Muskingum Watershed Conservancy District

Long-term Maintenance Dredging Program

WEDA Conference

Thursday, April 10, 2014

Cincinatti , OH

MUSKINGUM WATERSHED CONSERVANCY DISTRICT

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PRESENTATION FOCUS

- ✓ **The Muskingum Watershed Conservancy District- An Overview**
- ✓ **Introducing the URS Dredging Team**
- ✓ **The Long-term Maintenance Dredging Program**
  - Why Dredging is Needed
  - Program Goal and Objectives
  - How we are Organized
- ✓ **Program Elements**
  - Tasks and Activities
  - 2013 Accomplishments
  - 2014 Plans
- ✓ **Lessons Learned for Application Elsewhere**
- ✓ **Questions**

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Why Dredging is Needed (cont)

- Flood capacity volume of selected lakes has been reduced up to 25% to date, and will be reduced by up to 37% by 2025 if no action is taken
- The Program will address threats of localized flooding; threats to human health, safety, and welfare; property damage; and road obstructions
- The Program will improve water quality, fish and wildlife habitat, and water-based recreational opportunities

Bottom Line: *The consequences of inaction will increase risks to watershed residents, livelihoods, property and quality of life, as well as the environmental health and ecological viability of the watershed.*

Program Goal and Objectives

Goal: Restore and maintain flood capacity of lakes within MWCD jurisdiction

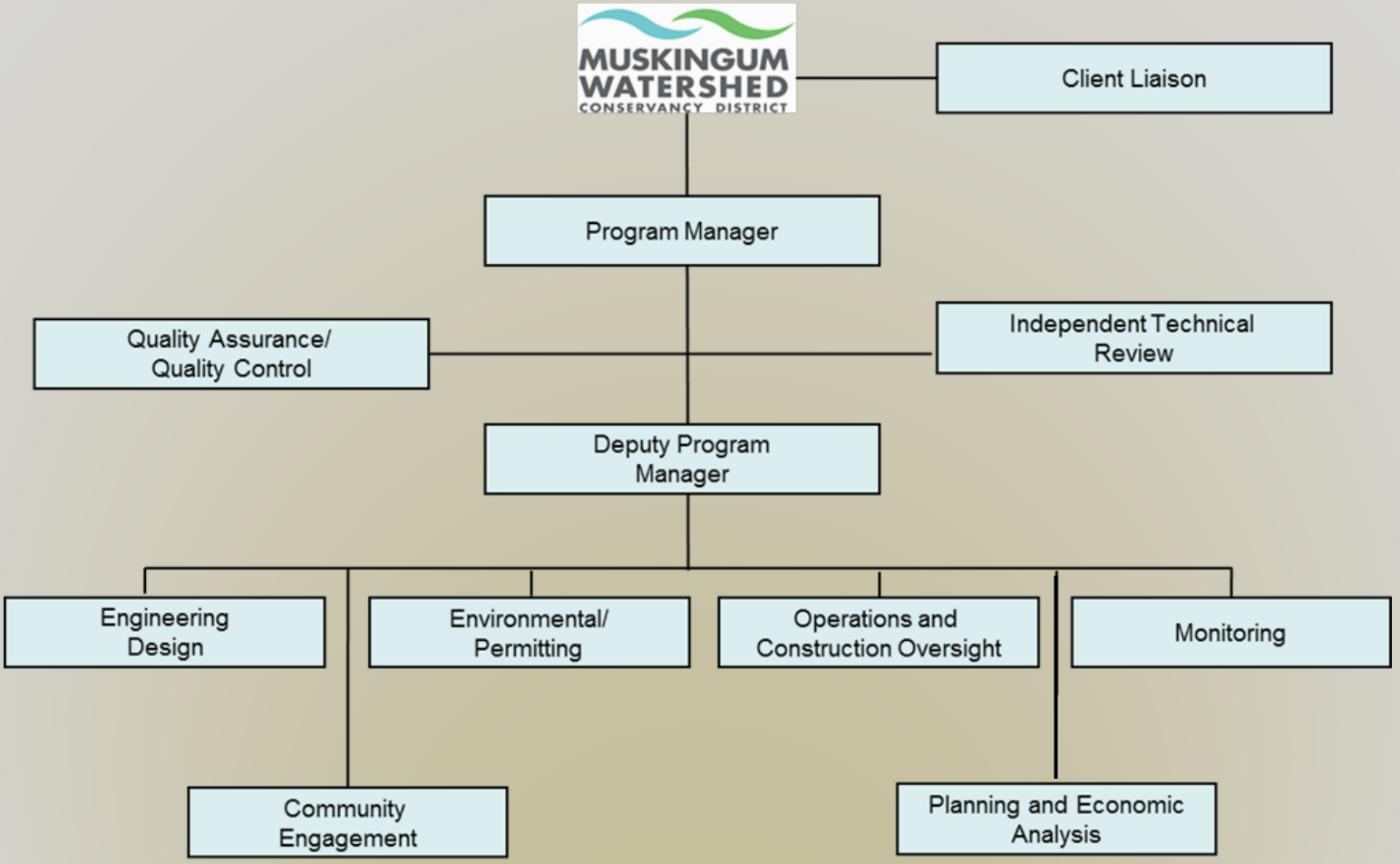
Objectives:

