

## **STOP #2: NEWPORT PASS AND CORPUS CHRISTI PASS**

Newport Pass, 1852 Pass, and Corpus Christi Pass, form a complex of *washover channels* along northern Padre Island and southern Mustang Island. A **washover channel** is a temporary *tidal inlet* that occurs where ocean waters driven by storms have washed over the island, eroding a channel and depositing sand in the bay.

Imagine a big tropical storm or hurricane coming toward Mustang Island. As the storm approaches the shore from the Gulf of Mexico, the strong winds are creating large waves and higher than normal tides. The waves and higher water levels are now impacting the upper backbeach and dunes. The storm could even be strong enough to erode all of the beach and dunes and cut a channel through Mustang Island all the way to Corpus Christi Bay. The channel cut across a barrier island by a storm is called a *washover channel*. (fig. 1)



**Figure 1.** View west of Corpus Christi Pass a few days after Hurricane Allen in August 1980. Note the washover fan in the distance and the spit that is building northward and will soon seal the Gulf entrance to the pass. Photo by William White.

The water in the washover channel is moving quickly and carrying a lot of sediment that has been removed from the beach and the dunes. When the water from the channel meets the bay, the current velocity slows down and spreads out (moving from a channel into a larger body of water). The water is no longer moving fast

enough to carry the sediment so the sediment is deposited in the bay. This large fan-shaped layer of sediment is called a *washover fan*. (fig. 1)

Washover fans are significant features in the expansion of barrier islands (fig. 1). A *washover channel* may transport many thousand cubic yards of sediment in a single event and build a large *washover fan*, a square mile or more in area. The washover fans may be modified by wind and rain, stabilized by back-island vegetation, and merged imperceptibly with the older parts of the barrier flat.

After the storm has passed, the channels are partially refilled with sand and other sediments along the shoreline. Usually the channels are very shallow and the water exchange caused by tidal currents between the open ocean and bay with very low. The mouth of the channel will quickly fill with sediments deposited by longshore currents cutting off the channel from open ocean. Given enough time (and sand) low sand dunes will begin to form. These low areas are particularly vulnerable to reoccurring washovers in future storms. Washover channels obscure the beginning and end of Padre and Mustang Islands (even some local residents are unsure of the location of the official boundary) and indicate the dynamic nature of this environment.

A tidal inlet and a washover channel are similar in that both are channels from the Gulf to the bay. The washover channels tend to be temporary and are usually quickly filled with sediment after the storm has passed. Because the Gulf processes—winds, tides, waves, and longshore currents—are generally more dynamic than those of the bay; the mouth of the channel on the Gulf generally fills quickly with sediment. Look toward the Gulf of Mexico from where we are standing in the channel of Newport Pass. You should see that the pass is now choked with sediment and a narrow ridge of fore-island sand dunes has developed. From this perspective (plus it is blocked by the highway) we are unable to see the washover fan feature. In order to see the washover fan we need to get back on the bus.

Drive very slowly (and stop if it is safe) on the bridge across Corpus Christi Pass. Corpus Christi Pass was a natural tidal pass between Corpus Christi Bay and the Gulf of Mexico prior to 1929. Corpus Christi Pass was reopened as a washover channel by Hurricane Carla in 1961 and by Hurricane Allen in 1980 (fig. 1). The bridge is across the actual washover channel. The channel across the vegetated barrier flat takes a much longer time to refill because it is harder for the wind to carry sediment to this environment. If you look toward the Gulf of Mexico, you will see low sand dunes across the mouth of the washover entrance just like at Newport Pass. Look toward Corpus Christi Bay. You should be able to see the washover fan from this elevation even though it is covered with vegetation.