



# DEVELOPING A STATE-LEVEL NATURAL AND WORKING LANDS CLIMATE ACTION PLAN

*A guide with examples from North Carolina*

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# What is a Natural and Working Lands Climate Action Plan?

**Natural and working lands (NWL)** include forests, wetlands, coastal, and agricultural lands.

A **Natural and Working Lands Climate Action Plan** provides recommendations for conserving, restoring, and managing these lands in order to preserve and enhance their benefits, often with an emphasis on climate mitigation to meet greenhouse gas reduction goals.

- These plans are often developed at the state level and offer recommendations for state government agencies. They can also include policies to incentivize action by private landowners.

The plans often include **co-benefits of NWL** beyond climate mitigation, such as supporting key economic sectors (forestry, agriculture, recreation, and tourism) and enhancing community resilience by reducing risks or accelerating recovery from hazards like floods and fires.

# Who is this guide for?

This guide is for states interested in developing a Natural and Working Lands Action Plan, particularly for staff at the state agency (often the environmental protection or natural resource agency) tasked with leading plan development. It will introduce key steps and walk-through considerations to facilitate a successful planning process.

Throughout the guide, North Carolina, which recently completed an NWL Action Plan, will be used as a case study. A few examples from other states are also included.

NC Examples from North Carolina are in teal boxes.

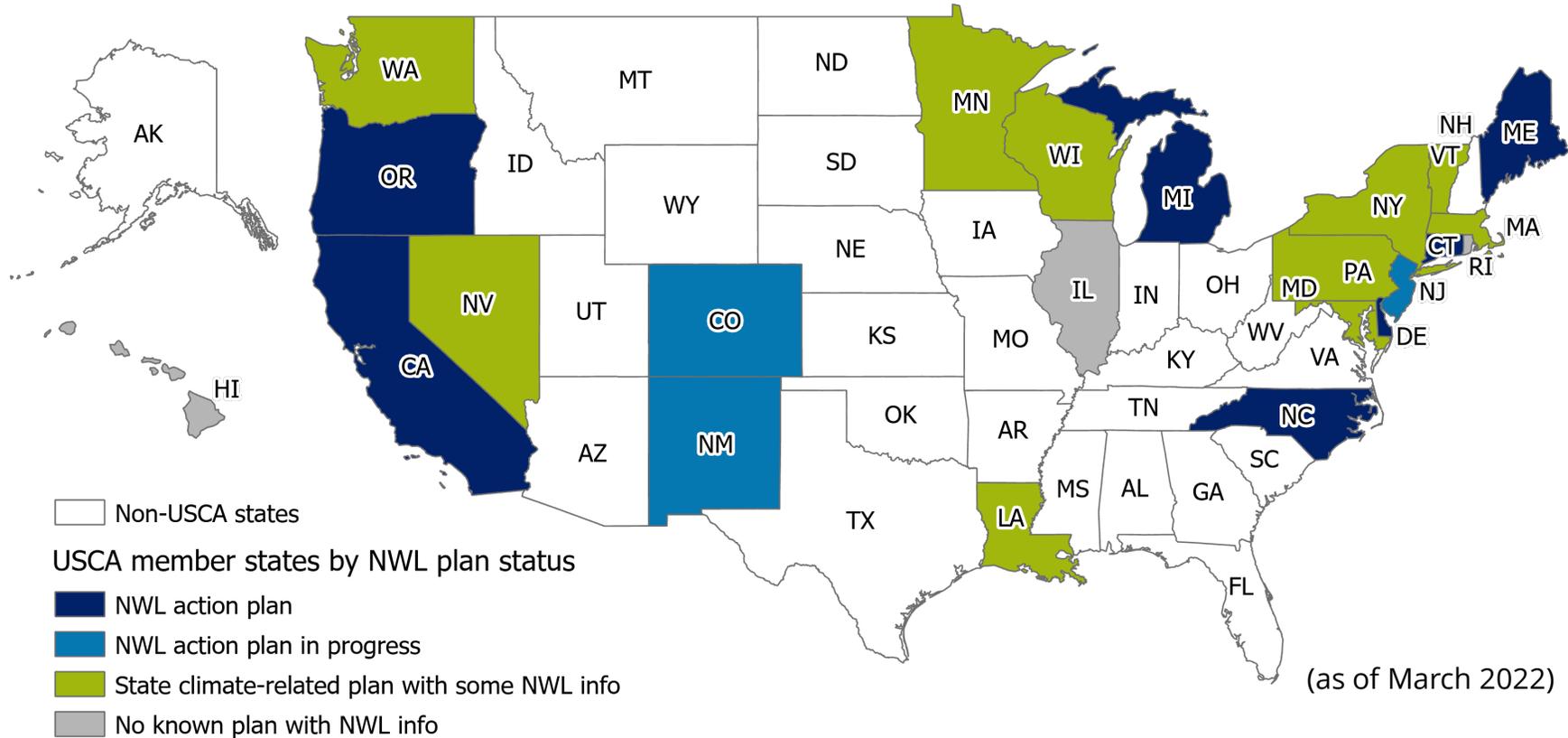
Examples from other states are in blue boxes.



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# Which states have developed NWL Action Plans?



The U.S. Climate Alliance (USCA), a bipartisan coalition of governors committed to climate action, has assisted several member states in developing NWL plans over the past few years. Other states are in the process of creating NWL Action Plans, and even more states have a climate plan with some information related to NWL.

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# 1. NWL Planning Process

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## When is the right time to develop an NWL Action Plan?

States that completed NWL Action Plans had executive or legislative direction calling for the plan, or a broader state carbon or resilience plan into which the NWL Action Plan could fit.

NC

NC Governor Roy Cooper joined the U.S. Climate Alliance in 2017 and signed Executive Order 80, which committed to greenhouse gas reductions and called for development of state climate and resilience plans. NC's NWL Action Plan is a part of the state's climate resilience plan.

CA

California Senate Bills 32 and 1386 commit to reducing greenhouse gas emissions and identify NWL management as a key strategy. Consistent with these bills, the CARB Resolution 17-46 requires the development of a NWL Climate Change Implementation Plan.

