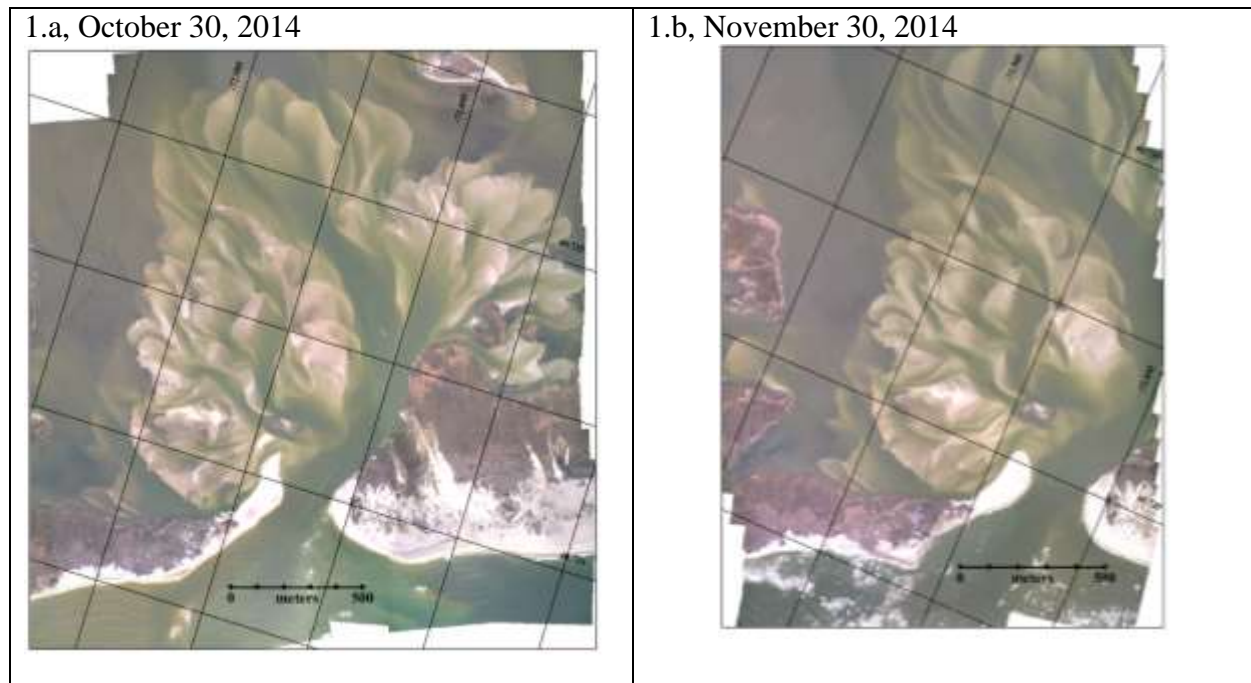


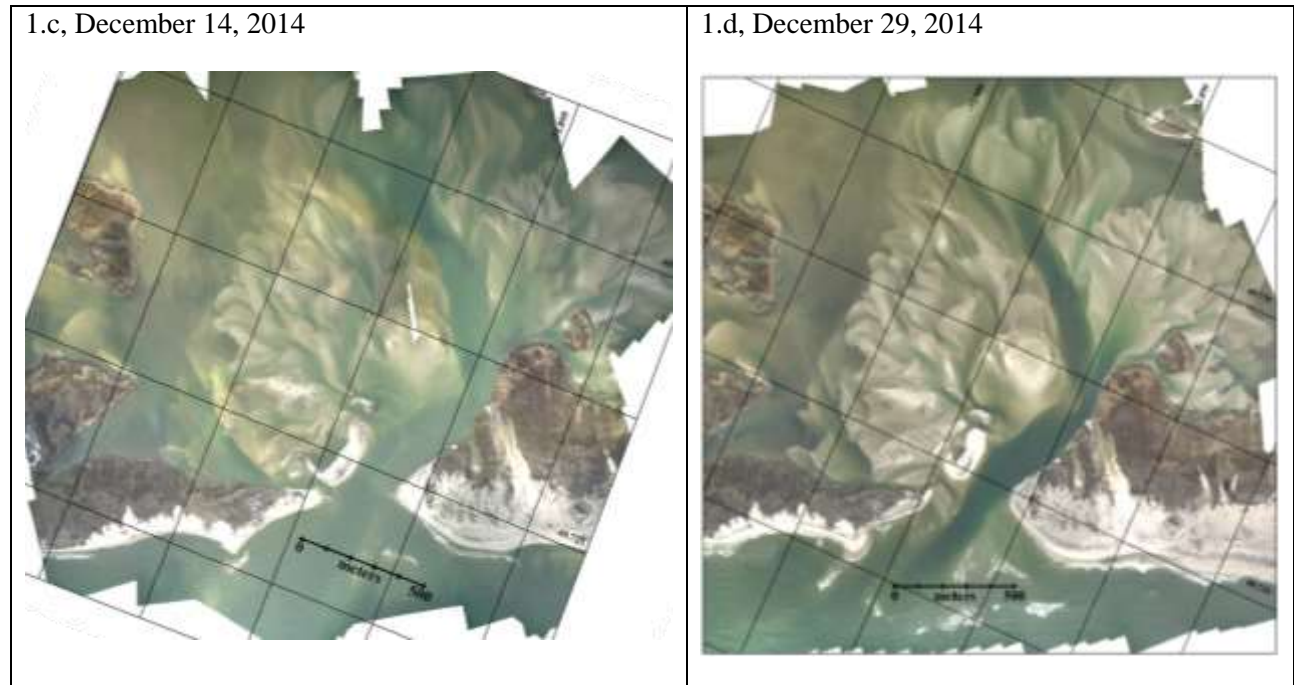
# Update on the Old Inlet Breach and Great South Bay

