

Proposal

Identification of Key Restoration Areas in the Darby-Cobbs Watershed through the use of Watershed Sediment Assessment

Background

The Darby-Cobbs watershed discharges to the Delaware River through the wetlands of the John Heinz National Wildlife Refuge at Tinicum. The watershed encompasses approximately 80 mi² of southeastern Pennsylvania, including parts of Chester, Delaware, Montgomery, and Philadelphia Counties, and can be divided into three subwatersheds: Cobbs Creek, Darby Creek, and Tinicum (Figure 1). Most of the Darby-Cobbs watershed is highly urbanized and as much as 66% of the surfaces are impervious.

The streams and creeks within the watershed have been a consistent problem in terms of flooding, streambank erosion, ecological degradation, and aesthetics. The Philadelphia District began studying this watershed in 1970 and has initiated 16 official projects over the past 35 years. Only one of these projects, gabion streambank reinforcement, was constructed. Most of these projects were initiated by individual municipalities and were terminated because it was not economically feasible to armor relatively small sections of streambank. In some cases, the high cost of traditional Corps solutions, such as levees and dams, were too expensive for the municipalities. Many of these towns took it upon themselves to channelize and armor most of the streams and creeks, which effectively unbalanced the sediment equilibrium of the watershed, causing more problems, such as excessive sediment or erosion. Urban sprawl and the corresponding increased runoff have further compounded the problem.

Currently, there are six Corps studies in the Darby-Cobbs watershed, four stream restoration projects implemented through the Southeastern Pennsylvania Environmental Improvement Program Authority (Section 566, WRDA 1996), the Darby Creek Habitat Restoration Section 206 CAP Project, and the Delaware River Basin Comprehensive Pennsylvania General Investigation Study.

The Philadelphia District received 34 separate project requests from communities within the Darby-Cobbs watershed during FY05, due in part to recurring floods. These potential projects include flood mitigation, protecting exposed sewage infrastructure along streambanks, stream restoration, riparian buffer and streambank restoration, floodplain restoration, and dam modification or removal.

The traditional strategy of proceeding with studies and projects from a municipality-based scale has not been effective. In order to develop an effective strategy to identify design or remediation needs, the problems described above should be examined from a watershed perspective. An unbiased watershed-scale assessment is needed to determine specific causes of problems and identify appropriate methods for immediate and long-

term solutions. This assessment should also take sediment transport into account, as most of the problems are a result of imbalances in the sediment equilibrium.

Project Description

The Darby-Cobbs Watershed Sediment Assessment is a demonstration project intended to develop a framework for the restoration of urban watersheds. This framework will be applicable nationwide because watersheds plagued by urban sprawl, degraded habitat, several stakeholders with conflicting interests that are often politically driven, and recurrent flooding are not unique to the Darby-Cobbs watershed or the Philadelphia District. This is an opportunity for the Corps to provide unbiased technical expertise.

Products associated with this proposal will be used to improve the planning and design of ongoing projects (Corps and non-Corps) and select and effectively implement future projects that will restore the Darby-Cobbs watershed. Future projects could be co-sponsored by several adjacent municipalities since the benefits of an effective stream restoration project will positively impact large portions of the watershed.

Restoration alternatives will be developed, such as proper stormwater management, storm water retention/ sediment detention areas, barrier removal, etc. These alternatives will be evaluated using a Sediment Impact Assessment Model (SIAM) of the Darby-Cobbs watershed. The result will be a comprehensive watershed plan that will recommend appropriate methods for immediate and long-term solutions. Non-federal sponsors can be identified based on projects identified in the plan. This plan may supplement or replace the Feasibility Phase and expedite the time to construction of future Corps projects. The specific project tasks follow:

Phase 1: Preliminary Evaluation

- Coordinate with multiple stakeholders
- Assess the watershed with a field investigation
- Assemble and review existing data

Phase 2: Detailed Assessment

- Detailed data evaluation and development of a database
- Perform a watershed-level geomorphic assessment
- Identify data gaps and collect additional data

Phase 3: Analysis and Planning

- Develop restoration alternatives
- Format data for model input
- Analyze alternatives using Sediment Impact Assessment Model (SIAM) and other models
- Write a comprehensive watershed plan

FY06 Activities

Phase 1 was completed in FY06:

- The District coordinated with multiple municipal and county environmental agencies and watershed groups that work throughout the Darby-Cobbs watershed.
- A 3-day preliminary watershed assessment was conducted with Meg Jonas, a sediment transport expert and hydraulic engineer from the Engineering Research and Development Center (ERDC) Coastal and Hydraulics Laboratory.
- The District compiled historic and current data that was collected by the Corps, watershed groups, the Philadelphia Water Department, and various agencies.
- A report was written documenting FY06 activities.

FY07 Activities

Phase 2:

- The District will do a detailed data inventory, format, and review existing data.
 - A database will be developed and posted on the District's RSM website.
- A watershed-wide baseline geomorphic assessment will be conducted, including an evaluation of channel stability and collection bed and bank material samples.
 - Desk assessment
 - Field investigation
 - Evaluation of all data
- Data gaps will be filled by collecting additional data.

