Strategic Placement of Dredged Sediment to Support Surrounding Resources

Joseph Gailani[1], **Burton Suedel**[1]

[1]U.S. Army Corps of Engineers, 3909 Halls Ferry Road, Vicksburg, MS 39056, USA Phone: +001-601-634-4851

E-mail: joe.z.gailani@usace.army.mil

Introduction: Management of dredged sediment is an integral part of the U.S. Army Corps of Engineers navigation mission. The Corps handles ~230 million m^3 of dredged sediment annually. The majority of this sediment is presently not applied for beneficial uses. The Corps is changing management policy to embrace beneficial use and Engineering with Nature principles for dredged sediment management. Strategic placement of dredged sediment is the practice of placing material at one location with the expectation that natural forces will move the sediment toward receptors of interest. This method is often more cost-effective than direct placement and permits for natural winnowing of fine and sandy sediments. This presentation provides three examples where the Corps is placing or plans to place sediment strategically with the goal of supporting nearby ecosystems or land-building.

Methods: This presentation will discuss strategic placement at three sites: 1) Tybee Island, Georgia, 2) Mobile Bay, Alabama, and 3) Atchafalaya River, Louisiana in the United States. At each site, placement options for strategic placement were evaluated using numerical models prior to application in the field. Tybee Island is a barrier island at the entrance to the Savannah River. The shore has receded as the ebb shoal moved seaward with increasing navigation channel cross-section. Numerical models indicated a sediment starved zone between the river mouth and ebb shoal attachment bar. The models indicate that placement in this zone, near the attachment bar will feed sediment to shore.

Prior to 1986, The Corps used in-bay placement of dredged sediment as a standard practice at Mobile. This practice was suspended and all sediment moved offshore after this date. Concurrently, the bay has experienced a net sediment deficit (confirmed by sediment budget analysis). The bay has lost significant wetland over the recent decades. The Corps began to re-evaluate in-bay placement to both reduce dredging costs and mitigate bay-wide sediment loss. Numerical models confirmed that in-bay placement is feasible without reducing cost. In addition, in-bay placement will nourish nearby habitat that has been stressed by the loss of sediment.
The Atchafalaya River navigation channel is an important gulf waterway. In 2002, the Corps began placing dredged sediment upstream of a naturally occurring sand bar with the objective of nourishing the island. Numerical models were applied to confirm that there was a sediment pathway between the placement site and the island. Since this time, the island has increased in size up to 35 hectares (Fig. 1). The island continues to grow as additional dredged sediments are placed upstream.

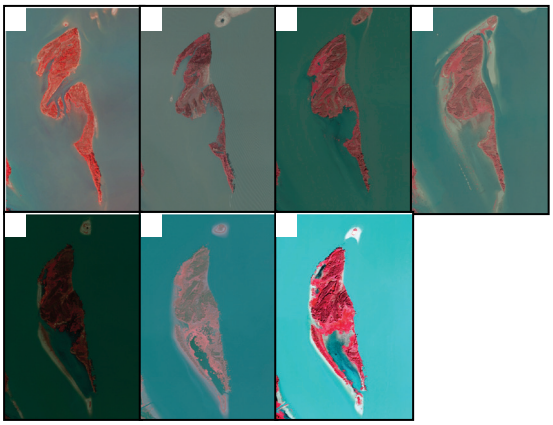

Fig. 1: Satellite images of Horseshoe Bend Island a) 2008, b) 2009, c) 2010, d) 2011, e) 2012, f) 2013, and g) 2014.

Results: Numerical models were applied at three different locations to demonstrate the benefits of dredged sediment strategic placement. Numerical models indicated that placement of dredged material offshore of the receptor sites would ultimately benefit the locations of interest. In addition, for each of the three cases, placement options are cost-effective and sustainable. Two of the sites, Mobile and Atchafalaya, are presently operational.

Discussion: The U.S. Army Corps of Engineers is modifying management practices with respect to dredged sediment. More emphasis is being placed on utilizing these sediments as a resource that can be applied to land and habitat loss in a cost-effective manner. This presentation provides three case studies where strategic placement of dredged sediment is a cost-effective management alternative that supports local ecosystem restoration and land building.