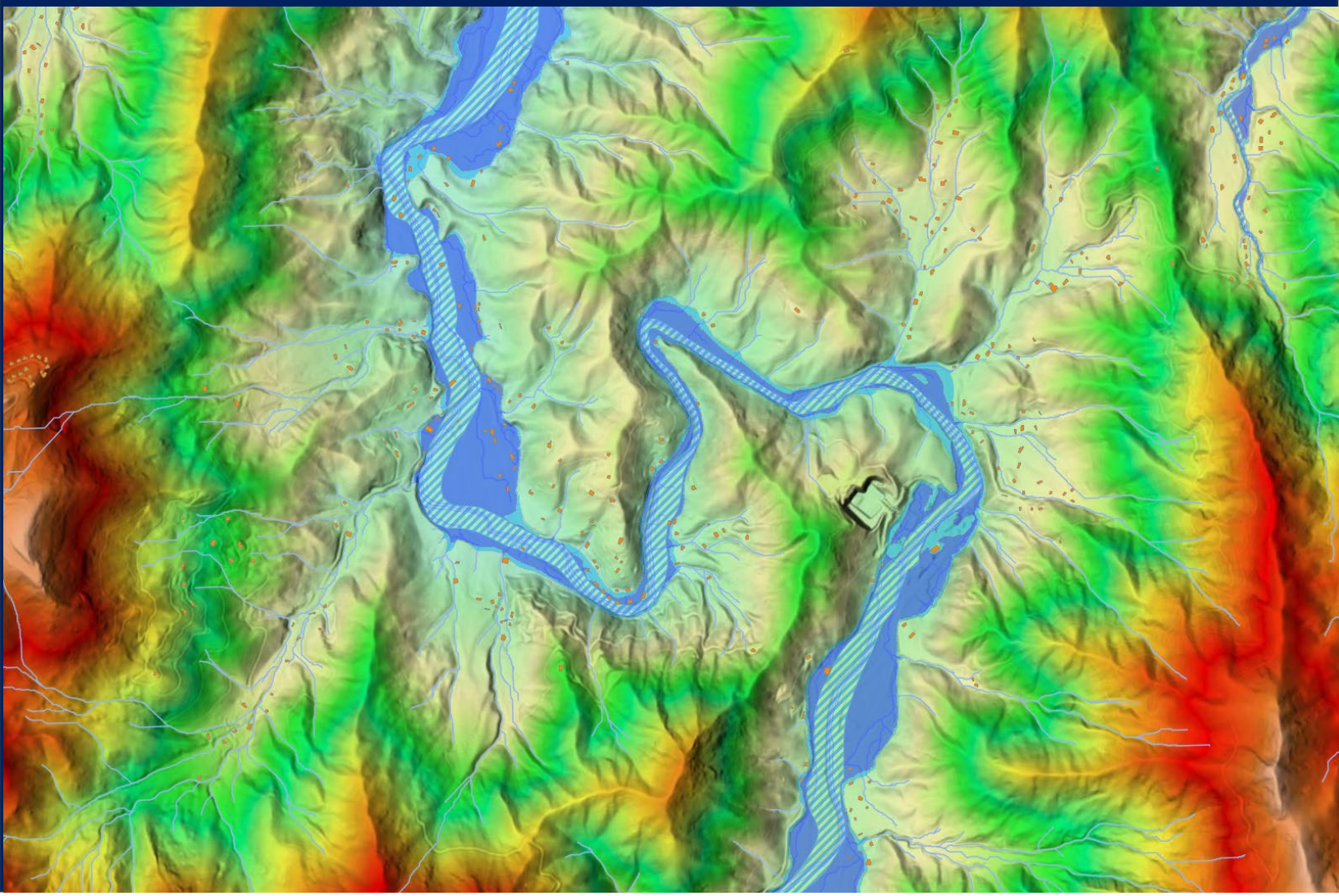
North Carolina Geographic Information Coordinating Council

2024 Annual Report



NCGICC

Presented to:

Josh Stein, Governor

Joint Legislative Commission on Governmental Operations

Teena Piccione, State Chief Information Officer and Secretary
N.C. Department of Information Technology

Hope Morgan, Chair
N.C. Geographic Information Coordinating Council

Contents

Executive Summary

The N.C. Geographic Information Coordinating Council (GICC) was established by the N.C. General Assembly in August 2001 and is supported by the N.C. Department of Information Technology (NCDIT). The N.C. Center for Geographic Information and Analysis (CGIA), housed within NCDIT's Government Data Analytics Center (GDAC), staffs the council.

North Carolina General Statute (N.C.G.S.) §143B-1421(g) requires the council to report annually to the Governor and the Joint Legislative Commission on Governmental Operations. The council submits this report to share its strategic focus on data-driven collaboration, outline priorities and challenges and update the Governor and the Commission on its Fiscal Year 2023-2024 accomplishments.

Over its thirty-year history, the GICC has coordinated groundbreaking geographic information systems (GIS) framework datasets and served as a model for other states' programs. Council coordination for important framework datasets such as orthophotography, seamless parcels, road networks and addresses form the backbone of spatial analytics that support state, local and private sector initiatives. These mature datasets, supported by the work of the council, provide immense value to public and private programs.

The council coordinates to continuously improve data and services while supporting the residents and governments of North Carolina. Geospatial data is the backbone for broadband expansion, regional planning, resource protection and economic development, and the council continues to coordinate projects that support a healthy North Carolina economy, environment and community. Support for Next Generation 911, adoption of standards for Hydrography and Parcels, increased federal coordination, and promotion of the value of GIS are just a few examples of council coordinated projects that support a resilient North Carolina.

The council's work involves not only data and analytic tools, but also the state's GIS community. It is the dedicated GIS community that volunteers for council working groups and creates successful projects. The GICC's leadership and forward thinking support a strong GIS community, and Fiscal Year 2023-2024 continued these successful efforts.

Introduction

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The council is the state's central point for geospatial collaboration and mapping and supports local and state geospatial programs and services. The council serves to improve the quality, access and cost-effectiveness of geospatial resources for state, federal, local, academic and private organizations while promoting the value of geographic information.

North Carolina General Statute (N.C.G.S.) §143B-1421(g) requires the council to report annually to the Governor and the Joint Legislative Commission on Governmental Operations. The council submits this report to share its strategic focus on data-driven collaboration, outline priorities and challenges and update the Governor and the Commission on its Fiscal Year 2023-2024 activities.

Figure 1. The council's focus on collaboration and communicating GIS priorities is on display after meetings, as members meet one another and make plans.

About the Council

The council meets quarterly to consider policies, issues and initiatives. Council meeting dates for Fiscal Year 2023-2024 were August 23, November 1, February 14 and May 8.

Figure 2. GICC Members are appointed by a range of organizations to represent the entire GIS community in North Carolina.

The council is composed of a broad set of stakeholders representing perspectives from local, state and federal government, higher education and private business. The council's collaboration promotes better decision-making across all sectors in North Carolina. The council has three user-oriented standing committees: the Local Government Committee (LGC), the State Government GIS Users Committee (SGUC) and the Federal Interagency Committee (FIC). Two technical committees, the GIS Technical Advisory Committee (TAC) and the Statewide Mapping Advisory Committee (SMAC), address policy, guidance, standards and technical issues in collaboration with the user-oriented committees. Chairs of all five standing committees as well as the council chair and council representative from the Office of State Budget and Management comprise the Management and Operations Committee (M&O), which handles the council's business in-between quarterly meetings.

Committee members, the state's geographic information systems (GIS) community and the public used the council's website (it.nc.gov/gicc) and NC OneMap (nconemap.gov) website to keep current on initiatives, meetings, opportunities and news about both entities.

Figure 3. GICC Statutory Committees

What is GIS?

More than just mapmaking or cartography software, Geographic Information Systems, known as GIS, are the power of location-based, data-driven decision support. GIS is a network of feature locations, feature information, software, databases, servers, mobile collection devices, sensors and analysis tools that support planning and decision-making. GIS is more than a static

map; it is a powerful tool that ties together spatial and non-spatial data to support critical decisions and planning.

GIS data forms the foundation for daily decisions and is used by experienced GIS analysts as well as the general public, who may not even realize they are using GIS data. Addresses and street centerlines may be the two datasets most often used by the public, yet the coordination involved in collecting addresses and roads from local governments into a standardized, regularly updated, statewide database that is then used to better route a car in a phone app is invisible to most parents trying to find the right park for soccer practice. When these datasets are not complete or accurate, online purchases get delivered to the wrong location, households are missed during the Census, or emergency responders take longer to find the correct home. Without GIS, many of the tools we use daily would not exist.

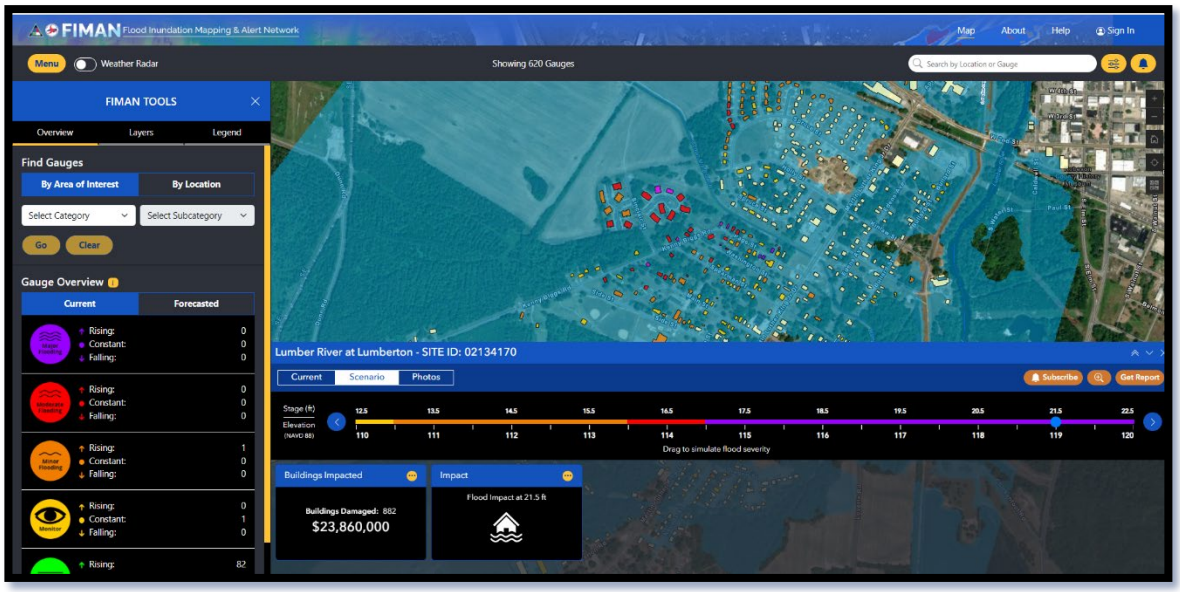


Figure 4. GIS is the foundation for decision-support tools that make government more transparent and efficient. Tools like FIMAN assist local emergency managers in keeping North Carolinians safe during floods.

Because of the critical importance of GIS to government functions as well as the private sector's reliance on accurate, well-maintained data, the council must include a wide range of stakeholders in its committees and working groups. These local, state, federal, private sector and education stakeholders drive the data-driven collaboration necessary to meet the needs of North Carolinians now and in the future.

FY23-24 Council Highlights

Introduction

The GICC meets quarterly, and agendas include committee and working group updates and recommendations, state projects that rely upon GIS data for decision support, issues and needs of the GIS community, and discussions on how to best integrate and promote GIS as a decision support tool. Select highlights from council meetings can be found in this section, while more detailed information about project progress and issues discussed both within the GICC and within its committees will be covered in the accomplishments section of this report.

Figure 5. State Geographic Information Officer Tim Johnson gives an update to the council on his office's progress.

Geospatial Maturity Assessment

North Carolina was the only state to receive an A grade in the National States Geographic Information Council's (NSGIC) 2023 Geospatial Maturity Assessment (GMA). NSGIC conducts the GMA every two years to assess national progress on a set of common data themes and other coordination activities such as Next Generation 911. The GMA's common grading system allows a comparison of state progress and encourages states who struggle with certain geospatial datasets to learn from those like North Carolina that excel at most. State Geographic Information Officer Tim Johnson presented North Carolina's GMA results to the Council in February of 2024.

The 2023 GMA yielded a set of letter grades for nine geospatial layers as well as coordination activities as shown in Figure 6. Overall, North Carolina received a grade of A, which was an improvement from the A- received in 2021. At the detailed level, geospatial investments in recent decades at both the state and the local government level resulted in A grades for all but leaf-off imagery. North Carolina's only B grade is related to our mature orthoimagery program outweighing the need for investment in leaf-off imagery at this time. Eastern and Western states differ in their need for leaf-on vs leaf-off imagery, with most eastern states investing more heavily in leaf-off imagery. Examples of the A grades include orthoimagery that the GICC and the N.C. 911 Board have championed, as well as cadastre (i.e., parcels), transportation, elevation and addresses. North Carolina is recognized as a national leader in these data themes.

