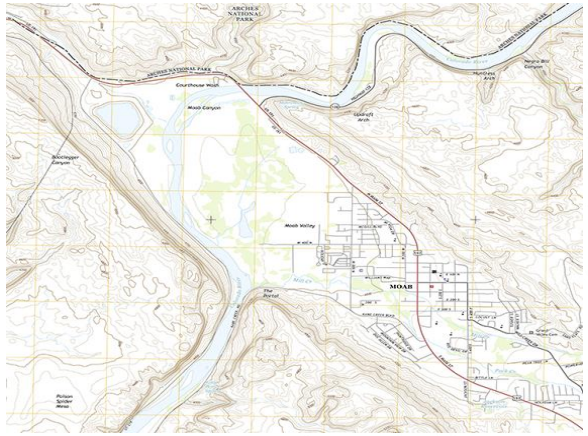
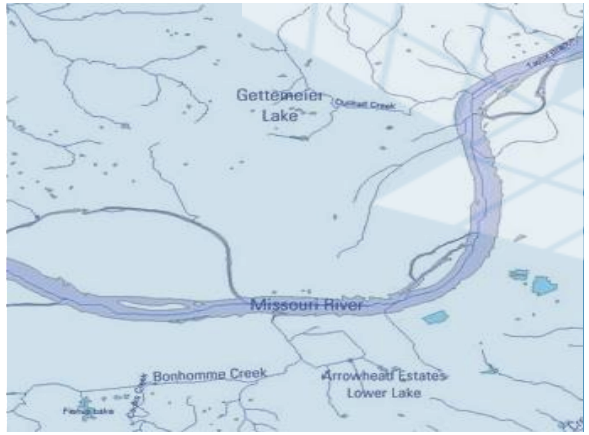
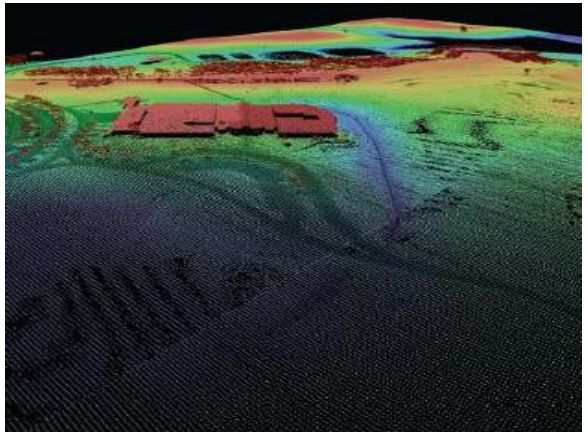
3D Hydrography Program (3DHP): A New Model for the Nation's Hydrography







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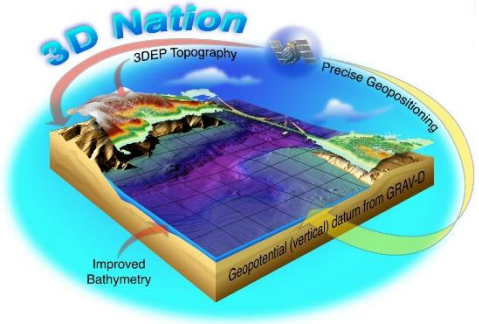
Texas GIS Forum
October 25, 2023

Claire DeVaughan – National Map Liaison for TX, AR, KS, NE, OK, & UT

3D National Topography Model (3DNTM)



Integrates elevation and hydrography datasets to model the Nation's topography in 3D

3D Hydrography Program (3DHP)

- Hydrography derived from/integrated with 3D Elevation Program data
- Connections to groundwater, wetlands, and engineered hydrography
- 3DHP Infostructure for data sharing as part of the Internet of Water

"next gen" 3D Elevation Program (3DEP)

- New quality levels and refresh cycles
- Integration of inland bathymetry
- 3DEP Ecosystem for data and resource sharing
- Continual improvement with new technologies and approaches

Future Integrated 3D Model

- *Research and develop a 3D data model to fully integrate 3DHP and next gen 3DEP*
- *Integrate other data from The National Map*

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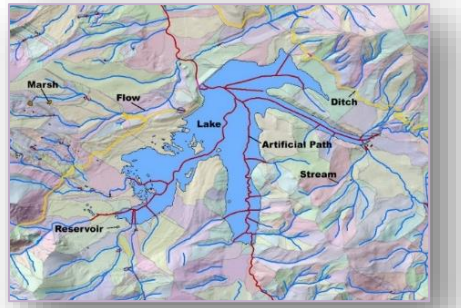
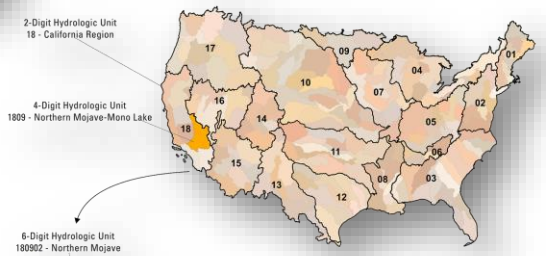
Previous Approach to National Hydrography Datasets

- The National Hydrography Dataset (NHD) portfolio of datasets is the most comprehensive and current data of the Nation's surface waters
  - 9.4 million miles stream of network, including 8 million waterbodies and over 130,000 nested hydrologic units
  - Based on 1:24,000-scale maps
- NHD and Watershed Boundary Dataset (WBD) leverage local knowledge and updates through a stewardship program with participants from 41 states and Washington DC
- **Updates are not uniform**
  - Some areas have been updated; others untouched and based on older information – sometimes 40+ years old
  - National consistency of data quality has decreased over time
  - NHD surface water features don't align well with highly accurate 3D Elevation Program data



National Hydrography Dataset



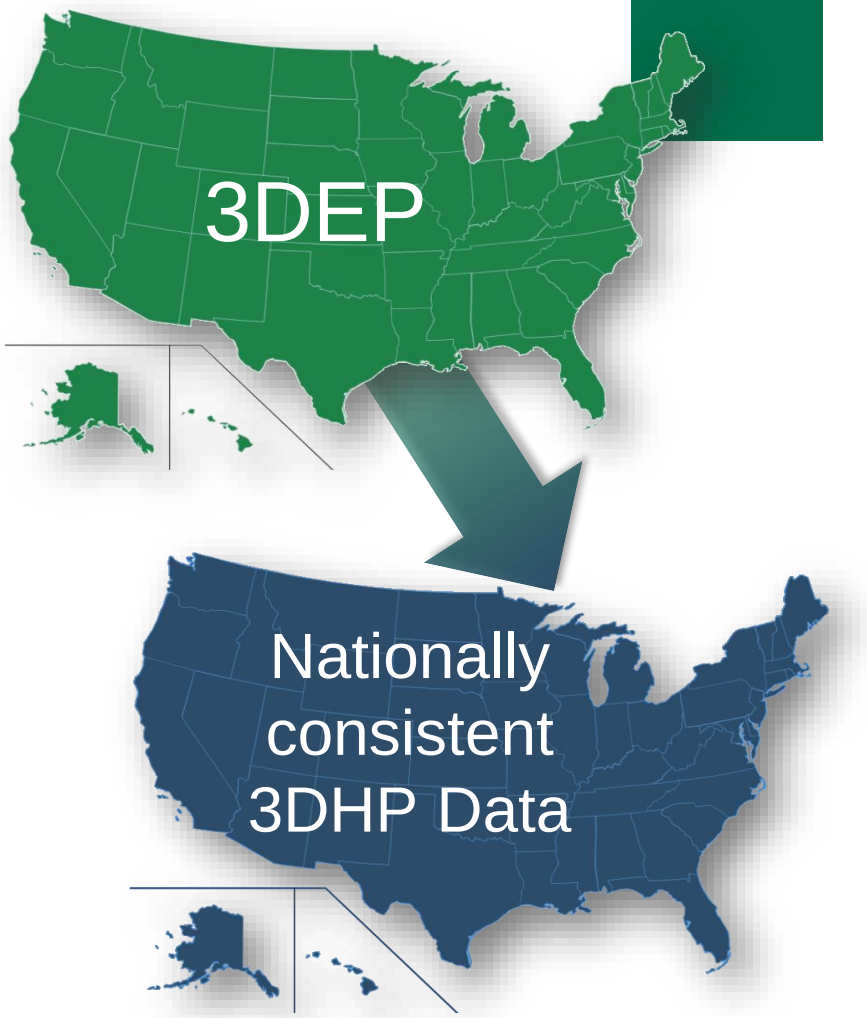
Watershed Boundary Dataset

NHDPlus High Resolution

Hydrography Derived from Elevation Offers a Solution!

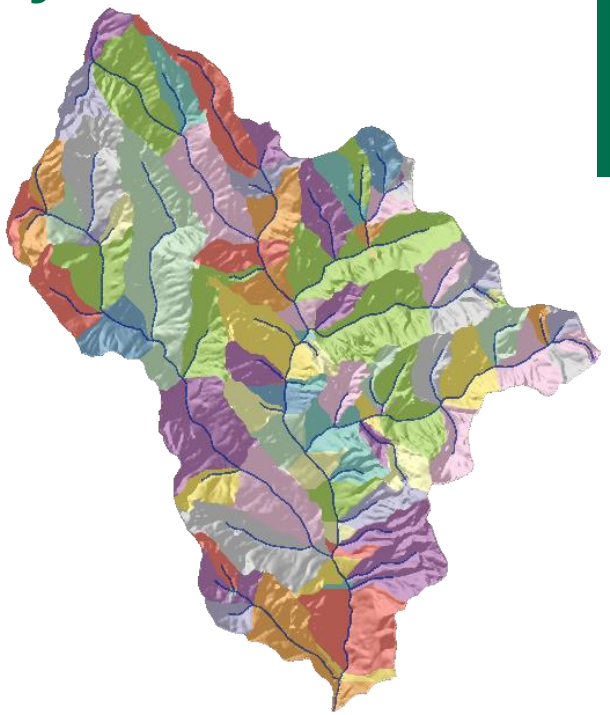
Introducing the 3D Hydrography Program (3DHP)

- 3DHP will provide national consistency while meeting local needs
- Goal to acquire new hydrography standardized to align vertically, horizontally, and temporally with 3DEP data, as well as other improvements
  - Supports national and regional-level issues like flooding, contaminant spills, water quality and quantity, drought, climate change, etc.
  - Supports more accurate, updated modeling and analysis capabilities
  - Supports sharing of water data as the geospatial framework underpinning the internet of water
- Building on decades of work and concepts from current hydrography products