- Assess sediment accumulation in each lake and identify those at risk (i.e., reduced capacity)

- Determine environmentally responsible and economically efficient dredging and sediment placement techniques

- Develop and implement a Long-term Maintenance Dredging Program

How We are Organized



Task 1: Program Management

Goal:

- Ensure the timely, efficient, and cost-effective delivery of Program services

Activities:

- Organize, conduct, and follow-up on MWCD and URS Dredging Team Team Coordination Meetings
- Prepare, submit and monitor work plans, budgets, and progress reports
- Manage administrative and technical staff, including subcontractors
- Prepare and administer contractor RFPs/ bidding documents
- Develop and apply Quality Assurance, Health and Safety, and related plans

Accomplishments:

- On-time, on-budget delivery of task products

Task 2: Communications Plan

Muskingum Watershed Conservancy District (MWCD) and the
URS Corporation (URS)

Communication Standard Operating Procedure

MWCD Long-Term Dredging Project

May 29, 2013

FINAL

This document will serve as the standard operating procedure for the communication between the Muskingum Watershed Conservancy District and URS Group, Inc. for the purpose of developing, managing and implementing a Long-Term Dredging Program for the District. This document also describes how interaction with other regulatory agencies, first and second tier users as defined by the District will occur.

Task 2: Communications Plan

Goal:

- Guide interactions between URS Dredging Team and MWCD staff in Program implementation including stakeholder outreach / engagement

Activities:

- Update, maintain, and implement Communications Plan
- Develop and maintain Program process and schedule
- Design, conduct, and evaluate stakeholder engagement efforts
- Support site-specific dredging operations through landowner relations

Accomplishments:

- Draft Communications Plan submitted
- Initial (Tappan Lake) landowner meeting conducted
- Landowner contacts - Tappan Lake dredged material placement

Task 2: Communication Strategies 2014

Goal:

- Focus on Tappan Lake “users” to include them in dredging program upfront.

Activities:

- Attend Cottage Users Spring Meetings
- Develop robust (interactive) website on dredging program
- Continue to support site-specific dredging operations through landowner relations

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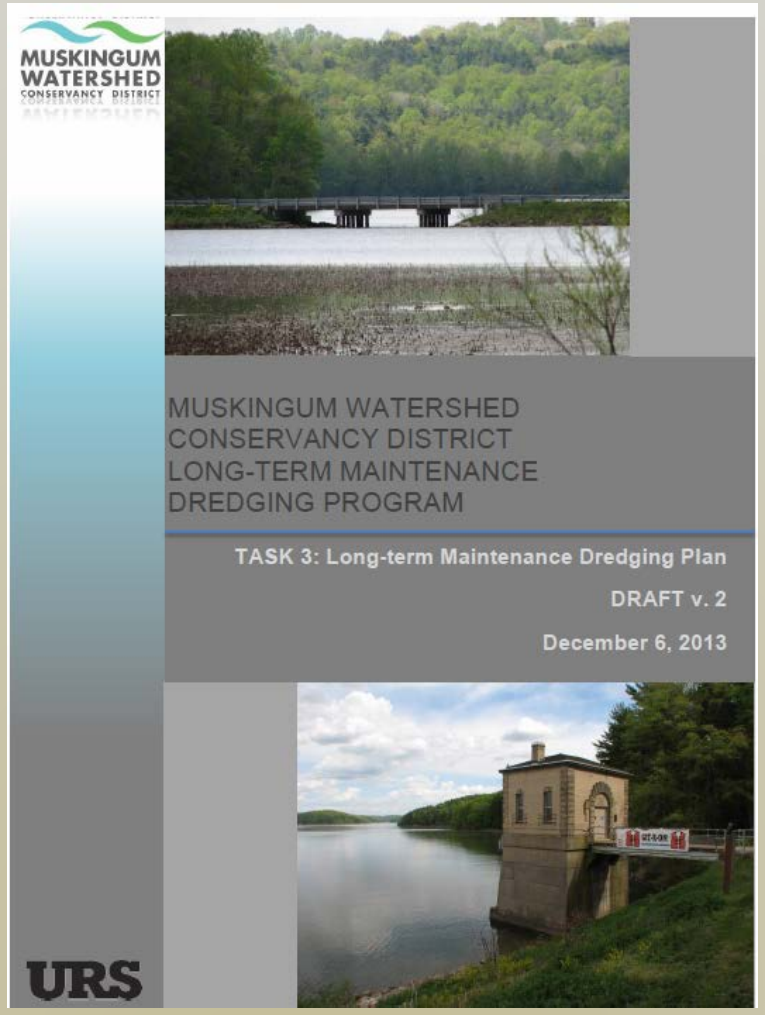
Task 3: Long-term Maintenance Dredging Plan



