

# Statewide Mapping Advisory Committee Meeting

## Minutes

**Wednesday, April 17, 2019; 1:30 PM – 3:30 PM**

**NC Department of the Secretary of State  
4701 Atlantic Avenue, Raleigh, NC 27604**

**Welcome/Introductions** – Paul Badr, Chair, called the meeting to order and Rich Elkins, John Bridgers, Cam McNutt, Gary Thompson, Kenneth Taylor, Lucy Brady, Alice Wilson, Jane Patrick-Burns, Matthew McLamb, Tim Johnson, Ben Shelton, John Derry, David Giordano, Jeff Brown, and on the phone Sean McGuire, Marcus Bryant, Drew Pilant, Steve Averett, and Stephen Dew. Scott Davis attended as a visitor and guest presenter.

## Minutes

The committee approved the January 23, 2019 minutes as written.

## Framework+ Datasets

Mr. Badr called on members to report on opportunities, development, maintenance, and issues for Geospatial Framework-Plus datasets for North Carolina.

- *ORTHOIMAGERY*

Ben Shelton (CGIA) provided a brief status report on the Statewide Orthoimagery Program funded by the NC 911 Board.

- The 2018 Northern Piedmont and Mountains project has been closed out. The 2018 imagery is now part of the Esri imagery base map at a scale closer than 1:36,000, completing statewide coverage by NC Orthoimagery where Esri imagery services are included in applications.
- The 2019 Southern Piedmont and Mountains project has acquired all imagery including a re-flight where the initial flight captured imagery with snow cover in high elevations. Wet weather interrupted acquisition in February, but leaf-off imagery acquisition was successful and completed on April 3.
- True orthoimagery was collected for tall buildings in Asheville and Charlotte.
- Work is underway on color balancing.
- VOICE quality control will take place this summer as usual.
- Delivery is targeted for December.
- The Orthoimagery Program website includes information about potential products that local governments could order in a buy-up with a flight contractor that acquired imagery.
- On April 26, the NC 911 Board is scheduled to review and vote on a proposal submitted by CGIA for the next four-year cycle, 2020-2023. The proposal includes a new optional line item for color infrared imagery.

In discussion, the project team confirmed that 30-60 check points are placed in each county. The same configuration of counties is proposed for the next cycle.

- *CADASTRAL*

John Bridgers (Working Group for Seamless Parcels) reported that the spring update of NC Parcels is in progress. He displayed a map of counties color coded by season of latest update. 92 counties have updated their parcels since fall 2018. He described the range of county update cycles, from daily to once a year. The Working Group will make another effort to reach the county with the oldest data (Anson from 2017).

CGIA submitted a request to NC Department of Information Technology (DIT) for another one-year contract extension with the Carbon Project, Inc., for operation and maintenance of the NC Parcels Transformer.

The Working Group met on March 28 and reviewed in detail the population of standard fields from county source parcel datasets. Some fields are mostly empty and may not be needed in applications that display NC Parcels.

- *ELEVATION*

In Hope Morgan's absence, Gary Thompson reported for the Department of Public Safety, Division of Emergency Management (NCEM) on North Carolina LiDAR.

Phase 5 of 5 is complete and submitted to funding partner USGS for review. NCEM plans to release Phase 5 data within a couple of months. Preliminary data have been shared with the NC Orthoimagery Program and NCDOT.

John Lay of NCEM has developed scripts to create contours from 3.1-foot digital elevation models (DEM) in Phases 4 and 5, and contours from 5-foot DEM for Phases 1-3. The processing is intensive and may take about four months to complete statewide contours. One-foot contours are planned for Phases 4 and 5. Mr. Thompson will check the smallest contour interval supportable by 5-foot DEM. Mr. Badr suggested looking at a chart from NCDOT on DEM spacing and contour intervals. NCEM has been consulting Dave Maune of Dewberry on details of contours created from DEM. Mr. Brown confirmed that CGIA is interested in making elevation data web services discoverable and accessible via NC OneMap. There will be a disclaimer in terms of using contour data for design purposes.

