USGS EDH to 3DNHD Team

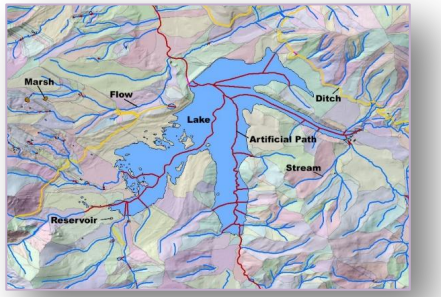
Project Leadership

- Current - Becci Anderson, National Hydrography Management and Planning Lead
- Future - Susan Buto, Hydrography Data Acquisition Lead / Acting Elevation Data Acquisition Lead

Project Coordination

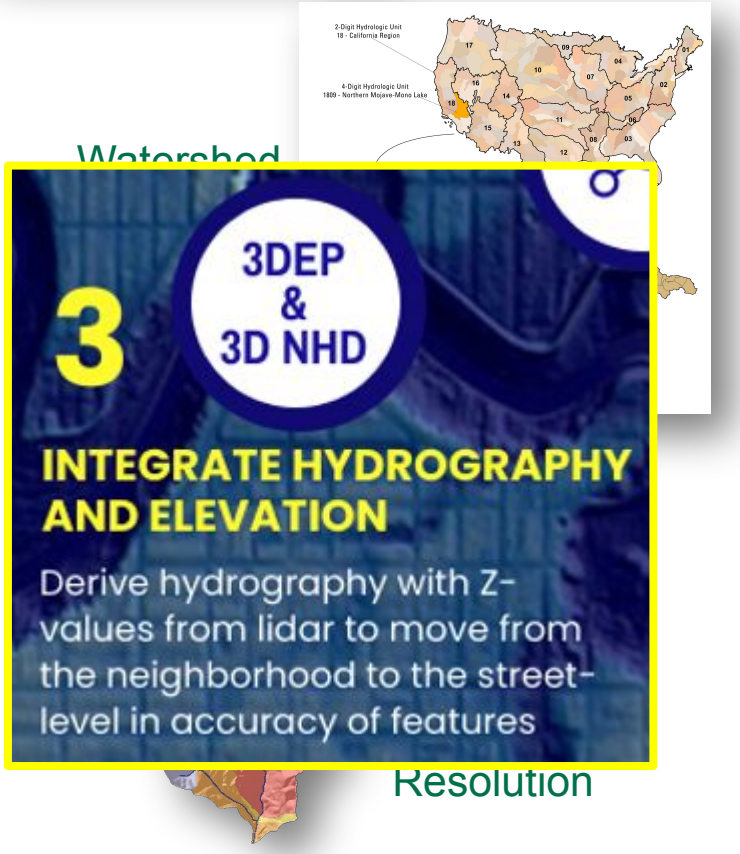
- National Map Liaisons
  - Drew Decker, Acting National Watershed Boundary Dataset Lead / National Map Liaison
  - Steve Aichele, User Engagement Hydrography Focus Area Coordinator

- NHD/WBD Partner Support
  - Joel Skalet (acting for Drew Lane), Acting Partner Support Section Chief



National Hydrography Dataset

- Hydrography Requirements and Benefits Study (2016)
  - Current annual benefits - $538M, total potential annual benefits - $1.14B
  - Strong need for integration of hydrography and elevation
- Standardizing the NHD to align vertically, horizontally, and temporally with 3DEP data:
  - Supports national, regional-level, and local issues like flooding, contaminant spills, water quality and quantity, drought, climate change, etc.
  - Supports integration for surface water modeling and analysis
  - Provides the basis for updating WBD and NHDPlus HR
- Creating a 3DNHD product, including a stream network with elevation (z) values on vertices, is a strategy of the 3D National Terrain Model



Watershed

Resolution

What is Elevation-Derived Hydrography (EDH)?

