

# Chilmark Pond 2020

## M.V.C. SAMPLING SUMMARY

### Nature of the Pond

Chilmark Pond is a closed coastal pond that lies entirely within the Town of Chilmark. This system consists of upper (western end), middle, and lower Chilmark Pond. When the pond is opened, the lower brackish basin requires about 15 days for a 95 % flush. The upper pond remains primarily freshwater. Historically, the lower basin of the pond has been primarily impaired by nitrogen input from septic systems. Meanwhile, the Upper Ponds have been mainly impacted by agricultural nitrogen input from fertilizers and animals. Since the upper and middle ponds are mainly freshwater, they are also impacted by phosphorous pollution, which can cause cyanobacteria blooms.

### Summary for 2020

Chilmark Pond nutrient levels are above the recommended Total Maximum Daily Load (TMDL) and have reached an all-time high in 2020 compared to past sampling seasons. The Pond openings flush the lower pond but do not flush the upper and middle ponds thoroughly. The upper pond remains entirely freshwater because of input from groundwater and freshwater from the tributaries. Cyanobacteria blooms have been observed in the middle pond for the past several years. Further management plans should be implemented to decrease nutrient loading to improve water quality on the entire pond system. This will increase the recreational, ecological and aesthetic value of the pond.

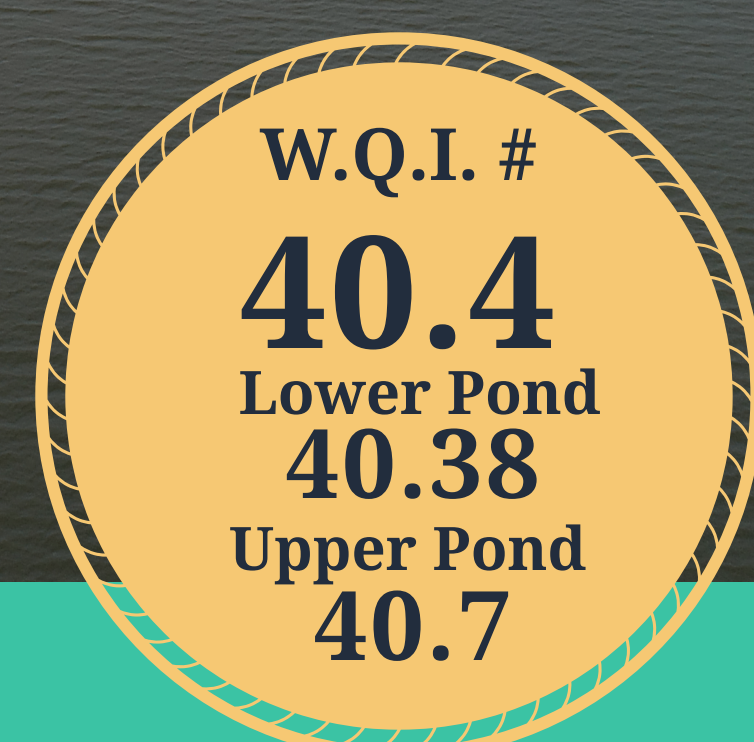
### Why Sampling is Important

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:  
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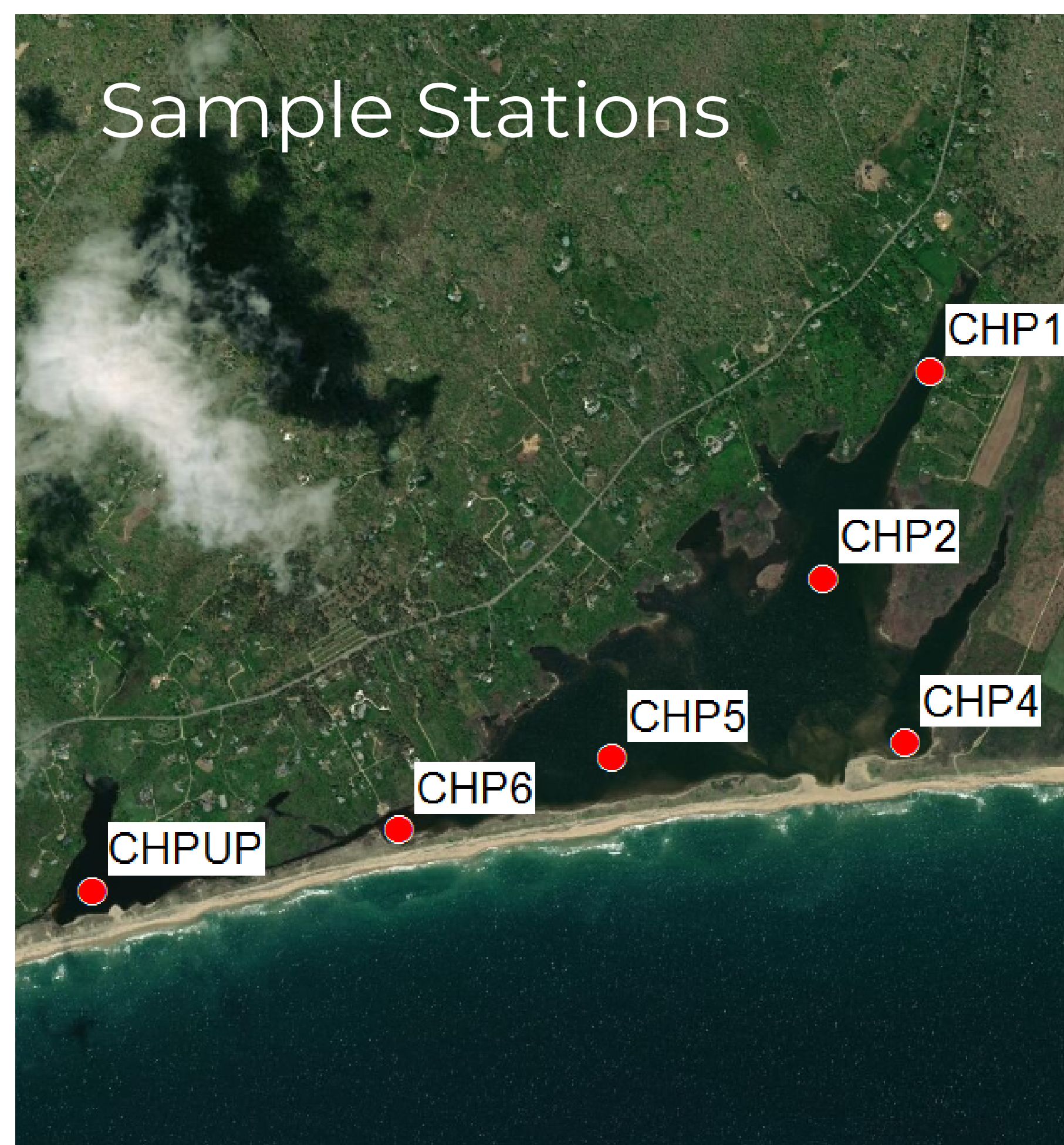
Chilmark ponds remains shallow and in poor health, with low water clarity, a increasingly shallow basin and rising bacteria levels.



