

NHD*Plus*

the OWDI's Geospatial Hydrologic Framework

(A Story of Plumbing, Persistence and Patience)

Objectives

- ▶ To convey an understanding of the OWDI geospatial hydrologic framework
 - Vision
 - Basic concepts
 - Plans for data and delivery
 - Progress to date
 - What's next?

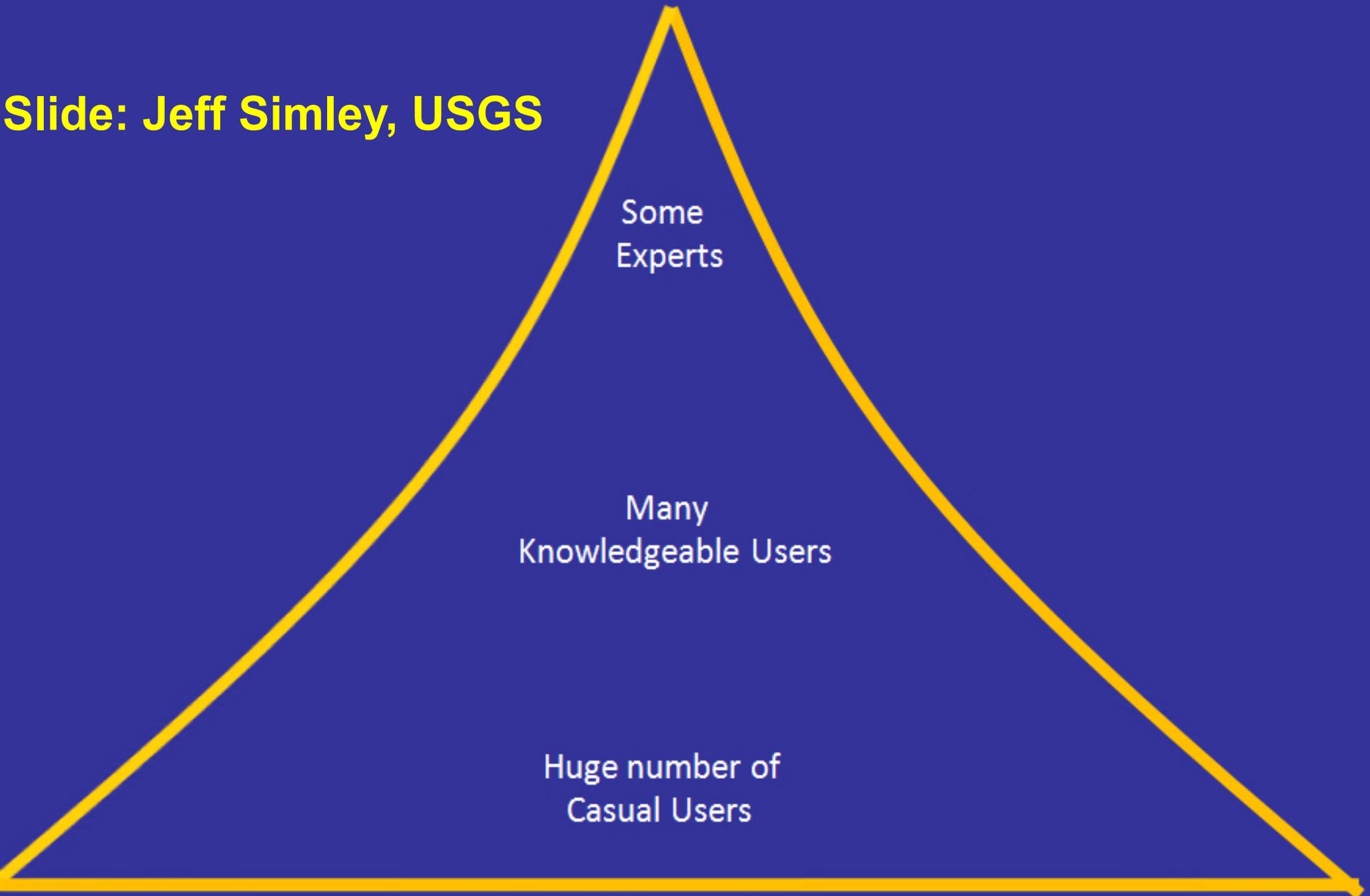
Acknowledgements

▶ *NHDPlus* Team

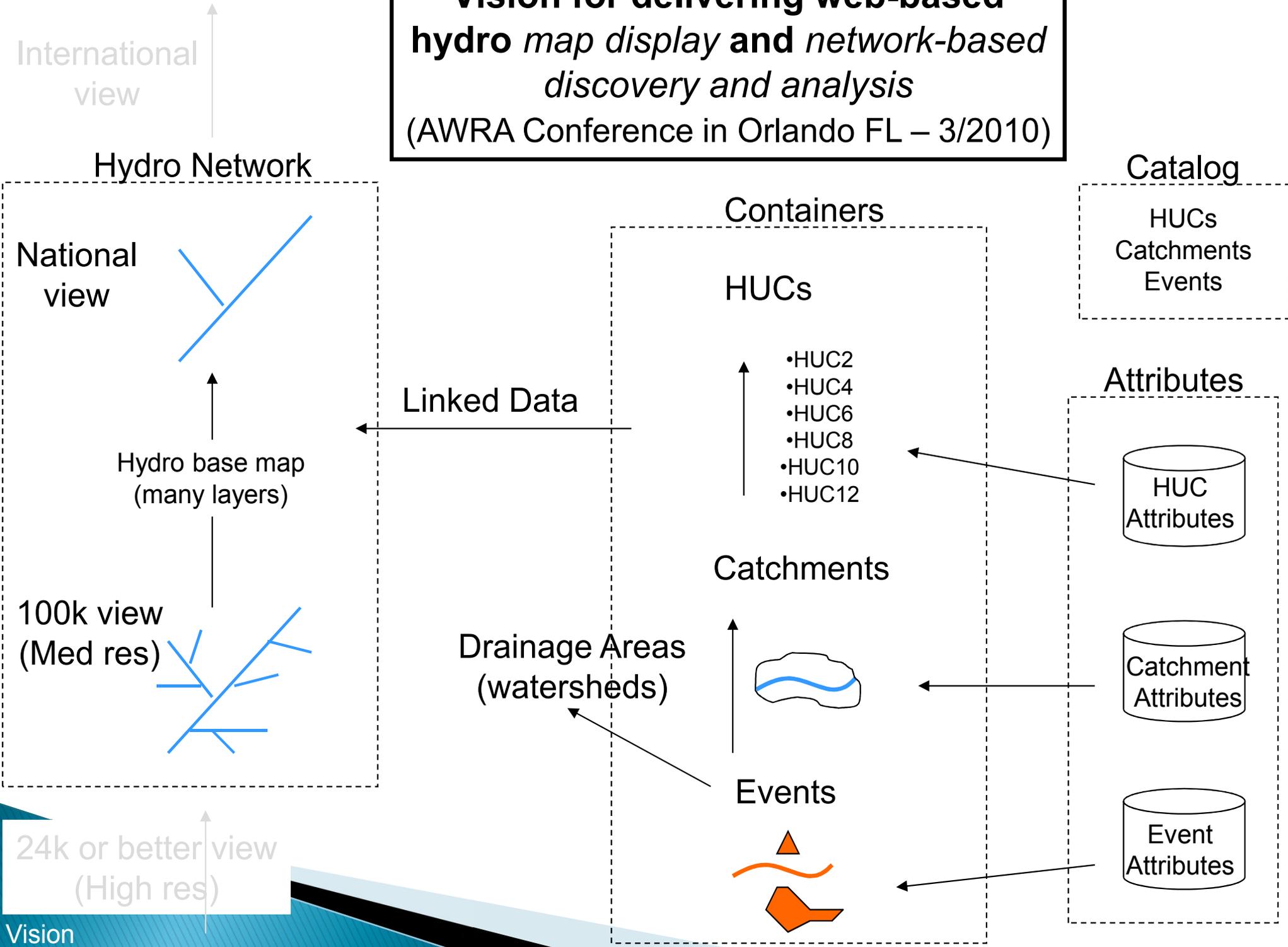
