

Egypt Road/Little Blackwater Restoration Project

Final Report

Project Description

The Egypt Road Restoration Project was a collaborative effort between the Maryland Department of Natural Resources (MD DNR) and the Dorchester Soil Conservation District (SCD). The property, originally scheduled to be developed as a residential/golf course community, was acquired in June 2007 by DNR's Program Open Space and is now managed by DNR's Forest Service. The project area, when purchased by MD DNR, comprised approximately 588 acres of agricultural land and 140 acres of existing forest land. Most of the existing forested area was adjacent to and/or within the 100-year floodplain of Maple Dam Branch and the Little Blackwater River. The project area is entirely within the corporate limits of the City of Cambridge, Maryland.

The majority of the site has been in agricultural production for last few hundred years. Over that time, the entire site had been hydrologically altered to more effectively convey surface water off the site to adjacent water bodies. This was accomplished by a series of agricultural ditches that drained the area for farming. Even though the majority of soils at the site are categorized as hydric (poorly drained), the ditches were of sufficient number and efficiency provide for successful farming operations (primarily corn and soybean production).



Figure 1. Egypt Road project area prior to restoration. The shaded area is the land retained by the developer. The unshaded area is the property purchased by the State of Maryland (728 acres).

Stormwater flows at the site were quickly conveyed off the property and into Maple Dam Branch or the Little Blackwater River.

The primary goal of the restoration project was to improve the water quality at the site and protect and improve water quality in the adjacent streams and rivers. The secondary goal was to improve wildlife habitat for the federally-endangered Delmarva fox squirrel, migratory waterfowl, songbirds, and other species native to southern Dorchester County.

A restoration and enhancement plan was developed to work with the natural topography of the site to reduce the rate and velocity of stormwater runoff to adjacent water bodies. This was accomplished by:

- Lengthening the travel time of stormwater flows by converting the agricultural ditches into functioning streams with riparian corridors and wide, flat wetlands and floodplains; and
- Increasing the agricultural and riparian forest and grassed buffers.

These characteristics act as filters to reduce nutrients and sediments reaching Little Blackwater River and Blackwater National Wildlife Refuge.

The primary objectives of the restoration project were to:

- 1. Improve water quality of tributaries/water entering Maple Dam Branch and the Little Blackwater River**
- 2. Protect and enhance existing natural resources**
- 3. Enhance wildlife habitat**
 - a. 223 acres of forested, scrub-shrub, and emergent wetlands
 - b. 20 acres (10,000 linear feet) of restored stream (previously ditched) corridors
 - c. 13 acres of upland forest
 - d. 40 acres of grassed buffer/meadow
 - e. reconnection of forest blocks for wildlife corridors and enhancement of Delmarva Fox Squirrel habitat
- 4. Maintain prime agricultural land (235 acres) and demonstrate best management practices**

Work Accomplished

Project Design

The contract for project design was awarded to Ecotone, Inc. in September of 2007 for \$85,100.00. Ecotone was directed to develop design and construction plans which would enhance water quality performance for both off-site and on-site generated runoff and improve wildlife habitat. Ecotone developed a concept which incorporated the following components:

1. Swamp Runs: Reconfiguration of the existing ditched stream channels and agricultural ditches into natural waterways (termed “swamp runs”) which would reduce and slow down water transport through the site and deliver cleaner water to the Little Blackwater River and Maple Dam Branch. Swamp runs were configured in such a way to provide broad, gentle watercourses with a lot of microtopographic relief. Swamp runs are designed to slow water flows through the system and deliver these flows to the receiving rivers over a longer period of time than provided by the existing ditched channels.

2. Roadside Emergent Wetlands: Development of approximately 19 acres of emergent wetland areas to capture runoff from ditches alongside of Egypt Road. These emergent wetland areas were constructed to capture and store roadside runoff prior to that water entering the swamp runs. This provided for retention of storm flows and greater water quality enhancement.



