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Incorporating 3DEP Data into National Hydrography Dataset (NHD) Updates & Elevation Derived Hydrogrpahy (EDH)

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October 21, 2021

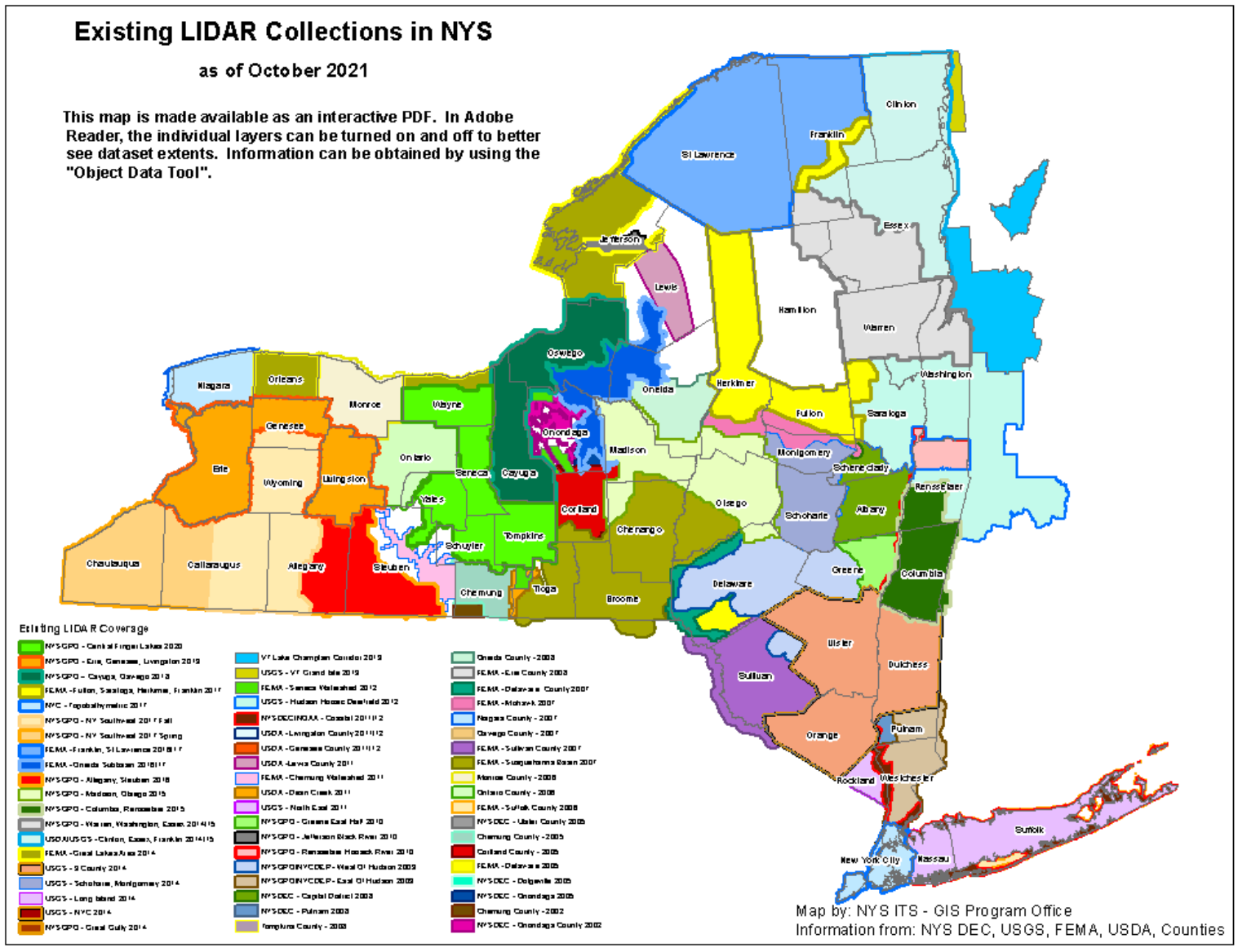
Topics

- How New York State Information Technology Services (NYSITS) became involved with USGS NHD/WBD
- NHD update process
- Current status of NHD
- Future of NYS involvement with NHD/EDH
  - Open discussion

New York State Information Technology Services (NYSITS)
GIS Program Office (GPO)

Programs related to NHD

- New York State Digital Orthophoto Program (NYSDOP)
- GIS Data Improvement
- Emergency Response
- LIDAR



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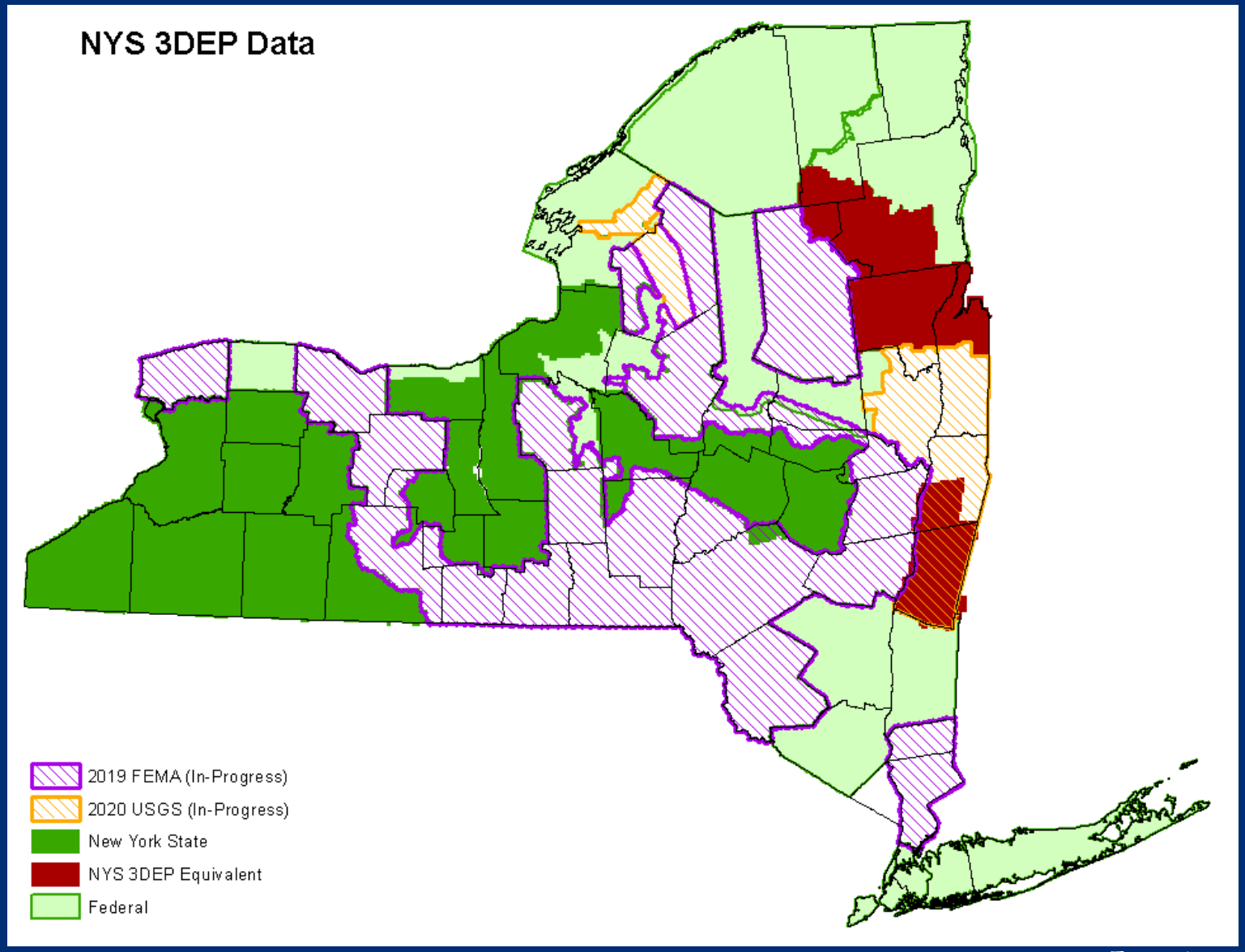
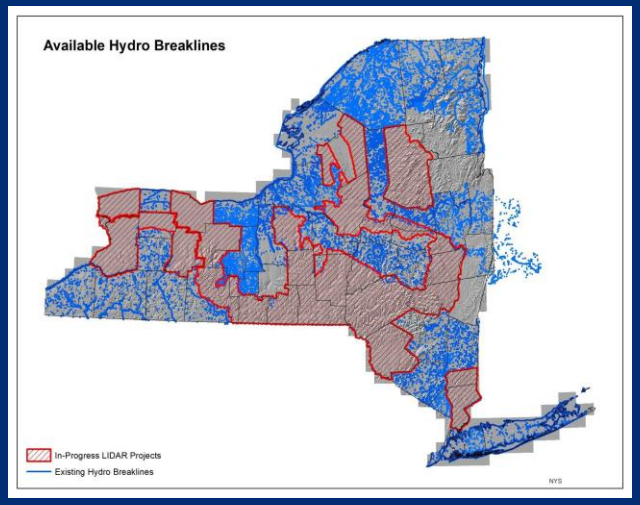
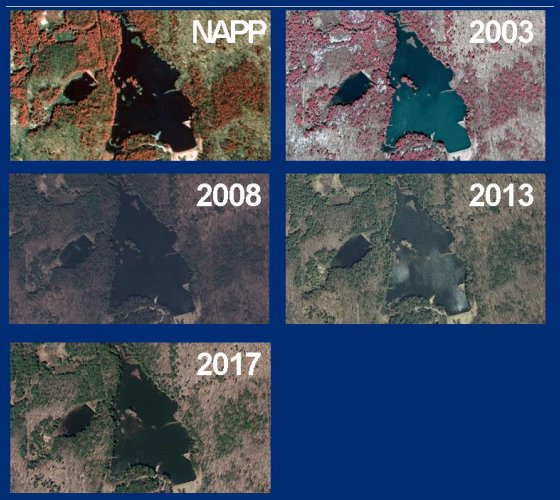
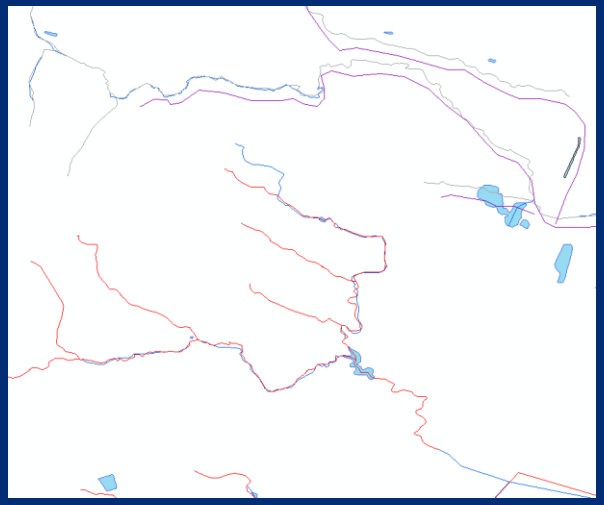