- Tommy Dewald / EPA Office of Water (Project lead)
- Cindy McKay / EPA Contractor
- Tim Bondelid / EPA Contractor
- Al Rea / USGS National Geospatial Program
- Craig Johnston, Rich Moore / USGS Water
- (Greg Schwarz, Kernell Ries, Dave Wolock / USGS Water)

Hydrography User Base

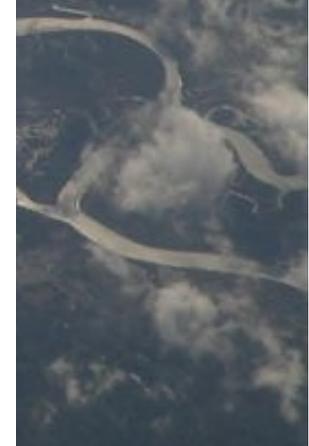
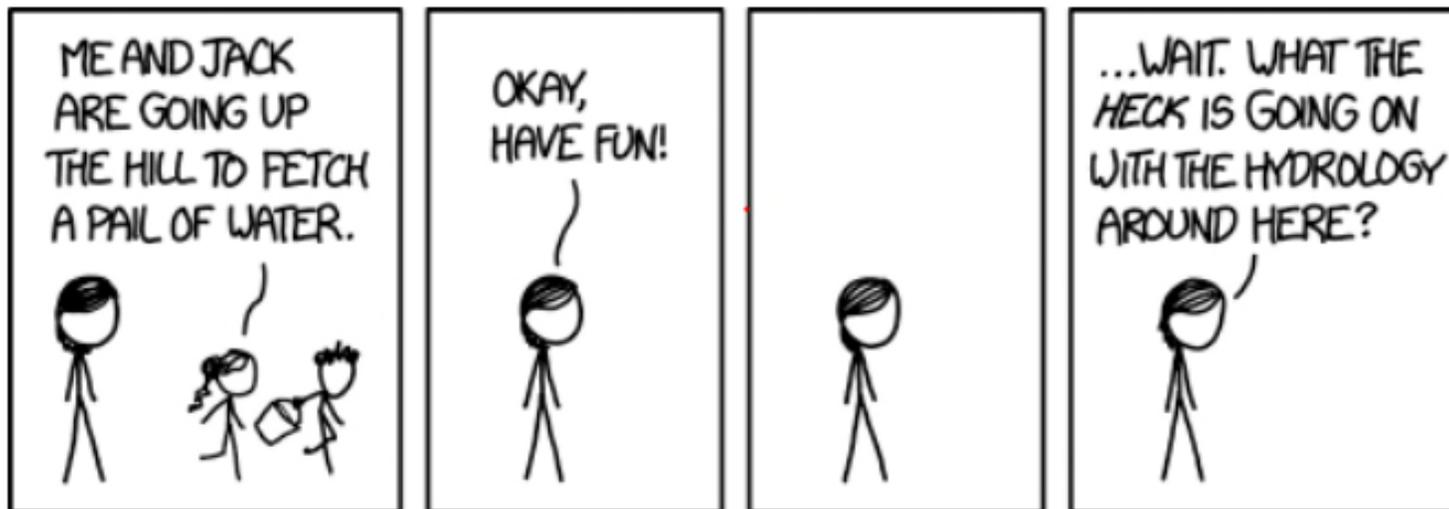
Slide: Jeff Simley, USGS