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Task 3: Long-term Maintenance Dredging Plan

Goal:

- Provide a framework to coordinate all Program activities and secure timely efficient, and cost-effective dredging services

Activities:

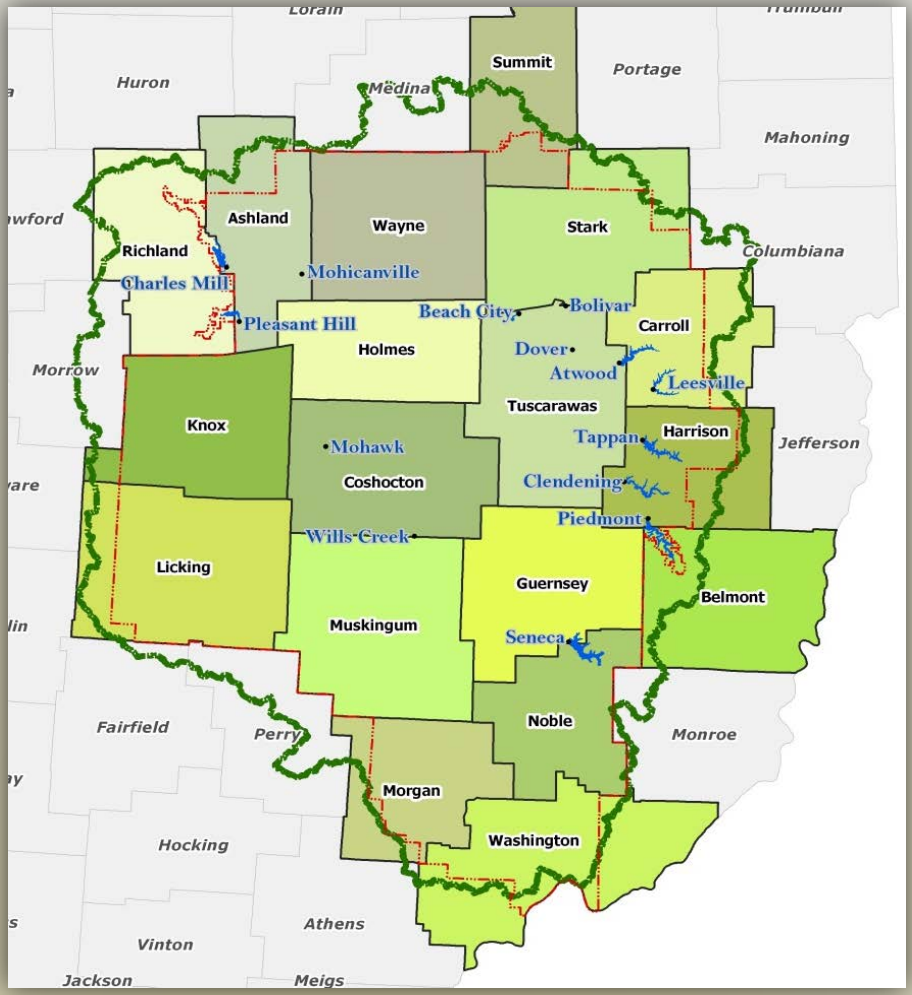
- Develop, update, and apply the Plan to address four critical Program components (i.e., Program Management, Operational and Environmental Services, Beneficial Uses of Dredged Material, Economic Analysis)
- Incorporate elements of all identified Program tasks
- Provide guidance for site-specific dredging projects

Accomplishments:

- Draft Plan submitted
- Plan served as basis for design of initial dredging project at Tappan Lake

Task 3: Long-term Maintenance Dredging Plan

Ohio counties associated with MWCD jurisdiction (red outline) and the Muskingum River Watershed (green outline).