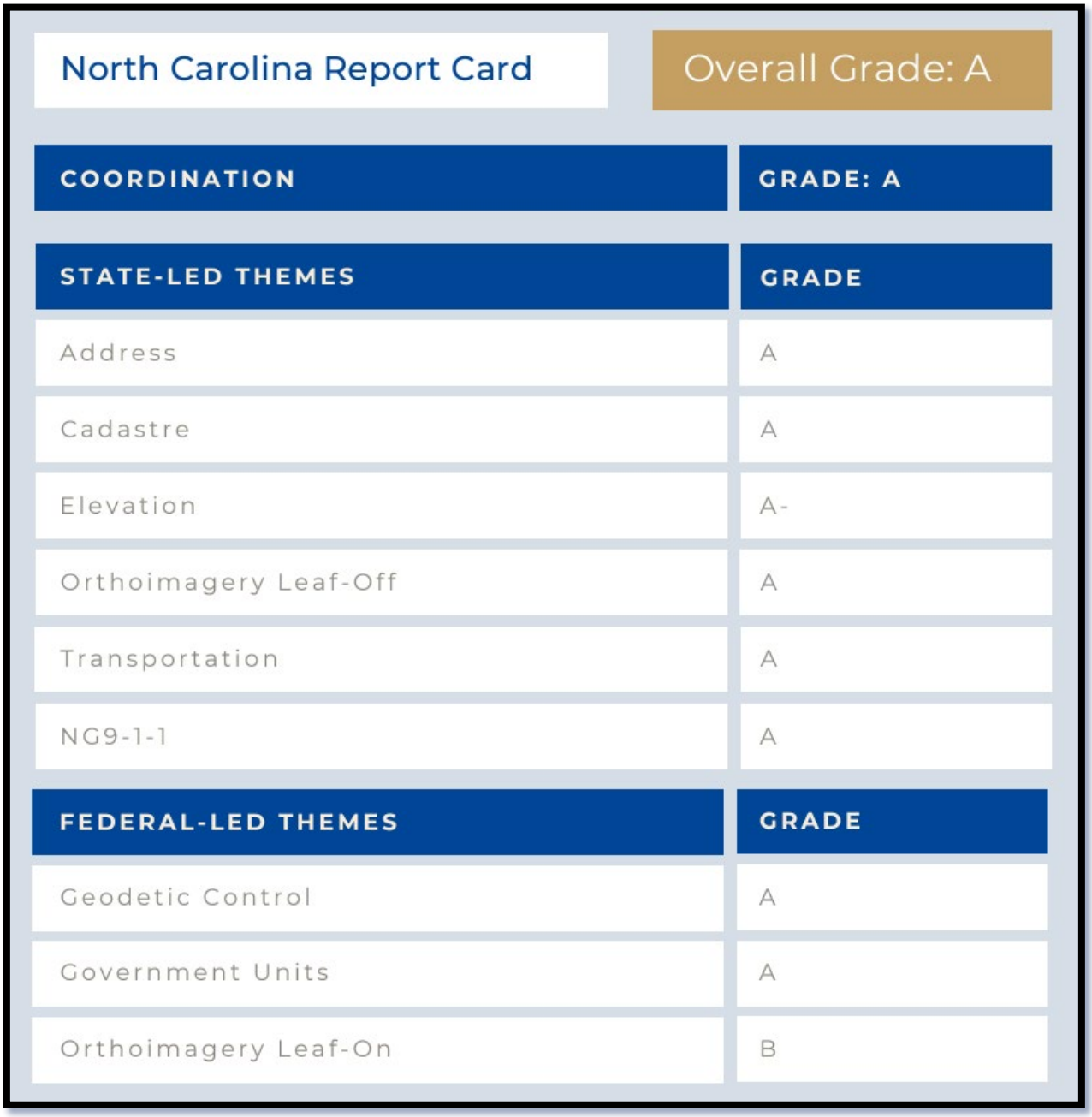


Figure 6. 2023 Geospatial Maturity Assessment Report Card. North Carolina was the only state in the nation with an A rating.

North Carolina's Coordination Program received an A grade due in part to the statutory authorization for the GICC, GICC support staff appropriated positions, the Geographic Information Officer state position, regular GICC meetings and activities, and the NC OneMap data clearinghouse. These activities, state-funded positions and engaged stakeholders demonstrate a commitment to excellence as well as strong community support for GIS in North Carolina. It also reflects substantial investments made through the legislature over the years.

Continued investment for maintenance and updating of these critical datasets will be required long-term to maintain North Carolina's leadership in data quality.

Statewide Coordination

The council plays a key role in supporting the development of statewide datasets. The Statewide Mapping Advisory Committee (SMAC) charters working groups to develop data recommendations which are then discussed and approved by the council. During this fiscal year, the SMAC's working groups were busy with new data development and stakeholder engagement.

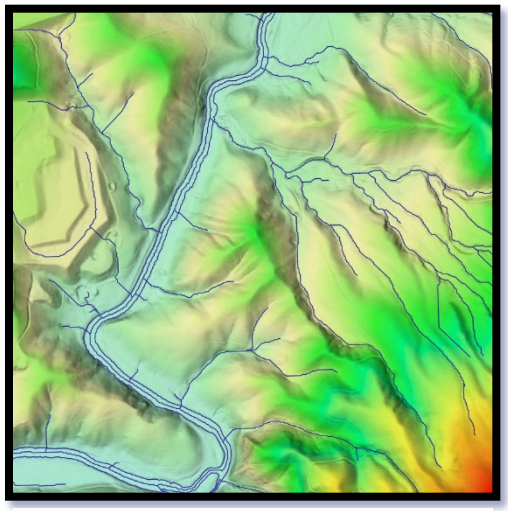


Figure 7. Elevation Derived Hydrography on NC Lidar digital elevation model

GICC members and the GIS community drive GICC priorities. During the 2023 NC GIS Conference, the committee sponsored a town hall session to seek feedback on a variety of issues. As a result, after the August 2023 GICC meeting, the council hosted data breakout groups to evaluate needs related to data layer improvements requested during the town hall meeting. Infrastructure, hydrography, community structures, landcover and boundaries were discussed during facilitated meetings after the regular GICC meeting. The issues and needs voiced during these discussions were brought back to the SMAC and tasked to working groups.

Hydrography

User feedback from the breakout sessions aided the Hydrography Working Group (HWG) in its gap analysis and recommendations presented to the GICC. The working group evaluated the existing hydrography models for the state, presented the data to stakeholders for feedback and formulated a set of recommendations to improve the data to meet the needs of the majority of users. The GICC adopted these recommendations at the November 2023 meeting. Hydrography is a council priority.

Landcover

Landcover, specifically the need for improved wetland and impervious surface data, resulted in the SMAC reinstating the Landcover Working Group (LWG). The group combined with a wetland data group established within the N.C. Department of Environmental Quality (DEQ) to evaluate whether recommendations made in a 2019 landcover recommendations report would still meet the needs

Figure 8. High resolution landcover data

of most users. Using feedback from the data breakout sessions, the LWG recommended that the GICC support statewide National Oceanic and Atmospheric Administration (NOAA) Coastal Change Analysis Program (C-CAP) 1-meter landcover. C-CAP data will provide more detailed landcover information and presents an opportunity to improve coastal wetlands mapping.

Seamless Parcels

The Working Group for Seamless Parcels (WGSP) is a mature working group that has developed one of the top datasets downloaded from NC OneMap. North Carolina has been a national leader in seamless parcels and provides updates and guidance to other states through NSGIC. The key to maintaining effective data is maintenance and updates to meet user needs. The WGSP reviewed the existing data schema for inconsistencies between counties, evaluated the ability of counties to update all attributes and solicited feedback from users on what attributes they needed. The result was a recommendation for required, recommended and optional attributes and a plan to work with counties to improve consistent data updates to required attributes. This plan was presented to and adopted by the council at the November 2023 quarterly meeting.

Figure 9. Seamless parcel and AddressNC Points

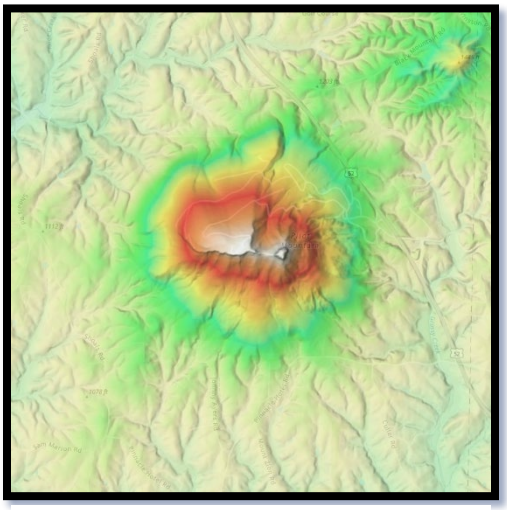


Figure 10. Pilot Mountain displayed using a lidar-derived shaded relief digital elevation model

Elevation

Based on community feedback, the council adopted elevation as a priority dataset for improvement. The most common source of elevation data is lidar, a remotely sensed dataset collected by fixed wing aircraft for wide areas. North Carolina has statewide lidar data, but landforms change frequently through floods, landslides, home and business developments, and roadway construction, among others. North Carolina lacks a consistent funding source for lidar, so the GICC tasked the SMAC with the development of a lidar business plan. Gary Thompson, GICC Vice-Chair, provided an update to the council at the February 2024 quarterly meeting on the value of lidar data and the working group's progress.

Broadband Expansion

Broadband expansion, a statewide priority, is heavily supported by geospatial data. In February 2024, Ben Shelton, a Project Manager with CGIA, shared with the GICC how framework GIS datasets support funding decisions for the broadband expansion program.

Broadband is critical to societal needs including remote learning, telehealth services, economic development and agricultural applications. In the wake of the COVID-19 pandemic, the digital divide and urgency of expanding broadband access became starkly apparent.

Diverse funding sources fueling broadband expansion include state appropriations and allocations from the American Rescue Plan Act (ARPA) and the Bipartisan Infrastructure Bill Act. These funds must be focused on unserved and underserved locations, and GIS data, including addresses, building footprints, imagery and parcels, are all used in the rigorous process of challenging inaccurate FCC mapping to ensure effective allocation of resources. CGIA developed an innovative approach leveraging artificial intelligence (AI), cloud computing and orthoimagery program data to extract updated building footprints for these challenges.

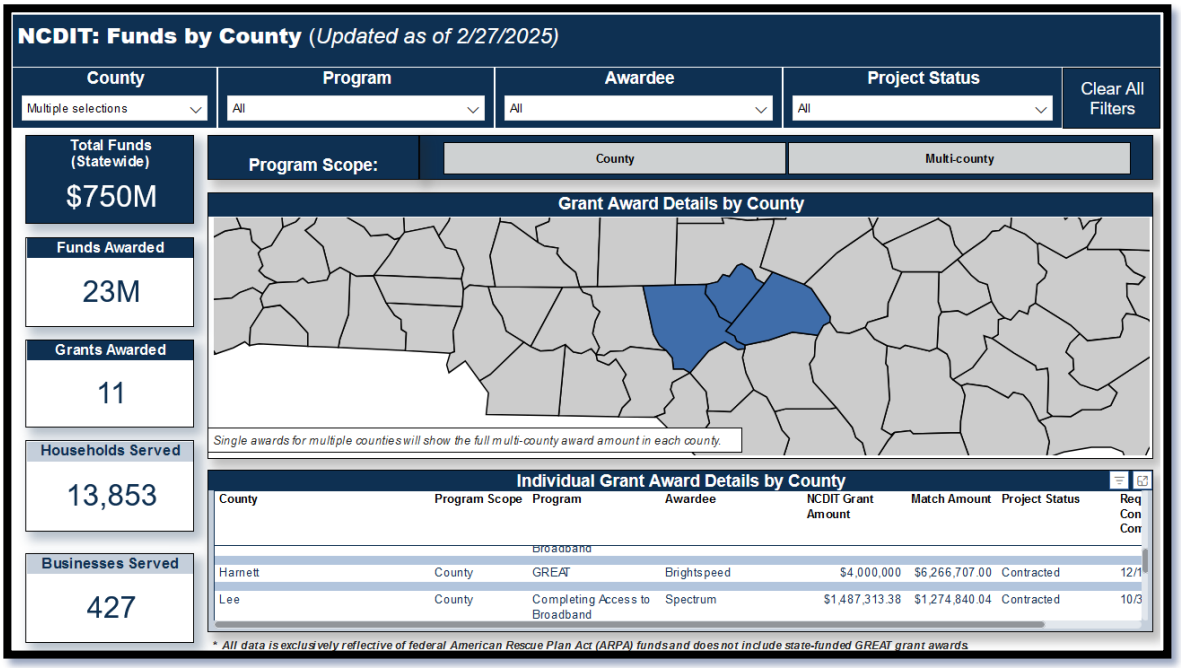


Figure 11. The NC Broadband and Digital Opportunity Award Summary Dashboard makes investments and grants transparent to local communities.

GIS provides a tool for transparency and accountability as funds are allocated to broadband expansion projects. Funding programs such as the Growing Rural Economies with Access to Technology (GREAT) grant, Completing Access to Broadband (CAB) program, and Broadband Equity, Access, and Deployment (BEAD) program use geospatial data to target grants to areas of need and then track project progress. This level of transparency allows local communities to see where funds are spent and know when projects are expected to be completed. North Carolina's broadband expansion efforts rely on mature geospatial datasets, and this effort is an excellent example of the return on investment in geospatial data, staffing and infrastructure.

Federal Coordination

Coordination with federal agencies benefits North Carolina and brings accurate and more complete data to federal datasets. The GICC's Federal Interagency Committee (FIC) is an important pathway to federal coordination, but it is not the only way that the state of North Carolina engages with federal agencies and coordinated federal efforts.

Gary Thompson, Vice Chair of the council, is also Chair of the National Geospatial Advisory Committee (NGAC). The NGAC is a federal advisory committee authorized under the Geospatial Data Act of 2018 to provide advice and recommendations on the management of federal and national geospatial programs and the development of the National Spatial Data Infrastructure (NSDI). It is also tasked with review and comment on geospatial policy and management issues and ensures that views of non-federal parties involved in national geospatial activities are conveyed to the Federal Geographic Data Committee (FGDC).

Figure 12. Josh Delmonico, Federal Geographic Data Committee Executive Director, addresses the GICC at the May 2024 meeting.

NSDI Strategic Plan

Josh Delmonico, FGDC Executive Director, provided an update on the NSDI and its importance to North Carolina. He highlighted North Carolina's GMA grade as an example of the benefit of dedicated state to federal coordination and shared the economic benefits of the geospatial industry and geospatial data. Delmonico also shared the proposed draft 2025-2035 NSDI strategic plan with the council and highlighted the proposed goals. Three main goals include:

- **Governance**
  - Fiscal support for geospatial data and programs
  - Policy support that reduces barriers to implementation
  - Collaborative data partnerships with representation from all sectors
- **Data and Technology**
  - Ensure data is accurate, up to date and accessible
  - Advance geospatial research through cutting edge technologies
  - Encourage and maintain open data standards for global interoperability
  - Maintain and build and infrastructure framework to support geospatial data and technologies

- **People**
    - Build partnerships with local, state, federal and tribal governments as well as academic, private sector and non-profit organizations
    - Build a skilled geospatial workforce
    - Promote geospatial literacy in all sectors to encourage the use of geospatial data and strengthen understanding of the importance of the NSDI.

The GICC, as a partner in the NSDI, has an important role to play in implementation of the strategic plan and was offered an opportunity to provide feedback on the plan. GICC committees and working groups are already actively engaged in efforts listed among the strategic plan goals including promoting the value of GIS within North Carolina state government, developing data standards and fostering local to state to federal partnerships among efforts.

