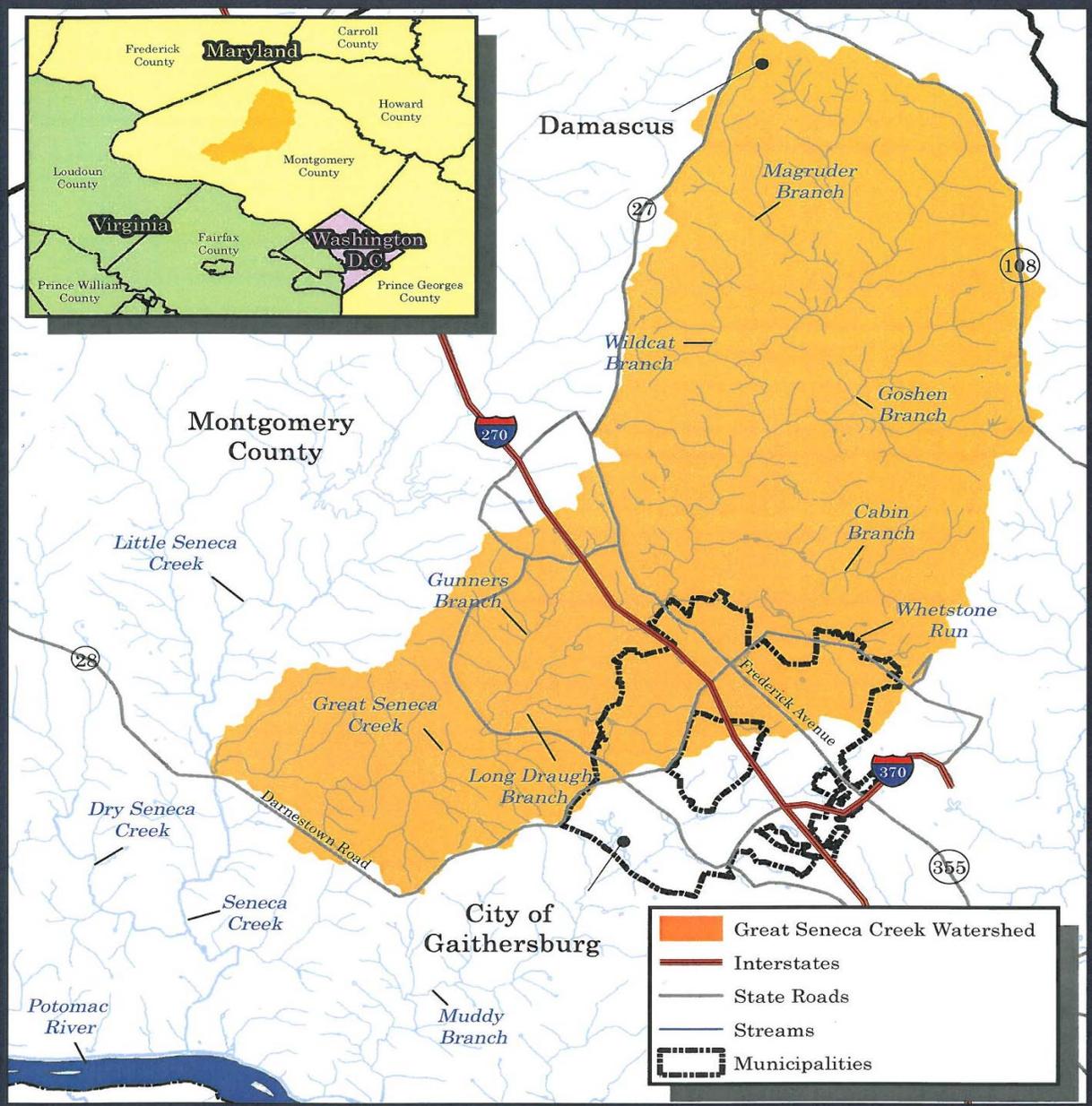


Lake Whetstone Dredging Project and Sediment Testing

Public Meeting December 13, 2011

Montgomery County
Department of Environmental Protection



