# PROPOSED SCUPPERNONG TRAIL SYSTEM OF POCOSINS, CAROLINA BAYS, & BLACK-WATER STREAMS

## TYRRELL, WASHINGTON, & HYDE COUNTIES

**A REPORT OF THE NORTH CAROLINA LAND OF WATER (NC LOW)**

**www.nclandofwater.org**

**March 1, 2018**

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**NC LOW SCUPPERNONG TRAILS TEAM**

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COVER PHOTOGRAPH: Kayak fishing on NC's vast canal system. Photograph is by S. Riggs.

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***Trails of multiple fauna. Photograph by M. Dunn***

# INTRODUCTION: THE SCUPPERNONG COASTAL SYSTEM

## A Rich Heritage of Natural and Cultural Resources

From a natural history point of view, the Scuppernong coastal system is a "wildlife spectacle" that is sometimes referred to as the "Yellowstone of the East" due to the unique landscapes, diverse ecosystems, and abundance and variety of wildlife (Figure 1). However, there are no raw and awe-inspiring snow-capped mountains, lush high meadows with elk and bison, or geysers with boiling hot springs. Rather, the "Yellowstone of the East" is a more introspective and contemplative landscape that requires one to slow down and become acquainted with that most crucial of natural resources: **WATER**. This region is North Carolina's "Land of Water"; a great mixing basin and transition zone where upland rivers meet the sea.

*FIGURE 1.Upper left photograph is a flock of snow geese in a field and upper right is a prothonotary warbler in a nest cavity. Lower left photograph is a zebra swallowtail butterfly on button bush flowers and lower right is a green tree frog. All photographs are in the Pocosin Lakes National Wildlife Refuge and by M. Dunn.*

The North Carolina Land of Water (NC LOW) consists of five basic components (Figure 2). The two main protagonists are fresh-water and salt-water. The fresh-water component rains down from the sky and flows through complex drainage systems of streams and rivers through the upland regions of the Appalachian, Piedmont, and Coastal Plain provinces. The salt-water

component is associated with the high energy dynamics of the omnipotent Atlantic Ocean. Where these two protagonists meet is the North Carolina coastal system dominated by the third and fourth components: the Outer Banks barrier island sand dam with its inlet/outlet system and the vast brackish-water, drowned-river estuarine system with its perimeter marshes, swamp forests, and sediment bank shorelines. This coastal system is superimposed upon the fifth component; the adjacent lowland topography dominated by a vast network of black-water tributary streams flanked by broad riparian floodplains that are slowly migrating into the upland swamp-forest pocosins, Carolina bays, and Carolina bay lakes.

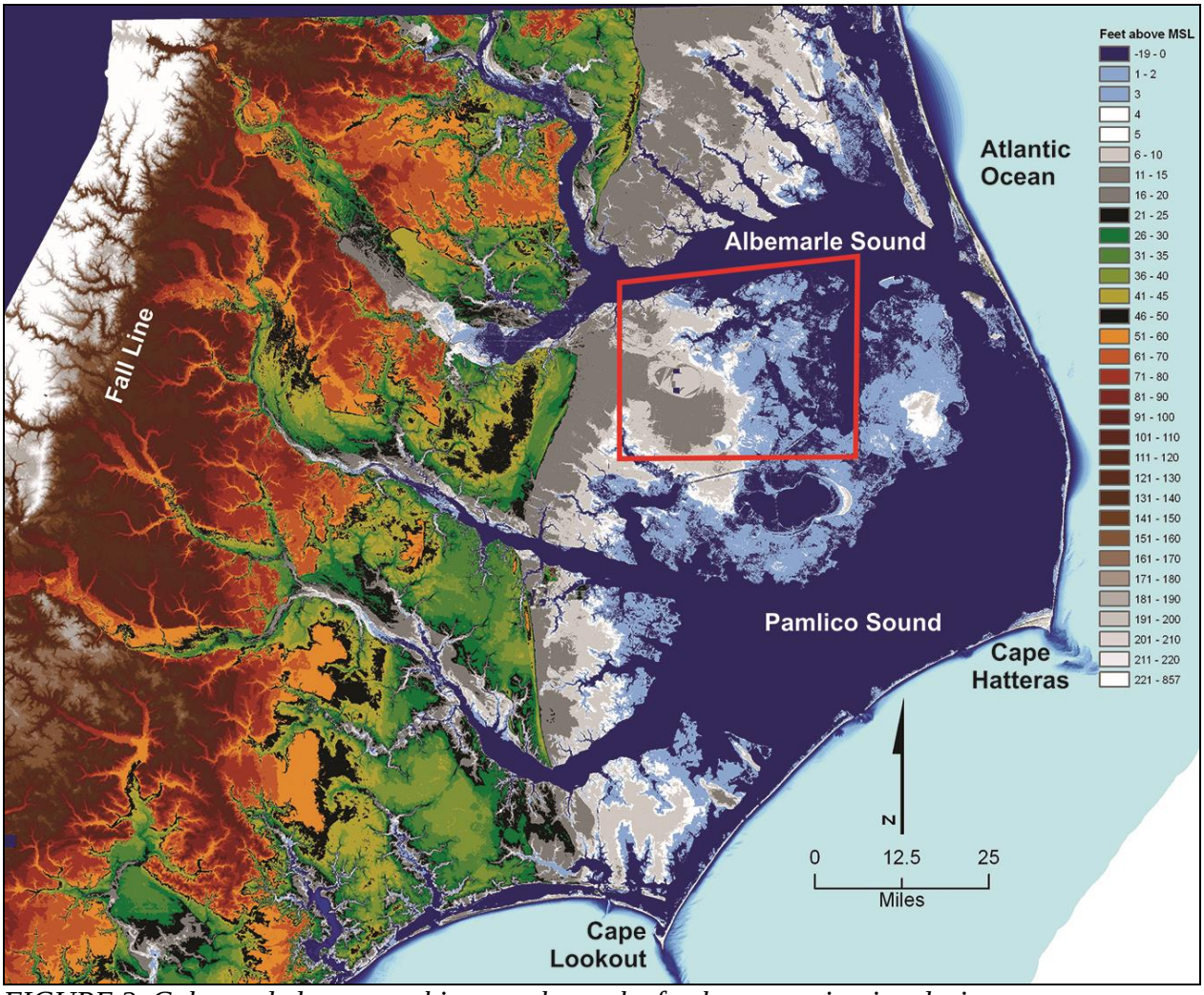


*FIGURE 2. Color coded topographic map shows the fresh-water, riverine drainage system flowing off the Piedmont Province (white and gray colors in upper left corner) and onto the Coastal Plain Province (dark red to light blue colors in the rest of the map). The vast estuarine system (dark blue) forms as the rivers approach sea level and mix with the salt-water of the Atlantic Ocean (pale blue east of the Outer Banks). The area outlined in red (a portion of the Albemarle Peninsula) is the primary area included in the proposed trail program. Topographic data are from the 2015 North Carolina Floodplain Mapping Program; map preparation is by D. Ames.*

The resulting lowland, riverine-estuarine-oceanic coastal eco-systems represent a living dynamic system. This system is evolving within human time spans (days to centuries) in response to ongoing climate change processes (sea-level rise, floods, droughts, fire, etc.) compared to the much slower, and long term (centuries to millions of years) evolutionary changes of the Rocky Mountain system. These coastal ecosystems are extremely diverse and contain a plethora of fauna and flora (Figure 3). The coastal ocean is home to whales, sharks, porpoise pods, sea turtles, pelagic birds, and a world of game fish, benthic shellfish, and algal forests. The estuarine and riverine components contain a great variety of brackish- to fresh-water bodies, each home to different assemblages of fish and reptiles and surrounded by vast wetland marshes and swamp forests containing exotic flora (e.g., insectivorous plants and orchids). The adjacent uplands are dissected by spectacular black-water streams that grade from their broad, lower stretches dominated by ghost forests as rising sea level drowns ancient riverine swamps to their magical, upper reaches with magnificent stands of cypress and Atlantic white cedar. Between the ribbons of black-water streams are the mysterious pocosins, what Native Americans called "swamps on a hill", with their unique wetland ecosystems and enigmatic Carolina bays and bay lakes. Within this multitude of ecosystems there are great concentrations of winter waterfowl (e.g., tundra swans and snow geese), raptors (e.g., bald eagles and osprey), mammals (e.g., black bear, bobcat, river otter, alligator, and red wolves); all of this makes the NC LOW region a paradise for kayakers, hikers, wildlife-watchers, photographers, fishermen, and hunters. This region is truly worthy of recognition as the "Yellowstone of the East".

The diversity of fauna and flora (Figure 3) within the Scuppernong drainage basin (Figure 4) is among the greatest within North Carolina. Much of the diversity of amphibians is represented by frogs and toads which can produce thrilling choruses at night under the correct environmental conditions (warm and rainy nights around May). Black bears and various endangered species occur within the Scuppernong region in the highest density east of the Mississippi River because of the vast wetland areas within NC's Land of Water.

*FIGURE 3. Photographs show common fauna and flora of the Scuppernong region. Top panels: black bears and river otter; middle panels: the formerly endangered bald eagle and presently endangered red-cockaded woodpecker; bottom panels: typical Scuppernong pocosin ecosystem with abundant yellow pitcher plants. Top panel photographs are by M. Dunn, middle panel are by T. Earnhardt, and bottom panel are by S. Riggs.*

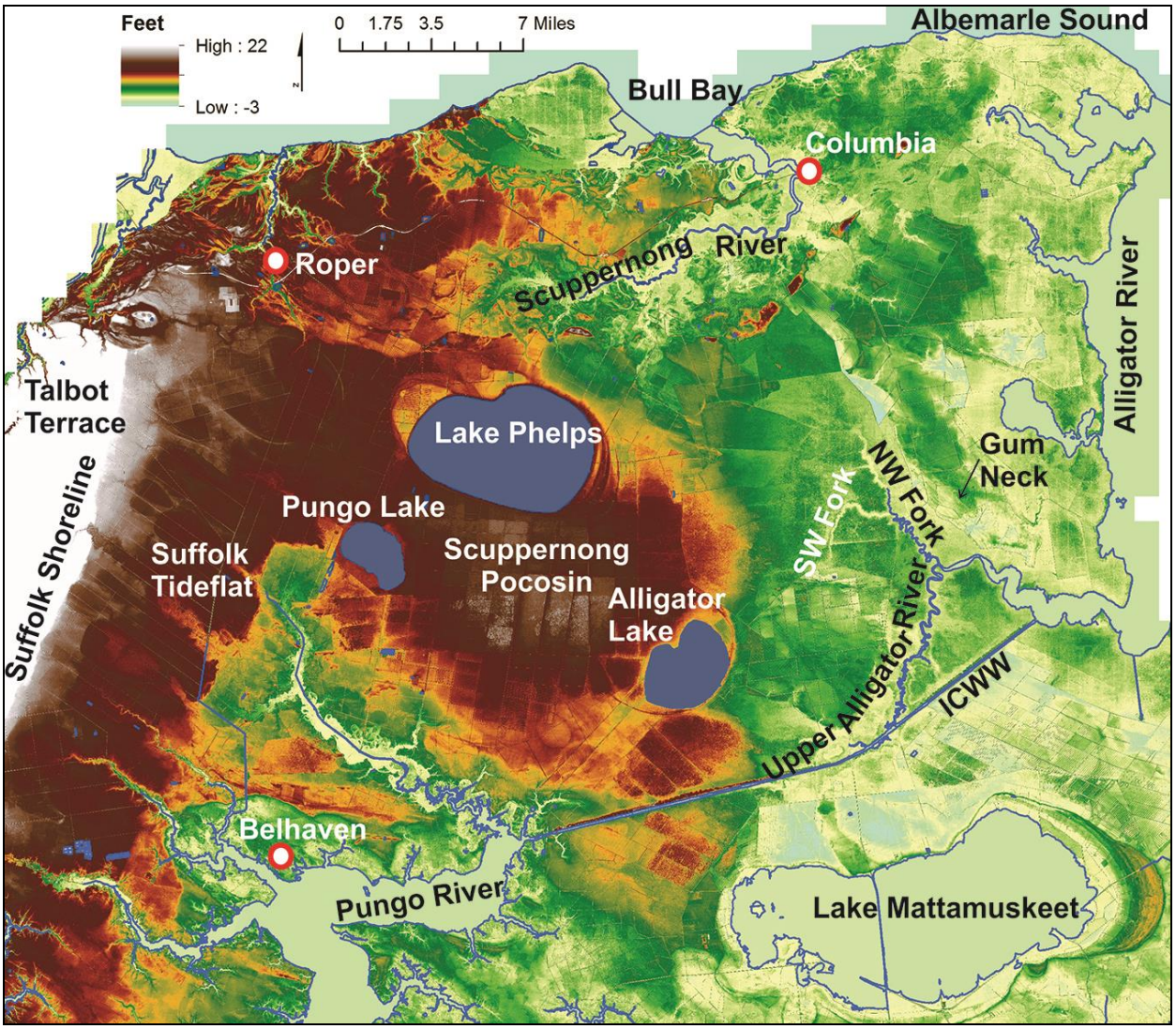


*FIGURE 4. A color topography map shows the landscape features of the Scuppernong coastal system. Mean sea level is pale green on this map. Land elevation rises systematically from mottled pale green (~0 to 3 feet) along the east and southeast margins, to green (~4 to 7 feet), orange to red (~8 to 10 feet), dark red (~11 to 19 feet), to gray (~20 to 29 feet). White is the highest elevation along the western margin (>30 feet above mean sea level). Pungo Lake is 9 feet, Lake Phelps is 10 feet, and Alligator Lake is 6 feet above mean sea level. Lake Mattamuskeet (pale green in southeast corner) is maintained at or slightly below mean sea level by dikes and pumping stations. Topographic data are from the 2015 North Carolina Floodplain Mapping Program; map preparation is by D. Ames.*

The Scuppernong region (Figure 4) is a component of the entire NC LOW region with a particularly complex set of geologic landscape features that includes several ancient ocean shorelines and extensive braided-stream river terraces, the more recent drowned-river estuaries, and the modern tributary streams and associated pocosin swamp forests. The Scuppernong coastal system is bounded on the north by Albemarle Sound (the drowned-river valley of the Roanoke River) and the Alligator drowned-river estuary on the east. The spectacular black-water Scuppernong River is a tributary drainage system that transitions upstream into a series of smaller tributaries with headwaters in the elevated wetlands of the Scuppernong pocosin (Native American name for a "swamp-on-a-hill"). Unique fresh-water, Carolina bay lakes (including Phelps, Pungo, and Alligator lakes) are situated in the pocosin and perched on the crest of the inter-stream divide between Albemarle Sound and Pamlico Sound.

For the past 125,000 years of Earth history, the geologic landscape and associated ecosystems of the Scuppernong region evolved as natural and interdependent partners (Figure 5). The Native Americans arrived in NC about 12,000 years ago with minimal environmental impact and few historical records. Their small, sustainable villages occupied the estuarine, riverine, and associated upland systems. Their cypress dugout canoes, preserved in the Carolina bay lakes, range in age from about 4,500 years ago until European occupation. The arrival of European explorers and colonists in 1584-1587 brought a new force onto the landscape. For the first 125 to 130 years the Europeans clashed with the Native American cultures that sadly ended with the Tuscarora Indian War of 1711 to 1713. The outcome of this war opened the door for the subsequent exploration and development of the wilderness with the critical aid of African enslaved labor.

Human modification of the wilderness exploded in the 19$^{th}$ century as the machines of the industrial revolution became available through the economic development and utilization of the vast natural resource base within the Scuppernong region (Figure 6). Nature's forces of climate change (sea-level rise, storms, floods, and fire) which controlled the dramatic evolution of the landscape and its ecosystems were also the forces that dictated the dynamics of the more recent development of human culture and its history. Numerous small towns and crossroad villages were established by the "down-easters" during the 18$^{th}$ and 19$^{th}$ centuries interspersed among vast areas of drained farmland, riverine wetlands and swamp forests. These range from the larger towns of Columbia and Plymouth, to small villages of Swan Quarter, Creswell, Roper, and Cherry; to the crossroad communities of Alligator, Newfoundland, Kilkenny, Gum Neck, Pleasant View, and Goats Neck. Thus, "The Scuppernong Story" intertwines the geologic landscape and its ecosystems with the human history.