Benefits to updating National Hydrography Datasets

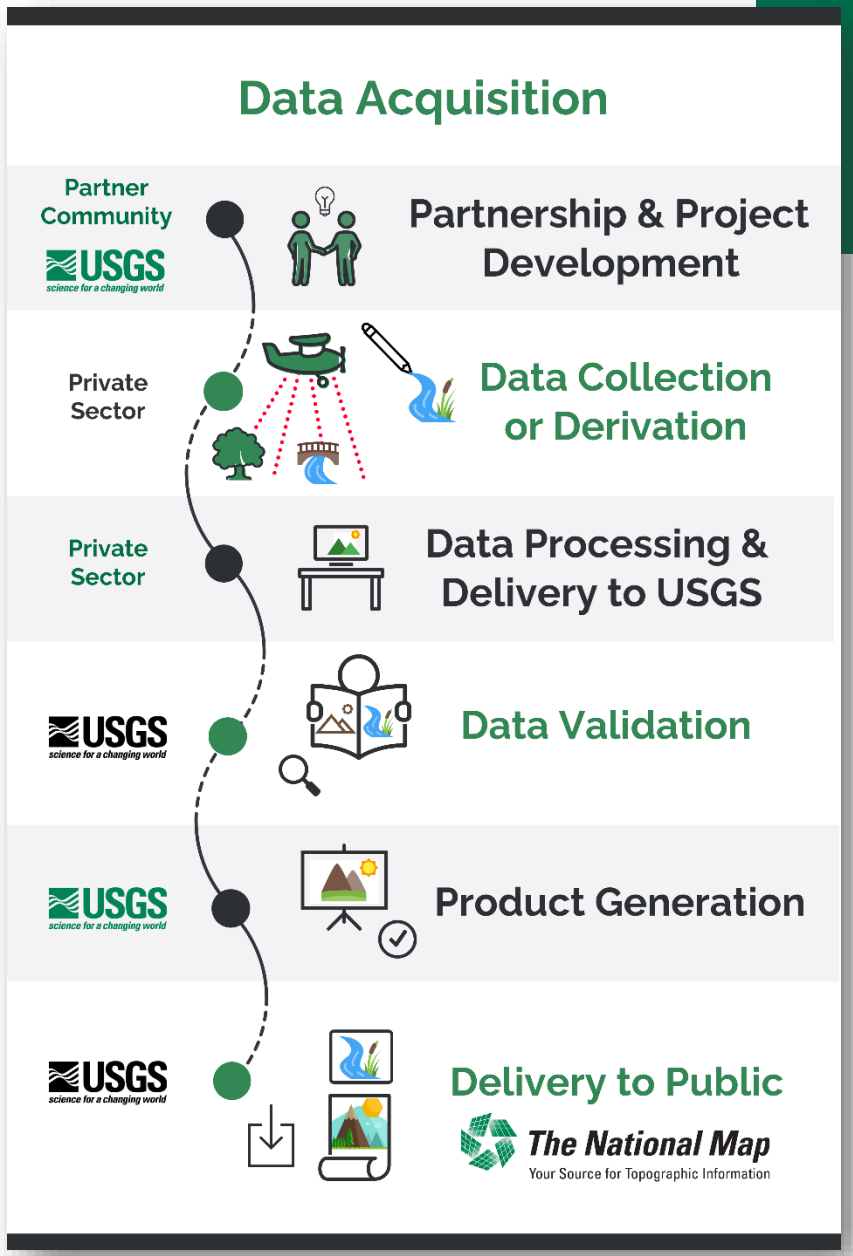
- **Hydrography Requirements and Benefits Study (HRBS; 2016)** documented 420 mission critical business uses with 23 Federal agencies, 50 states, 8 Tribal governments and 3 national associations
- HRBS found that hydrography data are essential to a broad range of critical applications and the current program provides $538M annual benefits
- A modernized 3D-enabled hydrography program could provide up to $1.14 billion annually in benefits if all user requirements are met



Building 3D Hydrography Program

3DHP will follow 3DEP

- Establish **3DHP governance** to develop and coordinate partnerships and acquisition plans
- Seek funding **partnerships in the broad community** through an organized partnership process
- **Contract acquisition** of 3DHP data primarily through the USGS Geospatial Products and Services Contracts (GPSC)
- Allow for co-operative data acquisition and contributed data
- Provide specifications



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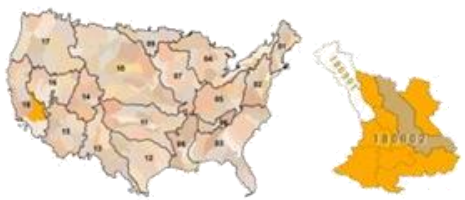
The 3DHP Data Lifecycle

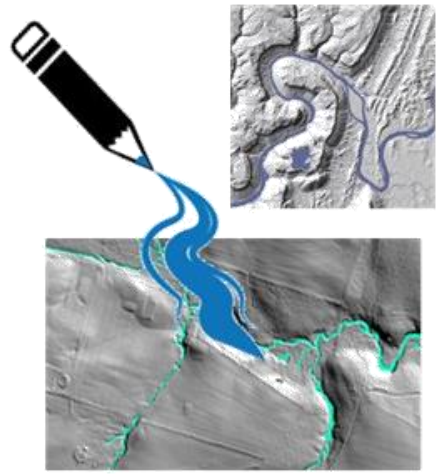
Planning | **Acquisition** | **Validation** | **Publication** | **Access**

Federal, state, tribal, local or private entities partner on an area of interest

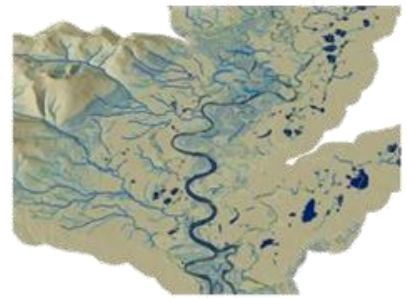
USGS and/or partners plan the project & award a task order



Contractors acquire and process data

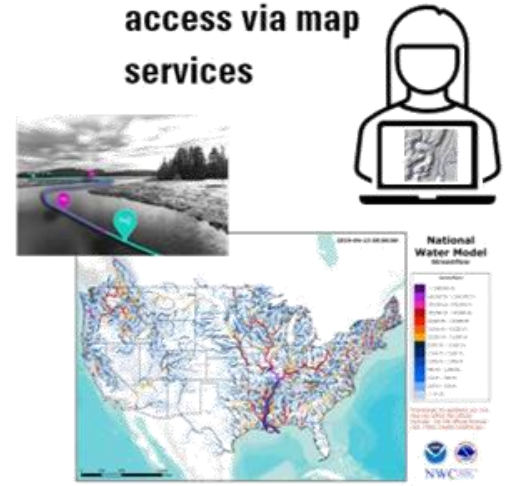


USGS validates data & produces standard 3DHP data products



USGS makes 3DHP data publicly available on The National Map & via services in the Cloud

Users can download analysis ready data or access via map services



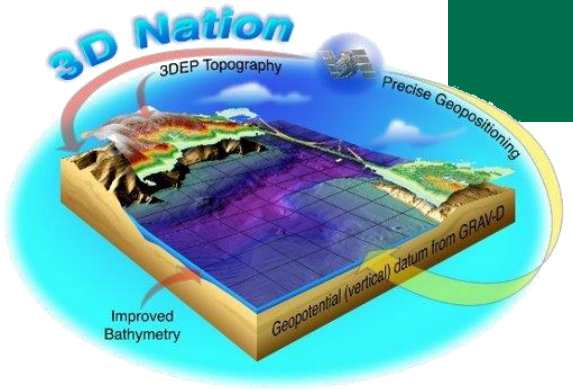
Over $ 1B in annual benefits to the Nation if hydrography data needs are met (HRBS, 2016)

Coordination is Key

- Coordination at all levels and across sectors is crucial
- Work to align goals
- Identify requirements and find areas of overlap
- Eliminate duplicated effort
- Pool resources

Federal Acquisition Strategies - 3DHP Governance

3DHP Working Group - multi-agency federal coordination



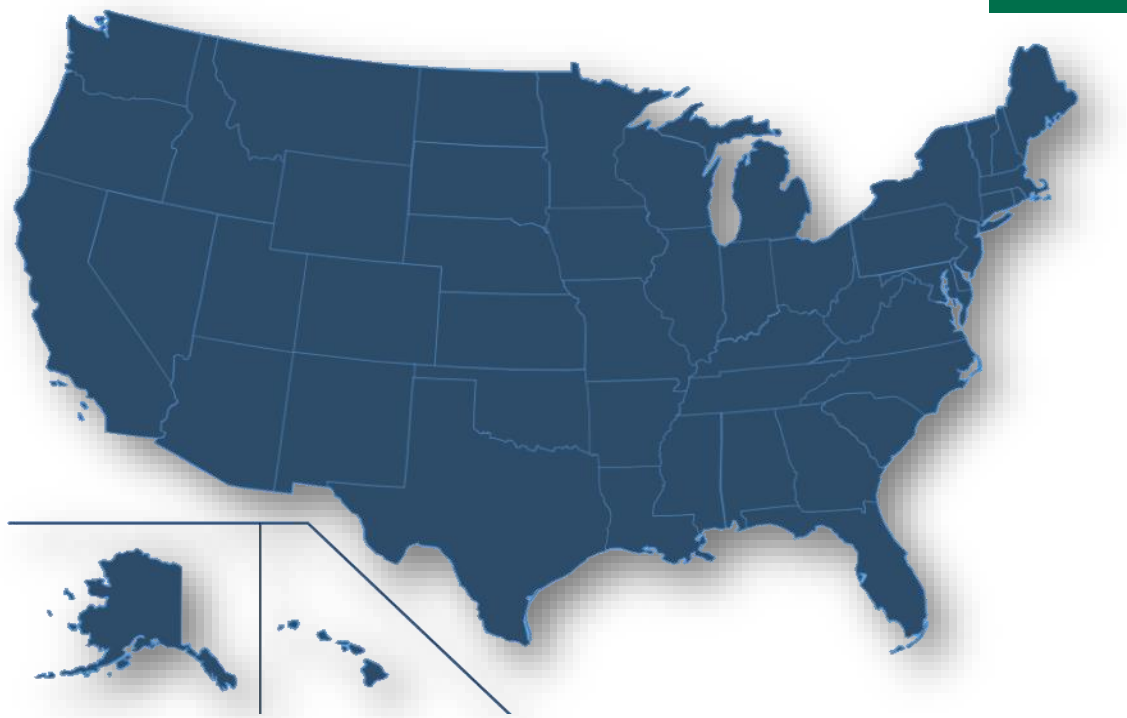
- Twelve member agencies working to move forward together with common purpose
- Goal to improve the currency and accuracy of National hydrography mapping through the 3DHP
- Develop and execute acquisition strategies that maximize available funding to support national and agency-specific goals for 3DHP
- Part of an envisioned 3DNTM joint governance in support of 3D Nation and 3DNTM goals

