

## Breach Update – February 2019

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Another breach overflight was carried out Thursday Feb 14<sup>th</sup> near low tide in the ocean. Photos and the most recent photo mosaic are up on the project website. Aside from the usual motivation to provide monthly surveys of conditions of the breach, this one was spurred on by the notably low salinities recently observed at the Bellport dock.

The salinity record at Bellport is a good marker for conditions in the breach through which the higher ocean salinities enter the Bay. But because the sensor at Bellport is so close to shore, it reflects not only the ocean waters but also the fresh water discharges from the Carmans River, Beaver Dam creek and local ground water. And since there has been several inches of rain in the past couple of months, we would expect some short-term low salinity events especially during nor'easters when rainfall is substantial and the creeks drain into the Bay. It is normal to see the salinity record at Bellport oscillate between high and low salinities but the recent rains serve to obscure what is going on. However, on the longer term when the highs and lows steadily decrease, as they have for the past couple of years, see Figure 1, it indicates that the supply of saline waters from the ocean is decreasing. And the recent rate of decline in salinity over the past couple of months seems to have increased. This comes despite an apparent opening of the inner breach channel as a result of a late October storm. The effect of the storm shows up in both the salinity and temperature records as short term drops.

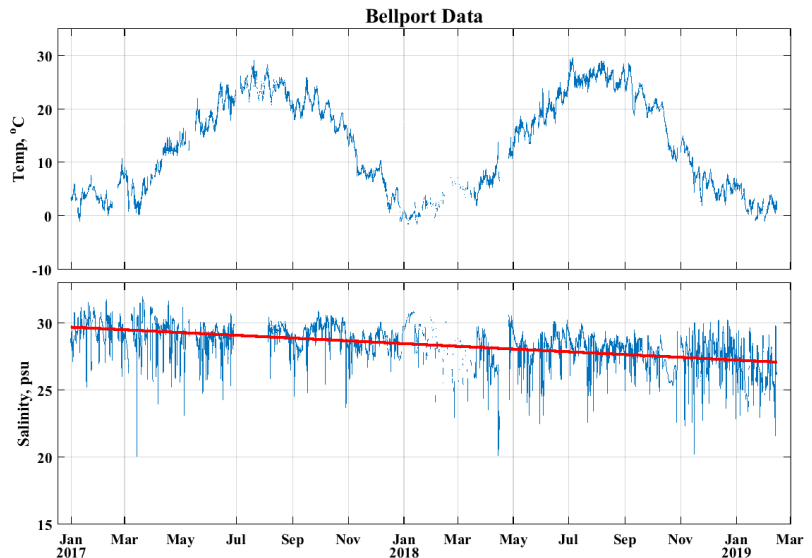


Figure 1. The temperature and salinity records from the Bellport dock from January 2017 to the present. The red line in the salinity plot is a least-squares fit to the data.

Figure 2 below shows the photo mosaics from the mid-October and mid-November overflights in which the passage into the flood delta has clearly been straightened out and opened up. Note that the width of the channel between the eastern and western shores is about 200 m during this time. As a result of opening of the inner channel there were a couple of months during which the Bay salinities increased. The salinities began to decrease again around the first of the year.