ME

Maine LD 1679 established the Maine Climate Change Council, charged with developing a four-year Climate Action Plan to meet greenhouse gas emissions targets. Recommendations for NWL management are part of the Climate Action Plan.

The NWL plans can be linked to related topics of interest within the state, such as resilience, water quality, economic development, outdoor recreation, or equity.

NC

NC focused on enhancing resilience through NWL management after hurricanes Florence and Michael caused major damage in 2018.



## Who should be involved?

Who to involve will be informed by the NWL ownership in your state. It is likely to require **federal, state, tribal, and private sector** representatives and involve **land trusts, NGOs, community groups, and academic experts** that work on NWL.

In states with large amounts of privately owned NWL, it is critical to develop broader buy-in when developing goals and approaches and coordinating implementation.

NC

The NC Department of Environmental Quality, which coordinated development of the NWL Action Plan, established a group of more than 90 stakeholders from state, federal, and local governments; NGOs; and universities.



## How can stakeholders be involved?

There are several ways to involve stakeholders in the development of an NWL Action Plan:

**Option A:** Stakeholders can be directly involved in developing recommendations and writing the plan. This approach may lead to better buy-in among stakeholders and a more diverse set of recommendations but can be harder to coordinate and take longer.

NC

NC had stakeholder groups directly develop the recommendations and write content for the NWL Action Plan.

ME

In Maine, an NWL stakeholder working group drafted initial recommendations and later refined them based on public comments.



Creating a manageable process involving a large group of stakeholders.

**Option B:** Stakeholders can be consulted for feedback on an initial set of recommendations developed by the lead agency, which can be a faster and more efficient process.

CA

In California, state agencies (CARB, CNRA, and CDFA) developed initial targets for NWL management that were refined through stakeholder outreach. The state agencies also wrote the final plan including priority NWL management actions to achieve state GHG goals and provide co-benefits.



## Developing recommendations for the plan

**Step 1:** State leadership sets clear goals and scope for the plan

NC

North Carolina Department of Environmental Quality had an initial list of goals and parameters for the NWL action plan.

ME

Maine LD 1679 includes objectives for the climate mitigation, adaptation, and resilience strategies included in the Climate Action Plan.



Considerations for setting NWL Action Plan goals and scope

**Step 2:** Stakeholders refine the goals and scope as a group prior to drafting recommendations

NC

The NC NWL stakeholder group reviewed and discussed the goals and parameters prior to drafting recommendations.



NC NWL goals and parameters

**Step 3:** Develop recommendations in alignment with the goals

NC

Each NC NWL subcommittee drafted and presented their top recommendations to the full group for review. The group assessed how well each recommendation met the criteria and whether it should be included in the action plan.



More information on the NC NWL process

## 2. Resource Needs for NWL Planning

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# What type of information will be needed?

Several types of information will be useful for developing your NWL Action Plan:

- **Current status of greenhouse gas emissions in your state, including carbon sequestration or emissions by natural and working lands.** This can help identify which types of NWL are most significant for carbon sequestration and set reasonable goals for carbon mitigation through NWL management. State inventories summarize greenhouse gas emissions and sequestration.



Greenhouse gas inventories

- **Opportunities for different NWL management approaches (e.g., reforestation, coastal protection, etc.).** This clarifies the scale at which each management approach can be applied in your state. If this information is spatially explicit, it can also be helpful for identifying priority areas.



NWL management opportunities mapping

*Continued on next slide.*



# What type of information will be needed? (cont.)

- **Carbon mitigation potential of different NWL management approaches.** This can help you select priority management approaches to maximize carbon mitigation.

 Natural climate solutions assessments

- **Co-benefits of NWL management approaches.** This can help you assess how each management approach fits the goals you identified for your NWL Action Plan.

 Co-benefits mapping



# How much time and resources will be needed?

**Time:** NWL Action Plans take about a year to complete, assuming the plan leads meet several days/month and staff or stakeholders developing the recommendations hold several half- or full-day meetings. Specific timing will depend on the number of people involved, the scope of the Action Plan, and the availability of funding for dedicated staff time. The most time-consuming part of the process is likely to be collecting the relevant information about each recommendation to include in the plan.

**Resources:** It will likely require 30–40% effort from a full-time employee (e.g., from the lead state agency or an external consultant) to manage development of an NWL Action Plan. Support work can be done largely by volunteers if needed, but having paid, dedicated support staff or an intern will make the process more efficient. It is also important to consider the need for ongoing resources to manage plan implementation. Information and support from the U.S. Climate Alliance (USCA), such as learning labs, regular working group meetings of the coalition of USCA states, technical assistance grants, and direct advising from the USCA secretariat and its trusted external partners, can be a helpful foundation for member states developing an NWL Action Plan.

See the next slide for examples of how states have allocated resources to NWL action planning.



# How much time and resources will be needed? Examples from states

NC

The NC DEQ staff who led the Action Plan process and other state agency staff who contributed to the plan fit the work into their existing duties and budgets. Other NC NWL working group members volunteered their time on the Action Plan. Agency staff estimate that plan development required 30–40% of a full time position over a two-year period, plus an intern, and that plan implementation currently requires about 10% of a full-time position but would benefit from an increase to 50%.

ME

A small amount of funding was allocated through LD 1679 to support legislators' work on the Maine Climate Council and related working groups. Participation costs for state agency staff were absorbed by existing budgets.

## 3. Implementing your NWL Action Plan

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# Implementing recommendations

After your NWL Action Plan is complete, the group of people involved in developing the plan can be transitioned into an implementation group to put the recommendations into action. Successful implementation relies on identifying opportunities that provide the resources needed—for example, new federal or state programs that align with plan recommendations.

NC

The NC NWL working group continued to meet in habitat-specific subgroups after the action plan was released to work on implementing recommendations. Subgroups selected initial recommendations for implementation; some of these actions are now complete, while others are in progress.



## Tracking progress

As work to implement the recommendations in the Action Plan continues, it is important to track the actions taken related to the plan. This can help with public engagement, securing funds for additional work, and motivating those working on implementation.