Figure 13. Dan Keefe addresses the GICC at the May 2024 meeting.

U.S. Census

Dan Keefe, Assistant Division Chief for Address Content Coverage and Geospatial Reference Data, in the Geography Division of the U.S. Census Bureau (Census), updated the council on the data and partnerships involved with maintaining the Census geospatial databases. North Carolina partners closely with the Census by contributing local and state data including governmental boundaries, administrative and statistical areas, road and highways, housing units and address points. Keefe updated the council on the data sources and technologies they use to detect changes from new developments to keep their databases updated to support Census programs and local decision making. Keefe presented challenges they face including understanding damages and population movement resulting from natural disasters, hidden housing units such as basement apartments and rural addressing. He sought assistance and feedback from the council on understanding these issues. Providing resources and staffing to maintain local and state data is important to supporting federal programs including the Census that drive federal dollars back to our state.

FLAIR Act

John Bird, a legislative liaison and federal lobbyist for the National Society of Professional Surveyors, presented on the FLAIR Act during the August 2023 quarterly meeting. Bird explained that the FLAIR Act, officially known as the Federal Land Asset Inventory Re-form (FLAIR) Act, aims to create a current and accurate inventory of federal land owned by the U.S. Department of Interior and the U.S. Forest Service. Bird cited past reports by the Government Accountability Office (GAO) that highlight the waste and duplication resulting from funding

over 100 single-purpose databases in the Department of Interior alone, and the lack of a current inventory of federal real property. The FLAIR Act calls for the development of a multi-purpose federal database, conducting an inventory of existing cadastre databases and coordination with state and local agencies. The FLAIR Act is important for other federal initiatives, such as infrastructure investments, broadband mapping and wildfire mitigation. North Carolina's investment in seamless parcels data will provide a valuable source of accurate state partner data as the federal database is developed.

Value of GIS

The State Government GIS Users Committee embarked on a task to increase the understanding of the value of GIS within state government. GIS is integrated into mission critical systems in many departments including those that protect life and safety. These

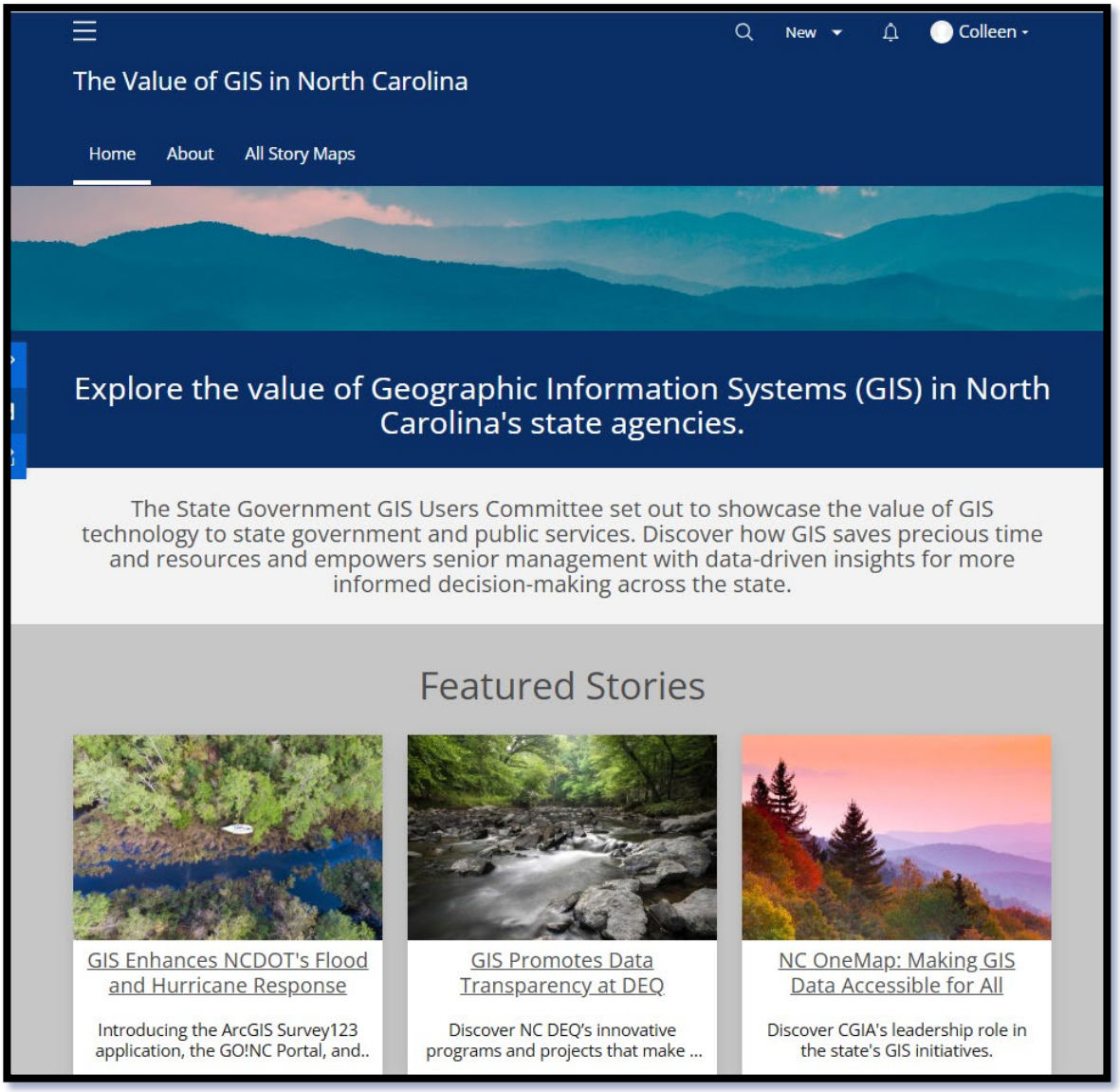


Figure 14. The Value of GIS website contains StoryMaps from xx agencies highlighting the ways that the use of GIS benefits North Carolinians.

systems require data to be updated and accurate, yet the work required to maintain geospatial data and infrastructure is underestimated in some agencies by senior management. Compounding this issue, the first couple of decades of GIS products were paper maps, and most non-GIS professionals did not realize the wealth of information contained within a GIS database. The idea of GIS professionals as "those map people" is still pervasive and results in a narrow vision of the power of geospatial analysis and integration into business systems. This limited understanding of the powerful capabilities of GIS is one reason why the NSDI strategic plan specifically targets geospatial literacy as a goal for improvement.

The goal of the "Value of GIS" project was to demonstrate the many ways GIS is utilized across state government in an interactive format. The SGUC employed the StoryMap format, a GIS tool that allows users to create interactive webpages to combine the power of stories with directly accessible tools and mapping applications. The Value of GIS StoryMap Hub was presented to the GICC and demonstrates examples of GIS saving lives, time and money, increasing efficiency and transparency, and providing insight into new connections previously unseen. SGUC members intend for the Hub to promote a better understanding of how GIS is integrated into the mission of their agency, and prompt ideas of how it can be used in new ways based on successes from other agencies.

The StoryMap hub includes 12 StoryMaps, each conveying multiple examples of the use of GIS. Some examples include:

- Increased Transparency
    - The State Property Office's Property Search tool makes searching for state property and buildings simple for the public.
    - The N.C. Department of Health and Human Services' GIS products simplify reporting and decision-making while promoting transparency.
- Increased Efficiency
    - The N.C. Department of Transportation's Traveler Incident Management System (TIMS) alerts media outlets as well as emergency responders to traffic incidents while sending traffic condition data to popular navigation apps.
    - The Office of the State Fire Marshall's use of GIS has reduced the time it takes to perform a fire rating inspection from days to just 1-2 hours.
- Emergency Response/Public Safety
    - The N.C. Department of Environmental Quality's (DEQ) Situation Reporting Tracking System integrates mobile reporting to respond proactively to flooding and storms.
    - The N.C. Division of Emergency Management's Flood Inundation Mapping and Alert Network (FIMAN) allows the public and local authorities to see a visualization of expected flooding and receive emergency alerts to avoid loss of life and take measures to protect property.

The SGUC continues to work on ways to educate senior management on the importance of funding GIS staff, data and infrastructure. In the 2024-2025 fiscal year, the SGUC will review with DIT Human Resources whether a GIS classification could aid in recruitment and retention of a skilled GIS workforce.

Strategic Direction for the Council for Data Driven Collaboration

Every two years, the council reviews its goals and priorities to plan its strategic direction for the coming two years. The council historically has not written a formal three-to-five-year strategic plan but has relied on a biennial planning process to remain nimble and respond more quickly to pressing needs and user priorities. The council's priorities and goals are a mixture of long-term and short-term projects, and this biennial process allows the members to more frequently assess progress, assign tasks and define new goals or priorities.

Goal 1. Improve, expand, and support statewide geospatial data and applications.

1.1. Promote free and open discovery of and access to geospatial data created and maintained by local governments and support efficient local to state data sharing.	
Need: *Accessible local data is essential for the success of most GICC initiatives.*	NextGen 911 program data updates monthly.
	Municipal boundary website promoted by the Municipal Boundary Working Group (MBWG).
	All counties contributed to AddressNC.

1.2. Recommend utility infrastructure solutions that maintain data sharing security to aid discovery and ease of access to geospatial data.	
Need: *Emergency response, planning and development communities need a better understanding of security concerns for infrastructure data and better resources for how to request data and securely treat requested data.*	TAC provided recommendations to the GICC.
	Template disclaimers, non-disclosure agreements and data sharing agreements provided in final report.

1.3. Support priority initiatives that compile and maintain statewide geospatial datasets that benefit the businesses and citizens of North Carolina.	
Need: *Continuously improve existing datasets and compile new datasets as needed by stakeholders.*	Municipal boundary data released and updates began.
	Federal/State coordination on hydrography standards.
	Building Footprint updates coordination between CGIA and NCEM.
	Transfer of lidar data to NC OneMap cloud.

1.4. Request all state agencies to make the Council's priority geospatial datasets discoverable and accessible through the NC OneMap Geospatial Portal.	
Need: *NC OneMap should serve as a single portal for state GIS data discovery.*	Elevation contour is available on the NC OneMap cloud from NCEM to configure for service.
	MBWG developed a streamlined process for boundary approval and annexation submittal.
	NextGen 911 data will directly supply addresses eliminating duplication.

1.5. Promote geospatial metadata for standard documentation.	
Need: *Metadata is essential to allow users to understand appropriate uses for data and should be promoted.*	The SMAC annually reviews datasets for new data needs.
	Elevation contour began to be copied to the NC OneMap cloud from NCEM to configure for service.

1.6. Support enterprise applications that derive business value from geospatial data assets and analytics.	
Need: *Promote the understanding of the enterprise capabilities of GIS*	The TAC began working on best practices for managing big data sources, a common use of enterprise solutions. The SGUC created a value of GIS portal to highlight the value of GIS to state government agencies. Most of these examples are enterprise examples.

1.7. Promote efficient data sharing of large datasets by recommending technical solutions	
Need: *Promote access to previously difficult to share datasets.*	The TAC is working on best practices for big datasets to aid local governments in data sharing.

Goal 2. Collaborate and conduct outreach for more integration of geospatial data in information technology for expanded benefits in the geospatial community in North Carolina.

2.1. Identify opportunities to collaborate on GIS solutions in all state departments including divisions not directly represented on the council to add value to state business processes.	
Need: *Collaborate with state agencies to add value and prevent silos*	SGUC documented 2023 data accomplishments and 2024 plans to share information across agencies. Value of GIS storymaps also provide context to share project information and prevent duplication.

2.2 Identify opportunities to collaborate on geospatial data and technical solutions on a regional basis, engaging councils of government, educational institutions, metropolitan planning organizations and rural planning organizations.	
Need: *Eliminate silos and increase resources by working on a regional basis.*	LGC and GICC members communicate to provide education and support regionally as needed.

2.3 Reach out to jurisdictions with the least resources to find ways to add value with geospatial data and applications.	
Need: *Provide education to the many small jurisdictions that lack GIS capability or expertise.*	
	Efforts to increase LGC membership resulted in over 100 participants at each LGC quarterly meeting.

2.4. Increase awareness and adoption of council initiatives and priorities through outreach and education.	
Need: *Increase participation in working groups and increase awareness of existing GIS resources to avoid duplication of effort*	Ongoing initiative- All committees and working group members have a charge to promote council initiatives within their organization and in their professional areas.
	Summaries of GICC meetings are sent to members soon after GICC meetings to allow them to distribute information to their organizations.
	The LGC changed the way it advertised quarterly meetings and increased attendance.

Accomplishments 2023-2024

Fiscal Year 2023-2024 was a productive year for the GICC. The following accomplishments are detailed through this section of the report:

- Value of GIS
    - State Government GIS Users Committee Initiatives
        - Value of GIS StoryMap Project
        - GIS Staffing in State Government
        - ESRI Enterprise Licensing Agreement
    - Local Government Committee Initiatives
        - Value of GIS in Local Government
        - Knowledge Sharing and Training
    - Statewide Efforts Based on GIS Data
        - Flood Resiliency Blueprint
        - NCORR Resiliency Exchange
        - Environmental Justice Tool
- Collaboration for Data Governance and Consistency
    - GICC Data Breakout Sessions
    - Hydrography Working Group Recommendations
    - Statewide High Resolution Landcover Update
    - Seamless Parcels Attribute Improvements
    - Statewide Municipal Boundary Dataset Development
- Collaboration for Public Access to Geographic Information
    - NC Broadband Expansion
    - Orthoimagery Program Update
    - NC OneMap Geospatial Open Data Portal
- Intergovernmental Collaboration for Efficiency
    - AddressNC: Building Upon Next Generation 911
    - Lidar Business Plan Development
    - Federal Datum Change Plans
- Collaboration for Information and Education
    - GIS Training
    - Presentations and Outreach

Value of GIS

Communicating the value of GIS is a current focus of the GICC. Council, committee and working group members cannot assume that the value is evident to everyone, especially those who hold power to set budgets. Members have been busy this year evaluating how to best communicate the importance of GIS and how to demonstrate the ways that GIS provides value.

