Living Shorelines: Synthesizing the results of a decade of implementation in Coastal Alabama

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LIVING SHORELINE: “a shoreline management practice that provides erosion control; protects, restores or enhances natural shoreline habitat; and maintains coastal processes through strategic placement of plants, stone, sand fill, and other structural and organic materials” (NOAA).

INTRODUCTION

- Substantial funds have been invested in living shoreline (LS) projects across the Gulf of Mexico and elsewhere.
- In Alabama, 12 LS projects have been implemented using 7 different reef technologies (Fig. 1, Table 1, Fig. 2).
- We do not yet have a comprehensive understanding of relative success of different technologies to guide future projects.

OBJECTIVES

- Evaluate and compare the physical, biological and socioeconomic impacts of 12 LS projects in Alabama.
- Identify the most promising strategies for ensuring future investments maximize ecological and societal benefits.

PROJECT SITES AND REEF TECHNOLOGIES

- All projects involved the construction of oyster reef breakwaters using different technologies (Table 1, Fig. 2).
- Some projects also included vegetation planting and/or sediment fill.

METHODS

- Existing data from each LS project were gathered, checked for accuracy and compiled.
- Key metrics included oyster density, nekton abundance, and shoreline position.

PRELIMINARY RESULTS

OYSTERS:

- Abundance of oysters, mussels and oyster drills were sampled for 10 of 12 projects (all except AL05 and LB10; Fig. 4).
- Bagged shell reefs supported highest oyster densities (Fig. 3) by gillnet and seine.
- Mussel drills were most abundant on loose shell reefs.
- Mussels outnumbered oysters in all treatments, except loose shell.

NEKTION:

- Fish and mobile invertebrates associated with oyster reef breakwaters were quantified for 6 projects (PAP07, AP07, HWP08, PAP09, CI10, AP10) by gillnet and seine.
- CPUE is highly variable by site, reef type, and taxonomic groups (Fig. 5, Fig. 6).

LESSONS LEARNED

- Loose shell reefs are subject to spreading and have resulted in flattened reefs.
- Significant loss of oyster shell has been observed in ReefBLK cages.
- Bagged shell reefs support the highest oyster densities.
- Bagged shell reefs support the highest diversity of nekton.
- Demersal fishes most broadly enhanced by reef structures.

ECOSYSTEM SERVICE VALUATION:

- Use market and non-market techniques to estimate the value of ecosystem services, including habitat enhancement, shoreline protection and water quality benefits, provided by LS projects over expected reef lifetimes (sensu Grabowski et al. 2012).

SOCIAL DATA SYNTHESIS:

- Synthesize data from companion social surveys conducted in Alabama from 1999-2014 (e.g. Scyphers et al. 2014, 2015, unpublished data).
- Model recreational fishing at LS project sites using InVEST.

References:

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