USFS NRCS BOR
BLM USGS USFWS
USDA-FPAC FEMA
NPS EPA NOAA-NWS
USACE

3DHP State Coordination

Coordination with state stakeholders

- Collaboration with National States Geographic Information Council to engage with state GIOs and key stakeholders
- USGS National Geospatial Program has a network of National Map Liaisons who lead outreach and coordination for 3DHP in their respective states and regions
- Keeping key stakeholders informed helps align data acquisition goals between federal and non-federal partners



NSGIC
National States Geographic Information Council

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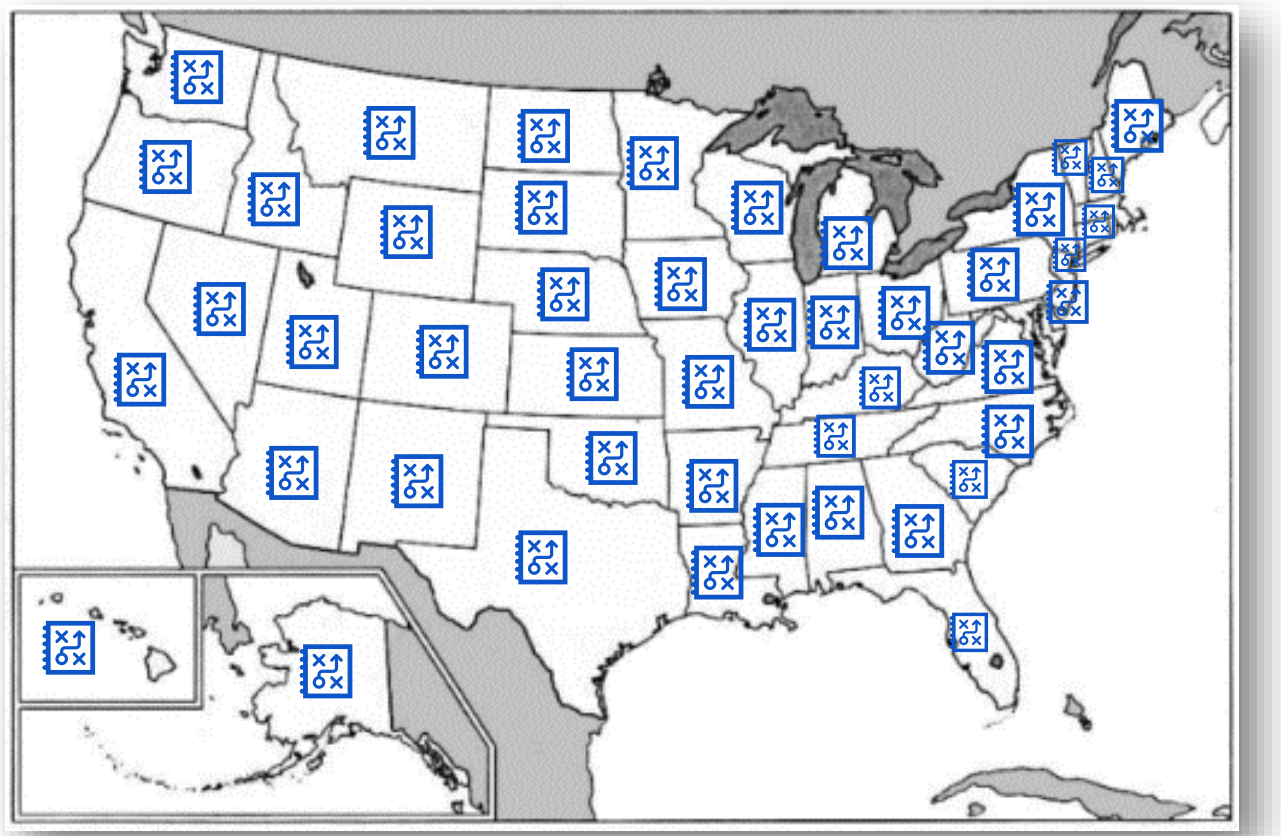
State Acquisition Strategies

Develop plans and best practices for key communities

NSGIC
National States Geographic Information Council

- Develop state plans for 3DHP data acquisition to identify
  - Business uses at the state level
  - Funding strategies
  - Strategies for finding and engaging funding partners and users
- Development of state best practices
- Forums to help partners learn and grow through collaboration
- Facilitate strategic funding investments in 3DHP
- **nsgic.org**



3DHP Acquisition Plans for each State and Territory

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Introducing the 3DNTM Data Collaboration Announcement

Overview

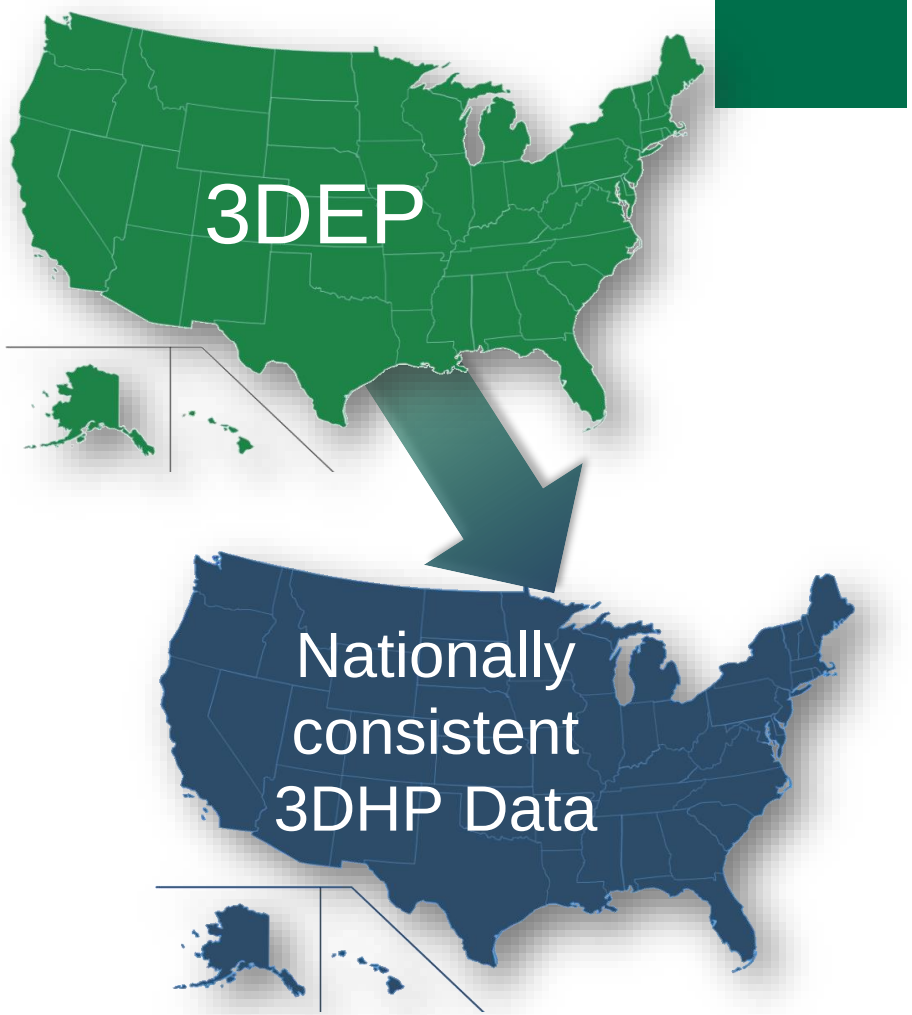
- Key elements of the 3DNTM are in place or under active development
- As part of the transition, NGP is changing its process for soliciting and selecting partnerships beginning in FY24
- The revised and streamlined structure is called the 3DNTM Data Collaboration Announcement (DCA)
- The DCA replaces the Broad Agency Announcement (BAA) and is intended to include partnerships for both 3DEP and 3DHP

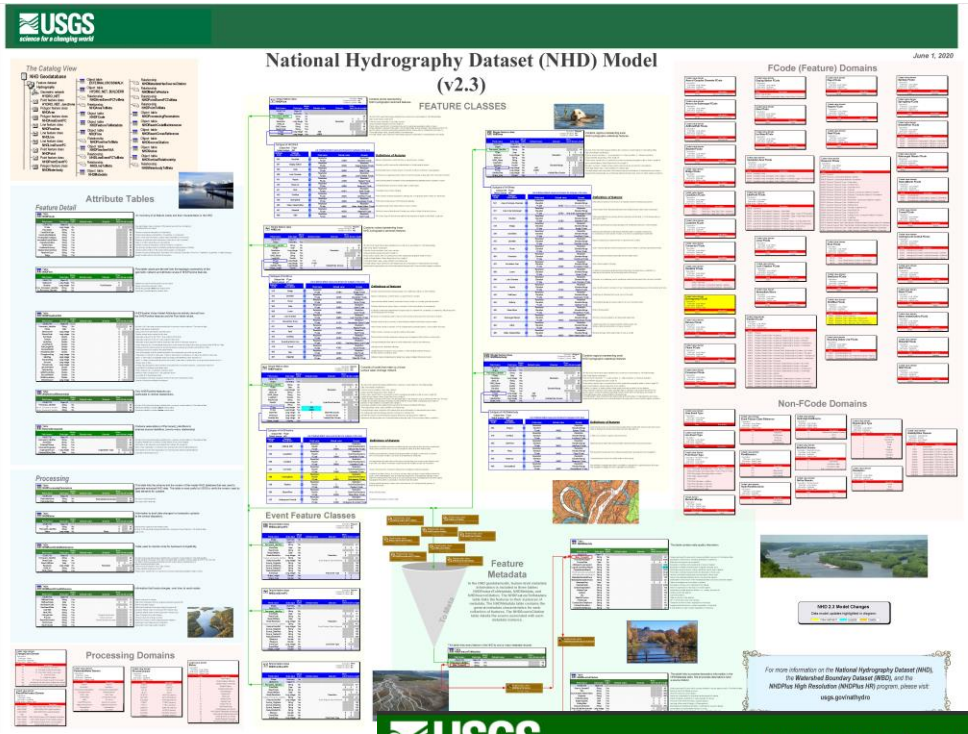
Data acquisition

Data Collaboration Announcement (DCA)

