

# Statewide Mapping Advisory Committee Meeting

## Minutes

**Wednesday, April 18, 2018; 1:30 PM – 3:30 PM**

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

**Welcome/Introductions** – Paul Badr was introduced as the new Chair of SMAC. He is President of the Geospatial Division of GPI in Charlotte, and he began serving on the GICC this year. He has been in the geospatial business for about 30 years and is familiar with statewide geospatial data programs. He is a certified photogrammetrist and professional land surveyor. He is excited to serve as chair.

Mr. Badr called the meeting to order and welcomed Gary Thompson, Alice Wilson, Hope Morgan, John Bridgers, Cam McNutt, John Farley, Sean McGuire, Sarah Wray, Tim Johnson, Ben Shelton, David Giordano, Jeff Brown, and on the phone Camille Tyndall Watson, Pam Carver, Marcus Bryant, and Silvia Terziotti. Nik Zisk and Zsolt Nagy joined the meeting as guests.

## Minutes

The committee approved the January 24, 2018 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 Northern Piedmont and Mountains (2018) phase is in progress. Imagery acquisition was completed on April 5 for leaf-off conditions. The schedule was challenged by the weather. February was unseasonably warm and March was unusually cloudy, rainy, and/or windy. Quality control and radiometry review are underway. Imagery samples by the four vendors are compared in overlapping and adjacent locations. The focus is on clarity and color of neutral-color objects such as pavement. The project team's orthoimagery generation workshop with the vendors will take place April 19. There will be in-person review of the samples and adjustments for consistency.

He explained that “true” orthoimagery will be applied for tall buildings in Greensboro and Winston-Salem to make the ground adjacent to buildings visible. Flight overlap requirements in urban centers have been in place previously, but this requires additional processing time to eliminate building “lean” for tall buildings.

He described local projects that are piggy-backing on the state contract to acquire 3-inch

ground resolution imagery in High Point, Mocksville, Cooleemee, Bermuda Run, and Boone. There are plans to acquire planimetrics/building footprints in three counties: Forsyth, Davie, and Davidson. The 3-inch imagery acquisition is by contract between the jurisdiction and the same vendor flying in that area. The project team assists a jurisdiction in quality control. The flight contractors acquire 6-inch imagery in the same locations. The project team selects the best available quality from the 3-inch and 6-inch versions in production of an imagery mosaic of a county for the convenience of Public Safety Answering Points. The contractors use digital elevation models from the latest LiDAR data from NC Emergency Management.

A preliminary web map service for each study area is targeted for June 8. Visual quality control with local government using the VOICE online system is scheduled for July 30 through September 21.

On March 23, the NC 911 Board approved the proposal for the 21-county Southern Piedmont and Mountains (2019). Fifty percent of the region is considered mountainous which will affect flight planning and acquisition.

- *CADASTRAL*

John Bridgers and Pam Carver (Working Group for Seamless Parcels) reported that the spring update is in progress, with 40 counties completed in the NC Parcels Transformer. He explained that the program is making progress on populating fields that describe the land use of each property (e.g., commercial) and building use (e.g., warehouse). But this is a challenge given the wide variations in land use codes and descriptions in county tax systems. Data entry is not consistent, too. There are consumers who benefit from land use information; the project team most recently heard from multiple transportation planners, conservation specialists and university researchers.

Many of the standard fields for NC Parcels are well populated by counties. He displayed a chart showing the percent of counties that populate selected fields. Counties do best in matching to standard fields for GIS Acres, Deed Book and Page, Site Address, Mailing Address, Owner Name, and Assessed Values. The most concerning shortcomings are Parcel Use Descriptions, Sale Date and Present Use Value.

On the question of incentives for county data producers, Cam McNutt explained an incentive for counties to achieve consistency in the parcel use descriptions and other fields. He is assisting on a request from the Fiscal Research Division of the General Assembly to compile information all or part of 47 counties for a study. He used the statewide parcel data and found several counties with missing values in fields needed to answer questions and/or fields with inconsistent values or values that appeared to be in error. He has had to contact county tax offices for more information about the data, taking extra time for local governments. The statewide parcel dataset is a critical component of the study and quality of attributes and geometry make a difference. In this case, the geometry of parcels is critical where parcels intersect water. Some counties include 100 percent of the county area (including rights-of-way) and some do not.