NYS 3DEP Data
2019 FEMA (In-Progress)
2020 USGS (In-Progress)
New York State
NYS 3DEP Equivalent
Federal


Available Hydro Breaklines
In-Progress LIDAR Projects
Existing Hydro Breaklines
NYS


NAPP
2003
2008
2013
2017



NHD

NHD/WBD Stewardship

- ITS signed Memorandum of Understanding (MOU) with USGS in July of 2019 becoming the state stewards of both NHD and WBD datasets
- 4 state employees are trained in NHD editing

Memorandum of Understanding

Between

New York State
Office of Information Technology Services

And

The United States Geological Survey

For

Stewardship of the National Hydrography Dataset and
Watershed Boundary Dataset in the State of New York

NHD Improvement Goals

- Improve upon the existing NHD Dataset
  - Delete features that are no longer relevant
  - Check classification of existing features
  - Improve geometry of existing features
  - Add missing features
  - Add missing names

- One hydro dataset for State of New York
  - Consolidate all hydro datasets into one
  - Fold in missing waterbodies/streams
  - Improve on naming

- Produce a statewide web service

NHD Waterbody Improvements

HUC 02050102 - Chenango

NHD polygons review

- Marked for deletion (276 records)

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- Replace geometry (68 records)
  - LiDAR breaklines
    - Ponds greater than 2 acres
  - Existing datasets

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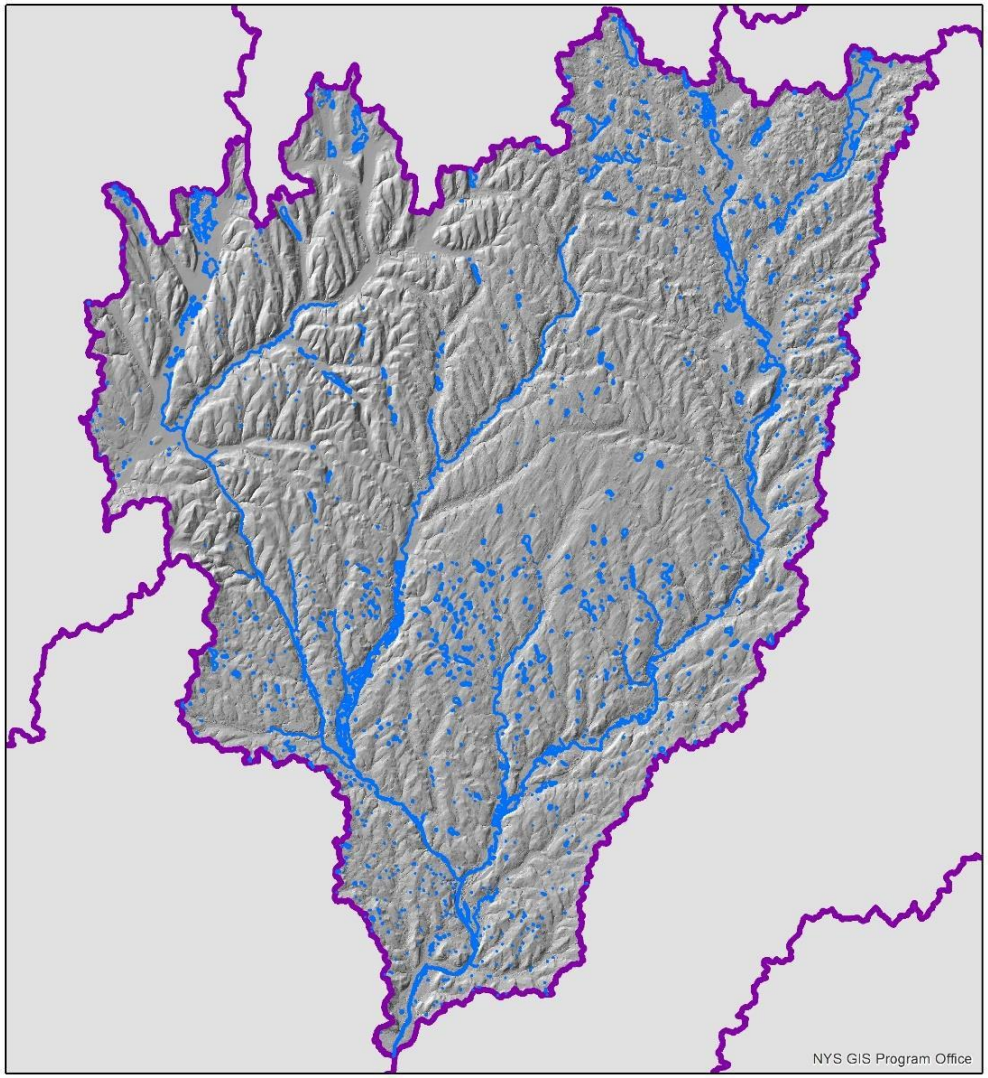
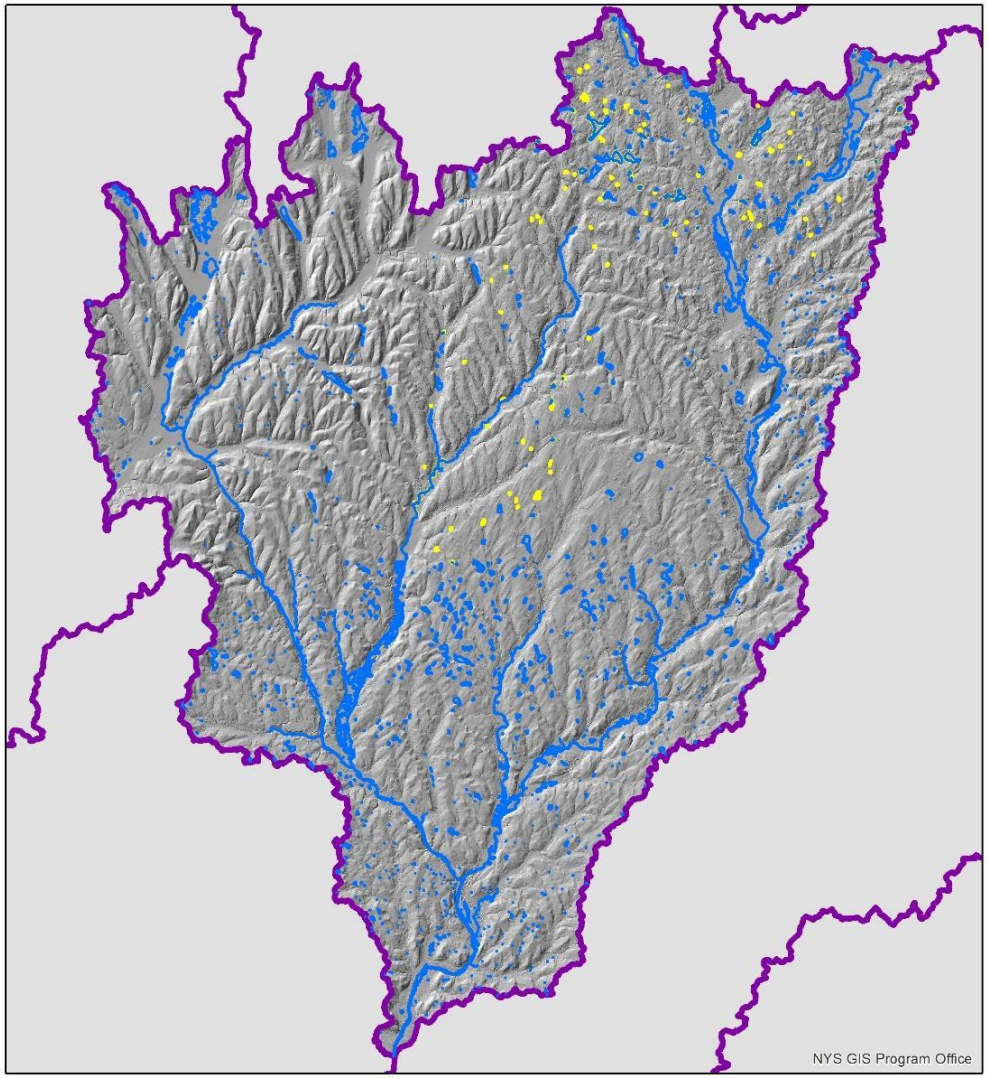
  - LiDAR breaklines
    - Ponds greater than 2 acres
  - Existing datasets
- NHD Area/Flowline improvements
  - Improved where breaklines available



