

N. C. Department of Agriculture & Consumer Services

2022 Climate Strategy Report

October 15, 2022

Introduction

About NC Department of Agriculture and Consumer Service

The mission of the NC Department of Agriculture and Consumer Services is to provide services that promote and improve agriculture, agribusiness, and forests; protect consumers and businesses; and conserve farmland and natural resources for the prosperity of all North Carolinians.

NC Department of Agriculture and Consumer Service's Vulnerabilities to Climate Change

Agriculture must constantly make improvements and changes to continue being both resilient and productive. The changing climate has for years created new challenges for agriculture. In order to adapt to the changes and to maintain sustainable feed and fiber production for our society, adaptations to maximize production and sustainability must be accomplished. Such practices of research, implementation of new technologies for both crop and livestock management practices, and the continued adaption to the needs of our environment and consumers are challenging but a necessity to the resilience of the foundation of society's existence

Climate Vulnerabilities and Risks

The paragraphs below describe the latest climate vulnerabilities identified by divisions within NCDA&CS, as well as a brief overview of the Department's response and preparedness efforts.

Preserving Farmland

Farmland preservation is one of the, if not the highest, priority for the department. The Farmland Preservation Division works with counties and nonprofits to record conservation easements on privately-owned farms and forests throughout North Carolina. These agricultural conservation easements restrict the residential, commercial, and industrial development of land to maintain its agricultural and forestry production capability. Agricultural conservation easements are key components in the department's climate resilience strategy because working lands are actively managed by farmers, providing essential benefits such as erosion control, carbon sequestration, rainwater percolation, waterway buffer protection, and permeable surfaces.

In 2021, the Agricultural Development and Farmland Preservation (ADFP) Trust Fund conserved 6,743 acres of working farms and forests across North Carolina. This is the most conservation easement acres recorded in one calendar year since the establishment of the program in 2005. In October 2021, the first partnership conservation easement between the Department of the Navy and the North Carolina Department of Agriculture and Consumer Services was recorded. This conservation easement met several objectives for compatible use, most notably military readiness for Marine Corps Installations East and the continued production of agriculture and timber products.

Agricultural Research Stations

The Research Stations Division (RSD) feels the effects climate change intimately. Just like a private farmer, RSD deals with weather extremes that impact planting, growing seasons, harvesting, crop yields, quality, etc. Learning to mitigate the adverse effects of weather extremes comes in the form of Precision Agriculture. With the use of satellite guidance technology, RSD can make precise applications of fertilizers and chemicals, reducing the overapplication of these crop inputs as well as the number of trips across a field in a tractor. This technology enables the reduction of inputs because there is less overlap. Precise GPS guided application translates into optimum yields with less input costs, potential runoff, and gallons of fuel.

North Carolina Forest Service

The NC Forest Service has been dedicated to the protection, conservation, and stewardship of North Carolina's forests for over a century. It offers a wide variety of forest management programs and services that help landowners become more knowledgeable about their woods as well as their options. NC Forest Service Foresters and Rangers work one-on-one with landowners to prepare woodland plans tailored to the landowner's unique management goals and the features of the property. In 2021, 4,662 Woodland Management Plans were prepared, providing landowners with sound forest management recommendations on 227,964 acres. Through the Forest Development Program, Florence Restoration Fund, and other forestry cost share programs, the NC Forest Service allocated \$5.8 million in funding and over 62,000 acres of forest tree planting on private lands were completed. Agency staff continued to work with forest stakeholders to ensure the protection of the State's water resources, with 7,128 water quality inspections occurring statewide. The NC Forest Service partnered with the NC Urban Forest Council and North Carolina State University Extension to provide education and technical assistance to homeowners and municipalities in storm preparedness, response, and recovery. Three municipal training webinars drew 173 attendees, and two homeowner webinars drew 333 attendees. A new series of publications focusing on urban forest resiliency has also been released and should be a helpful guide for communities and homeowners.

Wildfires

For the NC Forest Service, calendar year 2021 will go down as an above normal occurrence year for North Carolina with 4,970 wildfires. Even though occurrence levels were up, the acres burned was below the 10-year average at 14,896 acres. This was the direct result of aggressive initial attack on wildfires and thorough suppression of wildfires. Occurrence levels were increased as a result of two periods of drought, one in late spring and the other in late fall. Two burns bans (one statewide) were put in place in 2021 to mitigate ignition sources during these drought periods.

