Landcover Working Group Progress Update and Recommendations

Statewide Mapping Advisory Committee

Landcover Working Group

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Background

Through 2018-2019, the Landcover Working Group (LWG) of the Statewide Mapping Advisory Committee (SMAC) convened to review landcover needs for North Carolina. The LWG charter outlined its purpose.

> *The purpose of the Working Group for Land Cover is to evaluate business needs for a new statewide land cover dataset and/or for capability to produce classified land cover in an area of interest.*

At the time the working group was active, there were two main sources of landcover data in North Carolina: 1996 North Carolina funded statewide landcover dataset, and the 30-meter National Land Cover Dataset based on 2011 data. The SMAC identified landcover as an important dataset, yet lack of current data at appropriate scales hampers the ability for many stakeholders to use existing data as they need. This problem existed at the time the original working group convened and has not improved.

The working group engaged the North Carolina GIS community to determine their uses and needs for landcover data and provided a report to the SMAC in 2018. Questions addressed by the group through surveys of the statewide GIS Community included:

- What is the minimum ground resolution required for classified land cover?
- How many land cover classes are required?
    - What are the classes?
    - Which classes are essential?
- What are the temporal requirements?
    - What is the time span between date of capture of remotely sensed data and completion of products-ideal span and tolerable span?
    - What is the minimum frequency required if change analysis is required?
- What is the geographic extent?
    - Is statewide extent required?
    - Are there specific locations that take priority if statewide extent is not practical or affordable?
- If a business need is not met by NLCD or C-CAP, why?

The LWG resumed meeting in late 2023 to review recently produced Coastal Change Analysis Program (C-CAP) data and to determine if the needs identified in 2018 have changed significantly enough that the working group's original recommendations should be amended. Concurrently, a group within the NC Department of Environmental Quality and the Albemarle Pamlico National Estuary Partnership began reviewing data sources that would meet their needs for updated wetlands data. The two groups are now collaborating to meet their common goals.

Landcover Needs and Recommendations

The LWG surveyed the GIS community and outlined the following important needs in their 2018 report.

1. Apply land cover data to land use planning
2. Monitor changes in impervious surface that may affect stormwater flow and/or billing
3. Identify areas where forest cover has changed that may affect water quality
4. Monitor riparian buffers where forest cover is expected to be sustained
5. Identify areas that are clear cut or change from forested or cultivated to developed
6. Analyze water resources for watershed characterization
7. Identify areas where wetland cover has changed to inform floodplain management
8. Identify areas that are floodplains, small and isolated wetlands, longleaf pine forests, and rock outcrops to help identify priority lands for conservation
9. Predict wetland areas or stream locations using models
10. Monitor properties over time that qualify for "present use value" in county tax appraisal
11. Estimate the areas within property boundaries that are forested or cultivated for property tax appraisal purposes
12. Identify and/or analyze vegetation species related to wildlife habitat
13. Monitor terrestrial plant communities
14. Identify and/or analyze tree type for urban forestry planning
15. Assess timber condition and value in areas of interest

The working group reviewed the 2018 needs and determined that they still represent a valid list of landcover needs. However, in recent LWG discussions, the advanced age of wetland data in North Carolina has emerged as a common concern, and updated wetland mapping is a strong need shared by many of the group stakeholders. This need for wetland data is reflected in the wetland concentration of the NCDEQ/APNEP working group.

In addition to uses of landcover data, the original LWG also discussed the data requirements to meet the needs and outlined the following priority requirements:

- Ground resolution of 1-meter or better in a raster product
- Reliable distinction between what is classified as impervious surface, tree cover, farm fields, and wet areas at a minimum
- Frequency of at least annual classification to detect land cover change

Discussions within the current LWG regarding landcover frequency resulted in a new recommendation of a 5-year update frequency. Stakeholders would benefit from annual updates but agreed that a more realistic frequency given the cost would be 5 years.

C-CAP

NOAA C-CAP has provided 30-meter resolution land cover products with five-year updates going back to the 1990s, which has become the go-to source of land cover data for the coastal US. However, that 30-meter data is limited in its application at local scales, and the move to 1-meter resolution vastly increases the abilities of managers and researchers to monitor trends, analyze change, and improve planning. Newer high-resolution C-CAP products are being developed with federal, state, and local partnerships. The high-resolution products are an excellent fit for the LWG requirements. High-resolution C-CAP data has 1-meter resolution, has standardized 16-20 categories, and is planned for update every 4-6 years. Additionally, more detailed wetland categories can be developed to support wetland needs.

NOAA produced a limited classification C-CAP product for coastal areas of the United States that includes data for water, canopy cover, and impervious surfaces. This product is available for the coastal areas of North Carolina and provides a limited 1-meter sample of C-CAP classification.

Base High Resolution C-CAP categories

C-CAP Category
High Intensity Developed (2)
Medium Intensity Developed (3)
Low Intensity Developed (4)
Open Space Developed (5)
Cultivated Land (6)
Pasture/Hay (7)
Grassland (8)
Scrub Shrub {12)
Deciduous Forest (9)
Evergreen Forest (10)
Mixed Forest (11)
Palustrine Forested Wetlands (13)
Palustrine Scrub Shrub Wetlands (14)
Estuarine Forested Wetlands (15)
Estuarine Scrub Shrub Wetlands (16)
Palustrine Emergent Wetlands (17)
Estuarine Emergent Wetlands (18)
Open Water (21)
Palustrine Aquatic Bed (22)
Estuarine Aquatic Bed (23)
Unconsolidated Shore (19)
Barren Land (20)
Tundra (24)
Perennial Ice/Snow(25)

Current Plans

The LWG's review of recently released 1-meter C-CAP data, 2018 needs and recommendations, and current needs has resulted in a recommendation that the state pursue statewide C-CAP data. The high-resolution C-CAP product is a good fit for stakeholder needs, and the partnership with NOAA provides a cost-effective mechanism for obtaining landcover data.