- Elevation-derived hydrography (EDH) data are hydrographic features (streams, lakes, hydrologic units, etc.) derived from an elevation surface that form a drainage network that is horizontally and vertically aligned to the elevation surface
- EDH can be used for many applications
  - **this project is focused on updating the NHD**
- EDH features for use in updating the NHD are:
  - Modeled from 3DEP lidar / IfSAR
  - Created in an EDH schema according to specifications
  - Conflated to the NHD to map attributes to the new features
  - Ingested into the national NHD database with elevation (z-values) included on each vertex
  - ***Only*** applicable to updating elevation-detectable NHD features, not all features

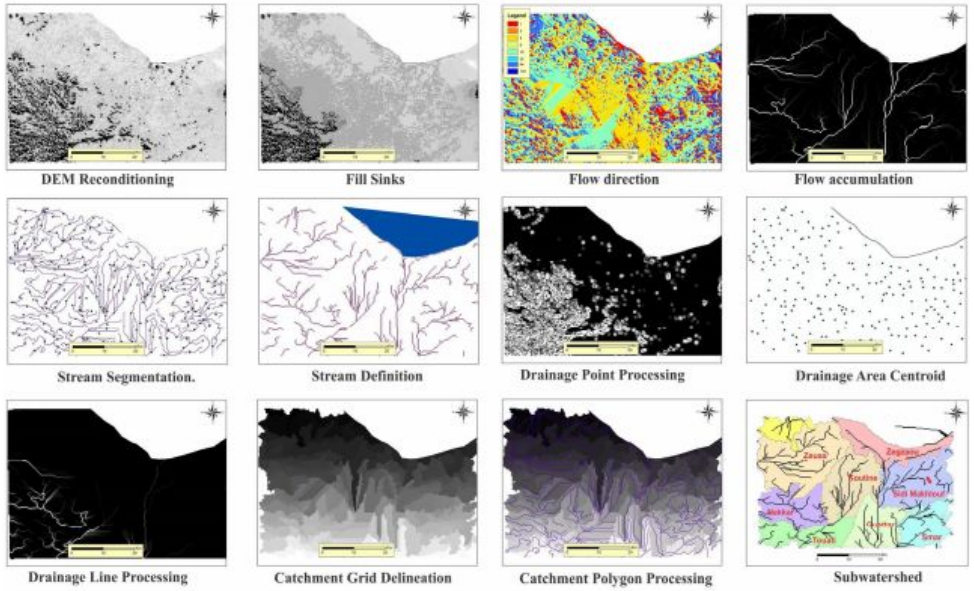
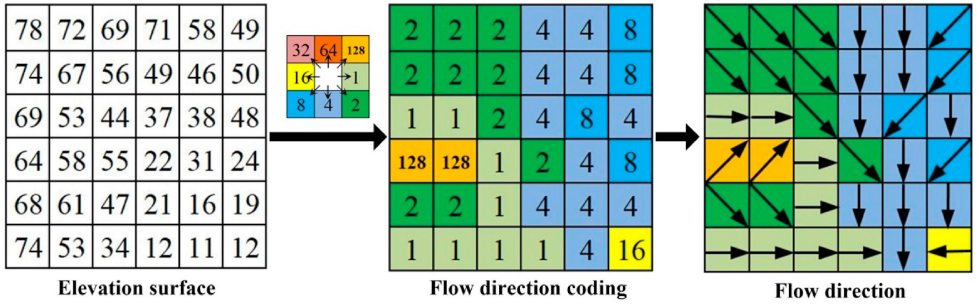


Figure 5. Different maps of flows extracted by Arc Hydro-tools.