- *HYDROGRAPHY*

Cam McNutt of the NC Department of Environmental Quality (DEQ) reported that in March the Environmental Management Commission (EMC) acted on comments from the GICC as recommended by SMAC regarding approval of new stream data for EMC riparian buffer rules. GICC had commented on the use of old maps and paper maps and a recommended role for GICC in approving future maps. The EMC hearing officer recommended keeping the soil surveys as reference documents, pointing to stream data on The National Map instead of USGS Topographic Quadrangles, and inserting the GICC recommended language on approval of mapping methods, metadata, and other documentation of geospatial data. The latter would mean that GICC will not be involved in decisions about environmental policy or regulations. Those changes were made in the rules.

As requested at the last SMAC meeting, Mr. McNutt called on Scott Davis of Axiom, a contractor to NCDOT, to share graphics and give an update on hydrography developed by NCDOT's Advancing Transportation through Linkages Automation and Screening (ATLAS) project.

As he reported to SMAC in January, Mr. Davis explained that contractors completed statewide hydrography data as a first-phase representation of surface waters to serve as a planning tool to meet needs of the ATLAS project. The effort combined the stream network from the Division of Water Resources, the Headwater Streams Spatial Dataset (HSSD) produced in the Division, and data that simulate streams from the Floodplain Mapping Program in the low-lying, flat areas where HSSD models are insufficient. Where available, the team used open waters identified from LiDAR data.

Based on a pilot project in a 10-digit hydrologic unit in the Neuse River Basin, the project team combined datasets successfully. However, the team found that integrating streams into the National Hydrography Dataset (NHD) requires more labor and time than producing the geometry for statewide streams as accomplished for the ATLAS project. The team created a path for stream data that can be extended to full integration with NHD to take advantage of event management functionality of NHD.

The project produced version 1.0 of a statewide stream network with 1.6 million records, including 336,000 records for streams with designated DEQ Assessment Units and 13,000 records associated with water quality data. Attribute data were joined to the geometry in a geodatabase. Attribution includes identification of streams draining to designated trout waters. Stream lines were snapped to match at 10-digit and 8-digit hydrologic unit boundaries. Mr. Davis noted that the density of streams with Assessment Units is higher in the mountains than in the Piedmont and coastal regions.

Mr. Davis explained that the team used double-line streams where available from data sources for widths of 200 feet or greater. Mr. Badr observed that the 200-foot width is quite wide for the concept. HSSD contains only single-line streams. Hydro-flattened bodies of water from LiDAR are represented by polygons integrated in the process. There are two layers – waterbodies and linear paths – to represent streams in the ATLAS data.

Mr. Davis showed comparative geometry from ATLAS, NHD and DEQ streams. There is a lot of agreement, but notable differences. For example, he displayed a portion of Yancey County where more tributaries are delineated in the ATLAS hydrography than in NHD or DEQ hydrography. He noted the complications of ditching in coastal areas, for example, in Brunswick County. This will lead to coordination with NCDOT and US Army Corps of Engineers.

Sean McGuire observed that ATLAS-generated stream segments, based on modeling with 20-foot digital elevation models, are not smoothed to visually resemble the DEQ stream segments at large map scales. Mr. Badr interprets the mapping scale of the HSSD

data to be equivalent to 1:400, certainly better than the original scale of 1:24,000 for the DEQ streams.

Mr. Johnson added that the density of streams in western North Carolina appears similar to the high-resolution stream data created in 19 western counties over 10 years ago using a different process. He asked if the 19-county “local resolution” data were used as a reference for the headwater streams. Mr. Davis explained that the previous data were not applied. The HSSD approach used field workers to identify origins of streams, perennial and intermittent, along with modeling and machine learning to delineate stream beds, or more precisely, valley bottoms. Also, the HSSD process is customized by ecoregion.

Mr. Johnson asked about a path from ATLAS hydrography to NHD hydrography. Mr. McNutt is seeking guidance from SMAC and the Hydrography Working Group. He posed three questions to SMAC:

- Should the ATLAS hydrography be limited to a planning tool for NCDOT and its contractors?
- Should DEQ host and serve the data as an authoritative statewide hydrography dataset?
- Should DEQ pursue stewardship with USGS and begin integrating the data into the NHD?

Another challenge will be to tie the streams into stormwater infrastructure for a more complete representation of a stream network. Stream origins may be in pipes now. DEQ is doing a pilot with the City of Raleigh on this topic. Another challenge is to account for tidal influences and ditches. Also, Mr. Badr suggested applying vertices from Quality Level 1 LiDAR in western areas to improve accuracy in valley bottoms.