Estimates are affected. He also found some missing values for land value and inconsistent information about tax exempt properties.

In response to an observation by Mr. Badr that standards are becoming increasingly important as data are integrated and easily accessed, Mr. Bridgers and Ms. Carver confirmed that NC has a state standard for mapping property, but not a standard for what is contained in a computer assisted mass appraisal system (CAMA). Counties report data to the NC Department of Revenue, but appraisal systems and content vary by county. There are a lot of differences in how appraisal is done across the state. Ms. Carver added that the NC Association of County Commissioners owns and offers a NC Property Tax System (NCPTS) that conforms to a standard, meets statutory requirements, and is available to counties for a fee. This has not been widely adopted. Farragut is the vendor providing software and technical support. David Baker is the contact for the Association and serves on the GICC. Mr. Johnson will follow up with Mr. Baker on this topic.

Mr. Bridgers described an approach that would result in a dozen CAMA vendors adopting a standard for data content. Hope Morgan observed that parcel standards have been discussed for years, and cautioned that local government business processes are tied to parcel data and standards would best be initiated by the Local Government Committee and local data managers considering the local impact. Alice Wilson suggested minimum requirements for the most valuable fields to limit the changes but to support multi-county analysis. Cadastral standards are developed by the Secretary of State, but not the tax appraisal data. Mr. Johnson added it is the GICC's purview to identify needs for standards and make recommendations.

Mr. Brown added for clarification that the statewide NC Parcels dataset has a standard set of fields modeled on the core parcel content standard of the Federal Geographic Data Committee, and the GICC adopted the standard in 2016 as a revision to the 2005 state standard. NC Parcels translates county source parcel data to the standard fields. The shortcoming is that counties may not publish a field to match a standard field or the values in a matching field may be missing or flawed in ways that reduce quality for analysis and mapping. Mr. Bridgers added that counties may lack incentive to maintain details in a CAMA system for properties that are tax exempt.

- *ELEVATION*

Hope Morgan reported for the Department of Public Safety on North Carolina LiDAR. For Phase 4 LiDAR collected with a Geiger Mode sensor, all 20 counties have been delivered by contractors. Of those, 16 counties have been sent to funding partner US Geological Survey (USGS) for review. USGS is finding minor issues (e.g., a point on top of a building that caused the digital elevation model to peak) in a handful of tiles. Metadata issues are being resolved. She expects all documentation to be completed by the end of May. Mr. Badr confirmed the value of the LiDAR data in private work.

Phase 5 data require more disk storage space because of new LAS header information requirements. Quality control is challenging with the larger file size. Tiling for phases 4

and 5 is 2,500 by 2,500 feet; that rolls up to match the 5,000 by 5,000 state tiling for orthoimagery.

Eight counties have been delivered in Phase 5 for quality review. Automated ground data are being provided for the 2018 orthoimagery project, and NC DOT will get automated ground data for all of Phase 5 for transportation project work. USGS is not a partner on Phase 5 and will get a copy but not review the data.

Also, Mr. Farley added that NCDOT plans to support reprocessing Phases 4 and 5 with more points per square meter and producing derivative products. Acquiring LiDAR with Geiger mode in the region covered by phases 1-3 is under consideration as well.

- *HYDROGRAPHY*

Cam McNutt of the NC Department of Environmental Quality (DEQ) reported completion of updates to hydrography data to include changes in stream segmentation going back to 2008, as far as possible using digital data. It is the display dataset for named streams and streams where there are water permits and monitoring data. It is good for displaying water classifications. This will go into a geodatabase depending on discussions about the National Hydrography Dataset (NHD) and Headwater Streams Spatial Dataset (HSSD) and data maintenance. Also, DEQ digitized Randleman Lake and Crabtree Lake to add those to the statewide hydrography dataset. He invited SMAC members to suggest other lakes that are missing from hydrography and could be added. DEQ has access to and uses stream breaklines from LiDAR data as needed. LiDAR breaklines are an element in an eventual improved hydrography dataset.