**Vision for delivering web-based
hydro map display and network-based
discovery and analysis**
(AWRA Conference in Orlando FL – 3/2010)

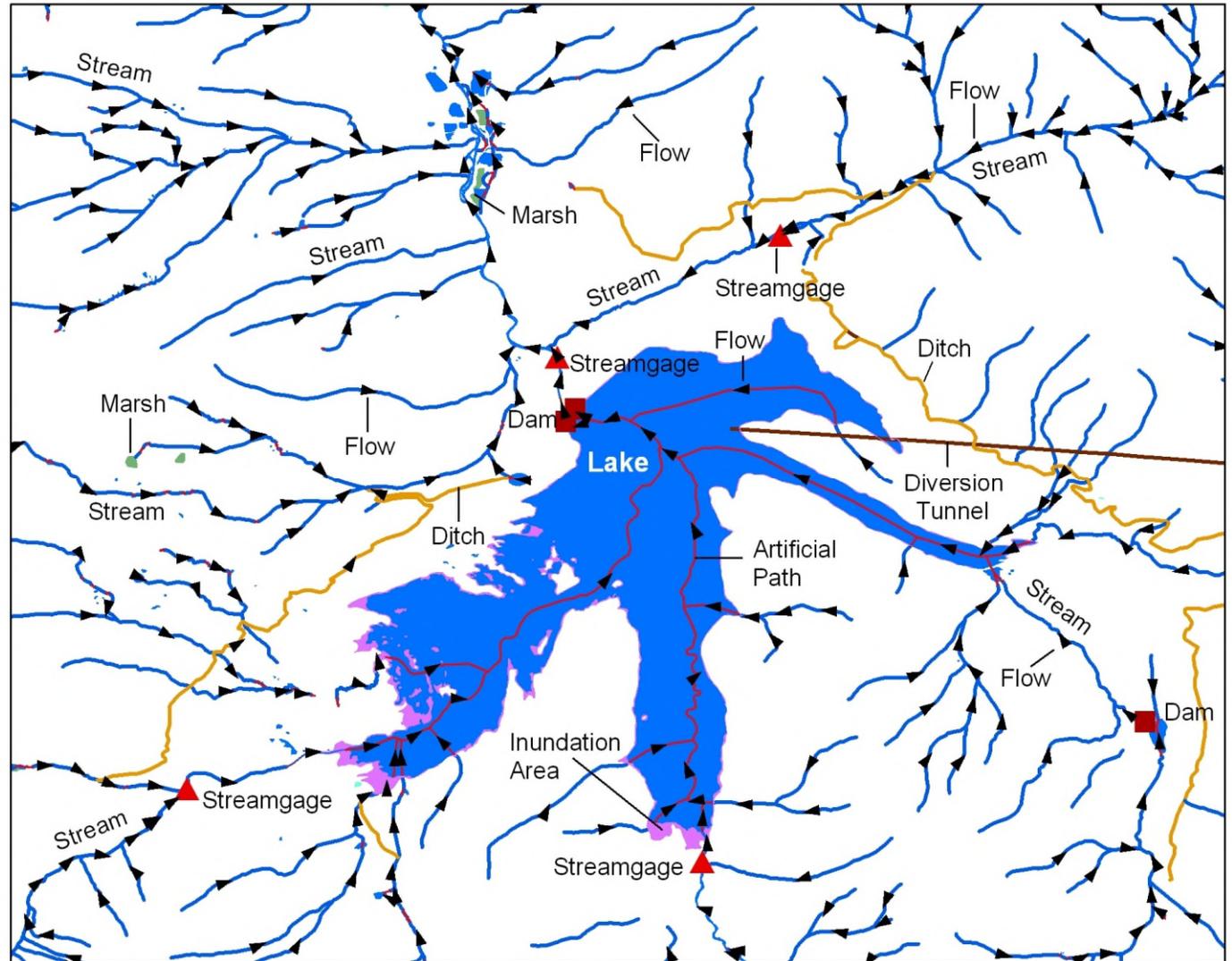


It's a complicated world out there!



The National Hydrography Dataset is the Foundation*

The NHD is comprised of the surface water features found on topographic maps combined to form a stream network with addresses.