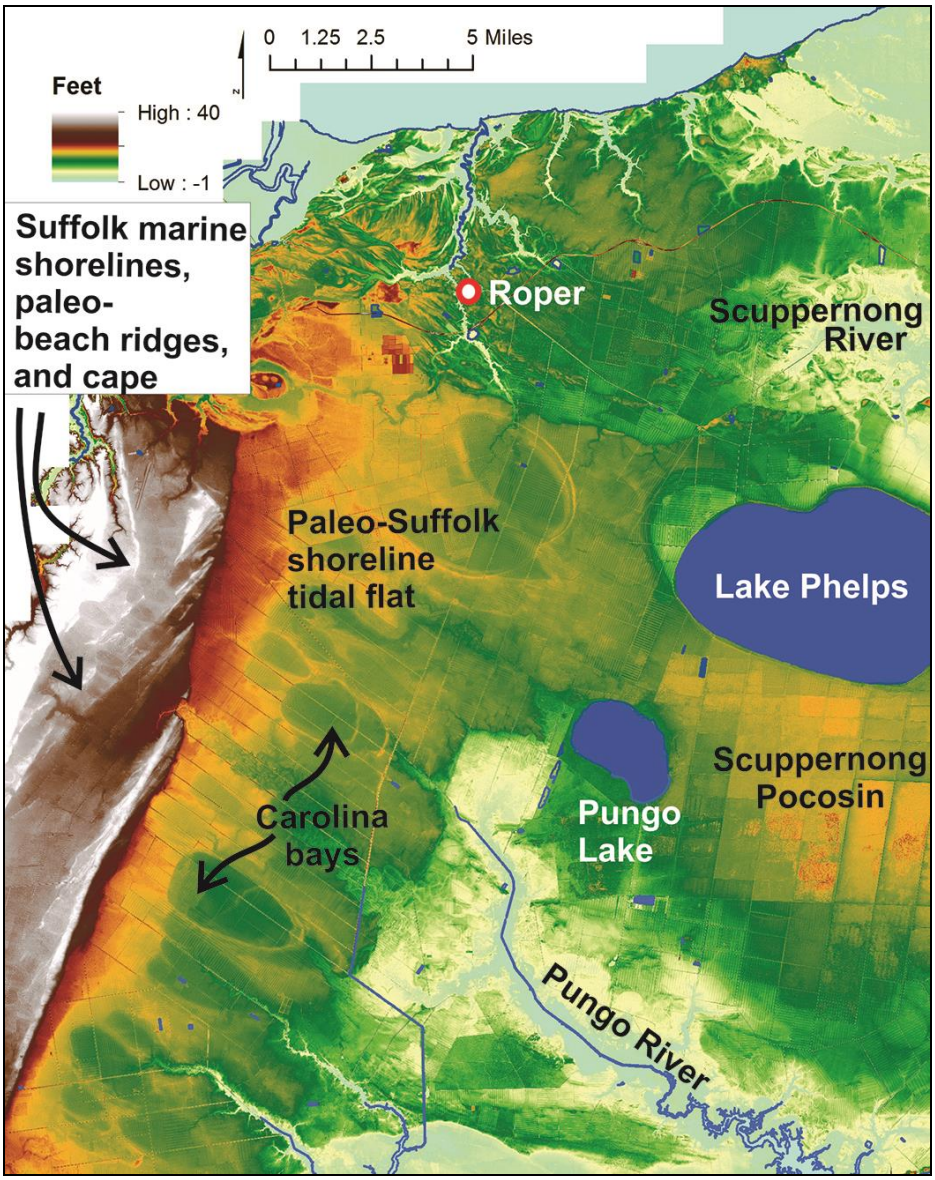


*FIGURE 5. A color topography map shows the Paleo-Suffolk marine shorelines along the western map boundary that consists of 1) an erosional scarp cut into the east side of the brown upland surface, 2) a series of paleo-beach ridges, and 3) swales and a paleo-cape feature (white) deposited on top of the eroded, paleo-Suffolk shore-face surface (dark red). The paleo-Suffolk Shoreline tidal flat (red to orange to dark green) is a seaward-sloping marine mud flat on which a series of northwest-southeast oriented, shore perpendicular, oval depressions (Carolina bays) formed while this region was a shallow, tidal flats. Notice that the Carolina bay depressions often consist of multiple overlapping curved sand ridges and that their southeast ends have been breached by the head-ward erosion of incised tributary streams of the Pungo River. The straight line channel segments within this drainage system are channelized streams. Also, notice the extensive window-pane network of ditches on both the paleo-Suffolk Shoreline tidal flat and the Scuppernong Pocosin to the south of Lake Phelps. Topographic data are from the 2015 North Carolina Floodplain Mapping Program; map preparation is by D. Ames.*

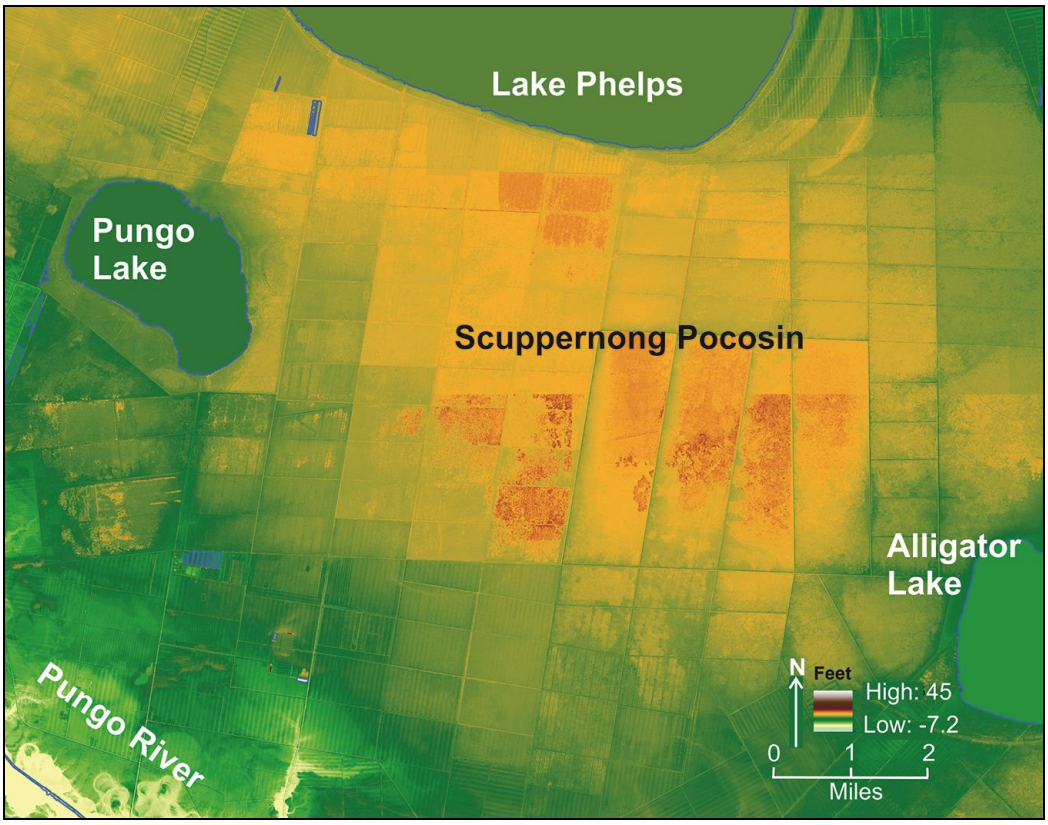


*FIGURE 6. The color topography map shows the Scuppernong Pocosin area due south of Lake Phelps. The elevations above mean sea level are as follows: light green to dark green is 5 to 10 feet; light yellow to orange is 11 to 15 feet; and red is 16 to 20 feet. Three scales of ditching occurred in an effort to drain the Scuppernong pocosin. The largest scale or main canals were dug >10 feet deep on a 1 mile grid. A secondary set of collector ditches were dug ~6 feet deep on a ½ mile grid. The smallest field ditches were dug in the lower elevations for agricultural development and were <5 feet deep and on a 330 foot grid. These efforts to drain the pocosin failed as indicated by the land elevations immediately adjacent to the two larger-scale ditch sets. Topographic data are from the 2015 North Carolina Floodplain Mapping Program; map preparation is by D. Ames.*

Since the latter portion of the 20th century, the Scuppernong region has slowly evolved into a preservation mode with establishment of a network of National Wildlife Refuges, Conservation Lands, and State Historical and Park facilities. Yes, the "Yellowstone of the west" is the "grande dame" of national parks and the ecotourism business, but many visitors are beginning to appreciate the "Yellowstone of the east" with its dramatically different coastal system components, unique wetland habitats, abundance of wildlife, and diverse cultural history.

The Scuppernong coastal system embodies the best of the three W's ***Water, Wildlife, and Wildness*** (Figure 7) that is overlain with a rich, but conflicted cultural history. Together they create an attractive destination for cultural- and natural-history tourism, as well as educational programing. "The Scuppernong Story" is an environmental and cultural history of a small coastal

system through approximately 125,000 years of climate change and landscape evolution. The cultural over-print on these landscapes and their ecosystems represent 12,000 years of human occupation. This story is the natural and cultural history of a dynamic geologic landscape, a complex and highly diverse set of ecosystems, and the human groups who inhabited this region.

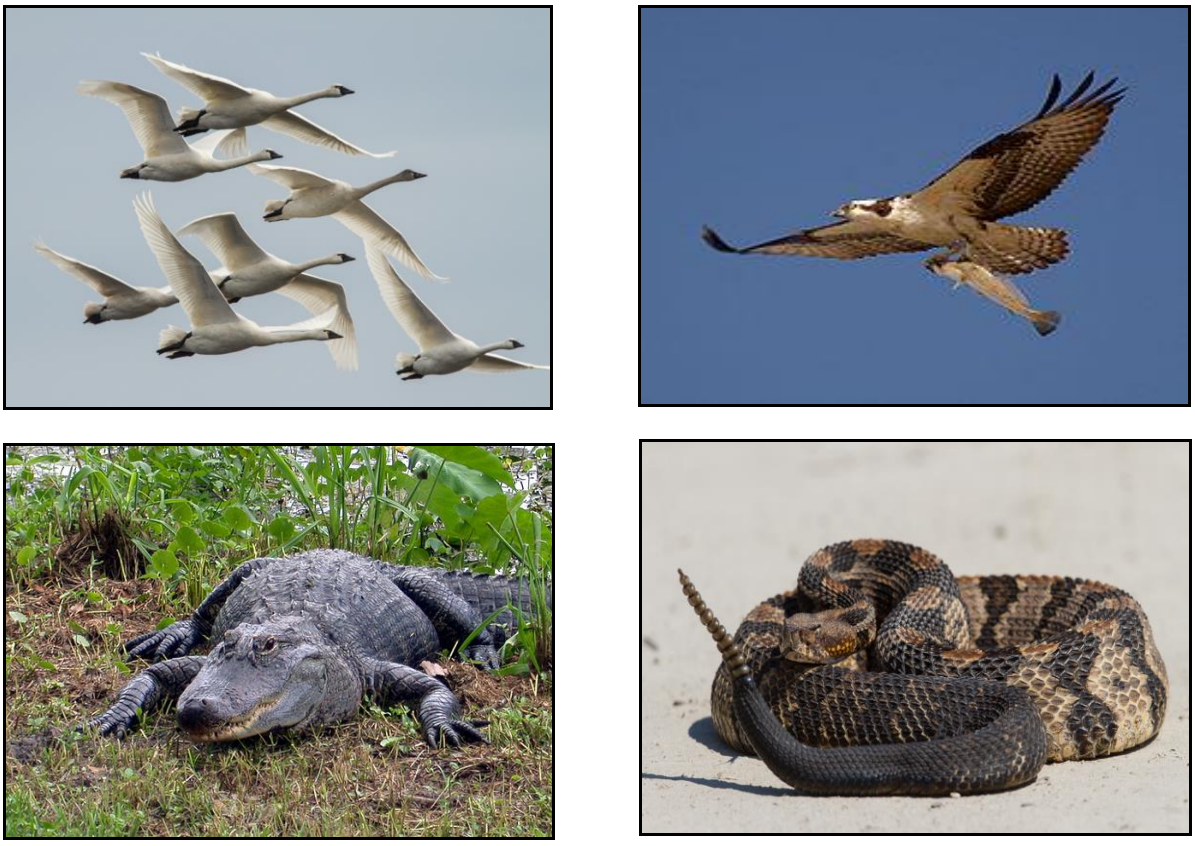

*FIGURE 7. Upper panels: winter tundra swans and summer osprey with supper; lower panels: summer American alligator and cane-brake or timber rattlesnake. Upper left and lower right photographs are by M. Dunn, others are from flickr.com.*

**Scuppernong Eco-Tourism Programs**

The goal is to build a cultural and natural history tour program around the rich heritage of the Scuppernong region: a) landscape evolution through 125,000 years, b) Native American archeology; c) European and African American history; d) import and export shipping and the resulting underwater archeology; e) economic development of regional agriculture and forestry; f) hydrologic modification of the region and ecosystem evolution; and g) the mysteries of the night. Each of these represents a major story to be told with field trips through the vast natural and cultural resource base of the Scuppernong region. Many local stories are also waiting to be told through programs and virtual field trips on the internet. For example, the NC Museum of Natural Sciences developed a program on American Shad along the Roanoke River that includes a traveling program called River Days. The production includes interviews of long-term local residents and their associations with the river. This model could also be used for each of the topics listed below.

Nocturnal Environment and Night Sky Programs

The night skies within most of the outer Albemarle Peninsula are among the darkest on the entire US east coastal system (Figure 2). The Peninsula is surrounded by four very large estuarine water bodies: Albemarle Sound on the north, Croatan and Pamlico sounds on the east, and the Pamlico River Estuary on the south. This outer land region consists of Tyrrell, Washington, and mainland Dare and Hyde counties with Columbia, Plymouth, Swan Quarter, and Engelhard being the largest towns on the Peninsula with much of the rural population living in very small crossroads communities (e.g., Goat Neck, Cherry, Kilkenny, East Lake, Stumpy Point, Alligator, Mackeys, New Holland, etc.). The largest industry is agriculture with vast areas of farms and timber lands, along with a small, but growing tourist industry. Four large National Wildlife Refuges occur within the region (Alligator, Pocosin Lakes, Mattamuskeet, and Swan Quarter) as well as vast acreages of NC game lands and private conservation lands. Thus, the >5,000 square miles of public ecosystems within the Outer Albemarle Peninsula (OAP) preserve a unique complex of nocturnal environments and associated night skies.

The nocturnal environment and their night skies rotate from the brilliant, big sky of the full moons to the black, blackness of the new moons when the starry sky opens to a dazzling universe. A large seasonal variation is superimposed upon the vastness of the sky itself. This local overprint ranges between two extremes. The cold, crisp, winter nights are dominated by either the overwhelming sounds of flocks of winter waterfowl (e.g., tundra swans and snow geese by the many tens of thousands) moving from the refuge lakes to the farm fields, the lonesome hoots of owls on their evening hunts, howls of roaming coyote packs, or occasionally the rare red wolf. The summer nights are hot and humid and dominated with a cacophony of insects and frogs and massive light and sound displays derived from the outlines of perfect thunderheads as they move across the Albemarle Peninsula. And of course, the never ending parade of early morning sunrises and evening sunsets (Figure 8) provides new mosaics of sky magic.

*FIGURE 8. Winter sunset over the Scuppernong pocosin. Photograph is by M. Dunn.*

The opportunities for building programs around the nocturnal environment and night sky are unlimited for both the public and associated school systems and can readily be integrated with the Scuppernong Trail System. Day time lectures can be offered at specific facilities, evening field trips can be taken to specific outdoor locations that are good for night viewing and listening, and course curricula can be implemented within the K-12 regional schools. Multiple day eco-tourism workshops and field programs dealing with the natural and cultural resources of the Albemarle region can include components associated with nocturnal environments and astronomy of the night sky that are integrated into the region's landscape and ecosystem programs.

Pocosin Arts Programs

We should capitalize on the proximity of Pocosin Arts Folk School (Figure 9) and the Eastern 4H Environmental Conference Center for programming, lodging, and food. These organizations are centrally located to the natural and cultural resources of the Scuppernong region and other significant regional assets and would broaden the scope of tourism possibilities. Incorporating the arts community, that is thriving at Pocosin Arts, provides opportunities for combining art with the rich natural and cultural history of the region (e.g., nature journaling, field sketching, nature photography, weaving with natural materials, art based on natural themes, ceramics and basket weaving of Native Americans, etc.).


*FIGURE 9. The Pocosin Arts Folk School has built and operates the dormitory and classroom facility shown in the right panel in downtown Columbia. Photographs are by S. Riggs.*

Nature Photographer Programs

Nature photographers are an important visitor group to the Scuppernong region that could be expanded if adequate infrastructure resources and amenities were available. The Carolina Nature Photographers Association and other photography clubs and individuals already make annual trips to the area. People interested in bird watching and nature in general, as well as Friends of Pocosin Lakes NWR have conducted successful bear and waterfowl tours of the refuge. These could be expanded with proper vehicles (ideally small buses with large viewing windows) and staffed trained volunteers.

Alphabet Bucket List Program.

Develop an "Alphabet Bucket List" program that works in concert with an "A to Z list of potential natural and cultural resource opportunities" for major things to see and do while

visiting the Scuppernong coastal system. This program could utilize the "passport" concept to guide the visitors to the many different venues and opportunities within the region. Have you done the following?

a. Seen our constellations, stars, and meteorite showers in a truly black night sky?
b. Howled with the wolves or marveled with the night time insects and frogs?
c. Gone fly-fishing in the many different waters of the Scuppernong coastal system?
d. Stood in a 1786-1862 African slave cabin?
e. Biked through the wilderness of a pocosin swamp forest?
f. Seen black bears feeding in the corn fields?
g. Watched a flock of tundra swans take flight from Pungo Lake at dawn?
h. Eaten a local blue crab or a succulent oyster on the banks of Albemarle Sound?
i. Been on a commercial fishing boat in Albemarle Sound?
j. Walked among a grand stand of Atlantic white cedars?
k. Savored a cluster of Scuppernong grapes picked directly from the vine?
l. Camped on a village site of the Carolina Algonkians along the Lake Phelps shore?
m. Paddle-boarded on the drowned tributary estuary of Bull Bay?
n. Made an Algonkian cooking pot from local clays at the Pocosin Arts Center?
o. Visited a "prairie gothic" mega-farm operation?
p. Slept on a 125,000-year old ocean shoreline?
q. Photographed a broad cluster of 3-foot high, green pitcher plants?
r. Shared a bottle of wine in a tree-house along the shores of the Alligator River?
s. Walked the "Scuppernong African American Trail" from the Scuppernong River, along the 6-mile hand-dug canal to Somerset Place on the shores of Lake Phelps?
t. Motored or biked the "Scuppernong Trail System" through the ethereal pocosins, Carolina bays, and black-water swamps of the Scuppernong coastal system?
u. Ventured along the 11,000 year "Scuppernong Cultural History Trail"?
v. Considered the origin of hundreds of mysterious Carolina bays in the Scuppernong coastal system?
w. Participated in the slave's Jonkonnu observance during Christmas at Somerset Place?
x. Paddled the awesome black-waters of the Scuppernong River or Deep Creek?
y. Looked for alligators on the NW and SW Forks of the Alligator River?
z. Observed a modern ghost forest forming today in response to ongoing sea-level rise?

<u>Mountains to Sea Trail</u>

The present Mountains to Sea trail travels east along the Neuse River to Ocracoke, north along the Outer Banks, and ends at Jockey's Ridge State Park. This trail could be developed to loop back west through Roanoke Island, the mainland and Scuppernong region (including Dare, Tyrrell, Washington, and Martin counties), along the Roanoke River to Roanoke Rapids, Medoc Mountain State Park, and tie back into the main trail at Falls of the Neuse. Hiking across the major water bodies of northeastern NC is a problem. However, it can be resolved with a series of kiosks located at both sides of each long bridge with an associated group of trained "bridge taxi drivers" that could be available by phone to transport hikers across the bridges during certain time periods and at pre-determined fees. This would not only add a few jobs to the region, but would bring in new and expanded user groups.

**Resource-Based Scuppernong Eco-Tourism Plan**

This **plan** is based on the natural resource and cultural history information within "The Scuppernong Report" (January 2016) and three trails reports produced for NC LOW: 1) the overview, integration, and maps by Stanley Riggs and Dorothea Ames; 2) the fauna and flora resources by Mike Dunn, and 3) the physical development of the trails by David Hodges. The purpose of the **plan** is to provide a framework for moving forward with fund raising and implementation of the following potential trail system. NC LOW has funds for developing this **plan**, along with some low cost implementation of the Scuppernong Trail System. Some proposed trails will be easily developed, others may just require upgrades to an existing trail, while a few like the African-American Trail will be more difficult due to major unknowns with respect to the final route, land ownership, permits, etc. Construction of the initial trails will begin with those that can happen quickly with the fewest problems and lowest cost.

