

# When resistance is futile, new paper advises RAD range of conservation options

July 8 2021

---



Passive revegetation (left) following thin-layer placement by a low-ground pressure excavator (right) at a tidal marsh at Blackwater National Wildlife Refuge, MD. This "direct" strategy confronts ecosystem transformation from sea-level rise. Credit: D Curson/Audubon Society (left) and Middleton Evans (right).

Major ecosystem changes like sea-level rise, desertification and lake warming are fueling uncertainty about the future. Many initiatives—such as those fighting to fully eradicate non-native species, or to combat wildfires—focus on actively resisting change to preserve a slice of the past.

However, resisting ecosystem transformation is not always a feasible approach. According to a new paper published today in the *Ecological*

Society of America's journal *Frontiers in Ecology and the Environment*, accepting and directing ecosystem change are also viable responses, and should not necessarily be viewed as fallback options or as last resorts. The paper presents a set of guiding principles for applying a "RAD" strategy—a framework that involves either resisting, accepting or directing ecosystem changes.

"We are facing the harsh reality that in some locations, ecosystems are transforming at such a pace that we won't be able to restore or rehabilitate them to what they once were," said Abigail Lynch, the paper's lead author and a research fish biologist at the United States Geological Survey (USGS) National Climate Adaptation Science Center. "The RAD framework provides a common language for starting productive conversations about what comes next—when we need to consider options to accept and direct change in addition to just trying to resist it."

The paper was a collaborative effort by 20 federal, state and academic researchers from across the United States. It zeroes in on three National Wildlife Refuges (NWRs) along the East Coast, where [sea-level rise](#) is increasing at three to four times the global average rate and transforming ecosystems and local communities. Managers of the three NWRs have applied all three of the responses outlined in the paper:

- John H Chafee NWR (Rhode Island): managers are resisting the effects of sea-level rise by depositing dredged sediment on waterlogged salt marshes and securing the sediment with bags of recycled oyster shells.
- Chincoteague NWR (Virginia): After years of resisting dune overwash, managers are now allowing storm-induced waves to fill in waterfowl impoundments, accepting the landward transport of sand and moving National Park Service visitor infrastructure.
- Blackwater NWR (Maryland): Managers are directing the effects

of sea-level rise by facilitating marsh migration upwards. Assisted marsh migration is ten times cheaper than trying to restore marsh in situ.

According to Erik Beever, a research ecologist at the USGS Northern Rocky Mountain Science Center, research affiliate faculty at Montana State University and a coauthor of the paper, the importance of considering costs and benefits is paramount when selecting a course of action within the RAD framework.

"A 'resist' approach may involve less cost in the immediate term or may allow the persistence of a culturally treasured species, but it may involve substantially higher costs over the course of a period as short as 10-15 years," said Beever. "For example, if that treasured species' bioclimatic niche no longer occurs within the management area, facilitating its persistence will require more intensive and more costly efforts."

Accepting ecosystem change can involve a fundamental shift in the way of life for communities that rely on an ecosystem's goods and services. However, solutions that focus on resisting change are becoming increasingly impractical as ecological changes occur more frequently and more dramatically. The paper contends that three broad feasibility criteria—ecological, societal, and financial—must be considered when deciding which RAD strategy is most suitable.

Natural resource managers are using options from within the RAD framework to tackle a variety of problems across many different systems, including:

- Loss of corals in the Mexican state of Quintana Roo
- Spruce bark beetle epidemic and wildfires on Alaska's Kenai peninsula, where white spruce forests are transforming into grasslands

- Projected decline of cisco populations under warming conditions in Minnesota lakes

In the RAD framework, accepting change is not a passive approach; rather, it is a deliberate course of action geared toward a defined set of objectives. While the framework still needs to be tested and fine-tuned, the authors ultimately view it as a strategy of empowerment.

"It might be tempting to throw one's hands up in the air when faced with drastic and transformative environmental change, but there are options available," said Laura Thompson, a coauthor who is a research ecologist at the USGS National Climate Adaptation Science Center and adjunct faculty member at the University of Tennessee, Knoxville. "This RAD framework provides the full range of strategies."

**More information:** Abigail J Lynch et al, Managing for RADical ecosystem change: applying the Resist-Accept-Direct (RAD) framework, *Frontiers in Ecology and the Environment* (2021). [DOI: 10.1002/fee.2377](https://doi.org/10.1002/fee.2377)

Provided by Ecological Society of America

Citation: When resistance is futile, new paper advises RAD range of conservation options (2021, July 8) retrieved 23 April 2024 from <https://phys.org/news/2021-07-resistance-futile-paper-rad-range.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.