

# Lagoon Pond 2020

M.V.C. SAMPLING SUMMARY

## Nature of the Pond

Lagoon Pond is a saltwater estuary located within the towns of Tisbury and Oak Bluffs. The tide flows to Lagoon Pond via a single inlet connecting it to Vineyard Sound. Direct groundwater discharge and outflow from Upper Lagoon Pond contribute nutrient laden freshwater. The major watershed area includes concentrated development. This proximity of developed land to the pond results in high nitrogen inputs. Lagoon Pond is used for recreational swimming, boating, fin fishing, and shellfishing. Mud Creek, located off the West Arm, is a poorly flushed area of concern that contributes a high nutrient load to the Lagoon.

## Summary for 2020

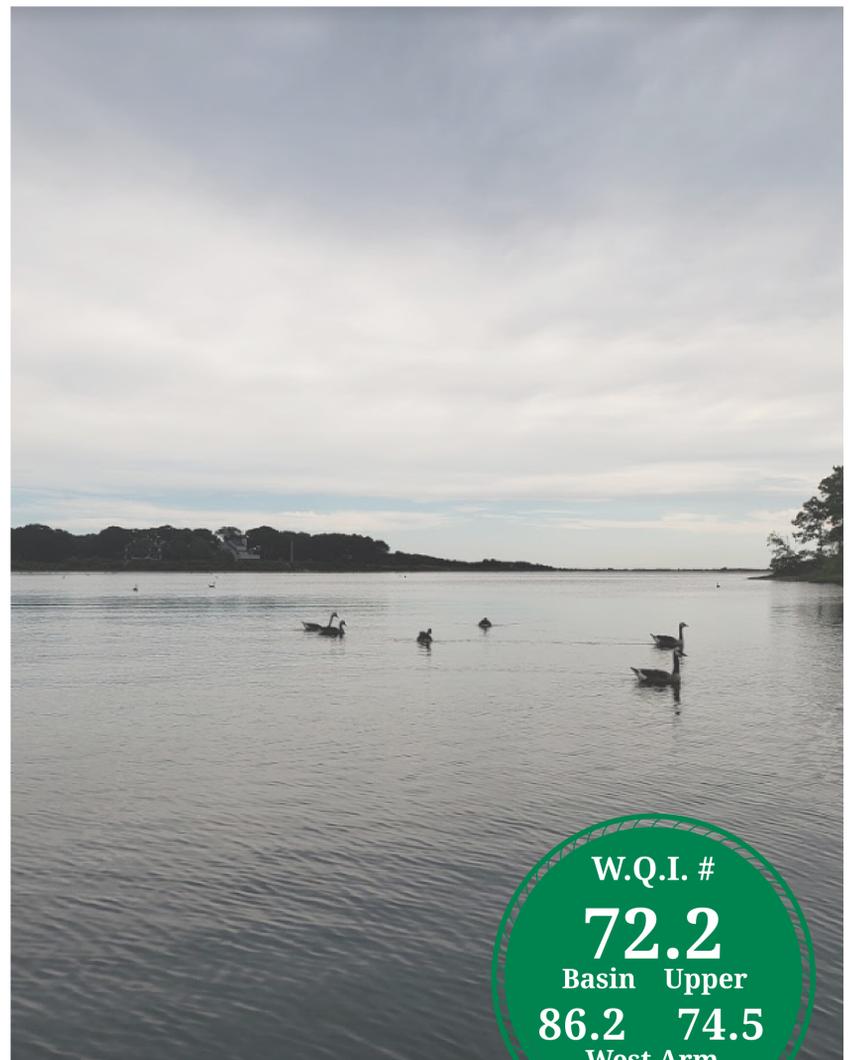
In 2020, water quality within Lagoon Pond central basin was good. However, areas furthest from the channel have slightly higher nitrogen and total pigment and lower dissolved oxygen levels. LGP-4 and LGP-6, located at the southern end, receive freshwater from Upper Lagoon Pond, at the southwest end of the pond. Limited flushing at these stations may contribute to reduced water clarity. LGP-11, located in Mud Creek, is particularly impaired and skews the data to the point it cannot be represented. Many restoration efforts are being implemented to reduce nutrients, including shellfish seeding, innovative wastewater systems, stormwater remediation and experiments with eelgrass restoration. Eelgrass is present but declining in Lagoon Pond.

## Why Sampling is Important

Field measurements and water samples are collected during the summer months to determine the pond's water quality. MVC staff collects water samples and water quality indicators including: temperature, oxygen levels, salinity, conductivity, pH, time, depth, and weather conditions at the time of our sampling. Water samples are also tested for several nutrients that in excess can be detrimental to the quality of the water and the systems it supports. Our sampling protocol is consistent with the Massachusetts Estuaries Project (MEP) and the Mass DEP TMDL recommendations, which developed the nitrogen threshold. Water samples are sent for analysis to the University of Massachusetts at Dartmouth, School of Marine Science and Technology.