One of the most effective tools to mitigate wildfire risk is to conduct prescribed fires that remove excessive fuels and maintain healthy ecosystems. Prescribed fire is also an important habitat management tool at many of the Plant Conservation Preserves, used for the benefit of endangered and threatened plant species. However, at a time when more prescribed burns are needed for habitat restoration and to mitigate increasing wildfire risks, fewer burns are possible in part due to challenging weather patterns with wet winters moving quickly into dry and droughty springs. These weather patterns have effectively shortened the traditional prescribed burning season on both ends and are negatively impacting wildfire mitigation efforts across North Carolina. Despite these challenges, it was a good year for prescribed burning with 894 projects completed for 93,691 acres. The Grindstone Fire on Pilot Mountain was a great example of the benefits of prescribed burning. Fuel loading in the area was lower due to previous burning and fire breaks were already in place. This made suppression of the wildfire timelier and more cost effective. Even though it was categorized as a wildfire, the impacts on the landscape are minimal and more in line with the results normally seen on a prescribed burn.

Plant Conservation

The Plant Conservation Program continues to view flood damage at the Plant Conservation Preserves and risk of wildfire as its two biggest climate change hazards throughout the state. In 2021, floods from heavy rain events continued to cause new damage on Plant Conservation Preserves. New in 2021, the Plant Conservation Program partnered with the Division of Water Resources within North Carolina's Department of Environmental Quality at a Plant Conservation Preserve in Sampson County to install monitoring wells to measure ground water salinity as part of a state-wide program to track saltwater intrusion related to climate change. This information will help inform management of this preserve as well as provide important data for a state-wide analysis.

Soil and Water Conservation

The Division of Soil and Water Conservation through its Stream Debris Removal program works with 103 local sponsors to remove debris that is blocking stream flow and potentially contributing to flooding of adjacent and/or upstream cropland and communities. In 2021, local

sponsors have completed nearly 632 miles of debris removal and stream repair. These same local sponsors are currently contracted to complete another 1,190 miles of debris removal and streambank restoration activities to further protect farm land, forest land and communities. The newly authorized Streamflow Rehabilitation Assistance Program will accelerate work to restore streamflow and drainage across the state.

A continuing goal is increasing on-farm water storage through the Agricultural Water Resources Assistance Program (AgWRAP) to assist agricultural producers and landowners in constructing and enhancing ponds and water collection. On-farm storage of water flattens the runoff hydrograph to reduce peak runoff, which lessens downstream flood potential. On-farm storage also increases water available for irrigation when needed. In 2021, the Division assisted in the construction of 21 new ponds, restored storage capacity of five existing ponds, and repaired or reconstructed 10 ponds. The Division has agreements in place to install, repair or replace an additional 114 ponds.

In 2021 the Division assisted 12 agricultural producers in upgrading their existing irrigation systems with agreements in place to assist an additional 17 producers to implement conservation irrigation conversion. Upgrading existing irrigation systems improves the efficiency of irrigation methods, thereby reducing the demand on water resources for agricultural production.

The Division oversees education and implementation of cover crop, conservation tillage and cropland conversion programs. These practices result in many climate resiliency benefits, including:

- Improved water quality from increased nutrient scavenging and cycling leading to a reduction in sedimentation and agricultural chemical inputs.
- Stormwater management leading to increased rainfall infiltration and decreased soil erosion and runoff.
- Drought resilience from improved efficiency in soil moisture use and increased soil water holding capacity.
- Increasing plant biomass and soil carbon storage leads to an improved means for carbon sequestration.

It is noted that in 2021, through the Agriculture Cost Share Program (ACSP), the Division has assisted producers in implementing these beneficial climate conservation practices on 17,574 acres of cropland. ACSP agreements are currently in place to assist producers with 22,836 additional acres.

[Activity Chart](#)

The chart and paragraphs below detail the specific climate resilience initiatives completed, underway, or planned by the NCDA&CS.

