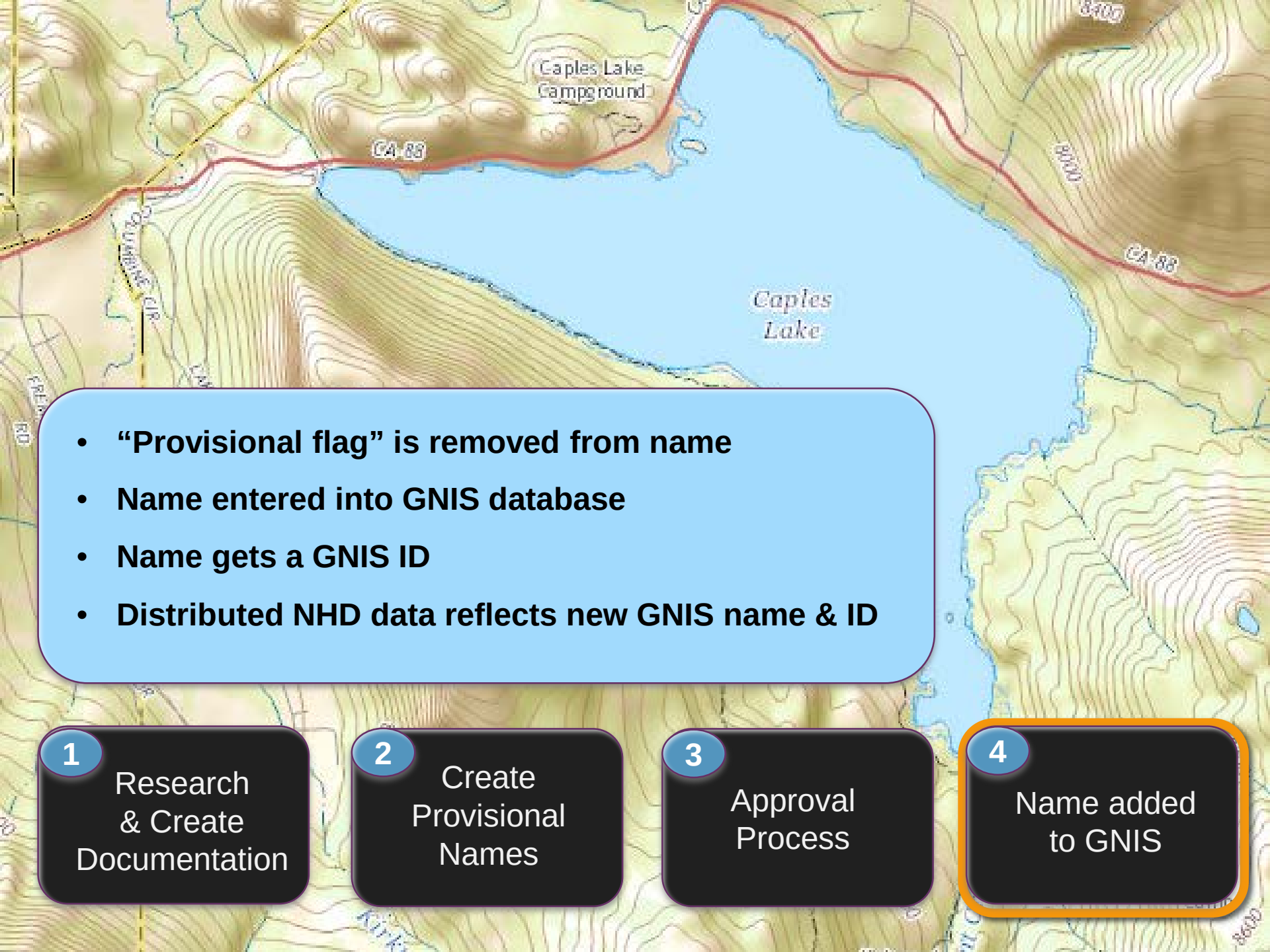
1. Research & Create Documentation
2. Create Provisional Names
3. Approval Process
4. Name added to GNIS

