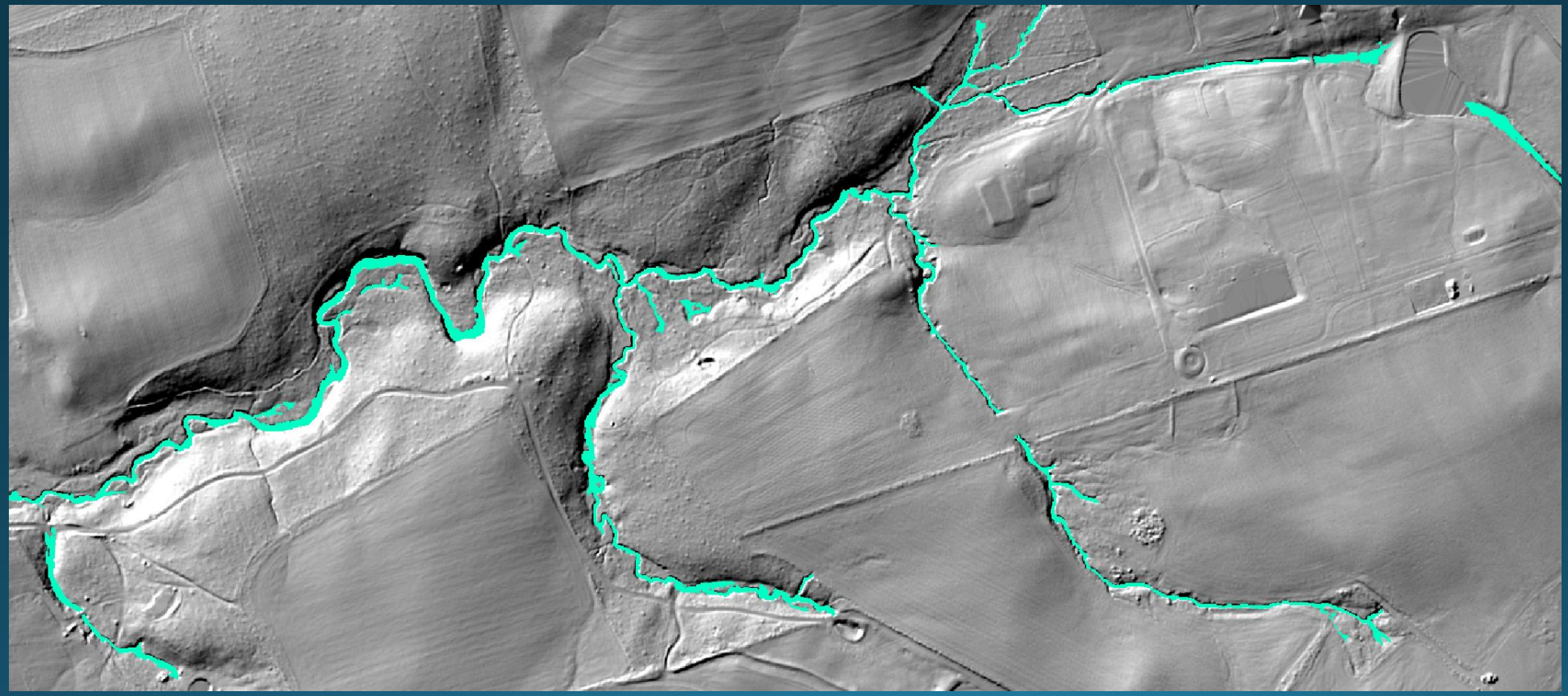
Objective 2: Hydrography

David Saavedra – March 31, 2021 LUWG meeting



Steps

Color-coded to match status map:
https://cicgis.org/portal/apps/webappviewer/index.html?id=262ce838a60048e9a0f136d904639f66

1. Prep DEMs

- Acquire lidar
- Mosaic DEMs
- Clip HUC12s within HUC8 and upload to HPCF

2. Denoise DEMs

- Denoise on HPCF

3. Automated channel extraction

- 2-D raster channels
- Channels can be discontinuous
- Does not distinguish stream from non-stream feature

4. Random Forest classification

- Classify each feature in **2-D raster** as stream or non stream
- 7 different non-stream types
- Probabilistic estimate

