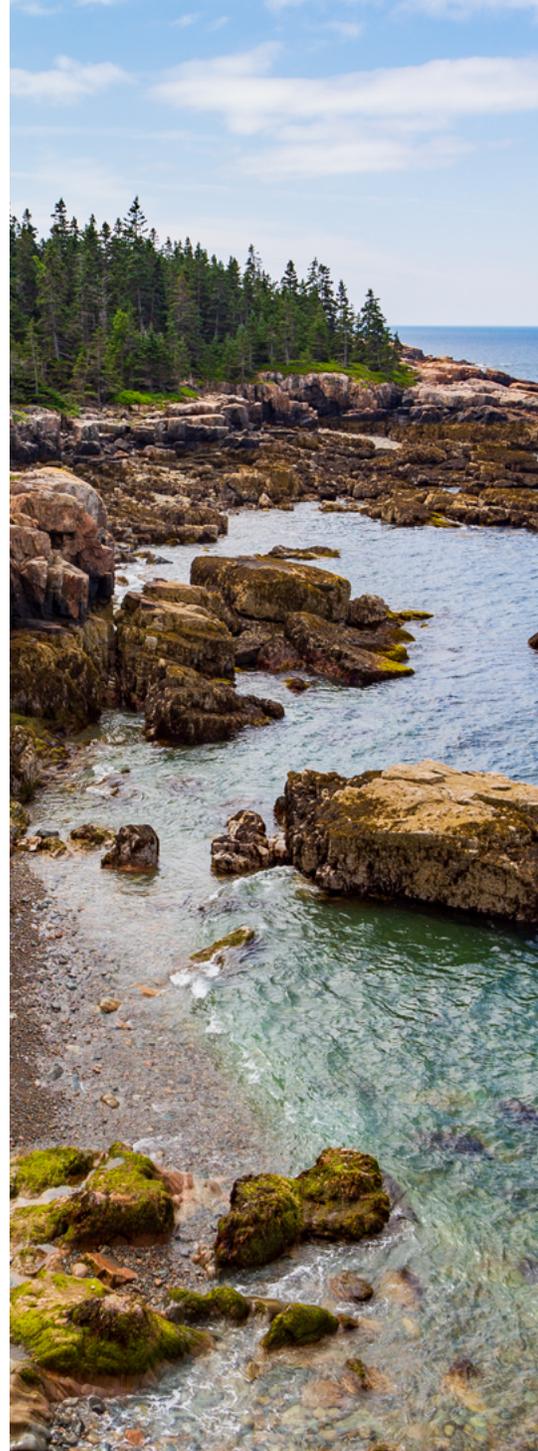
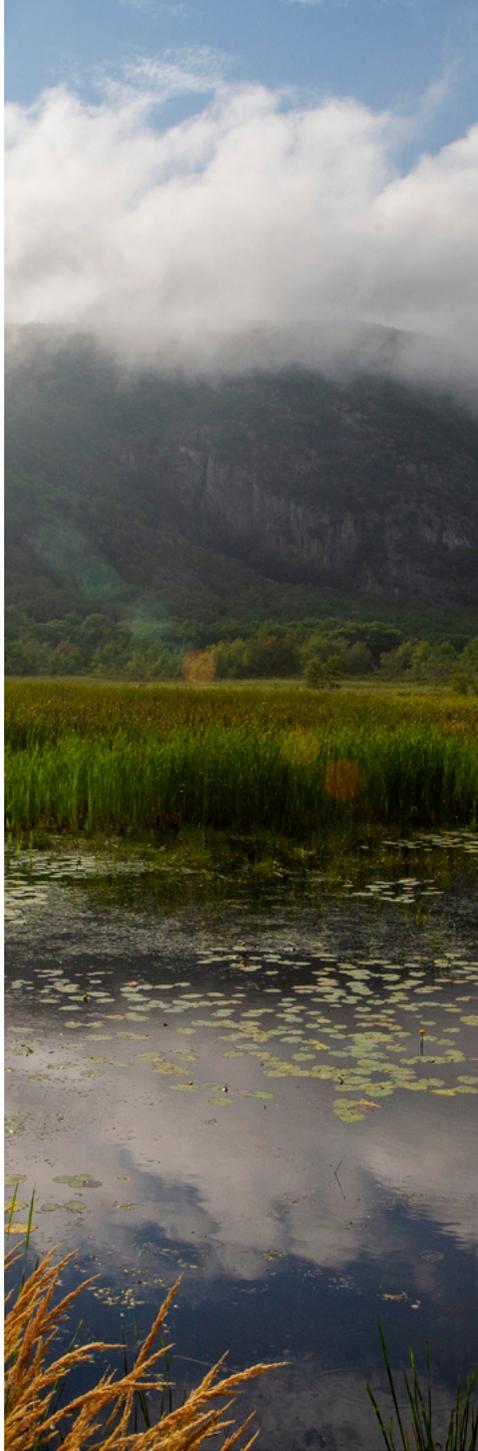