Within NHD Update Workflow



1. Research & Create Documentation
2. Create Provisional Names
3. Approval Process
4. Name added to GNIS

1. Research & Create Documentation
2. Create Provisional Names
3. Approval Process
4. Name added to GNIS



- **“Provisional flag” is removed from name**
- **Name entered into GNIS database**
- **Name gets a GNIS ID**
- **Distributed NHD data reflects new GNIS name & ID**

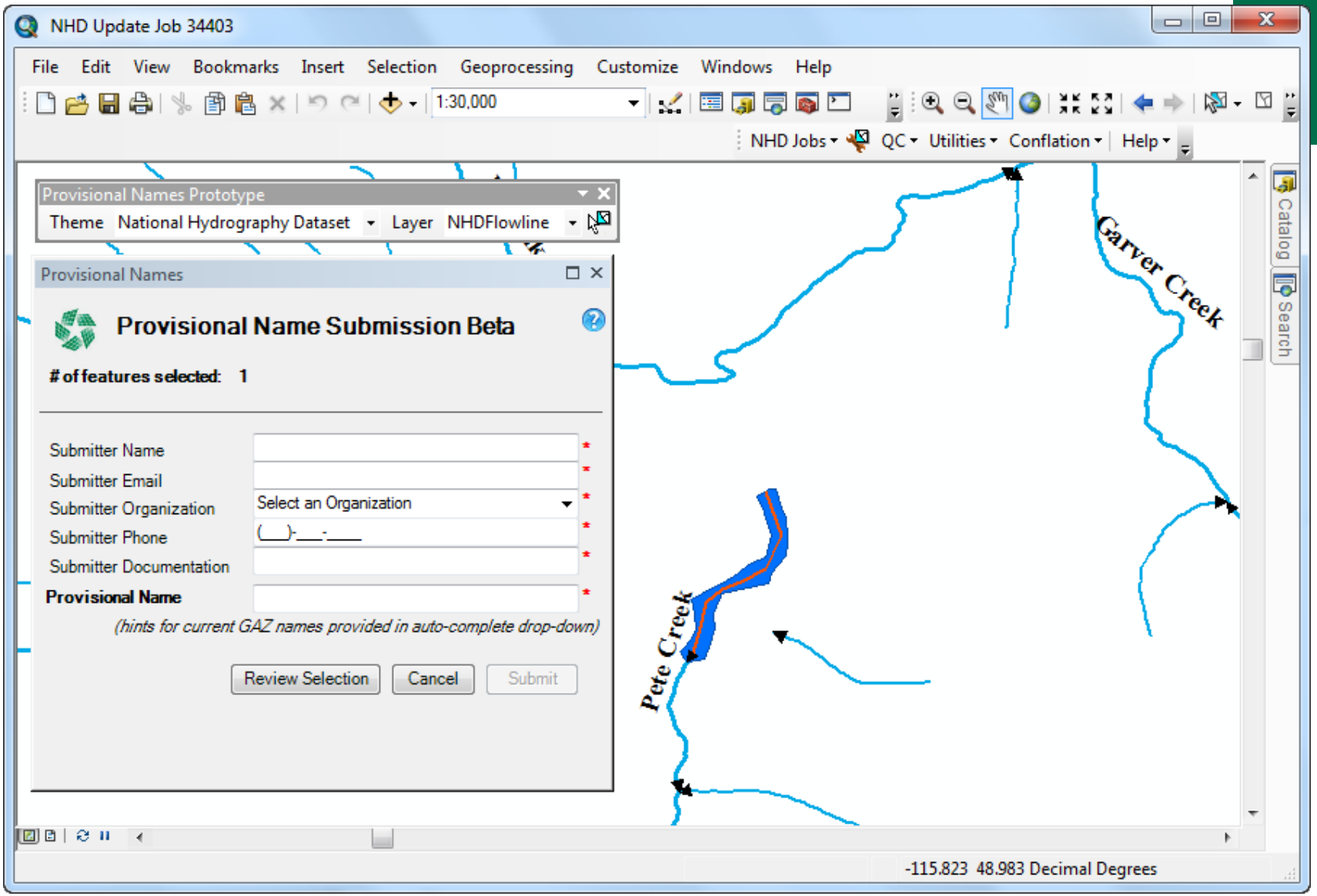
1 Research & Create Documentation

2 Create Provisional Names

3 Approval Process

4 Name added to GNIS

DEMO


NHD Update Job 34403
File Edit View Bookmarks Insert Selection Geoprocessing Customize Windows Help
1:30,000
NHD Jobs QC Utilities Conflation Help
Provisional Names Prototype
Theme National Hydrography Dataset Layer NHDFlowline
Provisional Names
Provisional Name Submission Beta
# of features selected: 1
Submitter Name
Submitter Email
Submitter Organization
Select an Organization
Submitter Phone
(___)-___-____
Submitter Documentation
Provisional Name
(hints for current GAZ names provided in auto-complete drop-down)
Review Selection
Cancel
Submit
Garver Creek
Pete Creek
Catalog
Search
-115.823 48.983 Decimal Degrees

The Provisional Name tables

Table

PROVNAME.PROVISIONALNAME

PROVISIONALNAMEID	PROVISIONALNAME	TNMTHEME	DECISIONSTATUS	DECISIONDATE	SUBMITDATE	SUBMITTERNAME	SUBMITTERCONTAC
80	Lateral 113	National Hydrography Dataset	0	<Null>	8/4/2016 3:07:44 PM	Danielle Favreau	Idaho Department of Water R
