



MARYLAND DEPARTMENT OF NATURAL RESOURCES

Deep Creek Lake – Water Monitoring Program

Deep Creek Lake Water Quality Monitoring 2010 - 2011

Presentation
Deep Creek Lake Property Owners Association
20 August 2011

John F. Wilson
Land Acquisition and Planning
MD Department of Natural Resources
Annapolis, MD 21401
jfwilson@dnr.state.md.us; 410-260-8412



MARYLAND DEPARTMENT OF NATURAL RESOURCES

Deep Creek Lake – Water Monitoring Program

State goals for Deep Creek Lake

- to protect the lake as a natural resource,
- preserve its ecological balance, and
- further its use as a recreational resource.

(Source: Code of Maryland Regulations 08.08.01.01)





Water Quality Workgroup – formed in 2008

Composition

- Technical staff and scientists from:
 - * MD Department of Natural Resources
 - * MD Department of the Environment
 - * US Geological Survey
- County representatives
- Citizen representatives – 2 from POA

Purpose

- forum for discussion
- review results of water quality monitoring
- distribute information to other interested groups



How will this monitoring be helpful?

In this effort, DNR has been monitoring water quality in the lake for the past 3 years in an effort to...

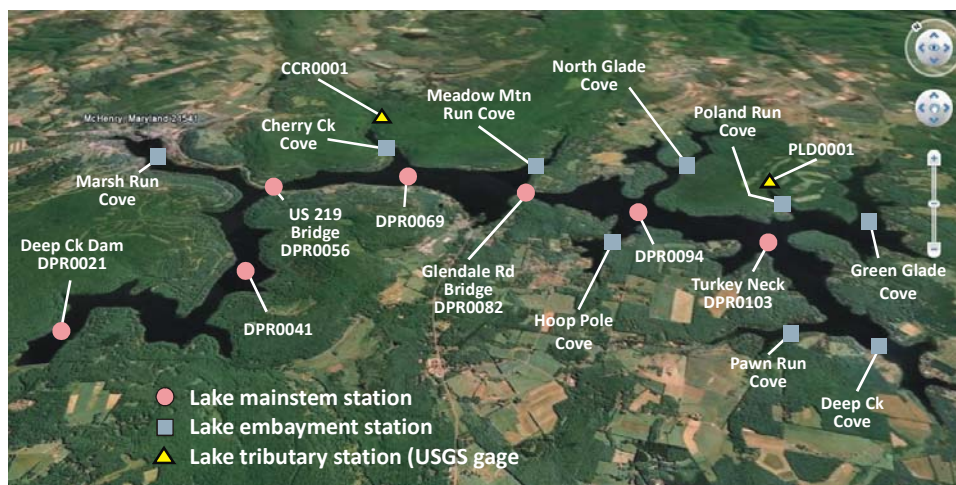
- provide information that will assist watershed and lake managers in making management decisions
- provide data to other agencies, such as DNR's Fisheries Service, MD Department of the Environment, and Garrett County
- inform and educate residents and visitors





2010-2011 monitoring objectives

- Continue water monitoring activities initiated in 2009 to define the lake's current condition and the natural range and variability of its physical environment, nutrients and primary productivity (algal) levels as a baseline for measuring future trends
- Continue monitoring of streamflow, nutrients and sediments at two USGS gage sites to be able to define nutrient and sediment loads to the lake, and
- Assess the species, abundance and distribution of the lake's aquatic plant community





2010 FINDINGS

2011 CONDITIONS



Climate review...

A review of weather history records (2004-2011) available from the weather data archives at Garrett College provides insight into crucial spring and summer weather conditions that can affect water quality in Deep Creek Lake.

<i>Summer</i>	<u>2009</u>	<u>2010</u>	<u>2011</u>
Air temperature	Cool	Hot	Hot
Precipitation	Very dry	Dry	Wet

In summer of 2009, air temperatures were below average. From March through October in 2010, temperatures were above average with the highest June monthly average. From April through July in 2011, temperatures were above average with highest average for the month in April, May and July.

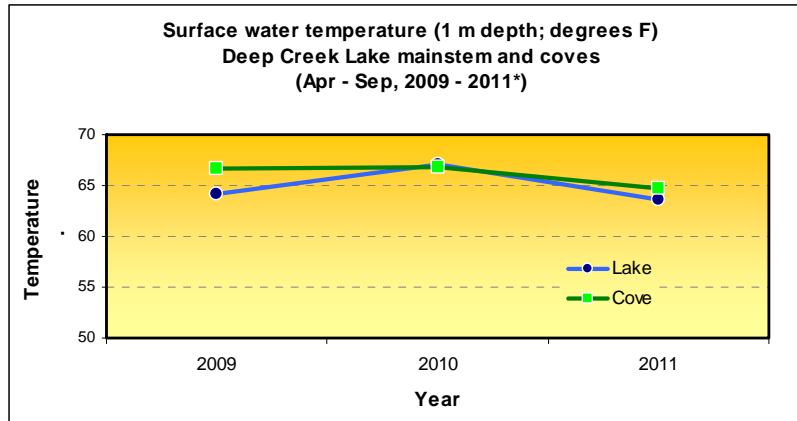
From February through July 2011, precipitation has been **Above Average** and the **Wettest** since before 2004. Though July 2011, total precipitation has been higher than annual precipitation in all of 2009 and in all of 2010.