### Water Quality Index #

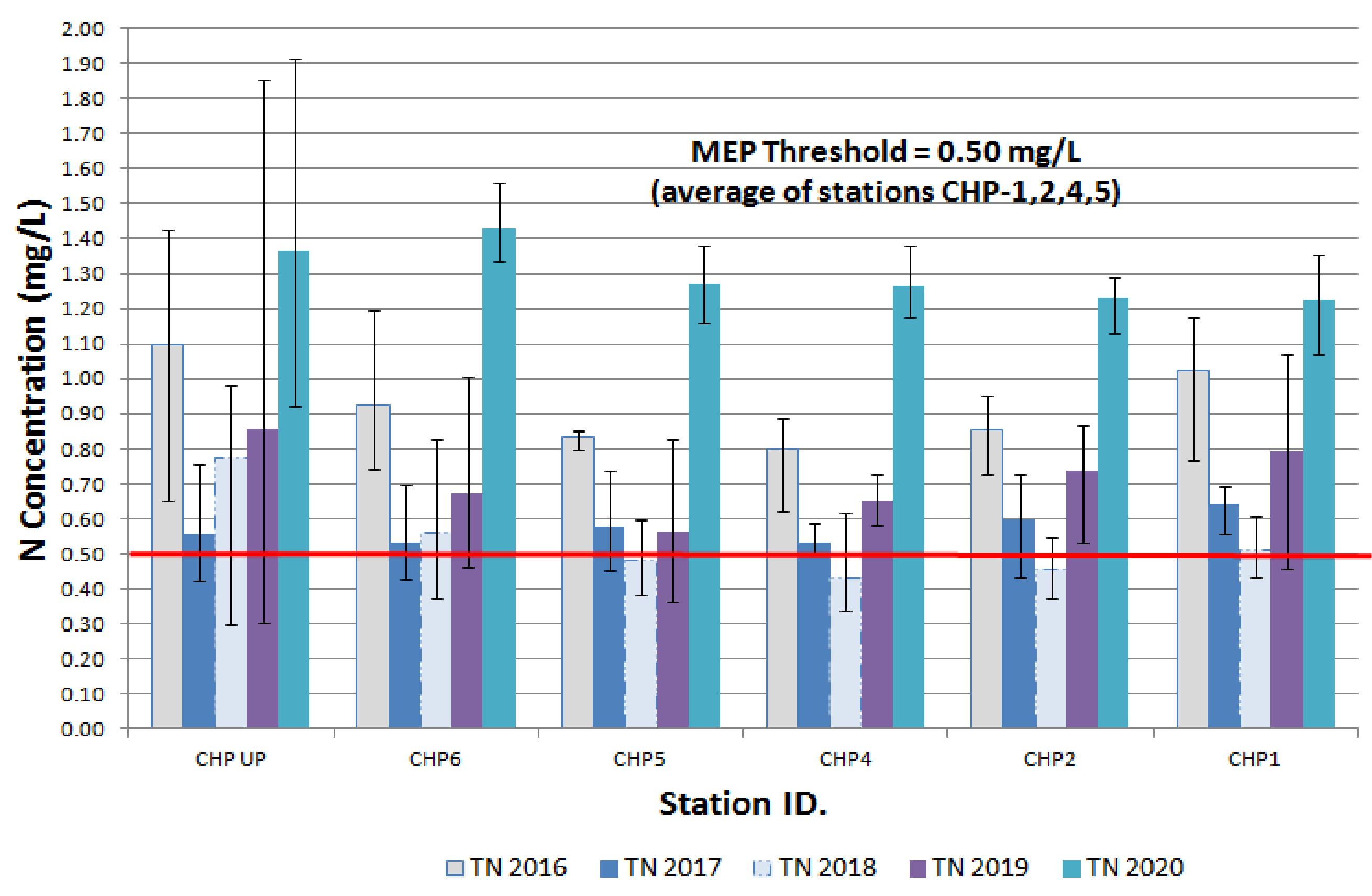
The water quality index score is a tool used to assess the well-being of a pond. It is composed of several parameters on the pond including water clarity, Oxygen levels, and nutrient levels. The score can range from 0 to 100 and is developed from data collected as part of a rigorous sampling schedule. Chilmark pond has seen a decrease in water quality since 2019 (score of 46) but is more consistent across the Upper and Lower Ponds with scores from each individual sampling site coming close to the average.