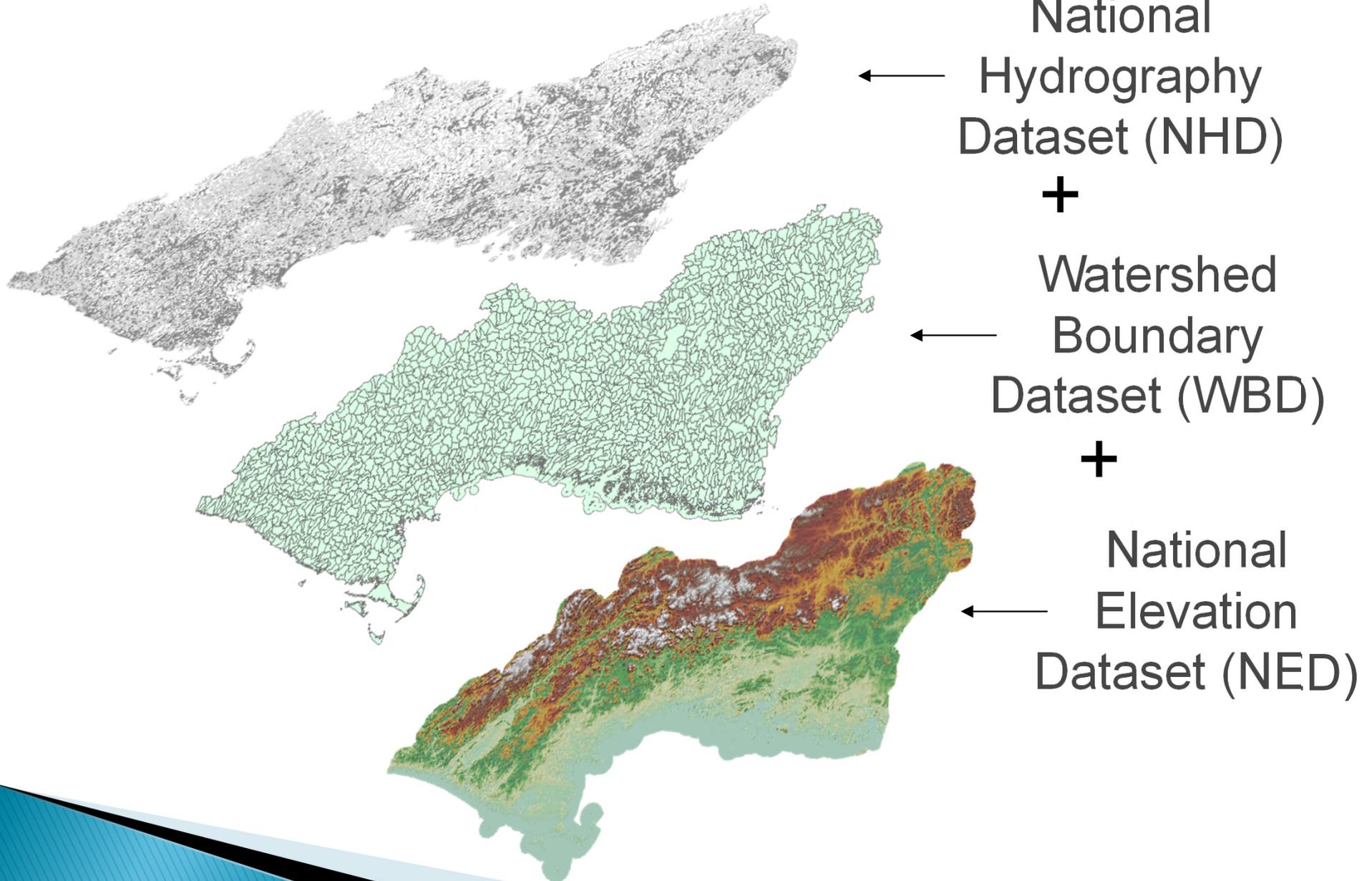


* (Making the Digital Water Flow, NHDPlus web site)

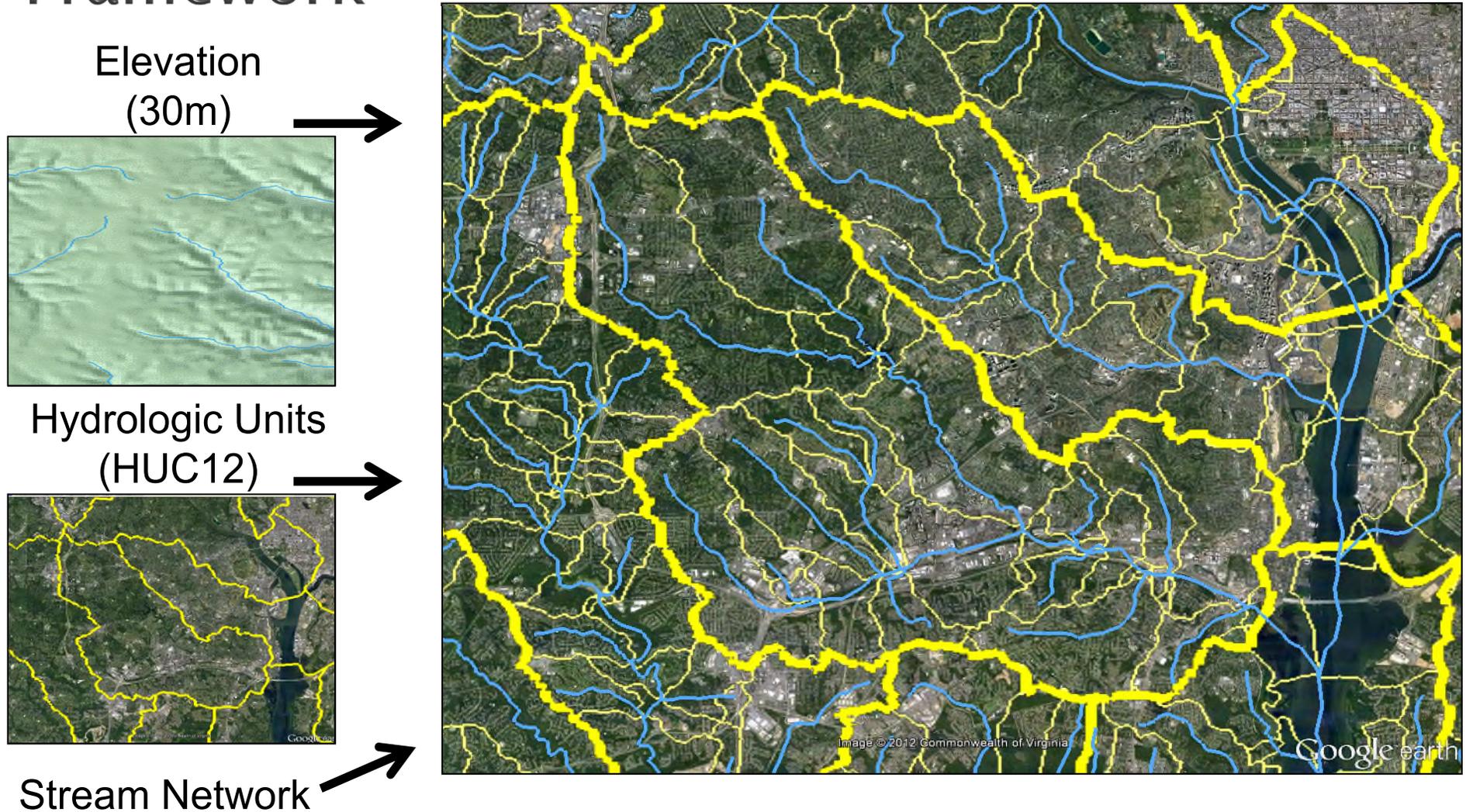
NHD Plus Business Need

- ▶ To provide flow volume and velocity estimates that support dilution (fate-and-transport) modeling for pollutants in the water

NHD *Plus* – integrates the ...