81	Lateral 127	National Hydrography Dataset	0	<Null>	8/4/2016 3:08:56 PM	Danielle Favreau	Idaho Department of Water Res
82	B-2 Canal	National Hydrography Dataset	0	<Null>	8/4/2016 3:10:12 PM	Danielle Favreau	Idaho Department of Water Res
90	Lateral 1710	National Hydrography Dataset	0	<Null>	8/4/2016 3:35:57 PM	Danielle Favreau	Idaho Department of Water R
91	Lateral 1710	National Hydrography Dataset	0	<Null>	8/4/2016 3:36:41 PM	Danielle Favreau	Idaho Department of Water
92	Lateral 1710	National Hydrography Dataset	0	<Null>	8/4/2016 3:37:21 PM	Danielle Favreau	Idaho Department of Water
93	Lateral 179	National Hydrography Dataset	0	<Null>	8/4/2016 3:54:34 PM	Danielle Favreau	Idaho Department of Water Re
94	Lateral 178	National Hydrography Dataset	0	<Null>	8/4/2016 3:55:44 PM	Danielle Favreau	Idaho Department of Water R
102	Lateral 419	National Hydrography Dataset	0	<Null>	8/4/2016 4:57:26 PM	Danielle Favreau	Idaho Department of Water
103	Lateral 420	National Hydrography Dataset	0	<Null>	8/4/2016 4:58:27 PM	Danielle Favreau	Idaho Department of Water Res
104	Lateral 74	National Hydrography Dataset	0	<Null>	8/4/2016 4:59:51 PM	Danielle Favreau	Idaho Department of Water Re
105	Lateral 77	National Hydrography Dataset	0	<Null>	8/4/2016 5:00:47 PM	Danielle Favreau	Idaho Department of Water Re
106	Lateral 421	National Hydrography Dataset	0	<Null>	8/4/2016 5:01:38 PM	Danielle Favreau	Idaho Department of Water