5. Manual Interpretation of RF

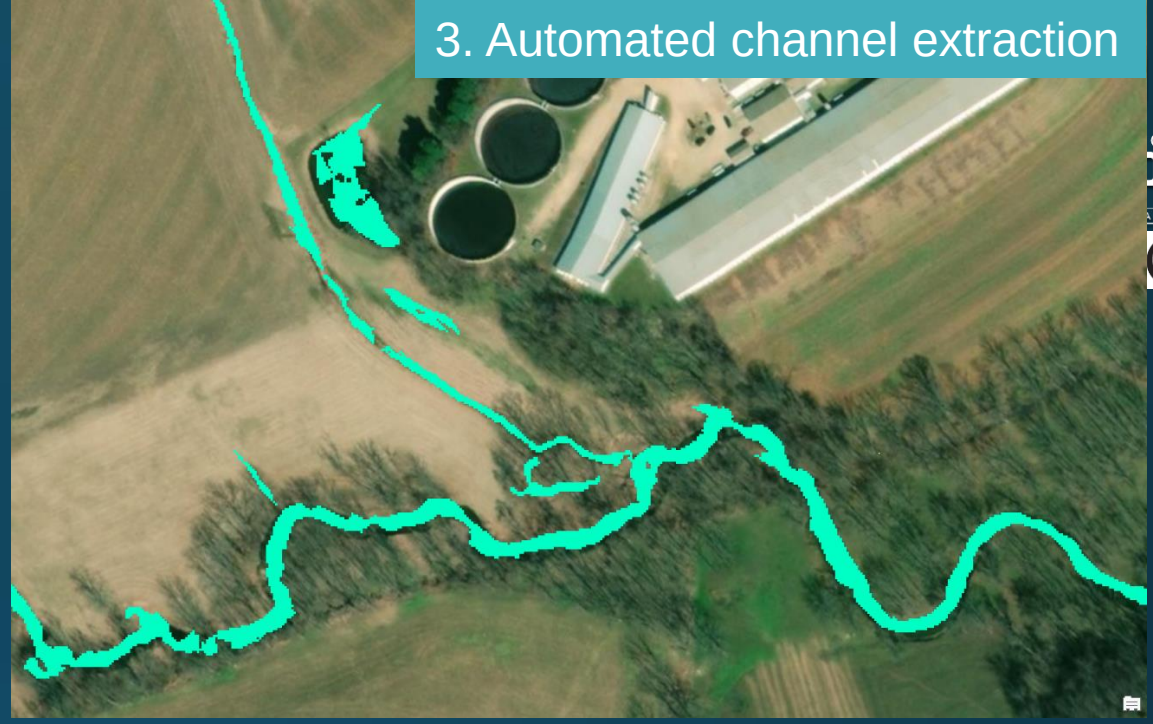
- High probability in single class = no manual review
- Similar probabilities in multiple classes = manual review

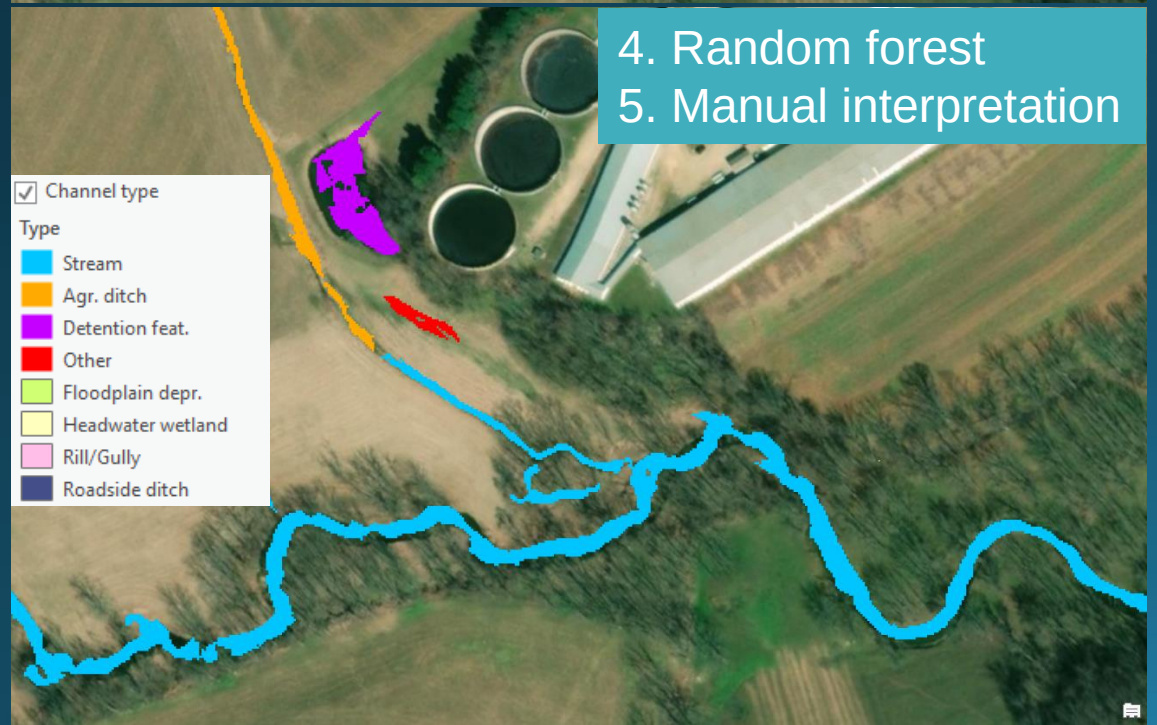
6. Polyline networking

- 1-D continuous line network
- “Connect the dots” on channel features classified as **stream**
- May require additional QAQC – vector manipulation

