

## 2002 AERIAL SAME IN-LINE POND RAPIDLY FILLING WITH SEDIMENT



## OFF LINE PONDS

- Created by berms and dams outside of the stream channel
- Fill with rain fall, overland flow, and springs



## GENERAL MAINTENANCE & MONITORING

- Maintenance dredging may be necessary
- Prevent trees and shrubs from establishing on berm and dam structures
- Prevent and repair erosion
- Keep all inlets and outlets free of obstructions
- Monitor twice a year for:
  - Erosion
  - Grass and tree cover
  - Obstructions, weathering and displacement of material
- Keep written and photographic records

## BASELINE SURVEY

- First step in planning the future for your lake
- Collect any historical data
  - Year built
  - Previous dredging done
    - When
    - How much removed
  - Keep or look for any construction plans of when it was built or modified

## BASELINE SURVEY

- Conduct a sediment survey of existing condition
  - Current Aerial of Lake
  - Divide lake into approximately 10 equal sections on aerial map
  - Take ~10 readings of depth of lake and sediment depths along each section
  - Data imported into Lake Sediment Survey program

## BASELINE SURVEY

- Results
  - Approximate depth of sediment
  - Approximate life span of lake before dredging is needed
  - Plan for future dredging and maintenance

Pine - Pine Lake Sediment Survey Results of 9/19/05	
<b>Lake Data Sheet</b>	
Lake Surface Area	13.2 Acres
Lake Depth (avg.)	6.1 Feet
Waterward Area	2000 Acres
Dredged Sediment Volume (1989 & 2000)	27.3 Acre-Feet
Lake Trap Efficiency	81%
<b>Calculated Values after Dredging operations in 1989 &amp; 2000</b>	
Acre-Feet of Sediment in Lake	18 Acre-Feet
Acre-Feet of Water in Lake	83 Acre-Feet
Acre-Feet of Original Volume in Lake	81 Acre-Feet
Cubic Yards of Sediment in Lake	26,000 Cubic Yards
Tons of Sediment in Lake	22,000 Tons
Percent Loss of Volume in Lake	22.2%
<b>Calculated Values before Dredging operations in 1989 &amp; 2000</b>	
Acre-Feet of Sediment in Lake	45.3 Acre-Feet
Acre-Feet of Water in Lake	35 Acre-Feet
Acre-Feet of Original Volume in Lake	81 Acre-Feet
Cubic Yards of Sediment in Lake	14,000 Cubic Yards
Tons of Sediment in Lake	86,000 Tons
Percent Loss of Volume in Lake	86.7%
Percent Loss of Volume of Lake per Year	0.72%

## AQUATIC VEGETATION

- ◆ **Submerged**
  - ◆ Chara – form of algae –not a plant
  - ◆ Najas, Pondweeds, Elodea, Coontail, Water Milfoil
- ◆ **Emergent**
  - ◆ Cattails, Irises, Bulrush, Pickerelweed
- ◆ **Floating**
  - ◆ Planktonic Algae
  - ◆ Filamentous Algae
  - ◆ Duckweed and Watermeal – hard to get rid of




## AQUATIC VEGETATION CONTROL

- ◆ Know what you have
- ◆ If using chemicals follow dosing instructions
- ◆ Do not treat an entire lake at one time
- ◆ **Chemical Control**
  - ◆ Contact herbicide – kills on contact
    - ◆ Copper Sulfate – most common
  - ◆ Systemic Herbicides – absorbed into plant to kill
    - ◆ Typically slower results and more expensive
  - ◆ Shading Products – reduce sunlight penetration
- ◆ **Mechanical Control**
- ◆ **Biological Control**
  - ◆ White Amur – vegetation eaters – not really algae

## FISH STOCKING

**Stocking guidelines for a one acre pond**  
*(pg 9 of Ohio Pond Management Handbook)*

Recommended Species	Example 1	Example 2	Example 3
Largemouth Bass	100	100	100
Bluegill	500	350	0
Redear Sunfish	0	150	500
Fathead Minnows	20-50 lbs	20-50 lbs	20-50 lbs
Channel Catfish	100	100	100

