Maryland Department of Natural Resources

Spring 2017 Update concerning Deep Creek Lake

The following is an update on some of the primary projects undertake by Maryland Department of Natural Resources during 2016 at Deep Creek Lake:

Lake Water Quality Monitoring

Water quality monitoring was done in the lake mainstem and shallow water coves of the lake from April through October 2016. This represents the 8th year of baseline water quality monitoring conducted by the Department at Deep Creek Lake. The goal of this monitoring effort is two part

1) To create baseline data for the lake from which future changes in lake water quality can be detected and

2) Characterize the water quality in the lake (both spatially and temporally) for the purpose of maintaining the ecological integrity of the lake.

The 2009-2016 baseline water quality monitoring efforts demonstrated that while there are locally important events, like dry periods, or short term 'heat waves', water quality in the deeper portions of the lake are largely representative of the respective regions of the lake however less is known about how those sites compare to the shallower, protected coves of the lake.

Beginning in July 2016, the Department began an effort to move monitoring sites from the more 'mainstem' deeper sites to the shallower portions of the lake with the hopes of better understanding how those shallower, nearshore environments compare to the deeper areas of the lake and impact the lake water quality. Four deep water, historic sites were maintained and are planned to continue so that future sampling efforts can be compared to historic sites. An additional 35 sites were sampled from July-October 2016 to gain insight as to how those sites compare to the deeper sites and determine the appropriate water depth for assessing the 'nearshore environment.' The 'nearshore environment' is the area where underwater plants typically grow, juvenile fish are most common, and the area where you find the most biological productivity and land/water interactions. This is the area where the majority of the lake's energy and biomass production occurs. Seven additional sites (selected for their importance to submerged aquatic vegetation or SAV and the respective hydrilla treatment) are slated to be added to the 39 nearshore/ reference mainstem water quality monitoring sites, for a total of 46 sites in 2017 (see attached map). This will provide the water quality data necessary to make proper management decisions in the future. Pending the results of the 2016-2017 nearshore water quality monitoring effort and analysis, it is anticipated that the number of sites may be pared down to ensure sampling efficiency. The number of parameters sampled at each site will increase to include a more concentrated effort to understand the nutrient and sediment related water quality dynamics at these sites over time.

Pictured above: Natural Resource Biologist prepares an automated water quality meter for deployment into Deep Creek Lake

As funding permits, the Department plans to use monitoring technology similar to what is used in the Chesapeake Bay, that allows for water quality data to be taken at selected sites every 15 minutes via a submerged meter. This will provide insight as to how water quality in the nearshore environment changes with seasonal or episodic human and/or natural events like droughts, increased boat traffic in the summer months, wind/wave driven erosion and resuspension to name a few.

SAV Monitoring

In 2016, the Department completed the seventh year of SAV related monitoring data. This includes two primary efforts: the annual SAV underwater transect survey (done at a total of 8 sites around the lake), and the annual SAV shoreline survey whereby the entire 65 mile shoreline of the lake is surveyed and mapped for SAV species composition, relative density and distribution. Both efforts are aimed at providing baseline SAV data capable of detecting changes in the plant community over time. SAV beds are critical habitat for lake biota such as fish and invertebrates and help provide needed oxygen to the water column, absorb excess nutrients and filter out suspended sediments. Species composition, density and depth of water in which plants inhabit are valuable biological indicators of overall lake health and water quality. Changes over time in species composition, density or depth can signal changes in water quality and help scientists target areas of the lake where additional monitoring would be beneficial. While the 2016 SAV report won't be available until late spring 2017, scientists observed a resurgence of *Elodea* (common waterweed) which was once more common throughout the lake but had diminished in abundance and density in recent years. The resurgence of *Elodea* is considered a positive shift in the SAV community for the lake as it is a plant that generally indicates good water quality and provides for a healthy and diverse SAV community. Other increases were seen in *Vallisneria americana* (wild celery) which is great habitat for both juvenile and larger fish as well as provides a good food source for waterfowl.

Above left: native plant Wild Celery (*Vallisneria americana*);
Above right: native plant Common waterweed (*Elodea spp.)*

Hydrilla Treatment and Monitoring

2016 was the third consecutive year of Hydrilla treatment using the herbicide Flouridone (trade name SONAR). 13 zones around the lake were treated 4 separate times throughout the summer months (June-September) with the herbicide. Three of those 13 sites were found to have Hydrilla growing however after two rounds of treatment, no Hydrilla plants were found remaining after the mid-July monitoring. Due to the biology of the plant and its ability to produce a reproductive structure called a "tuber" that can remain viable in the sediments for several years, it is necessary to continue to treat an infected area with the herbicide throughout the full growing season of the plant (usually June-September) and often for multiple years even after Hydrilla is thought to be eradicated at the site. During the first year of treatment (2014), there were 8 sites treated, in 2015 an additional 4 sites were found the previous year and added to the treatment, for a total of 12 sites treated in 2015. One additional small bed of Hydrilla was discovered in September 2015 and added to the treatment plan for 2016 for a total of 13 sites treated. Of these 13 sites treated, only 3 sites (see attached map) were still found to have Hydrilla growing from June-July before ultimately dying off from the treatment in mid-July 2016. Results of the 2016 treatment and monitoring are very encouraging that if no new beds of Hydrilla are found in the lake, the current population will continue to be weakened and hopefully eventually eradicated from the lake. Hydrilla has been called the "world's worst weed" for its ability to rapidly grow and spread throughout freshwater environments, out-competing native plants for space and resources and making the water column unusable for recreational use and reduce habitat quality. Hydrilla is one of many Aquatic Invasive Species (AIS) that threatens the ecology of the lake and highlights the need for boat owners to exercise good stewardship practices and properly clean and disinfect their boats, trailers, and any gear that comes in contact with infected waters.