Mr. McNutt added that the Hydrography Working Group plans to propose a way to host the data in the DEQ and make it available to the public.

In discussion, Mr. McNutt advised communicating to the public the extent of water across the state. He recalled that benefits to data users were described years ago for the stream mapping project in the 19 counties.

For public access, NCDOT will decide when to release the data. Version 1.1 is in progress to improve attribution. How data are distributed is to be determined. DEQ attributes are attached and will have value as a single dataset for DEQ purposes. Mr. Davis, as a consultant to NCDOT, sees value in waiting until release of version 2.0 a year from now when improvements and updates to geometry are completed. Geometry along the coast will be based on newer LiDAR Quality Level 2 data (2014). The data in version 2.0 will better serve consumers. Copies can be available if useful. Mr. McNutt is leaning toward version 2.0 for public release to have a better representation of stream networks in urban areas.

The Hydrography Working Group will need to review the current data and support movement to version 2.0. Mr. McNutt will have an update for SMAC in July, describe

benefits to state and local governments (e.g., NCDOT in planning, local government planning, NCDEQ water quality regulation) and describe practical applications.

SMAC will further consider the questions posed by Mr. McNutt, including the NHD path. The Working Group will learn more about stewardship requirements with NHD, consider business needs and level of effort to edit the data, and how to govern editing.

- *GEODETIC CONTROL*

Gary Thompson reported the 2022 Reference Frame will be dependent on models, including gravity models. NC Geodetic Survey is collecting gravity data in the mountains in support of the National Geodetic Survey and taking Global Navigation Satellite System (GNSS) observations on benchmarks. Also, NC Geodetic Survey is installing its second solar-powered Continuously Operating Reference System (CORS) on the coast at Rodanthe. The other is at Oregon Inlet. There have been no latency issues.

- *GOVERNMENTAL UNITS*

Regarding county boundaries, Gary Thompson reported that NC Geodetic Survey is working on 12 county boundary projects, including Harnett-Chatham. Concerning the state boundary, discussions continue with Virginia. As in past years, Georgia's legislature passed a resolution to form a boundary commission to move the NC-Georgia-Tennessee boundary to the 35<sup>th</sup> parallel, or about one mile northward. This is unlikely to happen.

There was no report on municipal boundary data from NCDOT.

- *TRANSPORTATION*

There was no report on transportation data from NCDOT

- *ADDRESSES*

David Giordano (CGIA) had no new information to report. He expects information to come out of the Next Generation 911 project.

## **Working Groups**

Working groups reported on activity in the last quarter.

### *METADATA COMMITTEE*

Lucy Brady of NCDOT reported for Sarah Wray, chair of the Metadata Committee. The new guide for editing metadata using ArcGIS software has been released and is accessible through [NC OneMap](#). It references the NC State and Local Government Metadata Profile. Stephen Dew tested and commented on the guide and is applying it in Guilford County. Lucy Grady did a presentation on the guide at the NC GIS Conference. Dr. Timothy Mulrooney also did a conference presentation on metadata tools.

Ms. Brady will consult with Jeff Brown on communicating the availability of the new guide. He added that this replaces a version from two years ago, and the document is much improved. Also, Cam McNutt will send CGIA a workbook on metadata in ArcGIS Online from NC DEQ. Ms. Brady added that metadata editing is similar in ArcGIS Pro,

and a version of the guide could clarify where the tools are located as more users adopt ArcGIS Pro.

#### *ORTHOIMAGERY AND ELEVATION*

Gary Thompson reported the working group met April 15 and received updates from the Statewide Orthoimagery Program and the National Agriculture Imagery Program (NAIP). The 2018 collection spanned many months and may have some leaf-off conditions instead of the planned leaf-on conditions.

There was an update on elevation data as described above. The group discussed sources of imagery in response to Hurricane Florence. NOAA oblique imagery was the most timely and useful overall. NOAA's orthorectification occurs on the plane to enable publication in less than 24 hours. Quality is high. The NC Emergency Operations Center can request imagery for priority locations. Some of the imagery collected by federal agencies could not be shared readily. In answer to a question from Mr. Johnson, there is no mechanism in place for private companies to get feedback about imagery acquired on speculation. Mr. Thompson observed there could be research value to such imagery and/or LiDAR collected by private flights.