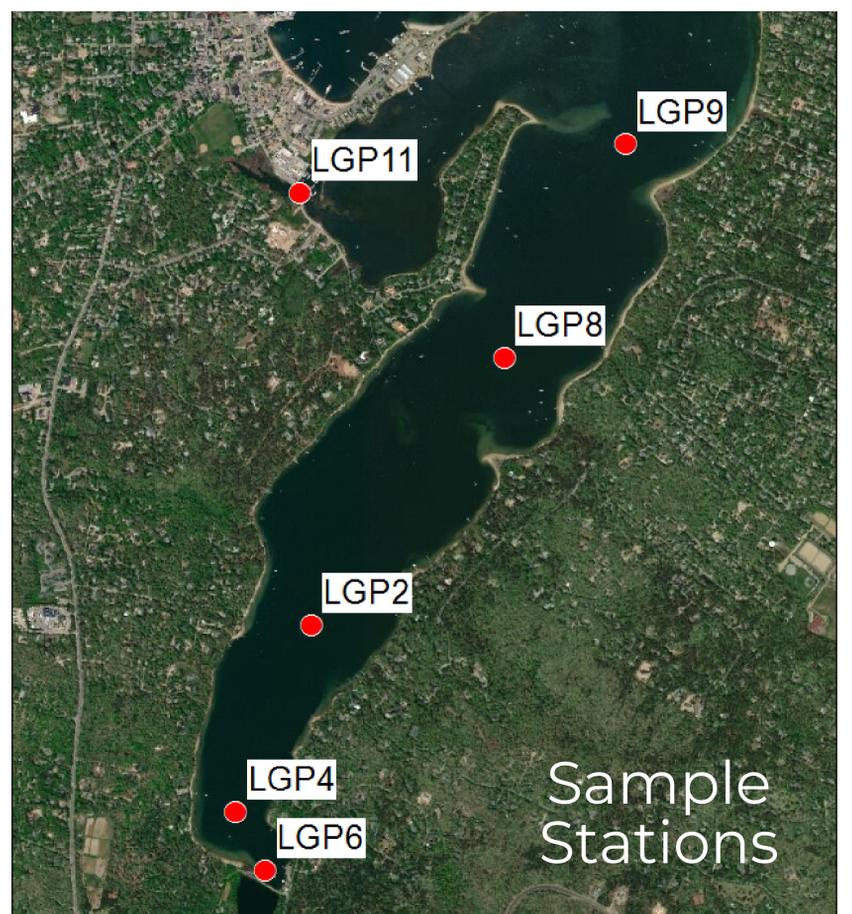


Please forward questions to:  
Sheri Caseau, Water Resource Planner  
Martha's Vineyard Commission (508) 693-3453