Khemiri Sami et al, 2013



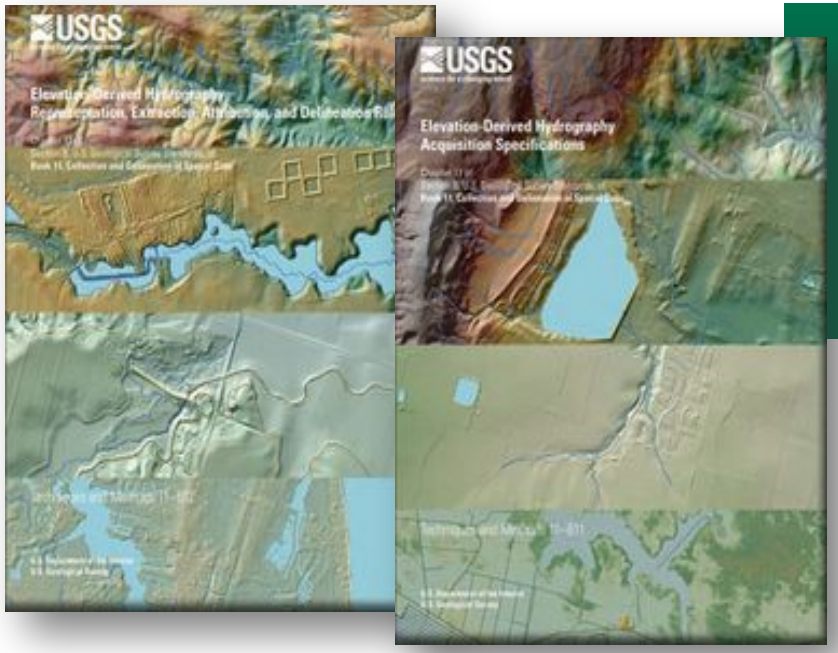
Elevation surface — Flow direction coding — Flow direction

Yao Li et al, 2019

EDH for 3DNHD

What we have been doing

- NHD EDH previous pilot projects have helped to understand products and processes
  - CONUS (2017), AK (2020)
- EDH Specifications released in July 2020
  - USGS Techniques and Methods 11–B11: Elevation-Derived Hydrography Acquisition Specifications
  - USGS Techniques and Methods 11–B12: Elevation-Derived Hydrography—Representation, Extraction, Attribution, and Delineation Rules
- NHD and WBD derivation from IfSAR in Alaska has moved from pilots to larger scale production, and NHDPlus HR production using updated NHD/WBD has begun
- EDH data inspection processes have been developed and tested at USGS



	PAST: NHDPlus Medium Resolution	PRESENT: NHDPlus High Resolution	FUTURE: Hydrography Derived from Lidar
Elevation source	30 meter	10 meter	1 meter
Hydrography source	1:100,000-scale NHD	1:24,000-scale or better NHD	1:5,000-scale or better derived from lidar
Number of features nationally	2.7 million	26 million	200-300 million