NC DOT and Geodetic Survey have collaborated on a test range for unmanned aircraft systems at Butner, a vacant facility of the Corrections Division. There is a good baseline of information with which to test data acquisition.

#### *NC BOARD ON GEOGRAPHIC NAMES*

Tim Johnson, interim chair, reported that the Board is accumulating naming requests to evaluate at the Board's next meeting on May 21. He was pleased to report that GICC Chair Alex Rankin has appointed Cam McNutt to serve as chair of the Board for two years starting July 1. Mr. McNutt observed that naming unnamed tributaries is valuable in stream restoration work.

#### *2022 REFERENCE FRAME WORKING GROUP*

Gary Thompson, chair, reported that the datum change is going to affect a large spectrum of geospatial data users. He talked with the National Geodetic Survey (NGS) about state plane coordinates and he plans to consult with a small State Geodetic Survey technical advisory group, NCDOT, and the working group, in that order. The datum change is small, but the state plane coordinate system numeric change will be large. False easting will change from 609,000 meters to 1,000 meters, and false northing will change from 0 meters to 200,000 meters. There is a simple translation for coordinates used to build PIN numbers for property mappers, developed by NGS, that will enable use of NAD 1983 (2011) PIN numbers if desired. The translation can be shared with software vendors.

The current tiling system used by the NC Orthoimagery Program and NC LiDAR will remain the same with the same tile numbering. The difference with the 2022 Reference Frame will be that coordinates of the corner of tiles will not be even numbers as before. Also, projects in progress don't need to transition in 2022, as both systems will be maintained for some time. The largest impact will be on elevation, especially at the coast.

#### *WORKING GROUP FOR LAND COVER*

Kenneth Taylor, chair, reported that he displayed a poster on business needs for land cover at the NC GIS Conference, and he increased the sample size of the land cover survey by 10 percent by engaging GIS professionals at the poster session. The survey results still reflect two camps of land cover users and their business needs. One camp requires a high level of resolution and land cover detail, driven by needs to delineate impervious surfaces for local government purposes including stormwater management and fair fees based on impervious area. A second camp has business needs that could be supported with less resolution over larger geographic extents for analysis and research and a range of purposes. He noted that higher resolution source imagery (smaller cells) can be resampled to lower resolution (larger cells), but lower resolution imagery cannot be resampled to higher resolution data.

SMAC discussed local government stormwater management, fees, and water quality concerns. If land cover cells are too large, estimates of impervious surface area have large margins of error. If land cover cells are very small, the cost of classifying land cover increases, and the affordable geographic extent may decrease. Modeling is one of the business needs that suffers if cells are too large.

Dr. Taylor asked the SMAC for direction for next steps. Which of the two camps of users take priority? What source(s) of imagery are suitable. What classes would meet most business needs? What geographic extent? Answers to these questions have implications for costs of land cover data. The working group has technical members who could identify products to meet business needs.

Mr. Johnson referred to the working group charter for context. Mr. Brown commented that the working group has analyzed business needs for land cover data as directed by the charter. The report on business needs, reviewed previously by SMAC, has been updated to integrate the additional survey responses and is considered complete. The working group has met that responsibility.

Discussion continued, with observations that the largest municipalities and counties are likely to have internal capability and resources to produce their own land cover data, including impervious surfaces, from high resolution imagery sources for their respective jurisdictions in support of planning, public works, and other purposes. Land cover data for larger geographic extents at less than the highest resolution is likely to add more value overall for state and federal agencies and for small towns that lack the resources to create their own data. Ms. Wilson added that land cover data helps analyze impacts of run-off downstream from large municipalities. Erosion is another concern explained by Dr. Taylor related to run-off.

SMAC concluded that the Working Group for Land Cover should continue and focus on defining a land cover product that would meet priority business needs, researching available imagery sources and methods, evaluating costs, and determining if funding is available to produce land cover data. The group will distribute the finalized report on

business needs and report progress on a product recommendation to SMAC in July.

*WORKING GROUP FOR MUNICIPAL BOUNDARIES*

John Bridgers, co-chair, reported that the working group met last week. Regarding boundary changes through municipal annexations, he described a pilot data flow in which selected counties forwarded annexation data to the Secretary of State as the counties received documents from municipalities within the respective counties. Counties need annexation data and updated municipal boundaries for many county applications whether the data are shared with the State or not. He concluded that the data flow is practical and worked well. Although it involved additional steps by county GIS data managers, they found that they saved time later when preparing data for a consolidated submission to the annual Boundary and Annexation Survey (BAS) early in 2019.