HUC 02050102
Chenango

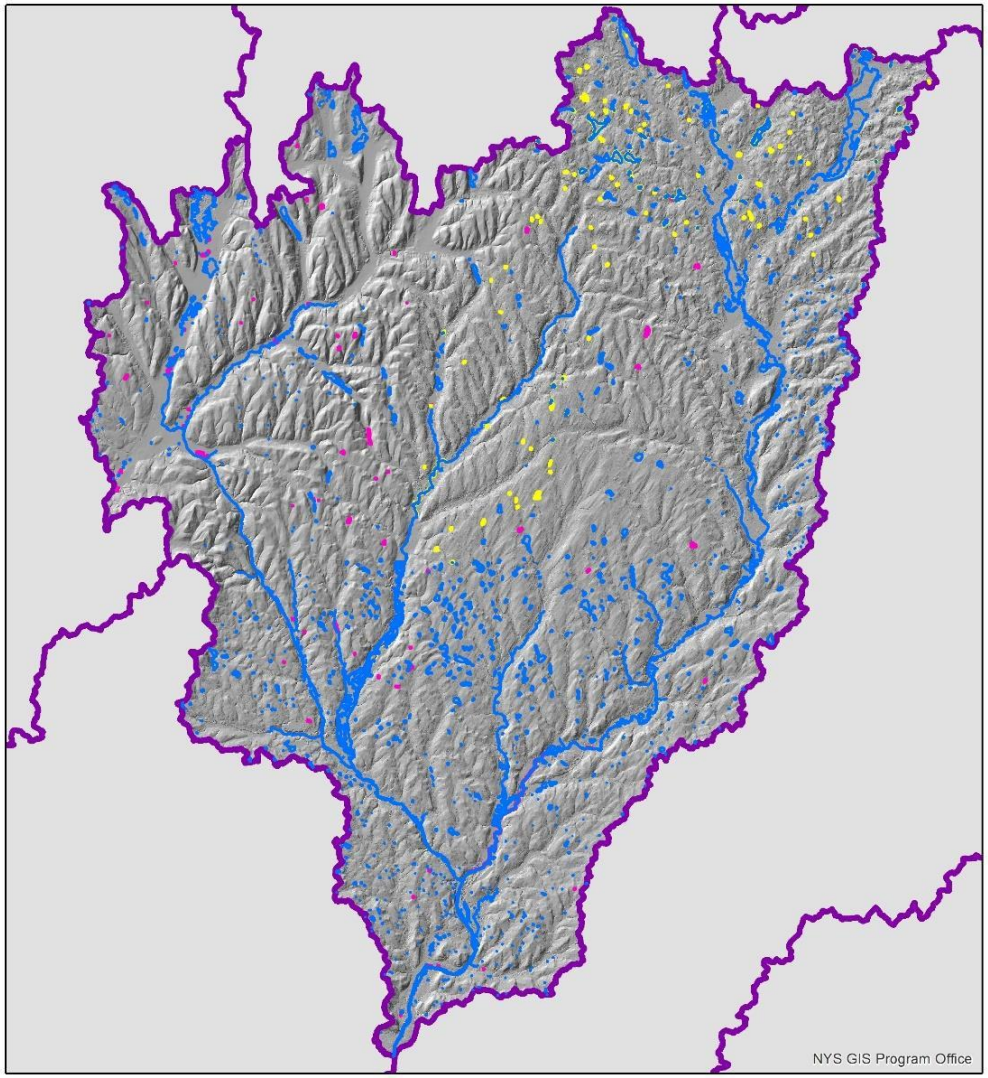
NHD Waterbody (1540 Records)



HUC 02050102
Chenango

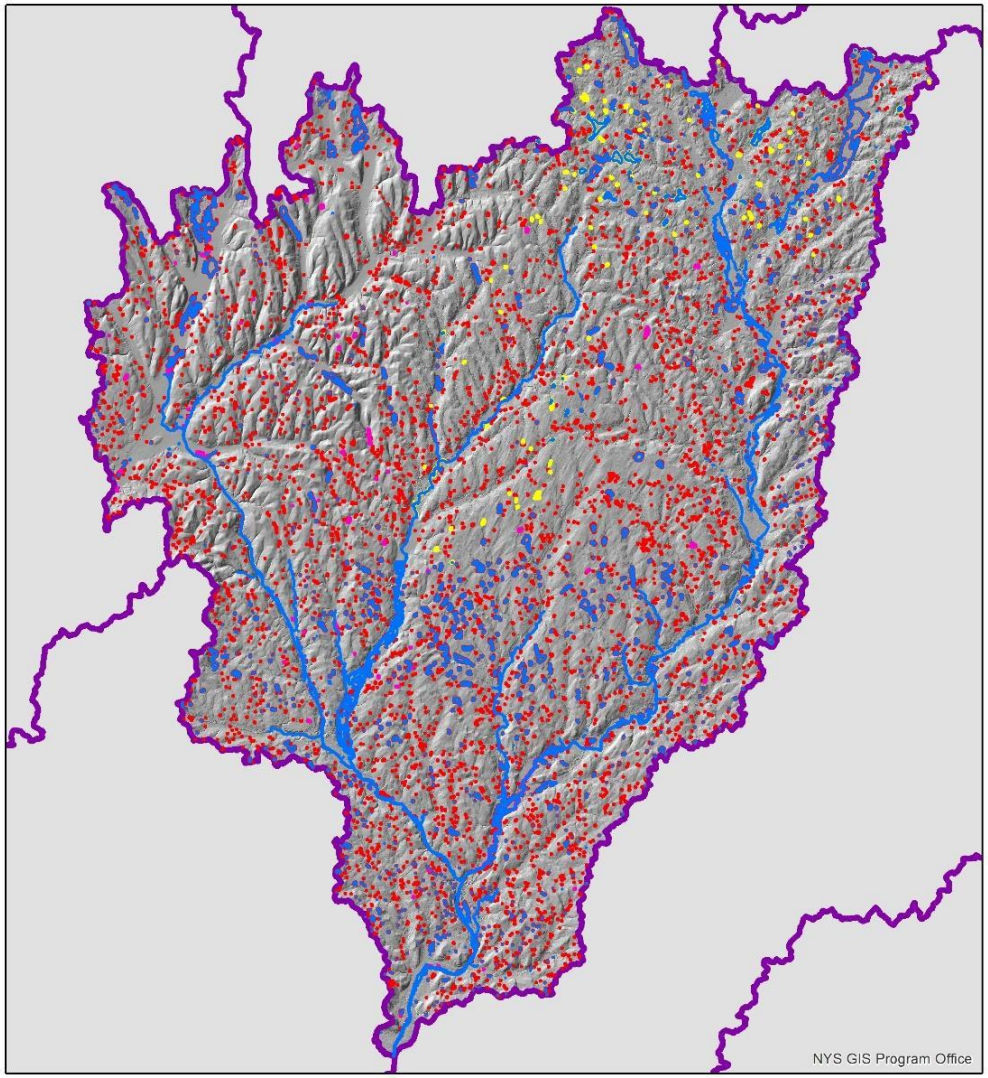
NHD Waterbody (1540 Records)