State Government GIS Users Committee Initiatives

Value of GIS Storymaps

Modern GIS relies on accurate spatial data, and paper maps are becoming less common than interactive online applications in the form of decision support tools. Dashboards, mobile applications and spatial questions pull information from spatial databases and display it in direct ways that management or the public can understand. How the maps and applications are produced, the work required to produce data for each layer, the infrastructure needed to support GIS databases and diverse skills GIS professionals need to develop strong decision support tools are not often well understood outside the GIS profession. SGUC members identified lack of resources and lack of understanding of the importance of GIS at the department level as issues that needed to be improved. During the summer of 2023, an NCDIT intern was hired to interview each agency to document the value of GIS to their mission. The following examples are samples of the many ways GIS increases government efficiency and transparency.

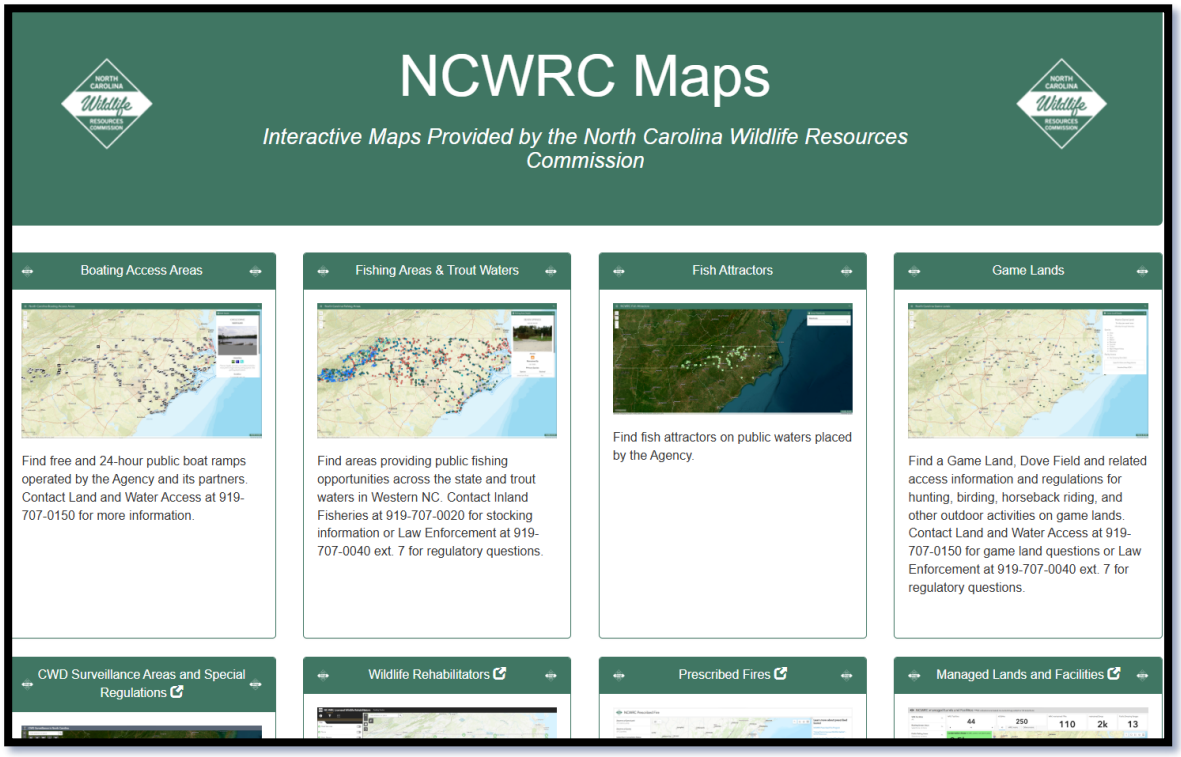


Figure 15. The N.C. Wildlife Resources Commission website offers users a suite of maps to assist them in responsibly accessing our natural resources and recreation areas.

The N.C. Wildlife Resources Commission (WRC) uses GIS to help North Carolinians find outdoor recreation opportunities statewide. GIS is a powerful tool that WRC employs to quickly share updates with the public about prescribed burns, gate closures and other factors that might affect public access to WRC lands. WRC has developed a series of maps that allow users to find boat ramps, game land access sites, wildlife rehabilitators or stocked fishing streams. By informing the public with mobile friendly, easy to use maps, WRC uses GIS to protect the public and our natural resources.

"GIS is a powerful tool that WRC employs to quickly share updates with the public about prescribed burns, gate closures and other factors that might affect public access to WRC lands."

The Office of the State Fire Marshall (OSFM) within the N.C. Department of Insurance (DOI) shared a time and cost saving example in their StoryMap. Fire ratings play as significant role in determining insurance premiums for homeowners insurance, and more favorable fire ratings lower insurance premiums. GIS implementation has reduced the time it takes to conduct a fire rating inspection from days to just one to two hours, facilitating increased frequency of inspections from ten to five years. Using GIS to identify higher risk areas means OSFM can direct resources and grants to areas in need.

N.C. State Parks staff within the N.C. Department of Natural and Cultural Resources (DNCR) track more land with limited staff using GIS technology. Their land protection dashboard integrates property deeds and surveys and allows field teams to track property boundary surveys for state owned lands in an intuitive dashboard. Previously, parks staff relied heavily on specialists familiar with specific park areas to assess fire damage and recovery. By using remotely sensed data, parks staff can accurately assess acreage burned and monitor vegetation health in recovery areas without sending staff on foot into remote, difficult to reach areas of the park.

The N.C. Department of Transportation (NCDOT) replaced manual, paper-based methods for collecting post-storm damage assessments with a mobile, survey-based method rooted in GIS. The survey streamlines data collection, allows field results to be seen in real time by management, minimizes user error and speeds response and recovery efforts. The GIS based survey makes budgeting and damage estimates rapid and easily accessible.

"The N.C. Department of Transportation replaced manual, paper-based methods for collecting post-storm damage assessments with a mobile, survey-based method rooted in GIS."

GIS Staffing

In addition to working on communicating the value of GIS to each agency, the SGUC worked with NCDIT Human Resources to evaluate whether adding GIS classifications could aid in recruitment, retention and pay equalization within state agencies. North Carolina does not

have a GIS position classification, partly due to the fact that GIS, as a profession, is incredibly diverse. GIS professionals may be classified as developers/programmers, environmental consultants, engineers, geologists, IT user support specialists or application systems specialists. Because of this, pay varies greatly from agency to agency.

GIS professionals are highly skilled, highly flexible employees due to the nature of GIS. GIS is a system, not simply mapping. GIS professionals often have experience in database design and management, scripting or programming skills, a strong aptitude for cartography, communication and design, and a specialization in their business unit's mission that allows them to target geospatial databases and communication to the goal of the agency. They often must advise their own IT departments on infrastructure needs, installation and updates, and data storage requirements, as GIS requires unique configurations and specialized data access that are not well understood by typical IT support staff. Even though some GIS professionals have strong IT-related skills, in some departments there is a reluctance to be classified as IT because the existing IT classifications may result in them being pulled away from GIS tasks to perform pure IT tasks.

Figure 16. SGUC Executive Committee members meet regularly to ensure North Carolinians receive the best value from geospatial services.

The issues with GIS staffing are common to other classes, but some are quite unique. GIS managers, like other managers in the state, suffer from having limited staffing. This problem is compounded in agencies where pay is not equal to higher paid agencies who classify their GIS staff differently. GIS staff loss to higher paying agencies is an issue. In agencies where GIS staff are not classified as IT, staff can struggle to keep software updated, because regular IT staff do not understand the necessary frequency of updates and do not trust GIS staff to counsel them on GIS/IT related topics. With few to no GIS staff in IT roles, a critical pathway to requesting funding and support for necessary infrastructure is cut off, leaving GIS staff relying on non-GIS management to attempt to convey the needs of their GIS employees to the IT department. GIS staffing and funding differences across agencies place undue limitations on efficiencies in underfunded and understaffed departments.

NCDIT HR classification specialists researched GIS classification descriptions and worked with SGUC members to develop a set of IT and non-IT GIS classifications. SGUC members will work with NCDIT HR specialists to review the HR proposed classification descriptions during the next fiscal year to make sure they accurately reflect the work requirements for each position and

the knowledge skills and abilities needed. Even if new classifications are adopted by the N.C. Office of State Human Resources, more work will need to be done to review pay discrepancies between agencies and reclassify existing GIS staff into the appropriate new classification. Reclassification and pay adjustment have historically been a difficult and lengthy process within state agencies, so executive management support will be important for success.

"SGUC members often mention the EA as a major accomplishment of the committee, as the fixed costs and flexibility of the EA for obtaining GIS software greatly benefits their agencies."

Enterprise Agreement

The SGUC coordinates to negotiate an enterprise agreement with ESRI, the GIS software used by the vast majority of GIS professionals. The state has had an enterprise agreement (EA) for over a decade, and the benefits extend well beyond the cost savings to agencies.North Carolina's EA includes a 35-40% discount on software and provides agencies with the ability to add new software at no cost beyond the 3-year fixed fee for certain products. This flexibility allows agencies to have fixed costs for the period of the EA while still providing software to all that need to add it. The EA also includes professional development resources in the form of unlimited online classes, a fixed number of instructor-led classes and complementary passes to user conferences. SGUC members often mention the EA as a major accomplishment of the committee, as the fixed costs and flexibility of the EA for obtaining GIS software greatly benefits their agencies.

Local Government Committee Initiatives

The Local Government Committee (LGC) began a series of presentations at its quarterly meetings focused on the value of GIS. Some presentations focused on communicating the value of GIS or the return on investment while others focused on the ways GIS provided value through concrete examples of process improvement or cost reduction. Many of our most used statewide datasets begin as local government data. There is great value in a statewide dataset including eliminating silos, duplication of effort and mismatched data formats.

Once a statewide dataset is available to the public, standard data formats, proper data documentation and transparent update schedules make it more valuable, trustworthy and widely used. Because local governments are the bedrock of data development, their capacity and ability to maintain and update data on a regular basis affects the entire statewide data layer.

The LGC works to assist its members with tools for data maintenance and provides time during quarterly meetings for members to share ways they have improved processes. Cabarrus County shared an excellent example of using scripts to automate Next Generation 911 data updates. Next Gen 911 data is critical data for emergency response and should be updated at least monthly. For resource strapped counties, automation can allow GIS professionals to maintain this important data while spending less hands-on time. Sharing these tips and tricks is one way the LGC provides value to its members.

As part of the 2021 Bipartisan Infrastructure Law, $15 billion was dedicated to lead service line identification and replacement. The first step in this process is to inventory existing lead service lines, which falls to local service providers. The City of Kannapolis shared their experience using ESRI's Lead Service Line Inventory solution. The solution can be deployed by any local government currently using ESRI products and provides a standardized data format that can seamlessly integrate with state and EPA reporting requirements. By using a solution provided as part of software already deployed by most GIS departments, local service providers can take advantage of expertise being developed within neighboring jurisdictions and eliminate the time needed to plan for solutions and database designs. This example demonstrates how GIS can minimize the burden of new state or federal reporting requirements when easy to deploy solutions that are available to most GIS departments can be implemented.

"This example demonstrates how GIS can minimize the burden of new state or federal reporting requirements when easy to deploy solutions that are available to most GIS departments can be implemented."

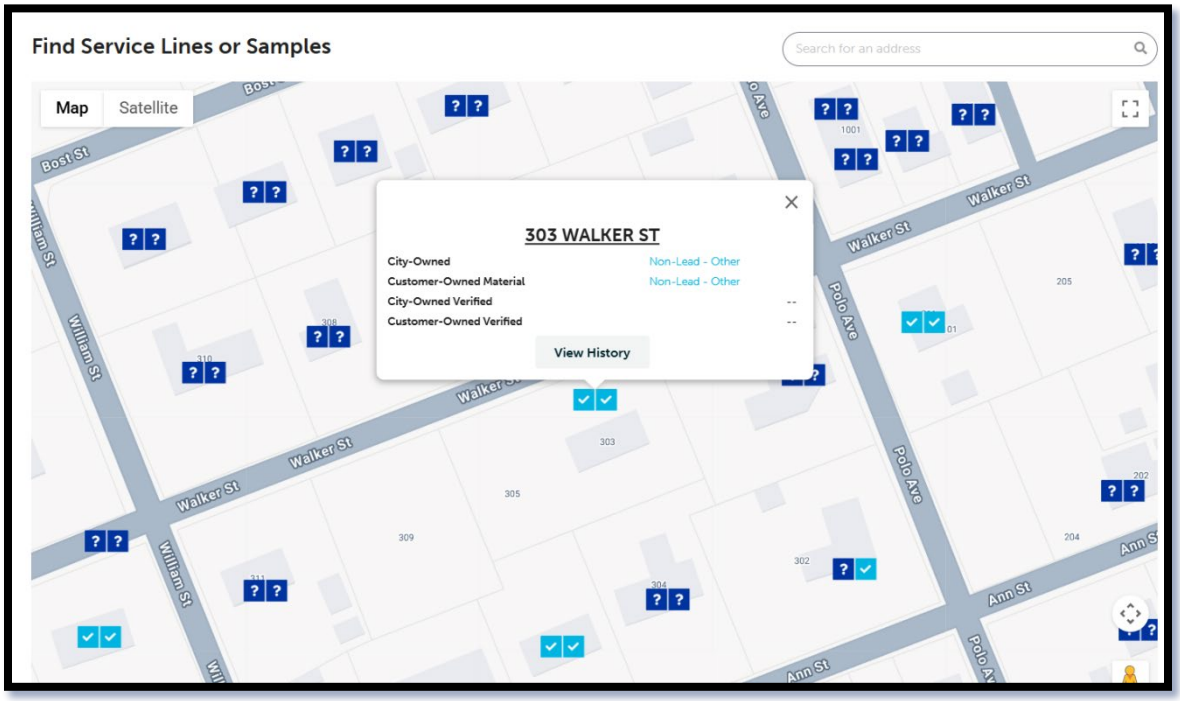


Figure 17. Kannapolis Lead Pipe Inventory Map

While the previous two examples focused on concrete tools that save time and streamline efforts, the LGC also focused on how to communicate the ways they provide value. Eric Wilson, NCDOT GIS Manager, shared the various ways to communicate return on investment. For the private sector, return on investment often focuses on dollars saved versus dollars

spent within a profit driven paradigm. For the public sector, this calculation becomes more difficult because profits are not a factor. Wilson shared other ways to look at return on investment, including providing additional services without increasing staff, making data more transparent, tracking improvements in public perception and documenting efficiencies achieved. Regularly communicating these improvements is important for maintaining existing public services and obtaining additional resources that will be needed as more local departments deploy GIS solutions. The LGC will continue to share solutions that increase efficiency and promote communicating the value of these solutions.

