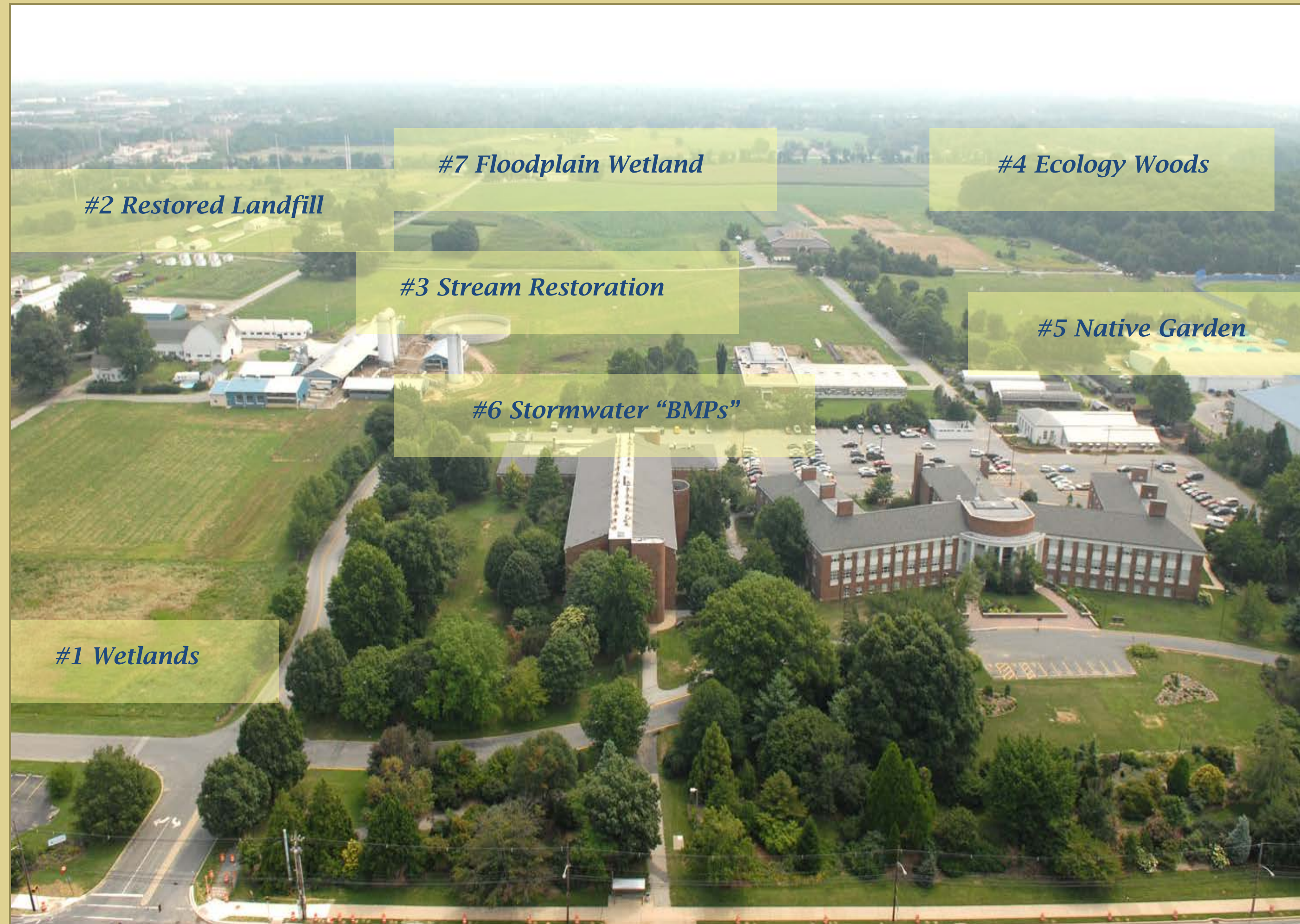


Creating a Floodplain Wetland to Protect Water Quality in the White Clay Creek National Wild and Scenic River Watershed

UD Project Team: UD WATER (Watershed Action Team for Ecological Restoration)*

Watershed Management Practices College of Agriculture & Natural Resources Farm (2006-2011)



