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Antón, Andrea, Just Cebrian, Kenneth L. Heck, Carlos M. Duarte, Kate L. Sheehan, Mary-Elizabeth C. Miller, and C. Drew Foster. 2011. Decoupled effects (positive to negative) of nutrient enrichment on ecosystem services. *Ecological Applications* 21:991–1009. <http://dx.doi.org/10.1890/09-0841.1>

Articles

Decoupled effects (positive to negative) of nutrient enrichment on ecosystem services

Andrea Antón^{1,2,4}, Just Cebrian^{1,2}, Kenneth L. Heck^{1,2}, Carlos M. Duarte³, Kate L. Sheehan^{1,2}, Mary-Elizabeth C. Miller^{1,2}, and C. Drew Foster^{1,2}

¹Dauphin Island Sea Lab, 101 Bienville Boulevard, Dauphin Island, Alabama 36528 USA

²Department of Marine Sciences, University of South Alabama, Mobile, Alabama 36688 USA

³IMEDEA (CSIC-UIB), C/Miquel Marqués 21, Esporles, Islas Baleares 07190 Spain

Eutrophication is a widespread phenomenon that disrupts natural ecosystems around the globe. Despite the general recognition that ecosystems provide many services and benefits to humans, little effort has been made to address how increasing anthropogenic eutrophication affects those services. We conducted a field experiment to determine the effect of nutrient enrichment on five ecological services provided by a model coastal system, a shallow seagrass community near Mobile Bay, Alabama (USA): (1) the provision of shelter for fauna; (2) the quality of food provided to first-order consumers; (3) quantity of food provision to first-order consumers and O₂/CO₂ exchange; (4) producer carbon and nitrogen storage, and (5) water clarity. The results showed a severe negative impact on seagrass density and biomass, which greatly reduced the structural complexity of the community and provision of shelter to fauna. Water clarity and the standing stock of producer carbon were reduced in the fertilized area in comparison with the control area. In contrast, nutrient addition did not affect in any consistent way the total quantity of food available for first-order consumers, the net exchange of O₂/CO₂, or the standing stock of producer nitrogen in the community. The nutritional quality of the food available for first-order consumers increased with fertilization. These results show that the impacts of nutrient enrichment on the services provided by natural systems may be disparate, ranging from negative to positive. These findings suggest that management policies for anthropogenic eutrophication will depend on the specific ecosystem service targeted. In the case of shallow seagrass beds, the loss of biogenic habitat and drastic impacts on commercially important fauna may be sufficiently alarming to warrant rigorous control of coastal eutrophication.

Keywords: [carbon/nitrogen ratio](#), [ecosystem services](#), [eutrophication](#), [Halodule wrightii](#), [nursery](#), [primary production](#), [respiration](#), [Ruppia maritima](#), [seagrass](#)

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⁴Present address: Curriculum for the Environment and Ecology, University of North Carolina, Chapel Hill, North Carolina 27599-3275 USA. E-mail: androide@email.unc.edu

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F. Tomas, J. M. Abbott, C. Steinberg, M. Balk, S. L. Williams, J. J. Stachowicz. (2011) Plant genotype and nitrogen loading influence seagrass productivity, biochemistry, and plant–herbivore interactions. *Ecology* **92**:9, 1807-1817
Online publication date: 1-Sep-2011.

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