	Great Seneca Creek Watershed
	Interstates
	State Roads
	Streams
	Municipalities



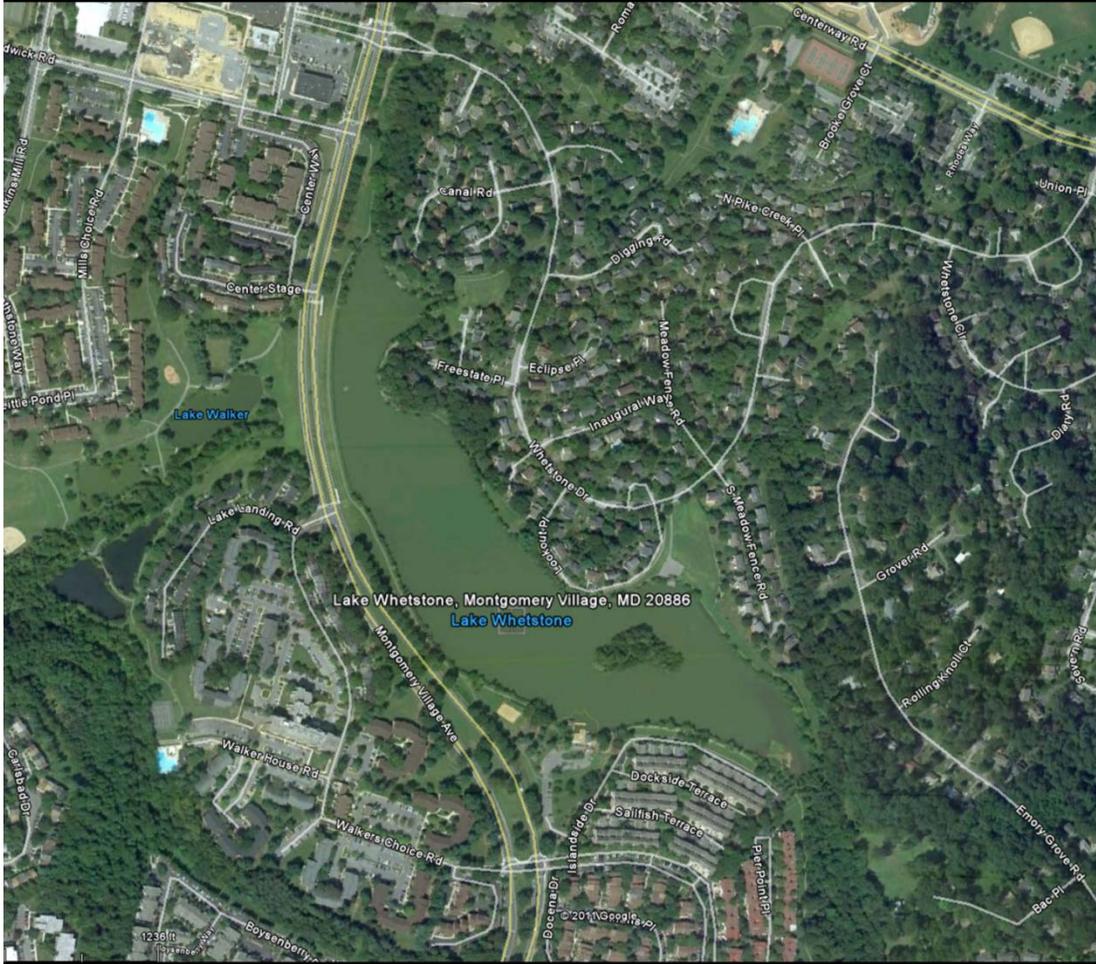
US Army Corps of Engineers
Baltimore District

