University of Massachusetts Dartmouth
The School for Marine Science and Technology

Technical Memorandum

To: George Meservey, Director of Planning & Community Development, Town of Orleans

From: Ed Eichner, Principal, TMDL Solutions
Micheline Labrie, Director, Coastal Systems Program, SMAST, UMass Dartmouth

Date: September 23, 2024

RE: 15 Website Water Quality Summary Sheets and Updated Estuary and Pond Databases

In August 2023, the Town requested assistance from Coastal Systems Program from the School for Marine Science and Technology at UMass-Dartmouth (CSP/SMAST) to: 1) update the freshwater pond and coastal estuary water quality databases (last updated in 2019) and 2) prepare two-page water quality summary sheets for inclusion in a town website update planned by the Town Marine & Fresh Water Quality Committee (MFWQC). This Technical Memorandum accompanies the delivery of the databases and water quality summary sheets.

The Town of Orleans has funded and organized volunteer collection of water quality samples in the Town's ponds and estuaries since 2000. The estuary data had an integral role in a) supporting Massachusetts Estuaries Project (MEP) assessments of each of the five town estuaries,[1] b) the subsequent Massachusetts Department of Environmental Protection (MassDEP) nitrogen TMDLs[2], and c) the Town's wastewater planning. The pond data, in turn, has had an integral role in supporting the assessment and management plans for the towns four publicly-owned Great Ponds[3] and Uncle Harvey's Pond. The Town's pond and estuary water quality data from 2000 through 2016 was reviewed and organized in 2017[4] and 2018[5], respectively. Annual updates of both databases were also completed in both 2018 and 2019. Monitoring has continued in anticipation of needing feedback on the status of these systems for both TMDL compliance and assessing the impact of the Town's wastewater planning.

The Town and the MFWQC, which organizes the volunteer water quality sampling, have asked for an update on the recent status of the ponds and estuaries based on the available monitoring results. As such and reflecting scope of work for the project, staff collected and reviewed town-

[1] Nauset Harbor/Town Cove, Pleasant Bay, Rock Harbor, Namskaket Marsh, and Little Namskaket Marsh

[2] Total Maximum Daily Load = TMDL; a contaminant concentration or load for a given impaired water body or portion of a water body that will allow those waters to attain state water quality standards

[3] Pilgrim Lake, Crystal Lake, Bakers Pond, and Cedar Pond

[4] Eichner, E and B. Howes. 2017. Town of Orleans Freshwater Ponds, Water Quality Monitoring Database: Development and Review. Coastal Systems Program, School for Marine Science and Technology, University of Massachusetts Dartmouth. New Bedford, MA. 216 pp.

[5] Eichner, E and B. Howes. 2018. Town of Orleans Estuaries: Water Quality Monitoring Database Development and Review. Coastal Systems Program, School for Marine Science and Technology, University of Massachusetts Dartmouth. New Bedford, MA. 86 pp.

collected 2019-2023 water column monitoring data from 1) Pleasant Bay, Rock Harbor, Little Namskaket Marsh, Namskaket Marsh, Nauset Marsh/Town Cove, 2) spring and PALS freshwater pond data and 3) water column data collected for the Management Plans of Uncle Harvey's Pond, Pilgrim Lake, Crystal Lake, and Baker Pond. The original scope requested a review of 2019-2022 data, but project staff added 2023 data as it became available from the CSP Analytical Facility. All data was checked with standard QA/QC procedures and incorporated into updated versions of the previously completed 2000-2018 estuary[6] and pond[7] databases.

After the databases were updated, project staff prepared two-page water quality summary sheets in a pdf format for the selected estuary systems and freshwater ponds. Nine (9) two-page estuary summaries were prepared with summaries for three sections of Pleasant Bay (*i.e.*, the River, Northwest, and Pochet), three sections of Nauset Marsh (*i.e.*, Town Cove, North/Salt Pond, and South/Mill Pond), and one each for Rock Harbor, Little Namskaket Marsh, and Namskaket Marsh. Five (5) two-page freshwater pond summaries were prepared for the following freshwater ponds selected by the MFWQC: Uncle Harvey's Pond, Pilgrim Lake, Crystal Lake, Baker Pond, and Uncle Harvey's Pond. As specified in the project scope, the estuary summary sheets focus on total nitrogen, clarity, total pigments, and dissolved oxygen. The freshwater pond summary sheets focus on total phosphorus, clarity, chlorophyll-a, and dissolved oxygen.

Please review the summary sheets and databases and let us know if there are any edits you would like prior to public distribution. If they are acceptable to you, the summary sheets and accompanying databases are ready for public distribution.

[6] CSP/SMAST Technical Memorandum: Coastal 2018 Water Quality Database Update. June 18, 2019 (revised 10/2/20). From: B. Howes, CSP/SMAST and E. Eichner, TMDL Solutions. To: C. Kennedy, Chair, Town of Orleans, Marine and Fresh Water Quality Committee and G. Meservey, Director of Planning & Community Development, Town of Orleans. 25 pp.

[7] CSP/SMAST Technical Memorandum: Orleans Freshwater Pond 2018 Water Quality Database Update. July 23, 2019 (revised 10/2/20). From: B. Howes, CSP/SMAST and E. Eichner, TMDL Solutions. To: C. Kennedy, Chair, Town of Orleans, Marine and Fresh Water Quality Committee and G. Meservey, Director of Planning & Community Development, Town of Orleans. 12 pp.