**Lone Cabbage Oyster Reef Restoration Project: Oyster Recruitment Monitoring**

**Introduction:**

Indices of recruitment are an important component of fish population assessments. Applying stock-recruitment relationships to commercial shellfish species is confounded by the highly variable and prolific nature of spawning patterns. Defining the stock-recruitment relationship in oysters is further complicated by the availability of hard settlement substrate; essential for oyster survival past the planktonic larval stage. Here an oyster is considered recruited to the fishery post-settlement; these small oysters are referred to as spat. This is when oysters are first able to be impacted by harvest activities; fishing mortality can occur to sub-market size oysters through field culling and sorting processes.

A minimal oyster recruitment monitoring program was established in order to provide basic information on oyster spawning patterns throughout the project area. This program was coupled with a water quality monitoring program in order to increase efficiency of field operations, and also in order to associate continuous water quality data with observed recruitment patterns. While developing a stock-recruitment relationship is currently beyond the scope of this monitoring program, it will provide a simple index of oyster recruitment.

**Methods:**

In order to monitor oyster recruitment, spat collectors were used. Spat collectors were deployed at each project water quality station in April 2016 (Figure 1). Collector design and deployment time were initially unclear. Two collector designs were tested: shell and tile. Collector deployment time was originally two months. Currently only tile spat collectors are being used, and are deployed for one month. Collectors are placed into zip-lock bags and frozen until processing.

Shell Spat Collectors:

Shell spat collectors consisted of ten clean market-size oyster shells enclosed in clam bag mesh. Clean oyster shell was acquired from an oyster processing facility in Cedar Key. After the collector was constructed, total volume (mL) was determined through displacement. Total mass (g) was also collected. Each shell spat collector was attached to water quality sensor housings, located immediately above the water bottom (Figure 2).

When processing, collectors were thawed and shell was removed from the mesh. Length, width, height (mm) were recorded for each shell. Total spat count for each side of shell (interior/exterior) was recorded, along with the height (mm) of the largest spat on each side. It was decided that only tile spat collectors would be deployed starting November 2018.

Tile Spat Collectors:

Tile spat collectors each consist of a 0.151 x 0.151 x 0.012 m (surface area = 0.058 m2). A small hole was drilled in the center of each tile and secured to the water quality sensor anchor chain with a buoy so the tile was oriented horizontally 0.151m above the water bottom (Figure 2).

When processing, collectors were thawed and total spat count for each side of tile (top/bottom/side) was recorded. The heights (mm) of the three largest spat per side were also recorded.

Supplemental data collected for both collectors included estimates of barnacle coverage and evidence of multiple spawning events (spat on spat) and predators (gastropod eggs).

Analysis:

-Shell totals (convert to mass and volume)

-Shell mean

-Shell side comparison

-Spat size

-Spat size by side

-Barnacle

X-Tile totals

X-Tile side comparison

X-Spat size

X-Spat size by side

-Barnacle

-Tile vs shell totals

-Mean monthly salinity

-cumulative number readings >7ppt (check lit

-Mean temp

GLM or GAM

