

Monitoring Salinity Levels in Seawater at Briarcliffe Acres, South Carolina

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Abstract

Salinity is the measure of the salt dissolved in a body of water. Salinity is conveyed in parts per thousand (ppt) or percentage (‰) at which both are the same but ‰ is just the symbol for parts per thousand. Salinity of seawater is important to the environment because increases and decreases in salinity affect marine and plant life. Salinity has an impact on fish growth as well as how much food the fish eats. It also impacts their eggs and their young fish. Salinity also impacts plant life. It also affects the way that plants grow as it does fish growth. In this research a total of 45 samples of environment quality lab salinity were taken from February 20, 2019 to February 17, 2021 in the mouth of swash in Briarcliffe Acres, South Carolina. Salinity was measured using Hach CDC401 Conductivity Probe. The mean of data was 26.2‰ and ranged from 2.9‰-39.7‰, which is out of the normal range.

Background

Salinity of a body of water is vital to marine life because increases and decreases affect development and growth of fish and salinity levels also affect eggs and juvenile fish. In the case of bigger fish, salinity also plays an important part in controlling how large the fish gets. Environmental salinity is also depended on by food intake of the fish. Not only is marine life affected, but the entire physical component of the ecosystem. Increased salinity levels may help remove particles from the water column, which in turn increases water clarity. Clearer ocean water leads to more sunlight which in turn leads to photosynthesis. can be affected by salinity as. Evaporation of ocean water and formation of sea ice both increase the salinity of the ocean. However these factors are continually counterbalanced by processes that decrease salinity such as the continuous input of fresh water from rivers, precipitation of rain and snow, and melting of ice. Marine salinity levels are influenced by a number of factors including rainfall, evaporation, inflow of river water, wind, and melting of glaciers. Salinity is the amount of salt that is dissolved in water. It is the concentration of salt in the weight of a body of water and is measured in parts per thousands (ppt or ‰). Salinity is important to measure because it is useful to know that if the seawater in the area that one is living is becoming too polluted, where if it is, people in the area can take precautions. The average salinity of seawater is 35 ppt.

Methods

- The study area where the research takes place is Briarcliffe Acres, a town near Myrtle Beach, South Carolina. The samples were taken from the mouth of swash from February 20, 2019, to February 17, 2021. The tool used to measure the salinity of the swash was a Hach CDC401 Conductivity Probe. In order to measure the salinity of the mouth of swash, a Hach CDC401 Conductivity Probe was used. The standard measurement on this device was in practical salinity units (psu) but could be changed to ppt (‰), which is what is used in this research. A IAPSO P-series (35 psu) Standard Seawater was used to calibrate the probe. A quantity of seawater is collected with a submersible pump in which the device is then used to access the concentration of the salt of the seawater.



Results

EQL measured Salinity (‰) Head and Mouth of Swash and Cabana Road Only

Site Name	# Samples	Mean	S.D.	Median	Max	Min	10th	25th	75th	90th
Head of Swash	47	14.2	12.5	10.7	34.0	0.6	0.9	2.3	27.8	31.8

Table 1: Figure 3: Above is a table of the data taken during this research. Showing the Mean, median, percentiles, etc.