Activity	Status	Expected Completion Date
1.0. Research Station Division		
1.1. Developing Climate Adaptive Technologies for Food Production	Ongoing	N/A
1.2. Protecting Endemic Species	Ongoing	N/A
2.0. NC Forest Service		
2.1. Firewise USA Program	Ongoing	N/A
2.2. NC Fuels Removal Program	Ongoing	N/A
2.3. Community Wildfire Protection Plans	Ongoing	N/A
2.4. Community Fire Protection Program	Ongoing	N/A
2.5. Resist Wildfire NC & Prescribed Fire Websites	Ongoing	N/A
2.6. Forest Development Program (FDP)	Ongoing	N/A
2.7. Florence Restoration Fund (FRF)	Ongoing	N/A
3.0. Farmland Preservation Division		
3.1. Preserving Upriver Farms to Reduce Flooding in NC – Phase I	Ongoing	2025
3.2. Preserving Upriver Farms to Reduce Flooding in NC – Phase II	Planned	2027
3.3. 2023 REPI Challenge	Underway	2025
3.4. WNC Farm Resilience Project with NC Foundation for Soil and Water Conservation	Ongoing	N/A
3.5. Pasture Management Project with NC Foundation for Soil and Water Conservation	Ongoing	N/A
3.6. Improving Soil Health: Cover Crops Project with NC Foundation for Soil and Water Conservation	Ongoing	N/A
4.0. Soil and Water Conservation		
4.1. Stream Debris Removal	Ongoing	N/A
4.2. Swine Buyout Program	Ongoing	N/A
4.3. On-Farm Water Storage	Ongoing	N/A
4.4. Conservation Irrigation Conversion	Ongoing	N/A
4.5. Cover Crops, Conservation Tillage, and Cropland Conversion	Ongoing	N/A
5.0. Marketing Division – Aquaculture		
5.1. Adaptive Practices for Controlling Excessive Rain Water Overflow, Turbidity and Settleable Solids in Aquaculture	Ongoing	N/A
5.2. Educational Producer Meetings for Resource Assistance and Economic Recovery Following Weather Disasters	Ongoing	N/A
6.0. Agronomic Services Division		
6.1. Soil Health and Nutrient Management	Ongoing	N/A
7.0. Plant Industry Division and Plant Conservation Program		

7.1. Inland Flooding Control	Ongoing	N/A
7.2. Protecting Endemic Species	Ongoing	N/A
7.3. Regenerative Practices That Sequester Carbon	Ongoing	N/A
7.4. Protecting Ground Water Quality	Ongoing	N/A
7.5. Protecting NC from Invasive Pests	Ongoing	N/A

Activity Progress

1.0. *Research Station Division*

ONGOING

1.1. **Developing Climate Adaptive Technologies for Food Production**

Research Stations across the state hosted research trials to continue improving crop and animal production. These trials include heat mitigation and tolerance in livestock, feed efficiency, crop breeding, disease/insect management, food safety, soil health and water management in cropping systems.

1.2. **Protecting Endemic Species**

ONGOING

The Division continued research on, and implementation of, best practices on forestry tracts to protect plant and animal species unique to North Carolina.

2.0. *NC Forest Service*

2.1. **Firewise USA Program**

ONGOING

The Firewise USA program is a nationwide voluntary program that helps homeowners improve the ignition resistance of homes and communities. Homeowners learn about the “Home Ignition Zone” and ways to reduce and/or mitigate ignition sources in this area. Currently, North Carolina has 37 communities actively participating in this program.

2.2. **NC Fuels Removal Program**

ONGOING

The intent of the Fuels Removal Program is to reduce the wildfire risk by providing a road-side debris pile removal service. This is a free service to communities and homeowners within North Carolina. This program is funded by the North Carolina Community Firewise Mitigation Grant.

2.3. **Community Wildfire Protection Plans**

ONGOING

Community Wildfire Protection Plans (CWPPs) are holistic fire management plans that evaluate wildfire hazards and provide preparedness, mitigation, and prevention recommendations at the fire district level. Currently, 899 CWPP’s have been completed across N.C. and 94 are in various stages of development.

2.4. **Community Fire Protection Program**

ONGOING

The USDA Forest Service's Community Fire Protection Program was established to provide funding to states to prevent wildfires and mitigate fire hazards that threaten communities surrounding national forestland. Through this program, prescribed burning and mechanical treatments are completed to reduce forest fuel loading within 10 miles of USDA Forest Service lands. These services are performed at no cost to the landowner by the agency with funding assistance

provided by the USDA Forest Service. On average, the North Carolina Forest Service (NCFS) has completed 4,698 acres of prescribed burning annually under this program.

