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Media Release: Pleasant Bay Water Quality Trends Presented

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Chatham, Massachusetts-- Fifteen years ago the [Pleasant Bay Alliance](#) launched a water quality monitoring program manned by citizen volunteers. One of the program objectives is to provide long-term data to evaluate trends in water quality parameters related to nutrient enrichment ("eutrophication"). Water quality trends for data collected from 2000 to 2014 were presented by the Alliance's consultant at a public informational meeting held this evening at the Chatham Town Hall Annex. Data analyzed from twenty individual monitoring stations shows improvement in some parameters linked to nutrient enrichment at only seven stations. The other thirteen stations show mixed trend results and some significant, ongoing problems.

The trends and other findings are contained in a study conducted by the Cadmus Group based on data from monitoring stations throughout Pleasant Bay and its sub-embayments. Dr. Robert Duncanson, Technical Advisor for the Alliance Water Quality Program, noted: "Pleasant Bay is a large and complex estuarine system, as a result there is variability in measurements taken at a given location over time. This analysis tells us if differences in measurements over time are random, or follow a meaningful trend." Duncanson added that "trends tell only part of the story. When we compare sample data to thresholds associated with healthy conditions, there are significant issues with nutrient enrichment in some areas. We're still far off from where we need to be for a healthy system."

The Namequoit South station, for example, shows improving trends in five of six parameters over the fifteen year period. However, 80 percent of the samples collected in 2014 do not meet the dissolved oxygen threshold associated with healthy water quality. Such results indicate why trend analysis is only one tool used to guide protection of marine waters.

Time factors and changing conditions are also important. Improvement at certain stations in open water areas of the bay is likely related to increased flushing of the bay following the 2007 breach in North Beach and formation of the new inlet. Looking forward, marine geologists do not expect the inlet and increased flushing to remain in place indefinitely, so this improvement could be time-limited.

In its analysis, Cadmus conducted statistical trend analyses for the twenty individual monitoring locations, and for all locations combined (baywide). Trends were assessed for four different nutrient parameters, as well as dissolved oxygen and algal pigments that provide insight into how the system is responding to nutrient inputs.

Key findings of the station-specific analysis:

- Seven stations (Big Bay-SW, Paw Wah Pond, Namequoit-South, Meetinghouse Pond, Pochet Mouth, Namequoit River Mid, and River at Rattles Dock) have results that show declines in some nutrient parameters and improved ecosystem responses. However, the lack of decline in all nutrient parameters and the lack of consistent dissolved oxygen improvements preclude definitive statements on an overall decline in eutrophication at these stations.
- One station (Little Quanset Pond) shows trends consistent with increased nitrogen enrichment and declining ecosystem conditions.
- Results for the remaining twelve stations (Outer Ryder's Cove, Inner Ryders Cove, Crow's Pond, Muddy Creek, Muddy Creek-Upper, Big Bay-NE, Round Cove, Quanset Pond, Namequoit-North, Arey's Pond, Kescayogansett Pond, and Pochet Upper) are more variable between measures. Such inconsistencies illustrate the potential influence other factors (pH, light, water clarity, tidal flushing, etc.) have on algal growth and dissolved oxygen concentrations.
- None of the twenty stations show improvements across all six eutrophication-related parameters and none show worsened conditions across all six parameters for the full fifteen year period.

Key findings of the bay-wide analysis:

- Data collected before the 2007 inlet show increased trends in two nutrient parameters (dissolved inorganic nitrogen and phosphate), decreased trends in two other nutrient parameters (bioactive nitrogen and total nitrogen), and no significant trends in response parameters (total phytopigments and dissolved oxygen).
- Data collected after the 2007 inlet show trends of continued nutrient enrichment but trends of decreased total phytopigments and increased dissolved oxygen indicate that any increase in nutrient enrichment has not translated to worsening ecosystem conditions.
- Analysis of other physical factors affecting algal growth and dissolved oxygen (pH, light, water clarity, tidal flushing, etc.) may provide insight into why response parameters have improved despite increased nutrient levels.

Although trend analysis results show improved conditions for some parameters in portions of Pleasant Bay, sample data show that numeric targets associated with healthy water quality were consistently not achieved in recent years.

The Cadmus report cautioned against extending the trends into the future. “The trends provide insight into water quality conditions during the period of data collection,” said Andy Somor, an Associate with the Cadmus Group. “These are not predictive models and should not be extrapolated into the future,” Mr. Somor said.

“We have our many dedicated water quality monitoring volunteers to thank for collecting this impressive amount of high quality data,” Carole Ridley said. “The Cadmus team told us that this was an exemplary data set from a scientific perspective,” Ms. Ridley said. “Our next step is to combine the trend analysis with that data showing the exceedances of thresholds to create a more complete picture of the long term health of the waters.”

The full report is available for download on the home page of the Alliance’s website, www.pleasantbay.org.

The Pleasant Bay Alliance is the organization of Chatham, Brewster, Orleans and Harwich formed to implement the resource management plan for the Pleasant Bay Area of Critical Environmental Concern and watershed.