Roadside Emergent Wetland

3. Riparian Forest Buffers: All forested buffer areas adjacent to the Little Blackwater River and Maple Dam Branch were increased to at least 300 ft. This component will increase the effectiveness of the forest buffer to filter surficial and shallow, subsurface flows. In addition, this provided for increase habitat for forest interior dwelling birds (FIDS) and the federally endangered Delmarva fox squirrel (*Sciurus niger cinereus*).

4. Reforestation: Approximately 253 acres of native hardwood and pine forest were planted as a part of this project. This included both upland (28 acres) and wetland (225 acres) reforestation. On the west side of the road, approximately 167 acres of loblolly pine and hardwoods were planted. Reforestation areas on the west

side of the road will be managed for timber production and wildlife habitat (specifically, delmarva fox squirrel habitat). The 86 acres of reforested areas on the east side of Egypt Road will be managed for conservation as riparian forest buffers and not specifically for timber management.

5. Warm-Season Grass Meadow & Buffers: Approximately 45 acres of warm-season grass meadows and buffers were planted. These areas are comprised of native warm-season grass mixes which include:

Switchgrass	<i>Panicum virgatum</i>
Big Bluestem	<i>Andropogon gerardii</i>
Indiangrass	<i>Sorghastrum nutans</i>
Coastal Panicgrass	<i>Panicum amarum</i>



Warm-Season Grasses in Field

Warm season grasses provide ideal nesting cover for many species of passerine birds. They are generally taller than cool-season grasses and provide excellent habitat for the bobwhite quail (*Colinus virginianus*) which are declining on the Delmarva peninsula. Warm-season grasses are also excellent for erosion control because of the deep and fibrous root systems and readily take up nutrients from the soil.

Bobwhite Quail



Horned Lark



Birds Present at the Egypt Road/Blackwater Restoration Site

In grass buffer areas adjacent to farm fields, some cool season grasses were planted as well. These species included:

Virginia Wild Rye	<i>Elymus virginicus</i>
Alkali Grass	<i>Puccinellia distans</i>
Creeping Bentgrass	<i>Agrostis stolonifera</i>
Fowl Bluegrass	<i>Poa palustris</i>



Cool- Season Grass Plug

Cool-season grasses are more turf-like than warm-season grasses and are most actively growing in the spring and fall when the temperature is below 65°F. Cool-season grasses generally stand up to traffic a bit better than warm-season grasses and are more shade tolerant.

6. Agricultural Fields: Approximately 235 acres of active agricultural fields remain on the property. These fields have been typically planted to a corn and soybean rotation. Canada geese (*Branta canadensis*), snow geese (*Chen caerulescens*) and tundra swans (*Cygnus columbianus*) are frequent visitors to these fields in the winter as are horned larks (*Eremophila alpestris*) and other species of wildlife.



Snow Geese on Ag Field at Restoration Site

Grading and Construction

Grading and construction activities began in the summer of 2008 and were completed in April of 2009. Site activities were shut down in December of 2008 and remained shut down for a few months due to the inhospitable conditions at the site. Most of the major earthwork was completed by December of 2008. However, it quickly became too wet to perform earthmoving activities at the site and rest of the earthwork activities were completed in late winter/early spring of 2009.

The bulk of the work at the site involved excavation, grading and the moving of soils. In all cases, where soils were excavated and/or graded, all topsoil was removed, stockpiled and replaced where the excavation occurred.

Most of the excavation took place where the swamp runs and emergent wetland areas were constructed. The construction of the swamp runs required massive excavation in order to widen the formerly narrowly ditched areas. Swamp runs were widened from a typical 4 ft. width to 100 ft – 200 ft. in some cases. This provided a broad floodplain and enhanced aquatic and wildlife habitat. Fills generated from this excavation were placed in pre-designated areas, graded and stabilized with grass seed mixes and planted with trees.



Swamp Run During Construction

The swamp runs were designed to reduce the velocity of water flow from the site. In order to do this, the longitudinal slope of the swamp runs had to be flattened. This was accomplished by:

1. Terracing the swamp runs with a number of “lifts” or weirs that were constructed of 6” cobble stone; and
2. In some cases, extending the length of the swamp run which allowed the slope to be decreased.