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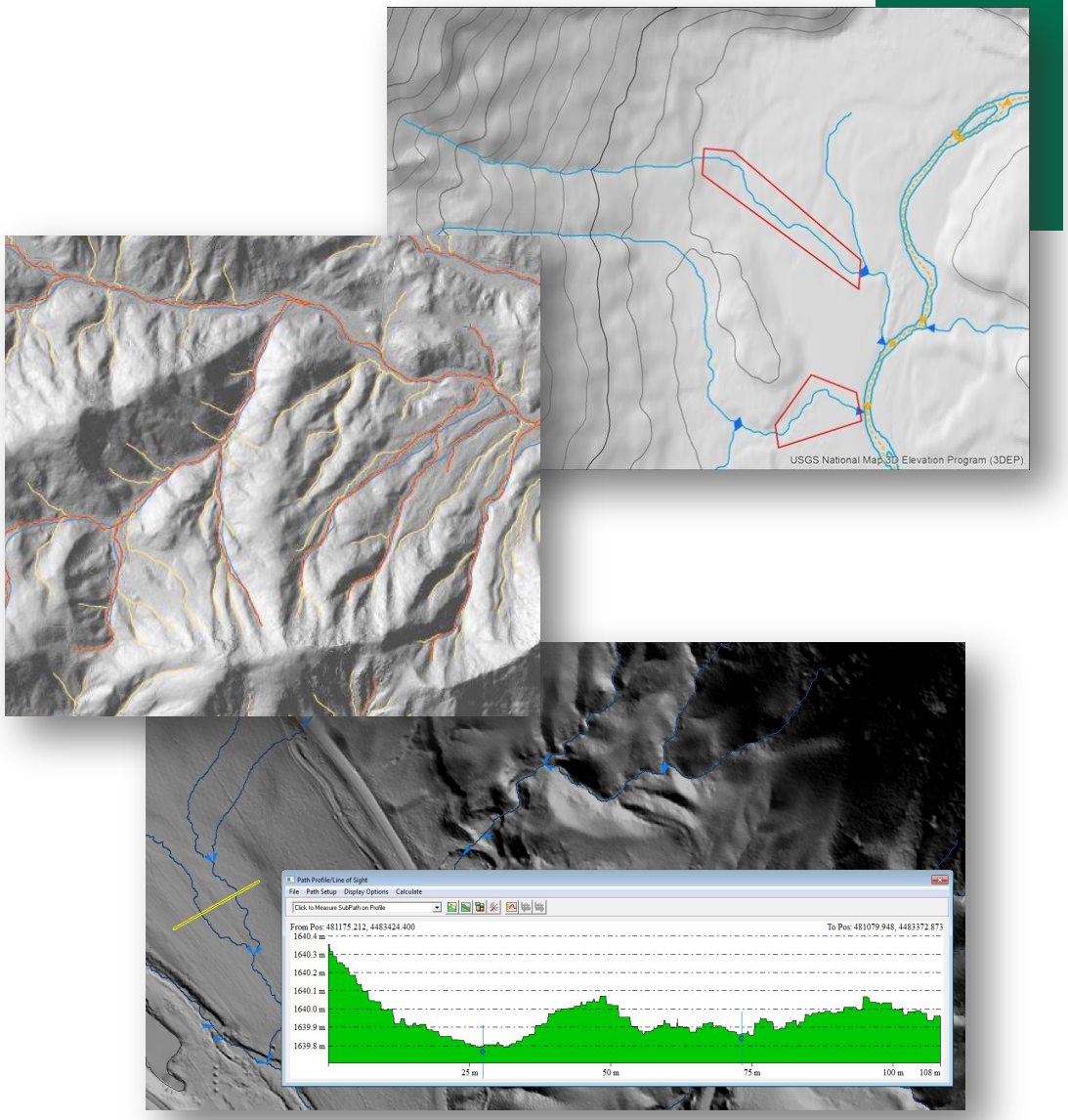
EDH for 3DNHD