Statewide Efforts Based on GIS Data

GIS data and technologies are being implemented across the state in collaborative applications. North Carolina's strong commitment to GIS data quality and data sharing supports the development of tools that use data for decision support. Data sharing portals like NC OneMap promote use of single statewide data sources across multiple agencies and applications. Federal portals like the Digital Coast and the Geoplatform provide similar data accessibility for federal resources.

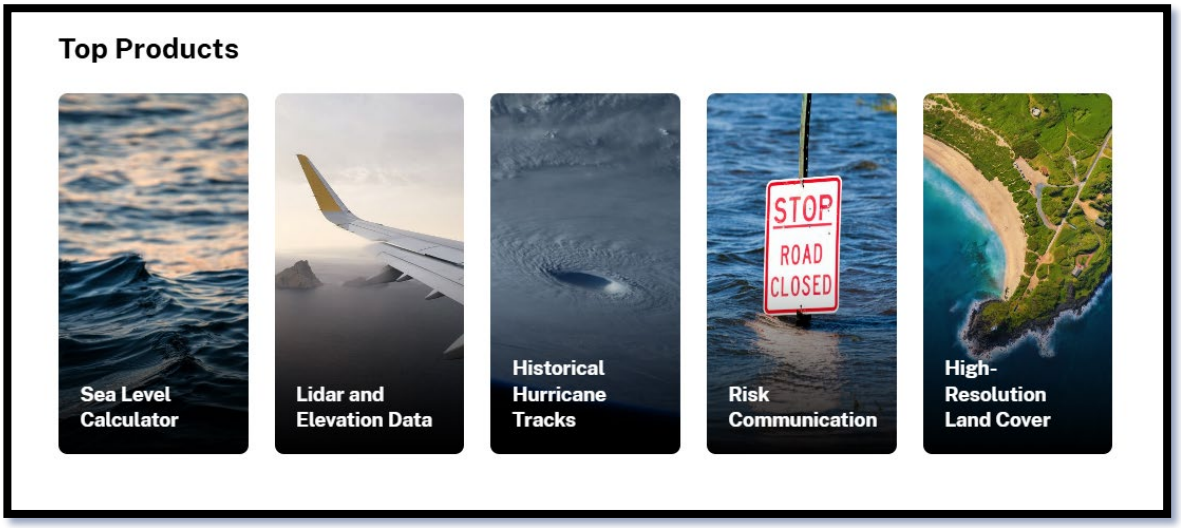


Figure 18. GICC partners in federal agencies share resources with state and local counterparts. NOAA's Digital Coast contains a wealth of data and tools that can be incorporated into state and local projects.

GIS projects within agencies do not always progress under the supervision of the GICC. However, council and committee members work to ensure the community is aware of GIS based projects and encourage participation by council and committee subject matter experts. Members ask those managing GIS projects to provide updates to the council and committees. These project updates allow GIS project managers to seek feedback from the GIS community on best sources of data, technical solutions and opportunities for engagement. The GIS community benefits from the awareness of project status and the opportunity to join in project steering committees to contribute their expertise.

Flood Resiliency Blueprint

The Flood Resiliency Blueprint (Blueprint), managed by the Divisions of Mitigation Services within the N.C. Department of Environmental Quality, is a strong example of the power of GIS to provide decision support tools for complex problems. The Flood Resiliency Blueprint is a tool designed to support targeted funding for flood projects that increase community resilience. While the Blueprint is not a GICC project, the tool relies on foundational datasets developed through the GICC including elevation, hydrography, building footprints, addresses, parcels, landcover, transportation and others. The Blueprint team provided updates to the GICC, and GICC members were chairs of Technical Advisory Groups that provided guidance to the development of the Blueprint. The Blueprint modeled the best practice of involving a wide variety of stakeholders including GIS experts in decision making, and supported feedback from these experts who recommended the use of well documented, well maintained, GICC backed datasets for foundational analysis.

Figure 19. The Flood Resiliency Blueprint Website will link to a GIS-based planning tool that local governments can use to prioritize flood resiliency actions.

Resiliency Exchange

The North Carolina Office of Recovery and Resiliency (NCORR) was tasked with creating a resiliency exchange website to bring together the many sources of information on community resiliency into a single portal for local communities. Part of this exchange was a focus on geospatial tools to assist local governments. Many map-based resiliency tools already exist, but those who are not already in the GIS profession may not be aware of where to find these

tools, as they are scattered across different federal, state, educational and non-profit organizational websites. The power of the GICC lies in its diverse stakeholder community who know what resources are available within their areas of expertise. CGIA assisted in gathering existing geospatial resources and websites from GICC members to assist NCORR in creating their resiliency exchange from the best data sources and existing tools. This coordinated effort saved time and money and did not duplicate existing work. The final product was shared with the GICC community through the LGC and SGUC.

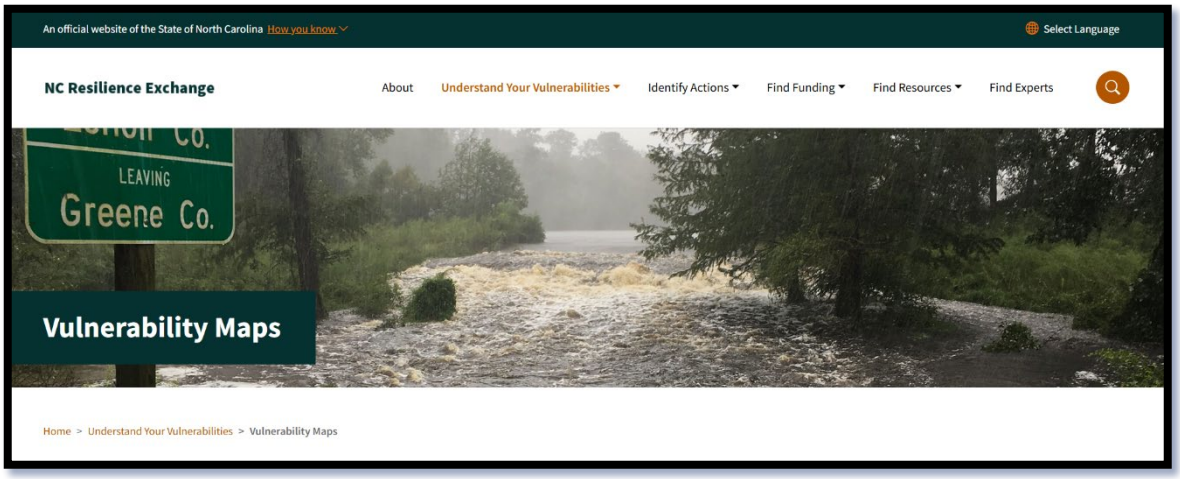


Figure 20. The Resiliency Exchange pulls together existing geospatial resources from various state and federal agencies into a single portal for ease of use.

Environmental Justice Tool

On October 24, 2023, Governor Coooper signed Executive Order 292 with an immediate effective date and remaining in effect until October 31, 2027 unless rescinded or superseded by another applicable Executive Order.

From the Governor's Office press release announcing the Executive Order:

> *"The Order defines environmental justice as the just treatment and meaningful involvement of all people, regardless of income, race, color, national origin, or Tribal affiliation, in agency policies and programming that affect human health, well-being, quality of life, and the environment so that people: (i) are protected from disproportionate and adverse human health effects and environmental hazards, including: those related to climate change, the cumulative impacts of environmental and other burdens, and the legacy of racism or other structural or systemic barriers; and (ii) have equitable access to a healthy, sustainable, and resilient environment to live, play, work, learn, grow, worship, and engage in cultural and subsistence practices."*
>
> *"The Order directs the Department of Information Technology to develop an Environmental Justice Hub, including a statewide environmental justice mapping*

tool and additional information about environmental justice resources across state government."

Section 8 of the Executive Order directed the development of a whole of government Environmental Justice Hub webpage and Mapping Tool. CGIA was tasked with the development of the Hub webpage and Mapping Tool and worked closely with NCDIT Communications, the N.C. Department of Health and Human Services, the N.C. Department of Environmental Quality and the N.C. Department of Transportation to ensure each component is not duplicative of existing applications, but captures existing data from the authoritative sources. CGIA provided regular updates to the Environmental Justice Advisory Council (EJAC) and the Mapping Subcommittee. Additionally, CGIA presented the Mapping Tool alongside the EJAC and Mapping Subcommittee at public outreach meetings across the State to capture their feedback for potential use cases and functionality. The Hub webpage and Mapping Tool will be released publicly during the Fall of 2024.

Figure 21. The Environmental Justice Mapping Tool is a whole of government application, leveraging existing environmental justice GIS data from other state and federal agencies.

Collaboration for Data Governance and Consistency

GICC Data Breakout Sessions

In August 2023, the GICC hosted facilitated data discussions on topics recommended by the GIS community during the 2023 NC GIS Conference. Members met in person and virtually from across the state to discuss infrastructure, hydrography, community structures, landcover and boundaries. The meetings were facilitated by GICC members and CGIA staff.

Hydrography Working Group Recommendations

The Hydrography Working Group (HWG) has been working for many years to develop an updated hydrography dataset for North Carolina. The national authoritative dataset, the National Hydrography Dataset (NHD), will be replaced by the U.S. Geological Survey with the 3D Hydrography Program, an elevation derived hydrography dataset based on 3D Elevation Program data.

While the HWG concentrated on understanding new federal data requirements, the N.C. Division of Water Resources (DWR) was developing hydrography data from the state's elevation data to support the N.C. Department of Transportation's ATLAS planning tool. This preliminary dataset, the Headwater Stream Spatial Dataset (HSSD), was completed in the summer of 2023. The HWG collected user needs during the LGC outreach meetings and by surveying the user community. HWG members used the fall data meetings as a final way to seek feedback on specific issues as they finalized their recommendations. The HWG developed a proposed schema to support stakeholder hydrography needs using this feedback and prepared a gap analysis that outlined the progress made and future needs and presented it to the GICC in November 2023. The DWR dataset, while statewide and more extensive than anything created to date, will require significant work and investment to meet the needs of the wider stakeholder community. Initial funding to support ATLAS was provided by NCDOT, but funding to bring the dataset to a more widely useful format does not currently exist.

Figure22A demonstrates the errors corrected by the new hydrography data. In the figure, older hydrography is displayed on a topographic base layer. Notice that the streams labeled "Laurel Creek" and "Brushy Creek" run uphill as depicted.

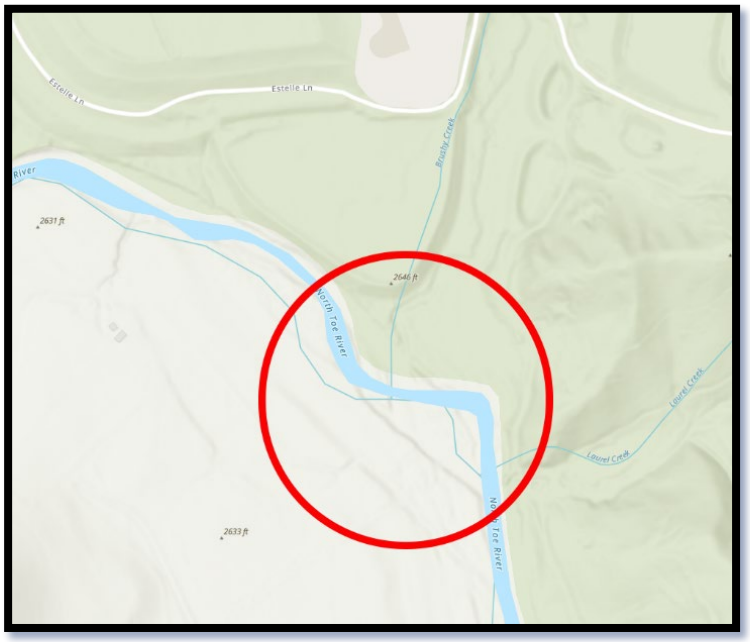
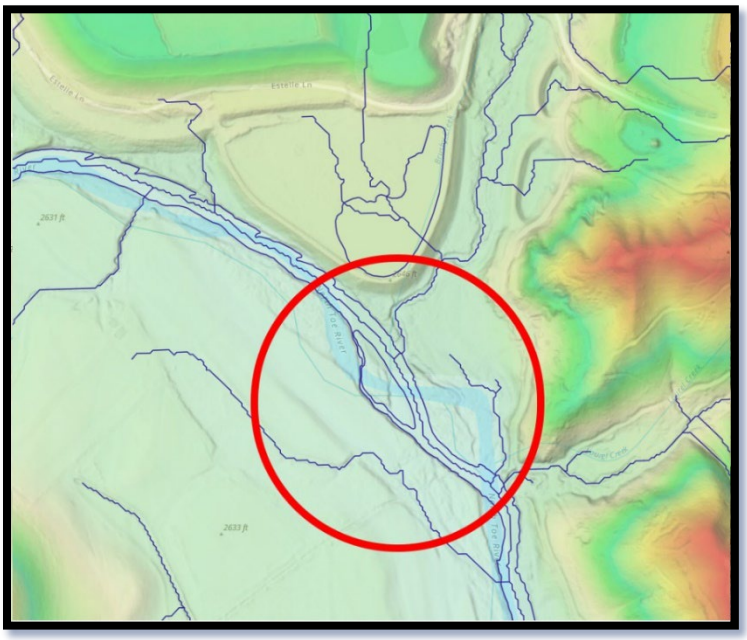


Figure 22A.



In figure 22B, new hydrography (blue lines) is overlayed on the older hydrographic map (labeled river) demonstrating a significant difference in stream position within the red circle. Streams move over time, and when data is not updated, maps quickly become out of date. Elevation derived hydrographic mapping has placed the streamlines in the current stream location.

Figure 22B.

Figure 22C shows new hydrography data over recent imagery, again demonstrating the greater accuracy of the new data.

Figure 22C.

Landcover Update

North Carolina has not invested in landcover data since 1996. The state has relied upon federally produced products like the Multi-Resolution Land Characteristics (MRLC) consortium National Landcover Dataset (NLCD) to meet its landcover needs. However, this 30-meter dataset has not met the needs of users, but they continued to use it because it was the best available. In the fall of 2023 and spring of 2024, the SMAC's landcover working group met to evaluate whether recommendations made in 2019 for a new NOAA product would still meet

community needs for landcover. The consensus was that the NOAA Coastal Change Analysis Program (C-CAP) data was a much better dataset for NC landcover needs and should be pursued for funding.