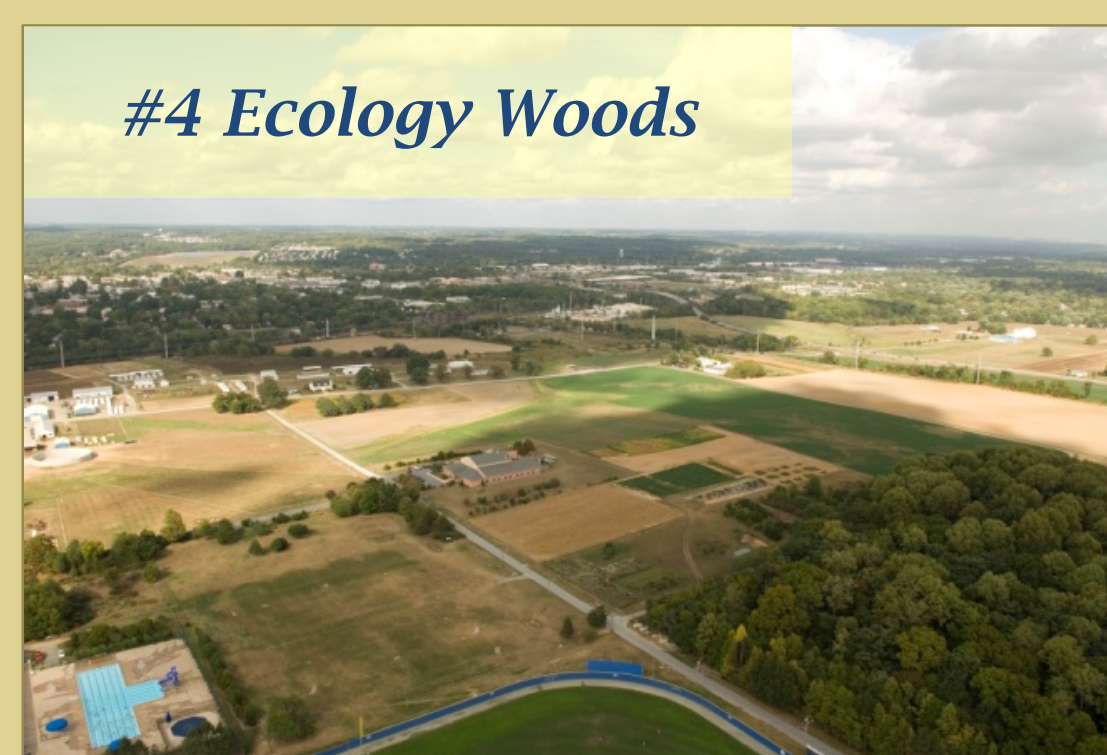
In 2008, the College of Agriculture & Natural Resources (CANR) constructed a wetland on a section of poorly drained and unproductive pasture. Wetlands are highly productive ecosystems that provide many important ecological services. The new wetland protects water quality, reduces downstream flooding, and features native plants that enhance biodiversity and provide wildlife habitat. UD faculty and students designed and planted the wetland which is now maintained by the UD Botanic Gardens for teaching and research.



In 2006, CANR, in cooperation with UD, the City of Newark, and the Delaware Department of Fish & Wildlife, restored an old urban landfill into a warm season grassland, using native grasses and perennial plants. The old landfill, closed in the 1970's, had been a poor quality pasture and is now gradually emerging as a new ecosystem. Faculty and students in Entomology and Wildlife Ecology, among many others, use the restored landfill for teaching, research, and public education.



In 2010, CANR, in cooperation with the Ecological Restoration section of Delaware's Department of Natural Resources & Environmental Control (DNREC), began a major stream restoration and wetland project. The project has since converted an old drainage ditch into a series of grassed waterways, pocket wetlands, and a forested stream corridor. Student groups are helping to plant the new riparian zone with native plants. This restoration project will improve water quality by filtering urban and agricultural runoff, while also preventing flooding, and restoring wildlife habitat.



The *Ecology Woods* is a 35-acre forest fragment on the UD CANR farm that provides habitat to a diverse range of wildlife and native plants. Faculty and students have used the *Ecology Woods* for teaching and research for decades, including the longest continuous study on the population health of forest songbirds in North America. This 30-year study involved dozens of students and has provided valuable insights on the relationship between habitat size and the change in songbird populations over time.



The UD Botanic Gardens is 12 gardens (15 acres) on the CANR campus that are used by faculty, students, Green Industry professionals, and the public. They support CANR programs in horticulture, plant science, entomology, and landscape design. Many others at UD and in the community enjoy the beauty and natural resource benefits provided by the UDBG. The *Native Garden* displays trees, shrubs and perennials native to the Eastern US; a recent addition is the *Lepidoptera Trail* that provides habitat for more than 20 species of butterflies and moths native to this area.



