Making a Difference: An Ohio Non-point Source Project

Project Title: **Bokes Creek Water Quality Enhancement Project**

NPS Problem Addressed: In addition to severe hydromodification and nutrient enrichment, this project addressed ongoing problems with seasonally high levels of atrazine and nitrates as well as a history of fish kills associated with manure management problems by a concentrated animal feeding operation.

Project Highlights: The Bokes Creek Water Quality Enhancement Project successfully addressed two significant nonpoint source causes of impairment—severe hydromodification & nutrient enrichment. Using natural channel design techniques, this project restored 3,900 linear feet of previously maintained agricultural ditch to meandering two-stage channel morphology within Powderlick Run in the Bokes Creek watershed. The project was completed consistent with recommendations in the Bokes Creek TMDL and accomplished the following:

- Restored 3,900 linear feet of previously maintained ditch using natural channel design practices and techniques.
- Planted 2.7 acres of riparian area with 10,200 tree seedlings and bare root shrubs and other native vegetation.
- Permanently protected 26-acre restoration site under conservation easements.
- Completed chemical and biological monitoring of 18 sites within the project area.

Project Results: This project restored a previously maintained agricultural ditch that was failing to meet designated modified warmwater habitat (MWH) aquatic life use using natural channel design practices and techniques. Within two years of restoration, Powderlick Run is very close to attaining warmwater habitat (WWH) aquatic life uses. The following environmental benefits were identified during monitoring that was conducted prior to and following completion of the project:

Table 1.1-Environmental Benefits Resulting from Project

Environmental Benefits Resulting from Project

Measure	Prior Condition-1999	Following Restoration
Assimilative Capacity Nitrogen	0.29 mg/L per hour	11.9 mg/L per hour
Habitat Condition (QHEI)	39	58
Index of Biological Integrity	18	34

In addition to making measurable biological and physical habitat improvements to Powderlick Run, water quality improvements resulting from this project are also being realized four miles downstream from the confluence of Powderlick Run with Bokes Creek. The project also resulted in the following NPS pollutant load reductions:

Table 1.2—Load Reductions Resulting from Project

Pollutant	Load Reductions
Nitrogen	7,956 lbs/year
Phosphorus	2,652 lbs/year
Sediment	1,326 tons/year

Partners & Funding: This project involved a diverse funding partnership as well as project participants. Following is a list of project partners who provided material and technical support for this project:

- DayLay Egg Farm
- Oxbow Stream Restoration
- City of Columbus
- Union County Soil & Water Conservation District
- Scioto River Federation
- Ohio EPA

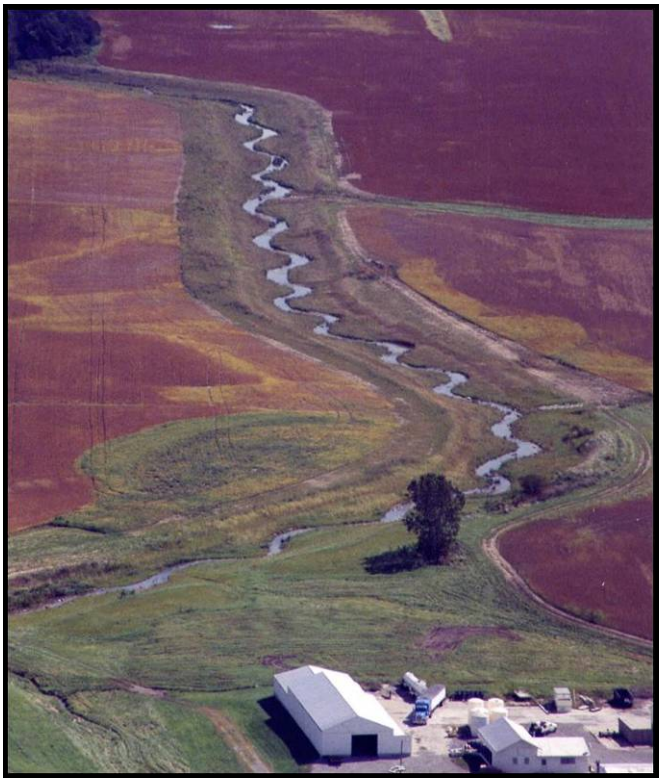
The project was funded primarily with a section 319(h) sub-grant (Project #01(h)EPA-22) and matching funds provided by the city of Columbus and Oxbow Stream Restoration. Section 319(h) sub-grant funds amounted to $189,000. Additional funding was provided by Ohio EPA's Division of Environmental and Financial Assistance (DEFA) under the Water Resources Restoration Sponsor Program (WRRSP) for restoration work in other nearby segments of Powderlick Run.

Photos and/Tables: Following are a variety of photos of the project site illustrating conditions within Powderlick Run PRIOR to restoration and FOLLOWING restoration activities:

PHOTO 1-1
Prior to restoration, Powderlick Run was a severely modified maintained agricultural ditch not attaining its MWH aquatic life use designation.

PHOTO 1-2
Following restoration, Powderlick Run is meeting designated WWH aquatic life use and proving to be highly effective at assimilating nitrogen loadings to the stream.

This aerial view of the project site shows the engineered meanders and sinuosity of the restored stream. What was once a straight maintained ditch channel now flows five times wider than previously, slowing flow rates and improving the stream's capacity for assimilating nitrogen loadings to the stream from 0.29 mg/L per hour prior to restoration to 11.9 mg/L per hour following the project's completion.



GRTS Project Number: **#975500010-21**
Sub-grant Project Closed 3/14/06

Date Delisted: Powderlick Run is not yet delisted from Ohio's 303(d) listing of impaired waters due to a continued recreational impairment resulting from bacterial contaminants. A TMDL for bacteria has not yet been completed. Intensive biological monitoring will continue by project sponsors as well as Ohio EPA. It is possible that following our next comprehensive assessment of the Bokes Creek Watershed that delisting may occur, however Bokes is not currently scheduled for such an assessment until 2019 due to continuing stresses upon Ohio EPA Ecological Assessment resources.

While not leading to the immediate delisting of Powderlick Run within the Bokes Creek watershed, this project demonstrates that severely degraded waters may be restored to warmwater habitat aquatic life use attainment using innovative practices, adaptive management and the commitment of multiple and diverse partners. Measurable benefits of this project continue to be identified as additional monitoring and ongoing restoration work within the watershed are completed.

Contacts: Following is contact information for individuals familiar with this project:

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