



### Description

Coastal areas are diverse in function and dynamics and therefore, can be challenging to define in a spatial context. Boundaries may change due to different time scales and project objectives. However, in order to programmatically assess regional coastal changes, a standard process would better enable utilization of available spatial data to delineate regions that can be scaled to incorporate different temporal and/or project objectives.

Recent efforts using available spatial data have focused on indexing key, engineering and environmental parameters and presenting them in a regional framework to help identify opportunities for coastal improvement through projects, regional sediment management, or engineering with nature. These coastal engineering indices (CEI) are consistent, standard, measurable indicators of the condition of the coastal zone, such as dune height, beach width, shoreline change, shoal volumes, navigation structure length/height, and coverage for land cover, submerged aquatic vegetation, wetlands, and impervious surface. The indices provide ideal indicators for identifying coastal regions based on physical and geomorphic characteristics. Upon defining a region, indices can be optimally synthesized into conditional rankings, ultimately resulting in a systematic approach for assessing and comparing conditions, prioritizing areas and project needs, monitoring changes over time, and providing support for decision making and planning (Figure 1).

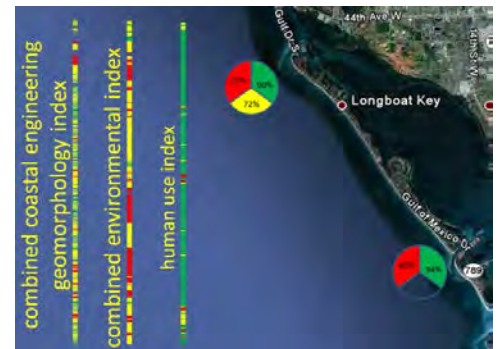


Figure 1. Example of combined CEI for the FL coast.

### Issues

Identifying a regional, coastal setting encompasses examination of processes, geological and morphological parameters, environmental characteristics, and infrastructure. The CEI requires regional extents to compare extracted indices, such as transect-level parameters averaged within a region and used to generate a hierarchical visualization of the synthesized data.

### Successes Lessons Learned

A demonstration effort along the Florida South West Coast has been conducted to show the added value that can be realized from extracting various engineering and environmental parameters. The CEI goal is to synthesize data needed for engineers, planners, and managers to determine detailed coastal conditions in order to meet specific- regional and project-level planning/restoration/management/monitoring objectives.

### Expected Products

Expected products from this effort include: (a) a process to programmatically assess regions based on extracted spatial data, (b) a demonstration of the approach at a selected site, (c) a report and other documentation to promote knowledge transfer, and (e) a presentation of results at the annual RSM workshop.

### Potential Users

Users include USACE coastal districts that conduct project planning, management, and operations as well as researchers and modelers that could benefit from a standard process to delineate a region.

**Projected Benefits**

The standard process to delineate regions could be used to assess change from storm events or for restoration efforts, identify resilient coastal systems, and provide planners with a programmatic method for defining boundaries used for project planning.

**Leveraging Opportunities**

This effort will leverage in-house spatial data resources, such as high-resolution, high-accuracy lidar elevation data and imagery provided by the National Coastal Mapping Program (NCMP) as well as commercial satellite imagery provided by the Army Geospatial Imagery Office through agreement with the National Geospatial-Intelligence Agency. In addition, it leverages initial efforts by the Joint Airborne Lidar Bathymetry Technical Center of Expertise to develop Coastal Engineering Indices that can be used to define regions based on landscape and nearshore morphology.

**Points of Contact**

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**Participating Partners**

This effort is led by the ERDC Coastal and Hydraulics Laboratory in partnership with the Environmental Laboratory.