

Uncle Harvey's Pond

Orleans, MA

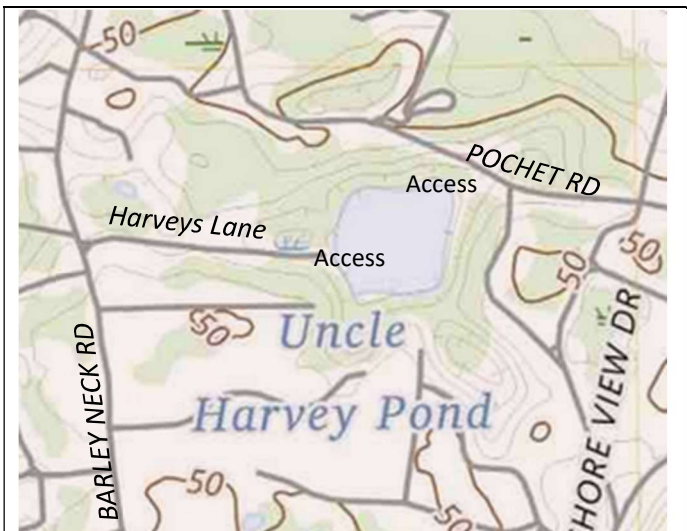
2001-2023 Water Quality Summary

POND SETTING

Uncle Harvey's Pond (UHP) is a 7.5 acre pond, located just to the south of Pochet Road and east of Barley Neck Road. UHP has public access off Pochet Road and at the end of Harvey's Lane. It is not a Great Pond, so it is not publicly owned. UHP has a maximum depth of 21 ft (6.5 m), based on a 2017 bathymetric survey completed during the UHP Management Plan. The Plan ecosystem review showed 1) impaired conditions and 2) sediment release of phosphorus (P) in the summer as the primary source of the impairments. The Town conducted an alum treatment in May 2021 to address the sediment P release and will be sewerage a number of the watershed properties as part of the Meetinghouse Pond service area.

SAMPLING HISTORY

Water column sampling has been completed at least annually since 2001. Citizen volunteers have sampled UHP in the annual Cape Cod Pond and Lake Stewardship (PALS) Snapshots each August/September and more recently added Spring sampling. Snapshot protocols include: dissolved oxygen and temperature profiles, Secchi clarity readings, and water sample analysis for pH, alkalinity, photosynthetic pigments, and nutrients [total P and total nitrogen]. The 2017 Management Plan completed more detailed ecosystem sampling, reviewed historical results, and addressed important data gaps for management, including sediment analysis, phytoplankton sampling, and stormwater measurements.



2023 WATER QUALITY STATUS

The UHP Management Plan reviewed historical water column data and 2017 collection of complementary measures (e.g., sediments, stormwater, watershed land use). The plan assessment showed that the pond had regularly impaired deep conditions (i.e., anoxia) that periodically released significant P to the water column. When the water column mixed, these large inputs of P caused cyanobacteria blooms. Review of all P inputs to the pond showed sediment P was 67% of the summer water column P budget and this load nearly tripled the available water column P. Phytoplankton growth regularly reduced clarity and historical data showed a significant decreasing clarity trend from 2001 through 2017. The May 2021 alum treatment was more limited than recommended, but monitoring after the treatment showed notably reduced water column P and chlorophyll levels and improved summer clarity.

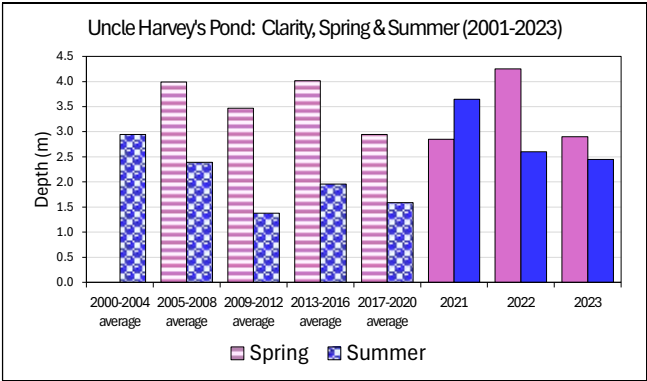
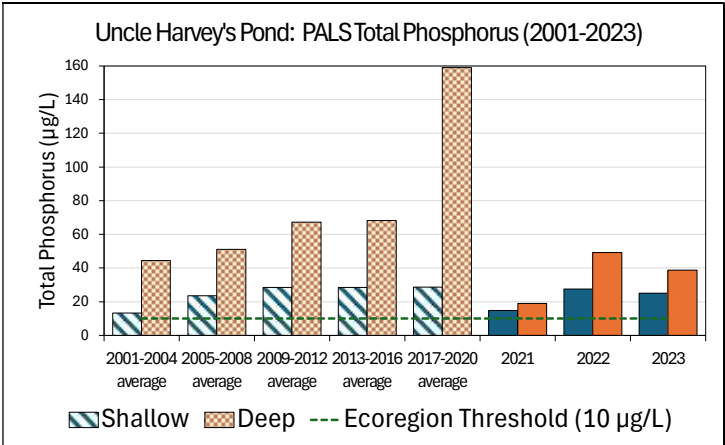
ECOSYSTEM STATUS:

IMPROVED

but still has deep summer anoxia and high TP concentrations. Monitoring recommended to evaluate whether additional alum will be needed.