Table 1. Time and Cost Estimate of Proposed FY07 Activities

Task	Resource	Time Required	Cost
Travel to two RSM meetings	NAP Special Studies Section	Travel costs for 1 person	\$3,000
Project coordination	NAP Special Studies Section (project management), NAP Hydrology, Hydraulics, and Coastal Section (labor for meeting attendance and site visits)	Labor for 1 person for FY07, labor for 2 people for 16 hours	\$30,000
Detailed inventory, format, and review of existing data	NAP Special Studies Section, NAP Hydrology, Hydraulics, and Coastal Section	Labor for 3 people for 1 month	\$20,000
Watershed-wide baseline geomorphic assessment- <i>desk assessment</i>	ERDC Coastal and Hydraulics Laboratory	Labor for 3-4 people for 2 weeks	\$30,000
Watershed-wide baseline geomorphic assessment- <i>field investigation</i>	ERDC's Water Operation Technical Support (WOTS) Program (1 week), ERDC Coastal and Hydraulics Laboratory, NAP Special Studies Section, NAP Hydrology, Hydraulics, and Coastal Section	2 weeks (Spring 2007), labor and per diem expenses for one person	(1 st week is free) \$20,000
Watershed-wide baseline geomorphic assessment- <i>evaluation of data</i>	ERDC Coastal and Hydraulics Laboratory, NAP Special Studies Section, NAP Hydrology, Hydraulics, and Coastal Section	Labor for 4-5 people for 2 months	\$47,000
Collect additional data	ERDC Coastal and Hydraulics Laboratory, NAP Special Studies Section, NAP Hydrology, Hydraulics, and Coastal Section OR a contractor	Travel expenses, per diem, and labor for 1 person for 3 weeks, labor for 3 people for 3 weeks	\$80,000

Collect additional data- <i>mapping (geo-referenced digital video)</i>	Contractor and helicopter pilot	~1 month	\$20,000
Total to Complete FY07 Product			\$250,000

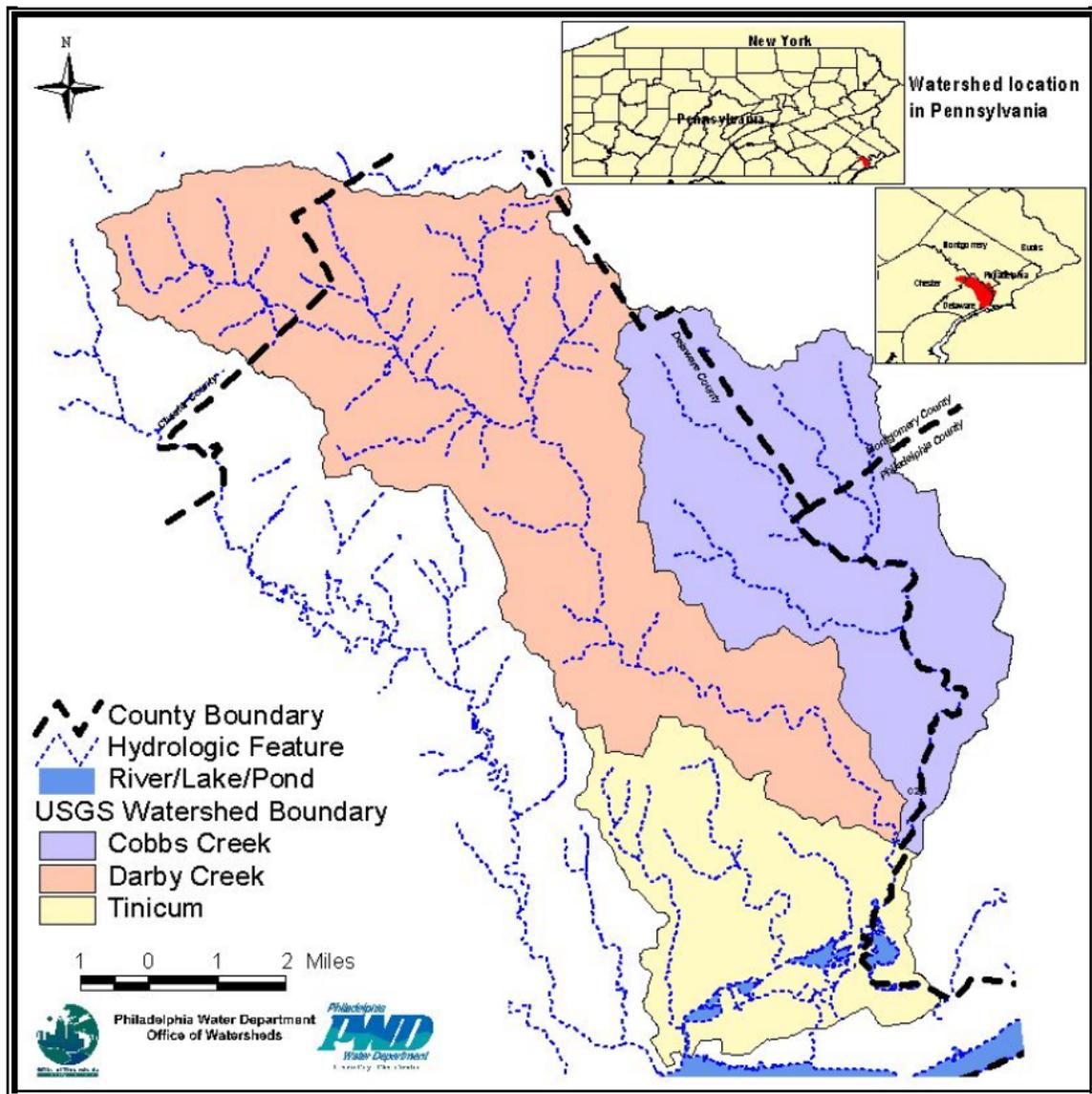


Figure 1. Darby-Cobbs Watershed

Map taken from *Cobbs Creek Integrated Watershed Assessment Plan*, Philadelphia Water Department, Darby-Cobbs Watershed Partnership, October 2004.