# SCIENCE TO PROTECT ACADIA

IN A RAPIDLY CHANGING ENVIRONMENT

Acadia National Park | Friends of Acadia | Schoodic Institute





**THIS PLACE** is a mosaic of diverse landscapes and varied topography and climate, a unique mix of ocean islands and peninsulas, glacially sculpted granite mountains, forest, marsh and meadow, lake and stream—all within the boundaries of a national park.

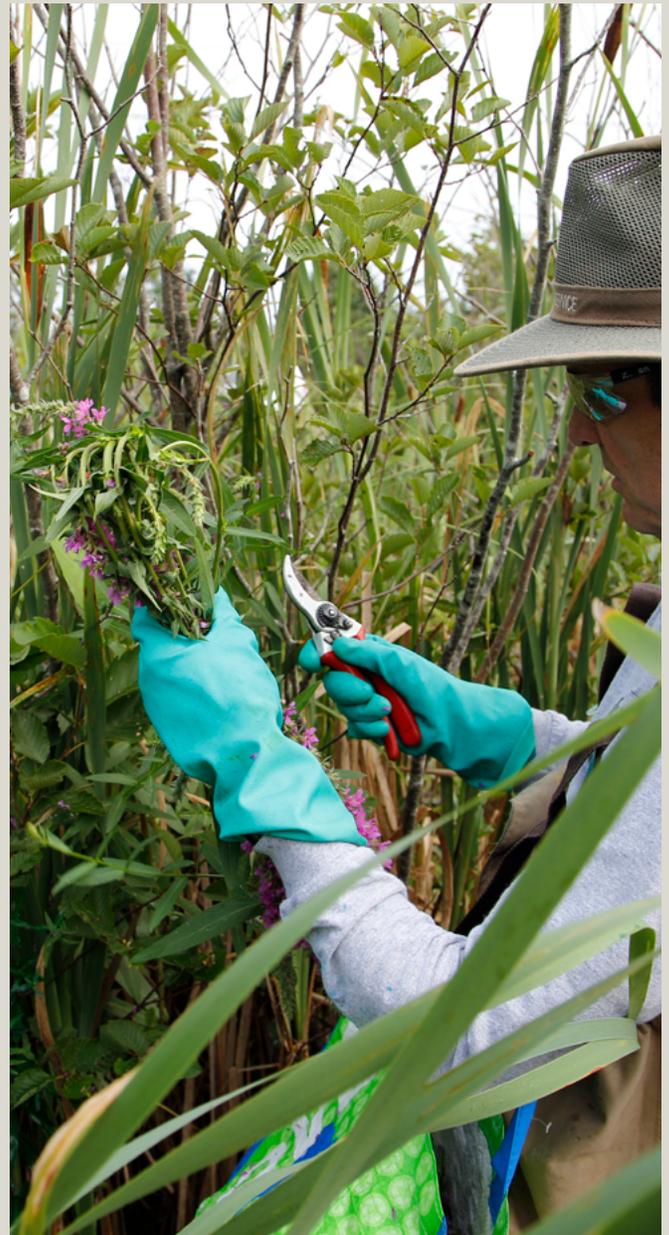
**THIS PLACE** is homeland of the Wabanaki people. The lands within and outside the park and the marine waters beyond support the livelihoods of local communities, and are visited by more than three million people each year. Scientists, teachers, and students have long recognized Acadia as a distinct and ideal environment in which to understand and connect to nature.