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We have continued the aerial surveys of the breach area while monitoring conditions from the Bellport realtime system. The GSB1 buoy was retrieved in December to avoid ice damage like last year and to do some repairs. To protect the buoy from the ice, it will be moored in the West Sayville Marina so that it can record local winds and water properties. When the ice season has passed, the buoy will be redeployed at its old position. In the next month or so the delayed-mode sensors at Tanner Part, USCG-Fire Island, Barrett Beach, Sayville and Blue Point will be turned-around, the data recovered and uploaded onto the website.

Over the past couple of months there have been some interesting developments in the breach with the further expansion and then bifurcation of the western spit, and changes to the western shoreline. By the end of November, the western spit which had begun to develop in September was more than 100 meters wide and extended about 300 meters along the main channel toward Pelican Island. In the early part of December, there were a couple of minor wind events, one of which on the 7<sup>th</sup> produced winds of around 30 kts from the northeast. This resulted in a break about 50 meters wide in the spit at the location of the old west channel as shown in the photo mosaic in Figure 1c. Compared to the mosaic from two weeks earlier, Figure 1b, the spit had also pushed another 100 meters to the north and the gap between the spit and Pelican Island had shrunk to less than 100 meters. Between the middle and the end of December, the west channel had expanded to about 100 meters while the gap between the spit island and Pelican Island was better defined and only 50 meters wide, Figure 1d. (Larger versions of these photo mosaics are available on the project website: <http://po.msra.sunysb.edu/GSB/>)





Another aspect of the breach development has been the change in the shape of the beach immediately to the west. Since earlier this summer there has been increased erosion over 600 to 700 meters of the beach and lately, the formation of a cusp and shoal off the southwestern corner of the breach. Comparing the series of photo mosaics over the past year, one can see that nearly 100 meters of beach has disappeared in this area since the beginning of 2014. This change may be associated with the rotation of the main channel through the breach. Last January, the channel was oriented nearly normal to the beach line but since June has had a more north-south axis. The shoals within the breach on either side of the channel still exist while the minimum width of the channel is roughly 150 meters as shown in Figure 1d.

The flight on December 29, Figure 1d, took place during low tide in the Bay and a remarkable number of flood delta shoals had risen above the water. An oblique photo from the northeast, Figure 2, shows the extent of these shoals located on both sides of the main channel extending from Old Inlet to the Smith Point Channel and all the way north to just short of John Boyle Island. While it was low tide at the time of this photo, it was not an extreme tidal event, see Figure 3 below. This suggests that while the flood delta has expanded considerably in all directions, it is not simply spreading out the existing sand reservoir but, as expected, accumulating more sand through the breach.



Figure 2, Oblique aerial photo from the northeast of the flood delta during low tide on December 29, 2014.

To get a longer term view of the changes within the Great South Bay Figure 3 shows the wind record from MacArthur Airport plus the water level and salinity data from Bellport from mid-summer to the end of the year. (The GSB1 buoy wind sensor conked out in early December so the airport record is used instead.) The wind record shows that there were five events in the past five months with wind speeds greater than 25kts. Rather interesting is the fact that for all but one of these, December 7<sup>th</sup>, the winds came out of the northwest to north-northeast directions. That means that there was rather little ocean wave action and thus a relatively muted erosional response in the breach. The one exception on December 7<sup>th</sup> led, we think, to the redevelopment of the west channel. Comparing the water level data with the wind record shows that most of the highs and lows were associated with along Bay winds. Thus there was a period of moderate winds from the west in early October which raised mean sea level at Bellport by 0.25 to 0.5 meters for several days. Salinity jumped up by ~1 psu as that event tapered off which suggests that water was brought in through the breach as the waters receded back to the west. The wind events of August 13<sup>th</sup>, November 3<sup>rd</sup>, December 10<sup>th</sup> and December 26<sup>th</sup> had similar water level responses, although not necessarily accompanied by similar salinity changes. Salinities at Bellport for most of this period averaged around 30 psu without any noticeable long term changes. The salinity increase through August appears to reflect the recovery of the Bay to the large rain events in July which had pretty well flushed out of the system by September.