www.usgs.gov/3DNTM/DCA

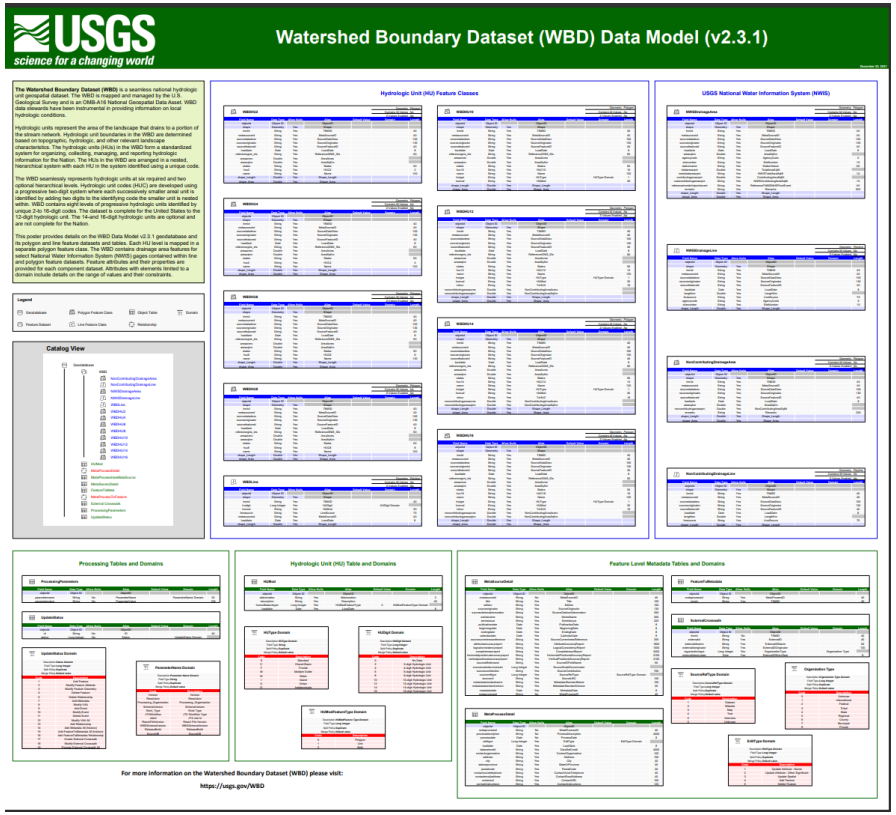
- The DCA is the mechanism used for non-federal entities to partner with USGS and other Federal agencies to acquire high-quality hydrography data for 3DHP
- Open to Federal agencies, State and local governments, Tribes, academic institutions and the private sector
- Applicants are encouraged to build funding coalitions to pool resources to fund 50% or more of project costs
- 3DHP “matching” funds added to cover remaining costs

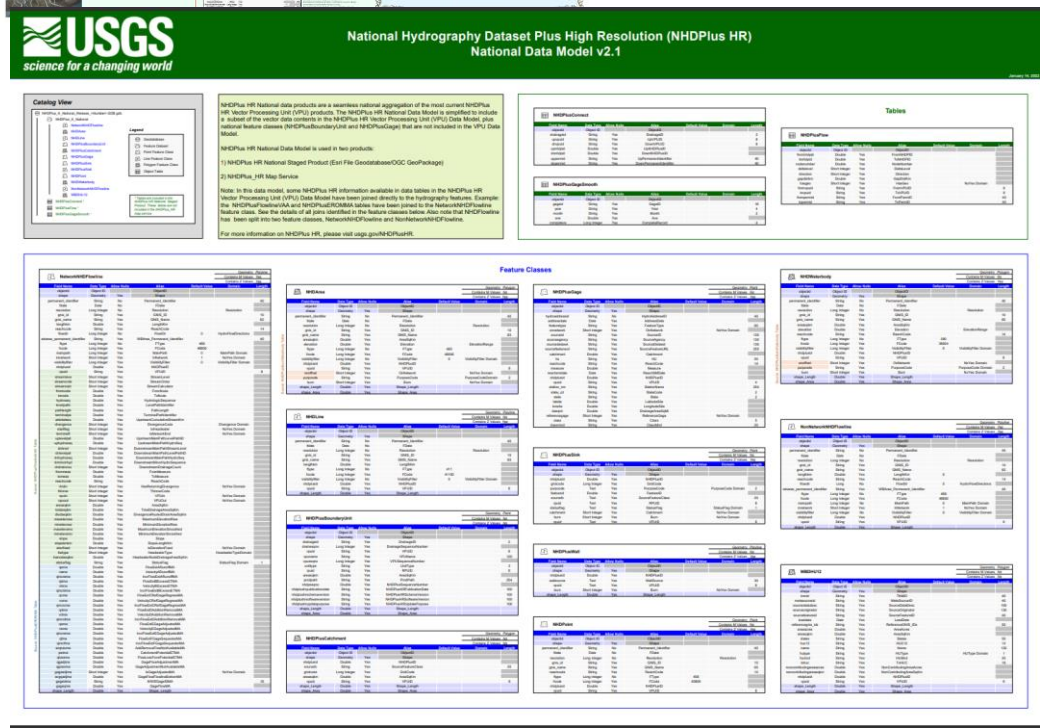




Tools

NHD Update
WBD Update
NHD Utilities (6 tools)
HEM
HydroAdd
Geoconflation
Generalization
NHDPlus HR Build





Technical Goals

- Radically simplify dataset
- Make catchments integral to the system
- Use catchments to build HUs
- Simplify and accelerate the workflow

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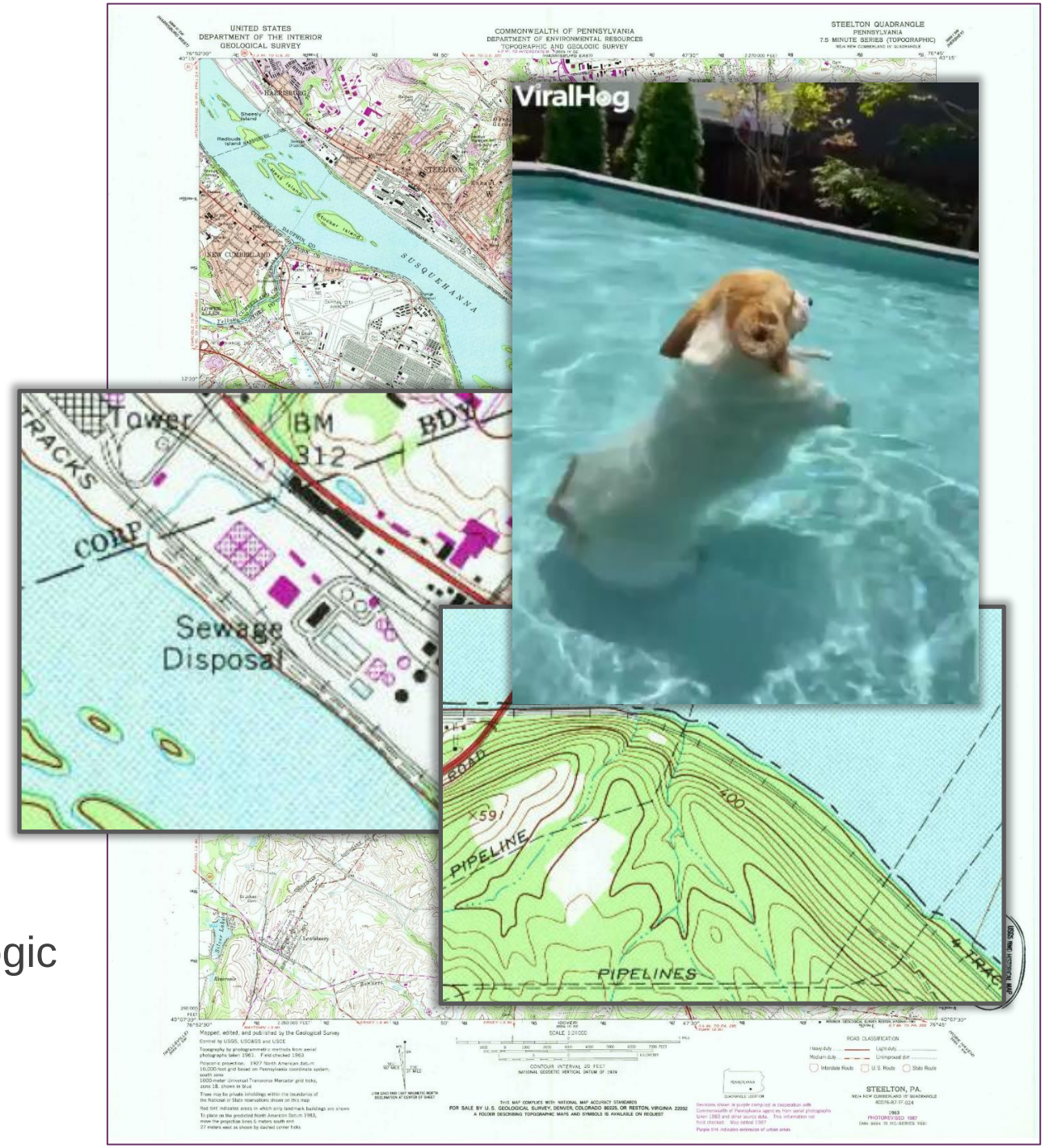
NHD data content

- Anything “watery” found a place in the NHD
  - Pipelines (22 varieties)
  - Reservoirs (24 varieties)
    - Swimming pools (FCODE 43608)
    - Treatment ponds (FCODE 43612)
    - Filtration pond (43610), Settling pond (43611)
  - Levees
  - Lock chambers
  - Rapids
  - Non-earthen shore
  - Rock
- A major burden for maintenance/use
- Not designed for data management or hydologic modeling