LiDAR Breaklines (74 Records)



HUC 02050102
Chenango

- NHD Waterbody (1540 Records)
- LiDAR Breaklines (74 Records)
- Area Hydrography (77 Records)



HUC 02050102
Chenango

- NHD Waterbody (1540 Records)
- LiDAR Breaklines (74 Records)
- Area Hydrography (77 Records)
- Digitized (4856 Records)

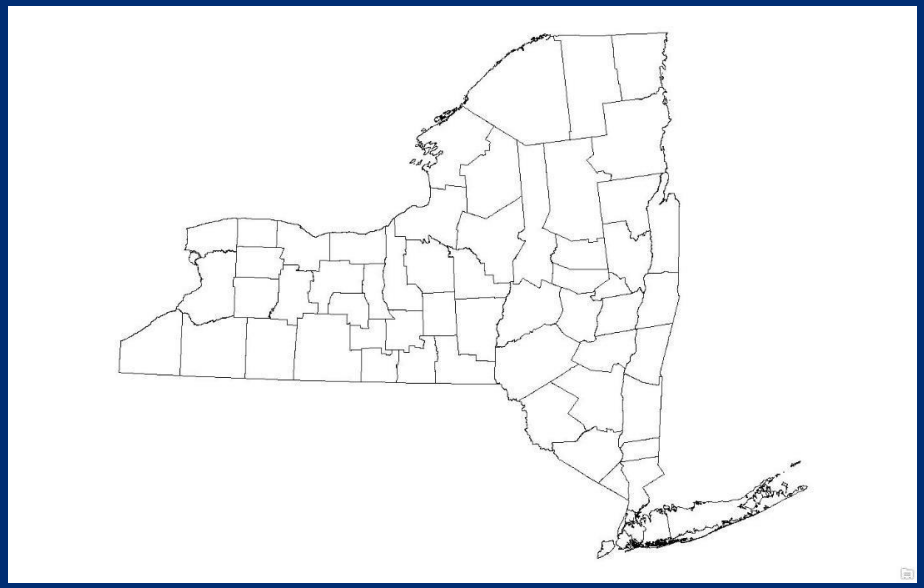
Original NHD		
FCODE	Description	Count
39000	Lake/Pond	39
39001	Lake/Pond - Intermittent	4
39004	Lake/Pond - Perennial	811
39009	Lake/Pond - Perennial (Average Water Elevation)	79
43601	Resevoir - Aquaculture	25
43613	Resevoir - Water Storage	7
46600	Swamp/Marsh	575
		1540

Updated to USGS/NHD		
FCODE	Description	Count
39000	Lake/Pond	37
39001	Lake/Pond - Intermittent	176
39004	Lake/Pond - Perennial	636
39006	Lake/Pond - Intermittent (Date of Photography)	2
39009	Lake/Pond - Perennial (Average Water Elevation)	69
39011	Lake/Pond - Perennial (Date of Photography)	4834
43601	Resevoir - Aquaculture	11
43608	Resevoir - Swimming Pool	1
43612	Resevoir - Sewage Treatment	1
43613	Resevoir - Water Storage	2
46600	Swamp/Marsh	482
		6251

Add Digitize	4856
Add Breaklines	74
Add Other Datasets	77
Delete	276
Attribute Changes	95
Replace with Existing Datasets	68
Edited Geometry	438

Web Services

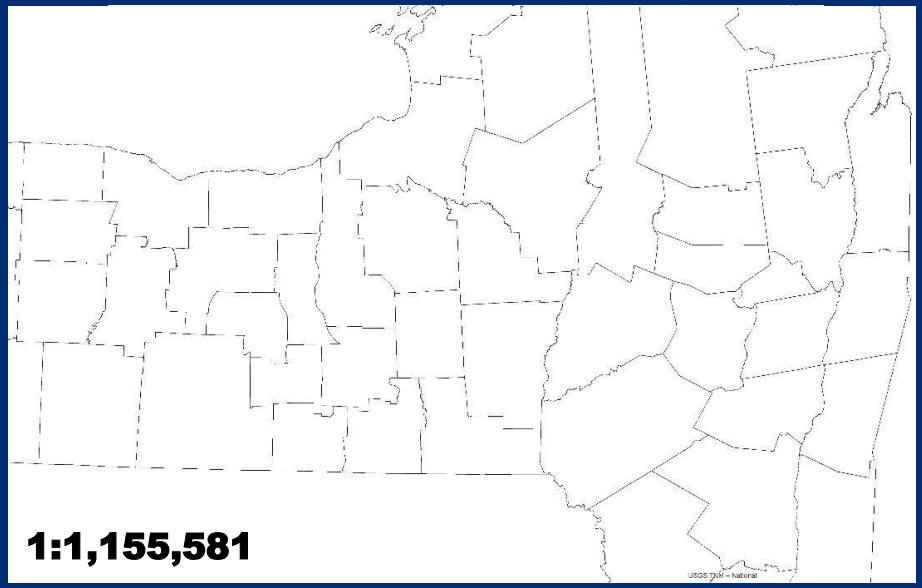
USGS Web Service



NYSGPO Web Service

- Hydrography Data viewable at a statewide scale
- Display waterbodies larger than 10 SQKM and NHD Area larger than 25 SQKM
- Labeling only waterbodies > 1000 SQKM