The bottoms of the swamp runs were “rough” graded in order to maximize microtopography which allows for heterogeneous vegetative communities and therefore, greater biodiversity at the site. Swamp runs were stabilized with a temporary grass mix and, in some areas where appropriate, palnted with native shrubs and trees.

Wetland areas were restored and constructed by either plugging existing agricultural ditches or by minimal excavation of low lying soils to increase capacity for water storage and establishment of aquatic grasses and

herbs. Existing agricultural ditches were plugged to restrict conveyance of groundwater and surface water. Plugs consisted of earthen material generated from the site. Approximately 26 ditch plugs were installed. These were primarily installed on the west side of Egypt Road.

Tree Planting

A grand total of 129,638 trees were planted on the property. Refer to Table 1 for the species list. The main planting contract was awarded to Hill’s Point Landscapes, LLC. In addition, several groups assisted with various tree plantings over the course of the project. These groups included 13 watermen from the Putting Watermen to Work Initiative, roughly 100 Chesapeake Bay Foundation volunteers, and approximately 100 students from The Salisbury School whose participation was coordinated through the Maryland Eastern Shore Resource Conservation and Development Council.



Earthen Ditch Plug at the Terminus of an Ag. Ditch

39 species of native trees and shrubs were planted at the restoration site. Planting location, spacing was based on a number of factors, including:

- Soils
- Hydrology
- Habitat Objectives
- Elevation
- Proximity to roads and other structures

NATIVE TREE AND SHRUB SPECIES PLANTED AT THE EGYPT ROAD/BLACKWATER SITE

Alder	Arrowwood	Atlantic White Cedar	Bald Cypress
Bayberry	Black Cherry	Black Gum	Black Oak
Black Willow	Button Bush	Chestnut Oak	Chokeberry
Elderberry	Green Ash	Indigo Bush	Loblolly Pine
Northern Red Oak	Persimmon	Pin Oak	Pitch Pine
Red Cedar	Red Maple	Red Osier Dogwood	Shadbush
Silky Dogwood	Southern Red Oak	Swamp Chestnut Oak	Swamp White Oak
Sweetbay Magnolia	Sweet Pepperbush	Sycamore	Tulip Poplar
Wild Raisin	Virginia Pine	Virginia Sweetspire	White Ash
White Oak	Willow Oak	Winterberry	

Tree Mortality Monitoring

Maryland DNR completed a series of tree mortality surveys in late summer 2009. The entire planting area was divided into 31 separate planting zones and a calculation was completed to determine how many 100 foot plot lines in each zone were required to sample at least 25% of the area. Trees were planted on a 10’ x 10’ spacing.

At each 10 foot interval along the 100 foot plot line, surveyors recorded whether the tree seedling was Alive, Dead, or Missing. Grasses and weeds in the planting areas were generally thick and waist high, and it was sometimes difficult to locate the planted seedlings. When a tree seedling could not be found, it was recorded as missing. Trees were given the following score based on condition:

Alive = 1.0
Dead = 0.0
Missing = 0.75

Fifteen planting zones were monitored during the surveys, and the percent survivability was calculated for each zone. The number of trees to be replanted was then calculated for each zone that had less than 80% survival. The replanting calculation was computed by determining how many acres needed to be replanted to increase the % survivability to 85%. The monitoring resulted in the replanting of 7,118 trees in 7 of the 15 surveyed zones in fall 2009.

Budget Allocation and Funds Utilized

Thomas Land Group, LLC funded the entire restoration project. Funds were allocated as follows:

Item	Amount
Project Administration	\$ 137,228.15
Design	\$ 99,875.00
Construction	\$1,001,104.97
Planting	\$ 165,649.24
Total	\$1,403,857.36

The remaining balance for the restoration project is \$5,324.34.

Project Summary

Partners

Maryland Department of Natural Resources partnered with the Dorchester Soil Conservation District to oversee project construction and completion.