Ideally, the impacts of these actions (for example, the amount of carbon sequestration by a newly restored forest) should also be recorded. However, this type of information is more difficult to obtain than information on activities like acres restored.

Online dashboards can provide an accessible way to track and communicate actions and impacts related to the Action Plan.

If a large group is working on implementation, collecting impact information systematically (for example, using an online survey that members are prompted to complete every six months) can ensure that all relevant work is included.

NC

The NC NWL stakeholder group publishes an annual implementation report that includes a compilation of activity reports submitted by stakeholders through an online form. A set of online dashboards also provides information about the status and trends in NWL within NC and the benefits they provide.

 NC NWL progress reporting

 NC NWL dashboards

# Additional details

The following slides provide additional details, examples, and resources related to NWL Action Plans. These slides can be accessed through the  links on earlier slides, or you can scroll through them in order.

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# **i** Creating a manageable stakeholder process

## **We recommend three strategies:**

1. Break the work into manageable pieces

**NC** North Carolina split the stakeholder group into six subcommittees linked to major types of NWL in the state. Each subcommittee was responsible for drafting a set of recommendations for their NWL type.

**i** NC NWL subcommittees

2. Identify leaders for each piece

**NC** Each subcommittee had one or two leads who coordinated the group's efforts.

3. Ensure coordination on goals, process, deliverables, and synergies

**NC** A steering committee—comprised of the leads from each subcommittee, DEQ leads for the action plan, and state facilitators for the larger NC Climate Risk & Resilience Plan—kept everyone on the same page throughout the process and ensured harmony between subcommittee recommendations.

**i** NC NWL recommendation goals and parameters



## **i** Considerations for NWL Action Plan goals and scope

### **NWL types:**

Will you focus on certain types of NWL in your state, or include all NWL types that are present?

**NC** NC included all identified NWL types, divided into 6 categories (subcommittees).

### **Time frame:**

Is the plan aimed at immediately feasible actions, longer-term ideas, or both?

**NC** NC focused on immediately feasible actions, but also identified longer-term ideas with potential for larger impacts.

### **Co-benefits:**

Are there any priority co-benefits of NWL management that you will consider when selecting NWL recommendations?

**NC** NC assessed draft recommendations based on their resilience and economic co-benefits as well as carbon mitigation potential.

### **Equity:**

How will you promote the equitable distribution of expenditures and benefits of NWL through your recommendations?

**NC** NC included equitable implementation of recommendations as a goal.



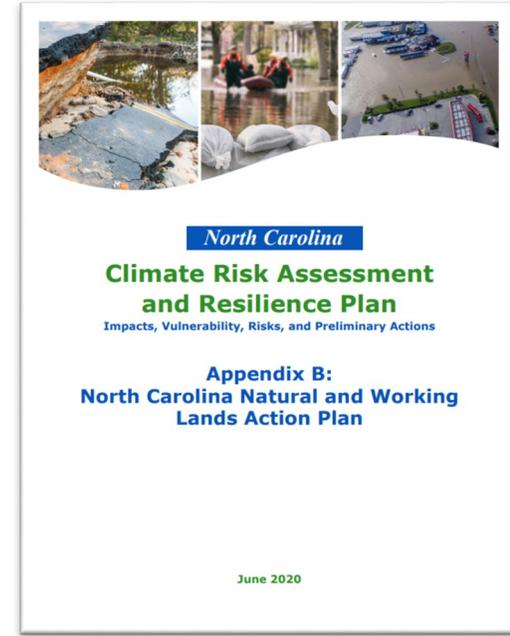
# i The final product: Making a useful NWL Action Plan

Once you have a list of recommendations, it's time to assemble the Action Plan. To ensure the plan is a useful product that can serve as a foundation for implementing your recommendations, you may want to include some general background about the importance of NWL in your state, as well as specific information about each recommendation:

- How the recommendation aligns with the goals set for the Action Plan
- How the recommendation could be implemented
- Examples of successful implementation of related actions

**NC** Each subcommittee drafted content for the Action Plan for each of their recommendations selected for inclusion following a template designed by the steering committee. The steering committee compiled the recommendations and added introductory content about the importance of NWL to NC's economy, recent changes in NWL extent and condition, and highlighting several key recommendations and goals.

**i** Effective public communication about the NWL Action Plan



NC NWL Action Plan



## Effective public communication about your NWL Action Plan

NWL Action Plans are generally written for an audience that is already familiar with natural and working land issues and will be involved in implementing the recommendations, including state agency staff and environmental organizations. It is also important to obtain public buy-in on the importance of NWL and management actions to enhance NWL benefits, including greenhouse gas mitigation. Since the public is unlikely to read a long, detailed, and sometimes technical NWL plan, you may want to develop additional communication products aimed at a more general audience.

NC

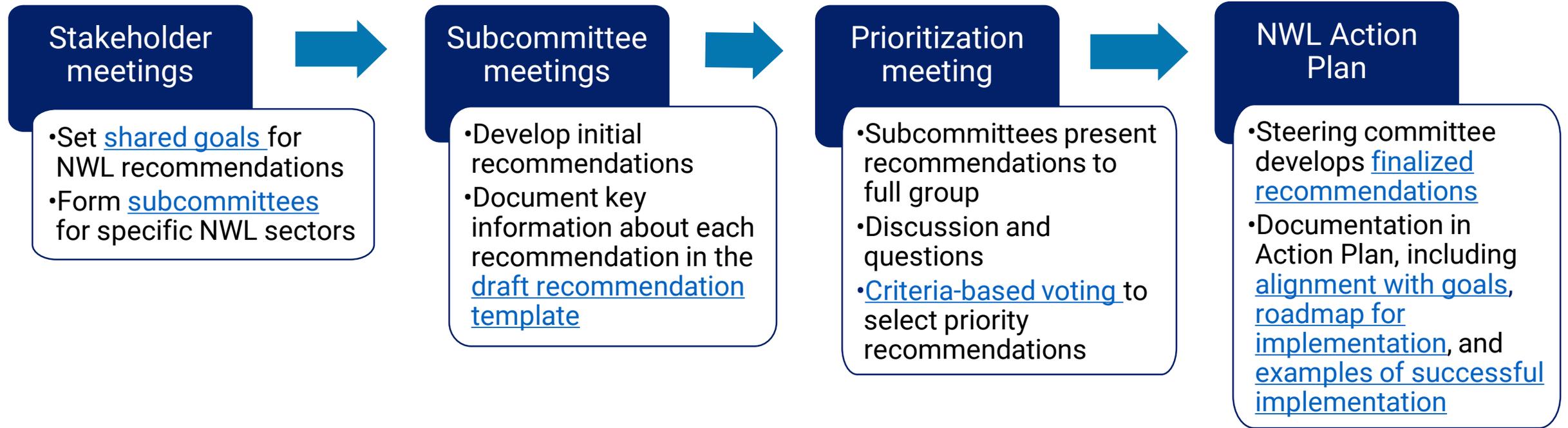
A collection of StoryMaps illustrating the importance of NWL in North Carolina and highlighting key recommendations for NWL management was released alongside the NC NWL Action Plan. These products help communicate the Action Plan to a broader audience.