Figure 1.1
Study Area-
Great Seneca Creek Watershed



0 5,000 10,000 20,000 Feet
1 inch = 10,000 feet

Lake Whetstone



Owner: Montgomery Village Foundation

Constructed: 1966

Purpose: Flood control and recreation

Normal Size: 26.6 Acres

Normal Volume: 270,000 Cubic Yards

Pool Length: 2,400 Feet

In 2003 county takes over structural maintenance of lake

Drainage Area Lake Whetstone: 3.28 square miles

Whetstone Run Drainage Area: 4.81 square miles

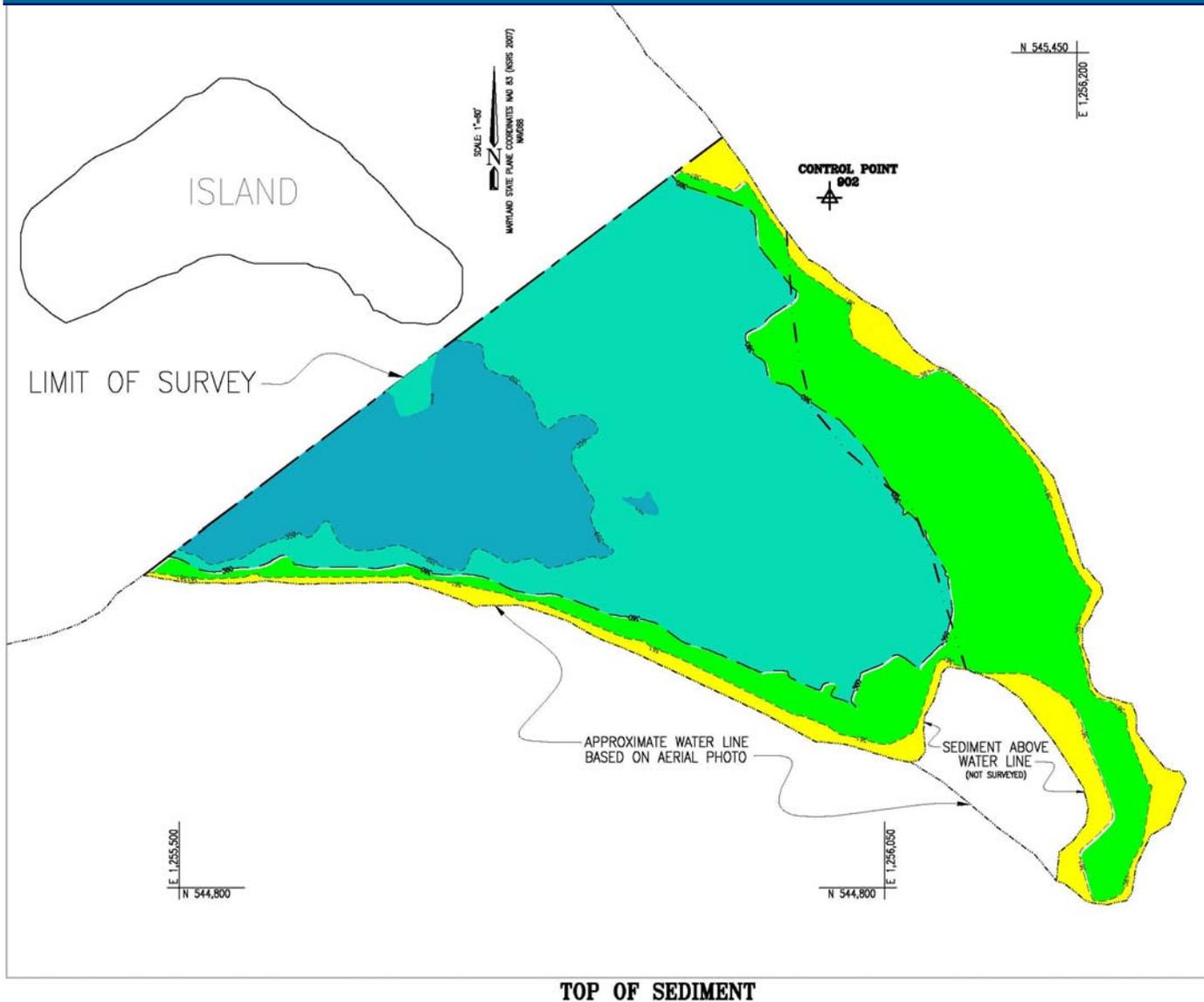
Dredging Project Summary

- Requested by MVF
- Project objective to remove sediment from Whetstone Run forebay
- Project is limited to 20,000 C.Y. sediment removed from Lake