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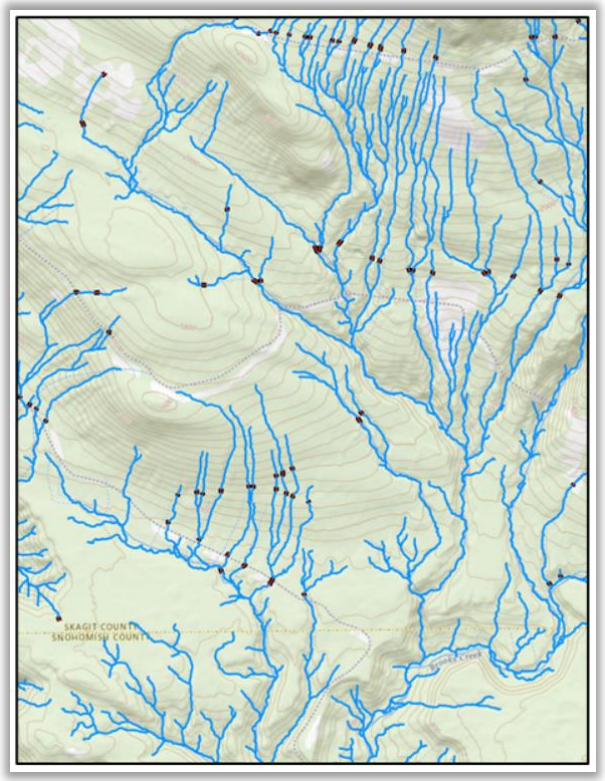
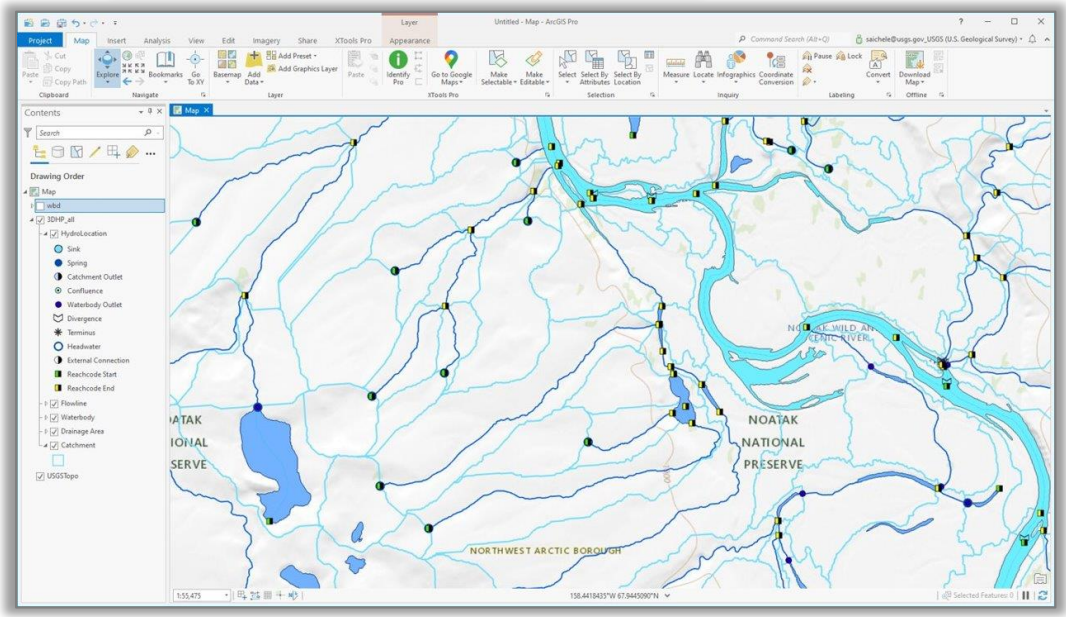
3DHP Data Model

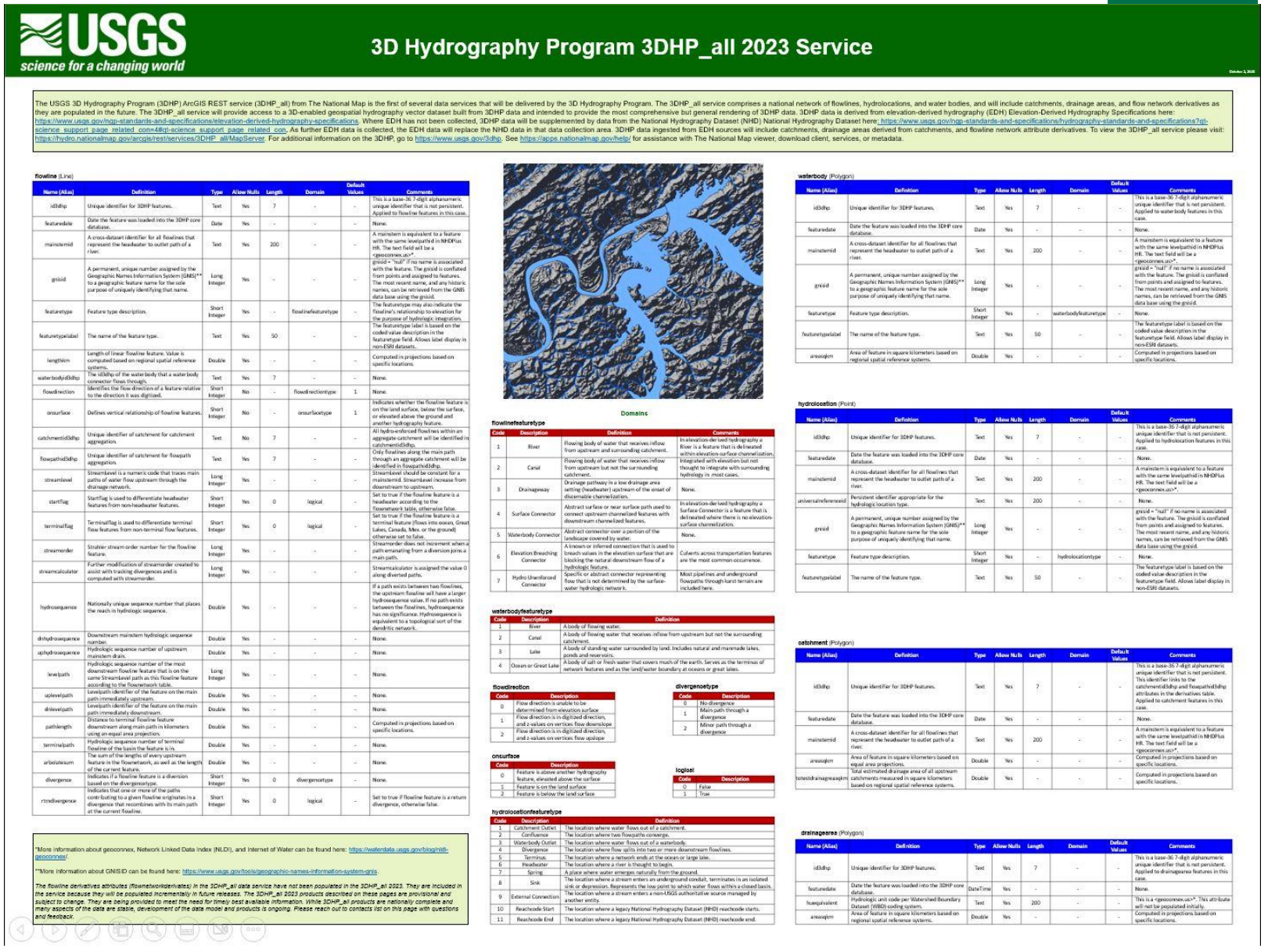
- Base **3DHP data model** on international standards as directed by the Geospatial Data Act of 2018
- Open Geospatial Consortium (OGC) WaterML2 Part 3: Surface Hydrology Features (HY_Features) provides a conceptual model of hydrology features, especially catchments, and different realizations
  - Common vocabulary and terminology
  - Based on hydrologic features, as opposed to human features
- Promotes interoperability (NOAA-NWM, Canada, USGS)
- Additional data about features can be carried as addressed data, indexed to the core dataset





+ New Data Model

- 95 percent of the features from NHD, WBD, and NHDPlus
- 10 percent of the feature types
- Reduced repetition
- Focused on hydrologic content



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3D Hydrography Program 3DHP_all 2023 Service

The USGS 3D Hydrography Program (3DHP) ArcGIS REST service (3DHP_all) from The National Map is the first of several data services that will be delivered by the 3D Hydrography Program. The 3DHP_all service comprises a national network of flowlines, hydrolocations, and water bodies, and will include catchments, drainage areas, and flow network derivatives as they are populated in the future. The 3DHP_all service will provide access to a 3D-enabled geospatial hydrography vector dataset built from 3DHP data and intended to provide the most comprehensive but general rendering of 3DHP data. 3DHP data is derived from elevation-derived hydrography (EDH) Elevation-Derived Hydrography Specifications here: https://www.usgs.gov/ngp-standards-and-specifications/elevation-derived-hydrography-specifications. Where EDH has not been collected, 3DHP data will be supplemented by data from the National Hydrography Dataset (NHD) National Hydrography Dataset here: https://www.usgs.gov/ngp-standards-and-specifications/hydrography-standards-and-specifications?qt-science_support_page_related_con=4#qt-science_support_page_related_con. As further EDH data is collected, the EDH data will replace the NHD data in that data collection area. 3DHP data ingested from EDH sources will include catchments, drainage areas derived from catchments, and flowline network attribute derivatives. To view the 3DHP_all service please visit: https://hydro.nationalmap.gov/arcgis/rest/services/3DHP_all/MapServer. For additional information on the 3DHP, go to https://www.usgs.gov/3dhp. See https://apps.nationalmap.gov/help/ for assistance with The National Map viewer, download client, services, or metadata.

flowline (Line)

Name (Alias)	Definition	Type	Allow Nulls	Length	Domain	Default Values	Comments
id3dhp	Unique identifier for 3DHP features.	Text	Yes	7	-	-	This is a base-36 7-digit alphanumeric unique identifier that is not persistent. Applied to flowline features in this case.
featuredate	Date the feature was loaded into the 3DHP core database.	Date	Yes	-	-	-	None.
mainstemid	A cross-dataset identifier for all flowlines that represent the headwater to outlet path of a river.	Text	Yes	200	-	-	A mainstem is equivalent to a feature with the same levelpathid in NHDPlus HR. The text field will be a <geoconnex.us>*.
gnisid	A permanent, unique number assigned by the Geographic Names Information System (GNIS)** to a geographic feature name for the sole purpose of uniquely identifying that name.	Long Integer	Yes	-	-	-	gnisid = "null" if no name is associated with the feature. The gnisid is conflated from points and assigned to features. The most recent name, and any historic names, can be retrieved from the GNIS data base using the gnisid.
featuretype	Feature type description.	Short Integer	Yes	-	flowlinefeaturetype	-	The featuretype may also indicate the flowline's relationship to elevation for the purpose of hydrologic integration.
featuretypelabel	The name of the feature type.	Text	Yes	50	-	-	The featuretype label is based on the coded value description in the featuretype field. Allows label display in non-ESRI datasets.
lengthkm	Length of linear flowline feature. Value is computed based on regional spatial reference systems.	Double	Yes	-	-	-	Computed in projections based on specific locations.
waterbodyid3dhp	The id3dhp of the waterbody that a waterbody connector flows through.	Text	Yes	7	-	-	None.
flowdirection	Identifies the flow direction of a feature relative to the direction it was digitized.	Short Integer	No	-	flowdirectiontype	1	None.
onsurface	Defines vertical relationship of flowline features.	Short Integer	No	-	onsurfacetype	1	Indicates whether the flowline feature is on the land surface, below the surface, or elevated above the ground and another hydrography feature.
catchmentid3dhp	Unique identifier of catchment for catchment aggregation.	Text	No	7	-	-	All hydro-enforced flowlines within an aggregate catchment will be identified in catchmentid3dhp.
flowpathid3dhp	Unique identifier of catchment for flowpath aggregation.	Text	Yes	7	-	-	Only flowlines along the main path through an aggregate catchment will be identified in flowpathid3dhp.
streamlevel	Streamlevel is a numeric code that traces main paths of water flow upstream through the drainage network.	Long Integer	Yes	-	-	-	Streamlevel should be constant for a mainstemid. Streamlevel increase from downstream to upstream.
startflag	Startflag is used to differentiate headwater features from non-headwater features.	Short Integer	Yes	0	logical	-	Set to true if the flowline feature is a headwater according to the flownetwork table, otherwise false.
terminalflag	Terminalflag is used to differentiate terminal flow features from non-terminal flow features.	Short Integer	Yes	0	logical	-	Set to true if the flowline feature is a terminal feature (flows into ocean, Great Lakes, Canada, Mex. or the ground) otherwise set to false.
streamorder	Strahler stream order number for the flowline feature.	Long Integer	Yes	-	-	-	Streamorder does not increment when a path emanating from a diversion joins a main path.
streamcalculator	Further modification of streamorder created to assist with tracking divergences and is computed with streamorder.	Long Integer	Yes	-	-	-	Streamcalculator is assigned the value 0 along diverted paths.
hydrosequence	Nationally unique sequence number that places the reach in hydrologic sequence.	Double	Yes	-	-	-	If a path exists between two flowlines, the upstream flowline will have a larger hydrosequence value. If no path exists between the flowlines, hydrosequence has no significance. Hydrosequence is equivalent to a topological sort of the dendritic network.
dnhydrosequence	Downstream mainstem hydrologic sequence number.	Double	Yes	-	-	-	None.
uphydrosequence	Hydrologic sequence number of upstream mainstem drain.	Double	Yes	-	-	-	None.
levelpath	Hydrologic sequence number of the most downstream flowline feature that is on the same Streamlevel path as this flowline feature according to the flownetwork table.	Long Integer	Yes	-	-	-	None.
uplevelpath	Levelpath identifier of the feature on the main path immediately upstream.	Double	Yes	-	-	-	None.
dnlevelpath	Levelpath identifier of the feature on the main path immediately downstream.	Double	Yes	-	-	-	None.
pathlength	Distance to terminal flowline feature downstream along main path in kilometers using an equal area projection.	Double	Yes	-	-	-	Computed in projections based on specific locations.
terminalpath	Hydrologic sequence number of terminal flowline of the basin the feature is in.	Double	Yes	-	-	-	None.
arbolatesum	The sum of the lengths of every upstream feature in the flownetwork, as well as the length of the current feature.	Double	Yes	-	-	-	None.
divergence	Indicates if a flowline feature is a diversion based on the divergencetype.	Short Integer	Yes	0	divergencetype	-	None.
rtndivergence	Indicates that one or more of the paths contributing to a given flowline originates in a divergence that recombines with its main path at the current flowline.	Short Integer	Yes	0	logical	-	Set to true if flowline feature is a return divergence, otherwise false.