7. Attribution

- Reach-scale summarizations
- Final list not yet decided

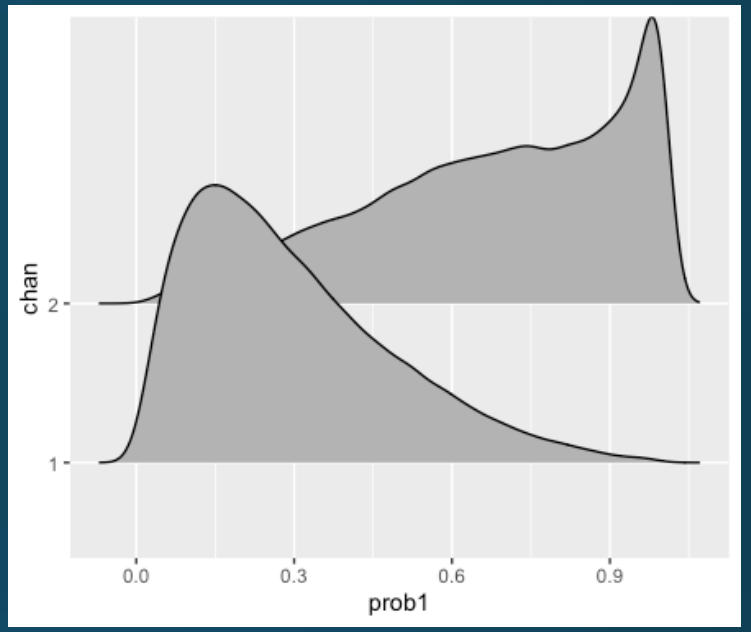

3. Automated channel extraction

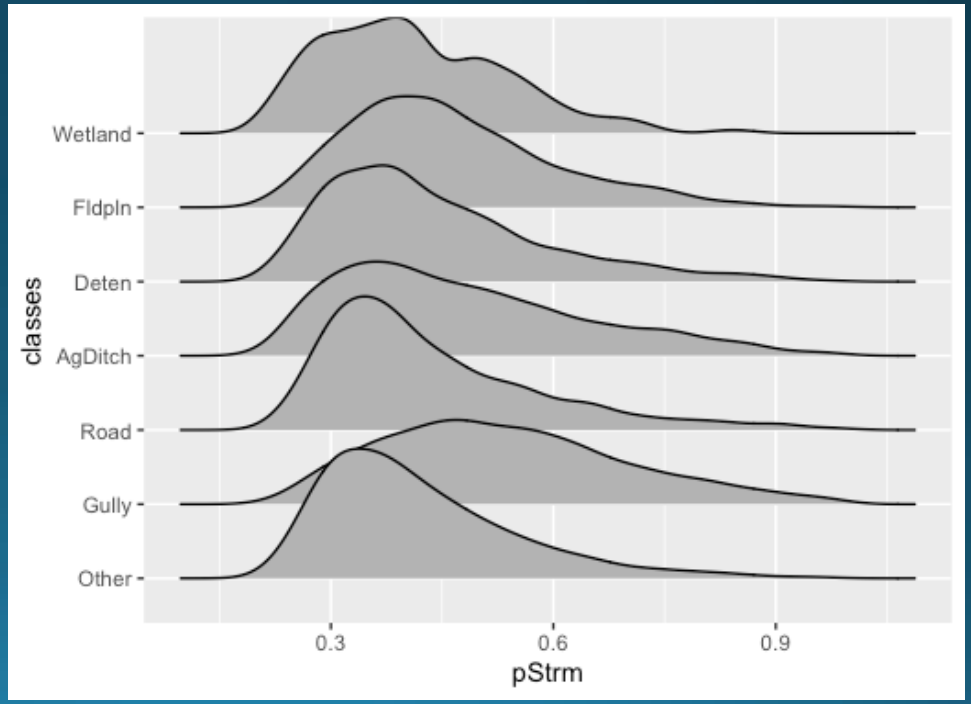

4. Random forest
5. Manual interpretation
Channel type
Type
Stream
Agr. ditch
Detention feat.
Other
Floodplain depr.
Headwater wetland
Rill/Gully
Roadside ditch


6. Polyline networking

Random Forest

- Trained with manually classified data
- Classifies each discrete channel feature using predictor variables including:
  - Geomorphon data (24 different layers)
  - Terrain characteristics (slope, curvature, elevation)
  - Land cover composition **around** channel
  - Geometric characteristics of channel (area, shape index)
- Outputs probability of feature being a stream or something else





Non-stream features

(Subject to change)

- Rill/Gully
  - Often short, relatively straight (non-meandering), erosive feature. Often surrounded by low veg in LC, sometimes surrounded by tree canopy
- Ag ditch
  - Long and linear, very uniform, surrounded by low veg in LC
- Roadside ditch
  - Long and linear, uniform, occur near roads in LC
- Floodplain depression
  - Oxbows, backwaters, secondary/remnant channels, meander scars, etc.
- Detention feature
  - Ponds, swales, basins meant to store runoff. Often found in agricultural and developed areas
- Headwater wetland
  - Small, often round or irregularly shaped wetlands near stream heads
- Other
  - Feature not easily identified as one of the above or any other common fluvial feature