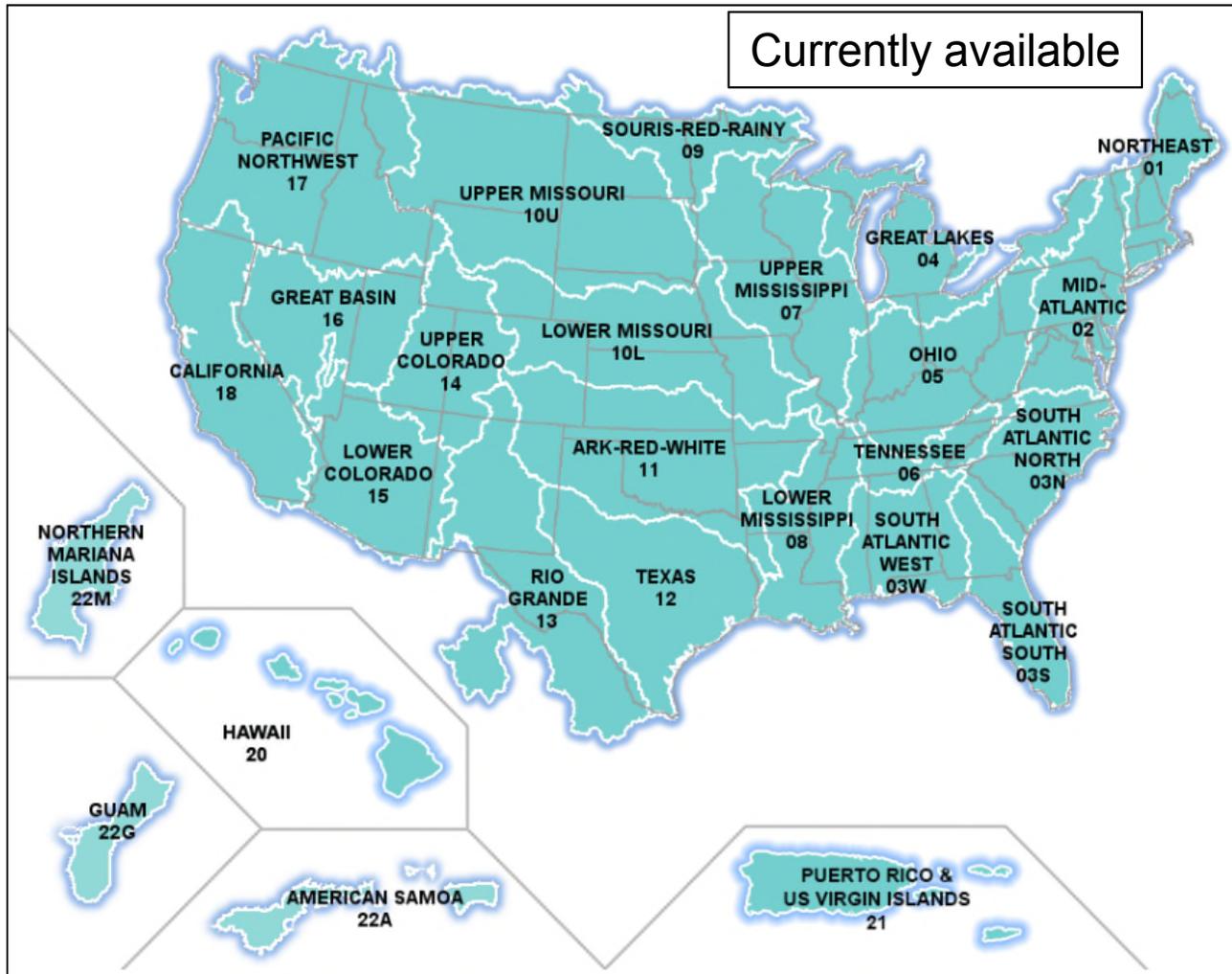
NHD*Plus* provides the Geospatial Hydrologic Framework



| Stream Network | Map Scale | Map Accuracy | Total Stream Miles (mi) | # of Stream Segments | Stream Segment Average Length (mi) | # of Lakes | Catchment Average Area (sq mi) |
|----------------------------|-----------------|--------------|-------------------------|----------------------|------------------------------------|------------|--------------------------------|
| Reach File Version 1 (RF1) | 1:500K | +/- 254m | 600,000 | 60,000 | 10 | 4,100 | 50 |
| Medium Resolution NHD | 1:100k | +/- 50m | 3,200,000 | 2,600,000 | 1.2 | 38,000 | 1.1 |
| High Resolution NHD | 1:24K or better | +/- 12m | 7,500,000 | 20,000,000 | 0.37 | 537,000 | Production underway |

(These figures are approximations (+/- 10%) provided for purposes of comparison.) 9

