Sunken Heath wetland, Acadia National Park. Kate Miller photo

Freshwater Wetland Monitoring

Northeast Temperate Network

Program Brief

Right: Dragon's Mouth is a rare wildflower that can be found in Acadia's Bigh Heath weltand. Albert Herring photo.

Below: A transect tape is laid out acoss a wetland in Acadia National Park. Kate Miller Photo.

Wetlands in NETN parks are widespread and diverse, ranging from marine to freshwater habitats. The greatest diversity and abundance of wetlands, however, are found in Maine's Acadia National Park, including considerable coverage of palustrine (freshwater wetland lacking flowing water) scrub/shrub and emergent habitats. Emergent wetlands feature perennial, erect, rooted, herbaceous water-loving plants that are present for most of the growing season and in most years.

Why monitor freshwater wetlands?

Wetlands provide many important ecosystem functions including habitat for plants and animals, chemical uptake and nutrient cycling, and erosion and flood control.

Wetlands are also important sites of biodiversity, and in Acadia nearly 2/3 of the state-ranked rare species in the Mount Desert Island (MDI) region are found in wetland and other aquatic ecosystems. Wetlands are particularly vulnerable to a number of stresses including physical alteration of their watershed, invasive species, polluted water run-off, and sedimentation.

Wetland impactees and impactors

Wetland ecosystems influence and are influenced by many factors.

Nearly all wetlands and watersheds in Acadia have been altered to some degree by human activities. Logging and sheep grazing were widespread enough throughout the 1800's that nearly all of the forests in the park today are second-growth. Many small and several large wetlands on MDI were dredged, ditched, filled, and/or impounded prior to establishment of the park. Roads and human development continue to impact wetlands through increased runoff from impermeable surfaces and changes to the typical rates of flow of rivers and in the levels and volumes of water in the marshes.

Beavers are important agents of natural disturbance in wetlands in the eastern U.S. Since their reintroduction in 1921 to MDI, beavers have created numerous wetland habitats across the landscape. After the large 1947 fire, early successional forests were common in the park and beaver populations increased until almost all the best sites for beavers were occupied by the population peak in 1979. Since then populations have declined and without a major disturbance to increase abundance of early successional and beaver-preferred tree species, expansion beyond the current population is unlikely.

A recent study on the influence of beaver and human disturbance on wetland plant communities found that emergent-dominated wetlands represented an early successional and relatively short-lived stage of natural wetland development that resulted from beaver activity. Only human disturbance has the capacity to force wetlands out of the range of natural variation, and create seemingly permanent emergent wetlands. While small wetlands were most susceptible to stressors and the

Above: Acadia's Great Meadow wetland during an intense rain storm. Kate Miller photo.

Below: Acadia's 420 acre Big Heath wetland is considered to be the southern-most example of a 'plateau peatland' and is designated as a National Natural Landmark. Kate Miller photo.

resulting shift to a persistent emergent marsh, excessive disturbance has converted several large wetland complexes in the park to permanent sedge-dominated meadows. Despite these significant human impacts, many wetlands in Acadia exhibit characteristics of minimally disturbed condition.

How is the monitoring done?

Intensive monitoring takes place at ten "sentinel" sites, and rapid assessments at a larger number of randomly selected sites. Results will be specific to undisturbed wetlands and findings may be able to serve as an early warning of threats or changes in wetland condition that may then be examined with follow-up research throughout the park. Monitoring sites are composed of a 40-m radius assessment area, and a 100-m buffer around the assessment area. In the assessment area of each sentinel site, a range of measurements related to vegetation, soils, hydrology, algae, and water quality are gathered.

More information:

For access to the full monitoring protocol, resource briefs, and more - visit NETN's website and click on the Monitoring / Wetlands - Freshwater links. You can also "like" NETN on Facebook where you can view pictures and time lapse videos of monitoring crews in the field.

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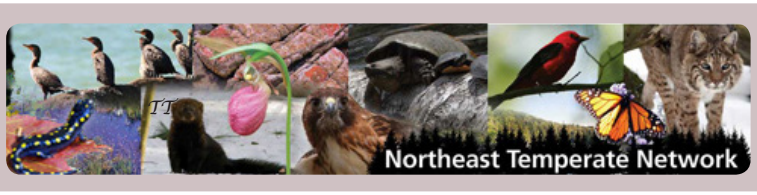
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