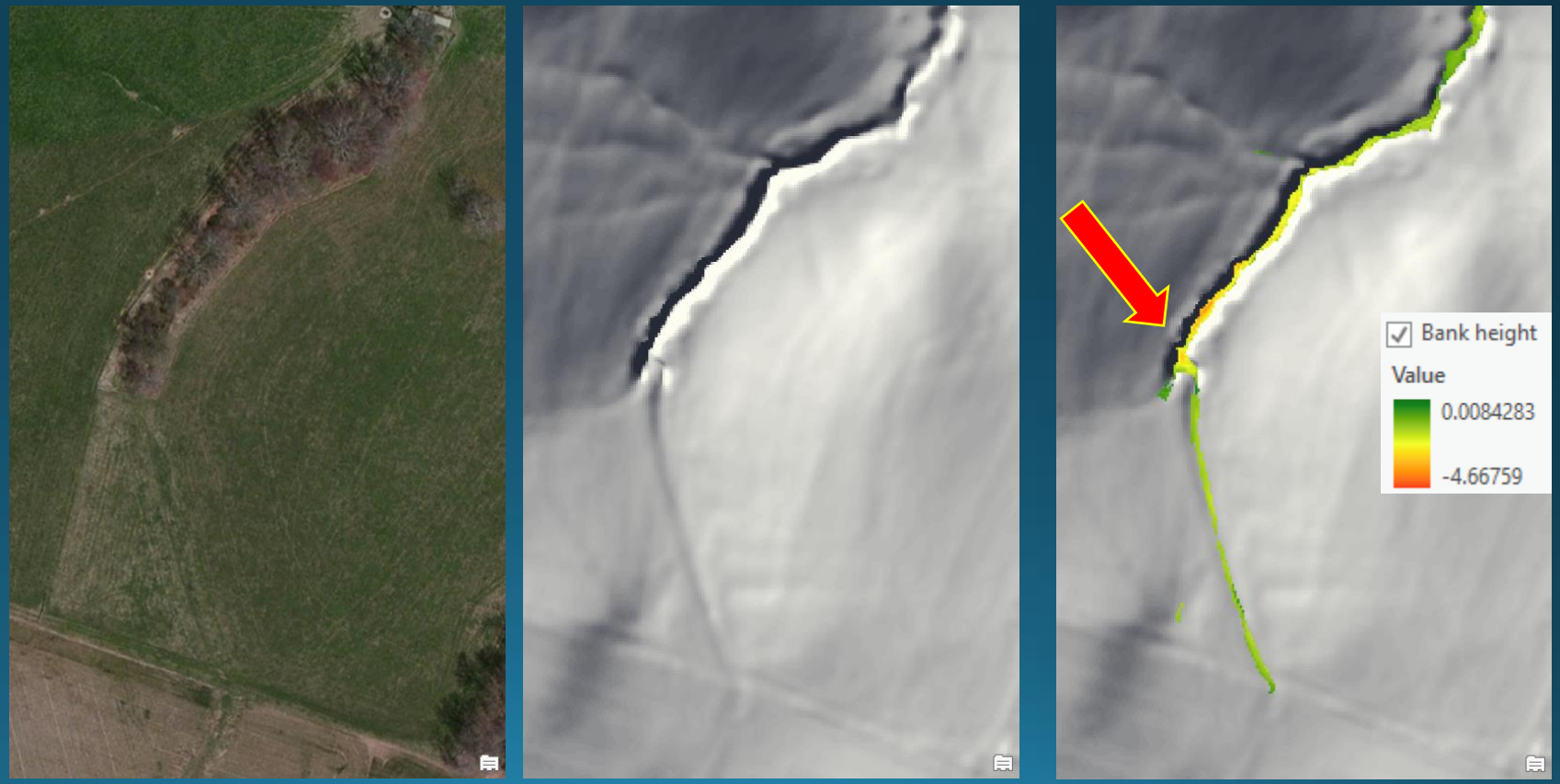
Anticipated attributes

- Potential reach-scale attributes (list not finalized yet):
  - Unique ID
  - Length
  - Width (avg/med/mean/etc. along reach)
  - Bank height (avg/med/mean/etc. along reach)
  - Stream order
  - Estimate flow permanence in coordination with USGS StreamStats
  - More TBD with relevant groups

Width and bank height

- *Spatially-explicit* layers of channel width and bank height are produced automatically
- Spatially-explicit layers can be used for various applications
- Information would be lost in reach-scale summary