A critical first step is to develop a regional Eco-tourism Commission consisting of the Scuppernong Team experts of this report, regional resource program managers, and key public officials from each of the participating counties. The commission will flesh out those ideas that are practical, prioritize them, and then raise the funds necessary to implement the programs. The wildlife spectacle and the cultural history of the Scuppernong region have incredible potential for attracting visitors to this region if developed properly. However, it is essential to focus on the realistic potential of ecotourism and substantially improve visitor experiences in those areas. This requires that programs be developed in support of the community and with cooperation from respective management agencies and potential eco-tourism organizations. Thus, the goals of the regional Eco-tourism Commission should be built around the natural and cultural resource-based "Scuppernong Story".

The proposed Scuppernong Trail System integrates a set of paddle trails on the many different types of water bodies with a set of driving, biking, and hiking trails developed on pre-existing roads and dikes throughout the Scuppernong region (Figure 4). The trails will pass through most major landscapes and ecosystems including pocosins, Carolina bays, black-water tributary streams, riverine braid-plains, and drowned-river estuaries. Some of the black-water tributary streams (e.g., the Scuppernong and Alligator Rivers) already have mapped paddle trails that were developed years ago. The plan for the Scuppernong Trail system will upgrade the existing paddle trails with landings, mile markers, and camping platforms. Some of these streams have water quality concerns that will need to be addressed, including alligator weed, blue-green algae, etc. The present program will then expand the existing trails to include other water bodies (e.g., such as Bull Bay, Deep Creek, Frying Pan, etc.) and different forms of recreational boating (e.g., kayaking, canoeing, sailing, and fishing) can take place within the Scuppernong region (Figure 10).

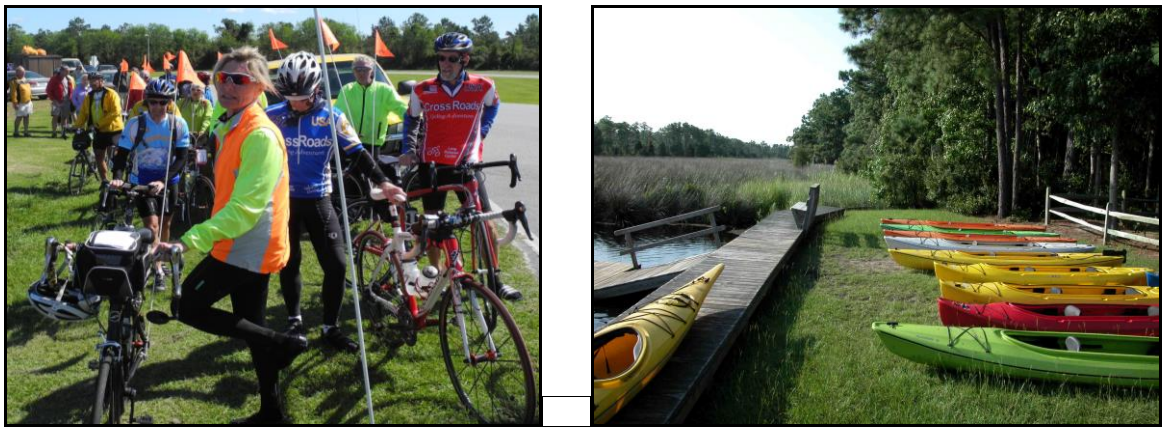

*FIGURE 10. Left panel shows a group of road bikers looking for the remote, paved roads within the Scuppernong Trail System and the right panel shows kayaks waiting for their return to the many diverse types of water bodies available within the Scuppernong region. Photographs are by S. Riggs.*

New regional hiking, biking (both road and off-road bikes), and car trails will be developed through specific ecosystems and varied water bodies within Pocosin Lakes National Wildlife Refuge and Pettigrew State Park. New trails will tie into other existing trails and facilities wherever possible (e.g., Freedom Trail, Charles Kuralt Trail, Historic Albemarle Trail, Wings over Water, Mountains to Sea, etc.) and partner with state agencies (e.g., Somerset Place State Historical Site, NC Dept. of Transportation road system, NC Wildlife Commission access ramps), private land owners, and state and federal land resources available within the Scuppernong Coastal System (Figure 11). There are over a quarter of a million acres of public lands within the Scuppernong coastal region.

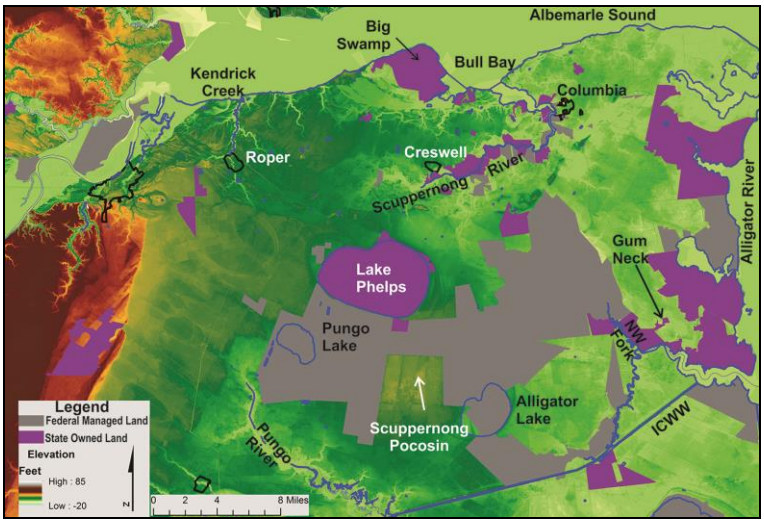


*FIGURE 11. A color topography map shows the location of federal and state-owned lands within the Scuppernong region. These lands represent critical natural and cultural resources upon which a viable natural resource-based ecotourism economy can be developed. Topographic data are from the 2015 North Carolina Floodplain Mapping Program; map preparation is by D. Ames.*

Hospitality infrastructure must be developed within the Scuppernong region for a viable eco-tourism economy that includes the following steps. Work with local residents to expand lodging opportunities in current housing, hunting cabins, unique camping adventures, and venues like Air B & B's. Investigate food trucks and local catering businesses as an option for providing seasonal dining and special group feed-outs at high attraction areas (Figure 12). Investigate farm to table dining options, along with vineyards and home brewpubs in the Scuppernong region (e.g., see how The Chef and Farmer is helping to transform Kinston).


*FIGURE 12. Upper left panel shows an example of a seafood trailer that provides "meals on wheels" for the "Full Circle Crab Co." in Columbia. Upper right panel is a food truck that can deliver a fresh-cooked feast to an eco-tourism group at a campground or kayak landing. Lower left panel shows a shucking bar in a local seafood house that serves oysters and other seafood in season. Lower right panel shows an outdoor fish fry common to regional program outings. These specialty food venues are suitable for feeding ecotourism groups within the Scuppernong region. Photographs are by S. Riggs.*

Also a critical component in developing a viable eco-tourism program is development of a camping platform network (Figure 13) within the Scuppernong coastal system similar to those already available on the Tar and Roanoke rivers (see Sound Rivers and Roanoke River Partners). Other unique types of camping facilities such as tree houses as shown in Figure 13, small cabins,

yurts, etc. should also be considered. An integrated network of new land-based boat launch ramps and piers with access boardwalks are needed for developing the paddle trail system (Figure 13). These water access points must also have associated parking areas, restroom facilities, and observation platforms.

*FIGURE 13. The upper two panels show a Roanoke River boardwalk and associated camping platform. Photographs are by M. Dunn. The middle two panels show two tree houses and riverine swamp forest observation platform that the town of Windsor (Bertie County) built in the Cashie River floodplain. The lower panels are examples of boardwalks that provide access through the perimeter swamp-forest surrounding Lake Phelps and extending into the lake. Photographs are by S. Riggs.*

A field guide should be developed to identify key tourist opportunities and information that include: 1) the specific seasons and their limitations (hunting, biting insects, heat, humidity, storms, etc.); 2) the major educational components within each trail system; and 3) public education concerning wildlife viewing etiquette. Wherever possible, it would be advantageous to supply additional staff to monitor and assist with public viewing and ensure minimum disturbance to the wildlife (model after Bosque Del Apache National Wildlife Refuge in New Mexico). Also, it is important to work with local groups and landowners to provide non-consumptive wildlife viewing opportunities (e.g., rental of photography blinds, waterfowl impoundments, parking, etc.) and develop no hunting zones for areas of high public use for wildlife observation.

"The Scuppernong Story" should be a major educational component built into the Scuppernong Trail System and include the natural and cultural resources of the region. The theme should be developed for use in local visitor and/or information centers in Columbia, Creswell, Lake Phelps, and the new visitor's center for Somerset Place and Pettigrew State Park. The latter facility was recently approved in a recent bond issue and is presently in the planning stages. Additional venues could be developed in other key locations such as a small, seasonal visitor center at the Pungo Unit for use during the prime months of waterfowl and night-scape viewing.

An abbreviated version of "The Scuppernong Story" should be told in the field guide that would include the following components: 1) origin and evolution of the geologic and ecologic landscapes; 2) human dependency upon water (lakes, rivers, estuaries, and wetlands); 3) mystery and fascination with pocosins, Carolina bays, and black-water swamps; and 4) the contribution and history of the Native American habitation, European settlement, and African enslavement. The field-trip guide should also highlight types and locations of 5) unique landscape features and ecosystems; 6) important floral species such as the Atlantic white cedar, bay trees, and green pitcher plants; 7) unusual fauna and such as bear, alligator, wolf, bald eagles, and waterfowl; and 8) information on seasonal happenings including weather, fauna, flora, night life, etc.

"The Scuppernong Story" should also be integrated into the trails with use of field-trip guides, posts for quick reference (QR) information, signage and story boards, etc. The location, construction, and maintenance of bear-proof trail infrastructure are critical for successful trail-use. Important infrastructure components include local parking areas, restrooms, direction signage, picnic tables, benches, and kiosks to tell key portions of "The Scuppernong Story" (Figure 14).

*FIGURE 14. Two examples of kiosks recommended for telling "The Scuppernong Story" along the various proposed trail systems within the Scuppernong Coastal System. Photograph in Panel A is by S. Riggs and Panel B is by D. Hodges.*

## LAND-BASED TRAIL SYSTEM

### Scuppernong Car and Bike Trail

This trail is on paved and well-maintained gravel roads through the mysterious pocosins, Carolina bays, and black-water swamps of the Scuppernong coastal system. A possible trail system is outlined on Figure 15 as an example of a route for automobiles and bikes. The trail would 1) incorporate a complex of landscapes and a multitude of ecosystems unique to the Scuppernong coastal system, 2) examine 125,000 years of natural history and the more recent cultural history, and 3) include an educational component of both the natural and cultural resources of the varied wetland systems. The various components of the trail would start and end at a visitor's center with educational programs, maps, aerial photographs, and specific information on the region's unique geologic, ecologic, and cultural components.

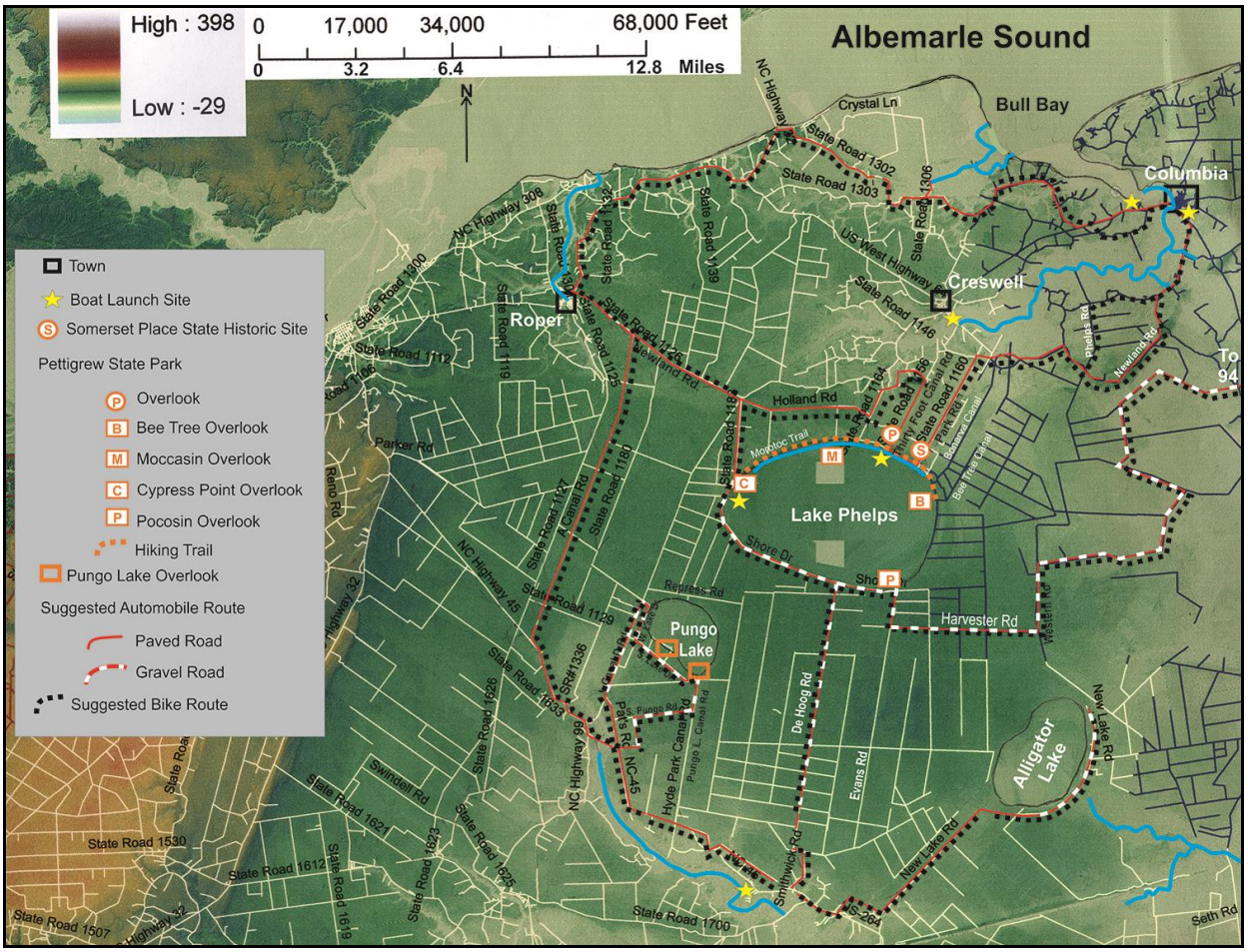


*FIGURE 15. A color topographic map shows a suggested Scuppernong car and biking trail with launch sites for paddle trails and overlooks. Formalizing this network requires defining trail segments and developing small parking areas with educational kiosks and substantial trail signage. Many of the roads in thin white and black lines are generally not open to the public. Topographic data are from the 2015 North Carolina Floodplain Mapping Program; map preparation is by D. Ames.*

Most of the roads north and west of Lake Phelps are paved with minimal traffic except for farm trucks during planting and harvesting seasons. In contrast, most roads within Pocosin Lakes National Wildlife Refuge that are open to the public (primarily south and east of Lake Phelps) are improved, gravel or sand-surfaced roads built on top of dikes and adjacent to drainage canals (Figure 16). Signage is needed to inform visitors not to take their vehicle down unmaintained, unmarked, or gated roads which often have high water tables, blown out sections, or occur on really soft mud. Visitors must not speed—the road sides are full of wildlife ready to cross and the ditches beside the road are deep—and take their time to experience the pocosin's three Ws (***Water, Wildlife, and Wildness***). Remember, help is far away!

*FIGURE 16. The left panel is a sand road and the right panel is a gravel road in the Pocosin Lakes National Wildlife Refuge. These roads run on top of the dike built with sediment dug from the canals on the side of the road. Photographs are by M. Dunn.*

**Columbia Scuppernong River Interpretive Boardwalk**

The 0.75-mile interpretive boardwalk (Figure 17) begins at the west end of Main Street in Columbia. It goes underneath the highway 64 bridge and follows along the eastern edge of the Scuppernong River for a short distance before entering a cypress swamp. Interpretive signs along the trail explain the unique features and characteristics of the area.

*FIGURE 17. Photograph on the left shows the interpretive boardwalk through the Scuppernong River floodplain swamp forest in downtown Columbia. Photograph on the right is looking out on the Scuppernong River from the boardwalk at sunrise. Photographs are by M. Dunn.*

A walk along the boardwalk is a step into a different world – the sights, smells, and sounds of a swamp fill your senses. Visitors should take time to look at the diversity of vegetation along the way: buttressed trunks of bald cypress trees, bright green of cattails, and unusual flowers like lizard's tail, buttonbush, swamp rose, swamp leather flower, pickerel weed,

and rose mallow add textures and colors to the walk (Figure 18). Green herons, pileated woodpeckers, great-crested flycatchers and a host of other birds may make their presence known by their calls or a sudden burst of flight. And look closely for the smaller creatures of the swamp: green tree frogs, dragon flies, and a variety of pollinators. The swamp is a busy world and this boardwalk gives the visitor an in-depth experience within a short walk from downtown Columbia.

*FIGURE 18. The left photograph is of the unusual swamp leather flower and on the right is a painted turtle sunning itself beside the boardwalk. Photographs are by M. Dunn.*

**Pettigrew State Park**

Pettigrew State Park has trails, campgrounds, and other public facilities that make it a great destination for nature-based tourism. The headquarters and campgrounds for the park are located on the north shore of Lake Phelps; both areas have pier access to the lake. Also, there are two public access points on the south shore of Lake Phelps: the Pocosin Overlook and Cypress Point (Figure 19). The park maintains a system of trails with several boardwalks that provide access to the swamp forests and overview points along the lake shoreline. The narrow zone of park-land forests follows the shoreline around the lake perimeter and contains many ancient trees that exceed 6 feet in diameter including bald cypress draped with Spanish moss, sycamore, and tulip poplar. Pawpaw and wildflowers including atamasco lilies, jewelweed, and jack-in-the-pulpit, dominate the understory. Abundant waterfowl make the lake their winter home when visitors may see and hear thousands of tundra swans and snow geese.