SUBMITTERCONTACTORGANIZATION	SUBMITTERCONTACTPHONE	SUBMITTERCONTACTEMAIL	SUPPORTINGDOCUMENTATION
Department of Water Resources (IDHYDRO)	<Null>	NHD.WBD@idwr.idaho.gov	http://idwr.idaho.gov/files/gis/special/MinidokaIDNames.zip
Department of Water Resources (IDHYDRO)	<Null>	NHD.WBD@idwr.idaho.gov	http://idwr.idaho.gov/files/gis/special/MinidokaIDNames.zip
epartment of Water Resources (IDHYDRO)	<Null>	NHD.WBD@idwr.idaho.gov	http://idwr.idaho.gov/files/gis/special/MinidokaIDNames.zip
epartment of Water Resources (IDHYDRO)	<Null>	NHD.WBD@idwr.idaho.gov	http://idwr.idaho.gov/files/gis/special/MinidokaIDNames.zip
partment of Water Resources (IDHYDRO)	<Null>	NHD.WBD@idwr.idaho.gov	http://idwr.idaho.gov/files/gis/special/MinidokaIDNames.zip
Department of Water Resources (IDHYDRO)	<Null>	NHD.WBD@idwr.idaho.gov	http://idwr.idaho.gov/files/gis/special/MinidokaIDNames.zip
epartment of Water Resources (IDHYDRO)	<Null>	NHD.WBD@idwr.idaho.gov	http://idwr.idaho.gov/files/gis/special/MinidokaIDNames.zip
Department of Water Resources (IDHYDRO)	<Null>	NHD.WBD@idwr.idaho.gov	http://idwr.idaho.gov/files/gis/special/MinidokaIDNames.zip
Department of Water Resources (IDHYDRO)	<Null>	NHD.WBD@idwr.idaho.gov	http://idwr.idaho.gov/files/gis/special/MinidokaID_Names2.zip
Department of Water Resources (IDHYDRO)	<Null>	NHD.WBD@idwr.idaho.gov	http://idwr.idaho.gov/files/gis/special/MinidokaID_Names2.zip
Department of Water Resources (IDHYDRO)	<Null>	NHD.WBD@idwr.idaho.gov	http://idwr.idaho.gov/files/gis/special/MinidokaID_Names2.zip
Department of Water Resources (IDHYDRO)	<Null>	NHD.WBD@idwr.idaho.gov	http://idwr.idaho.gov/files/gis/special/MinidokaID_Names2.zip
epartment of Water Resources (IDHYDRO)	<Null>	NHD.WBD@idwr.idaho.gov	http://idwr.idaho.gov/files/gis/special/MinidokaID_Names2.zip

The Provisional Name tables

“TNM Feature to Provisional Name”

Table

PROVNAME.TNMFEATURETOPROVISIONALNAME

TNMFEATURETOPROVISIONALNAMEID	PROVISIONALNAMEID	PERMANENT_IDENTIFIER
262	41	158117344
263	41	158117343
266	44	58050892
267	44	58050954
268	44	58050956
269	44	58050988
270	45	58052748
271	46	58052748
272	47	58052458
273	47	58052070
274	47	58052424
275	47	58052530
276	47	58052554
277	47	58052638
278	48	58054354
279	49	58054278
280	50	58054458
287	53	58050892
288	53	

Changes being implemented now

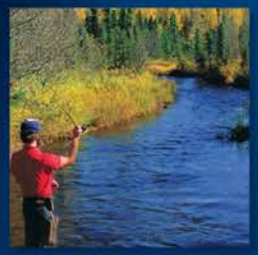
- New fields added to the Provisional Name table:
  - GNIS_ID
  - GNIS_NAME
- New domain added to “Decision Status” field:
  - **Submitted = 0**
  - **Approved = 1**
  - **Rejected = 2**
  - **BGN Case = 3**
  - **Applied = 4**
- ArcMap SQL interface for Names team to manipulate the “Decision Status” field
- This changes allows:
  - Names team to approve records directly in the Provisional Name table
  - Data Management team to harvest the approved transactions from the Provisional Names table, and apply them to the NHD features.

Still to build

- Web interface for GNIS staff review
- Documentation format and guidelines

Questions?

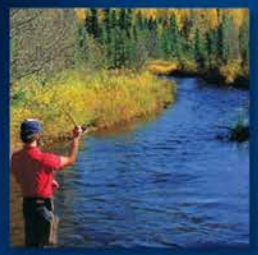
Michael Tinker
NHD Point of Contact
mdtinker@usgs.gov