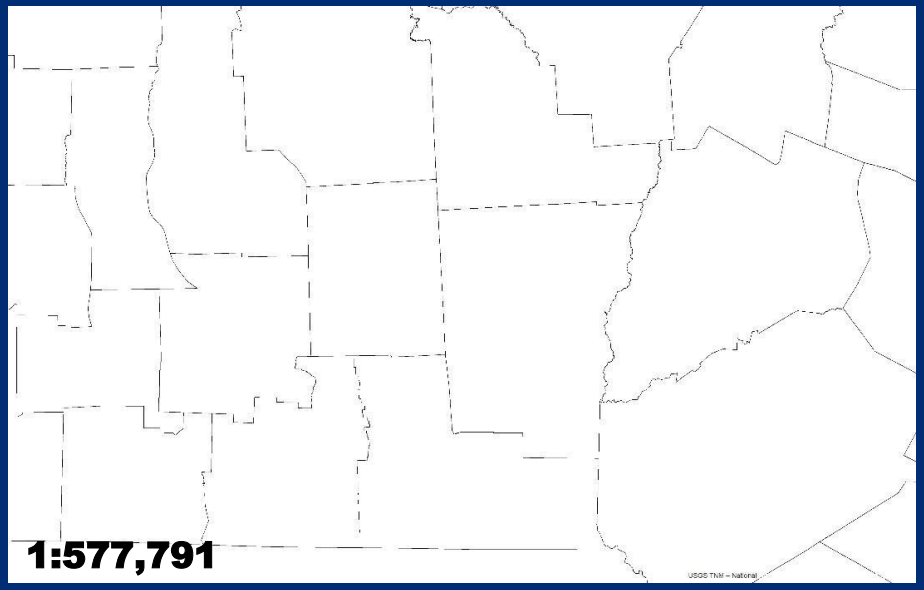
USGS Web Service



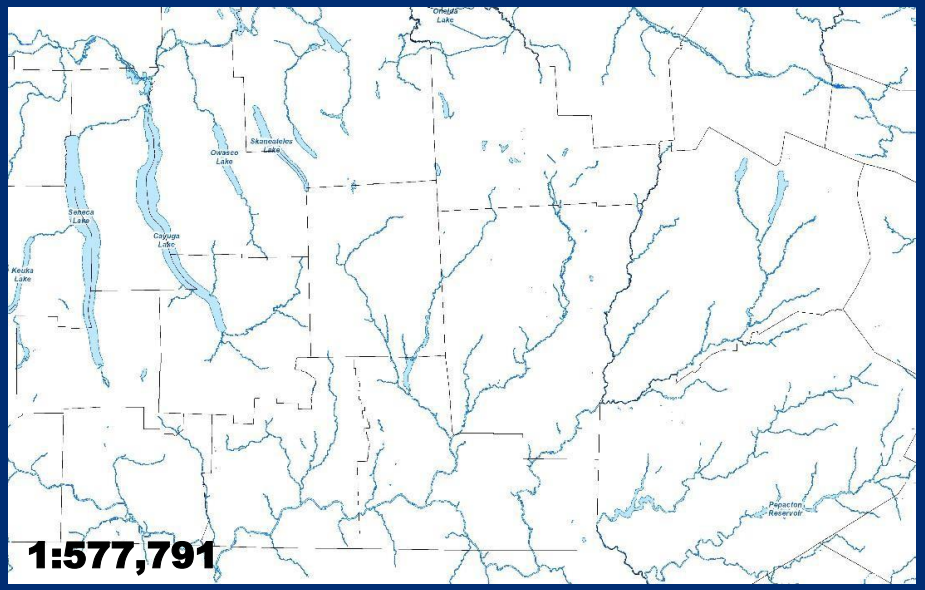
NYSGPO Web Service

- Waterbodies larger than .5 SQKM
  - Label waterbodies > 20 SQKM
- NHD Area larger than 10 SQKM

USGS Web Service



NYSGPO Web Service

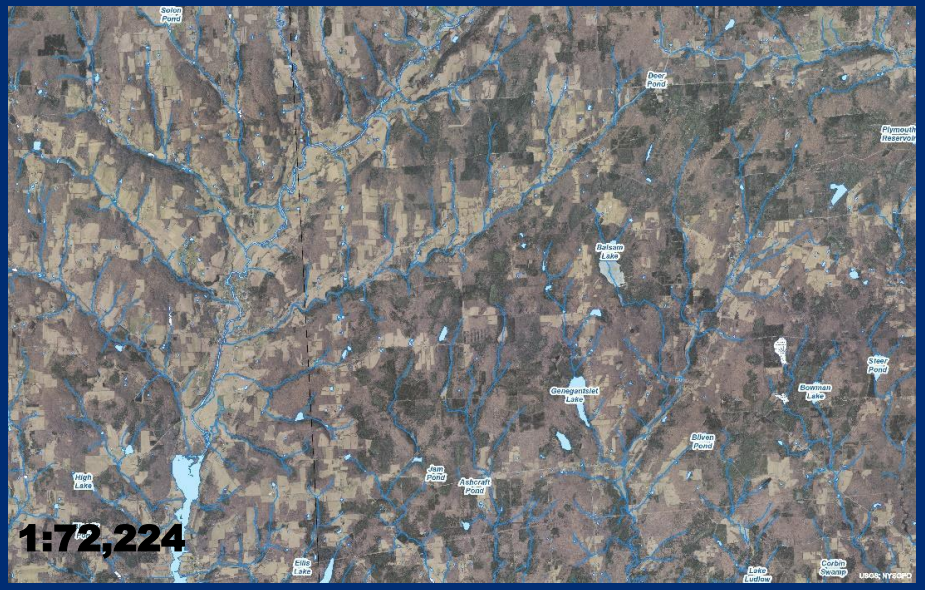


- Waterbodies larger than .25 SQKM
  - Label waterbodies > 10 SQKM
- NHD Area all displayed

USGS Web Service

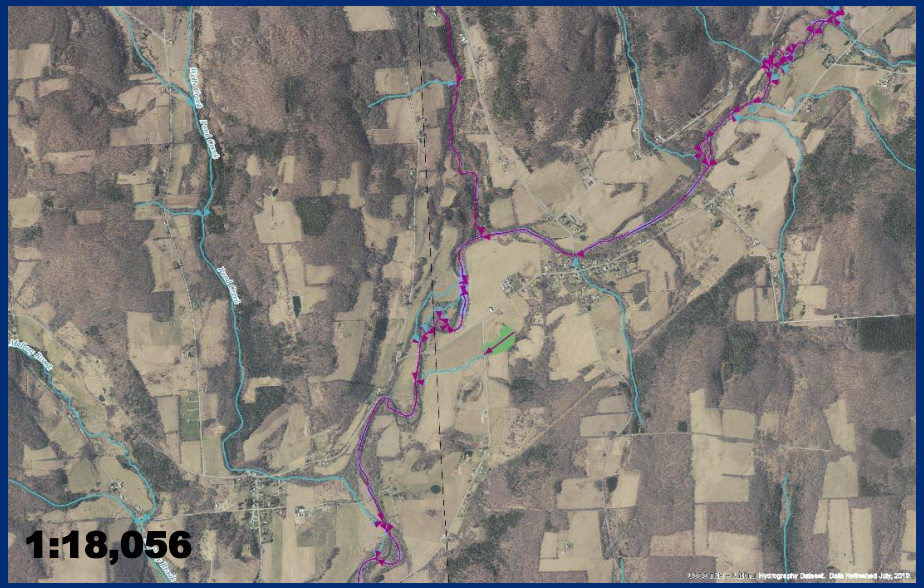
- All data turns on

NYSGPO Web Service



- Waterbodies displayed
  - Waterbodies labeled
  - Filter off some waterbodies (ex: sewage treatment)
- All NHD Area displayed
- NHD Flowline turns on
- Do not display “Artificial Path”