## **i** Case study: How NC developed its NWL action plan

During 2019, the NC NWL working group developed recommendations to include in the NWL Action Plan.



Click the links above or scroll through slides 25–32 for more detail on NC’s NWL Action Plan process.



## NC NWL goals and parameters

At initial meetings, the NC NWL stakeholder group set shared goals and parameters to guide development and assessment of recommendations.

### Goals

- Enhance the ability of NWL to sequester carbon and mitigate GHG emissions.
- Build resilience in ecosystems and communities.
- Provide public health and ecosystem co-benefits.
- Create economic opportunities for agribusiness, recreation, and tourism.
- Ensure implementation of any action is a socially equitable process.

### Parameters

- Develop actions with large potential for both carbon benefits and resilience.
- Focus on realistic options for North Carolina in the near-term by leveraging existing programs, authorities, and resources.
- Utilize cost-effective and pragmatic solutions.
- Investigate long-term actions to create new and larger opportunities for NWL climate mitigation and resilience.



Considerations for setting NWL action plan goals and scope



# NC NWL subcommittees

Due to its size and the diversity of topics to be covered, the NC NWL working group divided into six subcommittees to develop initial recommendations for the NWL Action Plan.

Subcommittee name	Scope
Forestry	All forested areas in the state (natural, managed, and plantations) except for those in urban areas
Coastal	Coastal wetlands, swamp and tidal forests, submerged aquatic vegetation, and vegetated shorelines
Floodplains & wetlands	Non-coastal wetlands and floodplains, except for pocosin wetlands
Pocosins	Pocosin wetlands (freshwater, evergreen, shrub-dominated peatlands in the coastal plain)— <i>this is a special habitat in NC due to its high carbon content and hydrologic function, so was separated from the floodplains &amp; wetlands group</i>
Urban lands	All developed areas in the state
Agriculture	All cropland and pastureland in the state, and food systems



# i NC draft recommendation template

When drafting recommendations for the Action Plan, NC NWL subcommittees used a standard template to summarize information about each recommendation.

<b>Summary of Action</b>	<ul style="list-style-type: none"> <li>• Category</li> <li>• Recommended strategy</li> <li>• Subcommittee member responsible</li> <li>• Alignment with NWL Action Plan goals</li> <li>• Type of action (e.g., funding, education, new practice, etc.)</li> <li>• Estimated carbon mitigation potential</li> </ul>
<b>Action/Practice Information</b>	<ul style="list-style-type: none"> <li>• Geographies included</li> <li>• Land types included</li> <li>• Landowner types impacted or engaged</li> <li>• Actions or practices</li> </ul>
<b>Implementation</b>	<ul style="list-style-type: none"> <li>• Model for action (from NC or elsewhere)</li> <li>• Ease of implementation</li> <li>• Timeframe</li> <li>• Lead implementing organization</li> <li>• Government support required</li> <li>• Other support required</li> <li>• Dependence on another recommendation?</li> </ul>

<b>Barriers</b>	<ul style="list-style-type: none"> <li>• Financial</li> <li>• Legal/institutional</li> <li>• Social/cultural</li> <li>• Informational</li> </ul>
<b>Opportunities</b>	<ul style="list-style-type: none"> <li>• Financial</li> <li>• Legal/institutional</li> <li>• Social/cultural</li> </ul>
<b>Funding and resources</b>	<ul style="list-style-type: none"> <li>• Level of funding required</li> <li>• Existing and potential funding mechanisms</li> <li>• Initial and ongoing costs</li> <li>• Existing or proposed policy mechanisms</li> <li>• Additional resources needed</li> </ul>
<b>Benefits</b>	<ul style="list-style-type: none"> <li>• Benefits of action or practice</li> <li>• Estimates of benefits (quantitative or qualitative)</li> <li>• How difficult is measurement and verification for each benefit?</li> </ul>

*NOTE: This template facilitated comparison recommendations' scope, benefits, and feasibility, but was time-consuming to complete. Consider using a simplified template focused on NWL plan goals for the draft recommendations, collecting more detailed information once final recommendations are selected.*



# NC recommendation assessment survey

At a full NC NWL working group meeting, each subcommittee presented their draft recommendations. All working group members then completed a survey to assess which recommendations should be included in the Action Plan.

Survey question	Rating scale
Cost of implementation	1 = high, 5 = low
Cost-effectiveness (benefits received per dollars spent)	1 = very cost-ineffective, 5 = very cost-effective
Greenhouse gas mitigation potential	1 = low, 5 = high
Resilience potential	1 = low, 5 = high
Financial/economic co-benefits	1 = low, 5 = high
Potential technical barriers	1 = high barriers, 5 = low barriers
Potential political barriers	1 = high barriers, 5 = low barriers
Complexity of actors involved	1 = complex, 5 = simple
Can the recommendation be implemented with executive power alone?	Yes/No
Overall potential to contribute to NC’s resilience and greenhouse gas mitigation goals	1 = low potential, 5 = high potential

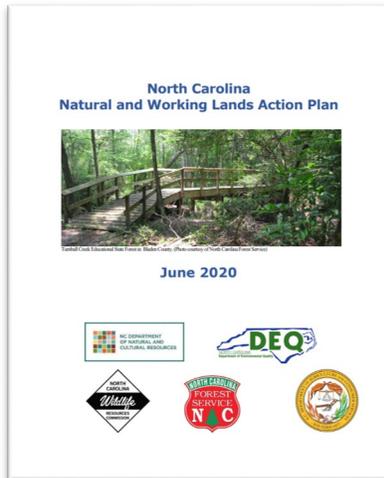
Higher scores indicate that a recommendation is more feasible and is expected to have greater benefits. Each question also included an “unsure” option for any members who did not have sufficient information to make an assessment.