*FIGURE 19. Left panel is a view of the north shoreline of Lake Phelps and the right panel shows the Lake Phelps dock at Pettigrew State Park headquarters. Photographs are by S. Riggs.*

The Pettigrew State Park literature describes their well maintained, land-based 8.3-mile trail system as follows (Figure 20). An ancient carriage road that goes back to the beginning of Somerset Plantation (~1786) followed the shoreline around Phelps Lake. Today, the park's trail system generally follows this carriage road. Starting at the Bee Tree Canal and Phelps Lake overlook platform at the east end, the Bee Tree trail goes 1.3 miles north and northwest through Somerset Place and the campground to the Pettigrew Park Headquarters and the 30-Foot Canal. The Moccasin Trail starts at the headquarters and goes 2.8 miles northwest to the Moccasin Canal. The trail goes through vast forest of cypress and hardwood trees and ends at a 350-foot boardwalk to the Moccasin Overlook at Big Point on the north shore of Lake Phelps. The Moratoc Trail continues west for 4.2 miles to the western end of Phelps Lake at Cypress Point with a restroom, picnic tables, a lake access pier, and kayak launch. Biking is allowed on the Moratoc Trail.

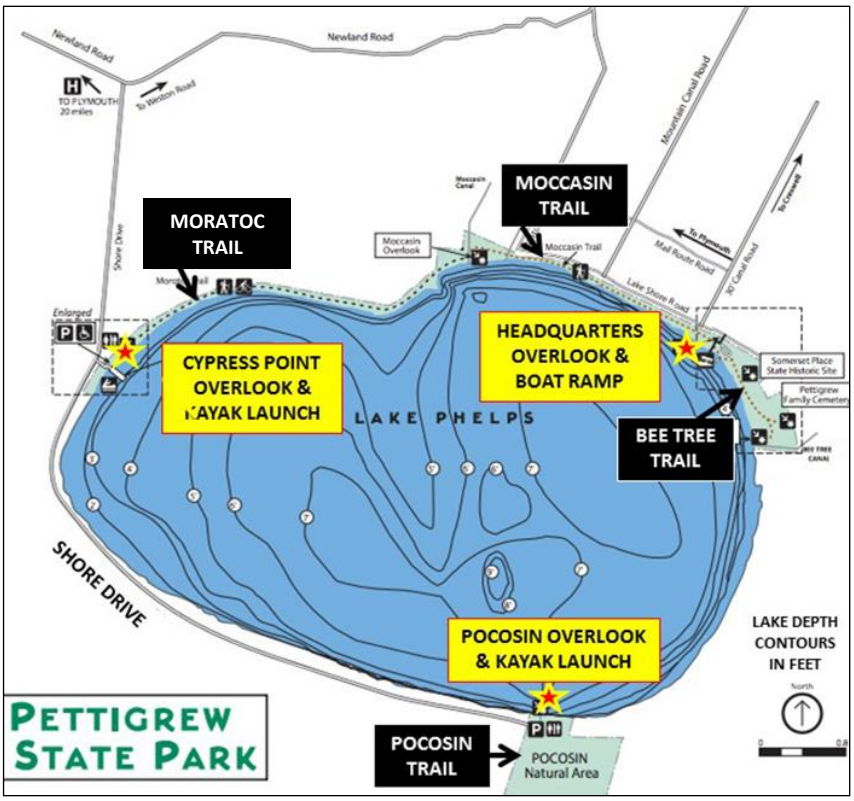


*FIGURE 20. Map of Lake Phelps (blue) shows Pettigrew State Park (pale blue) with the overlook facilities (yellow), boat access (red/yellow stars), and hiking trails (black).*

The addition of a new visitor center (to be built in conjunction with Somerset Place State Historic Site in the near future) will provide space for interpretation of the unique natural and cultural resources of "The Scuppernong Story". A priority would be to return at least one of the dugout canoes and additional artifacts that were recovered from the lake and adjacent shorelines in the 1980's so visitors can learn more about the fascinating Native American history of this area. On calm summer days, this clear-water lake is suitable for snorkeling to observe underwater life associated with aquatic vegetation. However, caution is needed when boating on this huge lake, as sudden storms can cause a calm lake to rapidly turn into a choppy and challenging water body.

**Scuppernong Pocosin Loop Trail**

The area immediately southeast and across the road from the Pocosin Overlook in Pettigrew State Park, is the proposed site for the Scuppernong Pocosin Loop Trail (Figures 20 and 21). This trail is located in the heart of the pocosin eco-system with its vast wetland habitats and incredible diversity of fauna and flora. The goal of this natural resource-based trail is to interpret the unique fauna and flora and the hydrology restoration work of this pocosin wetland habitat. The latter are management priorities of the Pocosin Lakes National Wildlife Refuge and Pettigrew State Park. In addition, this trail would serve to educate the visitor about carbon sequestration in the underlying peat deposits and its importance to climate change.

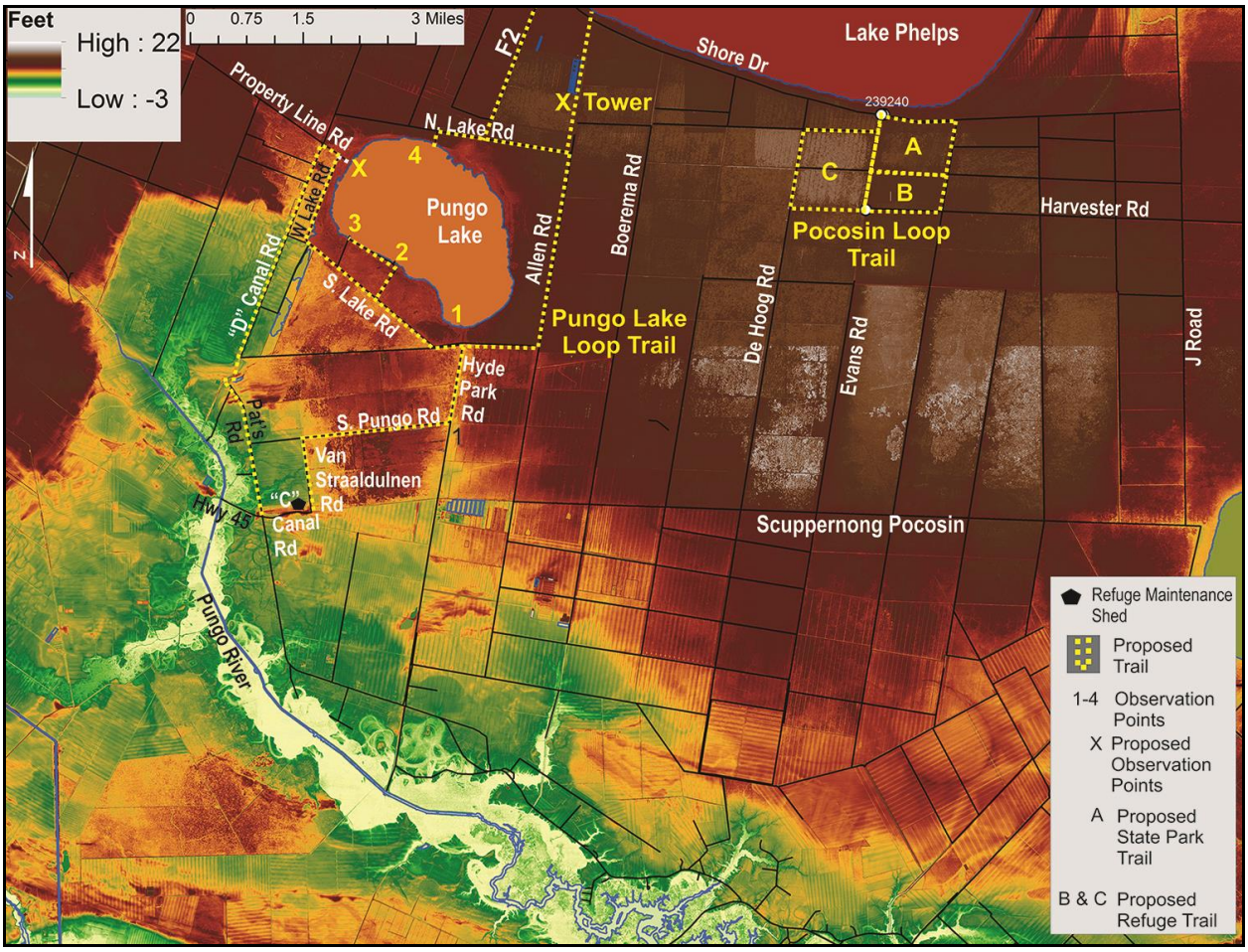


*FIGURE 21. A color topography map shows the proposed location of the Scuppernong Pocosin Loop and Pungo Lake Loop Trails. The map shows the Scuppernong Pocosin, a high wetland dome (dark red color) of organic matter known as peat. The Carolina bay lakes (Lake Phelps, Pungo Lake, and Alligator Lake) occur around the upper edges of the pocosin and grade downslope (orange to green colors) to Pungo River which is at sea level (cream color). Topographic data are from the 2015 North Carolina Floodplain Mapping Program; map preparation is by D. Ames.*

The trail head for the Scuppernong Pocosin Loop Trail would be at the Pocosin Overlook on Pettigrew State Park property north of Shore Drive. The Pocosin Overlook area has a public restroom and small parking area. The proposed trail is immediately south of Shore Drive and around a block of wetland that lies to the southeast, labeled A on Figure 21. This wetland block is part of Pettigrew State Park and is roughly 3 miles around (1 mile in the E-W direction and ½ mile in the N-S direction). Since the trail runs along the top of dikes and adjacent to the canals (Figure 22), several small foot bridges will need to be constructed across several of the canals and paths along the dikes will need to be mowed and maintained.

*FIGURE 22. Left panel shows a grassy road along the top of a dike built from the sediment dug from the adjacent canal, as well as two different ecosystems dependent upon maintenance of the water levels on either side of the dike. The right panel shows a water control structure between diked segments of the Scuppernong Pocosin. Photographs are by S. Riggs.*

If the loop trail were to be extended into Pocosin Lakes National Wildlife Refuge property, to the west and south around sections B and C in Figure 21, an additional longer 4-mile hike segment would be provided. This option also offers access to pump station E4, which is located at the intersection of Evans and Harvester canals, to demonstrate the hydraulic restoration and accretion of biomass within the pocosin (Figure 22).

**Connector Road between Lake Phelps and Pungo Lake**

The maintenance of unpaved roads and roadsides in Pocosin Lakes National Wildlife Refuge is an increasingly difficult and costly job. Staffing levels are at all-time lows and the gravel-dirt roads are continually susceptible to flooding; this impacts both visitor services and refuge staff alike. During wet periods stretches of road become impassable for two-wheel drive cars and challenging for inexperienced drivers of four-wheel drive vehicles. To improve visitor access, some roads need to be permanently upgraded with more frequent maintenance, which is costly due to the soft peat soils of the pocosin. In some major wildlife viewing areas, roadside vegetation mowing must be more frequent to improve the view scape.

In order to maximize public use of the two most popular visitation areas, around Pungo Lake in the Pocosin Lakes National Wildlife Refuge and Lake Phelps in Pettigrew State Park, a priority consideration is to develop an all-weather road connector between the two lakes. A potential route would be from Shore Drive, on the southwest side of Lake Phelps, south on Allen Road to South Lake Road (Figure 21). However, substantial roadwork is required to make this an all-weather route, since it is often closed due to an impassable section near the observation tower during rainy periods. This large outlay of funds to ensure all-weather access between these two popular destinations would alleviate problems associated with a lack of public facilities at Pungo Lake. An added benefit of a connector route would be the possibility of utilizing the old fire tower on Allen Road as an interpretive site (Figure 23). Areas adjacent to the tower provide great examples of pocosin habitat as well as the ongoing restoration efforts being undertaken by the

refuge. The tower provides an excellent view of the vast expanse of pocosin habitat and the scale of available wildlife habitat that is difficult to ascertain from the ground (Figure 23).

*FIGURE 23. Photograph of the observation tower located on Allen Road. Photograph is by M. Dunn. Lower two views are from the top of the tower and show the vastness of the Scuppernong Pocosin. The pond in the left panel resulted from an experimental peat mine in the mid-1980s and the associated drainage canal adjacent to the road shown in the right panel. Allen Road runs south from Lake Phelps to Pungo Lake through the highest wetlands of Pocosin Lakes National Wildlife Refuge. Photographs are by S. Riggs.*

If the short section of Allen Road near the observation tower cannot be improved, an alternate route is needed. An option uses road F2 (Figure 21), a good gravel road that heads south from Shore Drive and intersects North Lake Road. Turning west on North Lake Road is not recommended since it takes traffic through a prime wildlife viewing area and is notoriously muddy in wet weather. Thus, a gate should be installed to prevent westward vehicle travel on North Lake Road. However, a parking area at the junction of F2 and North Lake roads would allow people to hike west along North Lake Road to view wildlife. Turning east on North Lake Road from F2 back to Allen Road and then south to South Lake Shore Road bypasses the problem area on Allen Road and could by a useful connector if well labeled. A good connector in this area greatly shortens the drive between Lake Phelps and Pungo Lake area and provides access to two restroom facilities maintained by Pettigrew State Park at Cypress Point and Pocosin Overlook (Figure 20).

**Pungo Lake Trails**

Currently, there are only two viewing access points for Pungo Lake, which have particularly high pressure during the winter months when the lake is a resting area for thousands of waterfowl. The main observation platform on the SE shore of Pungo Lake (#1 on Figures 21 and 24A) offers excellent viewing, especially early and late in the day when waterfowl numbers are at their peak on the lake. The observation blind at Duck Pen (#2 on Figures 21 and 24B) offers good views of the lake and close proximity to waterfowl, especially on days when the winds are calm or from the south, as birds will tend to be closer to the south shore. While adequate for viewing, the Duck Pen blind (# 2 in Figures 21 and 24B) could be greatly enhanced by adding a few more observation ports and enlarging some observation ports to accommodate telephoto lenses. If the latter recommendations cause problems, hinged doors should be added to close the viewing ports not in use (this technique is used at Bosque del Apache National Wildlife Refuge). This is a simple fix and could be done by volunteers. A major priority for wildlife viewing should be to provide additional access to Pungo Lake.

*FIGURE 24. Left panel is the observation platform overlooking Pungo Lake from the SE shore at site #1 on Figure 21. Right panel is the Duck Pen blind for waterfowl viewing on the south shore of Pungo Lake at site #2 on Figure 21. Photographs are by M. Dunn.*

The Pungo Lake Loop Trail extends from the Duck Pen parking area on South Lake Shore Road, follows the Duck Pen trail to the lakeshore at #2 (Figure 21), along the lake shore to an old banding station (#3), then returns to South Lake Road, and back to the parking area at Duck Pen (#2). The banding station would be ideal for a waterfowl viewing site, but it is not clear if the refuge still uses the banding area and this needs to remain closed. With increased use of the Duck Pen trail, there needs to be a larger parking area at the #2 gate in Figure 21.

A suggested Pungo Lake access on the western shore (X on Figure 21) is an ideal location for waterfowl viewing if it can be done without excessive disturbance. Outlook X could provide the best public viewing point for waterfowl on the lake. A duck-blind and boardwalk would be needed through the marshy area, assuming the starting point would be near the turn at the north end of West Lake Road. However, this option requires consultation with wildlife specialists before development of this outlook could take place.

Another access point that has been available is off the North Lake Road, but it is currently closed off by a section of fencing (#4 on Figure 21). The fence is located a substantial distance from the lake shore and does not allow for good viewing. If the fence was removed, an observation blind built closer to the lake shore, the area could be re-opened as a prime location for increased access with interpretive signage encouraging visitors to use the area respectfully. This area was previously used for viewing late afternoon flyovers of birds and rarely caused major wildlife disturbance. Another prime location for wildlife viewing is the impoundment just west of Pungo Lake. Opening a portion of existing grass roads to make a short loop east off of D-Canal Road around the impoundment, would provide excellent wildlife viewing. Currently, there are no bathrooms in the Pungo Lake area, which is critical for visitor services. Even the placement of a maintained port-a-jon facility would be beneficial. This temporary fix, or a more permanent facility, could be located in the vicinity of the NWR maintenance facility at the corner of Refuge and Van Staaldulnen roads.

**Bayberry Loop Trail**

The proposed Bayberry Loop Trail is outlined on Figure 25. This loop trail needs considerable investigation for its potential development and for attracting visitors. This trail is easily accessible by vehicle along Northern Road from highway NC 94 which connects Columbia and Swan Quarter. The Bayberry area wetlands are the northernmost extent of the NW Fork drainage system flowing into the Upper Alligator River. Notice that the Bayberry area is surrounded by extensive farm land on three sides that contains small-scale drainage system of light-colored ditches on 330-foot spacing (Figure 25). Because of the large areas of cropped farmland, this section contains abundant wildlife food and therefore a dense population of black bears and other wildlife.