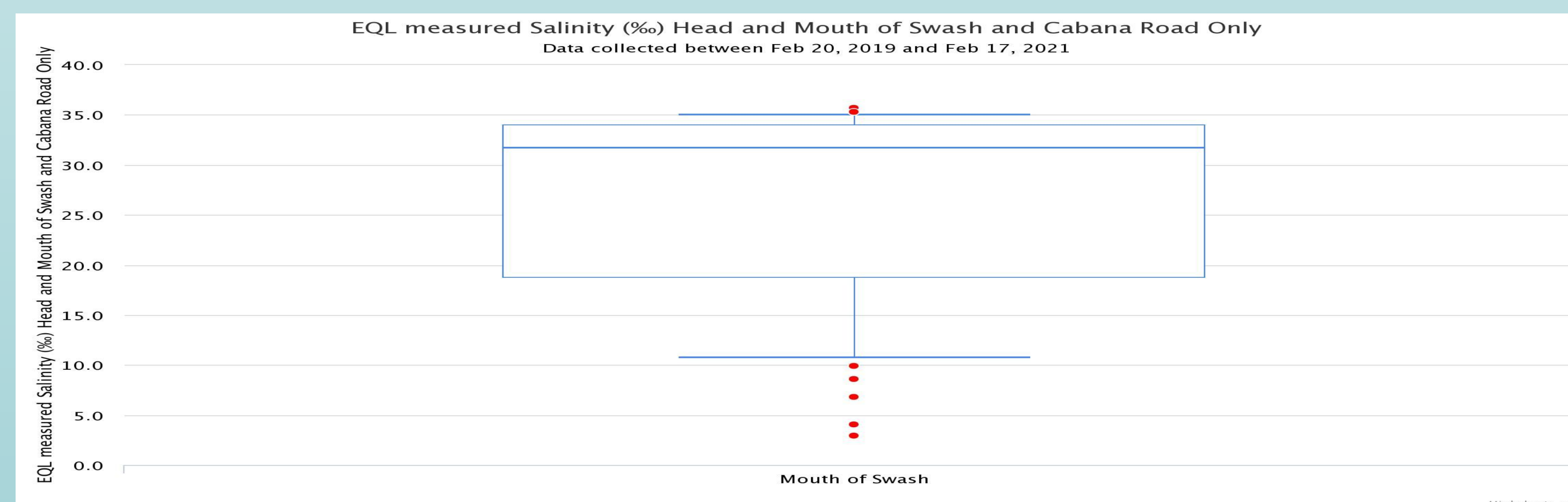


Figure 1: Figure 3: Above is a box plot of the data recorded, showing the median, interquartile range, and outliers. The lower outliers show to be the salinity of the seawater during cooler temperatures.