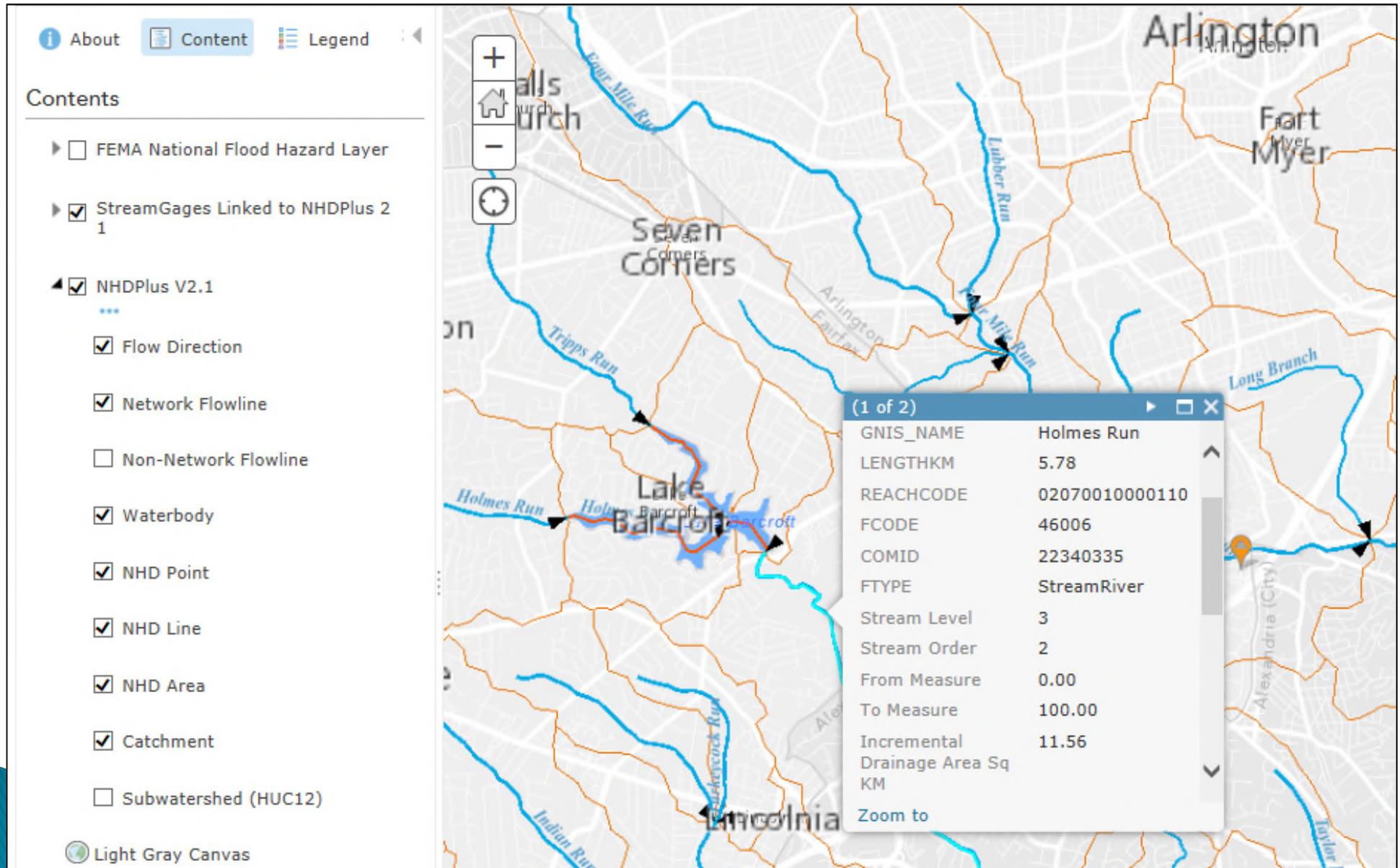
NHD *Plus* Data Availability



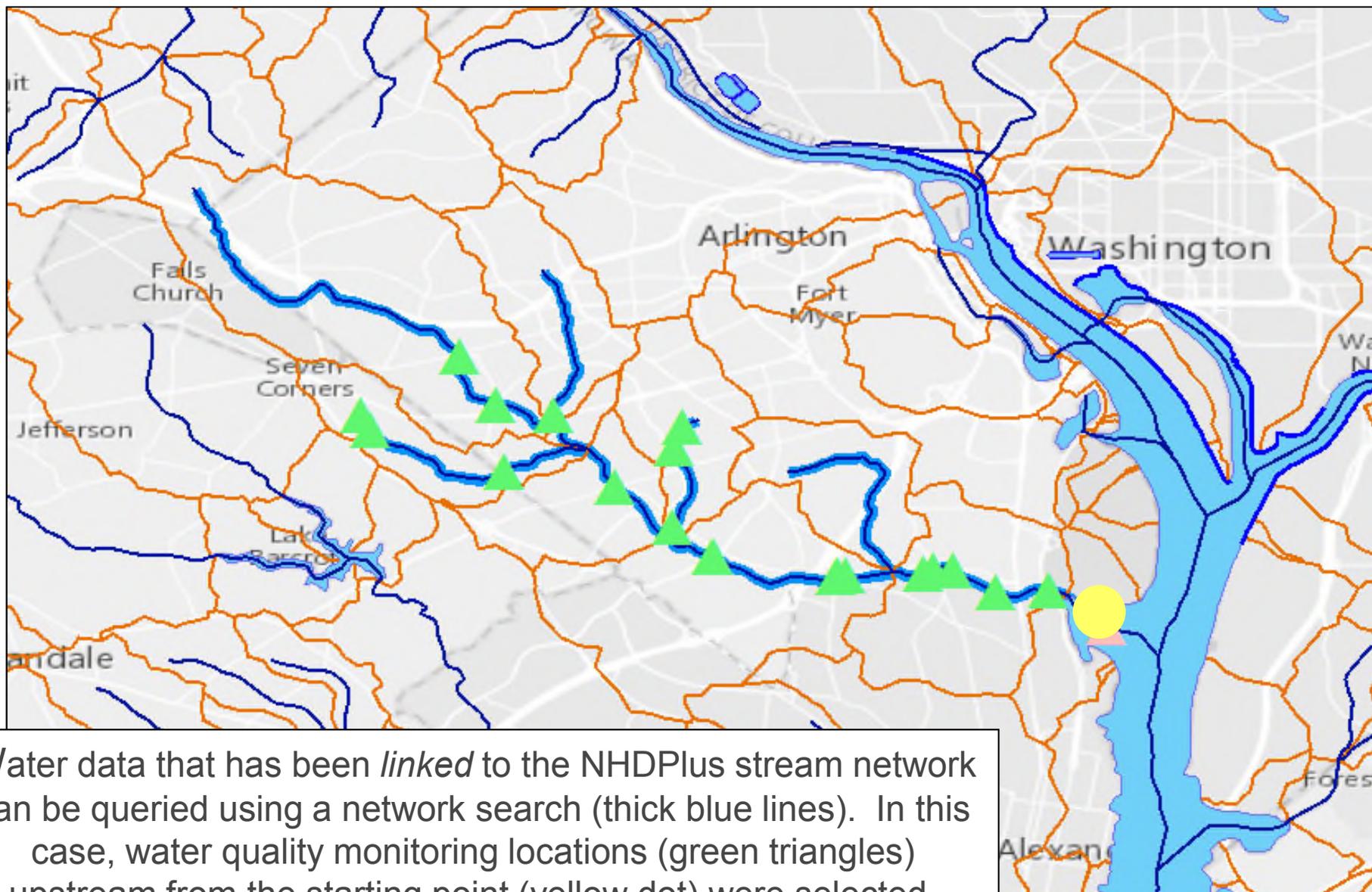
Planned for FY2016:

