



North Carolina

Climate Risk Assessment and Resilience Plan

Impacts, Vulnerability, Risks, and Preliminary Actions

Appendix G: Exposure Matrices for the 2020 Resilience Plan

June 2020

B. Agriculture & Forestry

Assets, Regulations, and Services	Air Pollution	Changed Seasons	Drought	Extreme Cold	Extreme Heat	Flooding (River and Land)	Forest Insects and Diseases (Native and Invasive)	Inundation (includes SLR)	Landslides
Crop and pasture lands	*		*		*	*		*	*
Livestock and poultry	*				*	*			
Shellfish and freshwater aquaculture		*	*		*	*		*	*
Department-owned facilities						*		*	*
Department-sponsored programs and services	*	*			*	*		*	*
Emergency response and wildland firefighting resources and equipment	*	*			*	*		*	*
Forest resource and nursery	*	*			*	*	*	*	*
Forest Service employees; all services provided	*	*		*	*	*		*	*
Endangered and protected plant species.	*	*	*		*	*	*	*	*

B. Agriculture & Forestry

Assets, Regulations, and Services	Non-Native Invasive Plants	Saltwater Intrusion	Severe Winter Weather	Storm Surge	Water Shortage (Drought)	Wild fire related Air Pollution	Wildfire	Wind
Crop and pasture lands	*	*	*	*	*		*	*
Livestock and poultry			*		*			*
Shellfish and freshwater aquaculture			*	*	*			*
Department-owned facilities		*		*			*	*
Department-sponsored programs and services		*	*				*	*
Emergency response and wildland firefighting resources and equipment		*					*	*
Forest resource and nursery	*	*	*		*		*	*
Forest Service employees; all services provided		*			*	*	*	*
Endangered and protected plant species.	*	*		*	*	*	*	

C. Coastal Resources & Infrastructure

Assets, Regulations, Services	Tidal Flooding	Flooding (River and Land)	Coastal Erosion	Storm Surge	Sea Level Rise	Saltwater Intrusion	Water Shortage (Drought)	Wildfire	Wind
Division of Coastal Management									
CRC rules & policies	*	*	*	*	*				
CAMA permitting	*		*	*					
Land use planning	*	*	*	*		*	*		
Access grants		*	*						
Coastal resiliency initiative	*	*	*	*	*				
Science & data	*		*		*				

C. Coastal Resources & Infrastructure

Assets, Regulations, & Services	Extreme Heat	Flooding (River and Land)	Water Shortage (Drought)	Changed Seasons	Inundation due to SLR	Saltwater Intrusion	Storm Surge	Tidal Flooding	Wildfire	Dam Failure	Invasive Species & Species Range Shifts	Wind
North Carolina Division of Marine Fisheries												
Fisheries Research	*	*	*	*	*	*	*	*			*	*
Division Infrastructure		*			*		*	*	*			*
Research Programs	*	*	*	*	*	*	*	*		*	*	*
Research Infrastructure		*			*		*	*	*			*
Fisheries Management	*	*	*	*	*	*	*	*		*	*	*
Fisheries Infrastructure (Commercial & Recreational)	*	*			*		*	*	*			*
Coastal Habitat Protection	*	*	*	*	*	*	*	*	*	*	*	*
Outreach Programs	*	*		*	*		*	*	*		*	*
Shellfish Sanitation	*	*			*			*				

C. Coastal Resources & Infrastructure

Assets, Regulations, Services	Extreme Heat	Flooding (River and Land)	Coastal Erosion	Changed Seasons	Sea Level Rise	Saltwater Intrusion	Storm Surge	Tidal Flooding	Wildfire	Invasive Species & Species Range Shifts	Vessel Groundings
North Carolina Coastal Reserve & National Estuarine Research Reserve											
Reserve Sites		*	*	*	*	*	*	*	*	*	*
Site Support Structures		*	*		*		*	*	*		
Research Program	*	*		*	*		*	*	*	*	
Research Infrastructure		*	*		*		*	*	*		
Stewardship Program	*	*	*	*	*		*	*	*	*	*
Education & Training Program	*	*			*		*	*	*	*	

