

ID: W2624603405

TITLE: Marine reserves can mitigate and promote adaptation to climate change

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ABSTRACT:

Strong decreases in greenhouse gas emissions are required to meet the reduction trajectory resolved within the 2015 Paris Agreement. However, even these decreases will not avert serious stress and damage to life on Earth, and additional steps are needed to boost the resilience of ecosystems, safeguard their wildlife, and protect their capacity to supply vital goods and services. We discuss how well-managed marine reserves may help marine ecosystems and people adapt to five prominent impacts of climate change: acidification, sea-level rise, intensification of storms, shifts in species distribution, and decreased productivity and oxygen availability, as well as their cumulative effects. We explore the role of managed ecosystems in mitigating climate change by promoting carbon sequestration and storage and by buffering against uncertainty in management, environmental fluctuations, directional change, and extreme events. We highlight both strengths and limitations and conclude that marine reserves are a viable low-tech, cost-effective adaptation strategy that would yield multiple cobenefits from local to global scales, improving the outlook for the environment and people into the future.

SOURCE: Proceedings of the National Academy of Sciences of the United States of America

PDF URL: <https://www.pnas.org/content/pnas/114/24/6167.full.pdf>

CITED BY COUNT: 453

PUBLICATION YEAR: 2017

TYPE: article

CONCEPTS: ['Climate change', 'Natural resource economics', 'Ecosystem', 'Marine reserve', 'Environmental science', 'Environmental resource management', 'Marine ecosystem', 'Greenhouse gas', 'Ocean acidification', 'Psychological resilience', 'Resilience (materials science)', 'Marine protected area', 'Business', 'Environmental protection', 'Ecology', 'Fishing', 'Economics', 'Psychology', 'Physics', 'Habitat', 'Psychotherapist', 'Biology', 'Thermodynamics']