Example: Headcut identification

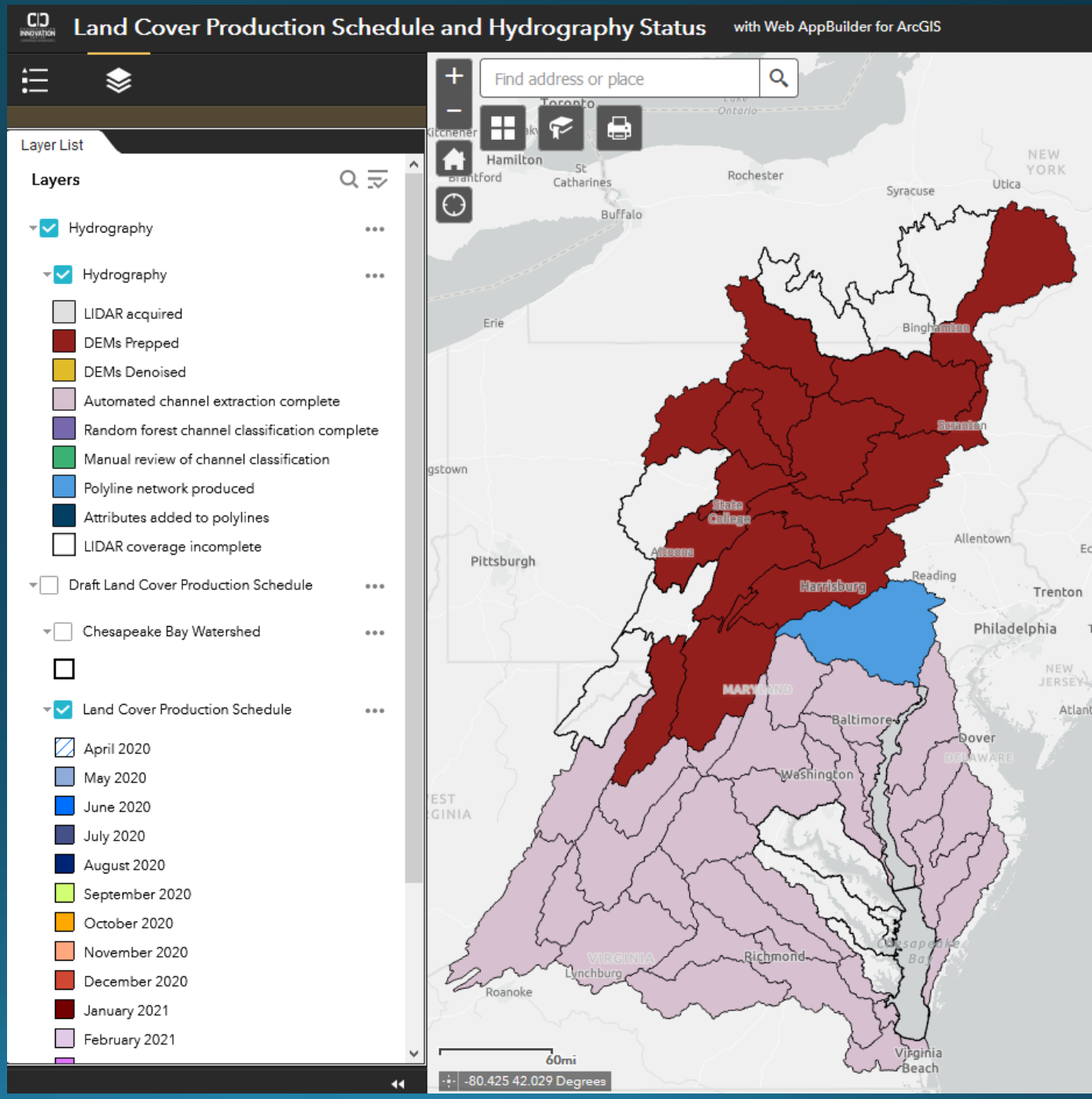


End-user data products

- 2-D channel network:
  - Raster and polygon versions
  - Classified into stream and various non-stream classes
  - Preserves discontinuities
- 1-D polyline network:
  - Akin to traditional “blue line map”
  - Connects “stream” class from 2-D channel network
  - Attributes for every channel reach
- More?
  - Channel width raster
  - Bank height raster
  - Valley bottom raster