- *GEODETIC CONTROL*

Gary Thompson described preparation for the 2022 Reference Frame including data collection in North Carolina. The working group will schedule a meeting soon. State Plane Coordinates will be redefined which will have an impact on GIS. The working group will review the plan and make a recommendation. NC Geodetic Survey is also meeting with NCDOT and SCDOT. Projects across state lines are a concern.

There will be no change in projections types or extent of the single zone in NC. The model for state plane coordinates will change from a 2-parallel Lambert Conformal Conic system to a 1-parallel system. This will result in less linear distortion. The parallel will be 35 degrees 15 minutes, even, instead of 15 minutes and 3 seconds. That will shift state plane coordinates by as much as 300 feet ground distance. This would impact values of parcel identification numbers constructed from digits of state plane coordinates.

Models require gravity data. NC is partnering with National Geodetic Survey to collect gravity data, as described at the last SMAC meeting. South Carolina and Virginia are cooperating. Transformation models are under development.

On the topic of autonomous vehicles and navigation, the NC Turnpike Authority will allow testing on the Triangle Expressway as a first step. NCDOT is planning for

autonomous vehicles, also. Looking ahead, Florida has examples of advanced applications.

- *GOVERNMENTAL UNITS*

Regarding county boundaries, Gary Thompson reported that plats have been recorded for county boundary surveys for all counties along the South Carolina border. Geographic data are available from [watson.ross@ncdps.gov](mailto:watson.ross@ncdps.gov). A video on the NC-SC boundary is now available [online](#). Work is underway on the NC-VA boundary as the states collaborate. Also, Georgia has resolved to request a significant border change with Tennessee and North Carolina. John Bridges added that about 2,000 parcels in Cherokee County would be affected by Georgia's proposal.

For NC county boundary projects, seven reports have been submitted to counties, plats have been recorded for Mitchell-Yancey and Greene-Lenoir projects, and six other projects are in progress.

NCDOT confirmed that it is applying the reestablished boundary in collaboration with South Carolina to clarify road maintenance. Ms. Morgan added that she is re-clipping some data for floodplain mapping along the border. Mr. Thompson added that NC Geodetic Survey has a goal of publishing a web service for the state boundary and county boundaries, to be discoverable through NC OneMap.

Regarding municipal boundaries, Mr. Farley reported municipal boundaries are a priority dataset of Council Chair Alex Rankin. A goal is to establish one local government submission for a collaborative process between the Department of the Secretary of State, NCDOT, and the State Demographer. Changes in legislation may be required.

- *TRANSPORTATION*

John Farley reported ongoing maintenance and quarterly publication of road characteristics and routes and map services. The next update is scheduled for May 14. He sees the next focus as collaborating with Next Generation 911 geospatial data acquisition and integration to avoid duplication of effort on road centerlines and other data.

Hope Morgan added that NC Emergency Management has system road edges generated by contractors in classifying roads in LiDAR data for phases 4 and 5. Mr. Farley sees that as useful for research purposes to improve the quality of road centerlines. NCDOT has a group maintaining road centerlines and orthoimagery is a reference source for improving and updating all centerlines. Mr. Badr observed that data can be derived from LiDAR in the process of quality control and hydro-enforcement; higher density, e.g., 30 points per meter, may make those derivative products practical. This is a research topic for Emergency Management and NCDOT.

Ms. Wilson brought up the topic of trails, greenways and bicycle paths. Mr. Farley's understanding is that among non-road systems, attention to linear referencing and rail lines are getting attention first.

- *ADDRESSES*

David Giordano (CGIA) reported the *AddressNC* project is on hold pending a hiring process that is in progress for a project manager.

## **Working Groups**

Working groups reported on activity in the last quarter.

### *WORKING GROUP FOR ROADS AND TRANSPORTATION*

Mr. Farley called on Nik Zisk of NCDOT to report for the working group. An updated data content standard for road centerlines was distributed to SMAC on April 12. The group used the National Emergency Number Association (NENA) standard for centerlines as a resource and accounted for current technology and terminology in updates to the wording. Mr. Johnson explained that SMAC may formerly approve this update and consider if the changes are significant, which would require a 30-day review period for the Council, or minor, which would mean a recommendation that that Council approve the update without a 30-day review period. Mr. Zisk and Mr. Farley suggested changes warrant a 30-day review period for the Council. A motion to approve the standard update and to submit it to the Council for approval at the August meeting by Tim Johnson was seconded by Hope Morgan.