(Data Source: <http://www.wunderground.com/weatherstation/WXDailyHistory.asp?ID=KMDMCHEN1>)

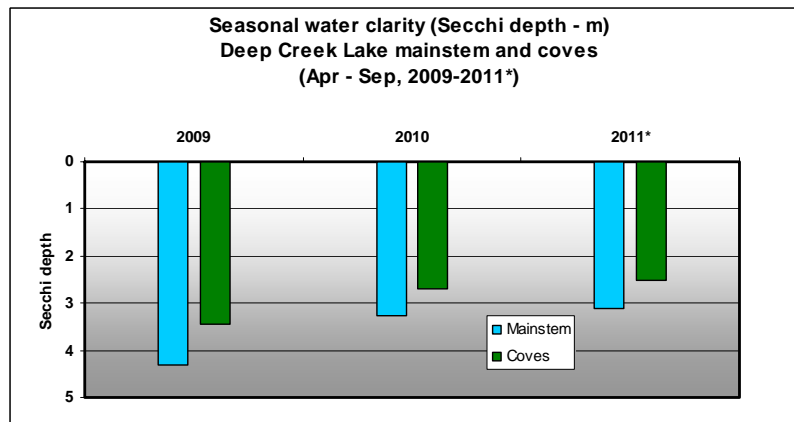




Water temperature (degrees F)

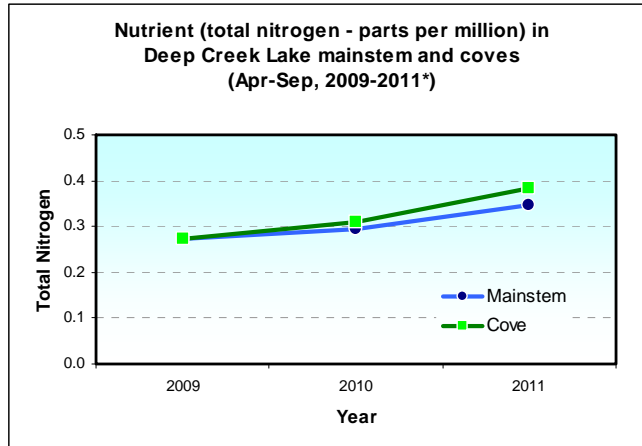


Water clarity

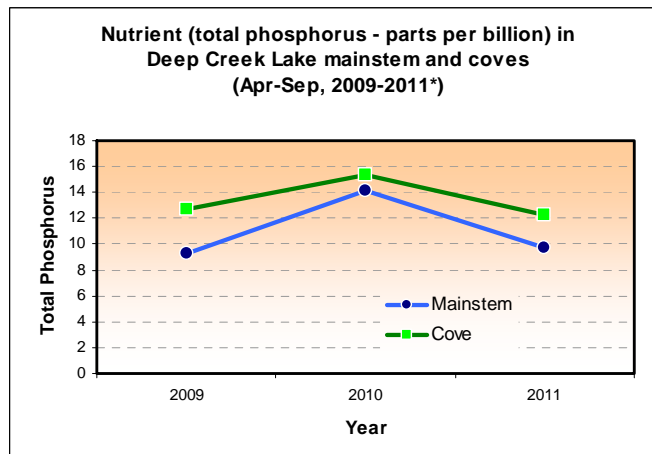




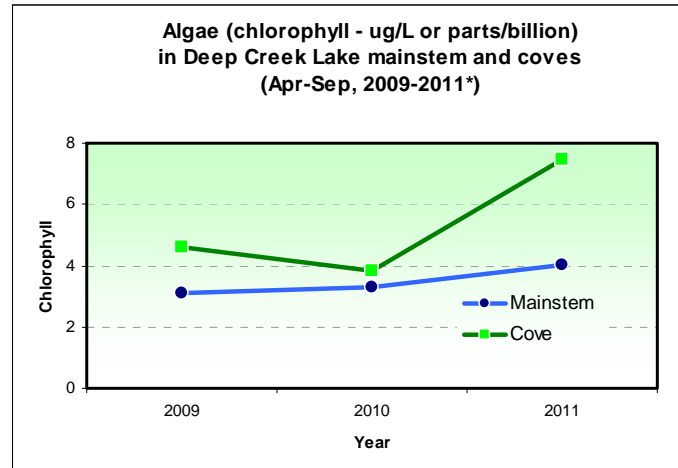
Nutrients (nitrogen)