2.5. Resist Wildfire NC & Prescribed Fire Websites

ONGOING

“Resist Wildfire NC” (<http://www.resistwildfirenc.org/index.htm>) and “Good Fires” (<https://www.ncforestservice.gov/goodfire/index.htm>) are both initiatives aimed at educating the public. Resist Wildfire NC focuses on things that homeowners can do on their own to improve their home’s ability to survive a wildfire. The NCFS Good Fires website is an ongoing effort to educate the public about the benefits of prescribed fire and provide a repository of resources relating to the subject.

2.6. Forest Development Program (FDP)

ONGOING

The Forest Development Program (FDP) continues to be a successful program that assists North Carolina woodland owners who are interested in receiving financial cost-share assistance for site preparation, tree planting, prescribed burning, and forest stand improvements on their woodlands. This program directly and efficiently results in a wide range of economic and environmental benefits for landowners, North Carolina’s citizens and the many natural resources that rely on our woodland habitats. The FDP Program is administered by the North Carolina Forest Service and is currently funded through assessments paid by the North Carolina forest industry to private landowners on a cost shared basis. The FDP requires a 10-year forest stand maintenance agreement for landowners to remain eligible to retain the reimbursement payment from the program. Using a carbon growth and yield simulator with typical tree planting assumptions for southern yellow pine, it is projected that each acre planted in trees with FDP funding could result in approximately 23.1 tons of carbon/acre sequestered.

2.7. Florence Restoration Fund (FRF)

ONGOING

This tree planting cost-share program is modeled after the FDP and utilizes North Carolina time-limited legislative monies allocated to address reforestation needs stemming from Hurricane Florence impacts. In FY2019-20, the FRF Program’s financial assistance to eligible woodland owners helped accomplish tree planting projects on 13,190 acres, representing approximately 7.2 million trees planted.

3.0. *Farmland Preservation Division*

3.1. Preserving Upriver Farms to Reduce Flooding in NC – Phase I

ONGOING

This phased project aims to reduce the negative impacts of soil erosion and runoff in the river basins in the Piedmont and Sandhills of North Carolina. In the past several years, hurricanes, tropical storms, and significant rain events in the state have caused catastrophic flooding events in Eastern North Carolina. There are several factors linked to these flooding events, including population growth, increased runoff from residential and commercial development, and a lack of debris removal from rivers and streams. Conservation easements will be placed on approximately 4,900 acres of farms and forests in the Upper Cape Fear River Basin. The working lands that are preserved are actively managed by farmers, providing essential benefits like erosion control, carbon sequestration, rainwater percolation, waterway buffer protection, and permeable surfaces. When conservation practices are enacted, they will help in managing animal waste, enhancing wildlife habitat, improving irrigation water management, creating stream bank protection, and complying with environmental regulatory requirements. Preservation of these working lands will protect existing pervious surfaces and reduce the impact of runoff downriver while supporting

North Carolina's top industry and providing fresh, local foods to the state's residents and quality products to the agriculture, forestry, and fiber industries domestically and globally. To date, the department has committed \$1M in funding for conservation easements to 372 acres of farmland for this project.

3.2. Preserving Upriver Farms to Reduce Flooding in NC – Phase II **PLANNED**

The department will apply for funding for the second phase of the Preserving Upriver Farms to Reduce Flooding in NC project through the USDA Regional Conservation Partnership Program (RCPP). Phase II will focus on farmland in the Upper Neuse River Basin located in portions of Orange, Person, Durham, Granville, Wake, Franklin, Nash, Wilson, and Johnston counties. The proposed funding request from USDA will be approximately \$8.5 million.

3.3. 2023 REPI Challenge **UNDERWAY**

In conjunction with the North Carolina Sentinel Landscape Partnership, the department is applying for working lands conservation easement funding through the 2023 Readiness and Environmental Protection Integration (REPI) Challenge. This project will reduce the negative impacts of soil erosion and runoff in areas identified by the military as critical to base sustainability and training viability. The proposed funding request from the Department of Defense will focus on approximately 1,500 acres of proposed conservation easements.