Task 3 (cont): Plan Implementation Process

Step 1 Select Lake(s) and Initiate Planning

- **(a) Prioritize** dredging needs District-wide and select priority site(s)
- **(b) Initiate** planning with "All Hands" Meeting
- **(c) Compile data** and information needs (including required field studies)
- **(d) Refine** options following data acquisition and stakeholder input

Step 2 Evaluate Potential Dredging Sites

- **(a) Develop** evaluation criteria of dredging sites
- **(b) Apply evaluation criteria** including flood risk reduction, cost, env. impact, beneficial use, stakeholder acceptability
- **(c) Draft** concept-level design options
- **(d) Select** preferred option

Step 3 Finalize Design

- **(a) Develop detailed plan** by defining labor/ equipment needs, preparing time/ cost estimates, and addressing site specific field studies
- **(b) Secure approvals** from landowners, and permits from regulatory agencies
- **(c) Draft plans and specifications** and pre-qualify dredging contractors eligible to bid
- **(d) Disseminate plans/ specifications** via Request for Proposal (RFP) process and select dredging contractor

Step 4 Implement Design

- **(a) Confirm compliance** with requisite permits, certifications, easements, landowner agreements, and Health and Safety Plans (among others)
- **(b) Prepare site** for mobilization
- **(c) Undertake dredging project** and perform construction oversight

Step 5 Monitor and Evaluate Lakes

- **(a) Implement monitoring, evaluation, and reporting** during and following project
- **(b) Apply Adaptive Management** to analyze results and identify "lessons learned" for future application

Task 4: Economic Analysis Model

Goal:

- Employ rigorous economic analysis to advise on cost-effective and environmentally responsible dredging operations.

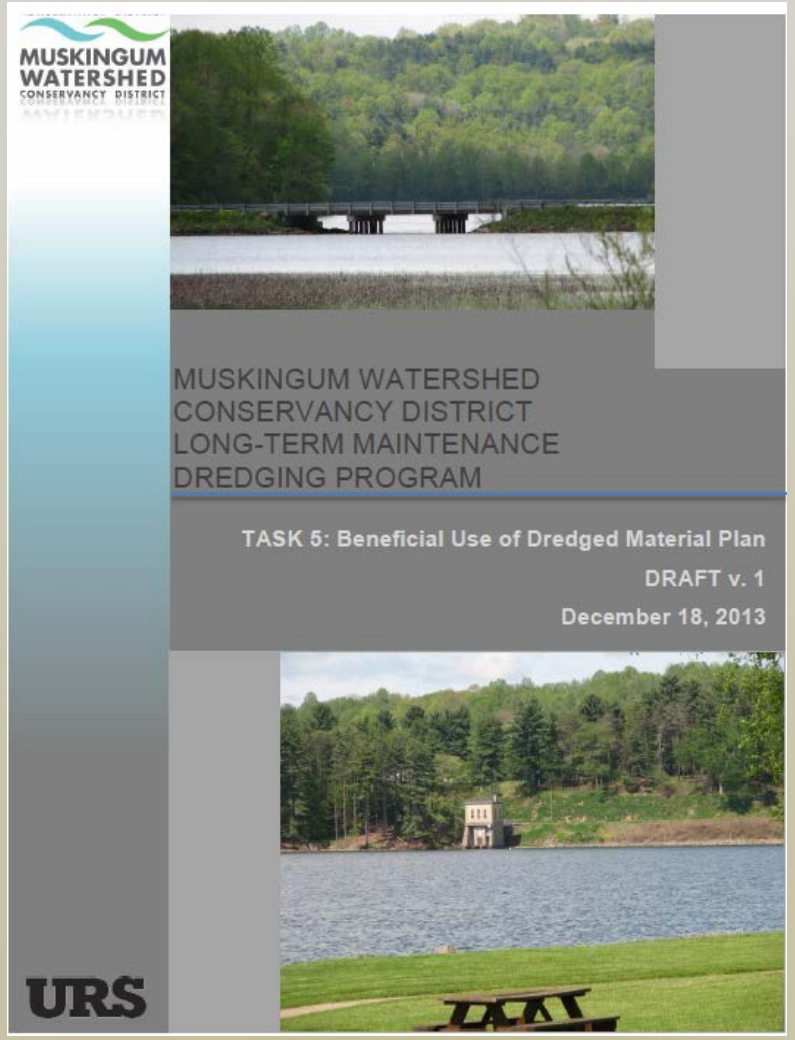
Activities:

- Review site-specific characteristics and dredging requirements to “scope out” prospective alternatives (e.g., “in-house” vs. contracting out)
- Refine and “customize” model for site-specific application, including simultaneous dredging operations
- Apply model to Lake Tappan and monitor associated costs
- Apply the refined model at a second dredging site to be determined

Accomplishments:

- Draft model submitted
- Model applied to Tappan Lake

Task 5: Beneficial Use of Dredged Material Plan



Task 5: Beneficial Use of Dredged Material Plan

Goal:

- Incorporate beneficial use technologies to realize environmental and economic benefits, and showcase MWCD commitment to sustainability

Activities:

- Identified 25 beneficial uses in three categories: Agricultural/ Product uses; Engineered uses; and Environmental Enhancement
- Comprehensive analysis of technologies and applications
- Develop, maintain, and apply Beneficial Use Plan
- Use plan to guide Tappan Lake dredging strategy and approach

