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Nutrient stoichiometry of fishes and invertebrates in coastal marine Caribbean ecosystems

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Abstract: The importance of animals for mediating ecosystem processes has long been recognized by ecologist. Traditionally, consumer-mediated dynamics have been considered through consumptive pathways such as predation, and herbivory. Yet, consumers also play critical roles in mediating 'bottom-up' pathways associated with nutrient dynamics. Foundational research demonstrated the importance of these dynamics in terrestrial, freshwater, and pelagic marine ecosystems, and introduced novel perspectives on the role of animals such as wildebeest, lacustrine fishes, and zooplankton, respectively, for providing an important source of nutrients that limit primary production. This research inspired a substantial body of research on the importance of consumer-mediated nutrient dynamics for ecosystem function. Yet despite this, only recently have ecologists begun to extend this line of thinking toward coastal marine ecosystems (with an important earlier exception, e.g. Meyer et al. 1983). The data presented herein, is a comprehensive study of CND from invertebrates and fishes that live in subtropical and tropical Caribbean coastal marine waters, including mangroves, seagrass beds, and coral

reefs. This data set represents the largest, to my knowledge, published nutrient stoichiometry dataset from a single system, including estimates of excretion rates (n= 900 individuals total, n = 667 individual fish, size range: 0.14-2597 g (2-107 cm), n= 233 invertebrates, size range: 0.04-487g, 900 total individuals), and somatic nutrient content analyses (n = 658 individuals total, n = 494 vertebrates, n=164 invertebrates). These data also include $\delta^{13}C$ and $\delta^{15}N$ stable isotopes of whole body, body mass (wet weight), taxonomic identification to class-level, and functional group classification. These data have been used to test basic ecological theory, to scale individual-level processes to coral reef, mangrove, and seagrass ecosystems, and to understand the role of human impacts for mitigating consumer-mediated nutrient dynamics. While these findings have helped improve our understanding of nutrient dynamics in tropical coastal ecosystems, these data offer a wealth of additional promise for advancing ecological theory and applied science in tropical marine ecosystems and beyond. Users are free to use and analyze the data. Attribution should be given to this presentation of the data.

Key words: body chemistry; body size; coral reef; ecological stoichiometry; invertebrate; mangrove; nitrogen excretion; phosphorus excretion; seagrass; vertebrate

The complete data set is available as Supporting Information at: [*to be completed at proof stage*].

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