

Multiple Lines of Defense Strategy to Integrate Coastal Habitat Restoration and Engineered Flood Protection

There is a growing consensus that what is needed is a pragmatic and effective method to design both coastal habitat restoration and engineered flood protection (such as levees) together. The Multiple Lines of Defense Strategy is a plan of how to these features (Lopez, 2005). This plan can be represented on a single map depicting the long range architecture of the coast including coastal wetland habitats and flood protection.

The Multiple Lines of Defense Strategy proposes that two key elements of the coast must be managed and perpetuated (**Figure 1**): 1) utilizing natural and man-made features which directly impede storm surge (a.k.a. Lines of Defense), 2) establishing and sustaining a target salinity gradient and the corresponding habitats (a.k.a. Target Habitat Types). This planning approach is not a new restoration technology; rather, it is a new method to coordinate and prioritize conventional methods of restoration for coastal habitats and engineered flood protection.

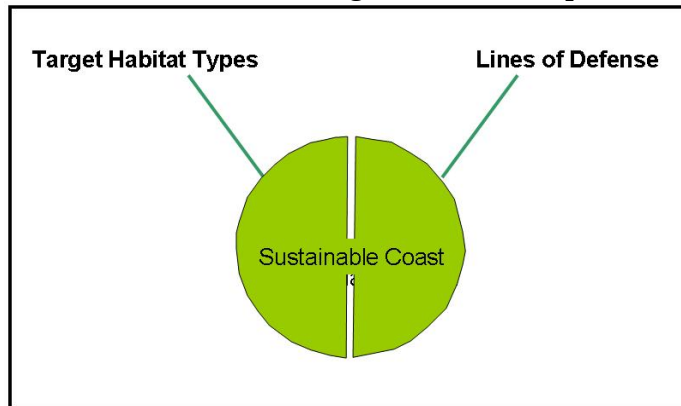


Figure 1: The Multiple Lines of Defense Strategy proposes the two planning elements that should be defined and sustained. The Target Habitat Types defines the salinity regime and habitats for the coast. The Lines of Defense are either natural or man-made features which may

The first, of the two planning elements, is the “Lines of Defense” (LOD), which provides Louisiana with the potential to reduce hurricane damage (**Figure 2**). Identification of these Lines of Defense allows hydrologists, levee district managers, emergency personnel, etc. to all share a common landscape template to evaluate and abate flood risk or other storm impacts.

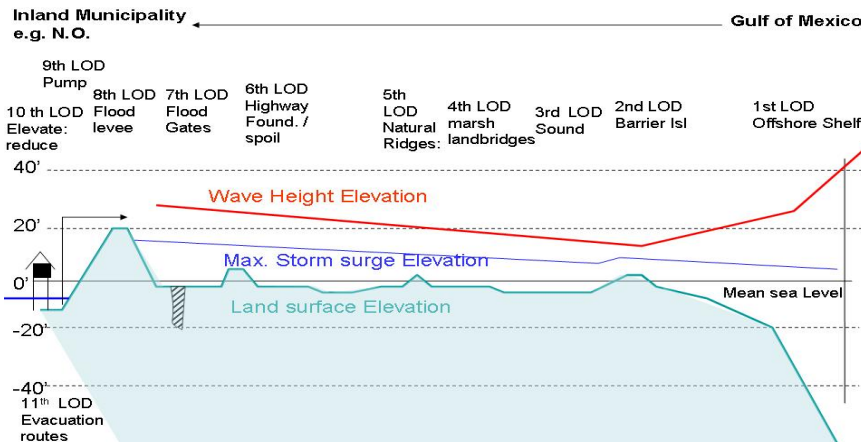


Figure 2: Diagrammatic profile of the Coastal Zone indicating the eleven Lines of Defense identified. Lines of Defense are definable geographically and contribute to the abatement of storm damage.

The second planning element is delineation of “Target Habitat Types” (THT) desired for the coast which, consequently, dictate the salinity regime of the coast (**Figure 3**). Maintaining the target salinity regime and then optimally managing the habitat types, puts all the natural resources and resource managers on the same page with a unified biological and natural resource vision.

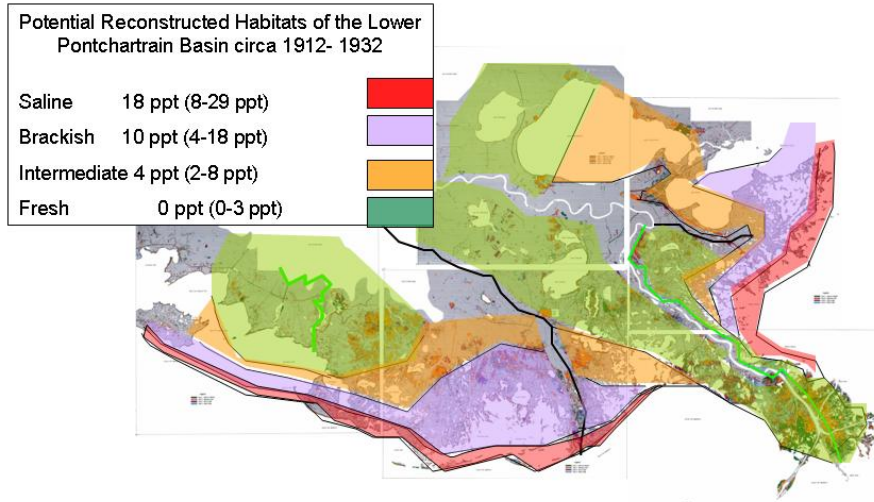


Figure 3: Potential baseline distribution of Target Habitat Types for southeast Louisiana. Map is primarily based on historic maps indicating the distribution of natural oyster reefs and wetland forests, circa 1900- 1930. The goal of this proposal is to have an accepted map of the Target Habitats Types but it is not required that this particular baseline reconstruction be accepted.

Establishment of the LOD and the THT are highly useful separately for the reasons described previously. Additional value is gained by overlaying these elements on a single map (**Figure 4**). This integrated map becomes the central coastal management planning tool since it depicts a unifying landscape vision for the coast, embracing environmental habitat restoration and engineered flood protection.



Figure 4: Overlay of the Target Habitat Types (Color) over the Lines of Defense (black). The Lines of Defense indicate priority areas for restoration or preservation of coastal habitats. The Target Habitat Types indicates the type of restoration that may be feasible or desired.

The Lines of Defense define priority areas for coastal habitat restoration; that is, the “where” of restoration. The target habitats types define potential restoration methods or limitations of coastal habitat restoration; that is, the “how” of restoration. This complimentary relationship together focuses restoration funding on priority areas and guides the type of restoration possible or required. Coastal habitat restoration using traditional restoration techniques may proceed producing ecologic benefits and enhancing flood protection to the coastal infrastructure.