

# **FLOOD DYNAMICS OF THE LOWER ROANOKE AND CASHIE RIVERS AND THEIR INTERACTION WITH THE ALBEMARLE-CHOWAN ESTUARINE SYSTEM**

Stanley Riggs and Robert Christian  
NORTH CAROLINA LAND OF WATER (NC LOW)  
[www.nclandofwater.org](http://www.nclandofwater.org)

Bertie Peninsula is water-bound by a complex drainage system encircling three sides and dissecting through its interior. Roanoke River forms the western and southern boundaries, and estuarine waters of Albemarle Sound and Chowan River forms the southeastern and eastern boundaries. The Peninsula's interior is dominated by a network of black-water tributaries, like the Cashie River. Complex interactions within this world-class, integrated water system produce various catastrophic storm impacts on this region.

The lower Roanoke River has three segments that function differently. Water flow in the upper segment (Roanoke Rapids dam to Hamilton) is dependent on dam discharge determined by upstream weather conditions and dam management policies. The middle segment (Hamilton to Jamesville) is a fluctuating transition zone. The lower segment (Jamesville to Albemarle Sound) is at sea level and dominated by Albemarle Sound and Chowan Estuary dynamics including small astronomical and wind tides, and storm surges that overwhelm the diffused flow from dam discharge.

The Cashie River tributary also has three river segments. The upper Cashie is riverine and dependent on rainfall. Windsor occupies the transition zone between riverine and estuarine conditions. The lower Cashie River estuary is dominated by Albemarle Sound dynamics with little to no influence from Roanoke River dynamics. Thus, catastrophic floods at Windsor are dependent on interactions of large upstream rain inputs simultaneously with major backflow from wind set-up and/or storm surge from Albemarle-Chowan estuary. Ground-water level and seasonal evapotranspiration in the lower Cashie floodplain also impact severity of flooding in Windsor.

246 words

**FLOOD DYNAMICS IN THE BERTIE WATER CRESCENT:  
INTEGRATING THE DYNAMICS OF COMPLEX DRAINAGE SYSTEMS TO  
MINIMIZE STORM IMPACTS AND MAXIMIZE AQUATIC ENVIRONMENT  
VIABILITY**

Consequently, when large-scale upstream (rainfall) and/or downstream (storm surge) events occur, then the smaller-scale processes can affect the extent of flooding. Inches to feet of increase or decrease in vertical water levels translate into significantly larger or smaller flooded areas. or if there has been a prior and/or extended wet weather period with a high groundwater levels, full river channels, and wet primary floodplains. When the latter situation exists there is a substantial potential for increased flooding in Windsor and the lower Cashie River.

501 words

Flooding in the upper segment is dominantly controlled by dam discharge, whereas the lower segment is controlled by storm surge.

3. Flooding and shoreline erosion on the eastern banks of Bertie County are totally dependent on the interaction of storm dynamics (storm surge, wind, and rainfall) and associated weather patterns through time on the very large water bodies of the Albemarle and Chowan estuaries.

Small towns in North Carolina's Land of Water are hard-pressed to create new economic opportunities. Today they face major challenges that include destructive floods, rising sea level, loss of jobs, population declines, high poverty rates, and crumbling infrastructure. In an effort to stimulate new economic opportunities, NC LOW's strategy is to focus on the natural and cultural, resource-based science, eco-tourism and environmental education as a means of diversifying the rural economy while minimizing the stifling impact of flooding and drought. NC LOW brings this vision to the Bertie County region with the expectation of improving the local quality of life through sustainable economic development that enhances and protects the environment and culture of the region.

115 words

Several smaller and incised, black-water tributary streams flow into Albemarle Sound and include the Salmon, Black Walnut, and Cashoke creeks. The high, east-facing bluffs of the Wicomoco and Talbot Terraces contain numerous small and deeply incised, ephemeral drainages characterized by small delta plains and cypress headlands where they discharge into the Chowan River and Albemarle Sound.