# i Finalizing NC NWL recommendations

The Steering Committee reviewed results of the prioritization meeting survey and selected final recommendations for the Action Plan. These included four transformative recommendations with high potential for climate and resilience benefits throughout the state, and 21 additional recommendations split between the six NWL sectors.

Detailed content for each selected recommendation was developed by the subcommittees for the Action Plan. This included how the recommendation aligned with the goals of the Action Plan, specific actions and participants, and examples of implementation in other places. This content was organized using a [template](#) developed by the Steering Committee to ensure consistency and readability. The next few slides have examples of Action Plan content for several recommendations.



Final recommendations are in the NC NWL Action Plan, Table 3-1

i The final product: Making a useful NWL Action Plan



# Action plan specifics: Recommendation alignment with goals

The NC NWL Action Plan describes how each recommendation aligns with the goals set for the plan and quantifies the benefits of NWL management when possible. This table shows how two NC NWL recommendations support three of the plan’s goals.

	Recommendation	
Goal	Protect forest lands	Encourage adoption of agricultural conservation practices
<b>GHG mitigation</b>	Protecting forests from conversion to other land cover types is one of the most important actions to reduce climate change because it maintains carbon stocks and sequesters additional CO <sub>2</sub> from the atmosphere. NC forests sequester about 37.8 MMT CO <sub>2</sub> e/year from the atmosphere, offsetting 25% of NC’s gross GHG emissions.	NC’s soil carbon sequestration potential on croplands and pasturelands ranges from 1 to 8.2 MMT CO <sub>2</sub> e/year, depending on the types and amounts of practices adopted by farmers.
<b>Economic opportunity</b>	The forest products industry was the state’s top manufacturing industry as of 2017. More than 1,000 companies in the industry employed more than 70,000 individuals, and industrial output from the forestry sector contributed \$18.5 billion in gross sales.	Adoption of conservation practices can increase the profitability and sustainability of farms and agricultural businesses, allowing them to maintain and create economic opportunities.
<b>Co-benefits</b>	Healthy and resilient forest land provides drinking water supply protection, wildlife habitat conservation, outdoor recreation, air pollution abatement, and reduced wildfire risk.	Conservation practices enhance soil, air, and water quality, enhance wildlife habitat and biodiversity, and promote water conservation.



# Action plan specifics: Recommendation implementation

The NC NWL Action Plan lays out a roadmap for implementing each recommendation, including specific actions and key participants. This table summarizes the roadmap for two NC NWL recommendations.

	Recommendation	
	Protect forest lands	Encourage adoption of agricultural conservation practices
Actions	Expand the present use value program to allow reduced property taxes for protecting ecosystem services such as carbon sequestration and water quality, and expand eligibility to small-tract landowners and corporations that don't currently qualify. Reinstate the conservation tax credit (repealed in 2014). Explore the feasibility of implementing a no net loss forest policy that would require forest mitigation for land use change that leads to loss of natural forest cover.	Existing soil and water conservation districts assist landowners with adopting conservation practices, but are chronically underfunded. In 2019, cost-share programs funded by the state could only support 18% of eligible applicants. Increase funding to allow the conservation districts to better meet demand from farmers applying for assistance and expand adoption of conservation practices.
Participants	Policy makers (governor's office, general assembly, associated staff), stakeholders (landowners, environmental nonprofits, NCFS, industry and trade associations, etc.)	Soil and water conservation districts, the state legislature, other public or private funders



# Action plan specifics: Implementation examples

The NC NWL Action Plan includes examples of implementation for each recommendation, including programs or actions taken in North Carolina, and examples from other states. This table summarizes implementation examples for two NC NWL recommendations.

	Recommendation	
	Protect forest lands	Encourage adoption of agricultural conservation practices
Examples	<ul style="list-style-type: none"> <li>The North Carolina Conservation Tax Credit was in effect from 1983 to 2014 and helped to protect 250,000 acres of land. Every \$1 of tax credit granted leveraged \$6 in land or conservation easement donations.</li> <li>Maryland’s Forest Conservation Act (1991) sets a “no net loss” forest policy, requiring developers to mitigate 75% of the area of forest lost through development by funding reforestation projects.</li> </ul>	<ul style="list-style-type: none"> <li>New York’s Climate Resilient Funding Program is an example of a publicly funded agricultural conservation program.</li> <li>Examples of efforts to research, develop, and promote voluntary agricultural GHG mitigation efforts include California’s Healthy Soils Program, the Carbon Cycle Institute, and USDA’s Conservation Innovation Grant Program.</li> </ul>



# Greenhouse gas inventories

**Greenhouse gas inventories** track the amount of greenhouse gases that are emitted and sequestered over multiple years. Natural and working land contributions are included in the Land Use, Land Use Change, and Forestry section of the [National Greenhouse Gas Inventory](#). Many states are also developing their own inventories with more specific data, often by using the EPA's State Inventory Tool. These inventories facilitate understanding of how the NWL sector can contribute to the state's GHG emissions reductions, but they have some significant limitations (see next slide).