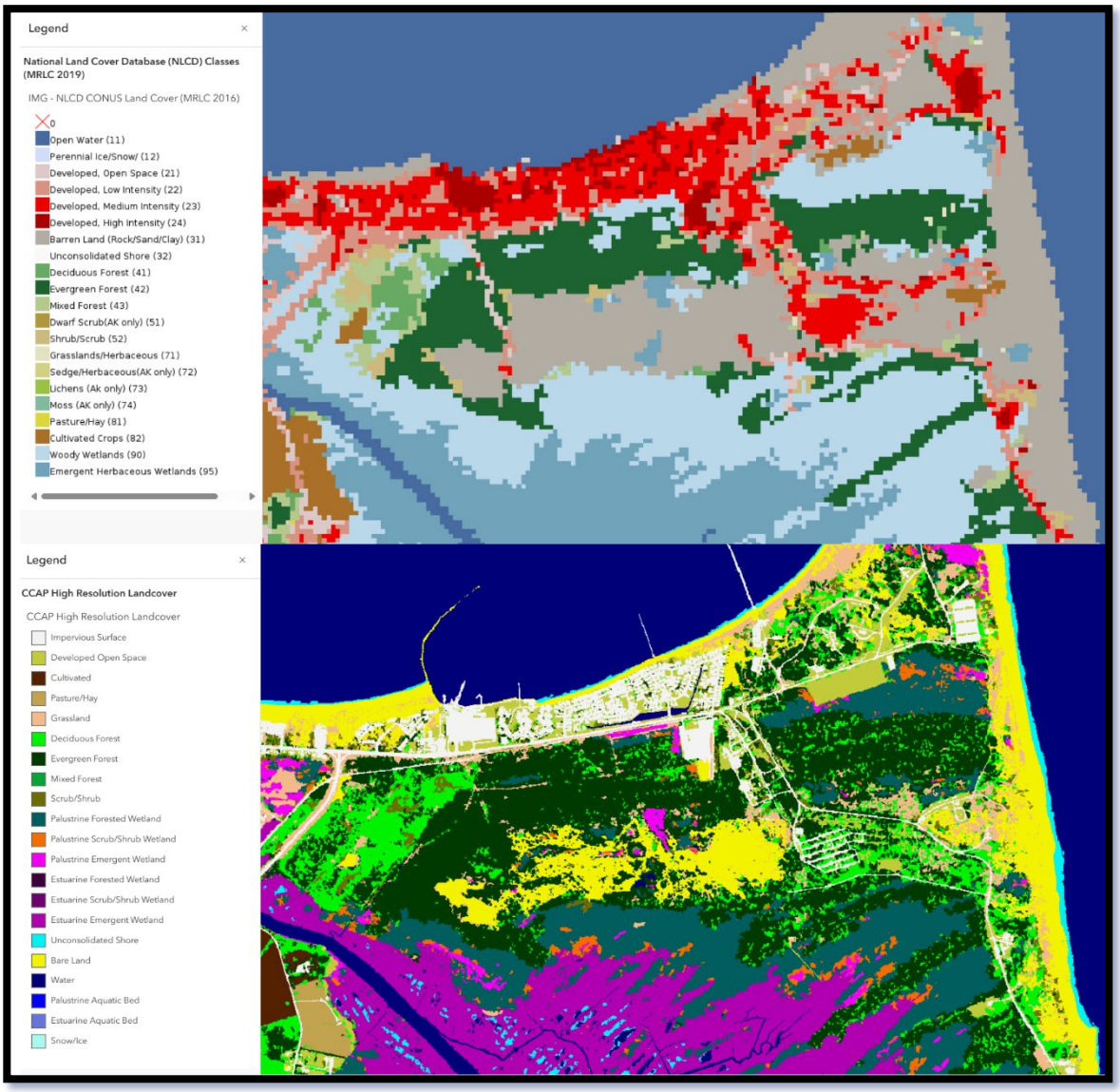


Figure 23. C-CAP high resolution landcover provides more detail for users. 30-meter data that has been used since 1996 is shown at the top and 1-meter C-CAP data is shown on the bottom.

NOAA's high resolution C-CAP program provides a 1-meter product with 22 land classes with the potential for additional wetland classes. DEQ's divisions recognized the need for investment in this product for multiple projects. The landcover update project is an excellent example of the value of the GICC. NOAA is a representative on the FIC Executive Committee, and through the FIC and the SMAC, the state directly coordinated with representatives from the C-CAP program. DEQ organized a wetlands working group, and when members of the SMAC landcover working group recognized a potential duplication of effort, they invited the DEQ group to join other stakeholders to coordinate on needs and funding together. NOAA also

put North Carolina in touch with the group in South Carolina that was planning to fund watersheds that flowed from North Carolina into South Carolina. Through these coordinated efforts, working group members identified funding for high resolution landcover for the state. The data is expected in FY2025-2026.

Seamless Parcels Working Group

The Seamless Parcels Working Group (SPWG) has been actively engaged in continuous quality improvement since the dataset was first published. The SPWG recognizes that the seamless parcels layer is the most requested layer on NC OneMap and recognizes the importance of local government support to the continued success of the layer. Data provider education and assistance is part of the working group's mission and includes reaching out to counties who are experiencing issues in data updates and maintenance to assist.

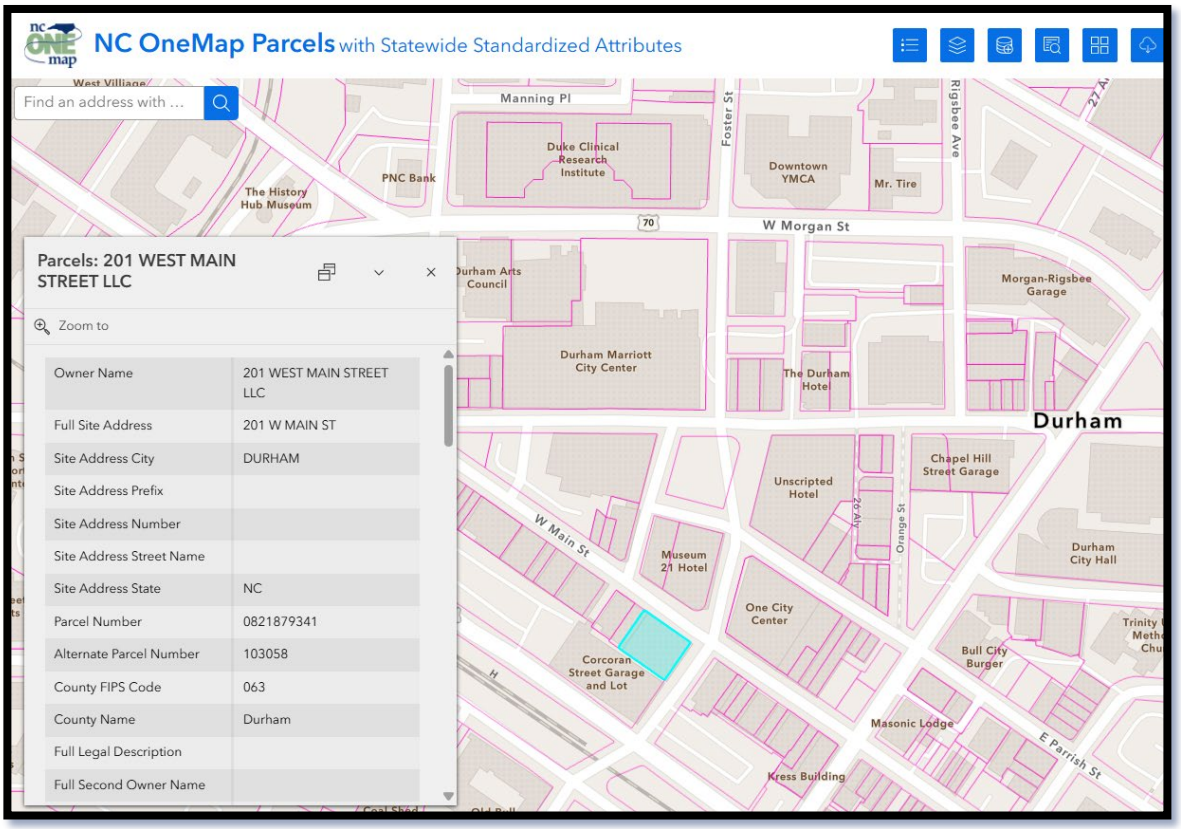


Figure 24. The Seamless Parcels viewer on NC OneMap supports the most traffic of any layer on the site.

The working group has also been focused on data user feedback related to inconsistencies in the data. The seamless parcel layer is maintained by 100 different counties, and it initially had no required data fields because the original project managers did not want to prevent counties from uploading data if they were unable to submit certain data fields. Now that almost all counties are regularly updating their data, the working group shifted its focus to identifying which data fields should be required. Limiting the burden on local governments is an important focus of the working group, so the group surveyed counties to ensure that the level of effort required to submit proposed data fields would be reasonable.

GIS Community feedback informed the decision for what fields should be required, and the working group weighed the need against the feedback from local governments on the level of effort required to supply the data. The result was a list of required, recommended and optional fields for parcel data. Table 1 shows the required fields approved at the November 2023 council meeting. The working group will be investigating whether engaging CAMA vendors, who provide tax database services to counties, might prove to be a venue for obtaining additional attribute data.

"Limiting the burden on local governments is an important focus of the working group, so the group surveyed counties to ensure that the level of effort required to submit proposed data fields would be reasonable."

Attribute	Description	Note
Parcel Number	The local parcel number for the parcel record	
Extended Parcel Number	The local parcel number with the state and county FIPS added to the beginning of the local number separated with underscore	*Derived*
County GNIS Identifier	The GNIS identifier for the county	*Derived*
County FIPS Code	The FIPS code for the county	*Derived*
State and County FIPS Codes	The state and county FIPS codes combined into single field	*Derived*
County Name	The name of the county	*Derived*
Record Area	The record or recorded area in numeric field, indicated as deed acres	One of the two is required: RECAREANO-RECAREATX
Record Area Text	The record or recorded area in text field, indicated as deed acres	
Owner First Name	The primary surface owner first name	One of the two formats is required: First Name/Last Name or Together in one field.
Owner Last Name	The primary surface owner last name	
Owner Name	The primary surface owner name in full	
Mailing Address	The full mailing address as a single field with everything	One of the two formats is required: Full Address field or individual fields.
Mailing Address Individual Part	The full name of the mailing street including the prefix, name, suffix, type and directions	
Improvements Value	The value of the improvements on the parcel	
Land Value	The value of the land on the parcel	
Parcel Value Type	The type of value reported in the parcel value fields, assessed, market, full cash	*Derived*
Parcel Use Code	The local assessment parcel use code	High Demand - High Use
Parcel Use Description	The local assessment parcel use description	High Demand - High Use
Site Address	The full site address as single field	One of the two formats is required: Full Address field or individual fields.
Site Address Street Name	The full name of the site street including the prefix, name, suffix, type and directions	
Source Agent	The agency that houses the source reference documents, clerk of court, regiser of deeds, etc.	*Derived*
Structure on Parcel	Is there a structure or improvement on the parcel, Y yes, N no, U unknown is default	*Derived*

Table 1. Required attributes for Seamless Parcels. Half of the required attributes can be derived, limiting the effort required to update this data.

Municipal Boundary Working Group

The Municipal Boundary Working Group (MBWG) focused this fiscal year on increasing the number of local governments using the municipal boundary update tool. The tool was created to address the duplication of effort existing in state government agencies that were all collecting and independently updating municipal boundary data. None of the agencies had a complete dataset, and none of the agency data layers matched, making analysis difficult to replicate across agencies and causing undue burden on local governments who were supplying the same data to multiple agencies. To compound the problem, the Land Records Office within the Office of the Secretary of State was not receiving annexation data that was being shared

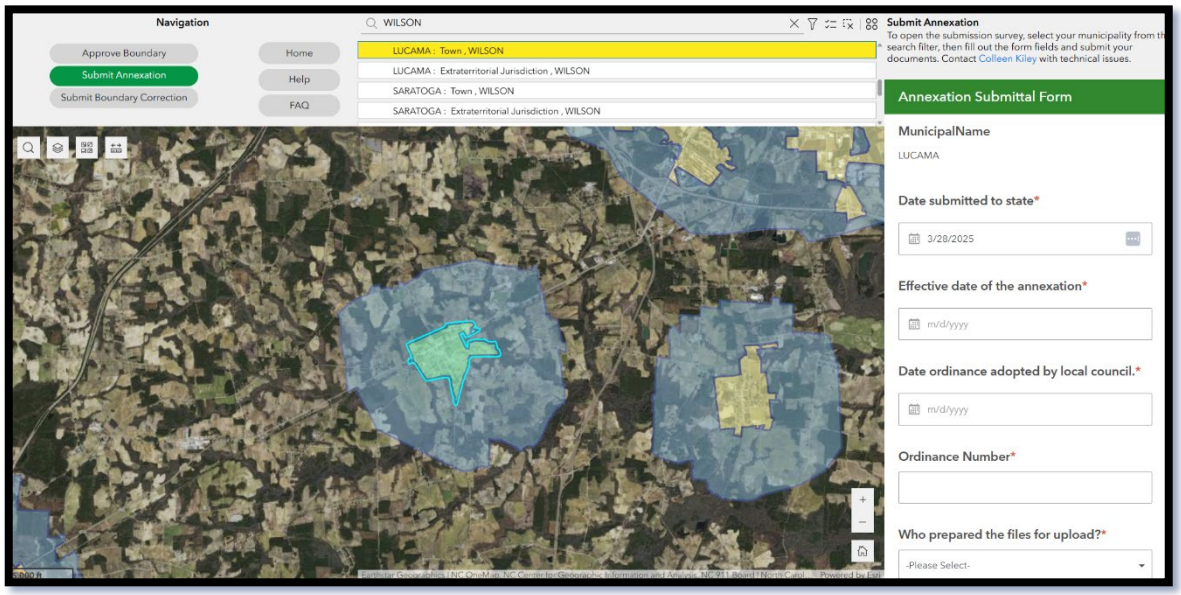


Figure 25. The Municipal Boundary Working Group tool on NC OneMap supports submitting annexations to multiple agencies from a single portal.

with other state agencies and with the U.S. Census (Census). The Land Records Office must certify boundary updates for the Census, but they were unable to certify changes that were not received by their office.