### Sample Stations





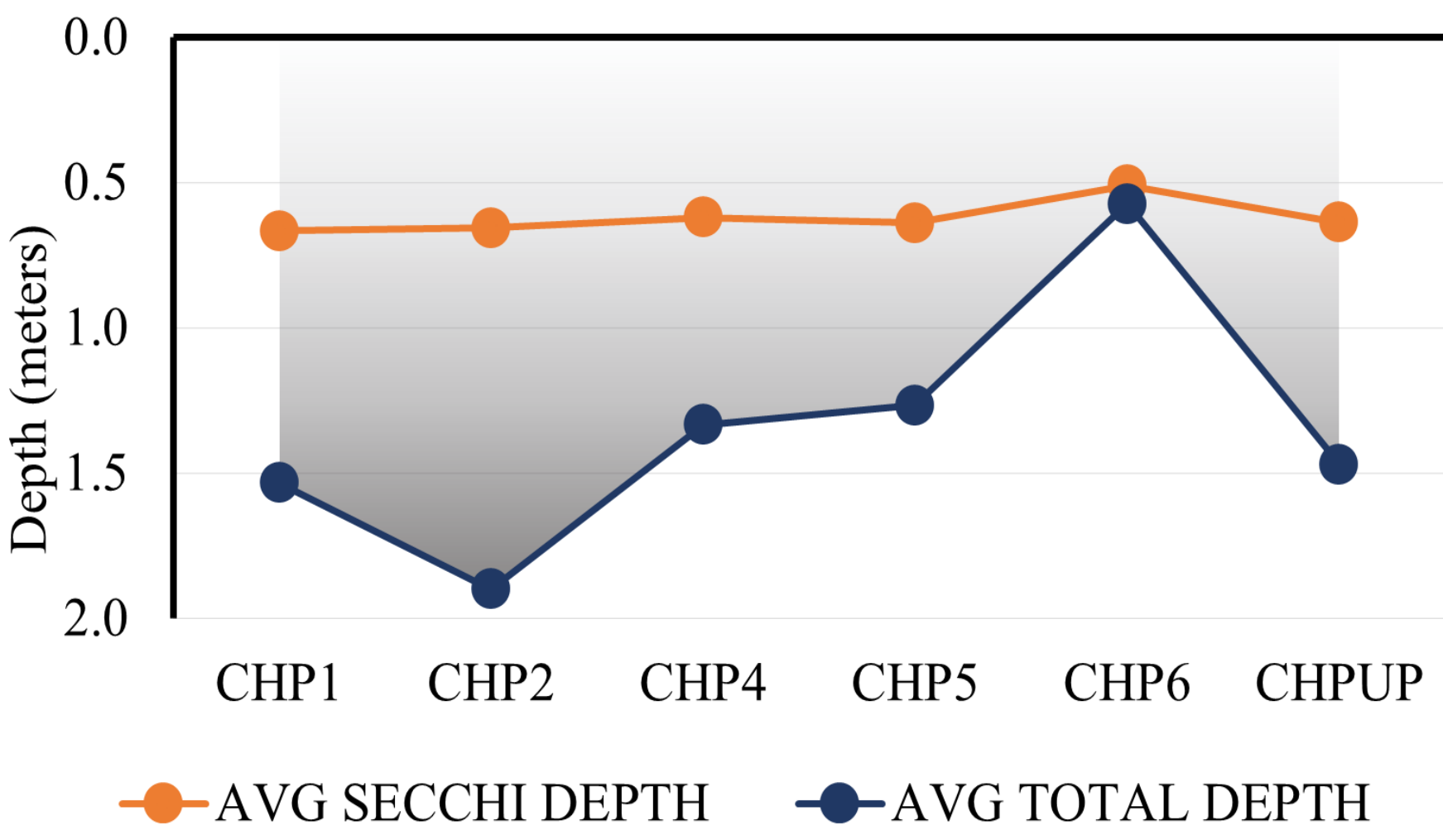
### Chilmark Pond: Total N Gradient (2016, 2017, 2018, 2019, 2020)



### Nitrogen

Nitrogen is necessary for plant, phytoplankton, and algae growth, but in excess can be harmful to the system. In 2020, high nitrogen was recorded at all sites across the pond. These values were more than double the TMDL threshold, and we have observed an upward trend in nutrient levels at most sites since 2017. More frequent openings could decrease total nitrogen levels within the pond. However, openings negatively impact recreational use of the pond. Additional remediation strategies could be considered.