Above: Hydrilla verticillata showing effects of herbicide treatment

Other Efforts

Tributary Monitoring: Beginning in October 2015 and continuing largely through December 2016, the Department began a tributary monitoring program whereby 7 of the major tributaries or streams entering the lake were monitored under base and storm flow events in an effort to determine the amount of and quality of water coming from each tributary. This was a yearlong effort funded in part through the Waterways Improvement Funds with the goal of determining which tributaries and resultant watershed were contributing the most amount of water, sediments and nutrients to the lake. Funding only allowed for one year of monitoring but that will at a minimum provide a benchmark for which future monitoring efforts can be compared. Results are anticipated to be available in 2017.

Above: Natural Resource Biologist measuring water velocity and depth along a cross-section of a lake tributary as part of the tributary monitoring effort

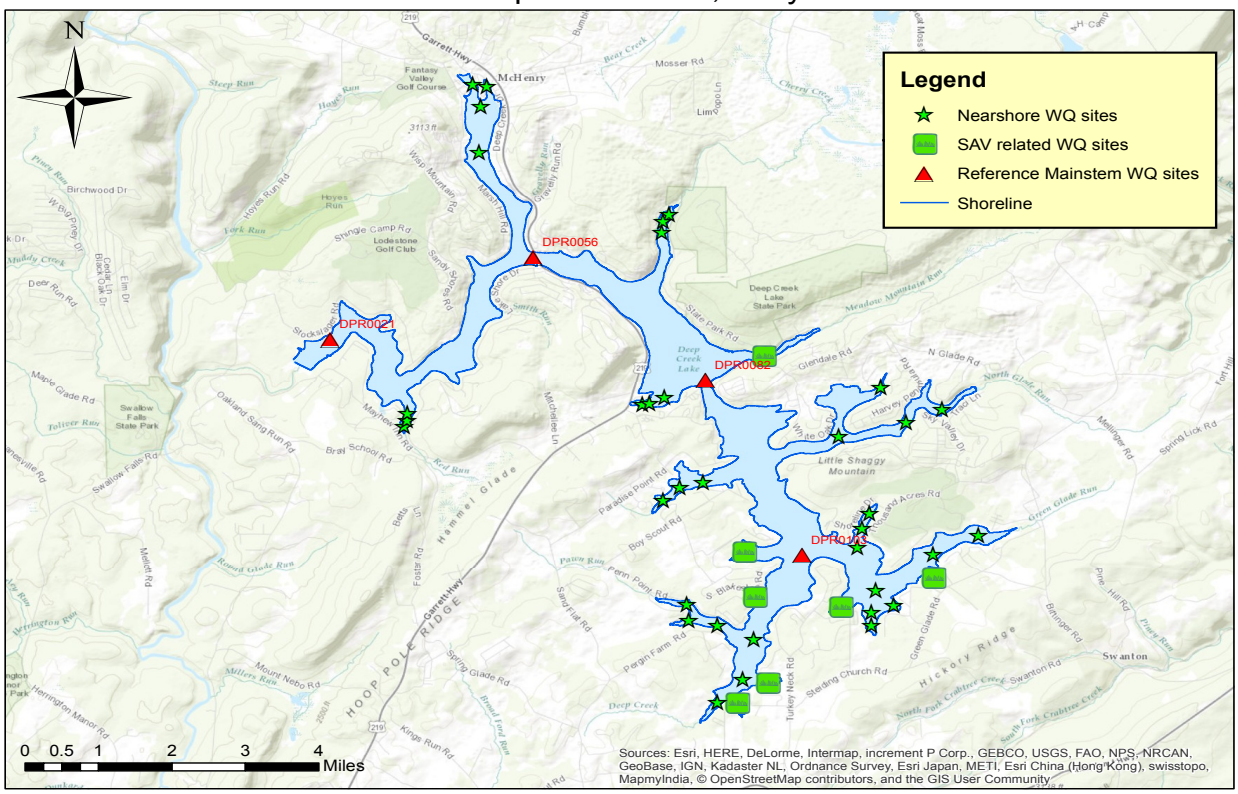
Sediment Erosion/Deposition Monitoring: Beginning in October 2015, 10 sites throughout the lake were identified to be long-term "lake level" monitoring sites. The sites were selected to have varying degrees of erosion from low, medium, to high. The goal of this effort is to determine how the elevation of these sites change over time. This will help managers better understand how much erosion and/or sedimentation is occurring at the monitored sites and thus in the different regions of the lake. Level surveyors are used to determine the set elevation of fixed sites parallel to the shore and then perpendicular to the shoreline. It is anticipated this monitoring will continue for several years at possibly 3-5 year intervals to assess changes over time and thereby highlight areas of the lake that need additional monitoring or management efforts.

Mark your calendars: Upcoming DCL Public Meetings:
Policy Review Board (PRB) Meetings - July 17th , October 30th, 2017

Contact Information: For more information concerning the Department of Natural Resources related monitoring activities contact Julie Bortz, the Maryland Department of Natural Resources representative to the Deep Creek Lake Watershed Management Plan Administrative Council at 301-387-3552 or via email at Julie.bortz@maryland.gov.

***You may find additional information about the monitoring programs mentioned here, along with background information and study findings on the soon to be updated webpage at http://dnr.maryland.gov/ccs/Pages/DCL-Watershed-Management-Plan.aspx ***

2017 Nearshore WQ Monitoring Locations
Deep Creek Lake, Maryland



Hydrilla Treatment Locations:

Of the 13 Hydrilla treatment locations in 2016, only 3 sites circled in RED were found to still