In 2010-2011, CANR, working in partnership with the UD WATER project (Watershed Action Team for Ecological Restoration) and DNREC constructed two large ecological filtration beds that will filter runoff from the parking lots, roads, roofs, and other urban areas on south campus. This "best management practice" (BMP) will contribute to improvement of water quality in the White Clay Creek. Water quality monitoring stations have been included to allow for assessment of the BMP effectiveness at reducing nonpoint pollution.

Creating a Floodplain Wetland

Background: The Cool Run tributary of the White Clay Creek drains land on the UD campus and in the City of Newark. It has long been negatively impacted by nonpoint pollution from urban, industrial, and agricultural sources and is listed by the US EPA as an impaired water body for nutrients, dissolved oxygen, bacteria, and sediments. In 2008, the UD WATER team analyzed stormwater pollutant loads in the Cool Run Watershed and recommended increasing the number and acreage of wetlands in the watershed to improve water quality and ecosystem health.

Project: A section of low quality pasture was removed from agricultural use to create a healthy, functioning floodplain wetland, thus reducing pollutant load to the White Clay Creek by filtering stormwater runoff. This wetland, along with others created on the farm, will also create stormwater storage, important to prevention of downstream flooding. This project illustrates how the University partners with the City to manage land in the White Clay Creek watershed in a manner that improves water quality. Wildlife habitat will be created and enhanced, increasing the diversity of species on the farm and campus, an important component of UD efforts to be a more sustainable university.

Funding: Provided by the UD Sustainability Fund, the College of Agriculture and Natural Resources, and the Department of Natural Resources and Environmental Control (DNREC)

Wetland Construction and Status:

- ✓ Wetlands ecological design developed by DNREC
- ✓ Permits obtained from state and federal agencies
- ✓ Land adjacent to stream channel excavated, lowering it and creating pockets with openings to the stream.
- ✓ During storms, water rises higher in the stream channel and can now flow into the excavated acreage and pond in the low areas. In this way, water is "stored", allowing it to evaporate or infiltrate and thus reducing storm flows downstream
- ✓ The combination of hummocks and pockets of differing depths also creates a varied habitat for wildlife. While some native flora will be planted, the wetland will naturally fill in with native vegetation.



How Wetlands are Constructed



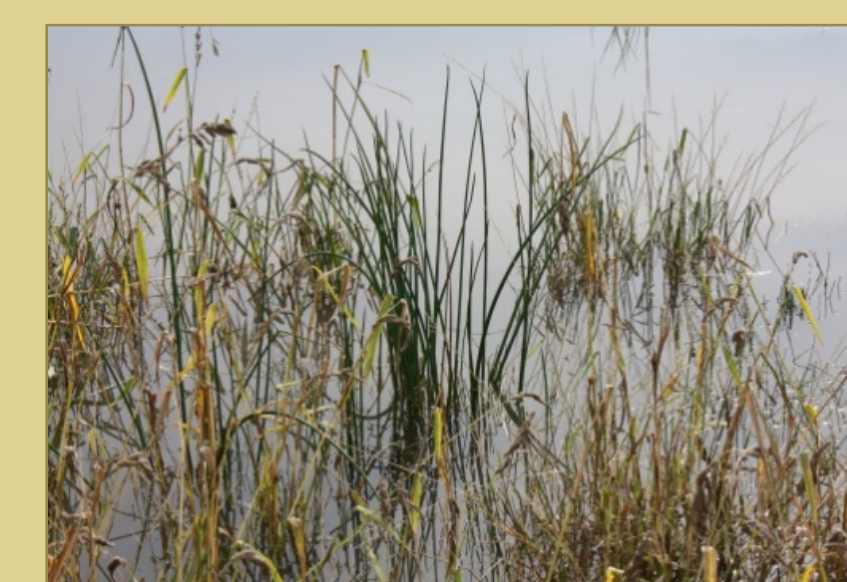
Poorly performing agricultural land is excavated to create "microtopography"- shallow ponded areas and hummocks of different depths.



Large, aged logs and stumps may be added to create habitat



Native trees, shrubs, and grasses are planted for additional habitat.



Wetland plant species begin to colonize the ponded areas naturally



While the constructed wetland may take a few years to fill in and become naturalized, wildlife move in right away.