Accomplishments:

- Draft plan submitted
- Plan used to guide beneficial use approach to Tappan Lake dredging

Task 5: Beneficial Use of Dredged Material Plan

Beneficial Use	Dredged Material Sediment Type						Notes
	Rock	Gravel	Sand	Compact Clay	Silt/ Clay	Mix	
Category 1 Agricultural/Product Use							
Aquaculture/Aquafarm Ponds	2	2	2	1	1	2	Range of sediment types can be used, depending on structure. This is a specialized and seldom-employed use.
Construction Materials	1	1	1	2	2	2	Common, extensive, highly versatile use of dredged materials; clean preferred but contaminated material can sometimes be used.
Manufacture of Aggregates	1	1	1	3	3	3	Variety of uses when clean material is separated and then added to an aggregate mix.
Decorative Landscaping	1	1	1	1	1	1	All sediment types are applicable if clean and separated.
Land Application – Farmland	3	3	3	2	1	2	Excellent (and common) use when large volumes of clean, high-quality material are available. Separation required.
Topsoil/Compost	3	3	3	3	1	1	Also a common use when clean, high-quality material is available, even in limited quantities. Separation/ extensive preparation work required.
Category 2 Engineered Use							
Beach/Littoral Zone Nourishment	3	2	1	2	3	3	Common use of clean, high-quality sand and mixed soil. Cost-effective when hydraulically dredged and locally deposited.
Berm Creation/Maintenance	1	1	1	2	2	1	Multiple applications and sediment mixtures; does not require high-quality material or separation of sediment types.
Capping / Landfill Cover	2	1	2	1	2	2	Best suited for gravel, clay, or a combination thereof; some contamination may be acceptable.

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Task 5: Beneficial Use of Dredged Material Plan

Noise Control Berm

Sediment used for Beach Nourishment

Dredged Sediment at Landfill

Windmill Island, Michigan

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Task 5: Beneficial Use of Dredged Material Plan

Reclaimed Strip Mine

Structural Fill for Parking Lot

Using Dredged Material to Raise Dike

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Task 6: Prioritization of Candidate Dredging Sites

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LONG-TERM MAINTENANCE
DREDGING PROGRAM

TASK 6: PRIORITIZATION OF
CANDIDATE DREDGING SITES

Prepared for

MUSKINGUM WATERSHED
CONSERVANCY DISTRICT

October 2013

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Task 6: Prioritization of Candidate Dredging Sites

Goal:

- Determine priority dredging sites, based on multiple criteria, to advise MWCD on sequencing of dredging projects

Activities:

- Develop and refine prioritization protocol on basis of multiple criteria (e.g., conditions, capacity, dredging history, usage, constraints)
- Apply to candidate lakes within MWCD jurisdiction and offer advice
- Refine and apply annually to ensure optimal long-term strategy

Accomplishments:

- Draft prioritization protocol submitted
- Protocol applied to determine 2013 priorities
- Protocol refinements to re-prioritize lakes in 2014

Task 6 (cont): Prioritization Process and Outcomes

- **Evaluations:** Eight of 16 reservoirs included in prioritization process (excluded dry dams, others managed by USACE)
- **Criteria:** Flood Damage Reduction (50 points); Value to the Public (40 points); and Dredging Cost (60 points)
- **Outcomes in Priority Order:** Tappan (97); Seneca (95); Pleasant Hill (94); Charles Mill (91); Atwood (90); Piedmont (83); Leesville (80); Clendening (65)
- **Next Steps:** Process will be reapplied annually to accommodate any changes in the relative importance of each potential project, based upon criteria

Task 6: Prioritization of Candidate Dredging Sites

Factor	Max Pts.	Atwood	Charles Mill	Clendening	Leesville	Piedmont	Pleasant Hill	Seneca	Tappan
Flood Damage Reduction									
Potential to increase flood storage capacity	25	10	15	10	10	15	15	15	15
Opportunity to increase conveyance of flood flows	15	5	0	0	5	0	5	5	5
Percent of reservoir filled with sediment at summer pool elevation	10	5	10	5	4	8	10	8	7
Value to the Public									
Primary uses of reservoir	15	15	10	10	10	10	10	10	15
Opportunities for beneficial use of dredged material	10	0	0	0	0	5	0	5	0
Increase in water quality	10	5	10	5	5	5	5	10	10
Presence of local stakeholder groups	5	5	3	0	3	0	2	5	5
Dredging Cost									
Absence of contaminated sediment	10	10	10	10	10	5	10	5	10
Ease of sediment relocation	10	10	10	5	5	5	10	5	10
Potential for cost-sharing partner	10	5	3	0	3	5	2	7	5
Complexity of dredging operations	10	5	5	5	10	10	10	5	0
Upstream sediment management in place	5	0	0	0	0	0	0	0	0
Depth of material to be dredged	5	5	5	5	5	5	5	5	5
Amount of material to be dredged	10	10	10	10	10	10	10	10	10
Total	**150**	**90**	**91**	**65**	**80**	**83**	**94**	**95**	**97**

