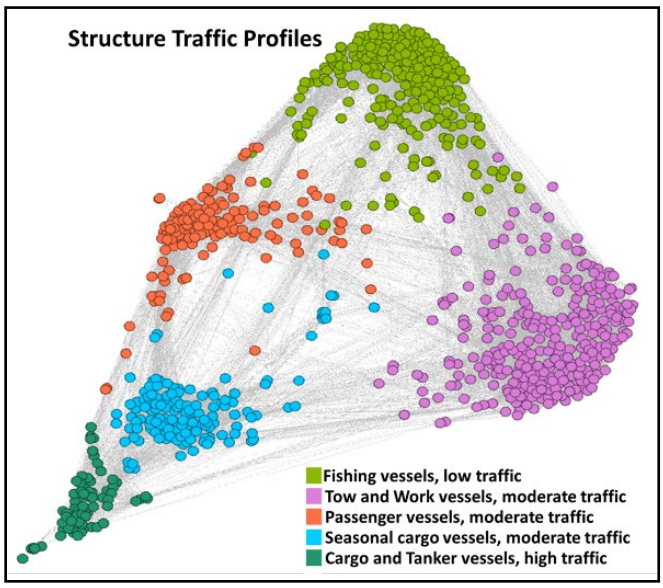
Coastal Navigation Analysis Methods Derived from AIS Vessel Traffic Data (FY21)

Background:

The USACE maintains a vast infrastructure portfolio of deep-draft coastal entrance channels and aging rubble-mound jetties and breakwaters. Due to limited budgetary outlooks for maintenance dredging and repair of coastal structures, the Corps needs to be able to objectively identify the structures in the portfolio that simultaneously encounter active use, provide service to users, and experience service degradation so that resources may be directed at the navigation structures that are most critical to overall marine transportation system.



Approach:

Identify and mine relevant metrics from shipborne Automatic Identification System (AIS) data that provide quantitative profiles of vessels operating in proximity to coastal navigation structures at the national portfolio scale. Apply developed methods to multi-year nationwide record of vessel activity in context with environmental and structural health indicators for coastal structures and assess the results as a method for comparative analysis of structures in terms of quantified user profiles. Further develop methods and relevant metrics into an operational tool for providing objective performance metrics for coastal structures.

Technical Advancements:

This work aims to develop and test methods to normalize performance of coastal structures for the purpose of comparative analysis across the structure portfolio. Given the size of the portfolio, the number of users, local environmental conditions, discrete structure condition, and the diversity across these domains, a distributed parallel computational approach provides results in a time-frame that makes informing managerial decisions feasible, while providing unprecedented insight into the domain of users interacting with coastal structures.

Payoff:

Enables the USACE Navigation business line to shift thinking of structures as a collection of individual assets to broad classes of assets with similar management requirements. This methodology will help align asset maintenance activity with level of use/service, environmental loading, and existing condition by making better use of available performance measurement data and aligning measurement and management with organizational goals.

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