### Water Clarity

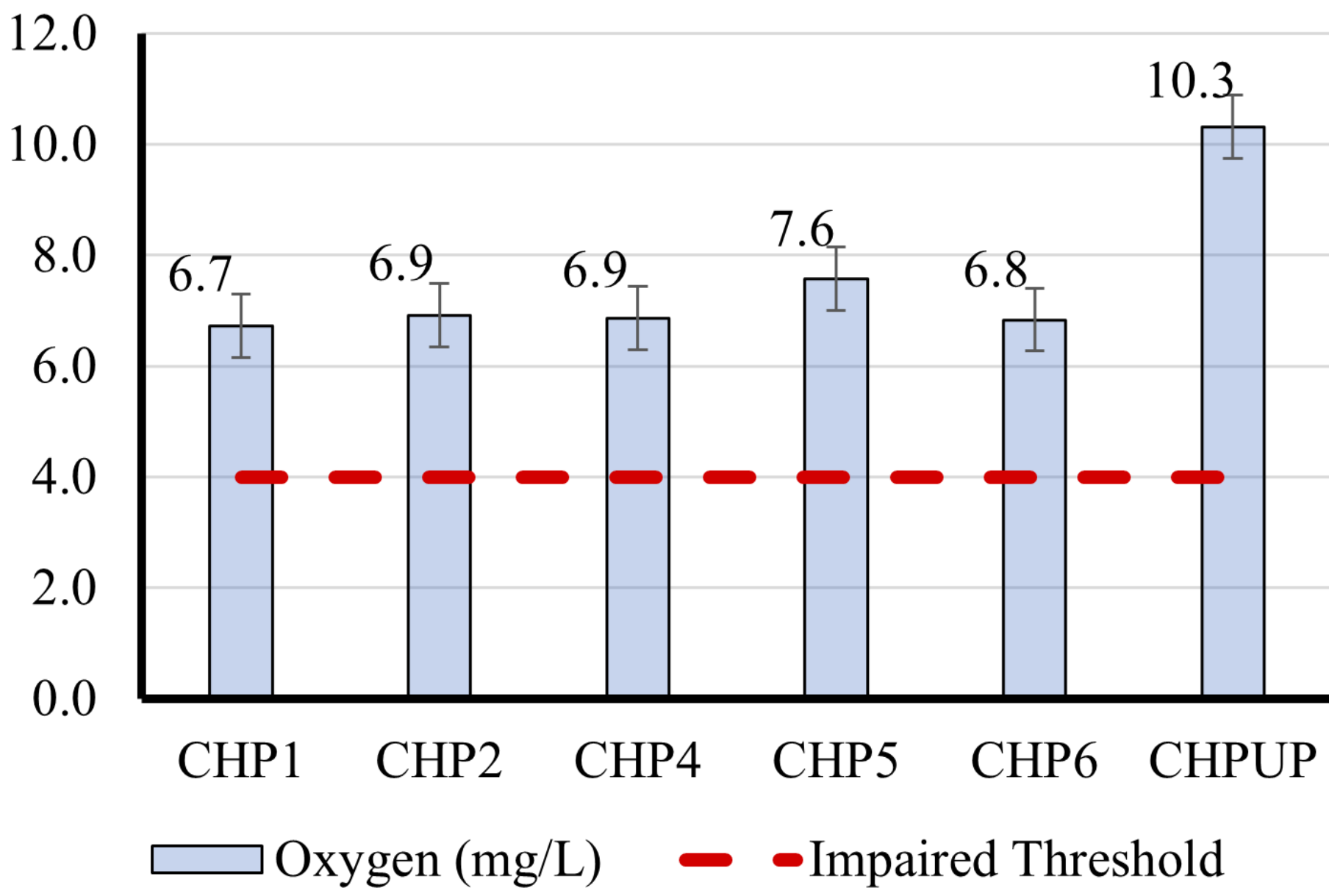


Similar to 2019, the average water clarity within Chilmark Pond remains very poor, with light penetrating no more than one meter in most parts of the pond. With the exception of CHP-6, which is a shallow site that had maximum light penetration throughout the sampling season. Turbidity could be caused by external sources or algal growth within the pond.