Sediment Levels

- Bathymetric survey performed to evaluate the sediment levels
- Survey of forebay/inflow from Whetstone Run
- Approximately 4 acres
- Results:
 - No more than 10,500 C.Y.
 - 4% total lake volume

Bathymetric Survey:



LEGEND

WATER DEPTH RANGE	ELEVATION RANGE	COLOR
0-0.64	361.64'-361'	Yellow
0.64-1.64	361'-360'	Light Green
1.64-2.64	360'-359'	Light Blue
2.64-3.64	359'-358'	Medium Blue
3.64-4.64	358'-357'	Dark Blue
4.64-5.64	357'-356'	Blue
5.64-6.64	356'-355'	Dark Blue
6.64-6.64	355'-354'	Very Dark Blue
6.64-6.90	354'-353.74'	Black

WATER SURFACE (WSEL) = 361.64

Dredging Method

- Mechanical Dredging
 - divert stream
 - Isolate dredging area with a berm or dike
 - Dewater dredging area
 - Use hydraulic excavator or clam shell to remove sediments.
 - Stock pile to dry out sediment
- Boat dock parking lot for staging
- Access lake from foot path

Mechanical Dredging:



Isolating Area to be Dredged:



Mechanical Dredging:



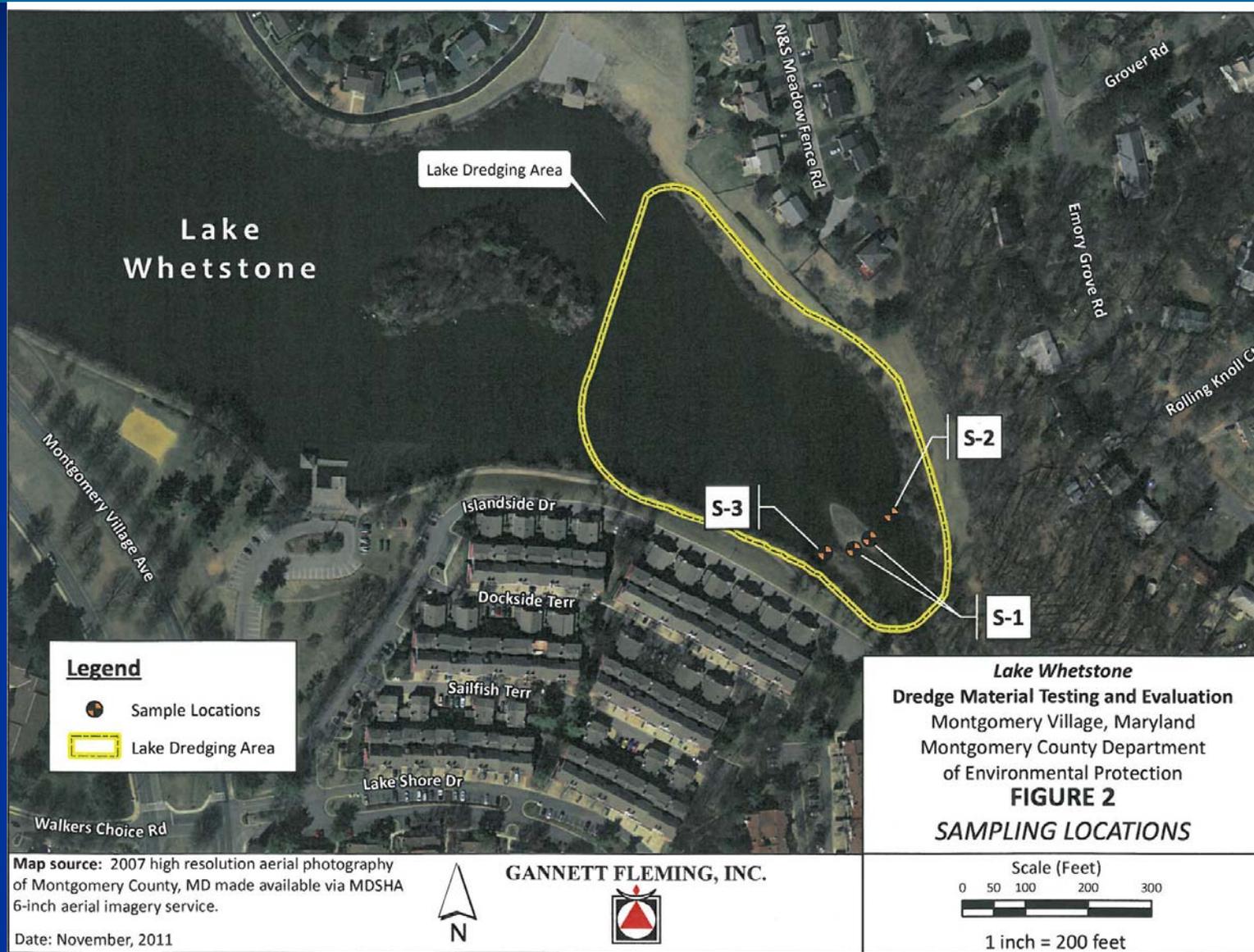
Sediment Testing

- Testing Method based On:

U.S. Army Corps of Engineers Technical Note
DOER-C2, February 1998 (May 1999)

- Three (3) samples taken from lake.
- One (1) background sample from ball field
at Apple Ridge Road & Montgomery Village
Ave.

Sampling Locations S1 to S3



Sampling Location – S4

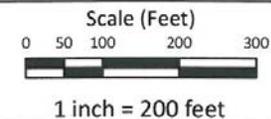


Map source: 2007 high resolution aerial photography of Montgomery County, MD made available via MDSA 6-inch aerial imagery service.