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Task 7: Funding Guidance for Dredging Initiatives

Goal:

- Acquire outside funds (e.g., public agencies, foundations) to augment MWCD resources allocated to dredging-related projects

Activities:

- Comprehensive review of funding opportunities for dredging projects
- Prepare and refine a spreadsheet identifying source, focus, application requirements, and related details
- Monitoring opportunities, grant-writing assistance, as requested

Accomplishments:

- Funding guidance spreadsheet and protocol submitted, with most promising funding sources highlighted
- Determined that funding is more likely if project has an environmental, ecosystem restoration, and/or habitat improvement component

Task 7: Funding Guidance for Dredging Initiatives

Prospective Funding (and Reference Sources)- Muskingum Watershed Conservancy District				
Funder	**Category**	**Grant Program Name/ Description**	**URL**	**Notes**
U.S. Environmental Protection Agency	Federal	Clean Water Act, Section 104 (b) (3) Water Quality Cooperative Agreements	http://water.epa.gov/grants_funding/cwf/waterquality.cfm	Supports research identifying innovative projects that will either reduce or eliminate pollution in the waters of the US, including Tribal lands.
U.S. Environmental Production Agency	Federal	Wetlands Program Development Grants	http://water.epa.gov/grants_funding/wetlands/grantguidelines/index.cfm	Promote coordination and acceleration of research, investigations, experiments, training, demonstrations, surveys, and studies relating to the causes, effects, extent, prevention, reduction, and elimination of water pollution. Priority is given to comprehensive monitoring and assessment programs; projects that improve effectiveness of compensatory mitigation; and/or projects that protect vulnerable wetlands and aquatic resources.
U.S. Environmental Protection Agency	Federal	Targeted Watershed Grants Program	http://www.epa.gov/twg/	Encourages the protection and restoration of the country's water resources through cooperative conservation.
U.S. Environmental Protection Agency	Federal	Clean Water Act, Section 319 (h) (Watershed Planning) Grants	http://water.epa.gov/polwaste/nps/cwact.cfm	Supports state and Tribal agencies in implementing approved nonpoint source management programs, including technical assistance, financial assistance, education, training, technology transfer, demonstration projects, and regulatory programs.
U.S. Fish and Wildlife Service	Federal	Fish Passage Program Funds, Partners for Fish and Wildlife, Private Stewardship Grants	http://fisheries.fws.gov/FWSMA/FishPassage/fpprgs/GetInvolved.htm	Funding and technical assistance for removing or bypassing barriers to fish movement.
USDA -- Cooperative Research, Education and Extension Service	Federal	National Integrated Water Quality Program	http://www.csrees.usda.gov/funding/rfas/water_quality.html	Advances the improvement of the Nation's surface water and groundwater quality through research, education, and extension activities. Projects address water resource problems by advancing and disseminating the knowledge base available to agricultural, rural, and urbanizing communities.
USDA -- Natural Resources Conservation Service	Federal	Conservation Innovation Grants	http://www.ut.nrcs.usda.gov/programs/CIG/index.html	Stimulates the development and adoption of innovative conservation approaches and technologies while leveraging Federal investment in environmental enhancement and protection, Competitive grants available to non-Federal governmental or non-governmental organizations, Tribes, and individuals. Enables NRCS to work with public/ private entities to accelerate technology transfer and adoption of promising technologies and approaches.
Doris Duke Charitable Foundation	Foundation	Ecological Restoration and Protection	http://fdncenter.org/grantmaker/dorisduke/index.html	Protects and restores ecologic integrity of land in suburban and rural areas threatened by development.
Frey Foundation	Foundation	Land Use Planning	http://www.freyfdn.org/	Funds protection of the environment and encouragement of better land use planning.

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Task 8: Tappan Lake Dredging Project

Goal:

- Design and execute dredging operations on Tappan Lake to increase flood storage capacity

Activities:

- Prepare plans and specifications, including studies, field analyses, equipment/ labor assessments, and regulatory (i.e., permitting)
- Pre-qualify dredging contractors through a “Letter of Interest” process
- Prepare/ release bid documents to pre-qualified dredging contractors
- Administer bidding process/ select one or more dredging firms
- Oversee dredging operations, including construction

Accomplishments:

- Site visits, conceptual design, sampling/ analysis, public meeting, landowner visits, permitting consultations