**Stocking guidelines for White Amur**


% of Vegetated Cover	# Amur/Acre
0-20%	2
20-40%	10
40-60%	15
Over 60%	20

## FISH STOCKING

- ◆ Many of your local Soil and Water Conservation Districts have annual or semi-annual fish sales
- ◆ Fish Sales in Spring and/or Fall
- ◆ Geauga SWCD Fish Sale – April 19, 2012 – 1pm
- ◆ Portage SWCD Fish Sale – April 25, 2012 – 10am

## WILDLIFE CONTROL

- ◆ **Geese**
  - ◆ Proven source of high levels of E-coli
  - ◆ Do not mow to the edges of lake
  - ◆ Short stake with string around lake edge
  - ◆ Grid system of lines across lake surface
  - ◆ Deterrent spray for adjacent grass to lake
  - ◆ Dead goose decoy
  - ◆ Dogs
  - ◆ Hunting
  - ◆ Contact ODNR for further preventative measures



For additional reading, please see page 49 of Ohio Pond Management Handbook.

## WILDLIFE CONTROL

- ◆ **Muskrats**
  - ◆ Contribute to Dam failures
  - ◆ Trapping
  - ◆ Stone around perimeter of lake
  - ◆ Steel mesh around edge of lake
  - ◆ Combination of steel mesh and stone



## DAM MAINTENANCE

- ◆ Dams
  - ◆ Know who the owner is and ensure all parties are aware of responsibilities
  - ◆ Ensure maintained and operated so it does not constitute a hazard to life, health, or property
  - ◆ ODNR can require owner to perform repairs or maintenance if deemed necessary
  - ◆ Inspect and monitor twice a year
    - ◆ Repair and erosion or animal burrows
    - ◆ Remove tree/shrub growth
    - ◆ Repair any damage or erosion of outlet structures
    - ◆ Keep written records

**Owner is responsible for the condition of the dam and maintaining its safe operating condition**

## WHY DREDGE?

- ◆ All streams naturally carry sediment which fills in lakes even if watershed is completely forested
- ◆ Maintain aesthetics
- ◆ Remove toxic sediments
- ◆ Manage vegetation and algae
- ◆ Deepen the lake



## SEDIMENT

- ◆ Identify the source of sediments e.g. streams and inline pond
- ◆ Manage the source to reduce the need for frequent dredging
- ◆ Install a forebay!



## SEDIMENT SOURCES

- ◆ Storm water outfalls, ditches
- ◆ Stream bank erosion
- ◆ Impervious surfaces such as parking lots
- ◆ Agriculture
- ◆ Construction sites



## SEDIMENT IS THE #1 SOURCE OF NPS POLLUTION IN THE UNITED STATES



## DREDGING PERMITS

- ◆ Erosion and Sediment Control
- ◆ Most Counties have Water Management & Sediment Control Regulations
- ◆ Ohio Environmental Protection Agency (Ohio EPA) has Notice of Intent (NOI) / General Construction Permit if disturbing more than 1 acre of land
- ◆ Most Communities have Codes/Ordinances regulating soil disturbing activities
- ◆ Use Best Management Practices (BMPs) for control, need to be used to manage erosion and sediment on site
  - ◆ Silt fence
  - ◆ Dewatering device
  - ◆ Check dams etc.

**POND & LAKE MANAGEMENT FUNDING**

- (1) Funding not available for dredging activities
- (2) Low interest loans may be available to maintain ODNR regulated dams

**RECOMMENDATION**

*ESTABLISH AN EFFECTIVE, MANDATORY, AND WELL FUNDED HOMEOWNER'S ASSOCIATION TO BUILD NECESSARY FUNDS OVER TIME.*



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**EXCAVATION EQUIPMENT  
LONG REACH EXCAVATOR**



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**DREDGING EQUIPMENT  
MUDCAT DREDGE**



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**SPUD DREDGE  
CUTTER HEAD**



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**DREDGE OPERATION  
DREDGE PIPE FUSING**





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**DREDGE OPERATION  
POLYMER INJECTION**



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**DREDGE OPERATION  
SPOILS AREA**