### 2020 Sampling Dates

- July 22nd
- August 20th
- September 24th
- November 22nd
- January 6th

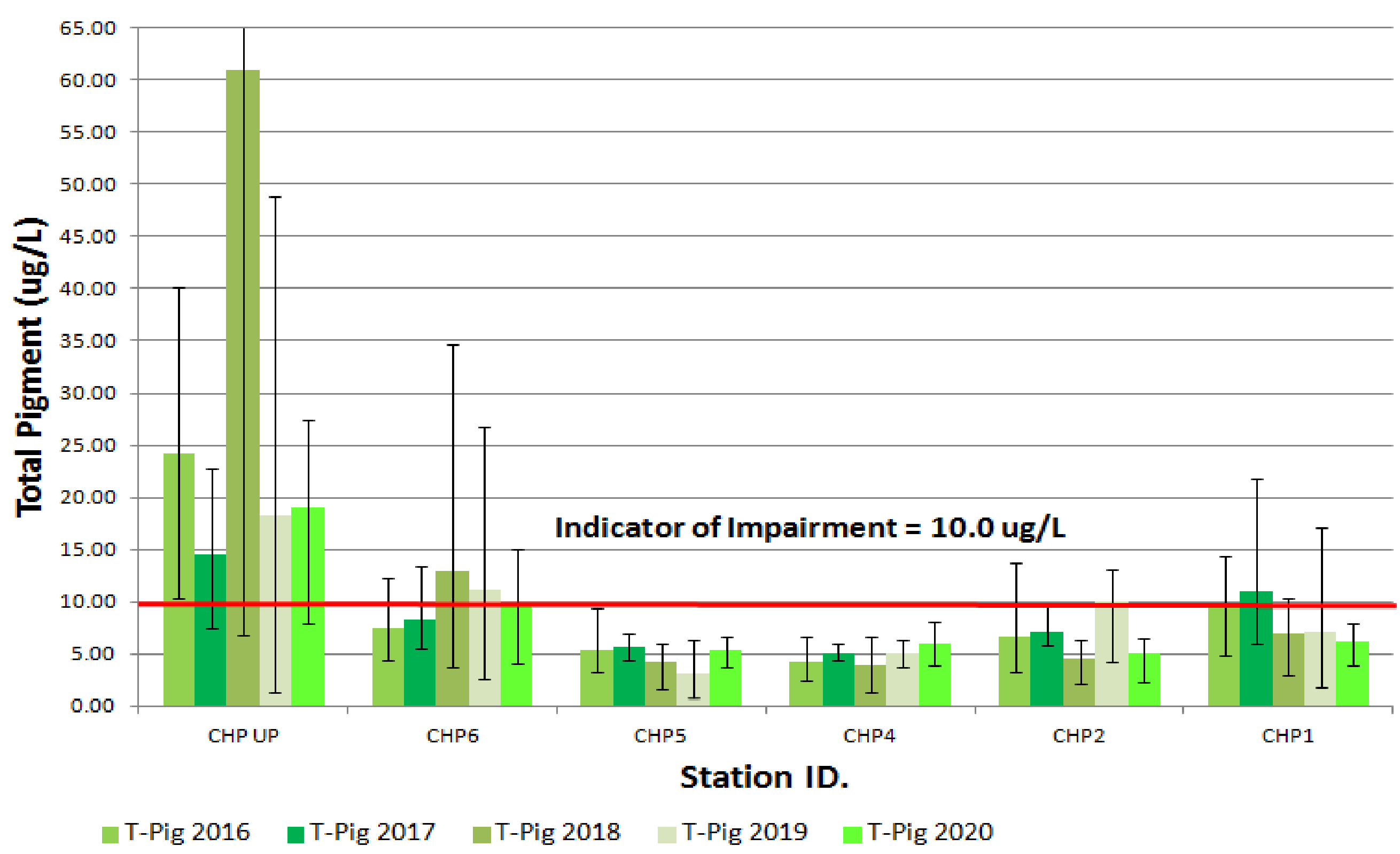
### Dissolved Oxygen (DO)



Dissolved Oxygen (DO) in 2020 remained above the threshold of impairment of 4 mg/L at all stations. This indicates that there is adequate oxygen to support a natural benthic community within the pond. Compared to previous years, 2020 DO was slightly lower at certain stations than in the past.

Disclaimer: Dissolved Oxygen (DO) concentrations shown here are snapshots of conditions at the time samples are taken. DO levels can fluctuate widely throughout the day and night due to photosynthesis and respiration of plants.

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



### Total Pigment

Total pigment indicates the level of microscopic plant matter in the water, which nitrogen levels can influence. During the 2020 sampling season, the average total pigment levels were within the impairment threshold except at CHP-UP and CHP-6. Total pigment values at CHP-UP exceeded the impairment threshold, CHP-6 values were equal to the threshold.