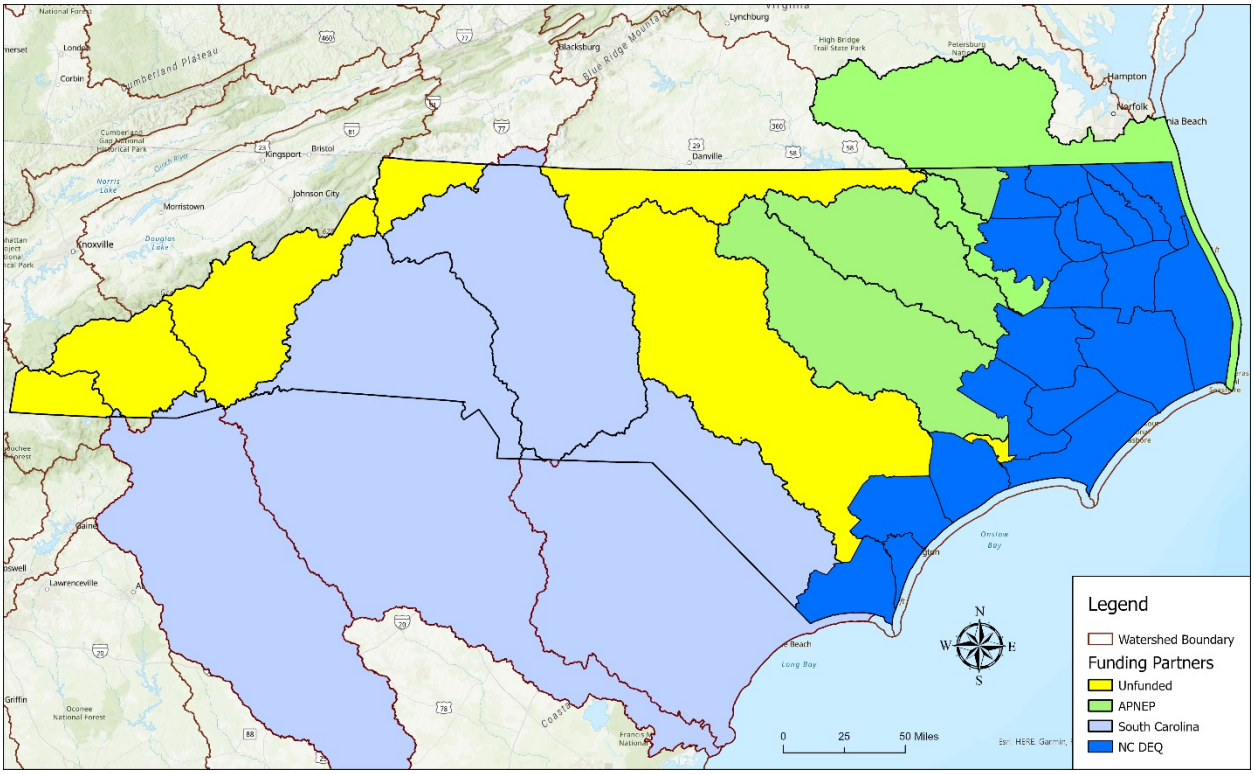
Progress has already been made by the NCDEQ/APNEP working group to secure funding for the state and has been successful in funding a large portion of North Carolina. The NC Division of Water Resources is currently pursuing an EPA grant that includes C-CAP funding for the unfunded Western NC area. They are seeking letters of support to include in their application and have requested the SMAC consider a letter.

Current Funding Summary

Area	Estimate	Funding partner	Funding Secured	Funding Needed
CAMA Counties	$400,000	Division of Marine Fisheries	Yes	
APNEP watersheds (Outside CAMA)	$400,000-$425,000	APNEP	Yes	
Upper Roanoke*	$225,000-$275,000	Virginia DEQ	Partial	$82,500
Cape Fear (Outside CAMA)	$225,000-$275,000			$275,000
Western NC	$175,000-$200,000		No	$200,000
Watersheds draining to SC		South Carolina Office of Resilience	Yes	
Enhanced Wetland Mapping	$100,000	Division of Coastal Management	Yes	

*Virginia DEQ plans to map the Virginia area in partnership with the EPA, and classification may be different from NOAA's C-CAP. It is unclear what work will be necessary on the NC side of the watershed, and could range from full classification to update of the VA classification to be consistent with C-CAP.

Funded Areas



Landcover Working Group Initial Recommendations

The landcover working group, after reviewing the 2018 report, considering new data products, and evaluating current needs, has the following recommendations for the SMAC.

- North Carolina should take advantage of partnerships with adjacent states and federal agencies to produce statewide high-resolution C-CAP data.
- The SMAC and GICC should provide assistance, as needed, to support partners as they pursue grants and funding to complete unfunded areas of the state.
- Future work is needed to identify maintenance funding and frequency.