**THIS PLACE** is changing. Science continues to guide our relationships with Acadia's landscapes and shorelines. Studying the past, while monitoring current change, helps us prepare for the future. Turn to the next page for some examples from environmental research in Acadia, past and present.

Acadia's weather records show that annual temperatures have warmed by 3° F since 1890. Climate models suggest another 3° F rise by the middle of this century. Spring arrives earlier, autumn falls later. Research on plant pollen buried in the bottom of Sargent Mountain Pond—the first lake that appeared in what became Maine after the glaciers melted—shows how the forest came to be. Tree planting experiments give us a glimpse of what the forest might become.



Acadia is within a transition zone between temperate and boreal forests where many trees are at the edge of their range.



Managing invasive species is an important part of our work to help keep Acadia's forests and meadows resilient to climate change.

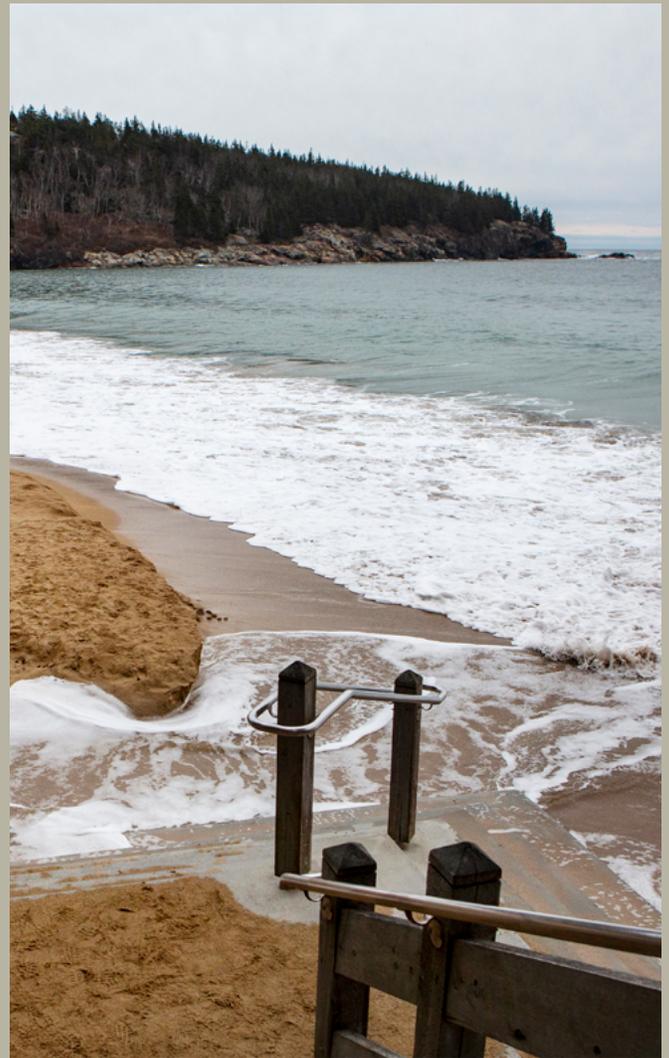
Early plant inventories conducted by student naturalists in the 1880s have allowed scientists to document changes in the flora of Mount Desert Island: One of every six plant species found in the nineteenth century no longer occur in the park. Native plant species have declined in abundance, whereas nonnative species have increased in abundance. Restoration of native plant communities now means thinking about what species might thrive in a future warmer Acadia.

Acadia's forests host 300 species of resident and migratory birds. Research in the 1950s, which became a founding principle of ecology, found that warblers feed in different parts of spruce trees. Now bird populations, monitored via programs such as Sea Watch and Hawk Watch are shifting as Acadia's climate warms. Some bird species, such as boreal chickadee, no longer breed in the park.



Today only the black-capped chickadee lives in Acadia. By the end of the century, Carolina chickadees will likely breed in the park.

Precipitation has increased by six inches, with more rain and less snow, while the seasonality of precipitation has shifted. As storms become more intense, we are using adaptive management approaches, learning how to protect cultural resources and reduce damage to natural resources, for example by replacing undersized culverts along carriage roads to prevent washouts and erosion.



A "king tide" at Sand Beach shows how rising sea levels and storms may impact Acadia.