Using the Seamless Parcels program as a guide, the MBWG created a website that supports local governments in submitting their updates to a single portal. The website has three functions. Local governments can approve their boundaries, if they are correct, or they can submit either a full boundary update or an annexation update. The work of the MBWG this fiscal year has been on increasing awareness of and encouraging use of this tool. The state intends to create a statewide Boundary Annexation Survey (BAS) agreement with the Census, which would alleviate some reporting burden from local governments who currently respond to the survey. By adopting the MBWG web tool, local governments can submit boundary updates to all state agencies and the BAS with a single tool. The MBWG will continue to promote and communicate the value of this tool and hopes to increase adoption ahead of a statewide BAS agreement.

Collaboration for Public Access to Geographic Information

NC Broadband Expansion

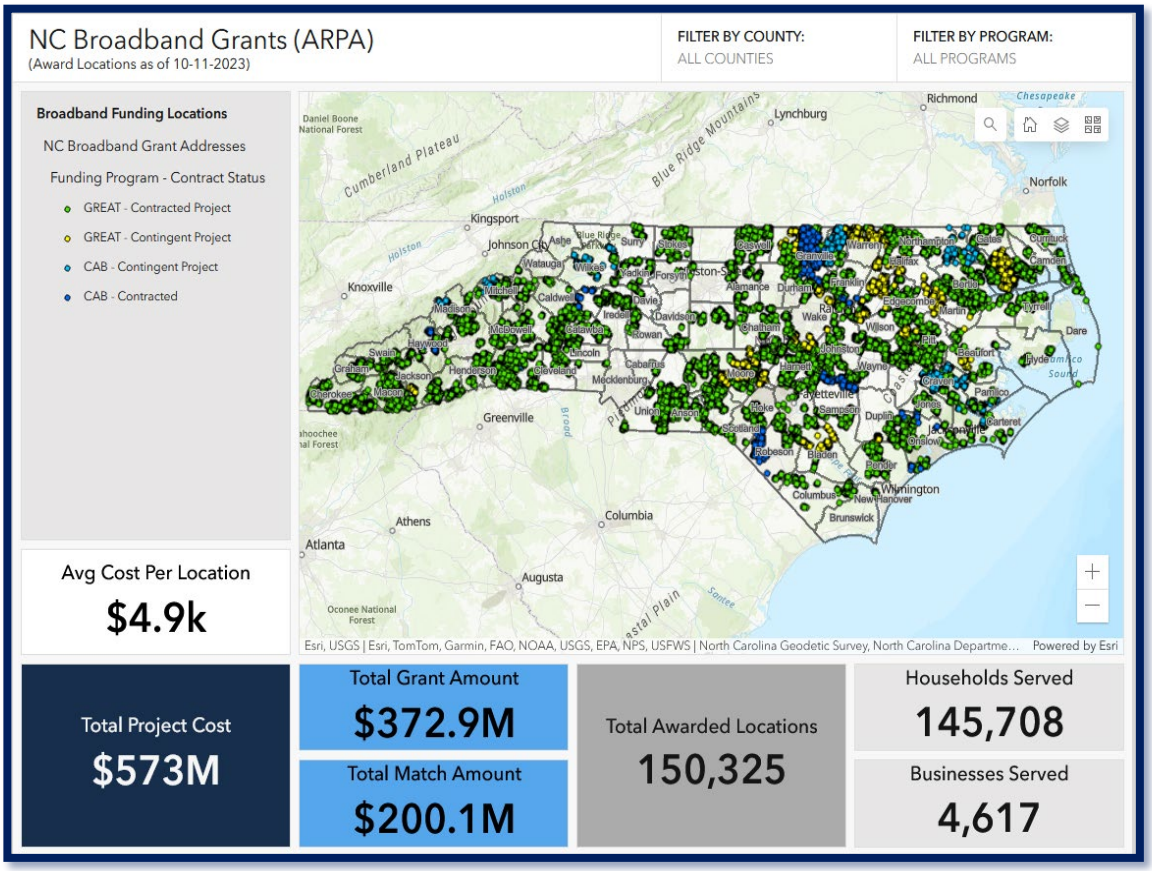


Figure 26. NC OneMap provides access to many tools for broadband planning, grant tracking and data transparency including this grant tracking dashboard.

Broadband expansion relies on solid geospatial data for planning, program management and grant tracking. NC OneMap and the NCDIT Division of Broadband and Digital Opportunity have a close partnership to support this important service for the state. GIS data supports critical decisions for the program and has been instrumental in bringing additional grant funding to North Carolina.

The existing building footprint data, though dated, combined with excellent address and seamless parcel information proved to be an exceptional example of the power of GIS and the return on investment from decades of GIS data development. The Federal Communications Commission (FCC) released their serviceable location fabric data, which will

"Because North Carolina was able to prove, through well-developed datasets, that locations were missing from the federal dataset, the state gained more unserved locations than any other state in the country."

be used to allocate grant money to all states for broadband expansion.

If a home needing broadband is missing from the FCC data, the state will not qualify for grant money for that location. North Carolina submitted challenges to the FCC data to ensure that as many locations as possible were represented in the federal dataset. These challenges will result in more funding for broadband expansion in the state and better services for North Carolinians.

Orthoimagery Program: A Success Story

The Statewide Orthoimagery Program, funded by the N.C. 911 Board, delivers a consistent and current visual reference for emergency communications and serves as a foundational layer for most online mapping in the state. The program updates a quarter of the state's counties each year on a rotating basis with high-resolution, consistent and accurate orthoimagery. The imagery is available to state, local, federal and regional government agencies, as well as the private sector, the academic community and private citizens as map services and downloadable files from NC OneMap.

Figure 27. Picture This: The 2021 Orthoimagery Program captured this image of a large art installation on the N.C. Museum of Art grounds.

In fiscal year 2023-24, the southern piedmont and mountains project (Phase 4) was collected in early 2023 and delivered in the last half of the same year. The coastal project (Phase 1) was collected in early 2024. The first delivery of imagery that includes the addition of a color infrared (CIR) product occurred in 2020, and the new product continues to be collected with each new phase. Because the internal cell structure of healthy plants reflects the near infrared wavelength, CIR imagery is useful in monitoring plant and crop health. With the southern mountain area collection, the CIR product became available statewide in the fall of 2023. The current orthoimagery program continues to provide a high-quality product to support emergency response and communications at a substantial savings from previous collection methods and serves as a model to other states. The orthoimagery program provides great value beyond its funded purpose for Next Generation 911, as it is used widely for planning, grant determination, tax valuation, emergency management, landscape change detection, transportation, resiliency and many other purposes.

NC OneMap

NC OneMap is an award-winning GIS open data portal used as an example of governmental excellence across the country. It is heavily used to discover and consume geospatial data. CGIA began a migration to the cloud in 2021 to provide elasticity and ensure a consistent experience during times of heavy use to protect this vital resource. The migration of services to a cloud hosted environment provides a more stable platform while preserving all the benefits of NC OneMap.

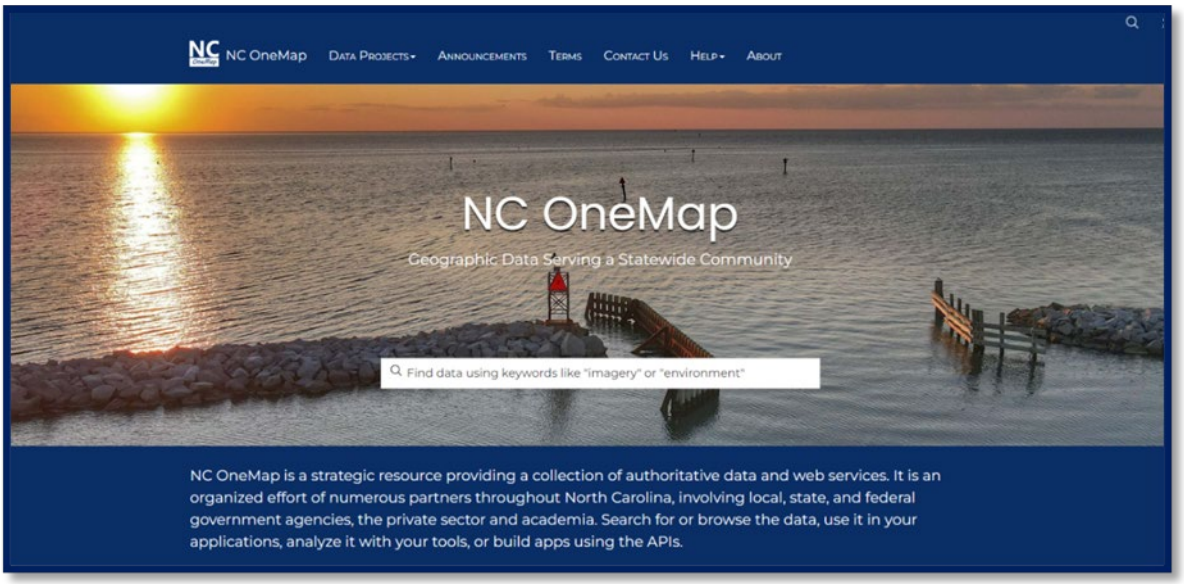


Figure 28. NC OneMap provides access to a host of GIS tools including Broadband, Municipal Boundaries, AddressNC, Orthoimagery and elevation data.

NC OneMap's resources are used across all levels of government, the private sector and the educational community. Standards for data quality, documentation and distribution provide users with the confidence that the data discovered through NC OneMap is authoritative and trustworthy. The site provides information and resources for GICC initiatives such as AddressNC, Municipal Boundaries, Seamless Parcels and Broadband. New updates for this fiscal year included the addition of elevation data visualizations, a partnership with N.C. Emergency Management. Based on community feedback, CGIA replaced older 20-foot digital elevation models (DEMs) with updated 3-foot DEMs.

Intergovernmental Collaboration for Efficiency

AddressNC: Building Upon Next Generation 911

Address data is closely tied to parcel and building footprint data, and the three datasets, when combined, form a solid foundation for powerful analysis and decision support tools. In 2018, one-time legislative funding was provided to update the dataset in preparation for the 2020 Census, but the GICC identified a more efficient and sustainable update model. The GICC saw

an opportunity to continually update the dataset rather than rely on a one-time update as had occurred in the past.

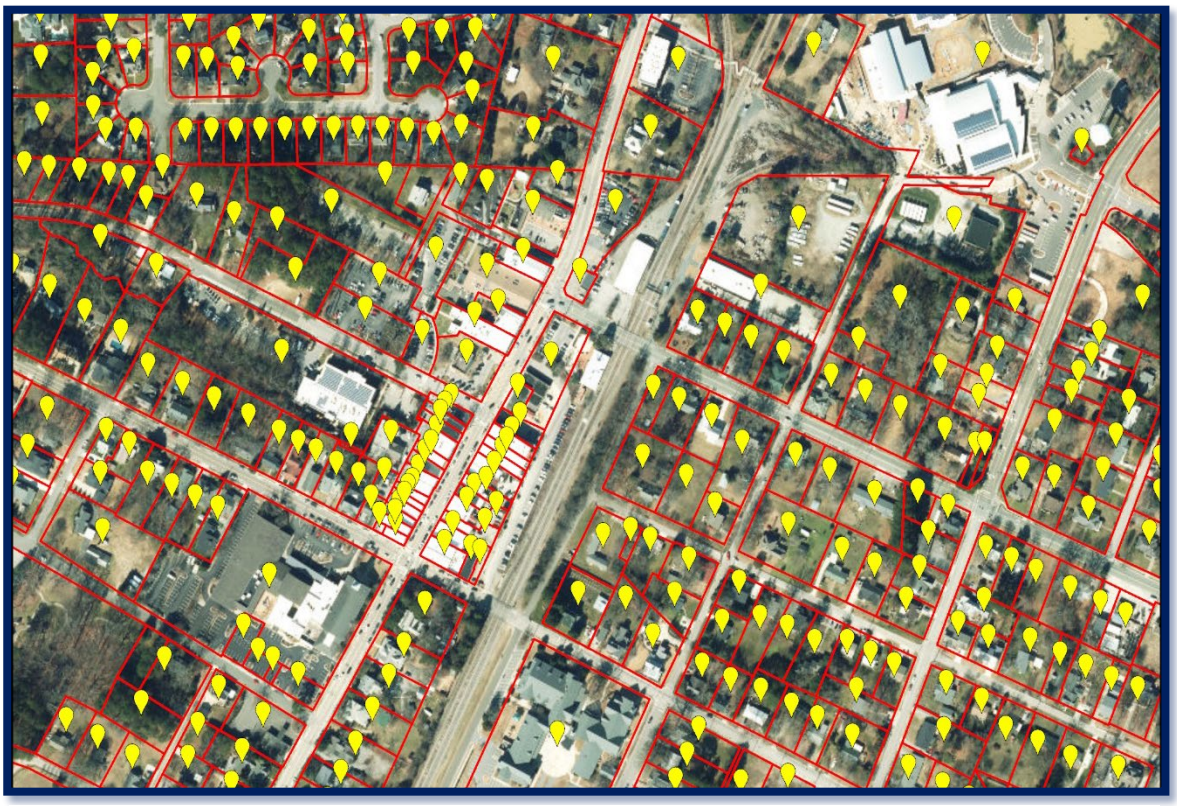


Figure 29. AddressNC compiles a statewide address layer from Next Generation 911 data, producing a dataset that is constantly updated to provide accurate address locations for many applications.

Address data is a continuously changing dataset and updating it once or twice a decade leaves the data lacking information, especially in rapidly developing areas of the state. In keeping with the GICC's goals of collaborating to eliminate silos and duplication of effort, the AddressNC steering committee developed a plan to maintain the AddressNC data using monthly updates from Next Generation 911.

The AddressNC team at CGIA developed update tools, data standardization tools, error reporting and process workflows to support the project. As data became available through Next Generation 911, address points were added to the AddressNC database and quality checked for future publication. Last fiscal year, the project met the milestone of publishing data from all 100 counties, and this year, the team worked closely with counties to assist them with their address

"Last fiscal year, the project met the milestone of publishing data from all 100 counties, and this year, the team worked closely with counties to assist them with their address data, while simultaneously providing outreach and updates to the GIS community about the importance of data maintenance."

data, while simultaneously providing outreach and updates to the GIS community about the importance of data maintenance.