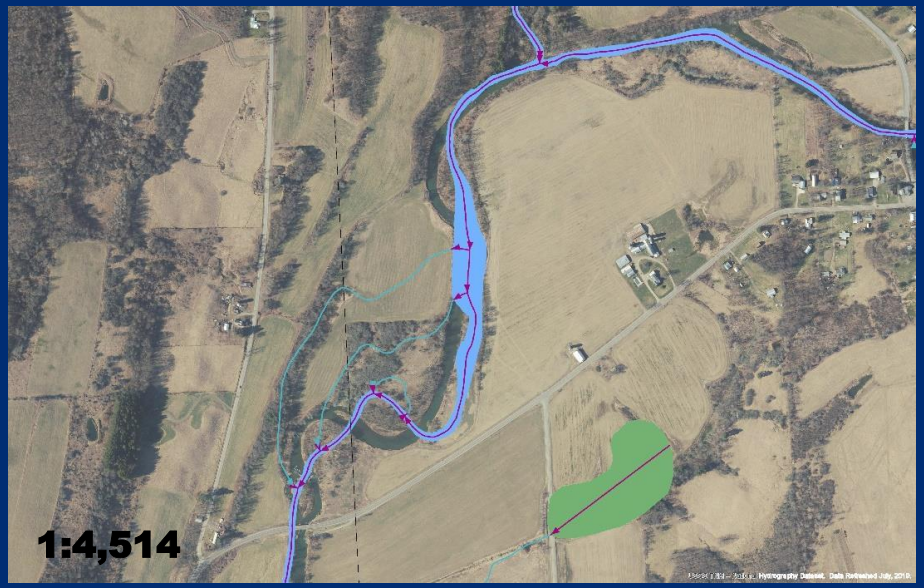
USGS Web Service



NYSGPO Web Service

- NHD Area Labels using “Artificial Path” from flowline

USGS Web Service



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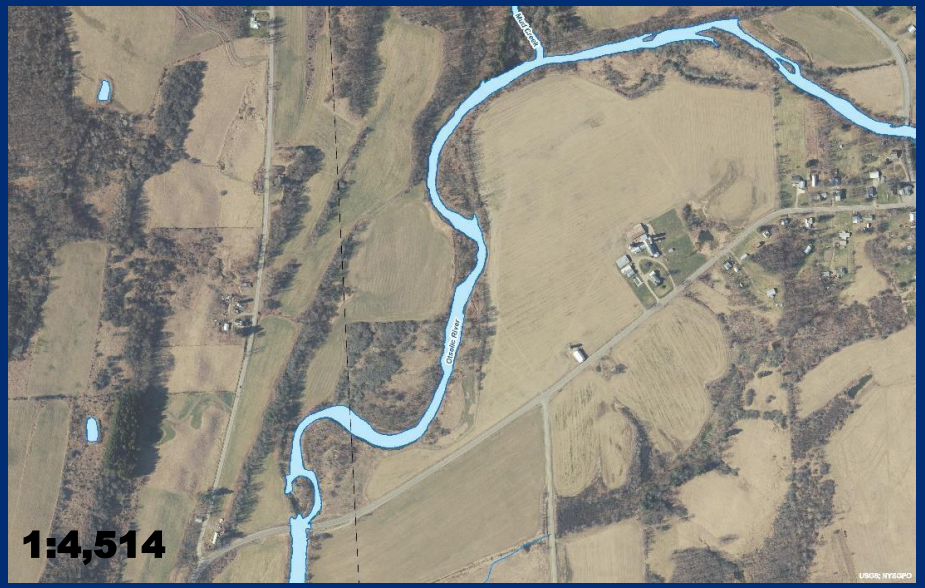
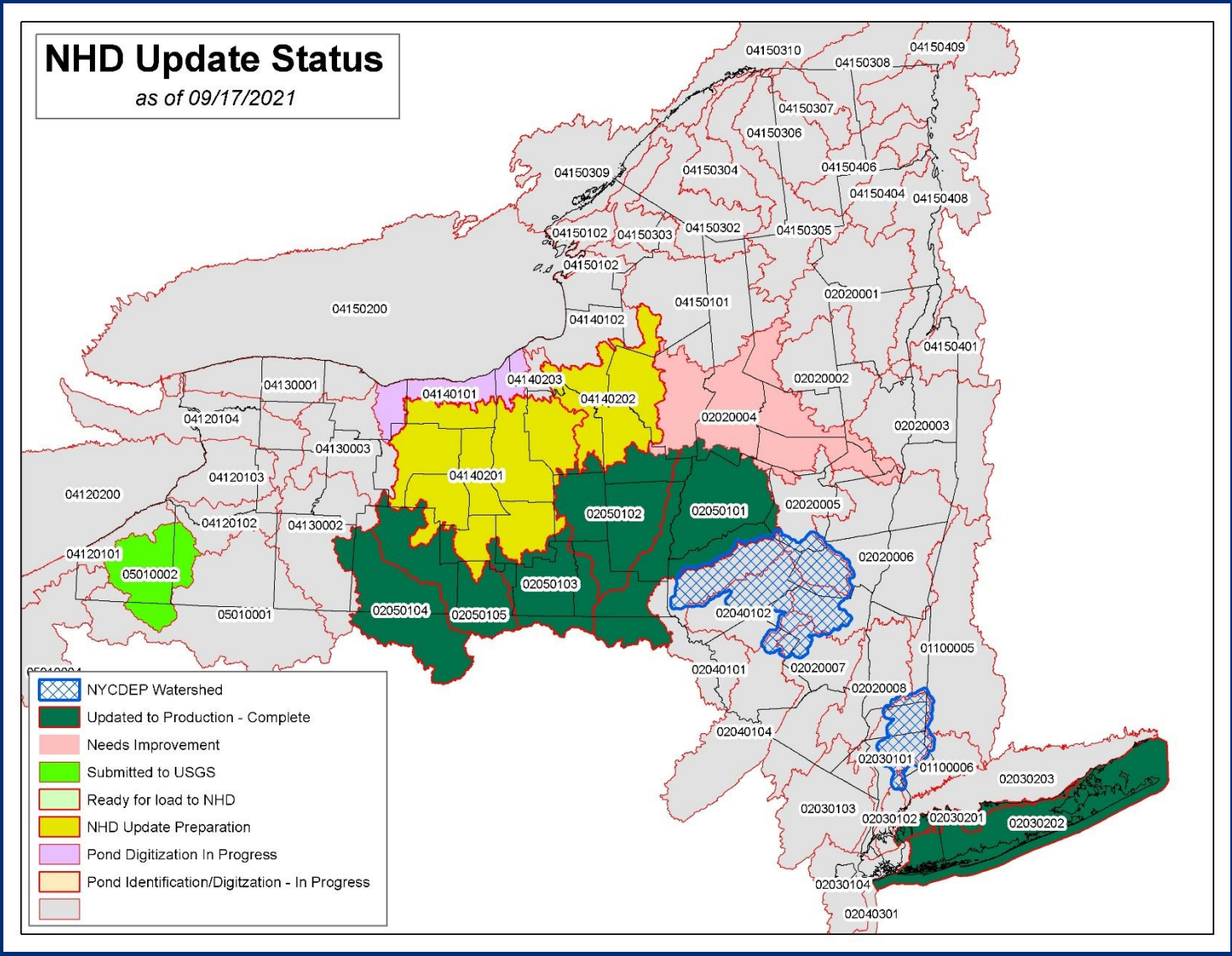


- Web Service may lag from what is downloadable

Naming Improvements

- NHD only names features that have a Geographic Names Information System (GNIS) Name - 3757 named waterbodies
- GPO adds a field for the Web Service that is a combination of GNIS Name and additional names we fold in from other datasets.
- GPO named waterbodies - 5103 named waterbodies (includes GNIS and other names we folded in)
- Additional 650+ names to be folded in once we work on additional HUCs.
- GPO labels do not go back into NHD, only available from NYS GPO Web Service
    - Goal is to add these named features into the GNIS



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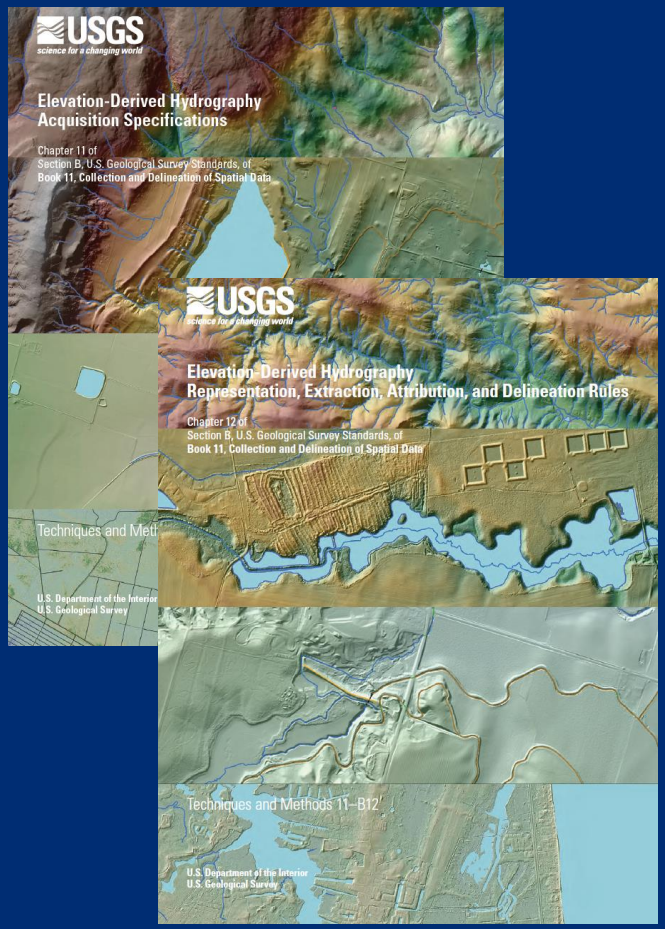
NHD & Elevation Derived Hydrography (EDH)?