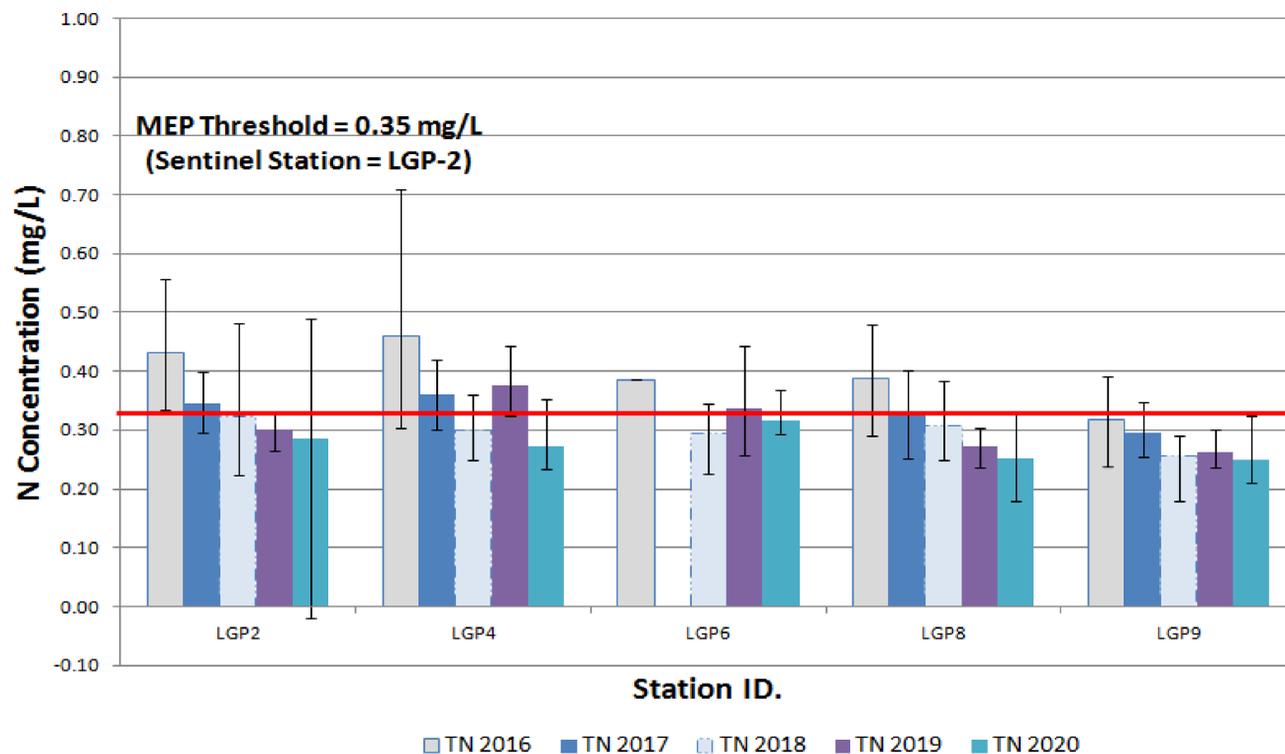


## Water Quality Index

The WQ index score is a tool used to assess the well-being of a pond. It is composed of several parameters including water clarity, oxygen levels, and nutrient levels. The score can range from 0 (low) to 100 (high) and is developed from data collected as part of a rigorous sampling schedule. The water quality in Lagoon Pond main basin overall is high. Sites further from the inlet that receive heavy nutrient concentrations and limited ocean flushing are more impaired.



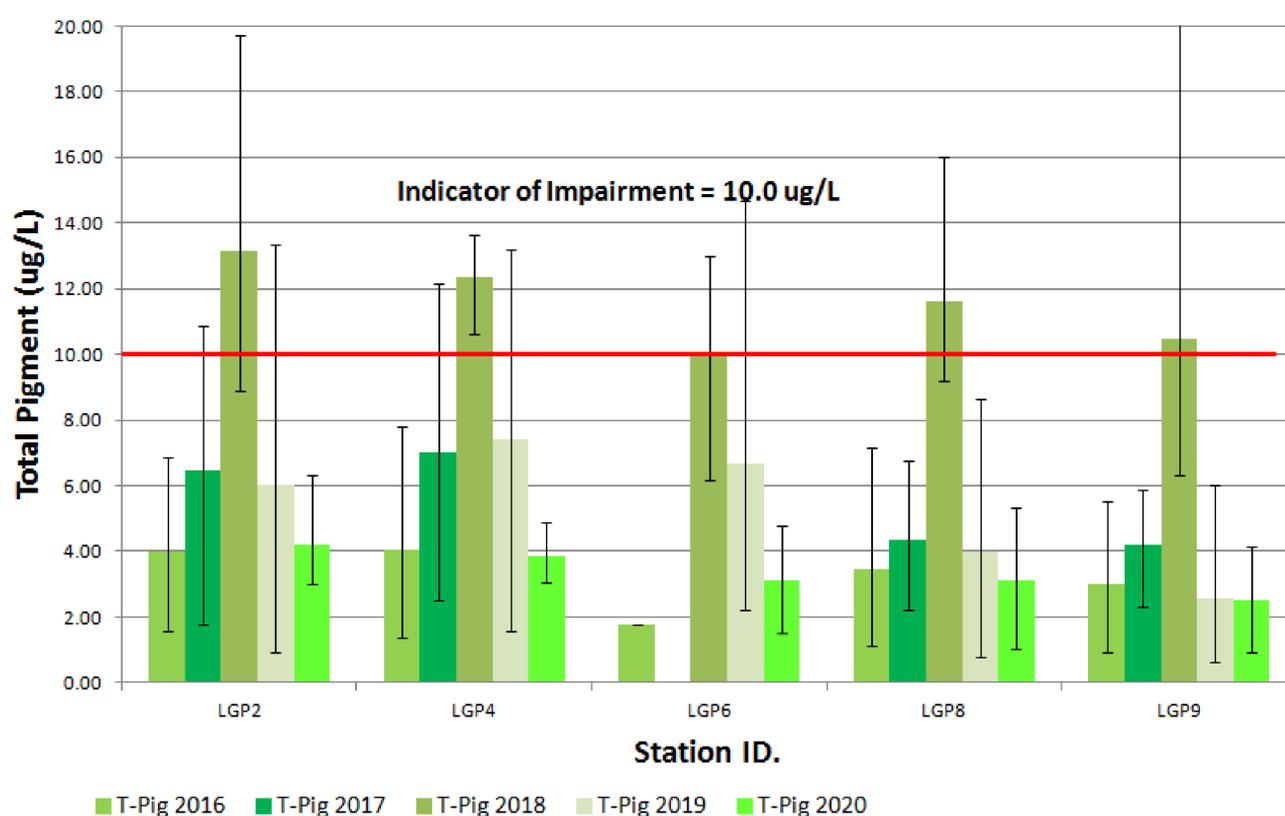
## Lagoon Pond: Total N Gradient (2016, 2017, 2018, 2019, 2020)



