4 MINUTE READ

Mud Creek Confluence

from **Engineering With Nature: An Atlas, Volume 3.**

by **US Army Engineer Research and Development Center**

Mills River, North Carolina, United States

Reshaping a floodplain to reduce agricultural impacts and create habitats. The Mud Creek confluence project, situated at the confluence of Mud Creek and the French Broad River in Henderson County, North Carolina, has been highly modified for agricultural production, including crowned fields for row crops, “push-up” berms along the riverbanks constructed of concrete debris and earth, and parallel ditches for drainage. The site also receives urban stormwater runoff, a potential habitat and water-quality stressor, through several pipe outfalls from a neighboring subdivision. The confluence was identified as having excellent potential for restoration and enhancement of aquatic and terrestrial habitats as well as opportunities for recreational access, education, and outreach. The Mud Creek confluence project addresses these needs by restoring a montane alluvial floodplain forest, a rare natural community in North Carolina. Specific vegetation communities and habitat types considered in the restoration design included muskellunge (*Esox masquinongy*) spawning areas, mountain bog wetland, pollinator plots, mountain grasslands, and montane alluvial forest. The project restored over 7 hectares of wetlands

using fine and large debris and excavated 0.7 hectares of floodplain pools. Nearly 4 hectares of spawning habitat were created for muskellunge with the removal of a dam and the addition of fine and large woody debris. Pollinator mounds were also established on the tract.

Article Cover: Aerial view of the confluence site, showing the French Broad River along with the wetland area and large woody debris piles that provide habitat for amphibians, reptiles, and birds. (Photo by North State Environmental)

Producing Efficiencies

The project sponsor, Conserving Carolina, identified the site during its yearly watershed review conducted to advance its mission of protecting, restoring, and inspiring appreciation of the local natural world. Agricultural production at the confluence could be challenging due to urban runoff, which degrades water quality and rare fish habitat. Project scientists and engineers collaborated on restoration and enhancement goals, which included natural hydrology, water quality, habitat for breeding muskellunge and other species, wetland habitat, recreational access, and native vegetation. The designer, Jennings Environmental, and the contractor, North State Environmental, conducted joint site reviews to minimize and balance earthwork.

Using Natural Processes

The project used a natural channel design process to determine overbank flowing dynamics into the site and to identify strategic locations within the berm breaches. The design maximized the retention and detention of off-site urban stormwater before it entered the receiving water. Excess material was shaped to blend with the landscape, including hummock areas, which were planted with pollinator vegetation. Fine and large woody debris that were removed along ditches and berm areas were used within the wetland areas to provide habitat for breeding muskellunge, amphibians, reptiles, and birds.

Wetland area constructed at the site to provide water-quality and habitat benefits. (Photo by North State Environmental)

Broadening Benefits

Conserving Carolina achieved several social, environmental, and economic benefits from implementing this project. The area, which lies adjacent to a subdivision, has been converted to a nature preserve. In the future, a greenway will be planned through the site, which already includes a paddle camp trail area. The project restored and now protects a rare montane alluvial floodplain forest community with wetlands within it. Further, the muskellunge have been found using the habitat created for them at the site.

On-site signage—created in partnership with the Revitalization of Traditional Cherokee Artisan Resources, Cherokee Preservation Foundation, Qualla Arts and Crafts Mutual Inc., and

Conserving Carolina—describes the ecological, historical, and cultural significance of river cane (Arundinaria gigantea) in English and Cherokee.

(Photo by North State Environmental)

Promoting Collaboration

Representatives from U.S. Fish and Wildlife (federal), North Carolina Wildlife Resources (state), and Conserving Carolina (local nongovernment organization) formed a project advisory committee to work with the designer and contractor to create the project objectives and inform design development. Other project partners who participated in the project to make it a success were the North Carolina Land and Water Fund, the North Carolina Department of Environment and Natural Resources, the North Carolina Environmental Enhancement Grant Program, the Natural Resources Conservation Service, SM Soil and Water Solutions, Jennings Environmental, and North State Environmental.

The slough created for muskellunge habitat looking toward its confluence with the French Broad River.

(Photo by North State Environmental)

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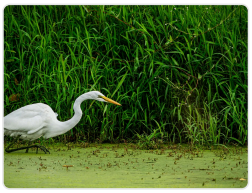

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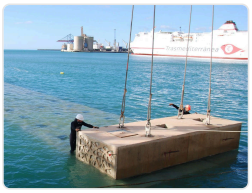

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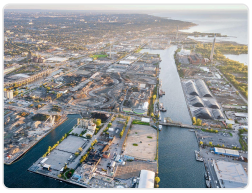

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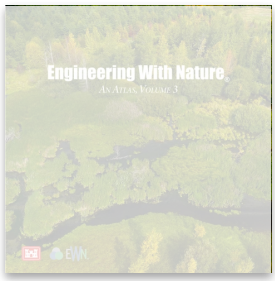

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