D. Commerce & Business

Assets, Regulations, Services	Extreme Heat	Flooding (River and Land)	Water Shortage (Drought)	Changed Seasons	Landslides	Saltwater Intrusion	Storm Surge	Tidal Flooding	Wildfire	Dam Failure
Division of Employment Security		*								
N.C. Seafood Industrial Park Authority (Wanchese, Engelhard)		*				*	*	*		
Division of Workforce Solutions		*								
Prosperity Zones										
North Central Prosperity Zone		*								
Northeast Prosperity Zone						*	*	*		
Northwest Prosperity Zone					*					
Piedmont Triad Prosperity Zone		*								
Sandhills Prosperity Zone		*	*							
Southeast Prosperity Zone		*				*	*	*		
Southwest Prosperity Zone					*					

D. Commerce & Business

Assets, Regulations, Services	Extreme Heat	Flooding (River and Land)	Water Shortage (Drought)	Changed Seasons	Landslides	Saltwater Intrusion	Storm Surge	Tidal Flooding	Wildfire	Dam Failure
Western Prosperity Zone					*				*	
Regional Planning Offices										
Southeast Regional Planning Office						*	*	*		
Western Regional Planning Office					*				*	
Rural Economic Development Division										
N.C. Community Development Block Grant Program (CDBG)	*	*	*	*	*	*	*	*	*	*
N.C. Main Street Program	*	*	*	*	*	*	*	*	*	*
N.C. Commerce Incentives and Grants	*	*	*	*	*	*	*	*	*	*
Appalachian Regional Commission		*							*	*

E. Cultural Resources

Assets, Regulations, and Services	Coastal Erosion	Flooding (River and Land)	Landslides	Inundation (includes SLR)	Severe Winter Weather	Storm Surge	Tidal Flooding	Water Shortage	Wildfire	Wind
Archival repositories, historic properties and museums		*		*		*			*	*
Archaeological resources	*	*		*		*		*	*	
Near-shoreline resources, e.g., historic wharves, shipwrecks, cemeteries and other sites	*	*		*		*	*			
State-owned or controlled lakes								*		
Regulation of destruction of all public records		*		*		*				*
Technical assistance to federal and state agencies	*	*		*		*	*			*
Technical assistance to local preservation commissions and records officials at municipal and county level	*	*	*	*		*	*			*
Training and technical assistance for disaster preparations and recovery of object and archival cultural heritage collections in museums and libraries		*		*	*	*				*

Most Vulnerable Ecosystem Types	Change in Seasons	Coastal Erosion	Dam Failure	Extreme Heat	Flooding	Inundation due to Sea Level Rise	Landslides	Saltwater Intrusion
Coastal Plain Floodplains	*		*		*			*
Coastal Plain Large River Communities				*	*			*
Coastal Plain Nonalluvial Mineral Wetlands								*
Coastal Plain Stream/Swamp Communities			*	*	*			*
Estuarine Communities	*	*				*		*
Freshwater Tidal Wetlands	*	*				*		*
High Elevation Forests and Outcrops	*			*				
Maritime Grasslands	*	*		*		*		*
Maritime Upland Forests		*						
Maritime Wetland Forests		*				*		*
Mountain Streams	*		*	*	*		*	
Mountain Bogs and Fens	*			*	*			
Piedmont Streams and Small Rivers			*	*	*			
Shell Bottom (estuarine)	*					*		*
Soft Bottom (estuarine)	*					*		*

F. Ecosystems

Submerged Aquatic Vegetation (Seagrass)	*					*		*
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F. Ecosystems

Most Vulnerable Ecosystem Types	Severe Winter Weather	Storm Surge	Tidal Flooding	Water Shortage due to Drought	Wildfire	Wind
Coastal Plain Floodplains	*	*	*			*
Coastal Plain Large River Communities		*	*	*		
Coastal Plain Nonalluvial Mineral Wetlands		*	*		*	
Coastal Plain Stream/Swamp Communities		*	*	*		
Estuarine Communities		*	*			
Freshwater Tidal Wetlands		*	*			
High Elevation Forests and Outcrops	*			*	*	*
Maritime Grasslands		*	*	*		
Maritime Upland Forests		*	*			*
Maritime Wetland Forests		*	*			*
Mountain Streams				*	*	
Mountain Bogs and Fens				*		
Piedmont Streams and Small Rivers				*		
Shell Bottom (estuarine)		*	*			
Soft Bottom (estuarine)		*	*			
Submerged Aquatic Vegetation (Seagrass)		*	*			