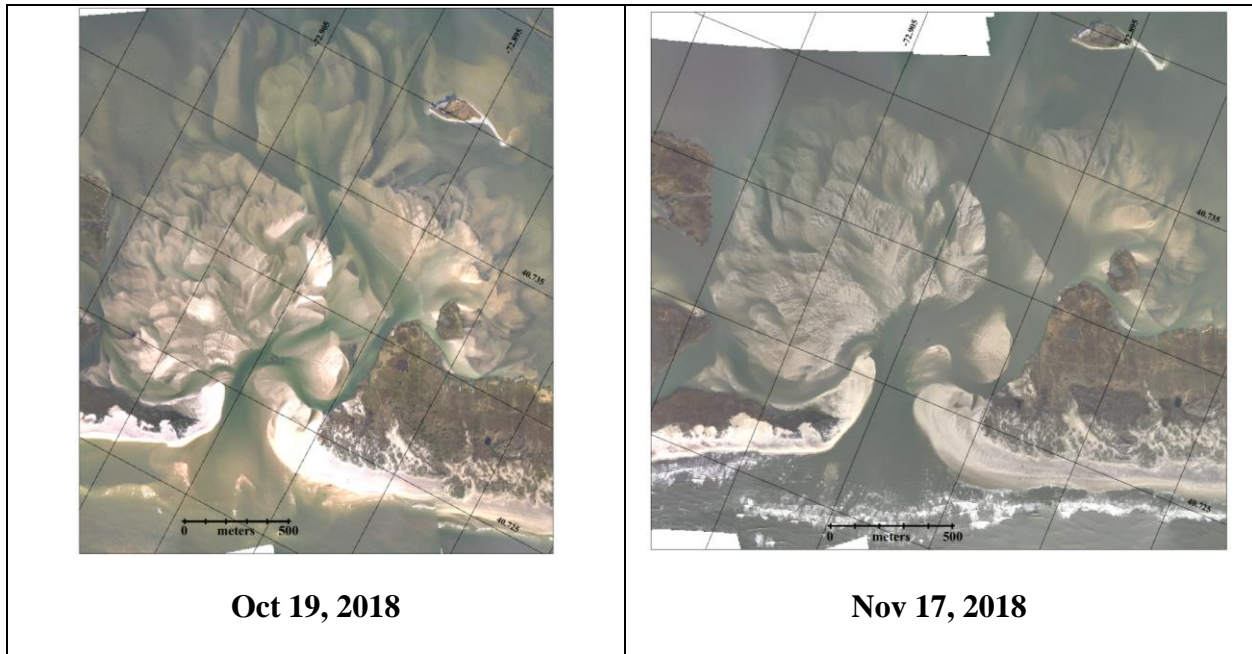


Figure 2, Photo mosaics from October and November 2018 showing the impact of the late October 2018 storm that opened up the inner channel into the flood delta.

The cause of this recent salinity decrease seems to be a closing off of the channel to the ocean. Figure 3 shows the photo mosaics from the last two months. The opening into the flood delta in February is more or less the same as in November although better water clarity suggests that there is some shoaling. However, the most important changes appear to be the extensions of the eastern shoal and the western spit. Both are getting larger, and the width of the opening between them is decreasing, from more than 200m in November and January to a little more than 100m this week. If this represents a roughly 50% decrease in ocean-Bay exchange, that is a substantial difference that will show up not only in salinity but also in temperatures and other parameters, nutrients in particular.

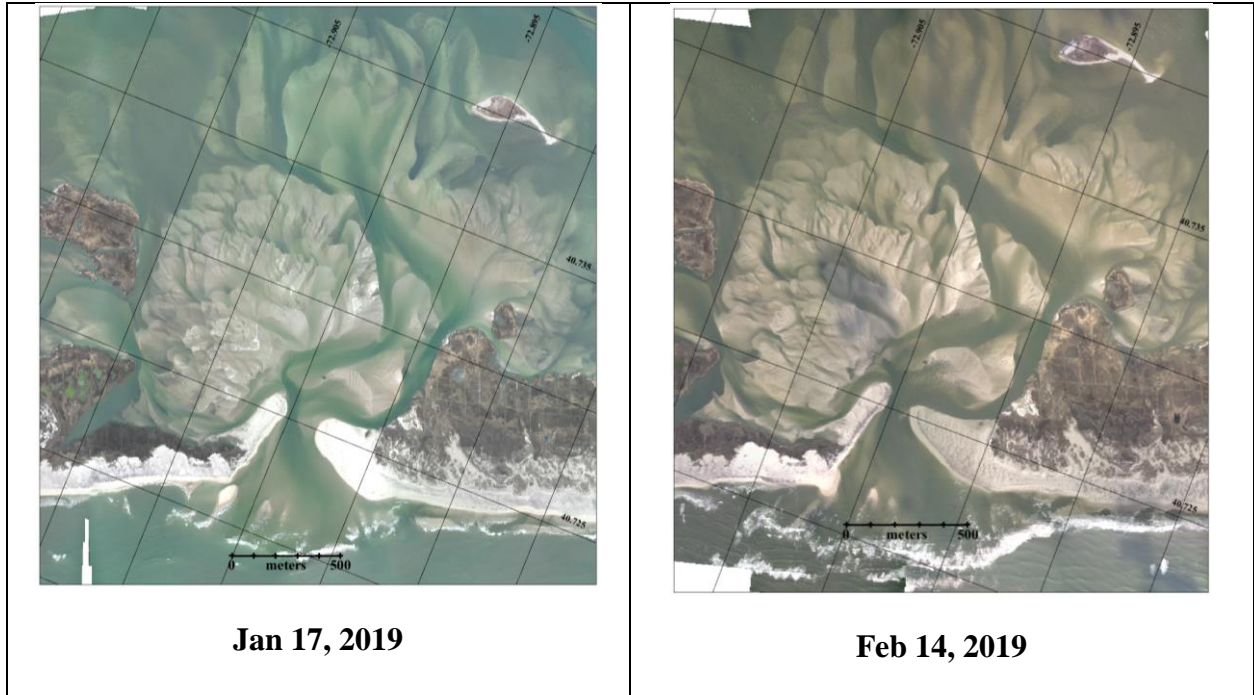


Figure 3, Photo mosaics from January and February 2019 showing the narrowing of the entrance channel. Note also the merging of the eastern finger shoal located in the outer breach with the western shore.