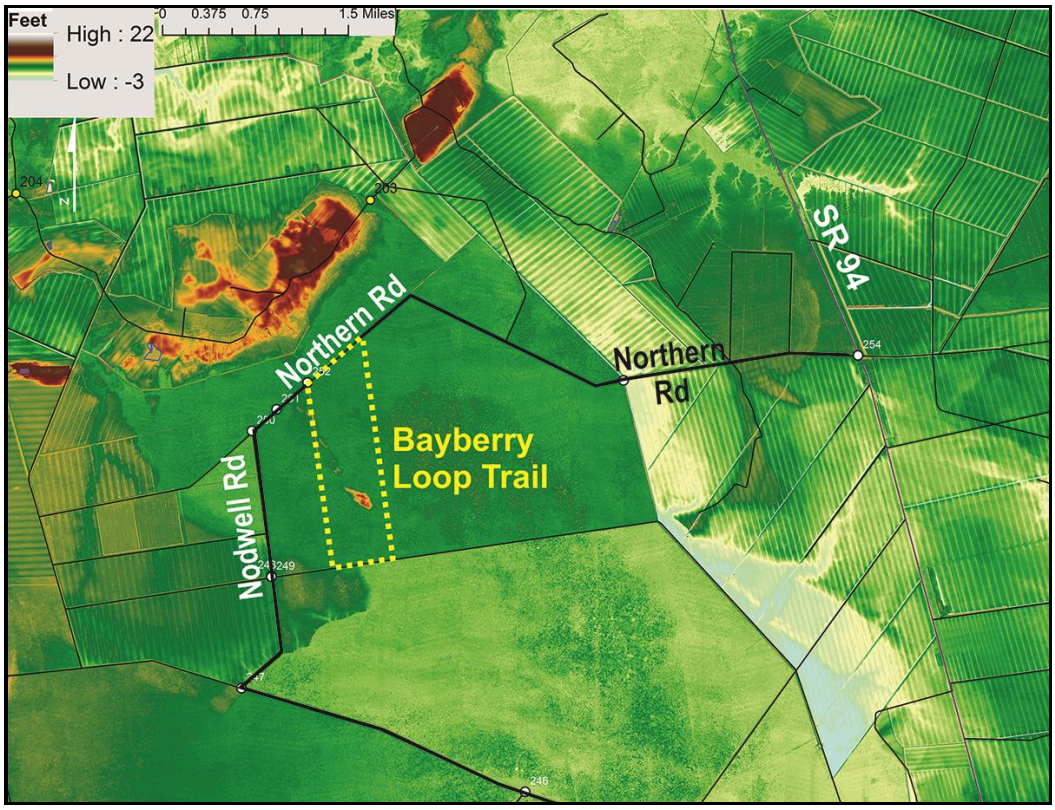


*FIGURE 25. A color topography map shows the proposed location of the Bayberry Loop Trail which is connected to NC highway 94 by the graveled Northern Road. The dark red and orange areas are high sand ridges (+20 feet) and they grade downslope through the green colors to the NW Fork of the Upper Alligator River in light blue color (sea level). The black lines are major drainage canals and associated dikes, some with good gravel roads. The small-scale, light colored patterns are agricultural field ditches constructed on 330-foot spacings. Topographic data are from the 2015 North Carolina Floodplain Mapping Program; map preparation is by D. Ames.*

This potential 3.3 mile long trail runs along low dikes and shallow canals that are generally overgrown. Notice the orange to red colored ridge (up to 10 feet in elevation) that is oriented from NW to SE diagonally through the Bayberry Loop about two-thirds of the distance south of Northern Road. A shorter 2.3 mile cross-over trail could follow this ridge, along with the location of an educational kiosk, some benches, and picnic tables at the ridge. Small foot bridges would also have to be constructed across the canals in one or two places to complete the loop. Small flat areas occur where Northern Road crosses the two canals and could be developed into one or two small, dry parking areas (Figure 27).

**Scuppernong African-American Trail**

The Scuppernong African-American Trail system incorporates a paddle trail along the beautiful black-water course of the Scuppernong River, where the enslaved Africans were discharged in 1786 to hand-dig the original Old Transportation Canal (Figure 26). In two years they dug the 7-mile canal up the Scuppernong Pocosin wetland dome to Lake Phelps. The canal segment can be traveled by hiking, biking, car, or on a potential trolley system. The trail ends at

Somerset Historic Site and Pettigrew State Park on the banks of the spectacular Lake Phelps, a Carolina bay lake with clear waters, long cultural history, varied ecosystems and ancient trees. In addition, "The Scuppernong Story" will be told in the recently funded visitor's center for Somerset Place and Pettigrew State Park.

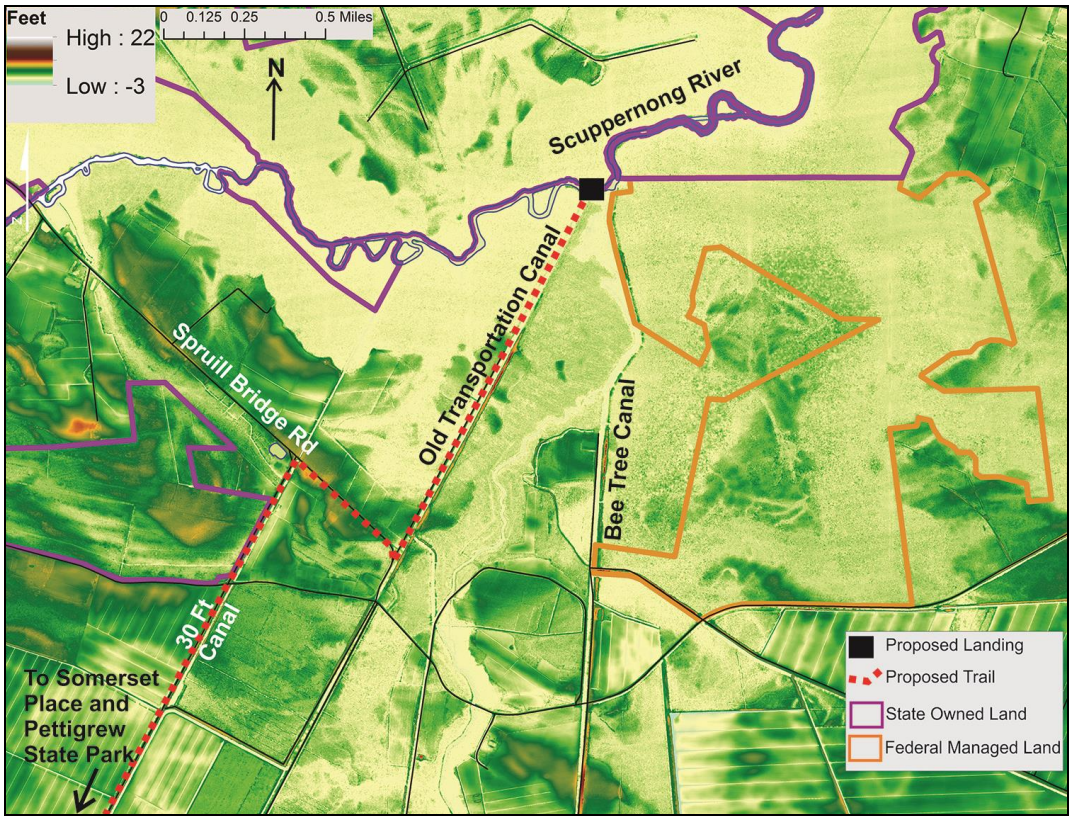


*FIGURE 26. Color topographic map shows the entrance on the south side of the Scuppernong River to the Old Transportation Canal. This was the first of the canals from the Scuppernong River to Lake Phelps that the enslaved Africans hand-dug from 1786-1788. Topographic data are from the 2015 North Carolina Floodplain Mapping Program. Map preparation is by D. Ames.*

Development of the Scuppernong African-American Trail can be the show-case of the Scuppernong Trail System. Success is dependent on a major North Carolina cooperative project requiring the integration of many different state agencies, county personnel, and local businesses and expertise. The "Scuppernong African-American Trail" has three segments that may be traveled together or as individual components.

Segment 1. The paddle trail starts on the Scuppernong River at either of two different boat ramps. The main boat ramp is located at the Visitors Center for the Pocosin Lakes National Wildlife Refuge in Columbia with a 12 mile paddle upstream to Spruill's bridge located at the town of Creswell (Figure 27). This segment may also be paddled in the downstream direction from the Spruill's bridge boat ramp. See the Scuppernong River paddle trail information (p. 44) for details of this segment.

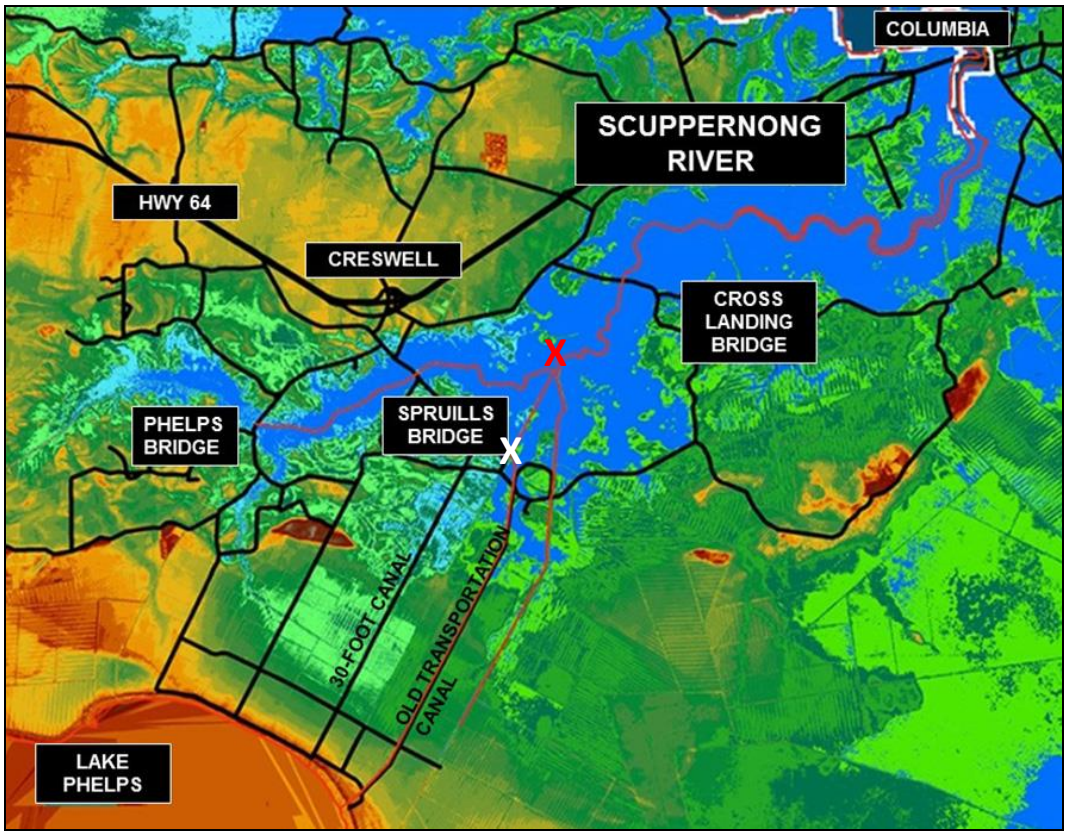


*FIGURE 27. Color elevation map shows the Scuppernong River (red) from Columbia to Cross Landing Bridge, Spruills Bridge, and Phelps Bridge (indicated with black boxes). Roads are in black. The location of the initial canals that were hand-dug by the enslaved Africans are the five lines running from the Scuppernong River SW to Lake Phelps. The canals are from left to right: Western Canal (black), Mountain Canal (black), 30-Foot Canal (black), Old Transportation Canal (orange and black), and Bonarva Canal (orange). The red X is where the Old Transportation Canal meets the Scuppernong River and the white X is where the canal intersects Spruill's Bridge Road. Topographic data are from the 2015 North Carolina Floodplain Mapping Program. Map preparation is by D. Ames.*

Segment 2. The Old Transportation Canal is located on the south side of the Scuppernong River 9.8 miles upstream from the Columbia boat ramp or 2.3 miles downstream from Spruill's Bridge (red X on Figure 27). Drone photographs of Segment 2 show the relationship of the Scuppernong River, Old Transportation Canal, Spruill's Bridge Road, and the area for a potential landing site (Figure 28). When the water level is high enough and if the canal is not choked with alligator weed (Figure 29), the Old Transportation Canal paddle segment is 1.4 miles to Spruill's Bridge Road (white X on Figure 28). A small dock is recommended for getting in and out of and securing the boats.

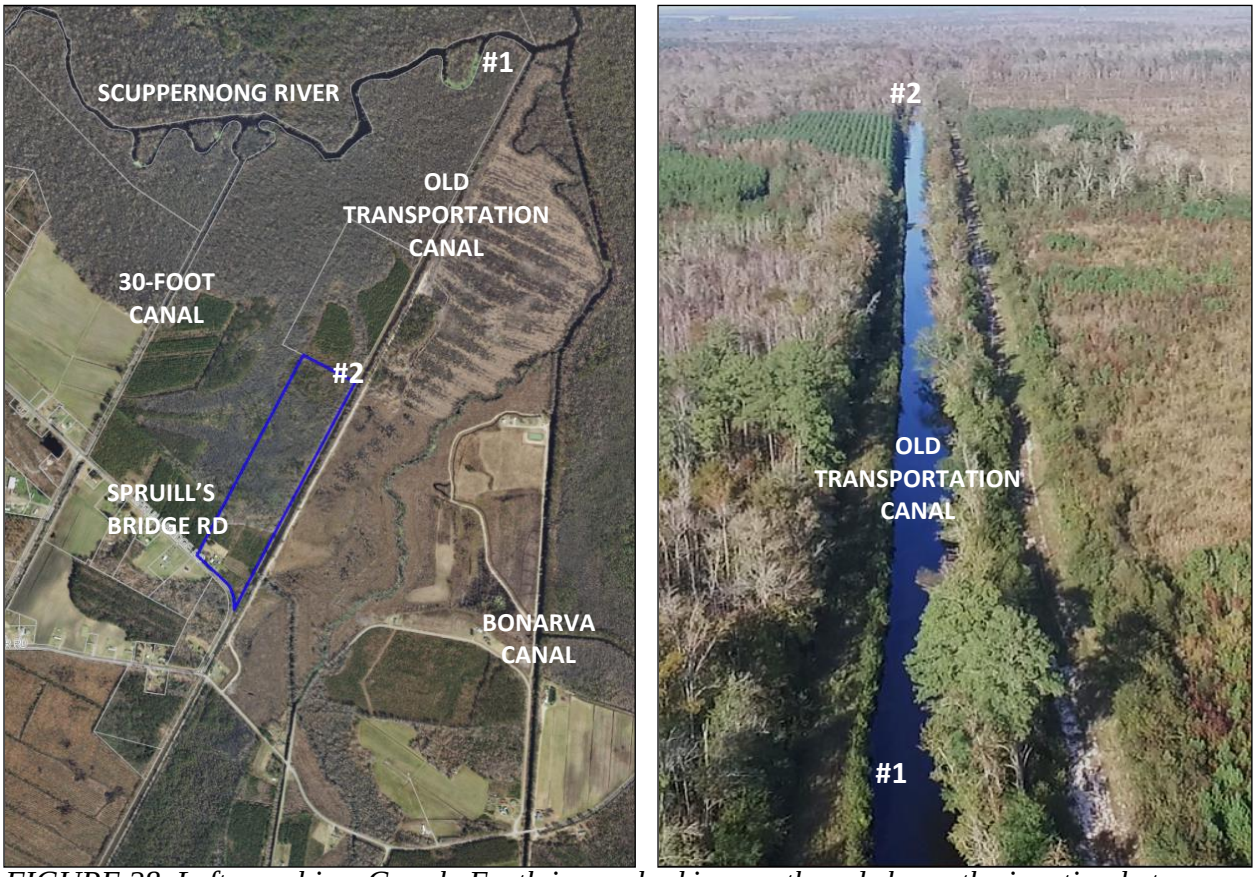


*FIGURE 28. Left panel is a Google Earth image looking north and shows the junction between the Scuppernong River and the Old Transportation Canal. Points #1 and #2 show the same spots on the right panel drone image looking from the Scuppernong River south towards Lake Phelps. Notice that the Old Transportation Canal, which was the original canal hand-dug by the enslaved Africans from 1786-1788, is only navigable today between points #1 and #2. Thus, substantial work will be required to get to the junction with Spruill's Bridge Road where a landing and launch area could be constructed (blue outline in left panel). Right panel drone photograph is by T. Fleming, Tyrrell SWCD.*

*FIGURE 29. The photograph shows the entrance to Old Transportation Canal, hand-dug in 1786-1788 from sea level on the Scuppernong River to the high elevation of Lake Phelps. Notice the heavy growth of alligator week part way up the canal. Photograph is by D. Hodges.*

Segment 3. At the intersection of Old Transportation Canal with Spruill's Bridge Road, it is possible to walk or ride northwest for about 0.45 miles on Spruill's Bridge Road to the 30-Foot Canal Road, turn southwest and walk or ride on the edge of the road and beside the 7-mile long, hand-dug canal with stops at the site of the original grist mill, and then on to Somerset Place State Historic Site and Pettigrew State Park on the shores of Lake Phelps. Segment 3 of the Scuppernong African-American trail utilizes hiking and biking on existing paved roads adjacent to the canal or utilizes cars or trolley system (Figure 30). Small groups will eventually be able to make prior arrangements to have an enclosed trolley system meet them for transport from the Old Transportation Canal to Phelps Lake and return. Also, this location could eventually have a set of rental bikes available to bike up and back from Lake Phelps (Figure 30).

*FIGURE 30. The left panel shows a bicycle rental rack similar to those that have been successfully utilized in many urban areas of the country. The right panel shows an all- weather trolley system that is commonly utilized on the barrier islands and can be pulled by either a truck or golf cart with additional cars added if needed. Photographs are by S. Riggs.*

The hiking-biking trail, along with a series of educational kiosks, benches, and small pull-off areas will need to be developed in partnership with NC Department of Transportation. The trail will end at the beautiful Somerset Place State Historic Site (Figure 31) with "The Scuppernong Story" being told in the new visitor's center being planned for Somerset Place and Pettigrew State Park. Generally, there is very little traffic on the roads to Somerset Place, but all hikers and bikers need to be extremely cautious of the large trucks that routinely move agricultural materials in and out of these large farms, particularly during planting and harvesting seasons.

*FIGURE 31. The left panel photograph shows reconstructed cabins of the enslaved Africans and the right panel shows the plantation house that the enslaved people built at Somerset Place. This is now Somerset State Historic Site located on the shores of Lake Phelps. Photographs are by S. Riggs.*

Alternative Segment 2. The Cross Landing Bridge is located at milepost 4.3 miles and 7.7 miles from Spruill's Bridge and Columbia launch sites, respectively. On the west side of the north flowing Scuppernong River, at the Cross Landing Road Bridge, is the entrance to a small canal that is several 100 yards to a facility for a potential paddle landing and campground (Figure 32). This area of Pettigrew State Park is known as the Tercyak and has the potential to ultimately offer camping platforms, toilets, parking area, an area to stow kayaks and canoes, and a possible bicycle rental facility. Small groups could eventually be able to make prior arrangements to have an enclosed trolley system meet them for the round-trip to Lake Phelps for programs at Pettigrew and Somerset Place and return.