- * Alaska - Areas with water quality impairments
- * Time of travel estimates that incorporate effects of lake residence time
- * Initial production version of National File GeoDatabase format for simplified data management and easier access to attributes

NHDPlus Core Capabilities – Stream Network and Catchment Visualization

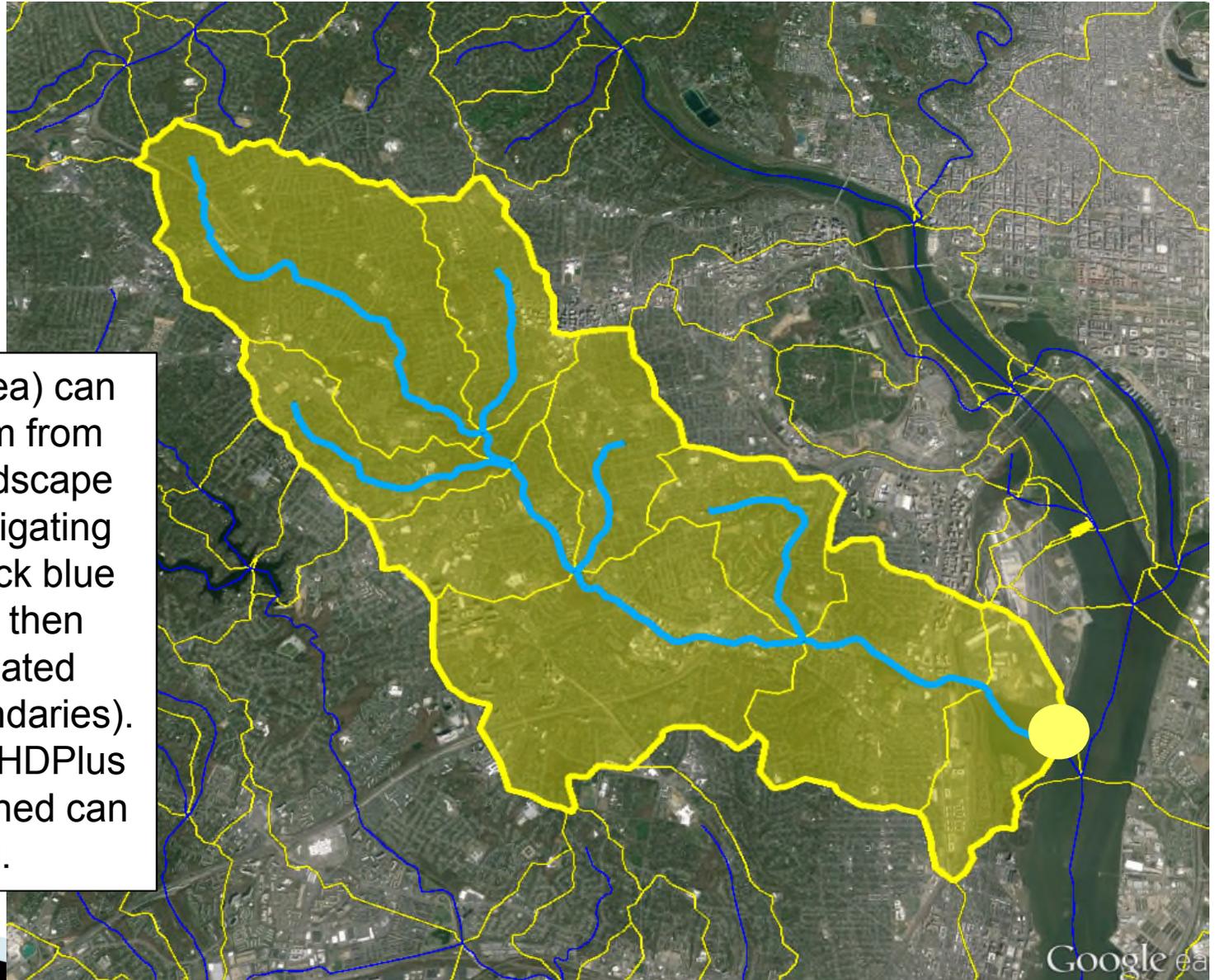


NHDPlus Core Capabilities – Upstream Search for Linked Data



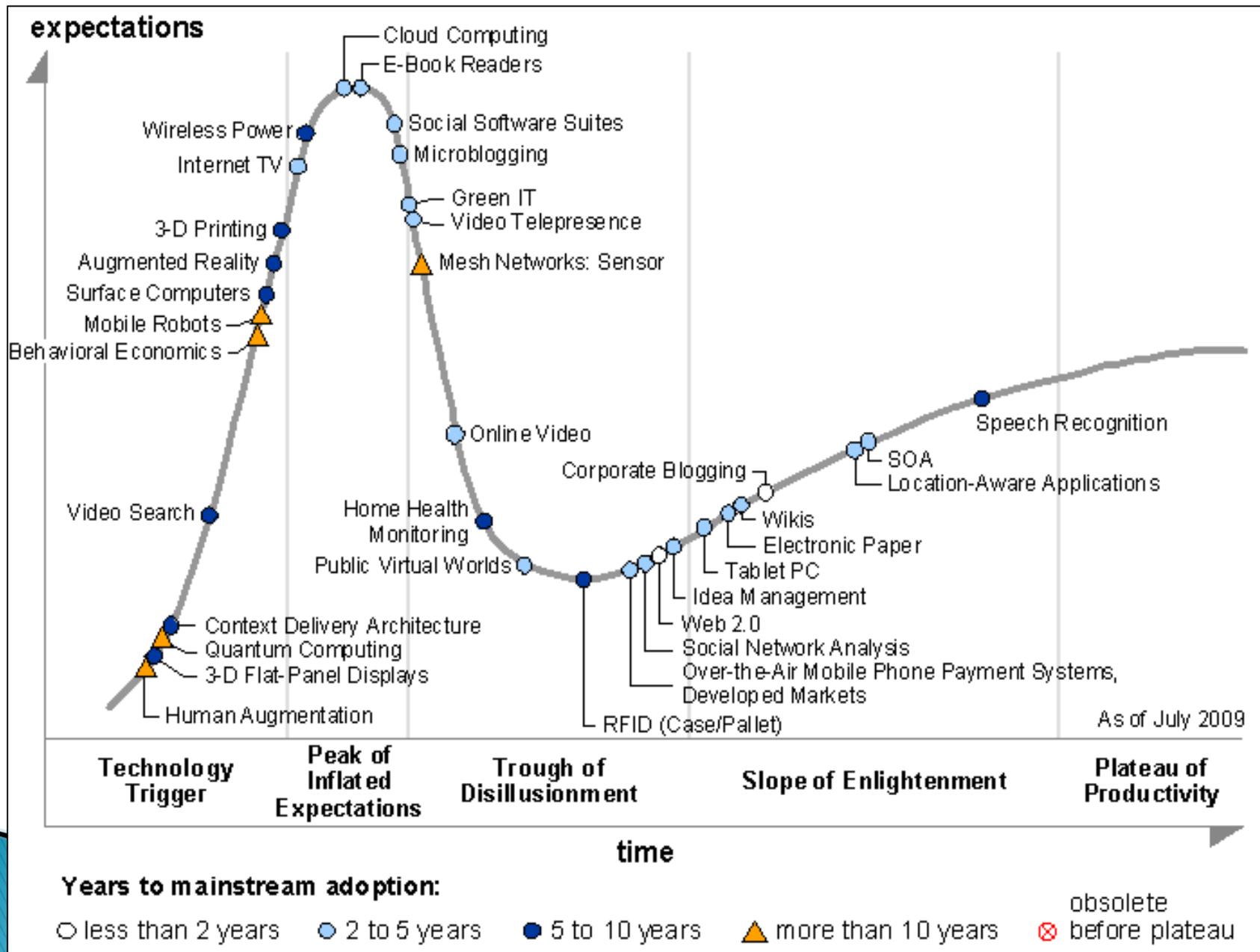
Water data that has been *linked* to the NHDPlus stream network can be queried using a network search (thick blue lines). In this case, water quality monitoring locations (green triangles) upstream from the starting point (yellow dot) were selected.

NHD*Plus* Core Capabilities – Watershed Delineation and Report



A watershed (yellow area) can be delineated upstream from any location on the landscape (yellow dot) by first navigating the stream network (thick blue lines) above the point then combining the associated catchments (yellow boundaries). A report providing the NHD*Plus* attributes for the watershed can also be produced.

2009 Technology Hype Curve (Gartner Group)



Progress to Date

- ▶ NHDPlus Version 2 release (2012)
- ▶ FGDC GeoCloud pilot (2012–2014)
- ▶ Open Water Data Initiative! (2014)
- ▶ Denormalized national NHDPlus FGDB (2015)
- ▶ EPA catchment-based indexing process (2015)
- ▶ EPA StreamCat catchment attributes (2015)
- ▶ DOI production cloud available (2015)
- ▶ OWDI Network Linked Data Index (NLDI) (2016)
 - EPA–USGS web services source code sharing
 - Upstream/downstream service implemented in WQP!

“It always seems impossible until it’s done.”
(Nelson Mandela)

What's Next?

- ▶ OWDI NLDI call tomorrow!
- ▶ NLDI design and development
- ▶ Improve service performance
- ▶ Populate GitHub open source repository
- ▶ Implement other analytical services
- ▶ Special edition of JAWRA on OWDI

Any Questions?



Thanks!

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