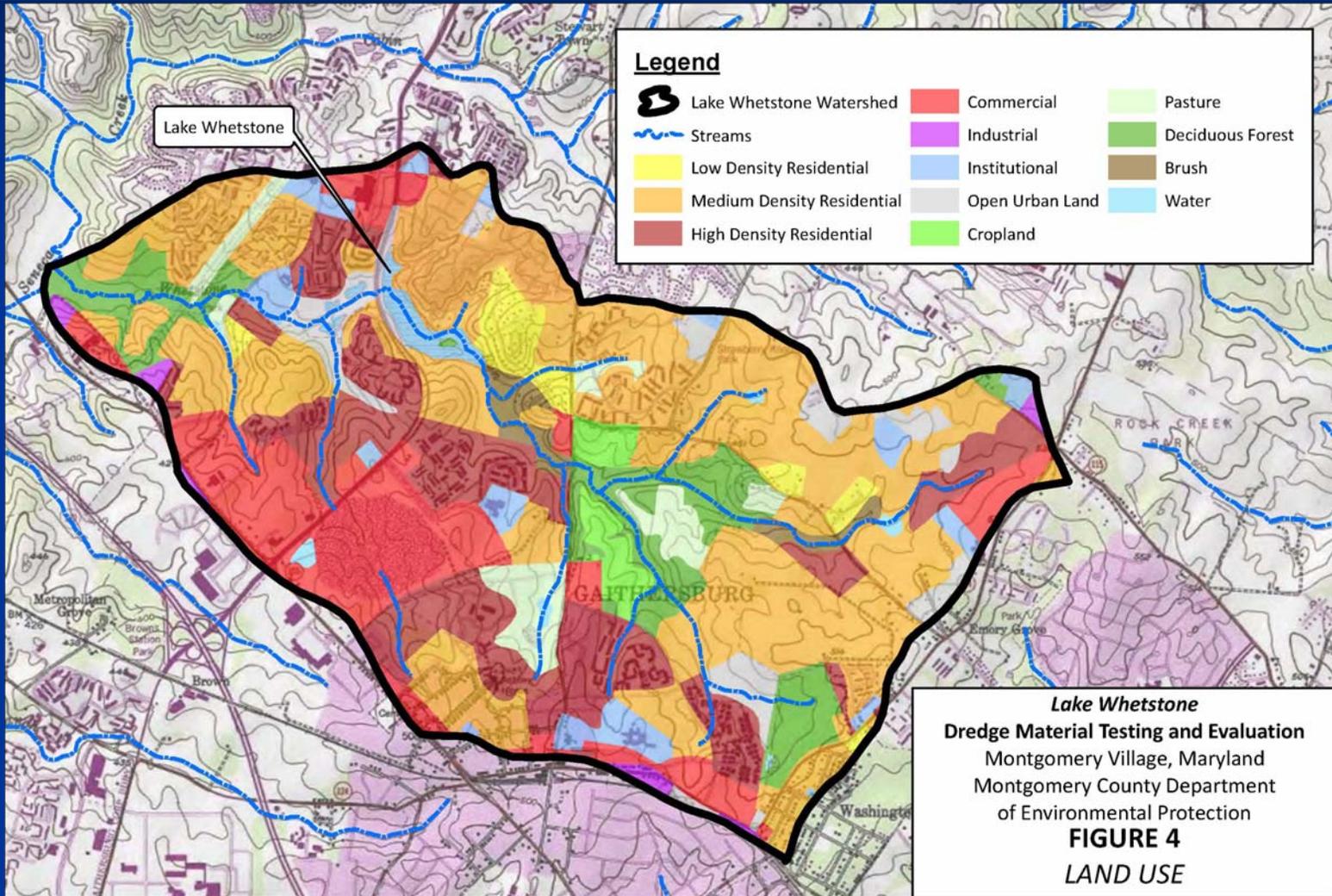
Date: November, 2011



GANNETT FLEMING, INC.



Land Use:

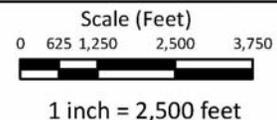


Map source: Maryland Department of Planning - 2002 land use/land cover of Maryland and Maryland DNR 14-digit HUC boundaries.

Date: November, 2011



GANNETT FLEMING, INC.



Sampling Method

- Samples were collected using conventional hand-held sampling equipment.
 - Stainless-steel hand auger
 - Lake samples were collected to depths of three to almost eight feet below the sediment surface.

Sampling Analysis

- Physical Analysis: A physical analysis was completed to determine the grain sizes in the sediment samples.
- Contaminant Analyses: The chemical analyses were conducted to investigate the general chemistry, presence of contaminants, and soil nutrients in the sediment samples.
- Biological Analysis: The biological properties of the sediment samples were determined by conducting fecal coliform analyses.

Sample Results

Physical Analysis

- Samples results vary from poorly graded sand with gravel to sandy silt.



