Marine and Fresh Water Quality Committee
Meeting Minutes
Public Information Meeting and Q&A – Pilgrim Lake Water Quality, Cyanobacteria, and Article 32 Funding for Interim Water Quality Remediation/Alum Treatment
October 11, 2023 (Nauset Room and via Zoom)

Attendees: Carolyn Auty, Ed Hafner, Mary Griffin, Carolyn Kennedy, Richard Levy (Chair), Valerie May (via Zoom), Robert Mullin (via Zoom) and Judy Scanlon

Regrets: Judith Bruce

Guests: Ed Eichner (School for Marine Science and Technology UMass Dartmouth (SMAST)), Alexandra Fitch (Orleans Health Agent), George Meservey (Orleans Director of Planning and Community Development)

AGENDA

1. **Call to Order.**

   The Chair called the meeting open at 10:31 AM.

   MFWQC members and guests introduced themselves.

   Rich summarized MFWQC charge items that are relevant to holding this meeting. He also summarized the purpose of the meeting with respect to providing information and public Q&A regarding Town Meeting Article 32, the meeting agenda and procedure for participation.

   If approved by Town Meeting vote, Article 32 would provide funding for an interim alum treatment for remediation of water quality in Pilgrim Lake, which was impacted by a large Cyanobacteria bloom starting in early August 2023.

2. **Welcome Guests: Ed Eichner, Principal Scientist, TMDL Solutions/Adjunct Professor, Coastal Systems Program/SMAST; Alexandra Fitch, Health Agent, Health Department, Town of Orleans; George Meservey, Director of Planning and Community Development, Town of Orleans.**

3. **Article 32 – Alum Treatment at Pilgrim Lake - How we got here and next steps if funding is approved - George Meservey.**

   George Meservey presented background information and described the process that resulted in Article 32:

   - The Town has supported water quality monitoring over many years, particularly the more recent monitoring conducted under strict Quality Assurance (QA) plans, the development of Management Plans by SMAST for four great ponds in Orleans and Uncle Harvey's Pond. SMAST works with MFWQC.
   - The Pilgrim Lake Management Plan was issued in 2019. Town is proceeding with steps toward sewering the Pilgrim Lake area. Sewers would be completed in approximately 2028.
   - MFWQC previously recommended an interim alum treatment of Pilgrim Lake to the Select Board.

- Town has approved funding in two previous articles in 2018 and 2021 for water quality measures for pond remediation. The Select Board chose to include Article 32 as it is specific to proceeding with an interim alum treatment at Pilgrim Lake.

Public Q&A

Approximately four citizens had questions, which generally included the following topics:

- The timing and funding of recommended remediation;
- The probability of future blooms with or without alum treatment; and
- Whether water quality conditions in lakes/ponds with algal blooms would improve.

George provided responses to the questions regarding administrative aspects, generally as follows, with some background information provided by members of the MFWQC.

- Initial work on the alum treatment has begun under contract with BSC ($9K committed) to proceed with the permitting process/NOI.
- Article 32 is a funding measure to proceed with the regulatory process to conduct the alum treatment of Pilgrim Lake.
- MFWQC members provided further background information regarding current and past approvals regarding funding for pond remediation.

A discussion was held regarding whether the ability to proceed could be stopped by the Select Board if the Town Meeting vote is positive in favor of Article 32 (George sees this as unlikely) or by a negative vote on Article 32, which George indicated would stop the process.

In a later portion of the meeting, a citizen had a question regarding the potential for treatment of Crystal Lake. George will check with Town counsel with respect to adjusting Article 32 to include Crystal Lake and respond to the citizen's question.

A question regarding continued community involvement during the permitting process also occurred later in the meeting. George responded that there will be no further public participation necessary other than during Conservation Commission meetings open to the public.

Ed Eichner responded to questions regarding the probability of bloom recurrence and effects on water quality generally as follows.

- While the probability of future blooms cannot be definitively predicted, the persistence of conditions that caused the initial bloom increases the probability that future blooms will occur.
- An alum treatment would result in improved water quality as phosphorous in the deep sediments would not be available to generate blooms and anoxic conditions.

Citizens' questions moved toward the treatment process under Item 4.

4. **Alum Treatment of Pilgrim Lake – What is alum, why is it used, and what does it do. Examples of historical use of alum to remediate freshwater ponds on Cape Cod. Why is it recommended for an interim water quality treatment for Pilgrim Lake - Ed Eichner**

Ed did not have an opportunity in advance of citizens' questions to present a summary of the treatment process and background information regarding its use on Cape Cod, but proceeded to integrate that information in responses to the questions.

- Public Q&A

Approximately nine citizens and Orleans Natural Resources Manager Nate Sears had questions regarding alum treatment of Pilgrim Lake, which generally included the following:

- The timeline for the treatment process/duration of effectiveness relative to the anticipated schedule for sewer installation;
- Continued phosphorous loading in the lake from septic system discharges to groundwater during the period until sewer connections are completed;
- Potential alternatives to alum, such as aeration or oxygenation, for treatment to protect from future blooms;
- Potential effects of alum on the Town's recreational use of the lake and on herring;
- The persistence of alum in the lake water and sediments after treatment and potential impact on human health; and
- Phosphorous loading to the lake resulting from use of fertilizer and pesticides within the lake watershed.