Elevation Derived Hydrography (EDH)

- Acquisition Specifications
- Representation, Extraction, Attribution and Delineation Rules (READ)

https://www.usgs.gov/**core-science-systems**/ngp/ss/elevation-derived-hydrography-specifications

Benefits of EDH

- Align 3DEP Data with the NHD

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- Nationwide coverage

Benefits of EDH

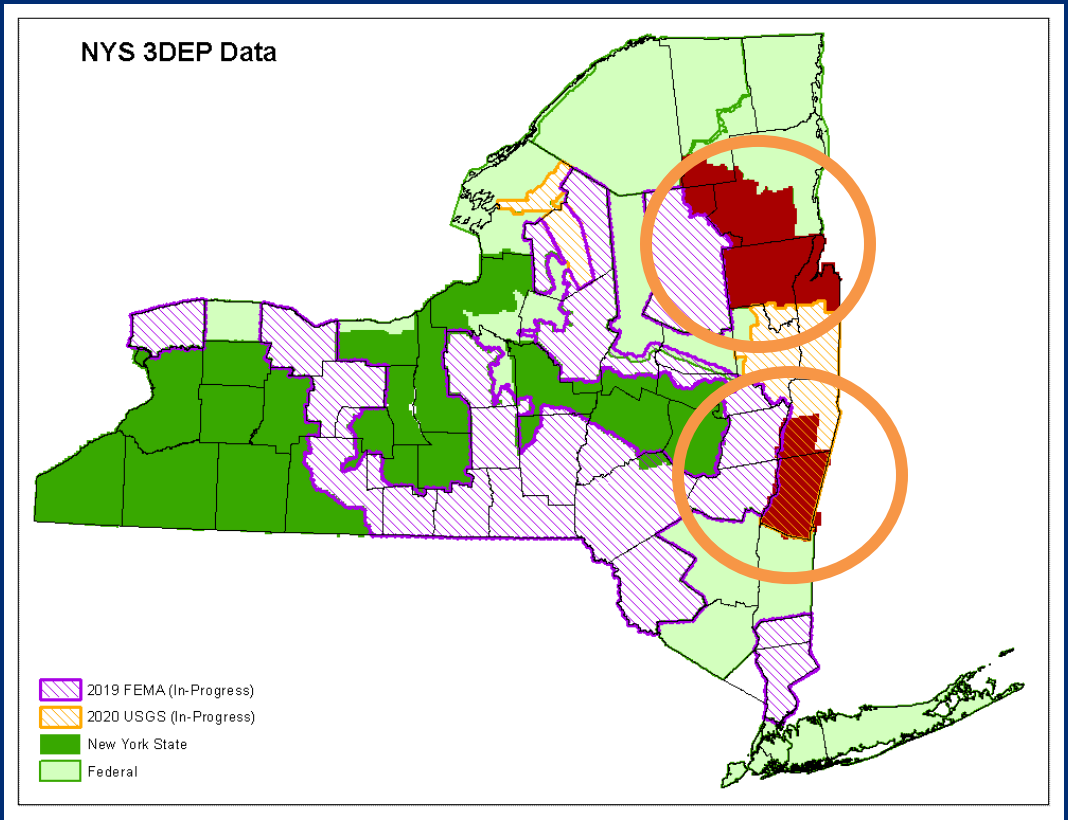
- Align 3DEP Data with the NHD
- Nationwide coverage
- Consistency/Guidance

Concerns with EDH

- **Will EDH replace NHD?**

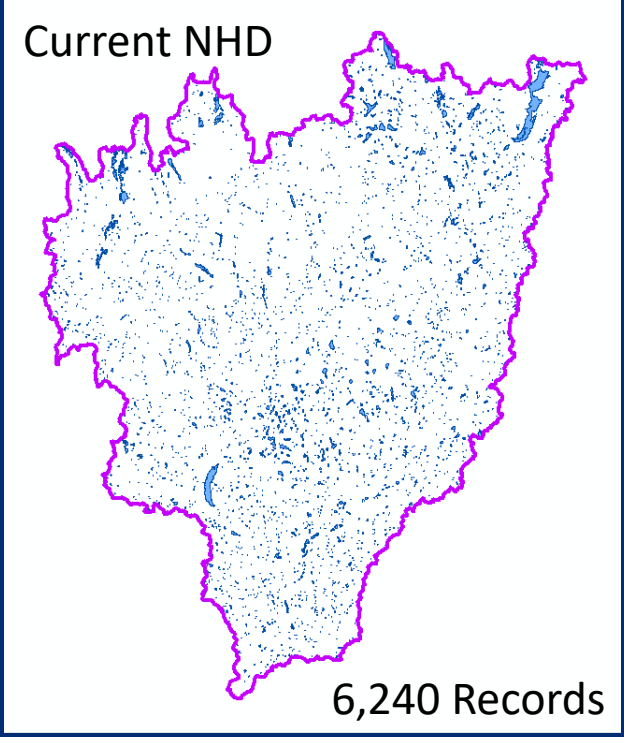
Concerns with EDH

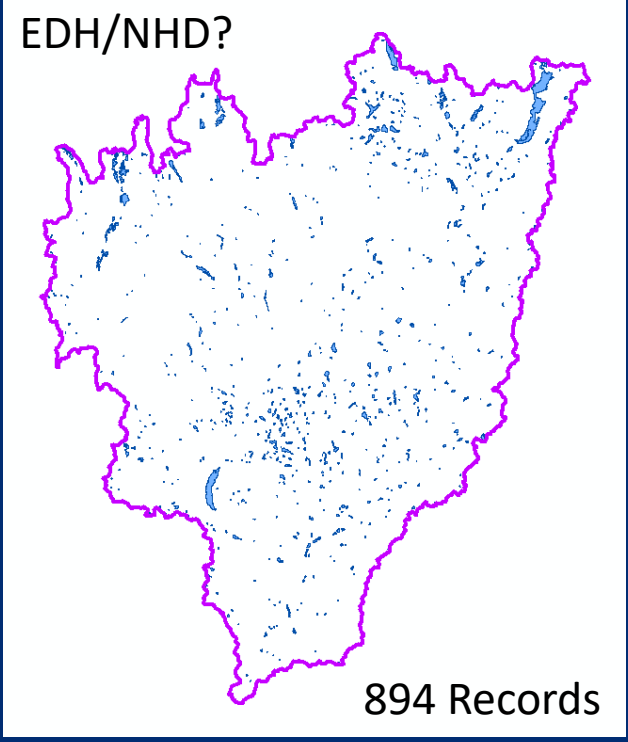
- Will EDH replace NHD?
- **Do incorporated breaklines need to be 3DEP breaklines?**



Concerns with EDH

- Will EDH replace NHD?
- Do incorporated breaklines need to be 3DEP breaklines?
- **What happens to waterbodies that don't have breaklines?**





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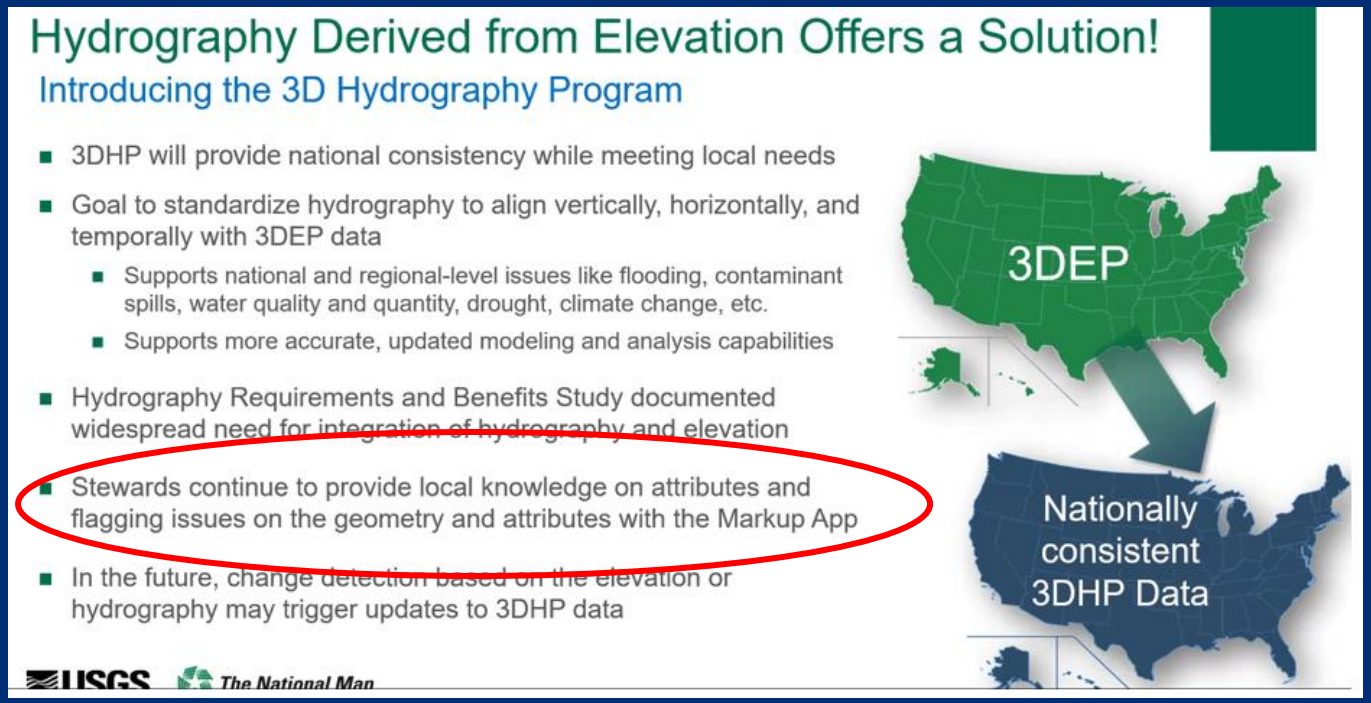
- **NHD Stewardship Role?**