In addition to serving the address data through NC OneMap, a geocoding tool was published that allows users from multiple platforms to locate addresses. Local stakeholders have been asking for a more complete address location tool than common tools like Google or Apple maps. These commonly used address datasets are not updated as frequently as NC OneMap, so NC OneMap now provides a more frequently updated alternative for package delivery and other location services.

Lidar Working Group

Light Detection and Ranging (lidar) data is a 3D scanning technique that uses light pulses to map elevation. Essential to the production of accurate flood risk models, the N.C. Floodplain Mapping Program has been using lidar data to more accurately depict flooding risk for residents and emergency response. This data is used during flooding events to warn residents

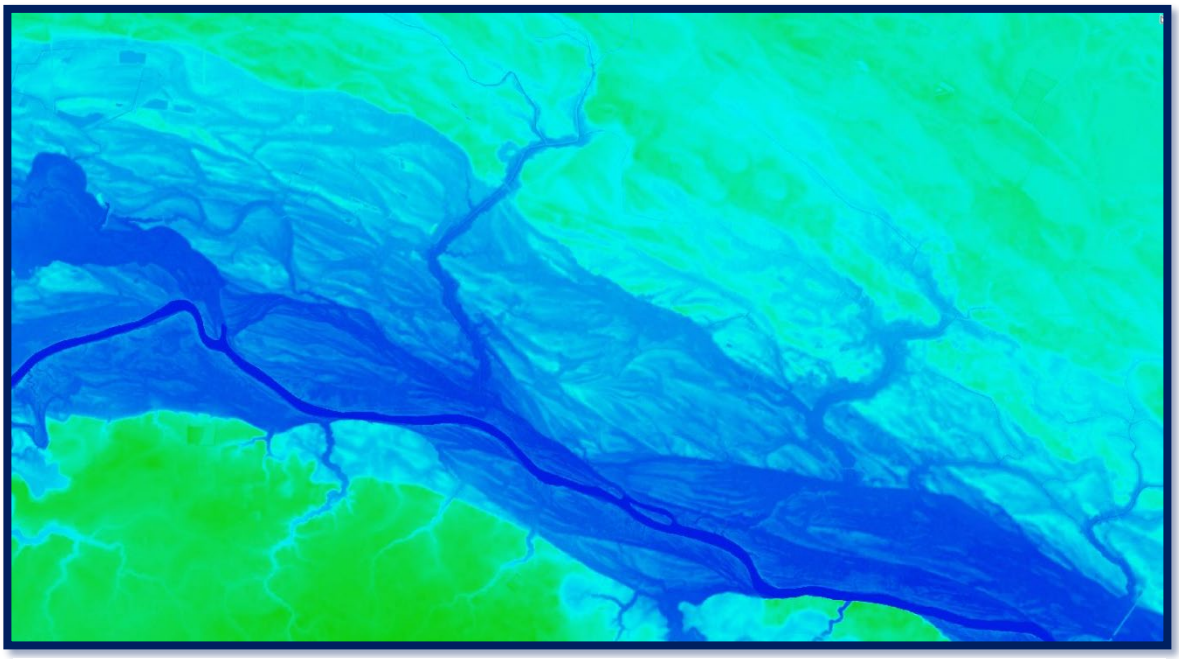


Figure 30. Lidar derived digital elevation model showing a river floodplain. This data is used to model flood risk and help warn residents when flooding may threaten property and lives.

of impending flooding and target evacuations. The N.C. Department of Transportation uses the data to determine which roads may overtop during flooding. Quite simply, lidar data has saved lives.

In addition to its application to emergency response and early warning, lidar data is used by a range of stakeholders that include the development community and precision farming. The USGS conducted a study to outline mission critical uses for lidar across the country. The report included 275 pages of information outlining the users and their requirements for lidar data in North Carolina. To the basic map or application user, lidar data may not be an obvious part of

their user experience. However, this often invisible dataset forms the backbone of mission critical activities and needs wider recognition of its benefits and value to users. The USGS study reported an estimated gain of $61.1 million in annual benefits to state, regional, local, educational and non-governmental organizations participating in the study. Geologic assessment, hazard mitigation, flood risk management, coastal zone management and infrastructure and construction management accounted for over 50% of the estimated total benefits.

Lidar data provides a more accurate representation of the ground surface and features such as roads, buildings and vegetation. North Carolina has approximately 80 percent of the state mapped with higher-quality lidar, with the central Piedmont, including the Triangle and Triad mapped this fiscal year to finish the state. Due to the rapid development in these areas, it will be important to collect updated high-quality data, but an ongoing funding source is not available. This critical dataset has been funded historically by disaster funds, but this is not a sustainable funding model. Partnerships and funding sources will continue to be a focus as stakeholders seek to fill this data gap. The Lidar Working Group of the SMAC is working on a business plan to address the lack of a consistent funding model for this critical dataset.

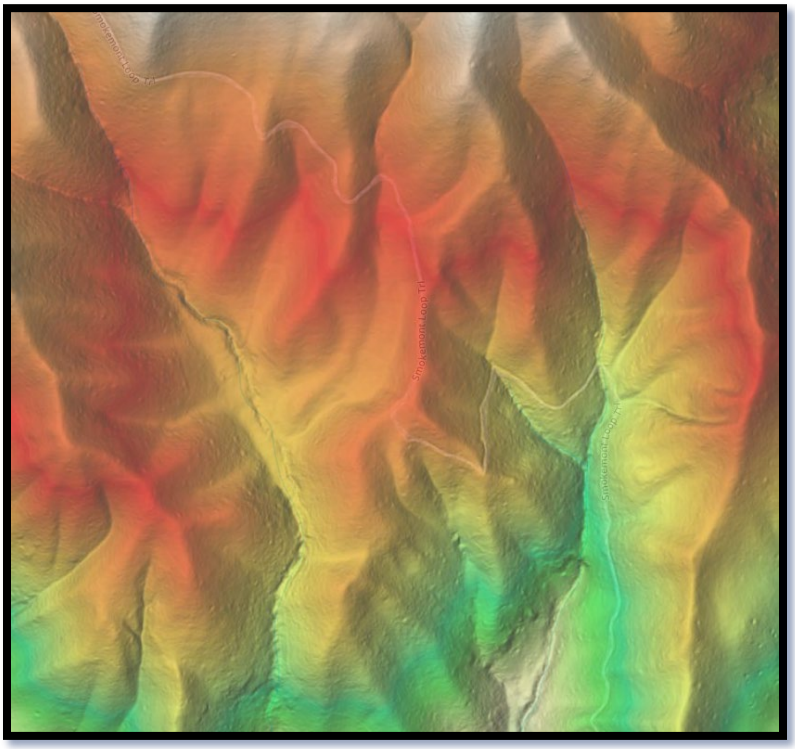


Figure 31. Lidar can be used for so many uses. In this image, a hiking trail is clearly visible as a lighter colored line snaking over the ridges within Smoky Mountain National Park.

Datum Change

The National Geodetic Survey (NGS) will be replacing the datums currently used in North Carolina and across the nation with new reference frames. A datum serves as a reference surface for measuring height above sea level and location. The older datum, NAVD88, was made with standard leveling and surveying techniques that have been in use for decades. The new datum will use satellite and gravity measurements to calculate more precise vertical heights. This new datum will be more accurate and provide better vertical height information critical to flood modeling and construction planning.

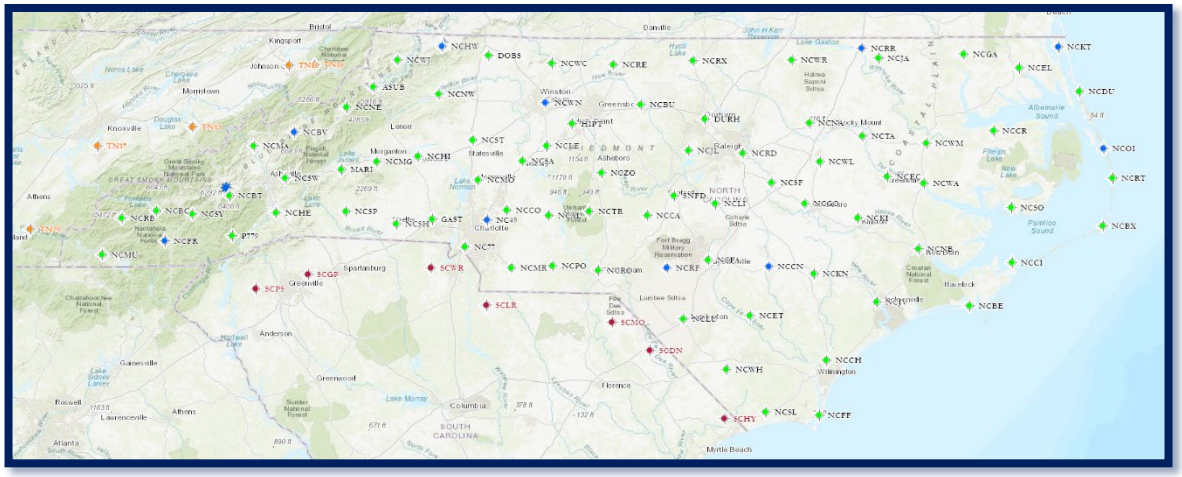


Figure 32. The Continuously Operating Reference Station (CORS) network supports global positioning and navigation.

North Carolina Geodetic Survey (NCGS) Chief, Gary Thompson, has been updating the council on this important change. The original release date for the new datum was originally scheduled for 2023, but it has been moved to 2026. Since all GIS data is referenced to a datum, users must be aware of how introducing a new reference frame will affect their work. The LGC has requested assistance with preparing for the change, and the NCGS will be preparing documentation for local governments.

Collaboration for Information and Education

GIS Training

The SGUC coordinates ESRI GIS group classes as part of the benefits available through the ESRI enterprise agreement. This fiscal year, the SGUC arranged to offer five group instructor-led classes that trained a total of 75 state employees. In addition, 14 additional employees were trained during individual instructor-led classes focusing on unique professional needs. Each group class offered allows the state to train 5 staff at no extra cost, so during this fiscal year, 25 additional employees were trained for free under the terms of the ESRI EA.

Presentations and Outreach

An important goal for the council is to educate the geospatial community and public about council initiatives and geospatial resources. As staff to the council, CGIA staff coordinate with working groups and committee chairs to present information and updates throughout the year. The following is a list of venues and topics presented this fiscal year:

Venue	Topic
North Carolina Local Government Information Systems Association (NCLGISA) Spring Symposium	Broadband and Automation
ESRI User Community Meeting	NC Broadband
North Carolina Land Records Workshops	GICC Framework Datasets and Working Groups
North Carolina Property Mappers Association	GICC Framework Datasets and Municipal Boundary Working Group
North Carolina Arc Users Group (NCAUG) Fall Conference	AddressNC Program Dashboard
NCDIT Town Hall	Value of GIS: Coordination and Data
North Carolina Association of State Floodplain Managers	Geospatial Data Update

Table 2. Outreach presentations for Fiscal Year 2023-2024.

Future Priorities

The council's priorities for the future remain centered around data-driven collaboration and continual improvement of access to data products. Fiscal year 2024-25 priorities cover improving existing datasets, formalizing partnerships, developing business plans for dataset maintenance, emergency coordination, and improving access to data that will save time, money and lives. Several of the future council priorities listed below will require a regular funding source. Those priorities are indicated in **bold**.

Data improvement

- Coordinate with local municipalities to approve municipal boundary data in a statewide authoritative source.
- Directly engage Computer Assisted Mass Appraisal (CAMA) vendors to pilot a process for delivery of required attributes for the seamless parcels layer and support attribution of building footprints.
- **Formalize the partnership between DEQ, NCDOT and NCDIT to secure the future development of NC Hydro.**
- Coordinate with NOAA to support contracting of high-resolution C-CAP landcover data.

Community Coordination

- **Update NC OneMap regularly to enhance data access and GIS community engagement.**
- Host 2025 NC GIS Conference.
- Increase federal to state, state to local and federal to local coordination by creating opportunities for direct engagement between partners.
- Assist local governments in understanding GIS disclaimer requirements set forth in SB355 and communicate technical solutions to bill sponsors.

Standards Development

- Create a business plan for elevation data acquisition and maintenance.
- Publish best practices for authoritative badging – an important tag used by those searching for geospatial data online.

For more information about the council including the latest meeting information and contact information for council members and staff, please visit https://it.nc.gov/gicc .

Appendix 1

Acronyms

- ARPA - American Rescue Plan Act
- AWS - Amazon Web Services
- BAS - Boundary Annexation Survey
- BEAD - Broadband Equity, Access, and Deployment
- CAB - Completing Access to Broadband
- CAMA - Computer-Assisted Mass Appraisal
- C-CAP - Coastal Change Analysis Program
- CGIA - Center for Geographic Information and Analysis
- CIR - Color Infrared
- DEQ - North Carolina Department of Environmental Quality
- DEM - Digital Elevation Model
- DWR - Division of Water Resources
- EA – Enterprise Agreement
- EJAC – Environmental Justice Advisory Council
- EPA - Environmental Protection Agency
- FCC - Federal Communications Commission
- FGDC - Federal Geographic Data Committee
- FIC - Federal Interagency Committee
- GAO - Government Accountability Office
- GDAC - Government Data Analytics Center
- GICC - Geographic Information Coordinating Council
- GIS - Geographic Information Systems
- GMA - Geospatial Maturity Assessment
- GREAT - Growing Rural Economies with Access to Technology
- HWG - Hydrography Working Group
- LGC - Local Government Committee
- MBWG - Municipal Boundary Working Group
- M&O - Management and Operations Committee
- MRLC - Multi-Resolution Land Characteristics
- NCAUG- North Carolina Arc Users Group
- N.C.G.S. - North Carolina General Statute
- NCDIT - North Carolina Department of Information Technology
- NCDOT - North Carolina Department of Transportation
- NCEM - North Carolina Emergency Management

- NCLGISA - North Carolina Local Government Information Systems Association
- NCORR - North Carolina Office of Recovery and Resiliency
- NCGS - North Carolina Geodetic Survey
- NGS - National Geodetic Survey
- NGAC - National Geospatial Advisory Committee
- NHD - National Hydrography Dataset
- NLCD - National Landcover Dataset
- NSDI - National Spatial Data Infrastructure
- NSGIC - National States Geographic Information Council
- OSHR - Office of State Human Resources
- SGUC - State Government GIS Users Committee
- SMAC - Statewide Mapping Advisory Committee
- TAC - GIS Technical Advisory Committee
- USGS - United States Geological Survey