Uncle Harvey's Pond Management Plan is available on the Town website:

<https://www.town.orleans.ma.us/DocumentCenter/View/1632/Uncle-Harveys-Pond-Management-Plan---March-2018-PDF>

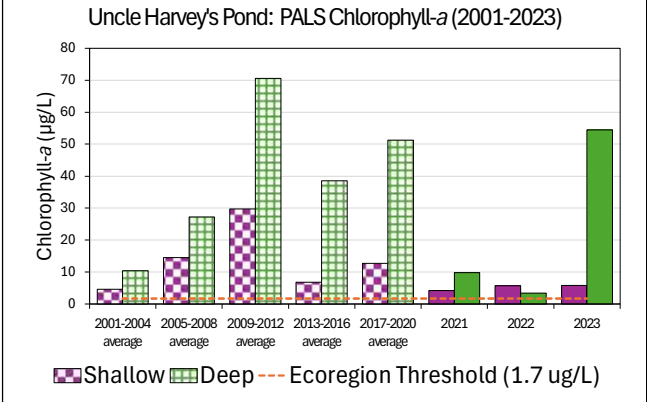
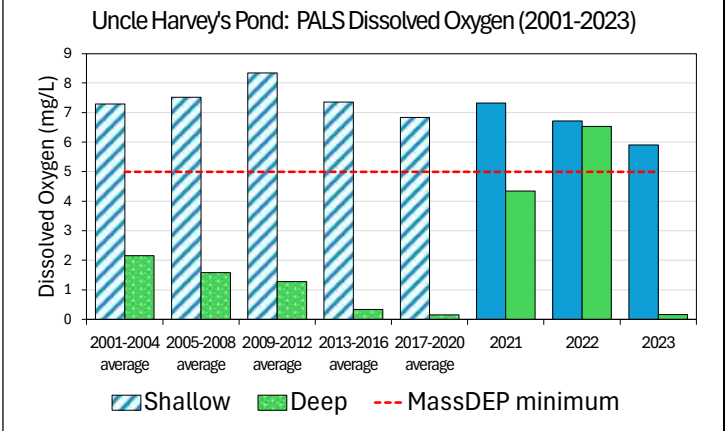


TOTAL PHOSPHORUS

Phosphorus (P) determines the amount of plant growth in freshwater ponds. Excessive P harms ecosystem health and causes algal blooms and bottom anoxia. On Cape Cod, a regional threshold goal of 10 µg/L total phosphorus (TP) was developed. In Uncle Harvey’s Pond, the 2021 alum treatment significantly decreased both shallow and deep TP concentrations, but summer concentration still exceed the regional threshold.

Water Clarity

Water clarity measured with a Secchi disk is an easy way to measure how deep light can penetrate into a pond water column. Clarity is an indirect measure of phytoplankton density and where plants can grow on a pond bottom. In Cape Cod ponds and lakes, clarity tends to be greater in the spring and reduced in the summer as phytoplankton populations increase. Summer clarity in Uncle Harvey’s Pond improved notably after the 2021 alum treatment.



DISSOLVED OXYGEN

Dissolved oxygen (DO) is a primary regulatory criteria used to assess the ecological health of freshwater bodies. MassDEP regulations require warm water ponds, like UHP, to have DO concentrations greater than 5 mg/L. UHP generally has acceptable shallow DO concentrations throughout the year. However, deep levels are generally less than the MassDEP minimum. Even though alum treatments are not expected to improve DO levels, 2021 and 2022 deep summer DO levels were notably improved after the May 2021 alum treatment. Sustained lack of oxygen will cause the release of P from the sediments to the water column.

Chlorophyll-a

Chlorophyll-a (CHL) is the primary pigment that most plants use for photosynthesis, so its concentration is often used as proxy for the size of the phytoplankton population. Phytoplankton are a natural portion of all pond ecosystems, but nuisance populations or “blooms” may occur when excessive nutrients are present. On Cape Cod, a regional threshold goal of 1.7 µg/L CHL was developed. Prior to the 2021 alum treatment, UHP average late summer shallow CHL levels were 7X the regional threshold. After treatment, they were ~50% of the prior level.