G. Health and Human Services

Assets, Regulations, Services	Wildfire	Flooding (River and Land)	Extreme Heat	Storm Surge	Tidal Flooding	Saltwater Intrusion	Dam Failure	Landslides
Population Exposure	*	*	*	*	*	*	*	*
Vulnerable Populations: Children, Older Adults, Low-Income, Minority, Veterans	*	*	*	*	*	*	*	*
Health Service Infrastructure	*	*	*	*	*	*	*	
First Responders, Town Staff, Environmental Health Specialists	*	*	*	*	*	*	*	*
Toxic Waste Facilities		*		*	*	*	*	*
Livestock Waste Lagoons		*					*	
Infectious Disease Management		*		*				
Sewage		*		*	*			
Stormwater Runoff	*	*		*	*			*
Indoor Air Quality	*	*	*	*	*		*	

H. Housing, Buildings, and Support Services

Assets, Regulation, Services	Changed Seasons	Extreme Heat	Flooding (River and Land)	Inundation (includes SLR)	Landslides	Severe Winter Weather	Storm Surge	Water Shortage (Drought)	Wildfire	Wind
Prison facilities	*	*	*	*			*	*		*
DOA-administered state buildings in Wake County	*	*	*			*		*		*
State-owned underground and above ground storage tanks			*							
Emergency management communications; DEQ/DOT Sensors/monitoring tools		*	*							
DEQ regional offices, office buildings, state-owned vehicles, furniture, field equipment, staff			*							
Regulatory oversight over public or private landfills, transfer stations, temporary disaster debris sites, solid waste management facilities			*			*				*

H. Housing, Buildings, and Support Services

Assets, Regulation, Services	Changed Seasons	Extreme Heat	Flooding (River and Land)	Inundation (includes SLR)	Landslides	Severe Winter Weather	Storm Surge	Water Shortage (Drought)	Wildfire	Wind
Regulatory oversight over the long-term cleanup of non-permitted releases of hazardous substances, support in emergency situations.			*				*			
Petroleum and hazardous substance spill response teams			*							
NIST Risk Management Framework (RMF) 800-53 Security Controls. General Statute Chapter 143B, Article 15; approvals, inspections, compliance										*

I. Public Safety

Assets, Services, Regulations	Extreme Heat	Flooding (River and Land)	Water Shortage (Drought)	Changed Seasons	Severe Weather	Landslides	Saltwater Intrusion	Storm Surge	Tidal Flooding	Wildfire	Dam Failure
Emergency Management: mitigation, preparedness, planning, response, recovery	*	*	*	*	*	*	*	*	*	*	*
Employee Safety	*	*			*			*		*	*
Law Enforcement	*	*			*			*	*	*	*
Emergency Sheltering support		*			*			*			
Flood Risk Management		*			*			*	*		
Correctional Institution Inmate Health and Safety	*	*			*					*	*
Correctional & Juvenile Justice Institutions	*	*	*		*			*	*	*	
Prison Wastewater Treatment		*									*
Prison Food: Caledonia Farmland	*	*	*	*	*						*
State-managed recovery programs (FEMA PA, HUD CDBG-DR, State DRA) for critical infrastructure managed by counties and municipalities	*	*						*	*	*	

I. Public Safety

Assets, Services, Regulations	Extreme Heat	Flooding (River and Land)	Water Shortage (Drought)	Changed Seasons	Severe Weather	Landslides	Saltwater Intrusion	Storm Surge	Tidal Flooding	Wildfire	Dam Failure
State-managed recovery programs for housing (FEMA IA, HUD CDbG-DR, State DRA, Hazard Mitigation Grant Program)	*	*						*	*	*	