### Total Nitrogen

Nitrogen is a limiting nutrient necessary for plant, phytoplankton, and algae growth, but excess can be harmful. During 2020, the average nitrogen levels were below the targeted threshold of 0.35 mg/L for all sites, except LGP-11. While we've seen decreasing trend in the past few years, we see nitrogen spikes that exceed the threshold. To determine the overall health of a system a long term average should be calculated.

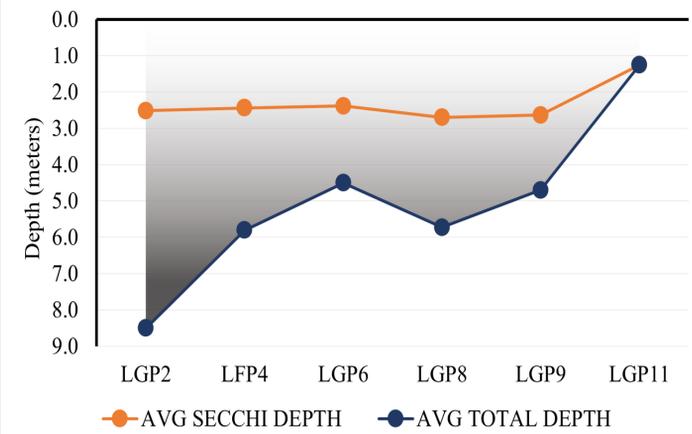
## Lagoon Pond: Total Pigment Gradient (2016, 2017, 2018, 2019, 2020)



### Total Pigment

Total pigment indicates the level of microscopic plant matter within the water, which nitrogen levels can influence. Within 2020, levels of total pigment decreased from past years. LGP-11 levels are extremely high and represent an area of concern. Data from LGP11 is excluded from this graph because it skews results for all other sites.

### Water Clarity

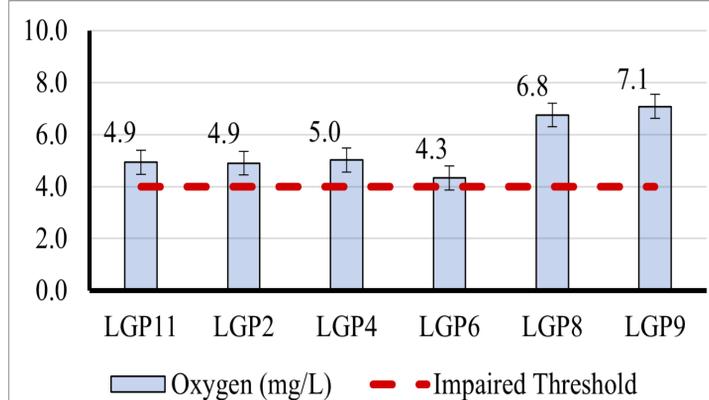


In 2020, water clarity averaged 2.53 meters across all sampling stations, excluding LGP11. This is slightly higher than in previous years. Water clarity is higher depending on the proximity to the inlet, as evidenced by stations LGP9 and LGP8 having slightly higher Secchi depths than other sites more removed.

### 2020 Sampling Dates

- July 12th
- July 28th
- August 9th
- August 24th

### Dissolved Oxygen



Dissolved Oxygen (DO) concentrations are above the impaired threshold levels at all sites. Stations LGP8 and LGP9 are above 6 mg/L, which indicates good water quality that could support a healthy benthic community at these sites. Stations LGP2, LGP6, LGP11 hover near the impairment threshold. LGP2 and LGP4 are deep stations, which may account for the low minimum DO concentrations because oxygen may not mix within lower levels of the water column.

Disclaimer: Dissolved Oxygen (DO) concentrations shown here are a snapshot of conditions when the sample was taken. DO levels can fluctuate widely throughout the day and night due to photosynthesis and respiration of plants.