Annual Report

Period Covered by the Report: June 2001 to January 2003
Date of Report: 20 January 2003
EPA Agreement Number:
Title: The influence of shallow water hydrodynamics on the importance of seagrass detritus in estuarine food webs
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Institution: University of South Alabama
Research Category: Small Grant for Exploratory Research (SGER)
Project Period: 1 June 2001 to 1 June 2002; extended until December 31, 2003

Objective(s) of the Research Project:
The objectives of this study were as follows:

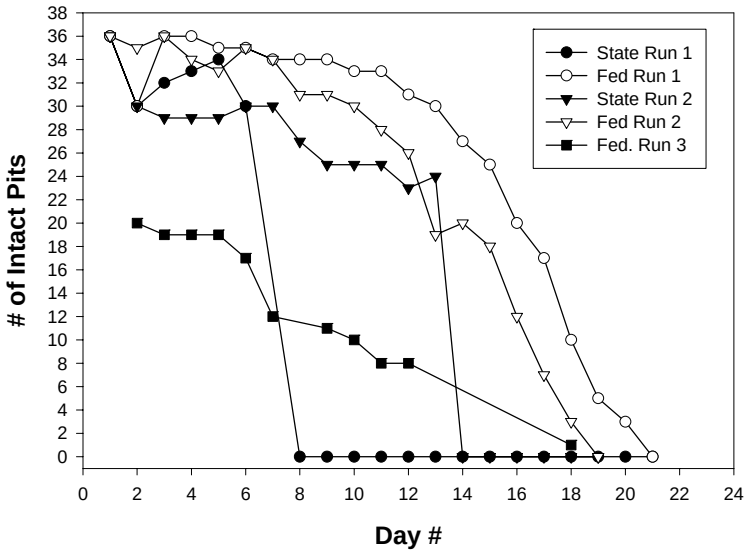
- To identify and characterize the hydrodynamic conditions that control the export of *Thalassia testudinum* and *Halodule wrightii* detritus from source beds and their subsequent deposition in nearby unvegetated areas.
- To determine the persistence of these small patches of accumulated *Thalassia testudinum* and *Halodule wrightii* under natural conditions.
- To estimate the amount of *Thalassia testudinum* and *Halodule wrightii* detrital export from source beds in Perdido Bay.
- To determine the degree to which the shallow water benthic community of Perdido Bay is controlled by small-scale accumulations of *Thalassia testudinum* and *Halodule wrightii*.

Progress Summary/Accomplishments:

The first objective of this study, "To identify and characterize the hydrodynamic conditions that control the export of *Thalassia testudinum* and *Halodule wrightii* detritus from source beds and subsequent deposition in nearby unvegetated areas" has been met. We have completed the laboratory (flume) experiments and have developed the predictive criteria that will be used to understand the role of hydrodynamic processes in controlling the spatial distribution of seagrass detritus accumulations in a shallow water seagrass-sandflat mosaic.

The second objective of this study, "To determine the persistence time of these small patches of accumulated *Thalassia testudinum* and *Halodule wrightii* under natural conditions," has also been completed. Results show that water depth, storm events, and anthropogenic effects such as boat wakes can significantly shorten the persistence of most detrital accumulations but, under certain conditions patches can persist for several weeks (see Figure 1). This indicates that patches at least occasionally persist long enough to be a source of food and/or shelter for organisms outside of living seagrass beds. Thus, these patches likely represent a an important, and as yet unconsidered, direct link between seagrass beds and mud/sand flat habitats, and this linkage must be considered during the development and implementation of coastal management practices.

Figure 1. Persistence of stingray pits in Big Lagoon.



The third objective of this study, "To estimate the amount of *Thalassia testudinum* and *Halodule wrightii* detrital export from source beds in Perdido Bay," has been met through field experiments which were conducted approximately every six weeks from August 2001 through July 2002. A few things became apparent during these field experiments: 1) the sampling methods were effective, and captured seasonal changes in detrital export, such as the winter seagrass die-off; 2) prevailing winds, even at low speeds, have a large influence on the distribution of seagrass detritus within the study site; and 3) storm events play an important role in seagrass detritus export and distribution.

The fourth objective of this study, "To determine the degree to which the shallow water benthic community of Perdido Bay is controlled by small-scale accumulations of *Thalassia testudinum* and *Halodule wrightii*", has also been completed through field experiments which were concluded in July 2002.

Publications/Presentations:

No publications or presentations have yet arisen from this project. However, preparation of the manuscript which will present the findings of the laboratory work is currently in progress, and we anticipate the submission of this manuscript by June 2003. Preparation of manuscripts presenting the findings of field experiments has also begun, but is dependent on the speed with which the samples can be processed.

Future Activities:

This study was originally proposed to be conducted from April 2001 to April 2002. However, the project start-up was delayed as funds to conduct the study were not obligated until July 2001. As a result, data collection began in August 2001 and continued until August 3, 2002.

A manuscript presenting the findings of our first objective, "To identify and characterize the hydrodynamic conditions that control the export of *Thalassia testudinum* and *Halodule wrightii* detritus from source beds and subsequent deposition in nearby unvegetated areas," is in progress and will be submitted for publication this summer.

The findings of our second objective, "To determine the persistence time of these small patches of accumulated *Thalassia testudinum* and *Halodule wrightii* under natural conditions," are being incorporated into the findings of the other objectives as manuscripts are prepared for publication.

All of the experimentation necessary to meet the third and fourth objectives of this study has been completed, and the samples collected during these experiments are currently being processed. Due to the large number and time-consuming nature of these samples, we anticipate that sample processing will continue through March 2003. Manuscripts which present the findings of these objectives will be submitted for publication by the end of August 2003.

Supplemental Keywords: marine, estuary, ecological effects, population, ecosystem, indicators, public policy, decision making, conservation, environmental assets, biology, ecology, modeling, southeast, Gulf Coast, Alabama, Florida.

Relevant Web Sites: NA

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Disclaimer

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