Dredging to Increase Navigation Channel Depths - Earlier sections of this report have discussed the "sand sharing" system composed of the ebb tidal shoal and the adjacent shorelines. A useful basis for consideration purposes is that a given system in its natural condition is in equilibrium and that if changes are made to the system, it will respond to reestablish equilibrium. Thus when sand is removed from an ebb tidal shoal, sand will flow toward the deepened area and a portion of this deficit will be felt at the updrift shoreline and a portion at the downdrift shoreline. If the longshore sediment transport were nearly unidirectional, one can simplify considerations as follows. The longshore sediment transport tends to rebuild the ebb tidal shoal which functions as a "sand bridge" across which this transport occurs. With the sand bridge cut (shoal deepened), the longshore sediment transport will deposit in the cut to reestablish the bridge. The volume of material deposited appears as a deficit to the downdrift shoreline and results in a volumetrically equal amount of erosion there.

The obvious appropriate approach to placement of beach quality sediment removed from navigation channels is, through surveys of the adjacent shorelines, to develop a basis for apportioning the high quality dredged sand on these shorelines.

Environmental Effects of Beach Nourishment Projects

Primary potential environmental effects of beach nourishment relate to: quality of sediment, impact of burial by the placed sediment and the more subtle effects above water such as altering the natural dune system. The actual impact of each of these is species dependent and to some extent locality dependent.

Sediment Quality - In this section sediment quality will be considered on a relative basis and will be quantified in terms of grain size and color. As an ideal measure of sediment quality, the grain size distribution of the material to be placed should match the native grain size distribution. As a more realistic measure of good sediment quality, the general mean grain size of the material to be placed should not be much smaller than that of the native material and the percentage of the silt and clay fraction (the fines) should be relatively small.