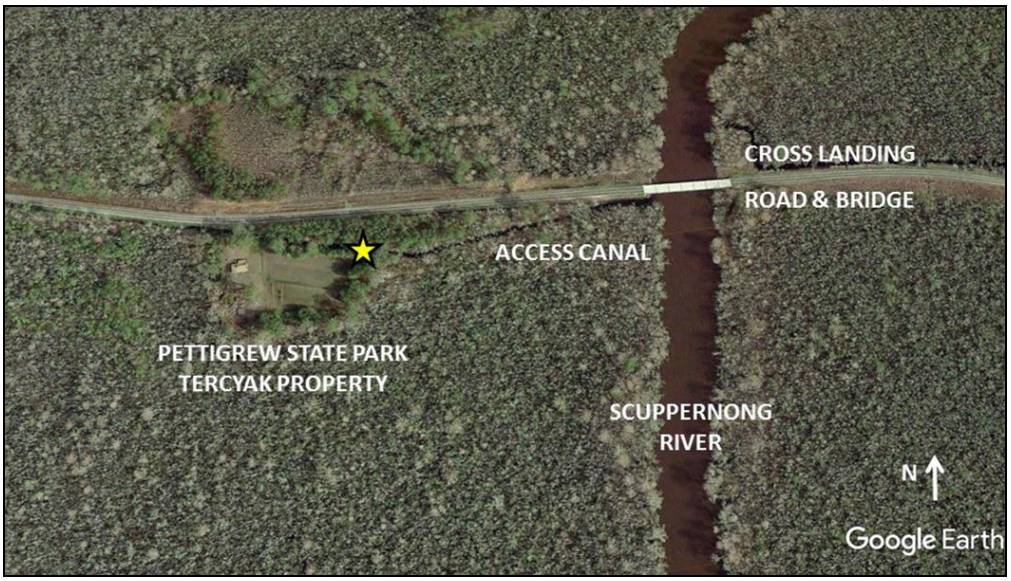


*FIGURE 32. A Google Earth image shows the Cross Landing Bridge over the Scuppernong River and associated floodplain. The cleared area on the west side of Cross Landing Bridge is the Tercyak property of Pettigrew State Park. This is the potential site for a boat launch (yellow star) through an improved access canal to the Scuppernong River. It is proposed that this property could be developed to include parking, primitive camping platforms, and toilets. The small overgrown access canal running from the river to a landing platform would have to be snagged and dipped so kayaks and canoes can paddle to the proposed area.*

**Lake Phelps—A Carolina Bay Lake**

Pettigrew State Park and Somerset Place State Historic Site consist of over 1,200 acres of forested land, mostly surrounding the 16,600 acre fresh-water Lake Phelps (Figure 20). This clear water lake (Figure 33) is the result of two overlapping Carolina bays that are fed only by rainwater. The lake is generally sandy with a series of concentric sand beach rims formed during periods of higher lake levels. Consequently, no water flows out of Lake Phelps. The higher sandy beach rims are not only where the park and historic site facilities are located, but also where the known occupation sites of Native Americans occur.

*FIGURE 33. Left panel is a view of the clear water of Lake Phelps at the Pocosin Overlook and the right panel shows the pier and cypress trees along the shoreline at Cypress Point in Pettigrew State Park. Photographs are by M. Dunn.*

Lake Phelps is a wonderful water body for kayaking and fishing. There are public parking areas and boat accesses on the north side of the lake at the main offices for Pettigrew State Park, on the west side of the lake at Cypress Point, and on the south side of the lake at the Pocosin Overlook (Figure 33). Visitors must remember that this is a large lake where major changes in the weather can happen rapidly; large thunderstorms are common during the warm seasons and strong winds with large waves are common during the cold seasons.

Lake Phelps differs from Pungo and Alligator Lakes in that it has a sandier substrate and generally clear water that promotes vegetative growth and provides suitable habitat for a variety of fish and other aquatic life. This encourages some different species of waterfowl to utilize this lake, including many species of diving ducks such as common loons, mergansers, and canvasbacks. Those species tend to be absent from the other lakes due to their peat substrates, dark waters, and lack of fish and submerged aquatic vegetation. Fish species in Lake Phelps include largemouth bass, yellow perch, catfish, and bluegill. Many species of woodland birds call the surrounding forests home: owls, hawks, bald eagles, woodpeckers, and many songbirds, especially neo-tropical migrant warblers can be found here at certain times of year. Mammals include black bear, red and gray fox, white-tailed deer, raccoon, and river otter. A wide variety of reptiles and amphibians can also be observed.

# WATER-BASED TRAIL SYSTEM

## Scuppernong River Region

The Scuppernong River is a classic black-water tributary stream of the former Roanoke River which is now, due to rising sea level, the drowned-river estuary called Albemarle Sound (Figure 2). The lowermost portion of the Scuppernong River (from Albemarle Sound to the highway 64 bridge in Columbia) is Bull Bay, a drowned-river tributary estuary portion of the Scuppernong River (Figure 34). Albemarle Sound and Bull Bay are brown, fresh-water estuaries that are at sea level and respond to wind tides and storm surges. Bull Bay narrows down and grades into the main stem of the Scuppernong River at the highway 64 bridge in Columbia, where it continues as a meandering black-water river that extends south and westward to Spruill's Bridge and NCWRC boat ramp at the town of Creswell and then continues westward to Phelps Bridge at the town of Cherry.

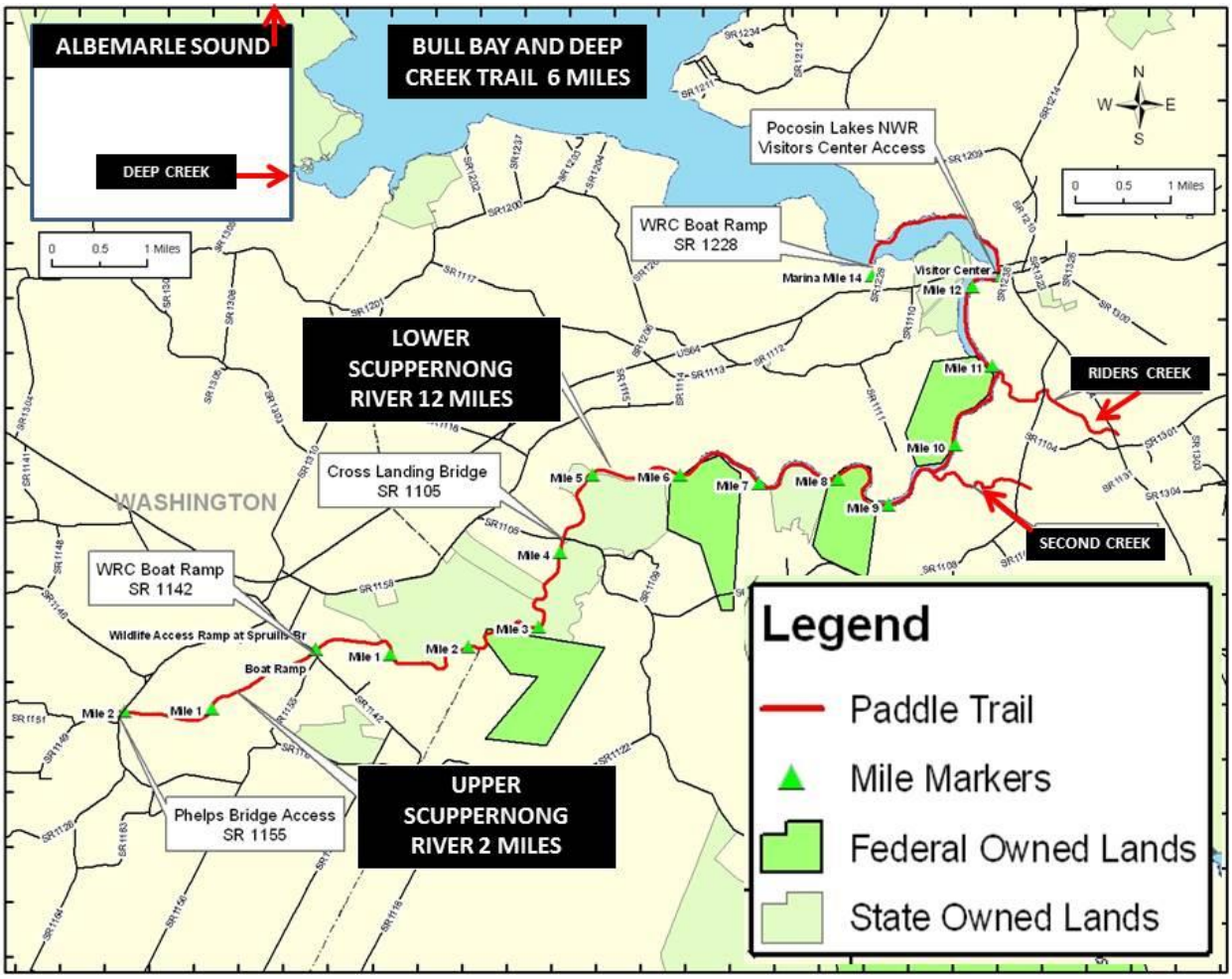


*FIGURE 34. Map of the Scuppernong River paddle trail, originally developed by the Albemarle Resource, Conservation, and Development Council and the North Carolina Paddle Trail Association (http://www.albemarlercd.org/paddle_trails.asp).*

The Scuppernong region is subdivided into two major paddle segments starting with the access ramp in Columbia behind the Visitor's Center of the Pocosin Lakes National Wildlife Refuge (Figure 34). These two subdivisions are as follows: the Bull Bay-Deep Creek segment (Figure 35) is 10 miles north and west of Columbia and the Scuppernong River segment is 14 miles south and west of Columbia.

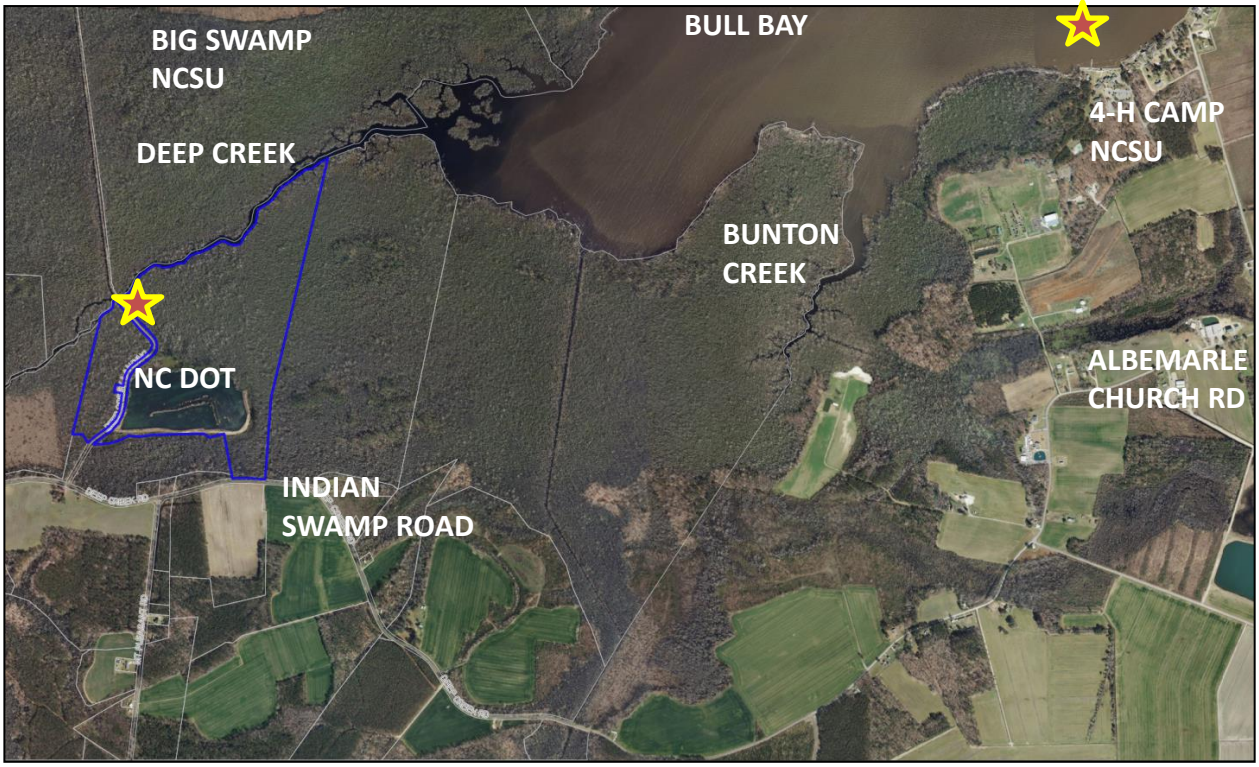


*FIGURE 35. Google Earth image shows the western portion of the Bull Bay-Deep Creek Trail. The lands of Big Swamp constitute the entire NW portion of the region and belong to NC State University, along with the 4-H camp. Overtones are being made to NCSU to join in a collaborative partnership in developing and utilizing this portion of the proposed Bull Bay-Deep Creek paddle trail.*

**Bull Bay-Deep Creek Trail**

Bull Bay is the estuarine portion of the Scuppernong River in which the entire Scuppernong Valley has been drowned over the centuries by rising sea level. This water trail offers the boater a variety of excursions ranging from very open estuarine water to small black-water tributary streams with pristine ecosystems. However, the visitor must be advised that caution needs to be taken with respect to the weather when starting out on the Bull Bay Trail. This is a large water body and weather conditions can change dramatically with strong north winds and waves. Also, there is considerable private land along the Bull Bay shoreline without public access.

The Bull Bay segment starts at the access ramp in Columbia behind the Visitor's Center of the Pocosin Lakes National Wildlife Refuge and goes north and west from Columbia. The route is as follows:

Columbia Visitor's Center public boat ramp and parking area to the NC Wildlife Resources Commission (NCWRC) public boat ramp on the southeastern shore of Bull Bay = 1.3 miles.

NCWRC public boat ramp and parking area to the NC State University 4-H camp (Figure 36) with a private boat ramp = 5.8 miles.

NCSU 4-H camp (private boat ramp) to the mouth of Bunton Creek = 0.5 miles.

Side trip up Bunton Creek is ~1 mile roundtrip.

Mouth of Bunton Creek to mouth of Deep Creek = 1.0 mile.

Mouth of Deep Creek to the remote wooden logging bridge on Deep Creek Landing Road (Figure 37) = 1.0 mile.

Total One Way = ~10 Miles

*FIGURE 36. The left panel is the private boat dock at the NCSU 4-H Camp on high ground along the south shore of Bull Bay. The right panel is a view of the Big Swamp shoreline on the western side of Bull Bay with a ghost forest and strand-plain beach that has formed in response to rising sea level. Left panel photograph is by M. Dunn and right panel is by S. Riggs.*

The trail head at the Deep Creek is a wooden logging bridge on a dirt road that connects in 0.5 miles to NC Indian Swamp Road (Figure 35). This trail head is primitive with a sand boat ramp, minimal parking area, and no improvements at present (Figure 37). Potential improvements would be possible if a collaborative partnership were developed with NC State University who owns the surrounding Big Swamp and the 4-H Center that utilizes this trail. Potential funding sources and collaborative partnerships could also include the following North Carolina agencies: Division of Coastal Management, Division of Water Resources, Wildlife Resources Commission, and Division of Transportation. Upgrade opportunities could include a floating dock and small boat launch transfer station (Universal Accessible and Small Boat Accessible), parking area, and toilet or porta-jon.

*FIGURE 37. Left panel is a view looking west at mouth of Deep Creek. The right panel shows the wooden logging bridge and the sand boat launch at the trail head of the black-water, Deep Creek. Photographs are by S. Riggs.*

Upper Scuppernong River Trail

The Scuppernong River segment starts at the Spruill's Bridge NCWRC access ramp in Creswell (Figures 27 and 34). From here one segment of the trail (Upper Scuppernong River Trail) goes about 2 to 3 miles upstream (west) to the Phelps Bridge at the town of Cherry. The Upper Scuppernong Trail is an easy paddle through a narrow channel eroded into agricultural upland without a swamp-forest floodplain. Consequently, the banks are overgrown and the water is often full of algae and alligator weed from agricultural runoff, making the stream partially navigable with the distance generally determined by the summer season invasion of aquatic alligator weed.

Lower Scuppernong River Trail

The main trail segment (Lower Scuppernong River Trail) goes downstream 12 miles from the Spruill's Bridge NCWRC access ramp, terminating in Columbia behind the Visitor's Center of the Pocosin Lakes National Wildlife Refuge (Figures 27 and 34). This section of the Lower Scuppernong River is a broadly meandering, black-water stream with a broad swamp-forest floodplain on both sides of the river. During the 18$^{th}$ and 19$^{th}$ century there were many commercial landings and docks to haul wood and crops out and bring supplies into this region. The only remaining evidence of this activity is the occasional dredged meander cut-off and turning basin to allow the larger vessels to navigate and turn around.

Spruill's Bridge and NC Wildlife Commission public boat ramp and parking area to the mouth of Old Transportation Canal (Figure 38) = 2.3 miles

Mouth of Old Transportation Canal to Cross Landing Bridge (Figures 27, 28, and 29) = 2 miles. On the SE side of the bridge is a small canal that leads across the Scuppernong floodplain to the Tercyak portion of Pettigrew State Park. A small landing, primitive campground, and facilities are presently being planned for this area.

Cross Landing Bridge to the mouth of Second Creek on the SE side (Figure 39) = 5.4 miles

Mouth of Second Creek to mouth of Rider Creek on the SE side = 1.2 miles

A side trip up the Second Creek represents a beautiful paddle through the black-water swamp forest for about 3.5 miles

Mouth of Rider Creek to Columbia Visitor's Center public boat ramp (Figure 39) and parking area on east side = 1.1 mile

A side trip up Rider Creek also represents a beautiful paddle through the black-water swamp forest for about 3.5 miles

Total One Way = 12.0 Miles (not counting the two side trips)

*FIGURE 38. Left panel is a picture of the NC Wildlife Commission's boat ramp and parking area on the Scuppernong River at Spruill's Bridge near Creswell. Right panel is a photograph of one of the hand-dug canals that is blocked with Alligator weed. Photographs are by S. Riggs.*


*FIGURE 39. Left panel is a photograph of the entrance to Second Creek with Alligator weed and the right panel is the boat ramp in Columbia at the Pocosin Lakes National Wildlife Refuge visitor's center. Left panel photograph is by D. Hodges and right panel is by S. Riggs.*

Necessary improvements for the Scuppernong River Trail from Spruill's Bridge boat launch area to Columbia include the following.

1) Some mile markers are missing or damaged and need to be replaced with deep water posts as alligator weed is often abundant along the adjacent shoreline.
2) Due to severe infestations by alligator weed, aquatic control of invasive species is necessary before paddlers can explore some of the Scuppernong tributaries and canals that were hand-dug by enslaved workers during the late 1700s (e.g., Old Transportation, 30-Foot, Bonarva canals, etc.) (Figures 38 and 39).
3) A collaboration between NC Divisions of Water Resources, Coastal Management, and the

Wildlife Resources Commission is recommended to make necessary improvements to the NCWRC boat ramp at Spruill's Bridge (Figure 38) including a Universal Accessible restroom, porta-jon, or other viable option.