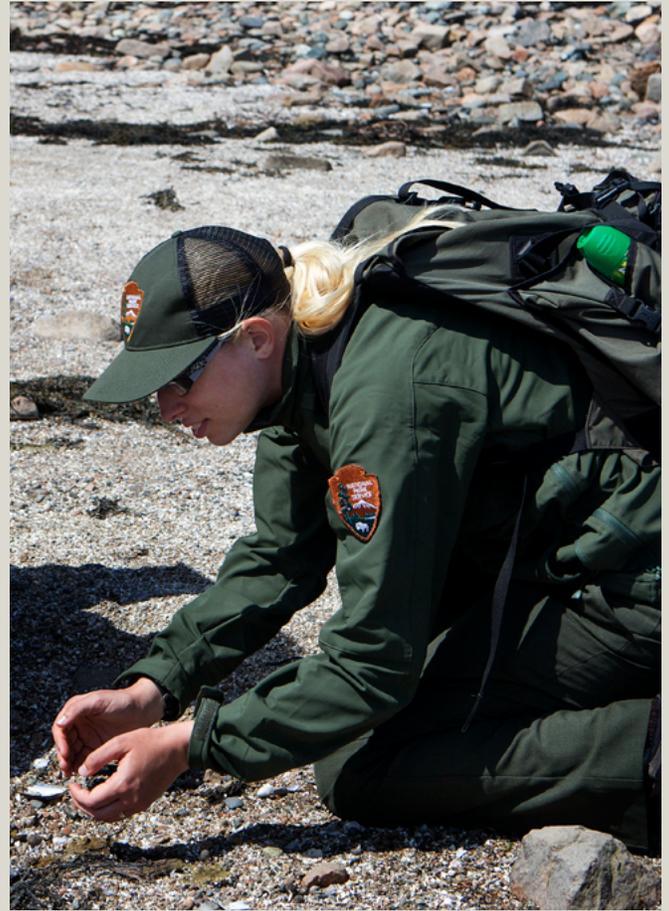
Acadia's interconnected streams, wetlands, shorelines, and forest allow wildlife to live and roam—the park is among the largest areas of intact habitat remaining along the U.S. East Coast. Yet even here, roads and trails fragment and impair habitat and hinder the ability of species to respond to changing conditions. The Wild Acadia initiative restores and reconnects park ecosystems to improve their resilience into the future. Second Century Stewardship Fellows and other scientists conduct research that informs restoration and other park management actions, and engage the public in their science to help everyone understand the changes taking place.



Schoodic Institute technicians and volunteers monitor biodiversity at Wild Acadia restoration sites.

Research and monitoring in Acadia's lakes have shown how environmental policies have successfully reduced pollution from acid rain and mercury, and how more frequent intense precipitation events are affecting water quality and food webs in lakes such as Jordan Pond. Historical fishing records have shown that food webs are also changing in the warming Gulf of Maine. Today, we track the changing ocean conditions with temperature sensors along the coast, monitoring buoys just offshore, tide gauges at the docks, and local students studying biodiversity in the mudflats.

Restoring and protecting the landscape includes repairing human relationships with this place. Partnerships with the Wabanaki Nations are renewing traditions of knowledge and stewardship, and expanding scientific and cultural perspectives, from salt marshes and forest trees to archaeological sites and mountain summits.



An important part of our work is sharing knowledge about how Acadia is changing.



Volunteers learn how to search for an invasive forest insect pest, the emerald ash borer, that threatens the cultural heritage of Wabanaki communities.



## TOGETHER,

FRIENDS OF ACADIA and SCHOODIC INSTITUTE work with the NATIONAL PARK SERVICE to preserve Acadia's natural and cultural resources unimpaired for future generations, making sure people have meaningful experiences, and restoring and protecting the beauty and resilience of this place.

## JOIN US

Follow Leave-No-Trace principles, use public transportation, and take to the trails, paths, and waters to fully experience this place.

- Prevent the spread of invasive species: don't move firewood, learn about plants where you live and travel, and create and protect habitat for bees, butterflies, and birds.
- Help us understand change by participating in a community science program or contributing to iNaturalist, eBird, or Nature's Notebook.
- Volunteer at a local park.
- Share your story about the changes taking place in Acadia and in your own neighborhood.