*Continued on next slide.*



# i Greenhouse gas inventories (cont.): Example from North Carolina

Category	GHG flux, MMT CO2e		
	1990	2005	2017
Electricity use	54.6	79.4	52.6
Residential/commercial/industrial combustion	26.8	26.0	20.9
Transportation	40.2	55.2	48.7
Waste management, industrial processes, natural gas & oil systems	8.4	13.5	17.4
Agriculture (manure management, soil management, enteric fermentation, soil flux)	6.9	11.5	12.0
Forest carbon flux	-23.0	-22.2	-24.8
Wood products	-12.3	-13.0	-13.0
Landfill yard and food waste	-0.6	-0.31	-0.33
NWL-related carbon emissions (forest fires, urea fertilization, N2O from settlement soils)	0.5	2.1	2.6
<b>Net emissions</b>	<b>101.3</b>	<b>152.1</b>	<b>116.1</b>

NC North Carolina finalized its [2017 greenhouse gas inventory](#) while recommendations were being developed for the NWL Action Plan. Information in the inventory helped to identify which NWL sectors play the largest role in carbon mitigation and how recent management affected emissions. The table at right summarizes NC's GHG emissions from 1990–2017. NWL-related carbon fluxes (shaded in blue) offset 17% of the state's gross emissions in 2017. NC's 2017 inventory did not include coastal wetlands.



# Greenhouse gas inventory limitations

State greenhouse gas inventories, especially those created with the EPA's State Inventory Tool, have some simplifications and omissions that limit their usefulness for NWL planning:

- Information is not spatially explicit and is usually only available for the whole state. This obscures differences in NWL carbon benefits across different parts of the state.
- Coastal wetlands are not included in the current version of the State Inventory Tool, so their contributions to GHG mitigation are not acknowledged.
- Some of the data used in the State Inventory Tool is out of date, and states often have more specific or updated information on their NWL that is not incorporated in the tool.



# Greenhouse gas inventory potential solutions

A recent [report by World Resources Institute](#) identified a number of improvements that could be made at the state and national levels to refine natural and working lands information in state greenhouse gas inventories. It also highlights several states, including Maryland, New York, and Washington, that have developed refined GHG estimates for their NWL.

Many other datasets provide spatial information about NWL carbon benefits that may be useful for quantifying NWL carbon benefits to inform your Action Plan. The WRI report linked above provides summaries of key data sources and tools related to NWL carbon. In addition, the U.S. National Greenhouse Gas Inventory is moving toward a consistent, spatially explicit national product that should provide a comprehensive and cohesive view of NWL carbon benefits in the future



# NWL management opportunities mapping

A first step to understanding the potential for a certain NWL management action is to estimate its geographic scope within the state (i.e., how much land area could be affected by the action).

Many management actions are only relevant to certain types of natural and working lands, or to limited areas within a state. For example, conservation of natural lands is only needed on lands that are not currently protected.

Opportunities mapping identifies the relevant area for each NWL management action. This enables you to quantify the area where the action could be implemented, check for overlaps among the opportunity areas for different actions (to acknowledge or avoid double-counting), and overlay the opportunity areas with additional spatial data to estimate co-benefits.

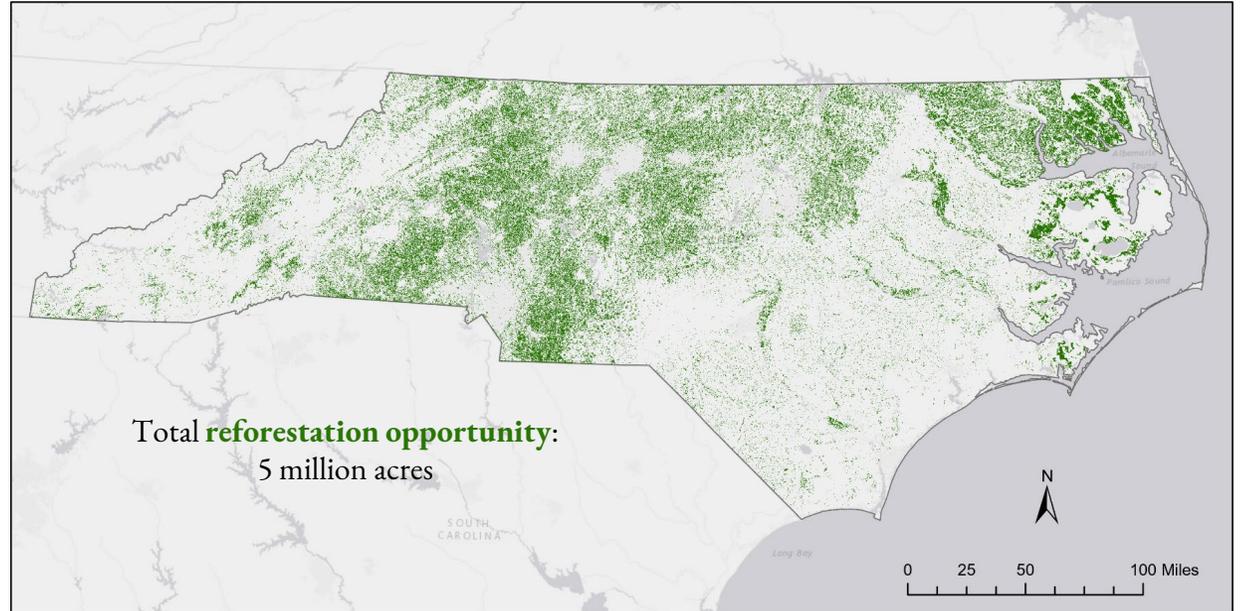
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## NWL management opportunities mapping (cont.): Example from North Carolina