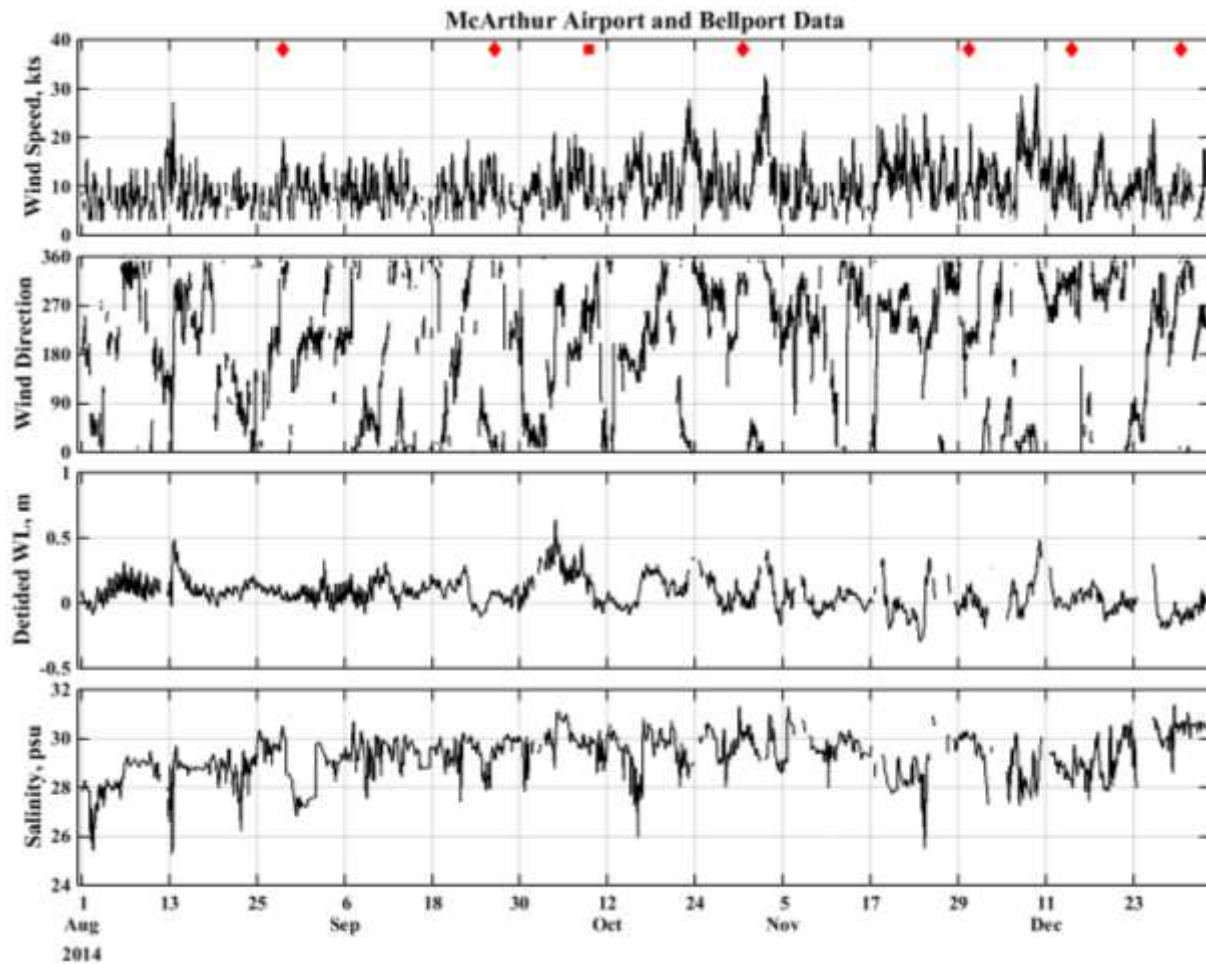


Figure 3, Time series plot of wind speed and direction from MacArthur Airport and detided water level and salinity from the Bellport SeaCat. The red diamonds along the top indicate times of aerial overflight while the red square indicates the time of the latest bathymetric survey of the breach.