Domains

flowlinefeaturetype

Code	Description	Definition	Comments
1	River	Flowing body of water that receives inflow from upstream and surrounding catchment.	In elevation-derived hydrography a River is a feature that is delineated within elevation-surface channelization.
2	Canal	Flowing body of water that receives inflow from upstream but not the surrounding catchment.	Integrated with elevation but not thought to integrate with surrounding hydrology in most cases.
3	Drainageway	Drainage pathway in a low drainage area setting (headwater) upstream of the onset of discernable channelization.	None.
4	Surface Connector	Abstract surface or near surface path used to connect upstream channelized features with downstream channelized features.	In elevation-derived hydrography a Surface Connector is a feature that is delineated where there is no elevation-surface channelization.
5	Waterbody Connector	Abstract connector over a portion of the landscape covered by water.	None.
6	Elevation Breaching Connector	A known or inferred connection that is used to breach values in the elevation surface that are blocking the natural downstream flow of a hydrologic feature.	Culverts across transportation features are the most common occurrence.
7	Hydro Unenforced Connector	Specific or abstract connector representing flow that is not determined by the surface-water hydrologic network.	Most pipelines and underground flowpaths through karst terrain are included here.

waterbodyfeaturetype

Code	Description	Definition
1	River	A body of flowing water.
2	Canal	A body of flowing water that receives inflow from upstream but not the surrounding catchment.
3	Lake	A body of standing water surrounded by land. Includes natural and manmade lakes, ponds and reservoirs.
4	Ocean or Great Lake	A body of salt or fresh water that covers much of the earth. Serves as the terminus of network features and as the land/water boundary at oceans or great lakes.

flowdirection

Code	Description
0	Flow direction is unable to be determined from elevation surface
1	Flow direction is in digitized direction, and z-values on vertices flow downslope
2	Flow direction is in digitized direction, and z-values on vertices flow upslope

divergencetype

Code	Description
0	No divergence
1	Main path through a divergence
2	Minor path through a divergence

onsurface

Code	Description
0	Feature is above another hydrography feature, elevated above the surface
1	Feature is on the land surface
2	Feature is below the land surface

logical

Code	Description
0	False
1	True

hydrolocationfeaturetype

Code	Description	Definition
1	Catchment Outlet	The location where water flows out of a catchment.
2	Confluence	The location where two flowpaths converge.
3	Waterbody Outlet	The location where water flows out of a waterbody.
4	Divergence	The location where flow splits into two or more downstream flowlines.
5	Terminus	The location where a network ends at the ocean or large lake.
6	Headwater	The location where a river is thought to begin.
7	Spring	A place where water emerges naturally from the ground.
8	Sink	The location where a stream enters an underground conduit, terminates in an isolated sink or depression. Represents the low point to which water flows within a closed basin.
9	External Connection	The location where a stream enters a non-USGS authoritative source managed by another entity.
10	Reachcode Start	The location where a legacy National Hydrography Dataset (NHD) reachcode starts.
11	Reachcode End	The location where a legacy National Hydrography Dataset (NHD) reachcode end.

waterbody (Polygon)

Name (Alias)	Definition	Type	Allow Nulls	Length	Domain	Default Values	Comments
id3dhp	Unique identifier for 3DHP features.	Text	Yes	7	-	-	This is a base-36 7-digit alphanumeric unique identifier that is not persistent. Applied to waterbody features in this case.
featuredate	Date the feature was loaded into the 3DHP core database.	Date	Yes	-	-	-	None.
mainstemid	A cross-dataset identifier for all flowlines that represent the headwater to outlet path of a river.	Text	Yes	200	-	-	A mainstem is equivalent to a feature with the same levelpathid in NHDPlus HR. The text field will be a <geoconnex.us>*.
gnisid	A permanent, unique number assigned by the Geographic Names Information System (GNIS)** to a geographic feature name for the sole purpose of uniquely identifying that name.	Long Integer	Yes	-	-	-	gnisid = "null" if no name is associated with the feature. The gnisid is conflated from points and assigned to features. The most recent name, and any historic names, can be retrieved from the GNIS data base using the gnisid.
featuretype	Feature type description.	Short Integer	Yes	-	waterbodyfeaturetype	-	None.
featuretypelabel	The name of the feature type.	Text	Yes	50	-	-	The featuretype label is based on the coded value description in the featuretype field. Allows label display in non-ESRI datasets.
areasqkm	Area of feature in square kilometers based on regional spatial reference systems.	Double	Yes	-	-	-	Computed in projections based on specific locations.

hydrolocation (Point)

Name (Alias)	Definition	Type	Allow Nulls	Length	Domain	Default Values	Comments
id3dhp	Unique identifier for 3DHP features.	Text	Yes	7	-	-	This is a base-36 7-digit alphanumeric unique identifier that is not persistent. Applied to hydrolocation features in this case.
featuredate	Date the feature was loaded into the 3DHP core database.	Date	Yes	-	-	-	None.
mainstemid	A cross-dataset identifier for all flowlines that represent the headwater to outlet path of a river.	Text	Yes	200	-	-	A mainstem is equivalent to a feature with the same levelpathid in NHDPlus HR. The text field will be a <geoconnex.us>*.
universalreferenceid	Persistent identifier appropriate for the hydrologic location type.	Text	Yes	200	-	-	None.
gnisid	A permanent, unique number assigned by the Geographic Names Information System (GNIS)** to a geographic feature name for the sole purpose of uniquely identifying that name.	Long Integer	Yes	-	-	-	gnisid = "null" if no name is associated with the feature. The gnisid is conflated from points and assigned to features. The most recent name, and any historic names, can be retrieved from the GNIS data base using the gnisid.
featuretype	Feature type description.	Short Integer	Yes	-	hydrolocationtype	-	None.
featuretypelabel	The name of the feature type.	Text	Yes	50	-	-	The featuretype label is based on the coded value description in the featuretype field. Allows label display in non-ESRI datasets.

catchment (Polygon)

Name (Alias)	Definition	Type	Allow Nulls	Length	Domain	Default Values	Comments
id3dhp	Unique identifier for 3DHP features.	Text	Yes	7	-	-	This is a base-36 7-digit alphanumeric unique identifier that is not persistent. This identifier links to the catchmentid3dhp and flowpathid3dhp attributes in the derivatives table. Applied to catchment features in this case.
featuredate	Date the feature was loaded into the 3DHP core database.	Date	Yes	-	-	-	None.
mainstemid	A cross-dataset identifier for all flowlines that represent the headwater to outlet path of a river.	Text	Yes	200	-	-	A mainstem is equivalent to a feature with the same levelpathid in NHDPlus HR. The text field will be a <geoconnex.us>*.
areasqkm	Area of feature in square kilometers based on equal area projections.	Double	Yes	-	-	-	Computed in projections based on specific locations.
totestdrainageareasqkm	Total estimated drainage area of all upstream catchments measured in square kilometers based on regional spatial reference systems.	Double	Yes	-	-	-	Computed in projections based on specific locations.

drainageareas (Polygon)

Name (Alias)	Definition	Type	Allow Nulls	Length	Domain	Default Values	Comments
id3dhp	Unique identifier for 3DHP features.	Text	Yes	7	-	-	This is a base-36 7-digit alphanumeric unique identifier that is not persistent. Applied to drainageareas features in this case.
featuredate	Date the feature was loaded into the 3DHP core database.	DateTime	Yes	-	-	-	None.
huequivalent	Hydrologic unit code per Watershed Boundary Dataset (WBD) coding system.	Text	Yes	200	-	-	This is a <geoconnex.us>*. This attribute will not be populated initially.
areasqkm	Area of feature in square kilometers based on regional spatial reference systems.	Double	Yes	-	-	-	Computed in projections based on specific locations.

*More information about geoconnex, Network Linked Data Index (NLDI), and Internet of Water can be found here: https://waterdata.usgs.gov/blog/nldi-geoconnex/.