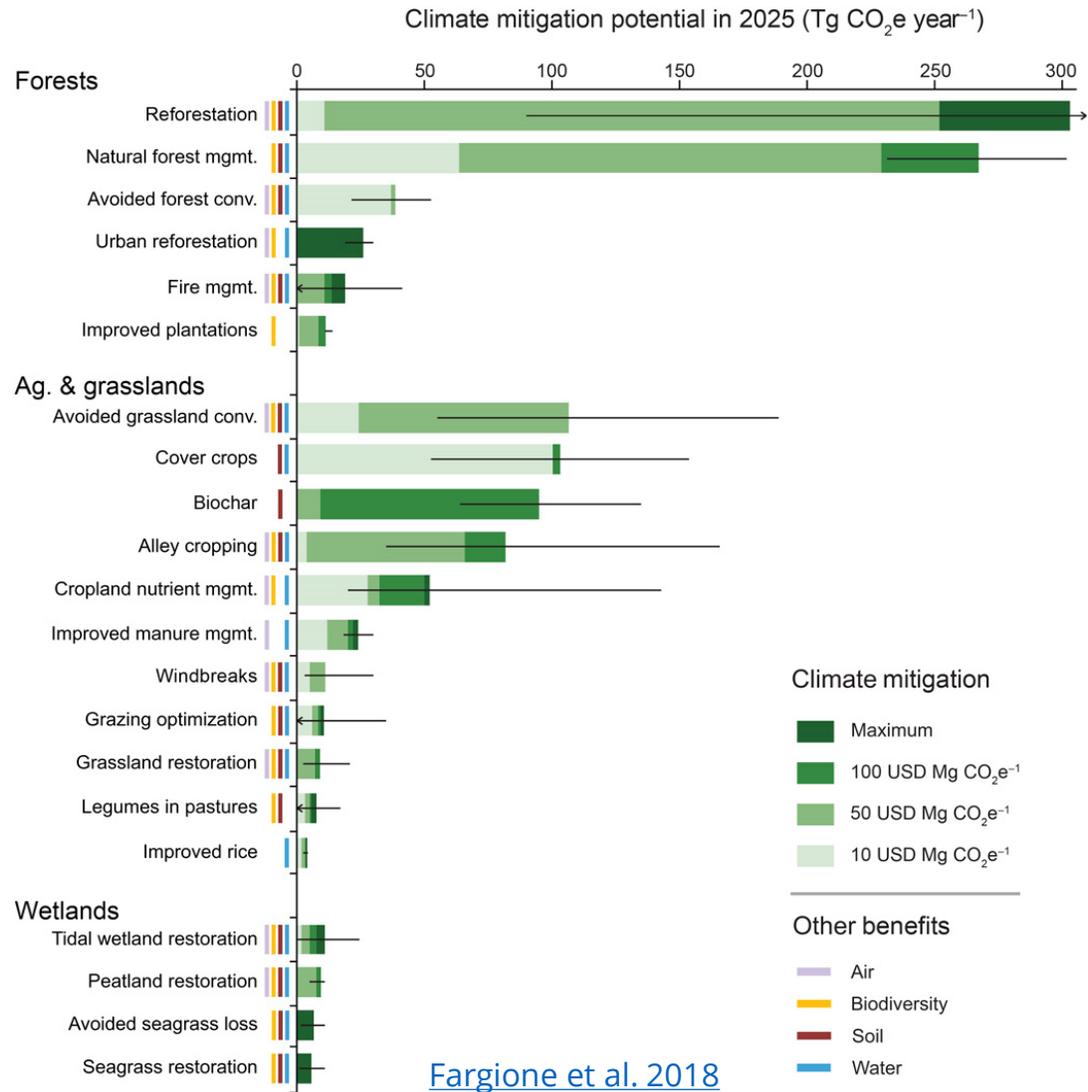
NC

The Nicholas Institute mapped opportunity areas for many of the NWL management actions under consideration. This information was used to compare the potential scope of recommendations and to estimate their co-benefits. The map below shows the opportunity area for reforestation. The [methods](#) used for opportunity mapping in NC could be extended to other states.





## Natural climate solutions assessments



**Natural climate solutions assessments** quantify the carbon mitigation potential of NWL management actions, such as reforestation, and often estimate the cost per ton of carbon dioxide of implementing each action. In 2018, a [national-scale assessment](#) of natural climate solutions was completed. The figure at right shows the potential for carbon mitigation by a variety of NWL management actions, categorized by cost.

The U.S. Climate Alliance has provided state-level breakdowns of natural climate solutions assessments to member states. These can help states identify key NWL management actions to consider based on their carbon mitigation ability and cost-effectiveness.

*Continued on next slide.*



# Natural climate solutions assessments (cont.): Example from North Carolina

NC

North Carolina representatives attended a U.S. Climate Alliance learning lab on NWL carbon mitigation strategies in 2017, where they received state-specific estimates for natural climate solutions and generated initial ideas for NWL management recommendations. These numbers were used for initial discussion and were supplemented with information from opportunities and co-benefits mapping.



# Co-benefits mapping

NWL management actions create a range of co-benefits, from carbon mitigation to recreational opportunities and water quality. Mapping the co-benefits provided by existing NWL, or those that could be provided if NWL management actions like reforestation occurred, helps you to assess which NWL management actions have the greatest potential to provide certain co-benefits in your state and to identify geographic areas where NWL management actions can create multiple co-benefits. This is especially useful if co-benefits are included in the goals and objectives for your NWL Action Plan.