Rider and Second Tributary Creeks

Highway 94 and Cross Landing Road south of Columbia cross over both Rider and Second Creeks (Figure 40). Unfortunately, there is no good access to the creeks from either of these roads. However, both Rider and Second Creek are accessible from the Scuppernong River and are only short distances upstream from Columbia. The creeks are narrow black-water streams that flow through broad swamp forest, pass under both bridges, extend eastward for over 3 miles after leaving the Scuppernong River, and make for great short paddles. Due to frequent storms, the upper portions of the channels may contain abundant downed trees and blockages.

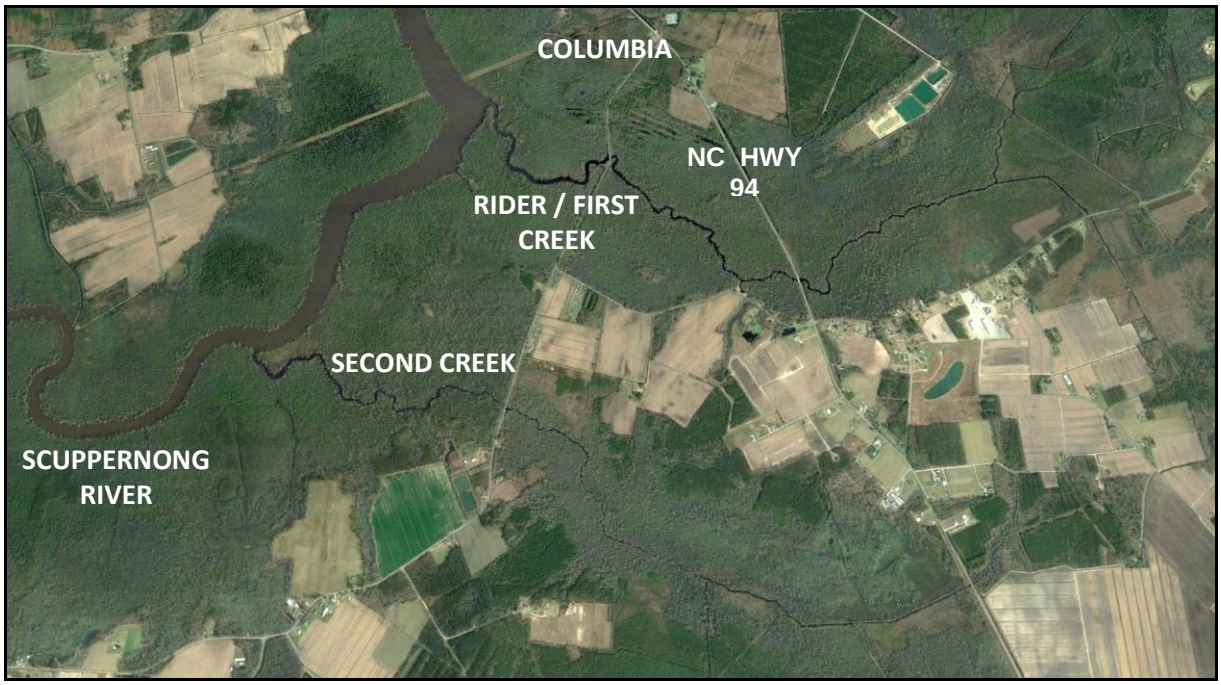


*FIGURE 40. Google Earth image shows the lower portion of the Scuppernong River with its broad floodplain and the two tributary creeks (Rider Creek and Second Creek). The two roads coming south out of Columbia and cross both creeks are Cross Landing Road on the left and Highway 94 in the center.*

**Alligator River Region Trails**

The main stem of the Alligator River estuary itself is an incredible wilderness. However, this very large water body frequently has large waves, severe winds, and thunderstorms that make open water kayaking and canoeing unsafe for the unexperienced water person. However, numerous streams and smaller water bodies occur along the western side of the main Alligator River with great potential for the future development of paddle trails (Figure 41). All of the potential sites are fresh, acidic, and very black-water systems dominated by wind tides and swamp-forest shorelines. They are listed below from north to south and have varying

character and potential. Many sites do not have public access or parking areas, but may have potential as indicated.

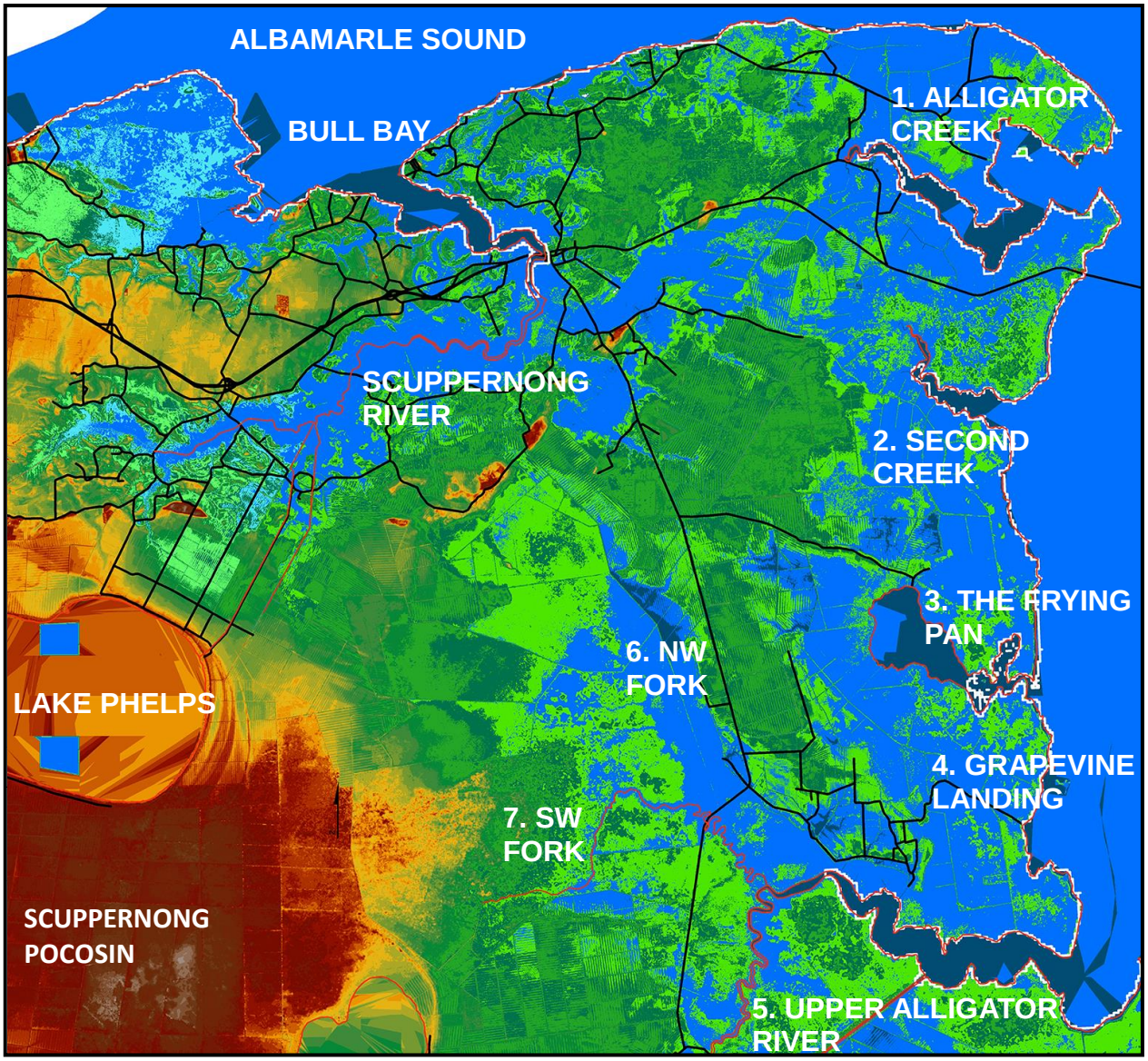


*FIGURE 41. A color topography map shows a portion of the Alligator River segment with seven possible areas for paddle trails in the Alligator region. Blue is water and wetland that is less than 2 feet above sea level. The green colors are 2 to 4 feet above sea level while orange is more than 6 feet and dark red is more than 10 above sea level. Topographic data are from the 2015 North Carolina Floodplain Mapping Program; map preparation is by D. Ames.*

1. Alligator Creek (Figures 41 and 42) is a large drowned-river tributary estuary situated north of Highway 64. The water body is an open embayment, but is semi-protected due to its geometry. It has one possible launching site at the town of Newfoundland where there is a NC Dept. of Transportation ramp at the bridge crossing the Alligator Creek.

*FIGURE 42. Left panel shows the NC DOT boat ramp where the loop road crosses the Alligator Creek at Newfoundland. Right panel shows a view of Alligator Creek looking east from the boat ramp. Photographs are by S. Riggs.*

2. Second Creek (Figure 41) is a small drowned-river tributary estuary south of Hwy 64, is a semi-protected, but open embayed water body with no apparent access. There are several logging roads associated with canals on the south side that do not appear to go to Second Creek.

3. The Frying Pan (Figures 41, 43, and 44) is a moderate sized, drowned-river tributary estuary situated at the east end of Frying Pan Road. The water body is an open embayment at the end of short canal. There is a NC Wildlife Commission boat ramp and parking area at the end of the canal with most of the land surrounding The Frying Pan being part of the Pocosin Lakes NWR and the Buckridge Coastal Preserve.


*FIGURE 43. A Google Earth image shows the Alligator River, The Frying Pan, and Gum Neck Farms. Star locates a NC Wildlife Commission boat launch site.*


*FIGURE 44. Left panel shows commercial fishermen utilizing the boat ramp at The Frying Pan. The right panel is a view looking north from The Frying Pan up the canal to the boat ramp with the higher ground to the right and low marsh drowning out the upland trees to the left. Photographs are by S. Riggs.*

4. Grapevine Landing (Figures 41 and 45) is a non-maintained site on the west bank of the very large Alligator River estuary. The site is open water with the potential for large waves, severe winds, and major thunder-storms. It is situated at the east end of Cahoon Road that is located east of Gum Neck. This property is state owned and part of the Buckridge Coastal Preserve and has dockage for commercial fishing boats along canal.


*FIGURE 45. Left panel shows the eroding perimeter fresh-water marsh adjacent to Cahoon Road. The right panel is a view looking north with the open, black-water of the Alligator River. Photographs are by S. Riggs.*

5. Upper Alligator River System (Figures 41, 46, and 47) is a NW-SE oriented tail of the Upper Alligator River. It is a moderate sized water body that is presently being drowned by ongoing rise in sea level. The resulting drowned-river estuary still retains the inherited river meander pattern. Access to this segment is through a small canal at Gum Neck Landing at the south end of Parisher Road. This is a NC Wildlife Commission boat ramp and parking area. It is possible that

access to this segment could be made available through state property at the Cherry Ridge Landing south of the Gum Neck Road.


*FIGURE 46. Map is of the Buckridge Game Land (green) and is from the NC Wildlife Commission. The map shows the Frying Pan Trail and boat ramp, Grapevine Landing, the Upper Alligator River Trail with the Gum Neck boat launch and a possible future ramp at Cherry Ridge landing sites, and the NW Fork. The Alligator and Pocosin Lakes NWR are in pink and private lands are white, including the Gum Neck Farms. The red and blue symbols represent gates that close the roads from access during specific seasons.*

Paddling about 4 miles upstream to the NW from Gum Neck Landing, there is a fork in the river with two branches (Figures 46, 47, and 48). The main part of the Upper Alligator River turns south and grades into the highly meandering riverine component with a broad, swamp forest eco-system. This river segment meanders for at least another 13 miles to the point where the stream passes under Hwy 94, which is another location where it might be possible to develop a boat access ramp. There is a possibility of developing a boat access ramp on Pocosin Lakes National Wildlife Refuge property at the east end of a small road in the village of Kilkenny.

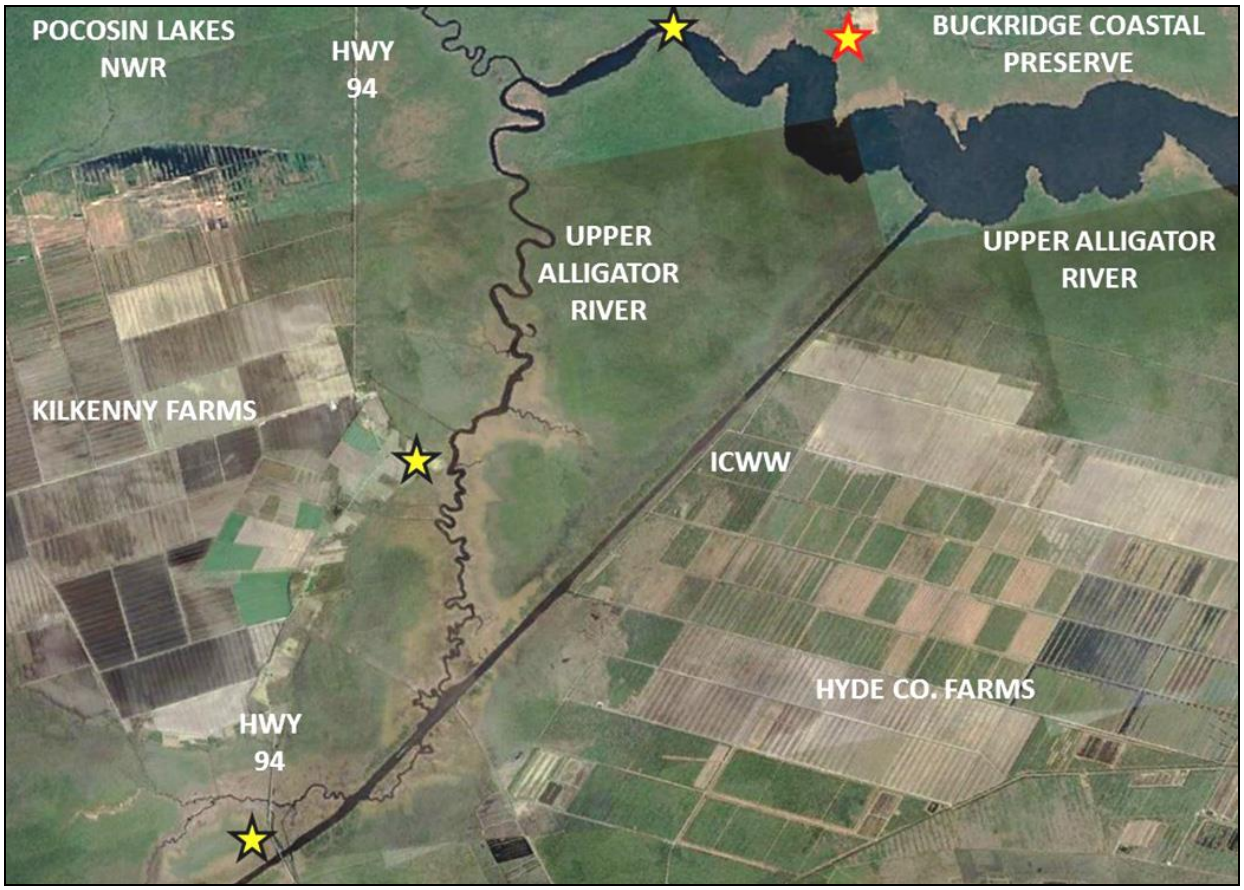


*FIGURE 47. Google Earth image of the Upper Alligator River that passes from an E-W oriented drowned-river estuary to a N-S oriented riverine system. Two possible boat launch sites are located where the stream occurs adjacent to farmland at Kilkenny and subsequently passes through the intra-coastal waterway (ICWW-dark straight ditch) and then passes under Hwy 94 in the lower portion of the image.*

6. NW and 7. SW Forks (Figures 41, 46, and 48). The NW branch of the Upper Albemarle River is a small meandering tributary that splits into the SW Fork and NW Fork of the Upper Alligator River 4 miles upstream at the Old Ferry Landing on Hwy 94 crossing. An old NC DOT boat ramp occurs near the Hwy 94 B

ridge crossing the NW Alligator River. This site today is a designated wetlands mitigation site for NC DOT and is posted. A short gravel road with a firm base leads to the creek that is often flooded. However, there is no adequate place to park. This area is wonderful wilderness water within the Buckridge Coastal Reserve to the south and the Pocosin Lakes National Wildlife Refuge to the north. From this point upstream on both the SW and NW Forks there is no easy access from high land and both streams tend to be heavily overgrown (Figure 50).

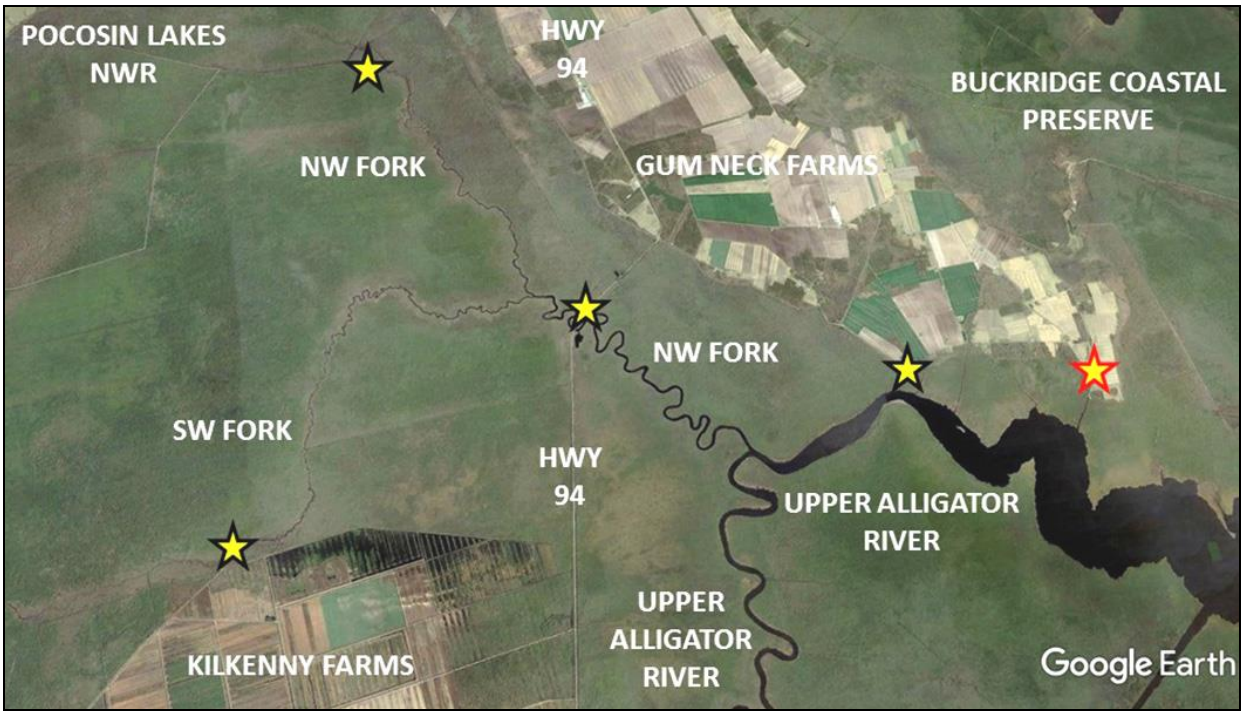


*FIGURE 48. Google Earth image shows the Upper Alligator River, NW Fork, and SW Fork drainages surrounded by vast areas of low wetlands that are very close in elevation to sea level. One existing boat launch site is indicated with a yellow star outlined in red and four potential sites labeled with yellow stars outlined in black. The latter areas have serious access problems that will require substantial work before they can become part of public paddle trails. The Gum Neck farms are on the upper right surrounded by a massive dike and the Kilkenny farms are on the lower left.*

Access to the NW Fork at the old barge landing on Hwy 94 needs major improvement (Figure 49). The road bed needs to be raised to the level of Hwy 94 and parking needs to be developed with warning signage since there is limited visibility where Hwy 94 curves at the bridge. The existing dock needs to be checked for structural integrity and improvements since it is too high for use by paddlers. The existing gravel side road can only be utilized for launching canoes and kayaks and there is no room for parking. The aquatic vegetation problem in narrow portions of the channel needs to be addressed (Figure 50).


