Investigating the role of bottlenose dolphins (*Tursiops truncatus*) in the Florida Coastal Everglades

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Abstract:

Top predators are best known for their ability to affect their communities through inflicting mortality on prey and inducing behavioral modifications (e.g. risk effects). Recent scientific evidence suggests that predators may have additional roles in bottom-up processes such as transporting materials within and across habitat boundaries. The Florida Coastal Everglades (FCE) is an "upside-down" oligotrophic estuary where productivity decreases from the mouth of the estuary to freshwater marshes. Research in the FCE suggest that predators can act as mobile links between disparate habitats and can potentially affect nutrient and biogeochemical dynamics through localized behaviors (e.g. American alligators and juvenile bull sharks). To date, little is known about bottlenose dolphins (*Tursiops truncatus*) in the FCE beyond broad-scale patterns of abundance. Because they are highly mobile mammals commonly found in coastal waters, bottlenose dolphins are an interesting case study for investigating the influence of ecology on the evolution of local adaptations. Within this influence lies the potential for investigation of the related roles those adaptations play in coastal ecosystems due to their high metabolic rates, movement capabilities, and tendency to display specialized foraging behaviors. Stable isotope analysis of biopsy samples were used to investigate habitat use, trophic interactions, and patterns of individual specialization in bottlenose dolphins to gain functional insights into ecosystem dynamics. $\delta^{13}C$ isotopic values are used to differentiate the relative importance of a food web to the diet of an organism, while $\delta^{15}N$ values are used to evaluate the relative trophic position of an organism. Dolphin $\delta^{13}C$ isotopic values seem to suggest that dolphins are foraging within single ecosystems and may not be moving nutrients across ecosystem boundaries while their $\delta^{15}N$ isotopic values appear to be of a top predator, at a similar level to bull sharks and alligators in FCE. Further research is necessary to provide vital insight into the large predators' role in affecting the evolution of local adaptations. Conducting this research should also provide information for predicting how future changes occurring due to restoration dynamics (see CERP: evergladesplan.org) and climate change will affect the ecological roles of these animals.