3.4. WNC Farm Resilience Project with NC Foundation for Soil and Water Conservation **ONGOING**

This project is a regional effort in promoting agricultural climate resiliency at the farm level by introducing and refining USDA technical resources via five carbon sequestration demonstrations on local farms in WNC and in partnership with five local Soil and Water Conservation Districts (SWCDs).

3.5. Pasture Management Project with NC Foundation for Soil and Water Conservation **ONGOING**

This statewide outreach program through local SWCDs improves pasture management and ensures farms are drought resilient. The project involves 25 pasture management demonstrations throughout the state. Through the demonstrations, producers learn pasture management techniques that minimize overgrazing, decrease pasture sediment runoff, and increase soil moisture rates to allow pastures to optimize water use during drought conditions.

3.6. Improving Soil Health: Cover Crops Project with NC Foundation for Soil and Water Conservation **ONGOING**

In 2019, multi-species cover crop demonstrations were planted in Camden, Stanly, Duplin, and Nash counties. Heavy rye cover-crop demonstrations were planted in Halifax, Hoke, and Northampton counties. The demonstrations teach producers the benefits of cover cropping, including reduced soil erosion, improved water quality, conservation of soil moisture, increased organic matter, increased nitrogen fertility, weed suppression, disease suppression, and carbon sequestration.

4.0. Soil and Water Conservation

4.1. Stream Debris Removal

ONGOING

The Stream Debris Removal program works with 103 local sponsors to remove debris that is blocking stream flow and potentially contributing to flooding of adjacent and/or upstream cropland and communities. In 2021, local sponsors have completed nearly 632 miles of debris removal and stream repair. These same local sponsors are currently contracted to complete another 1,190 miles of debris removal and streambank restoration activities to further protect ag land, forest land and communities. The newly authorized Streamflow Rehabilitation Assistance Program will accelerate work to restore streamflow and drainage across the state.

4.2. Swine Buyout Program

ONGOING

NCDA&CS is progressing to buy out five swine operations that are currently operating within the 100-year floodplain. This is a joint project with USDA Natural Resources Conservation Service. The project will include placing a conservation easement on the property that will prohibit operation of any confined feeding operation within the easement area and prohibit residential or commercial development of the property. Crop and pasture-based livestock production will be allowed.

4.3. On-Farm Water Storage

ONGOING

The Division of Soil and Water Conservation is increasing on-farm water storage through the Agricultural Water Resources Assistance Program (AgWRAP) to assist agricultural producers and landowners in constructing and enhancing ponds and water collection. On-farm storage of water flattens the runoff hydrograph to reduce peak runoff, which lessens downstream flood potential. On-farm storage also increases the amount of water available for irrigation when needed. In 2021, the Department assisted in the construction of 21 new ponds, restored storage capacity of five existing ponds, and repaired or reconstructed 10 ponds. The Department has agreements in place to install, repair or replace an additional 114 ponds.

4.4. Conservation Irrigation Conversion

ONGOING

The Division of Soil and Water Conservation is upgrading existing irrigation systems to improve the efficiency of irrigation methods, thereby reducing the demand on water resources for agricultural production. In 2021, NCDA&CS assisted 12 agricultural producers in upgrading their existing irrigation systems with agreements in place to assist an additional 17 producers to implement conservation irrigation conversion.

4.5. Cover Crops, Conservation Tillage, and Cropland Conversion

ONGOING

NCDA&CS oversees education and implementation of cover crop, conservation tillage and cropland conversion programs. These practices result in many climate resiliency benefits, including:

- Improved water quality from increased nutrient scavenging and cycling leading to a reduction in sedimentation and agricultural chemical inputs.
- Stormwater management leading to increased rainfall infiltration and decreased soil erosion and runoff.
- Drought resilience from improved efficiency in soil moisture use and increased soil water holding capacity.
- Increasing plant biomass and soil carbon storage leads to an improved means for carbon sequestration.

It is noted that in 2021, through the Agriculture Cost Share Program (ACSP), the Department helped producers to implement these beneficial climate conservation practices on 17,574 acres of cropland. ACSP agreements are currently in place to assist producers with 22,836 additional acres.