J. Transportation

Assets, Regulations, Services	Changed Seasons	Coastal Erosion	Extreme Heat	Flooding (River and Land)	Landslides	Severe Winter Weather	Storm Surge	Tidal Flooding	Water Shortage (Drought)	Wildfire	Wind
Transportation Sector											
Operation and maintenance of land transportation including state roads, bridges, and culverts		*	*	*	*	*	*		*		
Pavement resurfacing operations and budgets			*								
Employee Safety			*	*		*				*	
Aviation Operations and Maintenance			*	*		*				*	*
Marine Transportation Operations and Maintenance		*				*	*	*			*
Ports (Marine and Inland)		*	*	*		*	*	*			*
Rail			*	*	*	*					
Public Transport			*	*		*					
Bicycle/Pedestrian	*		*	*						*	*

J. Transportation

Assets, Regulations, Services	Changed Seasons	Coastal Erosion	Extreme Heat	Flooding (River and Land)	Landslides	Severe Winter Weather	Storm Surge	Tidal Flooding	Water Shortage (Drought)	Wildfire	Wind
Freight and Logistics Plan			*	*						*	
2023-2032 STIP Development		*	*	*		*	*	*	*		
NC Moves 2050 Plan		*	*	*		*	*	*	*		
Stormwater Management				*				*			

K. Water and Land Resources

Assets, Services, Regulations	Extreme Heat	Flooding (River and Land)	Water Shortage (Drought)	Changed Seasons	Landslides	Saltwater Intrusion	Storm Surge	Tidal Flooding	Wildfire	Dam Failure
Land and Water Quality										
Sedimentation, stormwater and wastewater permitting	*	*	*			*	*	*	*	*
State-owned groundwater monitoring wells		*				*		*		
Monitoring, survey and invasive species removal programs for waterbodies	*	*	*	*		*				
State stream and wetland restoration sites	*	*	*			*				*
Landslide mapping program	*	*			*				*	
Shellfish Growing Area Program	*	*		*		*	*	*		
Recreational Water Quality Program	*	*		*			*	*		
Water Quantity										
Municipal water supply			*		*	*			*	*

K. Water and Land Resources

Assets, Services, Regulations	Extreme Heat	Flooding (River and Land)	Water Shortage (Drought)	Changed Seasons	Landslides	Saltwater Intrusion	Storm Surge	Tidal Flooding	Wildfire	Dam Failure
Agricultural water use	*	*	*	*		*	*			*
Various water supply watersheds statewide		*				*				*
Water Infrastructure										
Public water systems	*	*	*		*	*	*	*		*
Wastewater treatment plants	*	*					*	*		*
Septic systems						*	*	*		
Water treatment plants	*	*	*			*	*	*		*
Dams										
State-owned dams		*			*				*	*
Dam safety program		*			*					*
Privately owned dams		*			*				*	*
Mines										
Regulation of active mines	*	*	*		*		*		*	*
Other										
DEQ staff	*	*	*		*		*	*	*	*
Floodplain development		*								*

L. Energy

Assets, Services	Extreme Heat	Flooding (River and Land)	Water Shortage (Drought)	Strom Intensity	Changed Seasons	Landslides	Saltwater Intrusion	Storm Surge	Tidal Flooding	Wildfire	Dam Failure
Power Generation											
Nuclear and Hydrocarbon Power Plants		*	*	*			*	*			*
Renewable Energy Generating Facilities		*			*	*				*	
Hydroelectric Power Plants		*	*	*				*			*
Electric Power Delivery											
Transmission and Distribution Grid	*	*		*		*	*	*	*	*	*
Substations and Other Support Systems		*		*		*		*	*	*	
Fuel Supply Chain											
Natural Gas Pipelines		*		*		*		*			
Petroleum / Gasoline Pipelines		*		*		*		*	*	*	
Petroleum Storage and		*		*	*			*	*		

L. Energy

Assets, Services	Extreme Heat	Flooding (River and Land)	Water Shortage (Drought)	Strom Intensity	Changed Seasons	Landslides	Saltwater Intrusion	Storm Surge	Tidal Flooding	Wildfire	Dam Failure
Bulk Terminals											
Gasoline Distribution and Fueling Stations		*		*	*	*		*	*		
Ports, Rail and Roads	*	*		*		*		*	*		



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