Mr. Bridgers explained that he is meeting with municipal clerks to urge annexation submissions, including “accurate maps” as called for in statutes. He cautioned against using maps from GIS for submissions. Mr. Bridgers is presenting to the North Carolina Association of Municipal Clerks in its regional academies this spring, emphasizing the value of digital map submissions for annexations and the Powell Bill Program. The UNC School of Government is involved in the academies as well.

A related data flow is the creation and submission of source maps, plats, or surveys by municipalities and/or their service providers. NC Geodetic Survey proposes to work with the NC Board of Examiners for Engineers and Surveyors (NCBEES) concerning minimum standards for certification of plats and promotion of transfer of digital Computer Aided Design (CAD) files to local governments to become a valuable part of the data flows for annexations and annual updates to the Powell Bill Program. Gary Thompson and John Bridgers will have opportunities to promote ways to improve source data during Land Records Management Program workshops this spring.

Regarding statewide boundaries, a subset of the working group evaluated boundary data from local governments, the Powell Bill Program, and the Census Bureau (BAS). NCDIT-Transportation and CGIA will collaborate on developing a baseline dataset from the best available sources, starting with a set of pilot jurisdictions. The idea is to have a statewide baseline to which changes generated from the data flow of annexations can be applied. A collaboration of state agencies is expected to establish a data maintenance process for regular updates to statewide municipal boundaries published through NC OneMap.

The Working Group recommends guidance from the Secretary of State, promotion of preferred practices, communication, and outreach to achieve a more efficient business process in support of improvements in the geographic data representing boundaries. The Working Group has identified rules and statutes that may need to be modified in 2021 if the guidance/promotion/communication approach needs reinforcement. By that time, the business case for strengthening and clarifying mandates will be easier to quantify and describe, based on experience in the coming months.



Mr. Johnson asked if the working group is ready to make a progress report to the GICC on May 8. It will have been a year since Haley Haynes presented the issue on behalf of the Secretary of State and the GICC formed the working group. As one of five GICC priorities, there will be interest and a lot of work has gone into the findings to date. Mr. Bridgers and Mr. Badr confirmed readiness to report.

## **Other Business**

### *PUBLIC ACCESS TO UTILITY DATA*

Jeff Brown reported on behalf of Hope Morgan based on her notes. While the Local Government Committee has gathered information about data access practice in municipal and county public water and sewer and electric power operations, Ms. Morgan is looking into practices of private utility companies regulated by the State of North Carolina. The immediate answer is typically “no” to data sharing. She added that written data distribution policies are not evident. However, in emergency situations, utilities take a “need to know” approach to sharing geospatial data with the US Department of Homeland Security.

She understands that many utilities are willing to have a conversation about when data are needed for emergency management during an event. She will continue to reach out to utility companies to gather more information. Non-disclosure agreements may be required for some data sharing. Ms. Morgan will also look into issues related to digging and NC 811 services.

## **Regular Status Updates**

### *NATIONAL GEOSPATIAL PROGRAMS OFFICE*

Jeff Brown reported for Silvia Terziotti based on her notes. She reports that the 3D Nation Elevation and Bathymetry Requirements study is nearing completion. After follow-up with two more survey respondents, the State Champion (Gary Thompson), a NOAA representative and Ms. Terziotti will draft a State Summary of elevation needs in North Carolina that can be shared with SMAC in July. She reported good responses to the survey and added that the summary will highlight diverse needs and requirements.

Supplemental funds related to Hurricane Michael were requested to fly the coastal counties with Geiger mode lidar (QL1), but the funds have not been approved by Congress yet. The amount initially approved was a reduced amount. A 25 percent match may be necessary from the State, or the area covered will be reduced.

### *NC ONEMAP*

David Giordano did not have a report yet on developments for NC OneMap.

**Adjourn** --The meeting adjourned at 3:34 PM.

## **2019 SMAC Meeting Dates**

Wednesdays, July 17, and October 16. Time: 1:30 PM

Location: Secretary of State’s offices on 4701 Atlantic Avenue