



## Evaluating the effect of environmental disturbance on the trophic structure of Florida Bay, U.S.A.: Multiple stable isotope analyses of contemporary and historical specimens

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**ABSTRACT:** Widespread seagrass and sponge mortality and increased water column turbidity caused by phytoplankton blooms and suspended sediments occurred throughout Florida Bay from 1987 to the mid 1990s. This disturbance led to the hypothesis that Florida Bay was shifting from dependence on benthic production to dependence driven primarily by water-column production. We tested this hypothesis by (1) evaluating the current trophic structure of Florida Bay and then (2) comparing it to a reference site in Biscayne Bay populated by dense seagrass beds with no recent history of large-scale seagrass mortality. Additionally, we (3) compared the current trophic structure of Florida Bay to a prior trophic structure recorded in historical specimens collected before the onset of the environmental disturbance. No evidence was found to support the occurrence of a large-scale shift from a seagrass-dominated to a plankton-dominated system. The  $\delta^{13}\text{C}$  and  $\delta^{34}\text{S}$  signatures of macroinvertebrates and fishes collected from sites in Florida Bay expressed the strong dominance of benthic production and were similar to values obtained from the Biscayne Bay reference site. Highly mobile apex predators that effectively integrate the signatures of their prey over longer temporal and larger spatial scales had  $\delta^{13}\text{C}$  signatures that ranged from  $-13\text{‰}$  to  $-11\text{‰}$  and  $\delta^{34}\text{S}$  signatures that ranged from  $+2\text{‰}$  to  $+6\text{‰}$ , indicating that the food web of the bay is currently dominated by strong benthic-pelagic coupling. A comparison between Florida Bay's historic communities (preserved fish from 1956- 1966) and its contemporary communities also supports the conclusion that the fundamental character of the bay remains relatively unchanged.

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