Voted: SMAC approves the revised Geographic Data Content Standard for Transportation Road Data Version 2, dated April 3, 2018, and will recommend adoption by the GICC.

### *METADATA COMMITTEE*

Sarah Wray, chair of the Metadata Committee, reported on activity including assistance from NC Central University. Six YouTube videos provide online metadata instruction. Also, Ms. Wray and Chelsea Duncan of NCDOT and Dr. Mulrooney of NCCU have done outreach beyond NC to share insights and get feedback on the curriculum. She noted presentation of an open source metadata editor by the Alaska Data Integration Working Group. The Metadata Committee plans to review that tool and consider the utility of applying it as a web-based tool. Following release of Alaska's editor this summer, a validator is expected in the fall.

Next efforts need to focus on in-person training of local government data managers and monitoring GIS software for their adoption of metadata validation tools based on the approved ISO 19115-3 xml standard. Outreach efforts have included a questionnaire that reached many local governments. Local venues have been offered, and professional organizations have hosted sessions at conferences.

Other outstanding issues are determining details of metadata for archiving orthoimagery, and posting federal metadata templates for the convenience of users.

### *STREAM MAPPING ADVISORY COMMITTEE*

Cam McNutt (NCDEQ) reported this committee will be reactivated. First, the Environmental Management Commission released water quality rules for public review.

He revived a document he wrote in September 2015 that recommended changing stream buffer rule language to clarify the role of the GICC. The review period for rules will be May 1 through July 2. The current language, first appearing in the Jordan Lake buffer rules in 2008, says that a stream requires riparian buffers if it is shown on (1) a paper soils map (Natural Resources Conservation Service), or (2) a USGS 1:24,000-scale topographic map, or (3) other maps approved by the GICC and the Environmental Management Commission. GICC was not involved in writing the rule, and has not approved any stream maps for the purposes of this rule. Mr. McNutt supports separation of mapping/data development/science and environmental policy, not combining those processes as this rule may be interpreted.

In discussion, SMAC members observed that GICC comments could be limited to the GICC role in the rules, and an appropriate role for the GICC is support good stream mapping, positional accuracy, and standards. Some part of the GICC's coordination structure could have a technical role in review of stream data.

Ongoing headwater stream mapping is a factor in representing streams and integrating datasets into a statewide resource. Another factor is the potential for the State to take on stewardship of the National Hydrography Dataset. A desired outcome is a single representation of surface waters for common use, not two different datasets for mapping and for water quality rules. Statewide datasets for orthoimagery and parcels bring stream maps into the mapping context of higher resolution data and property-based issues.

Mr. McNutt will circulate a document with the rule language and suggestions for new wording to clarify the role of the GICC related to governance of stream data. Mr. Badr recommended that SMAC review the document and comment in May or early June. Mr. Johnson agreed this could be an informational item on the Council meeting agenda on May 9 and SMAC may make a request of the Council before the end of the public comment period.

Mr. Brown added an example of a county inquiry to CGIA about how to get stream data approved by the GICC for application under the Jordan Lake riparian buffer rules. The county wanted to use a copy of streams generated by the Floodplain Mapping Program, but there is no process and no criteria for such an approval.

Mr. Farley suggested that NCDOT's Atlas Project will support data improvements in the long term and support rule language that accommodates improvements. Ms. Morgan added that federal requirements vary by agency, e.g., FEMA requirements for floodplain mapping and USGS requirements for stream mapping differ. The State needs to avoid duplication of efforts in the context of varying requirements.