**More information about GNIS ID can be found here: https://www.usgs.gov/tools/geographic-names-information-system-gnis.

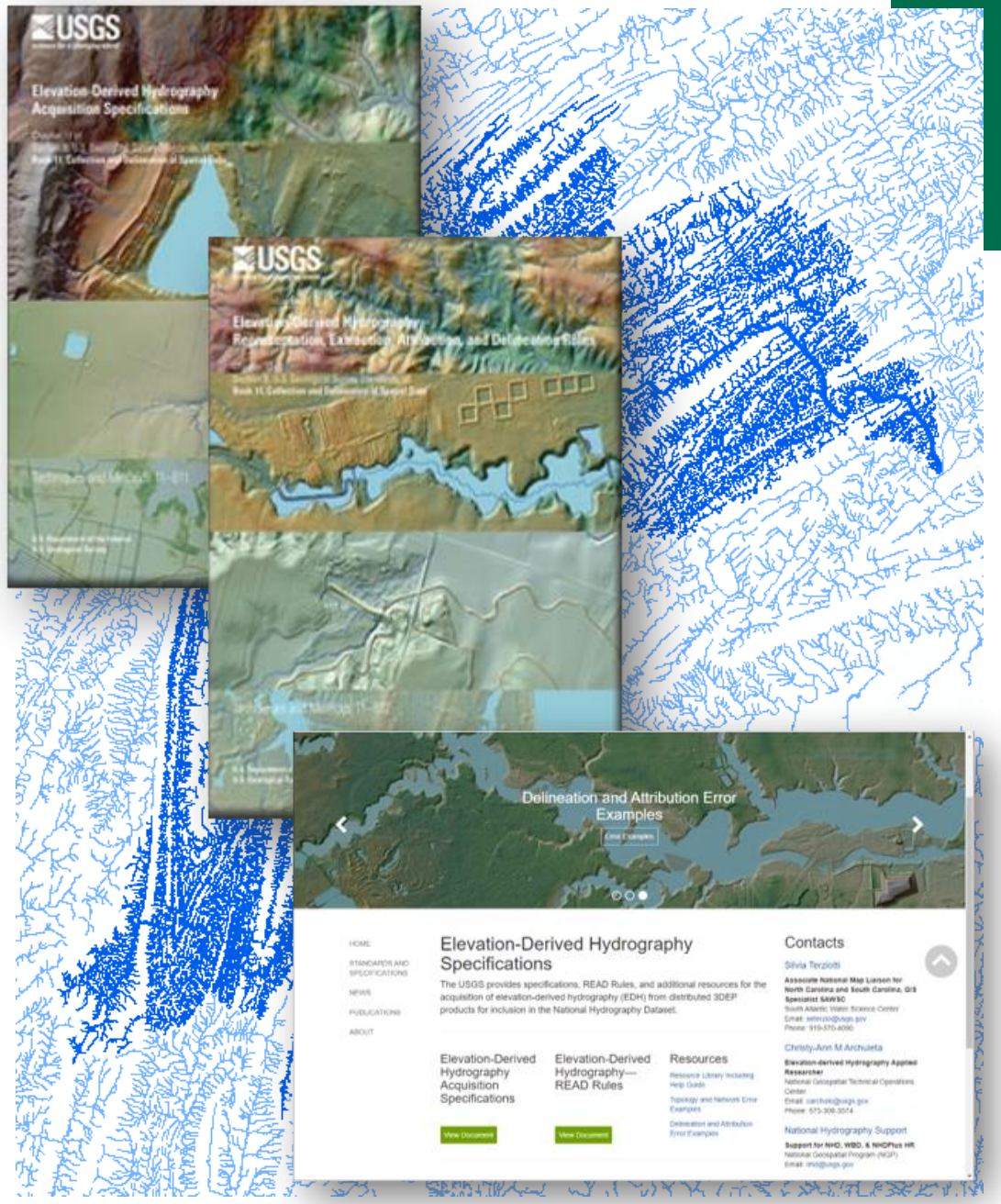
The flowline derivatives attributes (flownetworkderivates) in the 3DHP_all data service have not been populated in the 3DHP_all 2023. They are included in the service because they will be populated incrementally in future releases. The 3DHP_all 2023 products described on these pages are provisional and subject to change. They are being provided to meet the need for timely best available information. While 3DHP_all products are nationally complete and many aspects of the data are stable, development of the data model and products is ongoing. Please reach out to contacts list on this page with questions and feedback.

USGS science for a changing world

The National Map
Your Source for Topographic Information

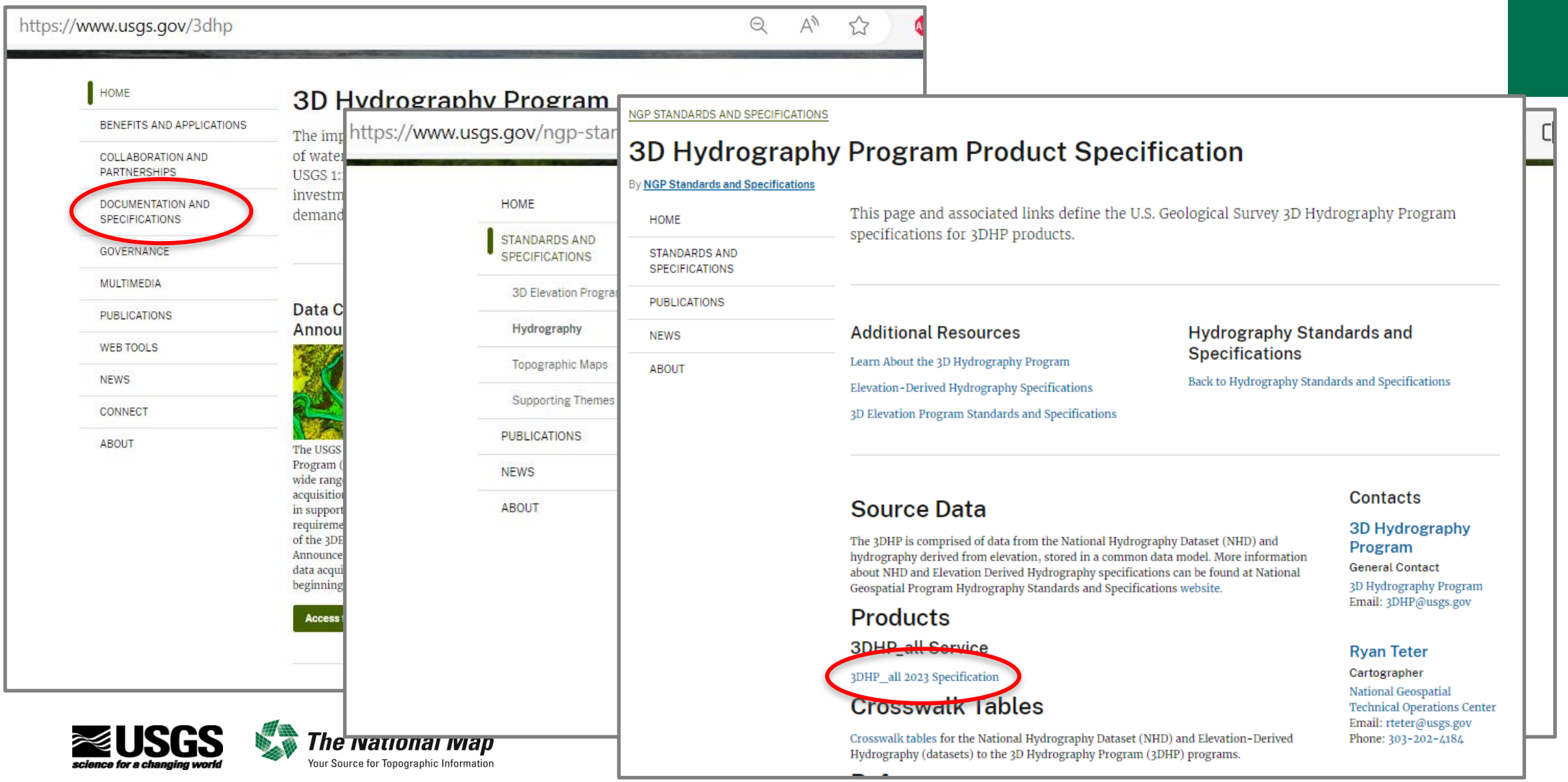
Populating 3DHP Data

- Migrate 24K NHD to 3DHP schema to provide reference and connectivity
  - Limited attribution
  - Limited functionality
- Add data from Elevation-derived Hydrography projects
  - **Elevation-derived Hydrography Specifications published 2020**
  - **Data validation prior to ingest**
  - Primary path for data improvement
- Best available data all in one dataset