Sample Results (cont.)

Environmental Contaminant Analysis

- Results of sediment samples reported at levels above soil screening levels (SSLs) determined by USEPA and cleanup standards established by MDE.
- Polycyclic Aromatic Hydrocarbons (PAHs)
 - benzo[a]anthracene
 - benzo[a]pyrene,
 - benzo[b]fluoranthene
 - dibenz(a,h)anthracene
 - indeno[1,2,3-cd]pyrene
- Metals
 - aluminum, arsenic, and chromium

PAH Levels

Site Location	Lake Whetstone			Apple Ridge	USEPA Soil Screening Levels		MDE Soil Standards	
Sample ID	S-1	S-2	S-3	S-4	Residential Soil	Industrial Soil	Residential Cleanup Standard	Non-Residential Cleanup Standard
Date	10/10/11	10/10/11	10/10/11	10/10/11				
Constituents	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Semivolatile Organic Compounds								
Benzo(a) anthracene	0.2	0.45	0.55	<0.008	0.15	2.1	0.22	3.9
Benzo(b) fluoranthene	0.28	0.93	1.5	<0.008	0.15	2.1	0.22	3.9
Benzo(a) pyrene	0.24	0.53	0.74	<0.008	0.015	0.21	0.022	0.39
Indeno (1,2,3-cd)	0.19	0.46	0.77	<0.008	0.15	2.1	0.22	3.9
Dibenz(a,h) anthracene	0.07	0.19	0.33	<0.008	0.015	0.21	0.022	0.39