What we are currently doing

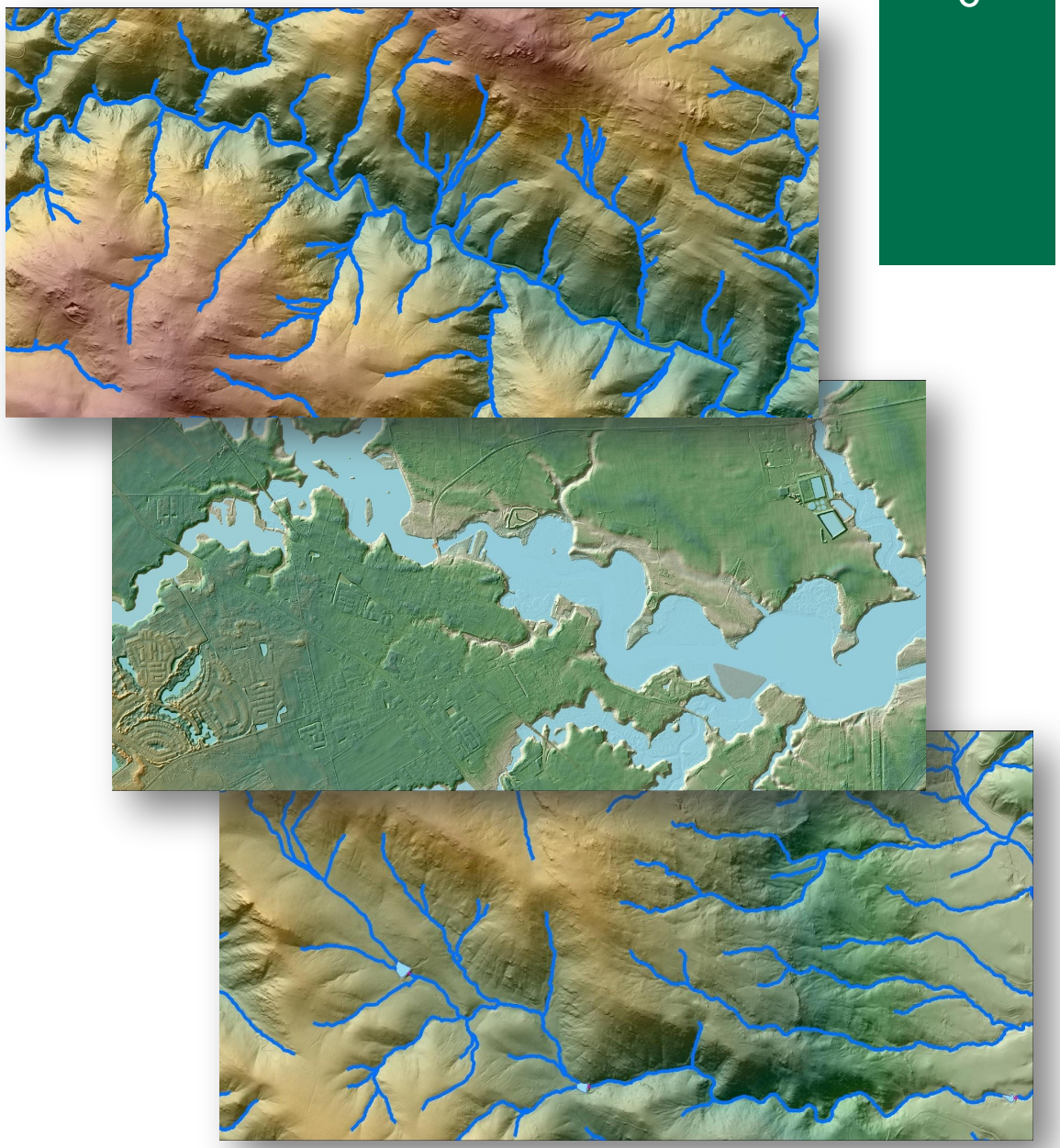
- FY21 NHD/WBD EDH pilot project in southeast Texas is helping to evaluate new specifications, work through processes, and test conflation
- USGS is internally working to
  - Improve and automate EDH inspection processes
  - Define and improve internal support processes from contracting -> ingestion -> NHDPlus HR production
  - Further research the best modes and means for updating the WBD using elevation data
  - Research new NHD conflation solutions that can scale to handle EDH features more efficiently
- Working to build out external support for partners



EDH for 3DNHD

Planning for the future

- National 3DEP data acquisition is not complete, but we are preparing so we are ready when it is
- Considering building a process similar to a BAA, but currently do not have funding to support it
- Developing the 3DNTM Call for Action with a focus on hydrography to define the work ahead including roles, partnerships, governance, funding, products and services, research and more
- Creating communications materials to support use and application of the EDH specifications as well as processes to conflate EDH to NHD
- Meanwhile, we want to work with partners to provide information for planning and to assist with coordination across partners



EDH for 3DNHD

Join us!