Task 8: Tappan Lake Dredging Project

Current Dredging Plans

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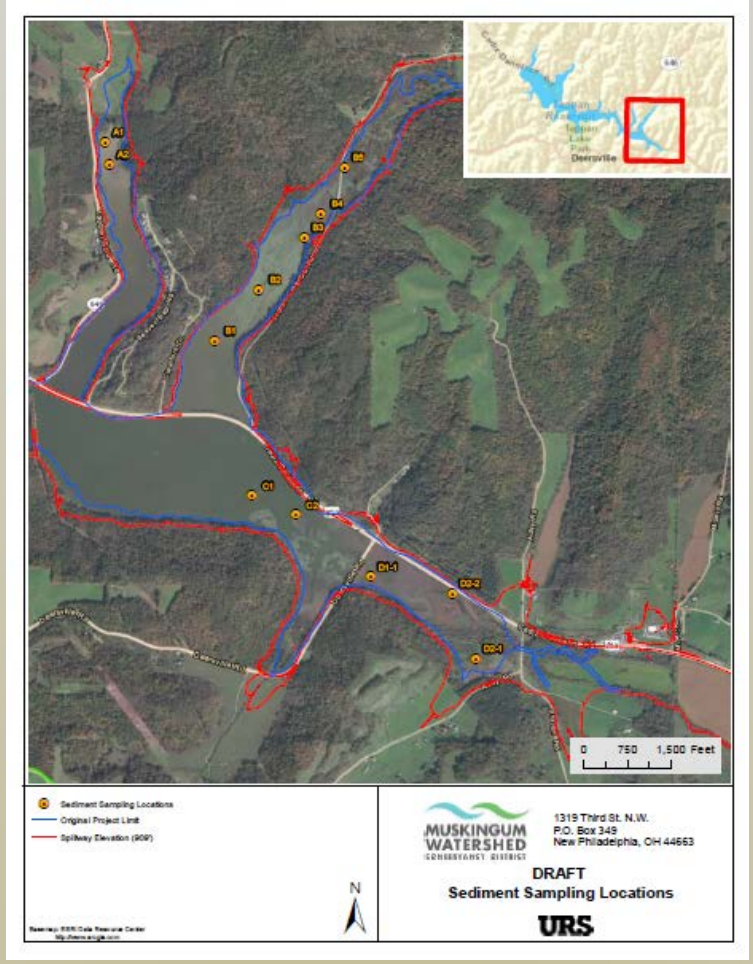
Task 8: Tappan Lake Dredging Project
-Sampling Protocol-



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Task 8: Tappan Lake Dredging Project

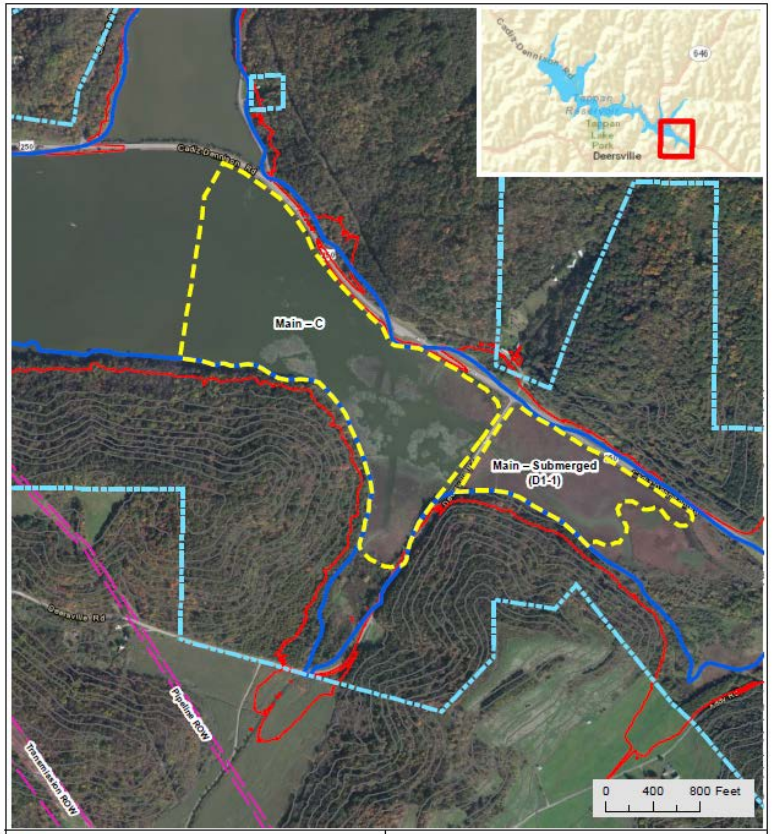

Figure 4. Proposed dredge areas for Phase 1 dredging of eastern Tappan Lake.