Highlighted cells show concentrations that were above EPA and MDE soil screening levels

PAHs

- PAHs are a group of organic compounds that contain two or more fused aromatic rings. PAHs are formed and released into the environment as the result of incomplete combustion.
- PAHs tend to adsorb (or cling) to sediments and do not break down easily in water.
- According to USEPA, exposure to PAHs can be from air contamination by smoke from fireplaces, wood stoves, furnaces burning coal or oil, and from smoked or charbroiled foods, smoking tobacco products, inhaling vehicle exhaust, and inhaling fumes from working exposure to coal tar and asphalt. PAHs also result from the production and processing of metals, coal, oil, and gas.
- Recent USGS investigations have found that coal-tar-based sealants often used on driveways and parking lots are a source of PAH contamination in urban lakes across the US (<http://pubs.usgs.gov/fs/2011/3010/>).

What could be the source?
1,500 mg/kg in creek sediment

• Fresh asphalt	1.5	Pavement
• Weathered asphalt	3	Sealcoat
• Fresh motor oil	4	
• Brake particles	16	Asphalt-based
• Road dust	24	50
• Tire-wear particles	86	
• Diesel engine emissions	102	Coal-tar-based
• Gasoline engine emissions	370	100,000
• Used motor oil	440	



USGS

How do some sources compare? Milligrams of PAH in:

- One storm on a CT sealed driveway **56 mg**
(Mahler et al., 2005)
- One storm on a CT sealed driveway **174 mg**
(Watts et al., 2011)
- Driving 12,000 miles (tail pipe) **56 mg**
(Bergvall and Westerholm, 2009)
- Driving 23,000 miles (tire wear) **56 mg**
(Aatmeeyata, 2010)
- One storm on an unsealed driveway **0.86 mg**
(Mahler et al., 2005)



Metals

Site Location	Lake Whetstone			Apple Ridge	MDE Soil Standards		
Sample ID	S-1	S-2	S-3	S-4	Residential Cleanup Standard	Non- Residential Cleanup Standard	Anticipated Typical Concentrations (ATC)
Date	10/10/11	10/10/11	10/10/11	10/10/11			
Constituents	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Metals							
Aluminum	3600	8900	13000	15000	7800	100000	19000
Arsenic	1.4	1.7	2.6	1.4	0.43	1.9	4.9
Chromium	22	31	41	32	23	310	30

Highlighted cells show concentrations that were above MDE soil Cleanup Standards, but they are similar to ATC values

Metals

ATC Levels

- Anticipated typical concentrations (ATC) were determined by MDE for several metal concentrations in soil for three different provinces of Maryland based on geologic conditions.
- The ATC values represent regional values of concentrations of metals that exist in Maryland soils
- Levels reported for sediment samples in the Lake and background are similar to ATC levels and are considered to be background levels.

Sample Results (cont.)

Bacteriological Analysis

- Fecal coliform levels reported by the laboratory were the following:
 - S-1: 23 MPN/gm
 - S-2: 326 MPN/gm
 - S-3: 14 MPN/gm
 - S-4: Not present

What does this mean?

- PAHs were identified as a contaminant of concern for the dredge material
- Small number of samples (not close to statistical sample needed to perform risk assessment)
- Exposure pathways (eat, drink, breathe)
- Risk

Next Steps

- DEP is committed to completing the dredging project for Lake Whetstone.
- Questions we are working on answering:
 - What additional sampling is necessary?
 - Where the material may be disposed of?
 - Are there ecological effects on the Lake?
 - Are there special considerations that must be evaluated before the removal of the sediment?