*FIGURE 49. Two areas where there is a possibility of accessing the NW Fork (left panel) and Upper Alligator River (right panel) with kayak and canoe launch docks. Both areas presently have access problems and no parking. Left panel shows the old barge dock on the NW Fork at the Old Ferry Landing where Hwy 94 crosses the black-water stream (see Figure 48). Right panel is a photograph at the end of the road in Kilkenny with a short canal to the Upper Alligator River. Photographs are by D. Hodges.*

*FIGURE 50. The left panel shows the low scrub-shrub wetland swamp forest of the adjacent floodplain in the Upper Alligator River and the NW and SW Forks. Notice the abundant 3-foot high pitcher plants. The right panel is a view of the NW Fork, approximately 3 miles upstream of Old Ferry Landing on Hwy 94, showing thick vegetation growth blocking the channel. Left panel photograph is by S. Riggs and right panel is by D. Hodges.*

# APPENDIX
# ECO-TOURS AND ASSETS OF THE SCUPPERNONG COASTAL SYSTEM

## Day-Tripper Eco-Tours

The first approach would be to develop local guides, equipment, and facilities that would service the daily visitor. Participants would include the following: tourists vacationing and staying on the Outer Banks, inland residents passing through the region on Highway 64, local individuals and organizations, and regional school programs. Examples of potential Day-Tripper Eco-Tours include the following:

1. Birding Trips (Bald Eagles, Tundra Swan, Snow Geese, Migratory Song Birds, etc.)
2. Hiking Trails (Pettigrew State Park, Pocosin National Wildlife Refuge, etc.)
3. Paddle Trails (Bull Bay, Deep Creek, Scuppernong River, Lake Phelps, and Alligator River)
4. Car Trails (paved roads and 4-wheel drive roads)
5. Biking Trails (paved roads and gravel/sand drainage ditch roads)
6. Black skies and night sounds (star gazing, wolf howls, and frog choruses)
7. Small Craft Sailing waters (outer Scuppernong River, Bull Bay, and Alligator River)
8. Nature Photography (fauna and flora of water and wetland ecosystems)
9. Wind surfing (Bull Bay, Albemarle Sound, and Alligator River)
10. Paddle boarding (Bull Bay, Scuppernong River, and Phelps Lake)

## Multiple Day-Tripper Eco-Tours

The second approach would be to recruit outside groups of tourists for multiple day, educational field- and lecture-oriented natural and cultural history programs on specific topics. This approach would require a daily per person charge that would include the program, housing, and food, and could model itself after the very successful "Roads Scholar Program". Examples of potential Multiple Day-Tripper Eco-Tours follows.

Recreational Eco-Tours

1. Kayak and canoe from black-water river swamps with fringing ghost forests of the drowned river estuaries
2. Trail hiking within coastal landscapes and ecosystems
3. Wilderness camping tours through the Scuppernong region
4. Biking tours through the back roads and ditch roads of the Scuppernong region
5. Sailing boat tours from Columbia through Bull's Bay and into Albemarle Sound
6. Power boat tours from the rivers to the sea

Educational Nature Eco-Tours

1. Pocosin—Riverine—Estuarine origin and evolution
2. Wetland ecology: from upland pocosins to Carolina bays and riverine swamp forests
3. Birds and animals of the Inner Banks wetlands
4. Landscapes and their geologic history within the Scuppernong coastal system
5. Storms and water dynamics of the Scuppernong coastal system
6. Carbon storage and climate change: role of peat pocosins and riverine swamp forests

Cultural History Eco-Tours

1. Wetlands: their origin, composition, and history of human modification
2. History of exploration, discovery, and economic development
3. Rivers and estuaries: the highways of down-east NC
4. Native American, Revolutionary, and Civil War histories
5. Archeological history of Native Americans
6. Maritime history: the sunken record
7. The Civil War in NC LOW
8. What happened to the "Lost Colony"?

Fishing and Hunting Expeditions

1. Fishing on inland waters from lakes to black-water streams and trunk-rivers to salt-water estuaries
2. Fishing, shrimping, and crabbing on commercial boats in Albemarle-Pamlico Sounds
3. Fishing in offshore ocean waters
4. Seasonal hunting guides (ducks, geese, turkey, quail, deer, bear, etc.)

**Environment and Community Volunteer Eco-Tours**

The third approach would be to recruit specific interest groups to volunteer to work on defined projects and for specific time periods. The third program approach can be well organized groups that work on a purely volunteer basis or they could be recruited as individuals who pay a fee to volunteer similar to the very successful "Earth Watch Program" or the many eco-tourism centers around the world. Examples of potential organizations that could participate in Volunteer Eco-Tours include the following.

1. Federal: National Park Service and National Wildlife Refuges
2. NC State: State Parks, Wildlife Resources Commission, Marine Fisheries, Aquariums, Museum of Natural Science, Coastal Reserves, Partnership for the Sounds, etc.
3. County and Local Communities: Chambers of Commerce, Parks and Recreation Departments, K-12 School Systems, Historical Restoration Projects, etc.
4. Conservation Organizations: NC Coastal Federation, Land Conservancies, Albemarle-Pamlico National Estuary Partnership, Sound Rivers, etc.

**Natural Resource Assets**

1. Unique Landscape Features and Ecosystems

Albemarle Sound and Alligator River: These two large, fresh-water, drowned-river estuaries formed by rising sea level as it flooded up their river valleys.

Bull Bay drowned tributary estuary: This bay is the lower portion of the Scuppernong tributary river that is being flooded by ongoing rise of sea level.

Big Swamp and Mackey's braid-plains: These vast terraces composed of sand braid-bars and swamp forest swales are products of the ancient Roanoke River floodplain when it was a braided river during the cold climates of the Last Glacial maximum.

Scuppernong and Pungo rivers, and the NW and SW Forks of the Alligator River: These are black-water tributary streams with vast floodplains and riverine swamp forests.

Phelps, Pungo, and Alligator lakes: These natural lakes are shallow Carolina bay lakes associated with the Scuppernong Pocosin.

Suffolk shoreline and tidal flats: This ancient ocean shoreline formed during a previous warm climate during an inter-glacial episode. Sea level was about 25 feet above present forming a large paleo-ocean embayment characterized by sand beach ridges and a shore-face with a shallow shelf dominated by mud-flats and Carolina bay depressions.

Scuppernong pocosin: This landform, better known as a "swamp on a hill", is an incredible dome of water, peat, and upland swamp forest with a high bio-diversity.

Vast, black night-sky views in an awesome world of night sounds, stars, constellations, meteor showers, big-sky sunsets and sunrises, thunder and lightning shows, and night sounds of wolves, frogs, and insects.

2. Diverse Fauna and Flora within the Complex of Ecosystems

Riverine wetlands that contain swamp forests of Atlantic white cedar, bald cypress, black gum, water tupelo, and red maple; with shrub layers composed of wax myrtle, ti-ti, Virginia willow; and herb layers dominated by royal fern, lizard's tail, and pitcher plants.

Non-riverine pocosin wetland communities containing a mixture of canopy trees including bald cypress, pond pine, black gum, sweetgum, and scattered Atlantic white cedar; a shrub layer of sweet-bay magnolia, red bay, and red maple; and a lower layer of hydrophytic plants including ti-ti, fetterbush, sweet pepperbush, highbush blueberry, Virginia chain fern, netted chain fern, pitcher plants, and sedges.

Uplands with mineral soils support two distinct natural communities. Dry uplands contain hardwood forests of beech, white oak, yellow poplar, and loblolly pine that form the canopy, while American holly, ironwood, and witch-hazel form the sub-canopy. Lower wet areas support a wet hardwood forest of swamp chestnut oak, water oak, cherry bark oak, sweetgum, and swamp black gum while switch cane, Howe's sedge, New York fern, and lizard's-tail occur in the wet mossy soils.

The large fauna that occurs within the Scuppernong region is diverse and includes one of the largest concentration of black bears in southeastern US, the endangered red wolf, American alligator, river otter, bobcat, and white-tailed deer.

The avian fauna includes bald eagle, red-cockaded woodpecker, wood duck, American woodcock, and osprey, along with many migratory species. The region also plays a vital role for the wintering tundra swans, snow geese, and many species of ducks.

The rivers and estuaries harbor a wide variety of fishes, a major crabbing industry, and the upper regions are spawning grounds for herring and other inland fisheries (Figure 51).


*FIGURE 51. The left panel shows the "Full Circle Crab Co." on highway 64 in Columbia, NC. The right panel is the symbol of one of the region's major fisheries. Photographs are by S. Riggs.*

3. Existing Trail Systems
   With the exception of Pettigrew State Park, most existing trails are in poor condition with respect to maintenance, signage, and information.
   Paddle trails on the Scuppernong River, NW and SW Forks of the Alligator River, and Kendrick Creek
   Paddle trails on Lake Phelps
   Biking trails through regional state back roads and national wildlife refuge sand and gravel roads
4. North Carolina Wildlife Resource Commission Facilities
   Boat access-ramp system: NC WRC has built and maintains many boat ramps throughout the Scuppernong region (Figure 52).
   North Carolina game lands: control over 100,000 acres of wild wetlands in this region.
   Mattamuskeet Lodge: This historic lodge is not presently functional.

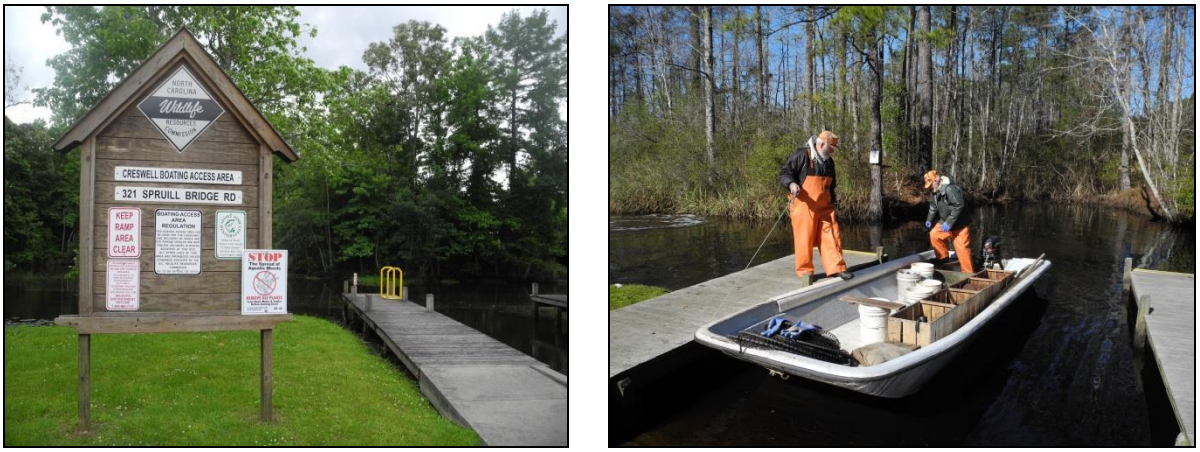


*FIGURE 52. Left panel is the NC Wildlife Commission's boating access ramp located at Spruill Bridge Road providing access to the Scuppernong River. Right panel is the NCWC's access ramp at The Frying Pan on the Alligator River. Photographs are by S. Riggs.*

**Cultural History Assets**

1. Historic Places and Features
   Somerset Place and canal system hand dug by enslaved people
   Native American artifacts and sites in and around Lake Phelps
   Maritime history of sunken boats and wharves
   Hertford Newbold-White House
2. Post-European American and African-American Histories
   Family Legacies (Collin, Pettigrew, Spruill, LittleJohn)
   Ditching and Draining History of NC LOW
3. Villages within the Scuppernong Region: Individual Histories
   Columbia, Creswell, Cherry, Cross Landing, Free and Easy, Alligator, Goat Neck, Newfoundland, Fort Landing, Phledger Landing, Pleasant View, Gum Neck, Frying Pan, Roper, Skinnerville, Colonial Beach, etc.
4. History of the Extensive Forest Industry: Timber industry (cypress and Atlantic white cedar), shingle industry, moonshine and paper-pulp industry (mono-culture pine plantations), and now the National Wildlife Refuges.
5. Agricultural History: Ditching and draining, blacklands soil agriculture, sustainable farming to mega-farms, and role of ethnic populations.
6. Future Potential of Sustainable Ecotourism

**Local Refuges, Parks, & Historic Sites, etc.**

A large number of agencies and their resources already exist in northeastern "North Carolina's Land of Water" coastal system that could be integrated into a National Heritage Area designation or an eco-park upon which the Scuppernong Program can be built. They include, but are not limited to the following.

1. US National Park Service
   Cape Hatteras National Seashore
   Cape Lookout National Seashore
   Fort Raleigh National Historical Site
   Wright Brothers National Historical Site
2. US Fish and Wildlife Service
   National Wildlife Refuge Center on Roanoke Island
   Pocosin Lakes National Wildlife Refuge Visitors Center in Columbia
   Pocosin Lakes National Wildlife Refuge (Figure 53)
   Alligator River National Wildlife Refuge
   Mattamuskeet National Wildlife Refuge
   Swanquarter National Wildlife Refuge
   Roanoke River National Wildlife Refuge
   Great Dismal Swamp National Wildlife Refuge
   Pea Island National Wildlife Refuge
   Currituck National Wildlife Refuge
   Cedar Island National Wildlife Refuge
   Mackay Island National Wildlife Refuge


*FIGURE 53. Left panel is the entrance to Pocosin Lakes National Wildlife Refuge in the Scuppernong coastal system; one of ten National Wildlife Refuges within the NC LOW region. Right panel is a reconstruction in Plymouth of the original screw-pile lighthouse that was located at the mouth of the Roanoke River during much of the 19th and 20th centuries. Photographs are by S. Riggs.*

3. US Forest Service
    Croatan National Forest
4. NC State Parks and Historic Sites
    Pettigrew State Park on Lake Phelps and Scuppernong River
    Somerset Place State Historic Site on Lake Phelps
    Jockey's Ridge and Goose Creek State Park
    Cliffs of the Neuse and Merchants Millpond State Park
5. Regional Facilities
    County and City land and parks
    Tyrrell County Visitors Center in Columbia
    Pocosin Arts Center in Columbia (Figure 9)
    Eastern 4-H Environmental Education and Conference Center in Columbia
    Theater Cultural Resource Center in Columbia
    Partnership for the Sounds
    Red Wolf Coalition in Columbia
    Historic and Pre-Historic Buildings, Archaeological Sites, & Maritime/Military Sites
6. Environmental Agencies, Organizations, and Programs
    North Carolina Coastal Federation
    The Nature Conservancy, Conservation Fund, and NC Coastal Land Trust
    Sound River Foundations
    Environmental Defense Fund
    Sierra Club-Cypress & Croatan regional groups
    Regional Resource, Conservation, and Development
    Roanoke River Partners
    Albemarle-Pamlico National Estuarine Partnership
    Partnership for the Sounds
    Regional economic councils, etc.
7. Museums
    NC Aquarium on Roanoke Island

NC Estuarium in Washington
Buckridge Coastal Reserve in Tyrrell County
Aurora Fossil Museum
Graveyard of the Atlantic in Hatteras
Beaufort Maritime Museum
Edenton State Historic Site
History Museum in Plymouth
Restored screw-pile lighthouse in Edenton
Reconstructed screw-pile lighthouses in Plymouth and Manteo (Figure 53)

8. Scenic Highways, Byways, and Trail Systems
   Mountains to the Sea Trail
   Albemarle Historic Trail and Outer Banks Scenic Byway
   Freedom Trails
9. Institutions of Higher Education
   East Carolina University in Greenville and ECU Coastal Studies Institute in Wanchese
   Elizabeth City State University and College of the Albemarle
   Beaufort Community College
10. Private Land Holders
    Corporations and individuals who offer public access, are willing to be part of the educational and interpretive story of the area, and can request to be part of the program.

**Local Amenities**

Both lodging and restaurants are critical for developing a viable ecotourism industry, but unfortunately they are presently very limited and continuously in flux. This is probably the greatest limitation to realizing the ecotourism potential of the Scuppernong region. A healthy ecotourism business requires local investments in developing unique and pleasant places for people to both stay and eat. Examples of existing structures (Figure 54) that could be developed into significant local amenities include the Mattamuskeet Lodge in Fairfield, Spruill's Farm on Albemarle Sound, Academy Lodge at Mackeys, and River Forest Manor in Belhaven.

*FIGURE 54. Former lodges that are now sitting idle. The left panel is the Mattamuskeet Lodge of the NC Wildlife Commission located on Lake Mattamuskeet, NC. The right panel is the private River Forest Manor located on the Intracoastal Waterway in Belhaven, NC. Photographs are by S. Riggs.*

*FIGURE 55. Different-aged cypress trees growing on sand beaches associated with elevated paleo-shorelines around Lake Phelps. Present shoreline of Lake Phelps is on the far right side of the photograph. Photograph is by S. Riggs.*