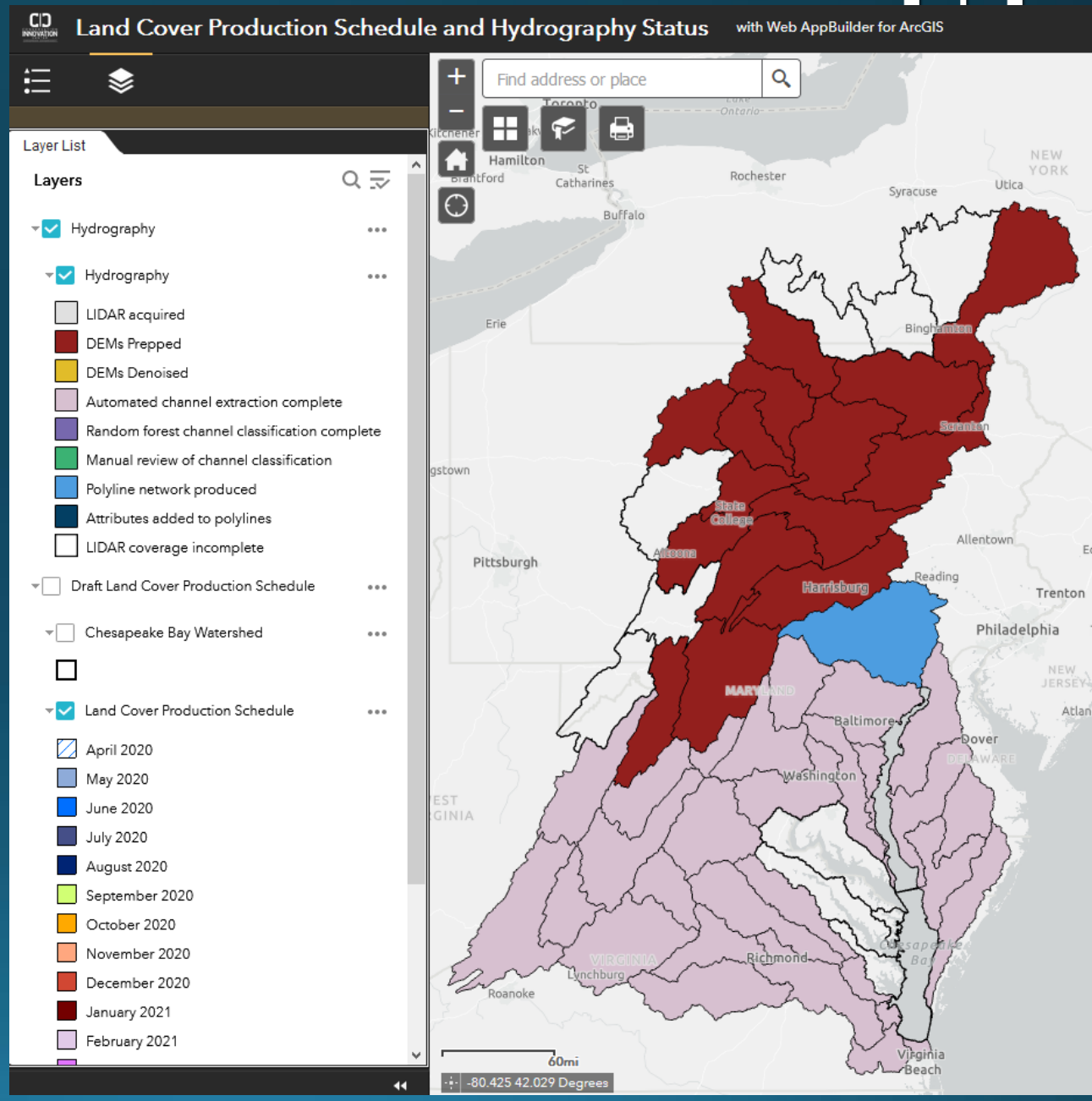
Status updates

- Web-viewer updated to better reflect more information about processing steps
- Coincides with information presented in Slide 2
- https://cicgis.org/portal/apps/webappviewer/index.html?id=262ce838a60048e9a0f136d904639f66