Other Updates

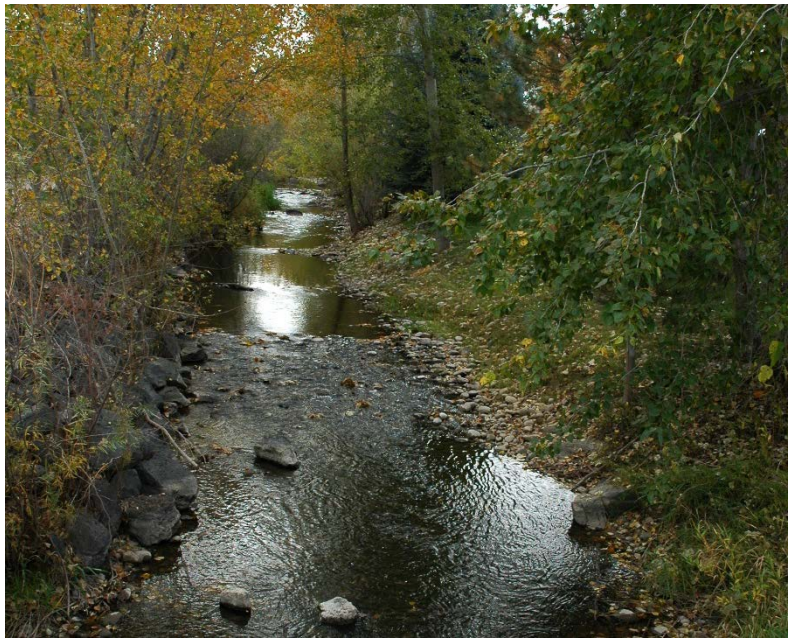
- Watershed Boundary Dataset
  - Provisional Gaged Drainage Areas
  - WBD and NHDPlus HR Catchments Comparison Project

- Danielle Favreau, IDWR

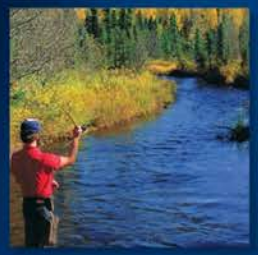



Other Updates

- National Hydrography Dataset
  - NHD Network Improvement Project
  - Naming of Staged Products



Product	Current Naming Convention (ex.)	Proposed Naming Convention (ex.)
NHD HU8	NHD_H_17050122_GDB	NHD_H_17050122_HU8_GDB
NHD HU4	NHD_H_1701_Shape	NHD_H_1701_HU4_Shape
NHD State	NHD_H_17_Idaho_GDB	NHD_H_Idaho_State_GDB
WBD HU2	WBD_16_GDB	WBD_16_HU2_GDB
NHDPlus HR HU4	NHDPlus_H_1704_GDB	NHDPlus_H_1704_HU4_GDB

Other Updates

- NHD/WBD Tools Status

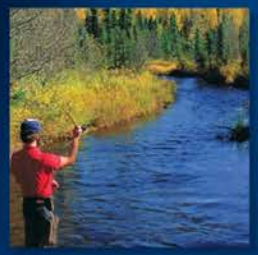
Editor Tools: All require ArcGIS 10.3.x

- NHD: version 6.3.3.2
- WBD: version 2.5.0.0
- GeoConflation: available from USGS

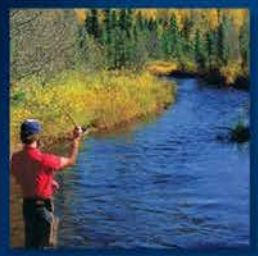
Tools available from NHD.usgs.gov

- HEM: version 2.8.1.0
- Utilities: version 3.0.4.0
  - Network Builder Requires ArcGIS Standard or Advanced License
- Metadata Viewer: version 1.0.0.4

- Danielle Favreau, IDWR



Other Business?

Upcoming Events

- **Intermountain GIS Conference**
  - April 18-21, 2017 West Yellowstone MT
- **IGC Spring Meeting**
  - April 20, 2017 at Intermountain GIS Conf.
- **AWRA Spring Conference**
  - April 30 – May 3, 2017 Snowbird, UT
- **Northwest GIS Conference**
  - October 9-13, 2017 Boise, ID

Contact Information:

Danielle Favreau, Idaho WBD & NHD Technical Point of Contact Danielle.Favreau@idwr.idaho.gov

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: Sept. 14, 2017