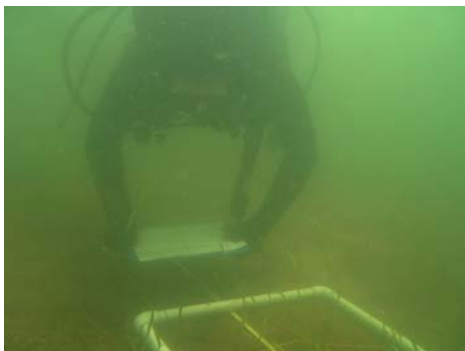
Nutrients (phosphorus)



Algal levels (chlorophyll)



Assessing aquatic vegetation



DNR divers surveying aquatic plant species and abundance along transects at selected shallow water sites in Deep Creek Lake (2010)

In 2010 (Aug, Sep), DNR biologists surveyed selected transects to identify: type, distribution and abundance of aquatic vegetation in Deep Creek Lake.

2010 results:

A healthy, thriving and diverse mix of aquatic vegetation growing as deep as 16 to 20 feet

Fish were present in all vegetated areas using the stems/ leaves as habitat and refuge

Water near piers where aquatic vegetation had been removed were more turbid than where aquatic plants remained.



Assessing aquatic vegetation (2011)

DNR has sampled selected transects in the lake for Aquatic Vegetation (SAV) on June 14 and on August 8 and 9.

Data entry and analysis of these data are underway.

DNR divers will survey the lake again in mid-September.



Sediment Surveys in Deep Creek Lake

- DNR (MD Geological Survey) began sediment surveys in the Fall of 2010 in response to citizen concerns and Deep Creek Lake Park Management.
 - *Preliminary Cove Study to quantify sedimentation within different drainage areas of the Lake.*
 - *General Sediment Chemistry to determine sediment types and quality*

These are nearing completion and results will be published this Fall.

- Follow-up studies are recommended, but are dependent on funding.





Generalized Results

Where sedimentation occurs, it is within 900 feet of the cove headwaters. Analysis beyond 900 feet shows very little accumulation, and where present, it is confined to depths >20 feet.

Summary of Findings (between 2011 and 1974)

Erosional Sites

Mean observed changes < -0.5 feet accumulation:

- Site 1 (Brushy Run); Site 10 (Gravelly Run Cove)

No Change

Mean observed changes between -0.5 and 0.5 feet:

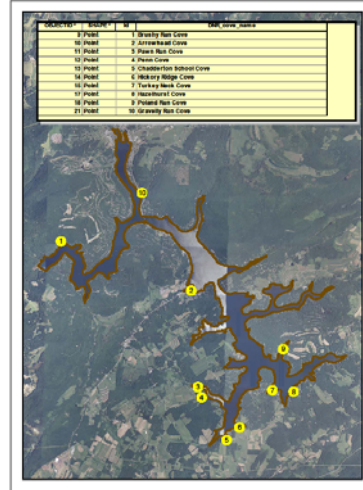
- Site 4 (Penn Cove); Site 6 (Hickory Ridge Cove); Site 7 (Turkey Neck Cove); Site 8 (Hazelhurst Cove)

Depositional Sites

Mean observed changes > 0.5 feet accumulation

- Site 2 (Arrowhead Cove); Site 3 (Pawn Run Cove); Site 5 (Chadderton School Cove); Site 9 (Poland Run Cove)

Deep Creek Lake -- Selected Coves for Sediment Study

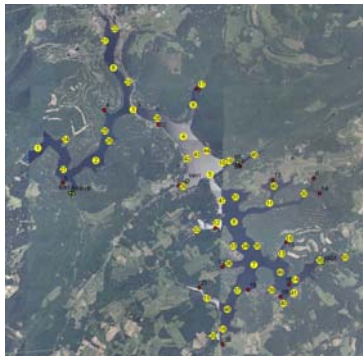


MGS sediment sampling survey

50 Sediment grab samples were collected by DNR in October 2010

Sites were selected to achieve an even coverage; some were co-located with water quality, aquatic vegetation, and County Health monitoring stations

Sediments were analyzed for grain size, nutrients and metals



SUMMARY

- Sediments are primarily fine-grained, ranging from silty clays to clayey silts (Mud not Sand);
Nitrogen and Phosphorus are average for lake sediments;
Most of the carbon measured in lake sediments is from algae production.
Sulfur is high in some sediments, and may contribute to the release of Phosphorus from sediments, which may then increase biologic productivity;
Concentration and enrichment of most metals are within normal range for Garrett County.





Other water quality monitoring efforts

In summer of 2010, the MD Department of the Environment (MDE) began to investigate nutrient levels in shallow areas in upper Deep Creek Lake in response to citizen and Park Service complaints about algal blooms. Samples are collected in July, August and September. Red markers show sites sampled in 2010. Sites shaded orange are new sites added for monitoring in 2011.



THANK YOU !