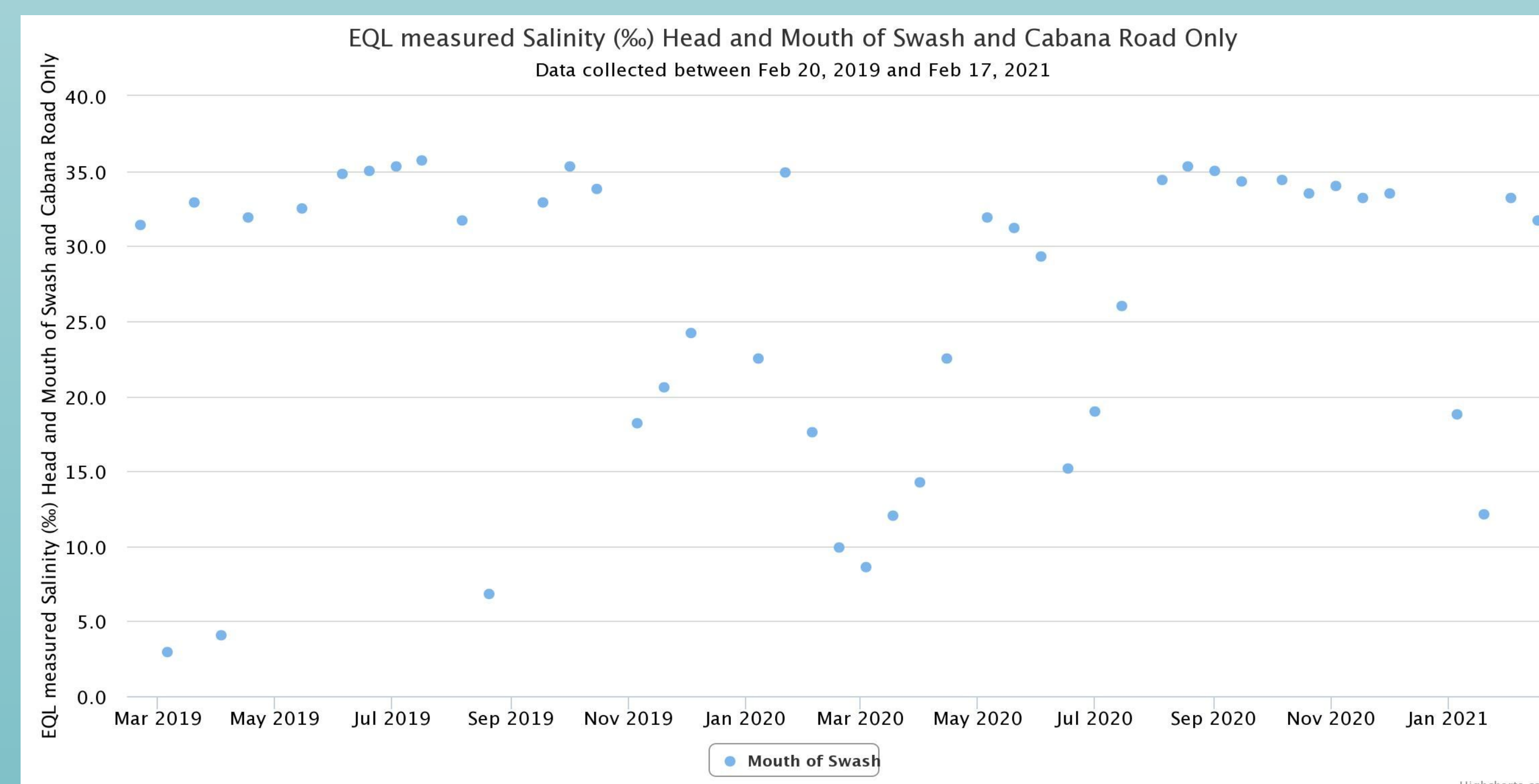


Figure 2: The about graph is a scatterplot of the measured salinity of the mouth of swash from February 20, 2019 to February 17, 2021.

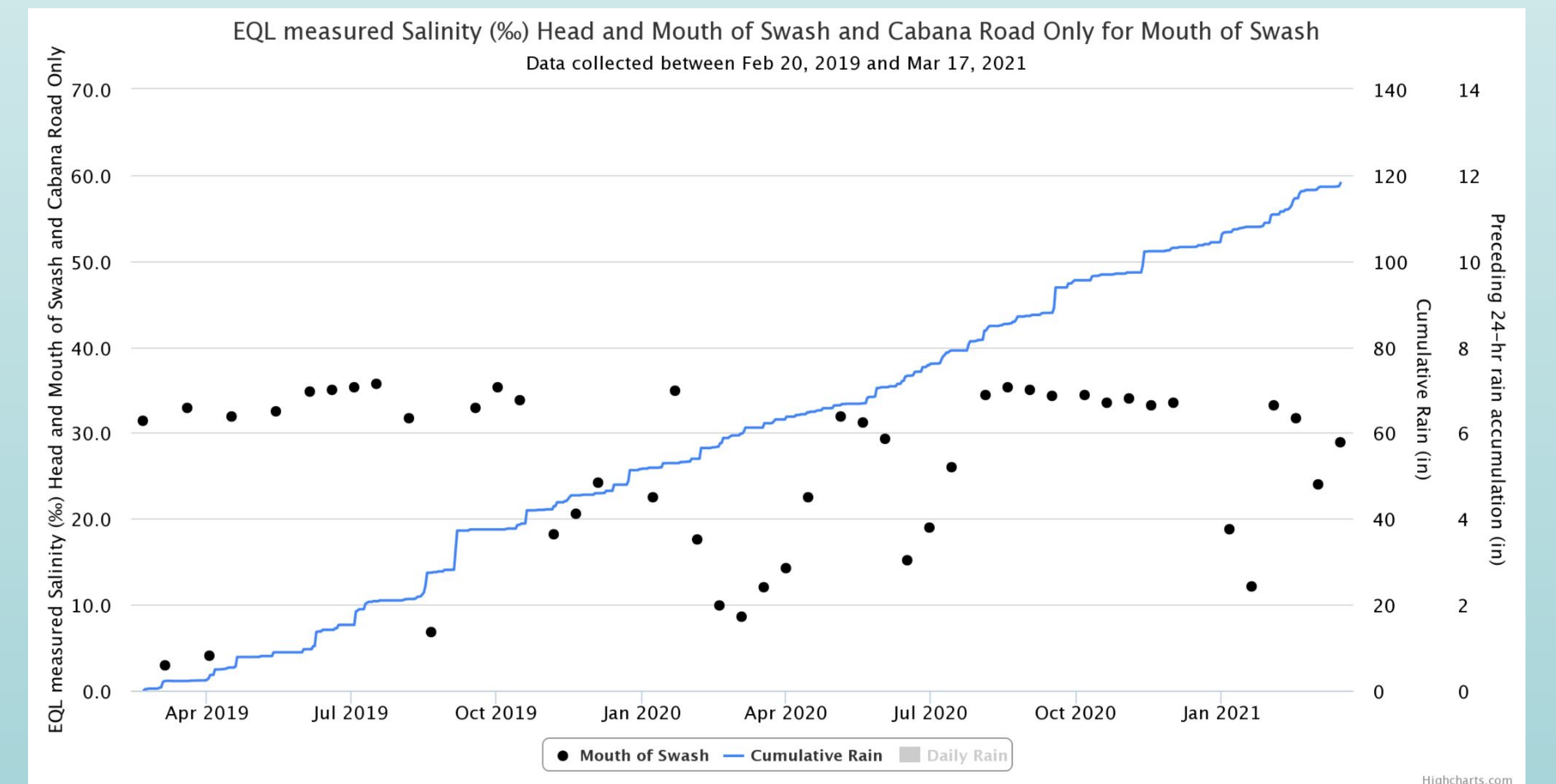
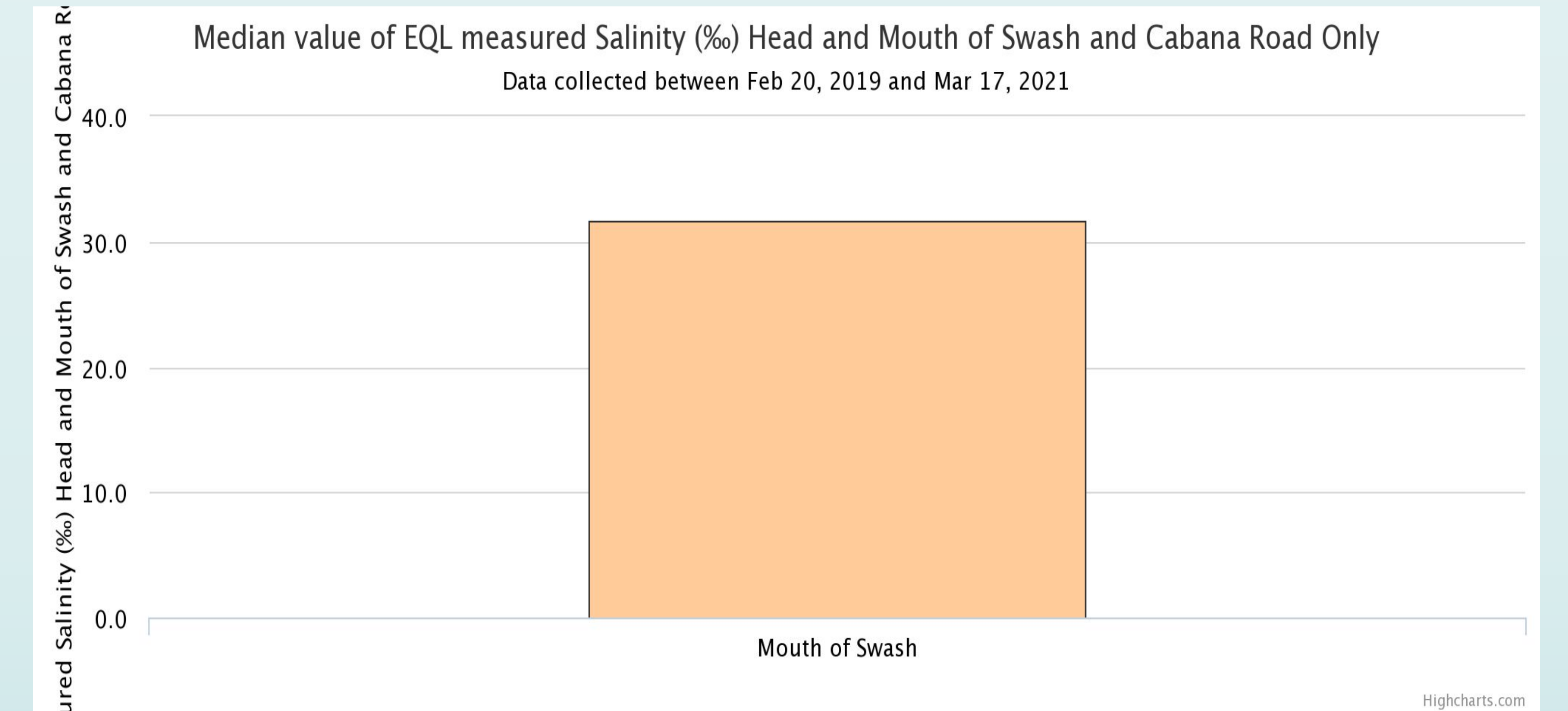


Figure 4: The about graph is a scatterplot of the measured salinity of the mouth of swash with rain trend from February 20, 2019 to February 17, 2021.

Conclusions & Project Importance

The research done in this study shows that there is not much to worry about in terms of salinity of the seawater in Briarcliffe Acres. As of the time period in which this study took place, salinity was lower than the average salinity of seawater, which is important because now the people of study know that the safety of the area is ensured and the pollution of the water is somewhat accounted for in term of salinity from seawater. Although the salt water can still do damage to the environment, it would not be more damage than the natural average of seawater, which is a positive thing as those of the area can take necessary precautions as needed. At this point there is not much of a threat from the salinity of the seawater. Knowing the salinity of the seawater in an area can open gates to what is needed to keep that area from being polluted and keep the homes, property and people of the area safe.