Ed Eichner's responses to questions and additional information provided by Ed, with supporting information provided by MFWQC members, generally included the following:

- Summary and review of pond data and the decision process for alum treatment, described as an "insurance policy" to avoid algal blooms in advance of completion of sewer connections over the next approximately five years.
- Discussion regarding the general ubiquitous presence of aluminum in the environment.
- Detailed monitoring data for both Pilgrim and Crystal lakes were presented, principally focused on the phosphorous budget for both lakes, showing relative contributions from various sources. The alum treatment would target phosphorous that is present in Pilgrim Lake sediments. Alum targeted for the deepest portions of the lake would immobilize phosphorous in sediments that would otherwise trigger algal blooms and anoxic conditions. Groundwater impacted by septic discharges that continues to discharge to the lake would not be affected and would continue for approximately one year following final sewer construction.
- Alum is the most efficient, cost-effective method for remediation of the lake. Limitations in implementation and effectiveness of alternatives, such as aeration and oxygenation, were discussed. A citizen member of the Orleans Pond Coalition (OPC) commented that the oxygenation project at Sarah's Pond is a demonstration project and not ready for commercial use.
- Alum will not be present in dissolved concentrations that could impact recreational use of the lake. Alum will be isolated in deep sediments that are not readily accessible by humans.
- To protect herring, alum treatment must be completed before herring return, typically in March. Alum treatment is a common measure for treatment with lakes with herring runs and has been used at other lakes with herring runs on Cape Cod.

- Best Management Practices for those living along ponds, including not using fertilizer, eliminating direct paths for runoff and planting of only native plants have been presented to citizens. In general, fertilizer use on the Cape is relatively low compared to off-Cape. Pesticides are not very mobile beyond being bound to plants and in soils, and, therefore, do not typically occur in significant concentrations in groundwater (i.e., not greater than ng/L level concentrations or current laboratory detection limits).

5. **Cyanobacterial Blooms - What actions does the Town Health Department take when there is a confirmed "significant" Cyanobacteria bloom.**

- Alexandra Fitch summarized the Town Health Dept.'s responsibilities in public communication and education and coordination with the State Dept of Public Health. The Town will respond to notice of a bloom with a site visit to collect observational data to pass along to the State. The Health Department works with the Association to Preserve Cape Cod (APCC) and OPC in data collection and public communication. State reviews data and directs the Town Health Dept. response regarding blooms. The minimum time period for closure due to agal blooms is two weeks. Alexandra also summarized the process for data collection and evaluation by the Health Dept in coordination with APCC/ OPC monitoring, which is conducted weekly during blooms (otherwise at 2-week intervals in the absence of blooms). Data are submitted to the State for review. Reopening of a pond/lake can occur after two consecutive weekly samples indicate that the bloom has abated.

- Public Q&A

Two citizens had questions, which were generally as follows.

- A question as to whether the public can report observations of potential impacts, such as water discoloration or scum on the water; and

- A question regarding impacts of cyanobacteria on humans, particularly children, and animals, particularly dogs.

Alexandra responded that citizens are encouraged to report observations of potential impacts and also reiterated that the Town will be further educating swim instructors and lifeguards to identify potential blooms. Reporting by phone is more efficient/timely than reporting via an email to the Town.

Alexandra indicated that not all cyanobacteria are toxic and deferred to Ed. Eichner for more s. Ed indicated that toxicity varies among cyano species. Body mass is critical, so pets are typically affected more because of low body mass and their tendency for consumption of the water. Effects on humans are typically on the skin, e.g., "swimmers itch". Ecological effects of a cyano bloom are the most critical impacts.

Other discussion regarding health and ecological impacts included generally the following:

- Judy Scanlon noted that ecological impacts and fish kills resulting from cyanobacteria blooms have occurred, such as previous cyano blooms in Cedar Pond that resulted in fish kills including perch and herring and negative effects on eels.

- Carolyn Kennedy cited research on cyanobacteria, including a long-term study around lakes in New Hampshire with frequent blooms and severe neurotoxic conditions in nearby residents possibly resulting from airborne exposure. The potential toxic exposures to both humans and animals that may result from particular blooms (12 species of cyanobacteria have been identified

to be of high risk) demonstrates the need to address bloom prevention by treatment of affected ponds/lakes.

6. Open Discussion

- A citizen described aluminum as a pharmacologically toxic compound (e.g., toxicity in antacids) and inquired regarding risk management for potential exposure of environmental receptors to aluminum from the alum treatment. Ed Eichner described the importance of pH balance that is implemented and monitored during addition of alum as an aluminum salt. Environmental exposure is low because applications occur in low light conditions where benthos organism populations are limited and not diverse (i.e., typically low populations of worms and bacteria). Benthos tends to recover to pre-alum conditions within about one year. More sophisticated aquatic species do not reside in the portion of the benthos to be treated and will not be subject to exposure to alum treatment.
- A citizen commented that ponds in Westwood's Hale Reservation have been routinely treated using alum over many years, and no blooms occurred within her 40-year residence in Westwood.

7. Closing Remarks

Members of the MFWQC expressed their appreciation for the participation of the guests and public during this meeting.

8. Adjourn

Motion to adjourn at 12:14 PM. Carolyn K motioned to adjourn, then Judy seconded. Approved 5-0-0.

Future MFWQC Meeting Dates: YR 2023- 10/23 (cancelled), 11/1, 11/27, 12/18.

Robert Mullin, Clerk Submitted Date: 12/06/2023 (Revision of 11/28/2023 submital). RAM 12/06/2023