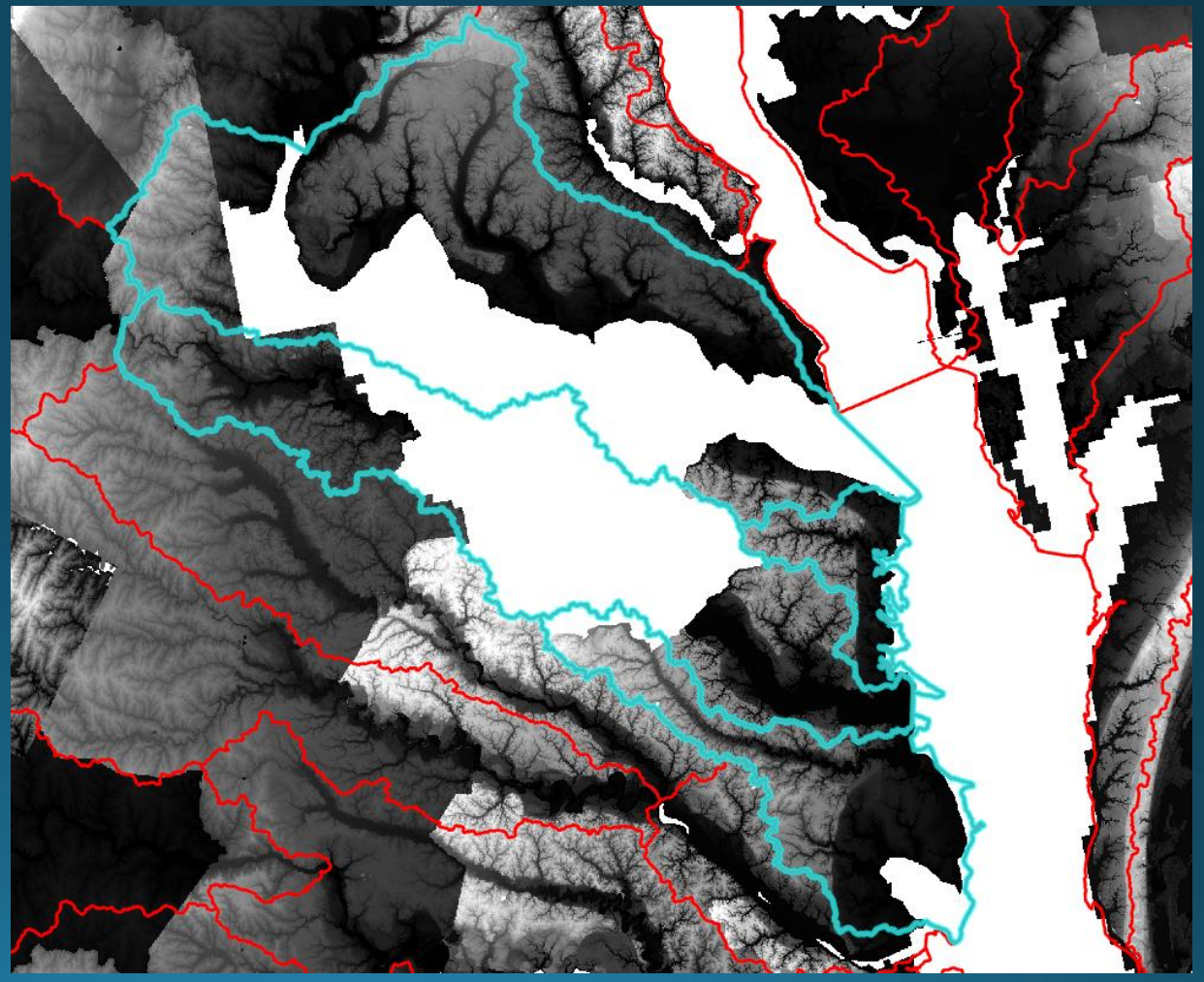
Timeline

- We aim to have the burgundy watersheds through automated channel extraction (pink) by end of June
- By that time we will have some portion of the pink watersheds through initial random forest classification (purple) and potentially through manual review (green)
- Difficult to assign timeline to random forest classification as we have not yet applied it in watersheds outside of Lower Susquehanna