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**DREDGE AND GEOTUBE OPERATION  
DEWATERING PHASE**



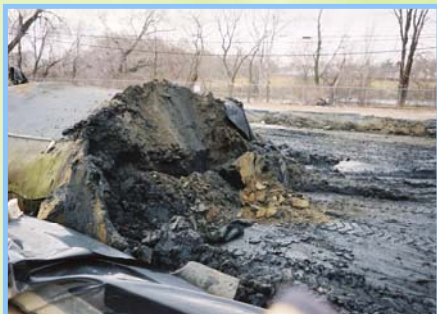
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**DREDGE AND GEOTUBE OPERATION  
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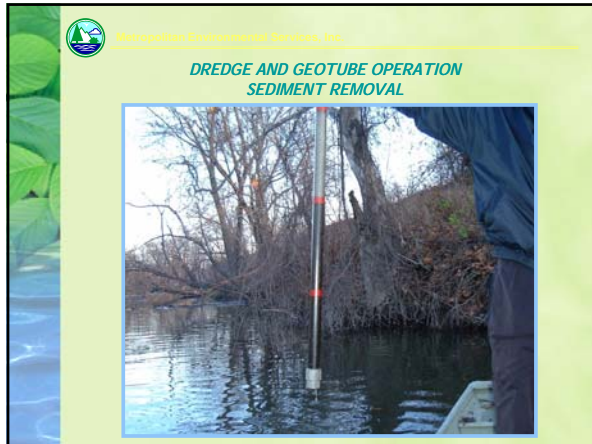
**DREDGE AND GEOTUBE OPERATION  
EXCAVATION PHASE**



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**DREDGE AND GEOTUBE OPERATION  
EXCAVATION PHASE**





### COST OF DREDGING

**Case by case specific:**

- Ease of access
- Amount/type of sediment to be removed
- Method of dredging
- Dewatering method and disposal of dredged material

**Mechanical Dredging Averages**

- \$8 - \$30/cubic yard

**Hydraulic Dredging Averages**

- \$4 - \$20/cubic yard

### SHORELINE RESTORATION

**Causes of erosion are:**

- Runoff
- Wave action
- Ice
- Access points

### BIOENGINEERING

**Vegetative buffer enhancements**

- Use native plants
- Use plant species adapted to wetlands and floodplains

**Benefits of Bioengineering**

- Improve aesthetics
- Long term, low maintenance
- Cost effective over long term

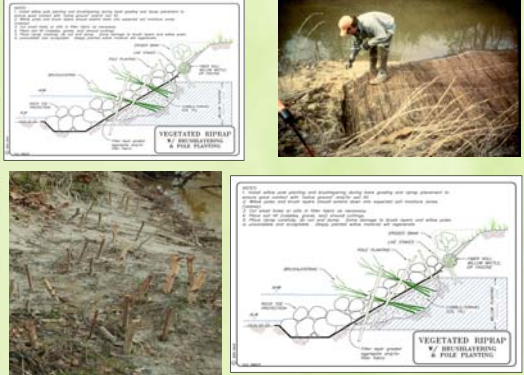
### COMPONENTS OF BIOENGINEERING

- Grading
- Live cuttings
- Erosion blanket
- Biologs
- Seeding

## GRADING



## LIVE STAKING



**VEGETATED REWRAP BY OVERLAYING & PILE PLANTING**

## EROSION BLANKET

- ◆ Effectively controls erosion
- ◆ Accelerates plant growth



**Coir Mattresses for Soil Bioengineering**

**BioD-Fillow™**  
Coir Fiber Mattress

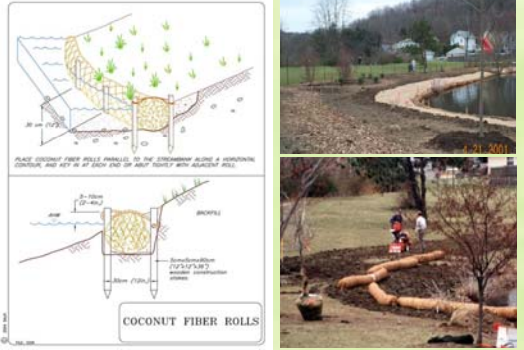
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## BIOLOGS



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## SEEDING



## QUESTIONS / RESOURCES?



**Cuyahoga Soil and Water Conservation District**  
(216) 524-6580



**Geauga Soil and Water Conservation District**  
(440) 834-1122



**Lake County Soil and Water Conservation District**  
(440) 350-2730



**Portage Soil and Water Conservation District**  
(330) 297-7633

Ohio Pond Management Book  
[www.dnr.state.oh.us/Portals/9/pdf/pondmgmt.pdf](http://www.dnr.state.oh.us/Portals/9/pdf/pondmgmt.pdf)