5.0. Marketing Division – Aquaculture

5.1. Adaptive Practices for Controlling Excessive Rain Water Overflow, Turbidity and Settleable Solids in Aquaculture **ONGOING**

By utilizing a 12-18 inch freeboard to catch excess rainfall amounts, NC catfish farms created the best management practice to help limit pumping requirements and expenses and decrease excess rainwater overflow from farms. With assistance and coordinated meetings from NCDA&CS, North Carolina Farm Bureau (NCFB) and NC Cooperative Extension on behalf of the farms with the DEQ Division of Water Resources, the practice was reviewed and accepted as a best management practice to mitigate excess water overflow from ponds and reduce turbidity. Similar practices are in use for NC trout producers by utilizing settling ponds at raceway ends. The settling pond practice was proposed and accepted to offer cost share by NC Soil and Water Conservation through collaboration from NCDA&CS, NCFB and NC State University.

5.2. Educational Producer Meetings for Resource Assistance and Economic Recovery Following Weather Disasters **ONGOING**

The NC Aquaculture Association, in partnership with NCDA&CS, continues to host regional meetings for producers to review assistance programs offered through USDA's Farm Service Agency. Meeting offerings reach producers of groups such as the NC Shellfish Growers Association and NC Aquaculture Association. Educational resources and examples are provided to farmers to utilize NAP Insurance programs, along with resources for cost share and disaster assistance programs to prepare and recover following weather disaster events.

6.0. Agronomic Services Division

6.1. Soil Health and Nutrient Management **ONGOING**

Regional agronomists provide daily on-site consulting services to help growers troubleshoot on-farm nutrient problems, establish appropriate agronomic sampling programs, and promote responsible land management to help safeguard environmental quality. Cropland that is under a strong nutrient management program is more resilient to drought.

7.0. Plant Industry Division and Plant Conservation Program

7.1. Inland Flooding Control **ONGOING**

The Plant Conservation Program (PCP) has secured funding to address existing culvert and road wash-out concerns at coastal plain preserves. Additional culvert and road wash-out concerns have been identified at other preserves due to storm-related inland flooding. The Program is working collaboratively with the Soil and Water Resources Division to design long-term solutions and repairs.

7.2.A Protecting Endemic Species **ONGOING**

Habitat management continues regarding land management activities such as tree-thinning, prescribed burning (in close collaboration with NC Forest Service), and invasive species control where appropriate on Plant Conservation Preserves to rehabilitate and enhance endemic species' habitats. In 2021, the PCP initiated a five-year restoration and research project to study the

interaction between three endangered plant species and prescribed fire, used to manage their habitats. The goal is the help understand the demographic responses in these species to adapt our fire prescriptions for best results.

7.2.B Protecting Endemic Species

ONGOING

Elongate Hemlock Scale has become a serious pest of Fraser Fir Christmas trees as well as other firs, pines, and spruces. In NC, hemlocks and true firs are the most common hosts. Control is concentrated on timely chemical and horticultural oil treatments, natural controls such as parasitic wasps and cultural controls so as not to plant young trees in infested areas. Total control is not achievable at this point due to lack of control measures, but researchers continue to find solutions.

7.3. Regenerative Practices That Sequester Carbon

PLANNED

The PCP is planning for tree replanting projects as appropriate within Plant Conservation Preserves. The intent was to plant longleaf pine in recently harvested areas; however, Covid-19 related delays and unseasonably wet conditions delayed this project until 2022.

7.4. Protecting Ground Water Quality

ONGOING

The PCP partnered with Division of Water Resources in DEQ to install permanent monitoring wells at the Pondberry Bay Plant Conservation Preserve in Sampson County. These wells are part of a state-wide program to monitor saltwater intrusion (a climate change hazard) and other factors in groundwater.

7.5. Protecting NC from Invasive Pests

ONGOING

The Plant Industry Division continues to work to prevent the establishment of new pests in the state, which would hurt or destroy our native forests and vegetation. The Division implements regular trapping programs for early detection and control measures to protect our state.

Looking Ahead

The North Carolina Department of Agriculture and Consumer Services intends to continue executing programs and services for the citizens of the state of North Carolina that promote the resiliency of the agriculture industry and our environment. Building partnerships with other agencies across the state and nation will help to promote initiatives that will benefit the health and wellbeing of our citizens and environment for a more resilient North Carolina as a whole.