Zsolt Nagy, a consultant to the environmental discipline group in the Atlas Project, explained that in determining requirements for permitting tasks for NCDOT projects, the group found that the location of surface water is essential to the flow of permitting activities. The group's top priority is to make progress with hydrography data, short term and long term. Options range from adding to the 1:24,000-scale data to refreshing the

entire hydrography dataset based on LiDAR data. For this year, a limited update could be accomplished using headwater stream data. That group is interested in a pilot effort. Whatever is done needs to be coordinated with long term requirements. Ms. Morgan added that research on LiDAR derivative products will include delineation of streams in pilot locations.

#### *ORTHOIMAGERY AND ELEVATION*

Gary Thompson reported the working group met April 17. The group reviewed its [report](#) from 2011 on business uses for color infrared imagery and found that it is still accurate and well explained, but updates and improvements are welcome. The group will share it with the Working Group for Land Cover to see if new uses can be added. On the topic of unmanned aircraft systems, Mr. Thompson described a database developed by NC Emergency Management for qualified and approved UAS operators who could be engaged by state or local government in an emergency.

#### *NC BOARD ON GEOGRAPHIC NAMES*

Tim Johnson, chair of the board on an interim basis, presented a naming recommendation. In the March meeting, the board considered a proposal to change the name of a 9-acre reservoir in Iredell County to Regency Lake. The current name is Auto Storage Lake Number One. The name has local history and local support. The NCBGN recommendation is approval by SMAC. A motion to approve was seconded.

Voted: The name Regency Lake for a reservoir in Iredell County is approved

Mr. Johnson added that thirteen name requests are pending, more than usual for the board to review.

#### *WORKING GROUP FOR LAND COVER*

Cam McNutt reported on behalf of Kenneth Taylor, chair, on progress by the working group. The group met April 6 to review the results of a survey. A total of 67 respondents represented local, state, regional, and federal government geospatial data consumers as well as university and private entities. The respondents were a mix of GIS professionals, scientists, managers, consultants, and specialists working in a variety of roles including mapping, modeling, planning, and analysis. The survey results indicate a wide range of business needs, led by identifying changes in forest cover, changes in wildlife habitat, and changes in impervious surface. The specifications favored are 1-meter resolution or better; detailed classes (USGS Level 2); leaf-off, or both leaf-on and leaf-off conditions; statewide extent; and publication on a 4 to 5-year cycle. The working group plans to prepare a report to present to SMAC in July.

Mr. McNutt continued by explaining that after the business needs are analyzed and documented, the next steps include identifying imagery sources and techniques for classifying land cover. To take advantage of orthoimagery, Mr. Badr suggested resampling the 6-inch pixels to 1-foot pixels for image classification at high resolution. Research on LiDAR derivatives will be relevant as well.



## **Regular Status Updates**

### *NATIONAL GEOSPATIAL PROGRAMS OFFICE*

Silvia Terziotti, USGS, reported that the new LiDAR Specification 1.3 is available. It now includes a breakline specification for hydrography as an optional component. The breakline specification can be used to guide data collection. The coding can be used to conflate to NHD. Also, USGS has developed a new tiling structure so that tiles will not have mismatch or sliver issues from collections in adjacent counties. She added that the 3-D Nation elevation requirements and benefits study is coming up. Office of Management and Budget (OMB) approval of the survey is pending. Gary Thompson is the state champion. The study goes beyond LiDAR to other elevation data development methods. On the topic of bathymetry as an elevation data requirement, Mr. Badr commented that accuracy of bathymetry from LiDAR can be problematic.

### *NC ONEMAP*

David Giordano reported data updates during the last quarter from the Natural Heritage Program—natural areas, element occurrences, managed areas, and federal lands—and from NC Agriculture—gas station locations. Mr. Badr commented that NC OneMap is a great product that is used in the private sector on a daily basis.

## **In-Meeting Task Review**

A recap of tasks identified today: (1) Tim Johnson and Cam McNutt will follow up with SMAC on the water quality rules, (2) CGIA will contact the NC Association of County Commissioners for more information about the NC Property Tax System, and (3) SMAC will recommend adoption of the revised data content standard for road centerlines and submit the document to the GICC for a 30-day review period.

**Adjourn** --The meeting adjourned at 3:36 PM.

## **2018 SMAC Meeting Dates**

Wednesday, July 18

Wednesday, October 17

Locations and times to be determined in consultation with the Chair.