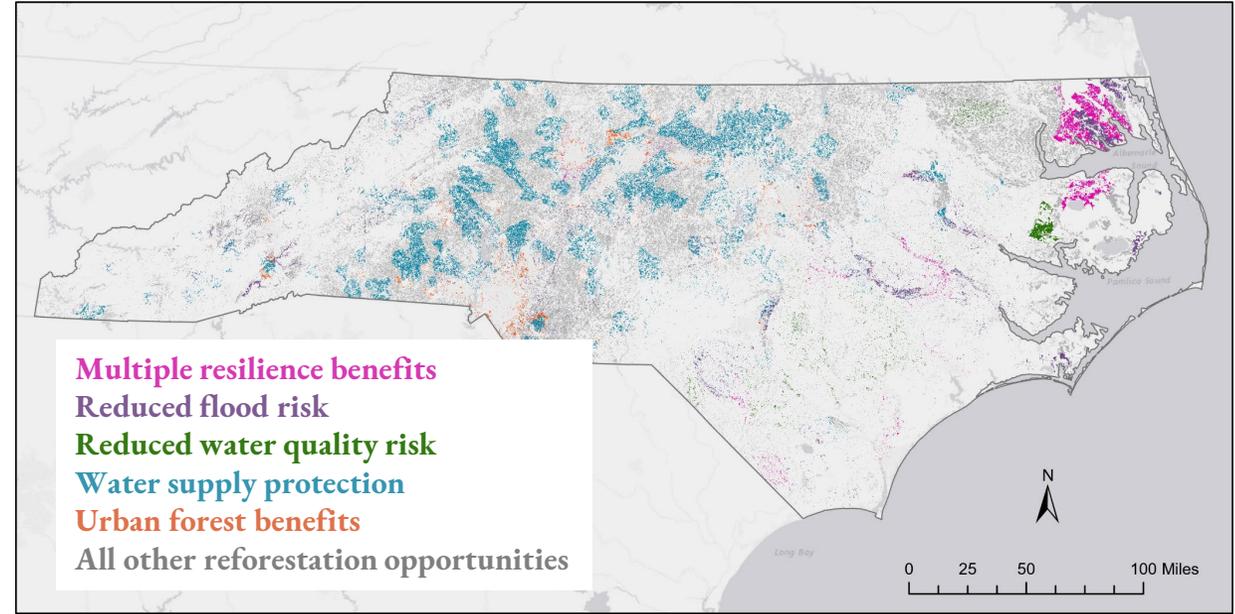
*Continued on next slide.*



## i Co-benefits mapping (cont.): Example from North Carolina

NC

The Nicholas Institute mapped a variety of co-benefits related to carbon mitigation and community resilience. Co-benefit maps were overlaid with the opportunity areas for NWL management actions to identify where within NC these actions have the greatest potential to create co-benefits. The map to the right shows the opportunity area for reforestation, color-coded by the resilience co-benefits it is likely to provide. The [methods](#) used for co-benefits mapping in NC could be extended to other states.

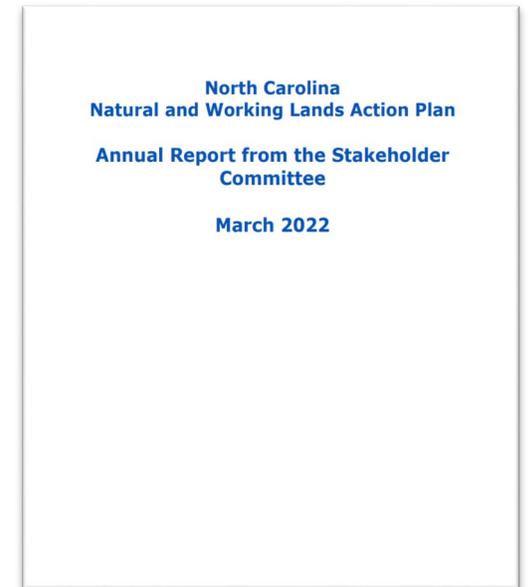




## NC NWL progress reporting

North Carolina uses a standardized form to collect the following information about progress toward implementing recommendations in the NWL Action Plan:

- Relevant NWL subcommittee
- Title of initiative or project
- Responsible party
- Description of action and how it relates to an NWL Action Plan recommendation
- Which NWL Action Plan objectives the action supports
- Metrics (e.g., cost, acres protected/restored, carbon sequestration)
- Relevant publications and external links



This information is used to compile an annual report of implementation activities for the NC NWL Action Plan.



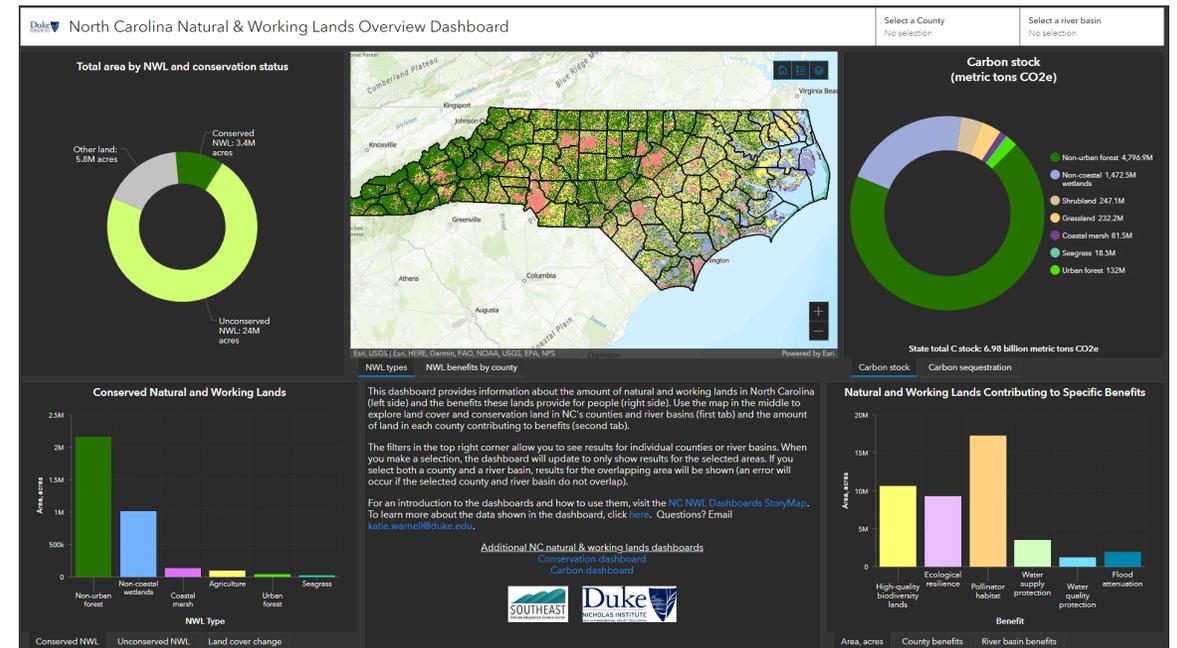
## NC NWL dashboards

Three online dashboards developed by the Nicholas Institute provide accessible, user-friendly information about the status and trends of natural and working lands in the state, as well as the benefits they provide.

As information about activities and impacts related to NWL Action Plan implementation is collected, the dashboards can be updated to show progress over time.

- **Overview dashboard:** General information about the extent and benefits of NWL in NC
- **Conservation dashboard:** Focus on NWL that are protected for conservation purposes
- **Carbon dashboard:** Details about past, current, and potential carbon storage by NWL

An [introductory StoryMap](#) gives users an overview of key terminology and data from the dashboards.



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