The initial impact of dredging:
9 March 2009

Visit to “The Point” on this day.
Arrived at ~3:30 pm about 2 hours after low tide (at 1 pm) tide and observed significant vertical erosion of the shoreline. It was obvious that the shore was defined by a 3 ft high escarpment that sloped vertically into the sea at angles of greater than 30 degrees.

Sand banks were seen falling off the scarp very actively over the one-hour period I was present on the coast.

I measured between the scarp and stationary (log) objects at the high water mark from two large logs. The southernmost was 95 feet from the scarp while the northern measure was 75 feet. I provided photos to Mr. Calvin Peck and Dr. Suzanne Dorsey of my observations of that afternoon of the 9th March. I suspect several tens of feet were lost before the first measurements.
10 March 2009
I returned at approximately 2:45 pm on 10 March 2009 to observe and photograph the condition of the beach at the Point. I measured the same benchmarks from a southern and northern benchmark at the high tide mark and found that the southern escarpment had advanced six feet landward, while the northern measure had eroded over 21 feet landward in the form of a vertical escarpment that was approximately 6 feet high. Large pillars of sand were observed falling actively into the sea.

Given this rate of almost 1 foot per hour, we expect to see erosion of the LAND above the MHW mark to erode significantly over the next few days and weeks.

11-12 March
Jeff Harms took photographs and made observations on these days, and showed some slowing of the erosion, particularly because the dredge had moved several hundred feet southward and offshore during these days.

13 March (Friday)
I returned to the SW Point at about 2:30 pm two hours before low tide at 4:22 pm and made these measurements and observations. The falling tide was being pushed seaward at several knots, amplifying the erosive potential at the site.

The southern benchmark had been shifted about 80 feet to the southeast, but it was possible to estimate its approximate location from the previous days. From the approximate location of the southern benchmark, the escarpment of 3-4 ft height had advanced shoreward about 40 feet. The northern benchmark remained in the same
location at the high water mark. From the previous Tuesday, the escarpment had advanced an additional 29 feet toward the high water mark (now only 27 feet from the escarpment).

Great Lakes Dredge and Dock. *Illinois.*

**Summary as of 13 March:** Over a 96 hour period (Monday to Friday mid afternoon), the shore was eroded 47 feet at the southern benchmark, while that from the northern mark lost 48 feet, yielding an average loss of ~1 foot every two hours. The maximum rate recorded earlier in the week was nearly ~1 foot every hour.

**Late March and April 2009.**

Because of the shifting of the southern benchmark, a new one was identified and GPS located. The shore was 207 feet from the benchmark labeled Line #10. As this is a semi-permanent marker, it shall remain the primary marker from which changes in the shoreline will be monitored. An additional “Line #11” slightly south and east of Line #10 was incorporated into the survey starting 16 March. The results of measurements on these two lines are presented below. It is apparent that there are significant fluctuations in the length of these transects to the shore (generally measured around low tide), probably due to the attempts to seek a stable slope while faced with stormy seas and high tides.
Sequence of measured transects since 9 March – the aerial photo is from 19 March and does not change or reflect erosion any time after that day.

NB: Previous to measurements on 9 March, it is clear that several tens of feet of shore were already lost.

Scarp 13 March 2009
Beach profile steepens to 14° slope along Line #10
Late April to Early May 2009

Over the past two to three weeks since mid April, there has been a progressive formation of a fairly large bar in the lower intertidal zone around the more southerly side of The Point. The bar emerges just at low tide and is about 100 to 300 feet wide bordering and being transported into the shipping channel. The bar extends to greater widths to the east toward the groin field.

Without much doubt, this bar is the result of a significant flux of sand eroded from the groin field, which itself is deteriorating quickly, as predicted by Mr. Erik Olsen and myself. Support for this observation of retrograde erosion extending from the newly dredged shipping channel is provided by a 2-10 foot scarp that has enlarged and migrated up both West Beach and along South beach through the groin field (see images below). It is feared that if the groin field continues to deteriorate due to sand “starvation”, powerful summer and autumn storms could severely damage homes and infrastructure on Bald Head Island.

The net erosion at Line #10 is estimated to be between 90 and 100 feet since 9 March 2009. Prior to the initiation of these measurements and observations on that date, as noted earlier, several tens of feet of shoreline were lost.
Erosional trends and general changes in the shape of The Point will continue to be measured and photographed on a weekly time frame. Additional air photography is planned in the coming weeks.

With regards,
Dr. Paul J. Hearty
Sedimentary Geologist
Director of Conservation
Bald Head Island Conservancy
P.O. Box 3109
700 Federal Road
BHI, NC 28461
and
Research Associate Professor
Department of Environmental Studies
University of North Carolina at Wilmington
Wilmington NC 28403-5949