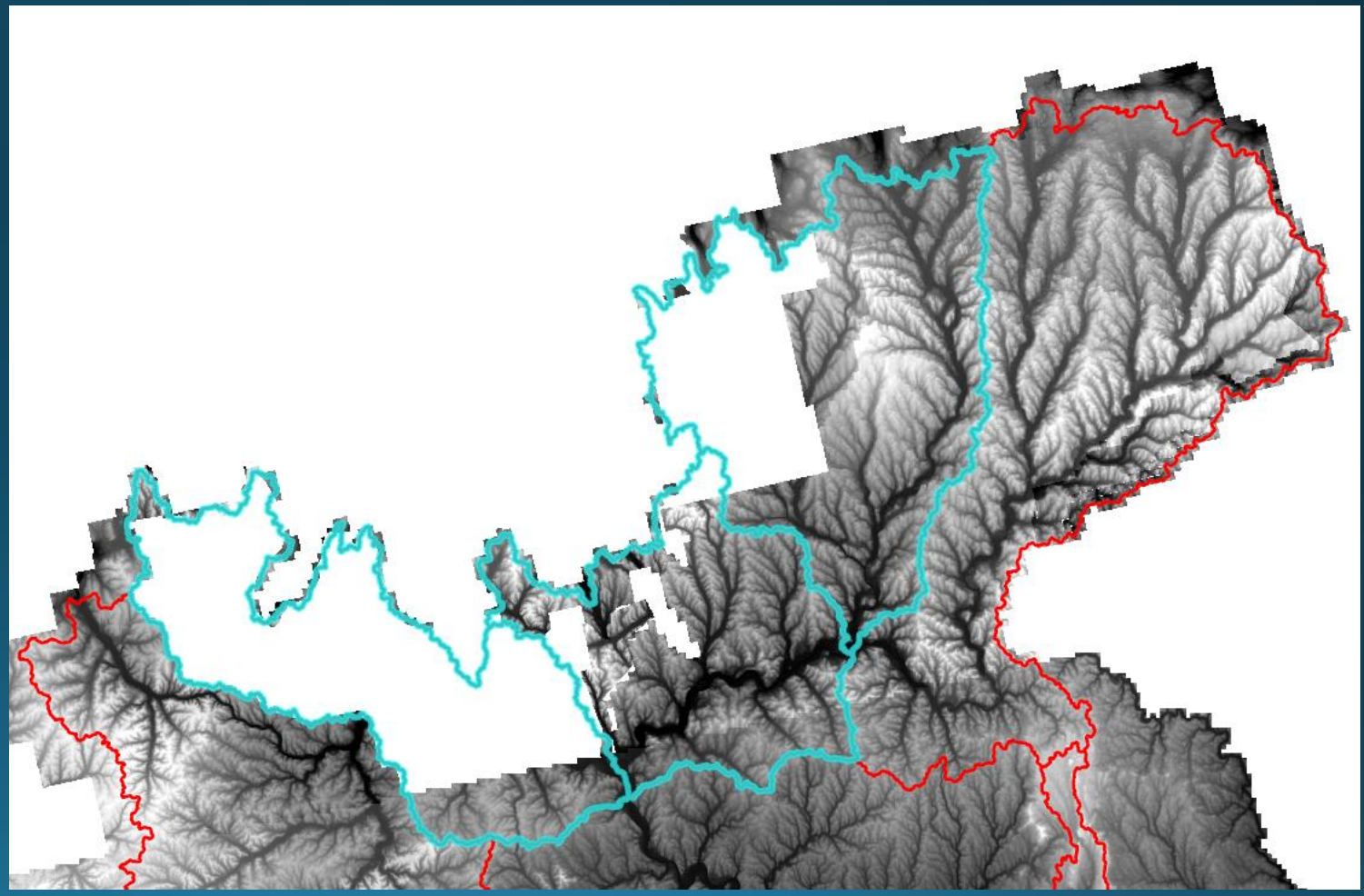
Incomplete lidar coverage

- 3 HUCs in VA
  - Awaiting "**2018 Upper Middle Neck Lidar B2**"
  - Word from USGS that this should be delivered soon ~1-2 months



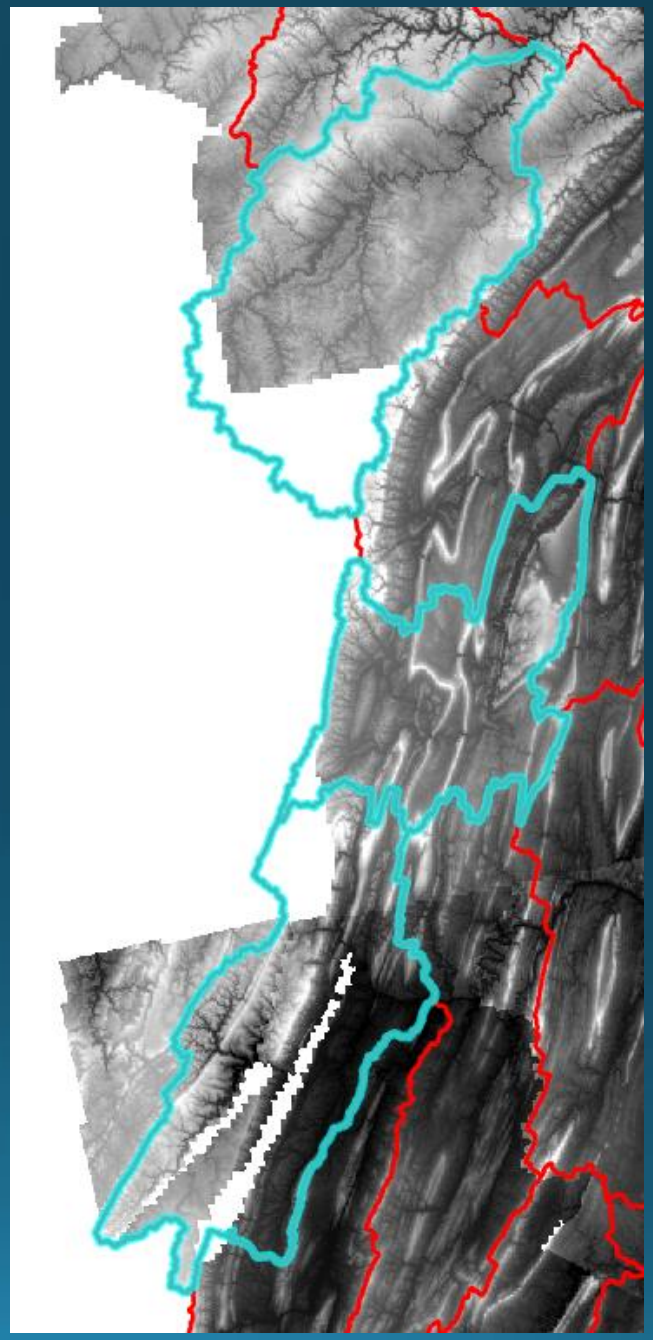
Incomplete lidar coverage

- 3 HUCs in NY
  - Awaiting "**2018 FEMA R2 Central NY Lidar**"
  - No word yet on when this will be available



Incomplete lidar coverage

- 3 HUCs in PA/MD/WV
  - Awaiting "**2019 Western PA QL2 Lidar**" and "**2018 FEMA South Central WV Lidar**"
  - No word yet on when this will be available



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