

Fish type, body size can help predict nutrient recycling rates

16 April 2015, by Dr. Craig Layman



species in The Bahamas. The robust size of the data set – some 900 individual fish or invertebrates in a diverse marine community – provided heft to the study, says Jake Allgeier, the lead author of the paper and a researcher at the University of Washington.

"We examined everything from sea cucumbers to moray eels – 102 species in all – and using these data were able to test what best predicts how animals recycle nitrogen and phosphorus," Allgeier said. "These findings can be applied to draw general conclusions across other ecosystems. But we also need to acknowledge that certain species can have unique effects on these ecological processes."

The nutrients excreted by fish in their "pee" may be critical to the health of coastal ecosystems. But knowing whether generalizations can be made about how to predict these nutrient levels in various ecosystems has vexed researchers – until now.

In a paper published in *Proceedings of the National Academy of Sciences*, North Carolina State University associate professor Craig Layman and colleagues show that ecologists can better predict the rates of how these chemical nutrients are transferred by fish if they know the various fish species living in an ecosystem, along with the [body size](#) of the fish.

"The findings suggest that body size and taxonomic identity are the most important factors to predict the amount of [nutrients](#) that fish recycle to the environment," Layman said. "Body size is important because the bigger you are the more you excrete. Taxonomy is important because different species of fish eat different food items and have different body structures."

The researchers studied fish and invertebrate

These research findings, along with a growing body of evidence from Allgeier and other researchers, carry much significance for coastal management initiatives, Layman added. "Coral restoration is becoming a widespread management practice and [fish](#)-based nutrient supply has been shown to be important for coral health – and thus the success of restoration efforts," he said.

More information: "Metabolic theory and taxonomic identity predict nutrient recycling in a diverse food web" *Proceedings of the National Academy of Sciences* [DOI: 10.1073/pnas.1420819112](https://doi.org/10.1073/pnas.1420819112)

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