- Following on the successful collaboration enabled by the 3DEP for the Nation project with NSGIC
- USGS is excited to be working together with NSGIC on this project to help with communications and coordination with state partners
- Talk with your USGS National Map Liaison for more information – many are on the call
- Engage with USGS Partner Support and the NHD and WBD steward in your state

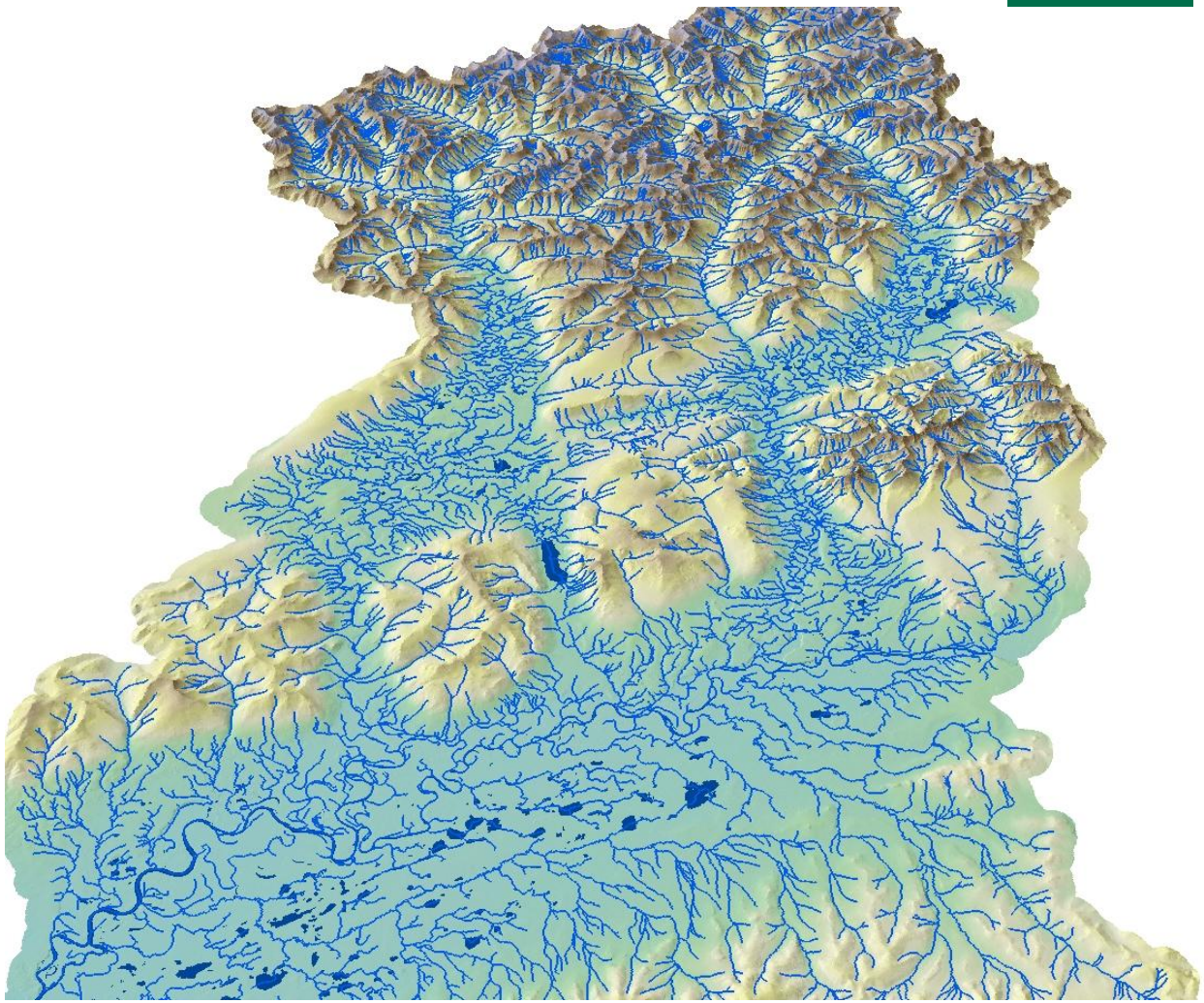


Image by Quantum Spatial