“Practical Restoration” at Buckridge Coastal Reserve

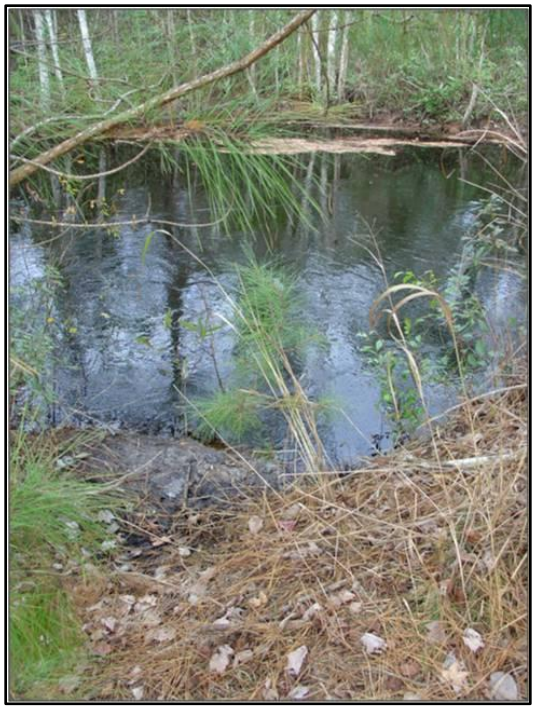
Protecting Rare Coastal Resources

The recent hydrologic restoration project at the Emily and Richardson Preyer Buckridge component of the North Carolina Coastal Reserve signals a step forward in protecting the water quality of the Alligator River and restoring rare Atlantic white cedar habitat. Historic timber management and canal construction have caused significant hydrological changes to this unique ecosystem, as the canals drain freshwater away from wetlands and introduce saline water into the system. The altered hydrology has the potential to impair the filtering ability of the rich organic soils at the Buckridge Reserve, which could increase mercury, heavy metal, and nitrogen levels, and affect the adjacent Alligator River. The N.C. Coastal Reserve undertook a restoration project to re-establish the surface and groundwater flows of the Buckridge wetland systems to reduce the release of nutrients into surface waters, prevent saltwater intrusion into the sensitive organic peat soils, and to accommodate adjacent property owners’ water rights during restoration. Eventually, the results of this project should ensure that the forested wetlands at the Buckridge Reserve are able to fulfill their natural functions, including providing habitat for endangered species, storing carbon, protecting estuarine water quality, and providing flood control.

Atlantic white cedar habitat

Leveraging Partner Support

Hydrologic restoration efforts were funded through a Clean Water Management Trust Fund grant. Established by the N.C. General Assembly in 1996, the Clean Water Management Trust Fund is responsible for issuing grants to local communities, state agencies, and conservation non-profits to address water pollution issues. The impact of the Reserve’s wetlands on the state-designated Outstanding Resource Waters of the Alligator River, and restoration of the degraded surface and groundwater surrounding the canal system, aligned the Buckridge Reserve proposal with the Clean Water Management Trust Fund’s conservation priorities.



Canal before tidegate installation

Partner involvement in the restoration project included staff expertise and in-kind roadwork from the N.C. Wildlife Resources Commission. The N.C. Division of Coastal Management, which is the state agency involved in N.C. Coastal Reserve operations, contracted with East Carolina University (ECU) to provide system monitoring, which generated teaching opportunities, graduate theses, and conference presentations.

Water Control Structures- A Balancing Act

To restore traditional water levels and prevent drainage and subsequent saltwater intrusion, N.C. Coastal Reserve staff and members of the Buckridge Restoration Advisory Council chose to install a combination of tidegates and flashboard risers. Tidegates, or flap gates, allow water to flow in a single direction, and were used at sites where neighboring property owners have drainage rights. This type of water control structure ensured that adjacent property

owners' water rights were not infringed upon, while also keeping saline water out of Buckridge Reserve wetlands. Flashboard risers, which are used to control water flow in two directions, were chosen for locations where the N.C. Division of Coastal Management held exclusive drainage rights.

Tidegate structure

Restoration with Results

N.C. Coastal Reserve staff have already observed changes in water levels, water quality, and ecosystem function following the installation of the water control devices. Water control structures have been successful at holding water in locations that were previously dry, preventing saltwater intrusion. Additionally, the natural seasonal variation in water levels has begun to return to the Buckridge Reserve, which will strengthen the established functions of the unique peatland Atlantic white cedar habitats. Staff also observed the return of low-lying vegetation in areas that were previously inhospitable due to high water levels.

Long-term results from this restoration project are expected to be dramatic. Relieving the saltwater intrusion and freshwater drainage caused by the canals will hopefully help vulnerable Atlantic white cedar populations rebound and grow more robust. Additionally, habitat shifts from forest to marsh will be limited to land adjacent to natural shorelines, which can restore natural forest habitat in areas once affected by canals.

Moving Forward

This restoration project provided several key "lessons learned" that can be applied to future water control efforts throughout coastal North Carolina. Although the tidegate structures were instrumental in preserving property owners' drainage rights, some of the new installations were not sensitive enough to adjust to the small water flow differentials that are common at the Buckridge Reserve due to the flat topography of the area. Water control alternatives that preserve property rights are currently being explored by the N.C. Wildlife Resources Commission, the ECU monitoring team and partners at The Nature Conservancy. N.C. Coastal Reserve staff also cited an increased understanding of how the permitting process for wetland construction interacts with project design as important knowledge gained during the restoration project. Expertise about the hyper-local conditions at water control sites was extremely valuable during the project, and staff also recommended seeking out individuals with local knowledge to provide expertise on project design and implementation.

After water control structure installation

The N.C. Coastal Reserve plans to continue the restoration work at a landscape scale through a partnership with The Nature Conservancy. Best practices and lessons learned from the original Clean Water Management Trust Fund project will play a significant role in developing strategies for larger-scale conservation.

Reflecting the N.C. Coastal Reserve Mission

The hydrologic restoration project at the Buckridge Reserve is a prime example of the N.C. Coastal Reserve mission at work. By gathering and engaging experts, undertaking long-term monitoring of habitat changes over time, and working to improve threatened natural wetland resources, staff at the Buckridge Reserve are truly "promoting informed management and stewardship of North Carolina's coastal and estuarine resources through research, education, and example." As Buckridge Site Manager

Woody Webster states, “hopefully Buckridge’s restoration project can act as an example of practical restoration, one that balances needs of the landowner and that of the resource.” It is clear that the work done at the Buckridge Reserve can help guide future restoration efforts in the region, as more communities face declining wetland health and sustainability.