

to the dimensions of the new channel, all six alternatives evaluated would satisfy the stability criteria, particularly with the closure of the existing channel. The only channel alternative that appeared to be marginally acceptable was the -13.5 ft NGVD x 400 ft channel, which would result in an overall inlet cross-sectional area very close to the critical area. Accordingly, in order to provide some degree of safety, the next smallest channel evaluated, i.e., the -13.5 ft NGVD x 500 ft channel was selected. This channel is deemed to be the minimum channel needed to completely satisfy the inlet stability criteria and will result in less scour than the 13.5 ft NGVD x 400 ft channel during the initial readjustment period immediately following the construction of the channel.

**8.1. Physical Impacts of Channel Relocation:** Relocation of the ebb channel to a mid inlet location will alter the sediment transport patterns on both shoulders and ultimately result in the reconfiguration of the ebb tidal delta. After an initial period of adjustment, the apex of the ebb delta will eventually shift between 2,500 and 3,000 feet in a westward direction. During this initial period of equilibration, which may last two years or more, a significant volume of the ebb-tidal flow will be redirected from the erosion hot spot along the eastern shoulder of the inlet to the new channel.

**8.2. Shoreline Adjustments on Bogue Banks.** Given sufficient time, the oceanfront shoreline along Bogue Banks will erode and recede to a position that is approximated by the location of the 1978 shoreline. Based on the amount of accretion that occurred on Bogue Banks between 1978 and 2001, the shoreline recession that could occur as a result of the channel relocation project along various segments on the west end of Bogue Banks are as follows:

**Table 8.1  
Estimated Erosion Rates West End of Bogue Banks**

	Average Erosion <sup>(a)</sup>	Maximum Erosion
Transects 1 to 5	-10 feet	-80 feet
Transects 6 to 10	-150 feet	-300 feet
Transects 11 to 13	-350 feet	-400 feet

<sup>(a)</sup> Note: Average erosion rates rounded from those presented in Section 4.

Figure 8.1 graphically depicts the average anticipated shoreline recession and the maximum expected recession that could occur following the relocation of the Bogue Inlet ebb channel. As shown in Figure 8.1, the predicted shoreline recessions would position the adjusted shoreline slightly seaward of the primary dune system.

**8.3. Estimated Volumetric Erosion – Emerald Isle.** The COE performed offshore profiles along Bogue Banks in April 2001. Six of the profile stations were in the area expected to undergo adjustments following the relocation of the Bogue Inlet channel. The approximate locations and numbering of these six profile stations are shown on Figure 8.2. Profile station 1252+76 is located near the east limit of expected shoreline adjustments and appears to be outside the influence of the Bogue Inlet ebb tide delta.



**Figure 8.1 Possible Range of Shoreline Adjustments following Relocation of the Bogue Inlet Ebb Channel**