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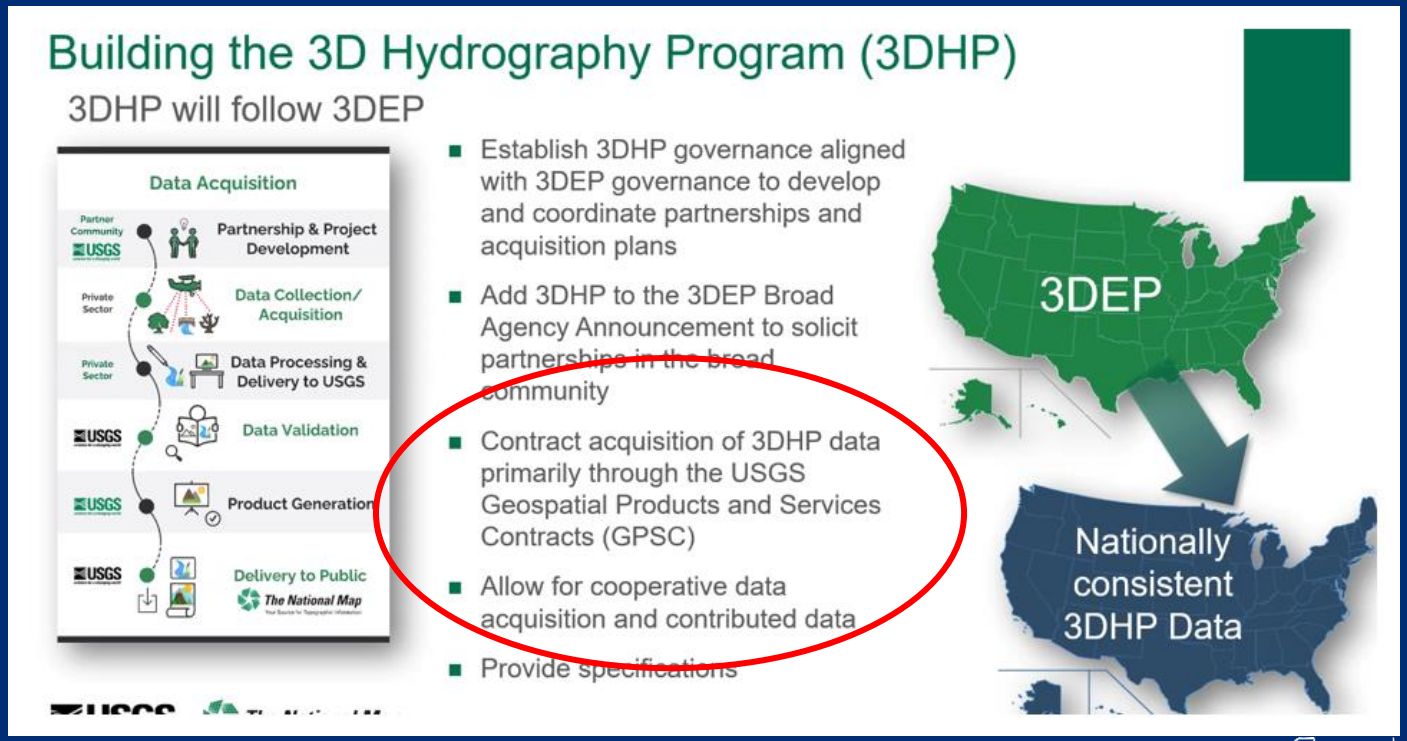

Concerns with EDH

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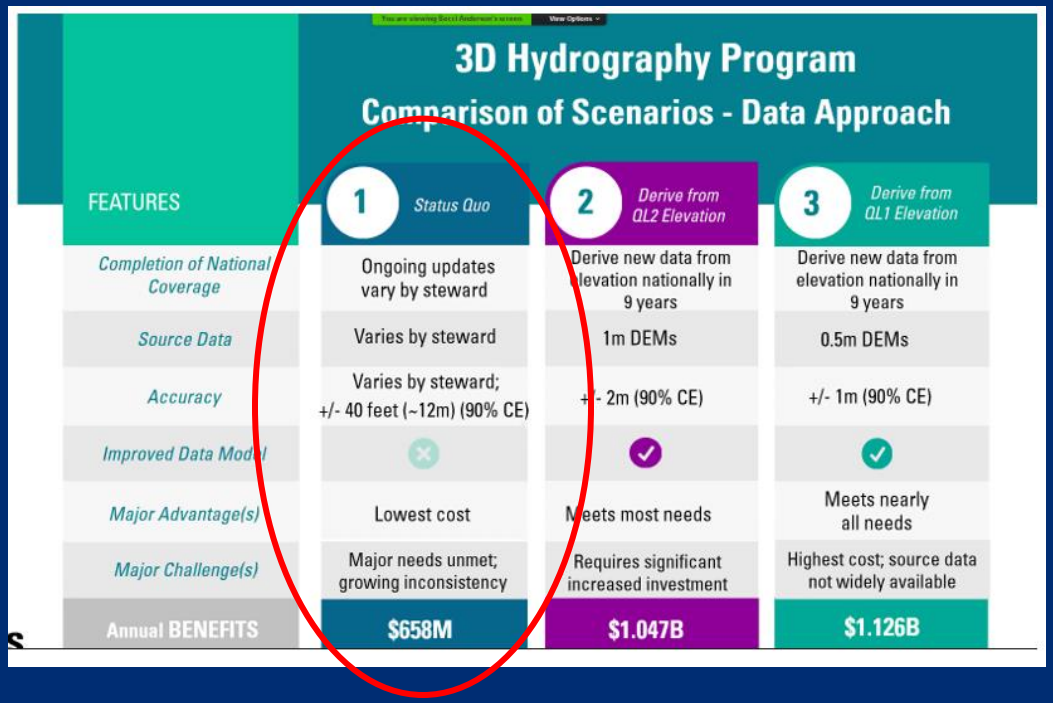
- Do incorporated breaklines need to be 3DEP breaklines?
- What happens to waterbodies that don't have breaklines?
- NHD Stewardship Role?
- **Cost/Need?**



3D Hydrography Program

Comparison of Scenarios - Data Approach

FEATURES	1 Status Quo	2 Derive from QL2 Elevation	3 Derive from QL1 Elevation
Completion of National Coverage	Ongoing updates vary by steward	Derive new data from elevation nationally in 9 years	Derive new data from elevation nationally in 9 years
Source Data	Varies by steward	1m DEMs	0.5m DEMs
Accuracy	Varies by steward; +/- 40 feet (~12m) (90% CE)	+/- 2m (90% CE)	+/- 1m (90% CE)
Improved Data Model	✗	✓	✓
Major Advantage(s)	Lowest cost	Meets most needs	Meets nearly all needs
Major Challenge(s)	Major needs unmet; growing inconsistency	Requires significant increased investment	Highest cost; source data not widely available
Annual BENEFITS	$658M	$1.047B	$1.126B

Open Discussion

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