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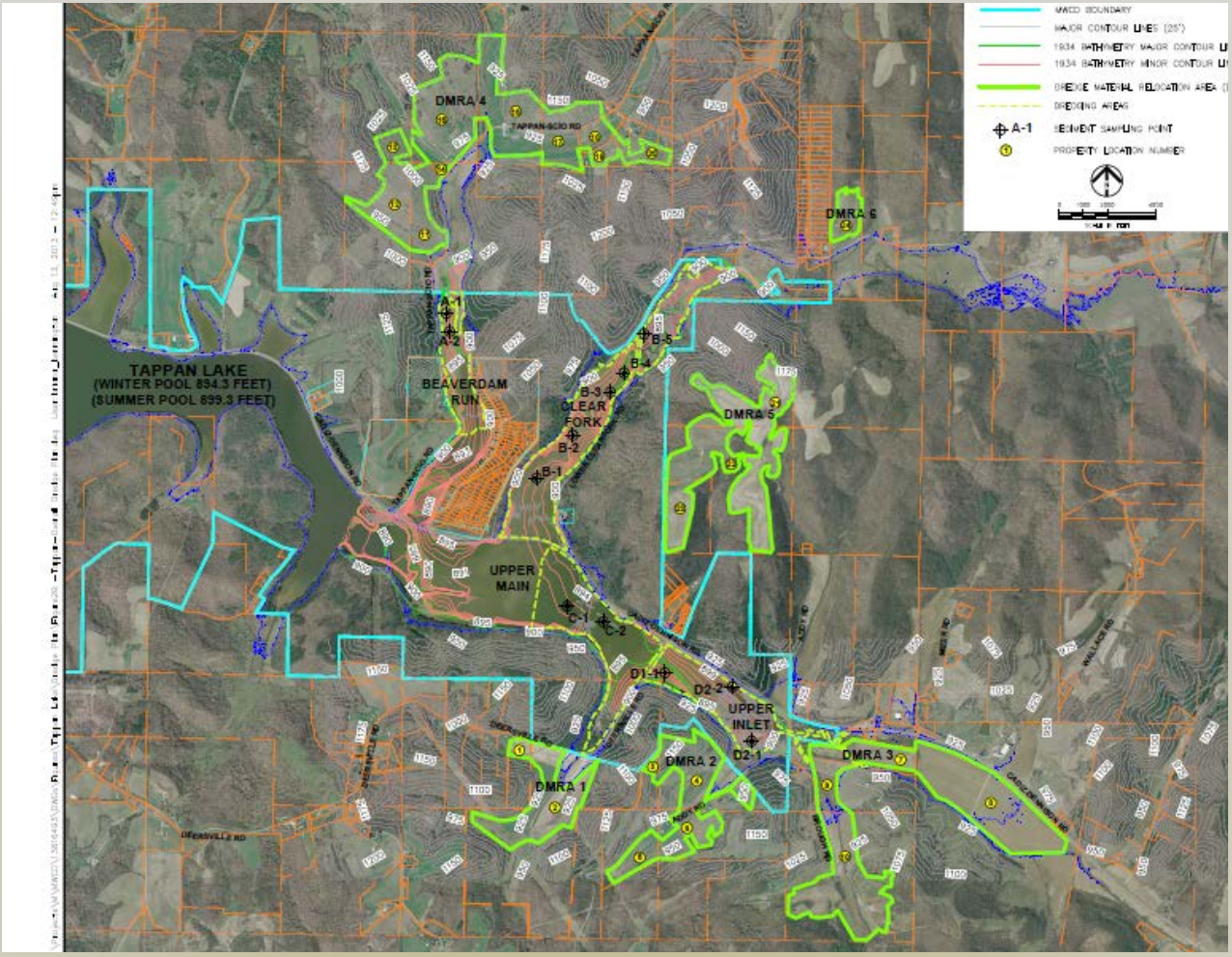
Task 8: Tappan Lake Dredging Project

-Dredging and Prospective Placement Locations-



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Task 8 (cont): Dredging Technologies

Hydraulic Dredging

Mechanical Dredging

Plans for 2014

- Secure landowner participation for placement of dredged material
- Complete plans and specifications for Tappan Lake dredging
- Issue an RFP and contract with one or more of six prequalified dredging firms
- Initiate dredging, providing oversight and monitoring
- Select and design a second dredging project, applying site prioritization, economic model, beneficial use, and related tools

Lessons Learned

- Comprehensive program may be warranted when multiple lakes/ reservoirs require assessment and dredging over the long term.
- Economic analysis is a critical consideration in prioritizing dredging activity and determining optimal use of equipment and labor.
- Careful assessment of beneficial use alternatives can “redefine” dredged material from a waste product to a valuable asset.
- Adequate time must be budgeted to secure a location for placement of dredged material, with an emphasis on landowner relations.
- Stakeholder outreach and engagement is the key to cultivating and maintaining public support for dredging activity.

Long-term Maintenance Dredging Program

Questions / Comments?

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