www.usgs.gov/3DHP

https://hydro.nationalmap.gov/arcgis/rest/services/3DHP_all/MapServer



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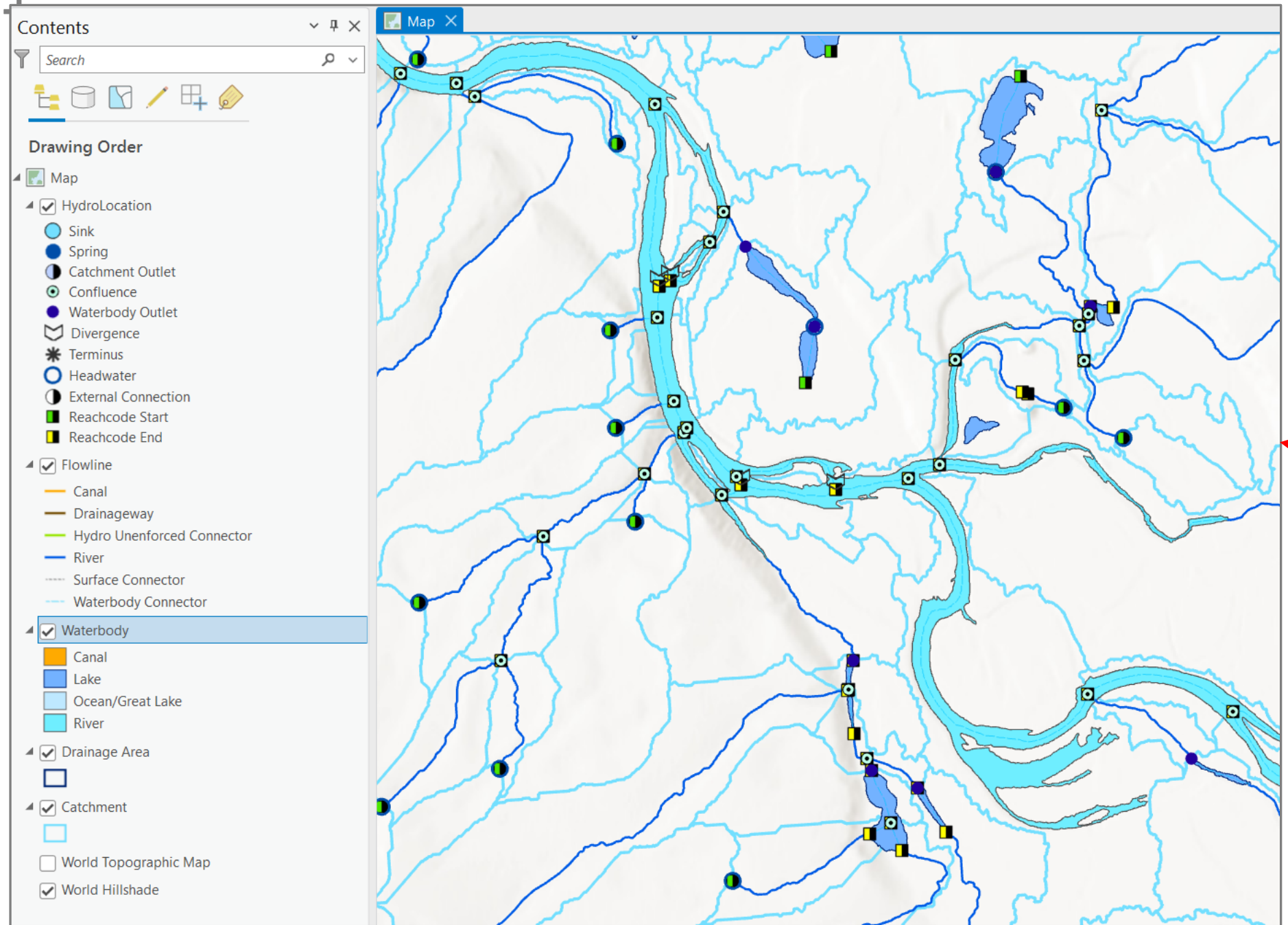
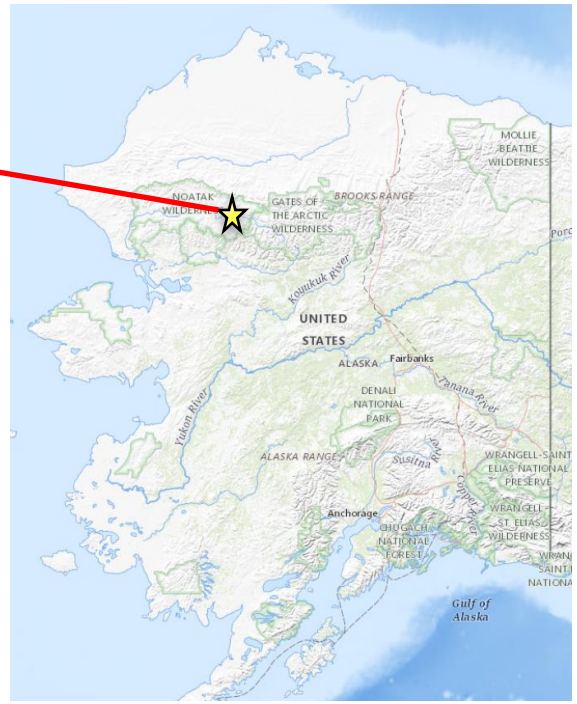




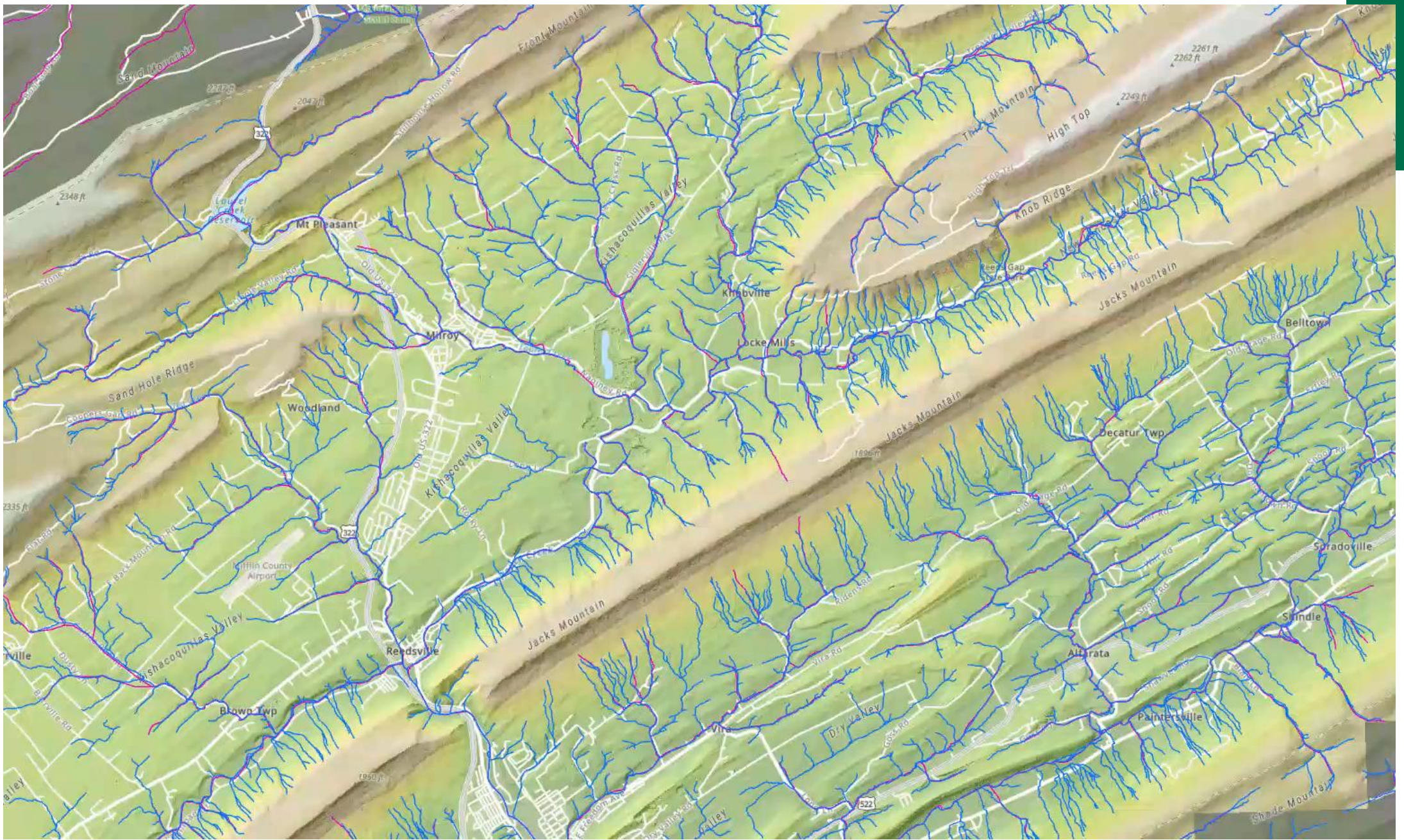
HUC 19050401

Pilots to Derive Hydrography from Elevation

Gaining an understanding of how to build 3DHP Datasets

- Goals of Pilot Projects
  - Build inspection procedures and assess specifications
  - Understand costs and any issues with contracting
  - Help zero in on project costs
- Started with 5 Areas across the U.S.
- Alaska Pilots - Kobuk River Basin
- Recent CONUS Pilots: **Southeast TX**, PA, OR

NHD vs. Hydrography derived from elevation in Pennsylvania



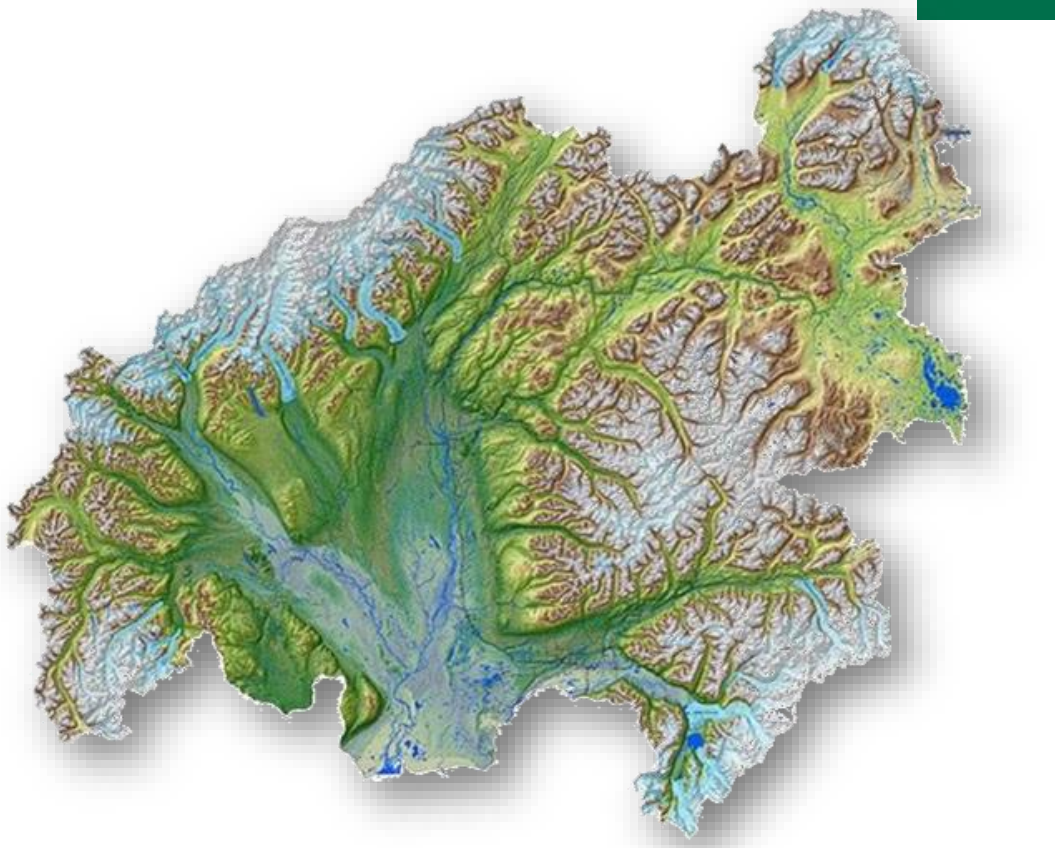
Key takeaways

- 3DHP is the first systematic remapping of the Nation's hydrography since the 24K maps
- NHD, NHDPlus HR, and WBD are not going away – all will remain available for years to come
- Final NHD linework has been transferred to 3DHP data model.
- New data acquisition will go directly to 3DHP
- Anticipate approximately 10 years to refresh the country (contingent on funding)
- Partnerships are vital

3DHP is a Community Investment

Built on partnerships

- Investments in 3DEP data have made it possible to derive 3DHP features for a significant portion of the Nation (3DEP costs are not included in 3DHP costs)
- Like 3DEP, the 3DHP is a community-wide goal that depends on significant investments by partner organizations to successfully meet their needs
- USGS will manage 3DHP on behalf of the broader community who would provide the majority of the funding



Thank you!

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USGS National Geospatial Program
www.usgs.gov/3dhp

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Image: 3D Elevation Program (3DEP) data near Bismarck, ND