

MAINE'S ECOLOGICAL RESERVES: Meeting the Promise of Saving All the Pieces



Maine's ecological reserve system was created by the Maine Legislature in 2000 to conserve the state's rich array of plant and animal life, and to protect examples of all the habitat types found in Maine. Today, the role of ecological reserves in supporting long-term scientific research and education, preserving biodiversity, and helping mitigate climate change is more critical than ever.

A Vision of Saving All the Pieces

Maine's natural environment provides us with so much: clean air, clean water, flood and erosion control, medicine, crop pollination, carbon sequestration, and recreation to name a few. It also inspires and rejuvenates us. Though our scientific knowledge grows every year, there are species and relationships in nature we know little about or that have yet to be discovered. For that reason, saving all the pieces is essential to maintaining healthy ecosystems and the fish, wildlife, plants, and microorganisms they support.

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“Maine’s ecological reserves are guarding against the loss of native wildlife in the face of a rapidly changing climate and teaching us about the complexity of unmanaged forests, wetlands, and waters. But the system is not yet complete — more reserves are needed to fully encompass the variety and breadth of biodiversity and landscapes in Maine.”

— Ecologist Janet McMahon, M.S.

The concept of an ecological reserve system in Maine gained traction in the 1980s and was developed in earnest in the 1990s by the State Planning Office and Maine Forest Biodiversity Project, which included representatives from the forest products industry, state agencies, and nonprofit organizations, including the Natural Resources Council of Maine. Because of those efforts, the ecological reserve system became a successful law. The vision was to “save all the pieces” by conserving Maine's unique biodiversity and providing key resources for long-term scientific research and education. Public and private entities would collaborate to create a network of ecological reserves connected by lands managed for forestry, as a complement to other conservation efforts. Together, these lands would create a matrix that helps sustain

functioning natural communities and the variations in species composition within each. Today, in addition to 19 ecological reserves designated by the Bureau of Parks and Lands, Maine Department of Inland Fisheries and Wildlife, as well as private organizations, manage 50 ecological reserves across the state.

Benefits of Ecological Reserves

Maine's ecological reserves provide a wide variety of benefits to Maine people. They:

- Serve as large carbon sinks and can help fight climate change. On average, ecological reserves store 30% more carbon than other lands in Maine on a per-acre basis.
- Act as long-term research sites that provide scientific research opportunities to enhance our understanding of environmental change on the landscape.
- Protect both common and at-risk species in Maine — including those that are well-known and loved and others that are lesser-known.
- Include some of the most mature forest stands in the state, a vanishing resource yet very important as wildlife habitat.
- Support nonmotorized recreation and views of spectacular landscapes.

Perhaps more importantly, ecological reserves protect representative examples of Maine's enormous variety of habitat types. These reserves provide benchmarks against which changes in the state's environment can be measured, and they offer outdoor laboratories or classrooms that enhance science, education, and management of forests, farms, fisheries, outdoor recreation, and natural resources.

Even though State-owned ecological reserves cover less than 1% of the state, they protect some of the state's well-loved places, like Chamberlain Lake and Mt. Abraham. They also include less recognizable ones, such as Great Heath and Wassataquoik Stream. Take a tour of some of the 19 ecological reserve sites managed by the Maine Bureau of Parks and Lands to learn about the different habitat types, plant and animal life, and other features of these spectacular landscapes that benefit Maine people and future generations.



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Bold Coast at Cutler Preserve (Washington County)



Featured Species: Blue-flag iris (*Iris versicolor*), Bald Eagle (*Haliaeetus leucocephalus*), crowsfoot butterfly (*Plebejus idas empetri*)

Habitat and Natural Features: Coastal plateau bogs, open headlands, and bluejoint meadows characteristic of Downeast Maine

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Tunk Lake Area (Hancock County)



Featured Species: Old-growth red spruce tree (*Picea rubens*), American red squirrel (*Tamiasciurus hudsonicus*), Blackburnian Warbler (*Setophaga fusca*)

Habitat and Natural Features: Includes some of Maine's only old-growth tree stands, mid-elevation summits, and classic East Coastal Region ponds.





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Mahoosuc Unit (Oxford County)



Featured Species: Yellow-banded bumblebee (*Bombus terricola*), northern blueberry (*Vaccinium boreale*)

Habitat and Natural Features: Spans an alpine ridge that supports numerous populations of rare plants and is known to be one of the most difficult sections of the Appalachian Trail.

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Bigelow Preserve (Somerset County)

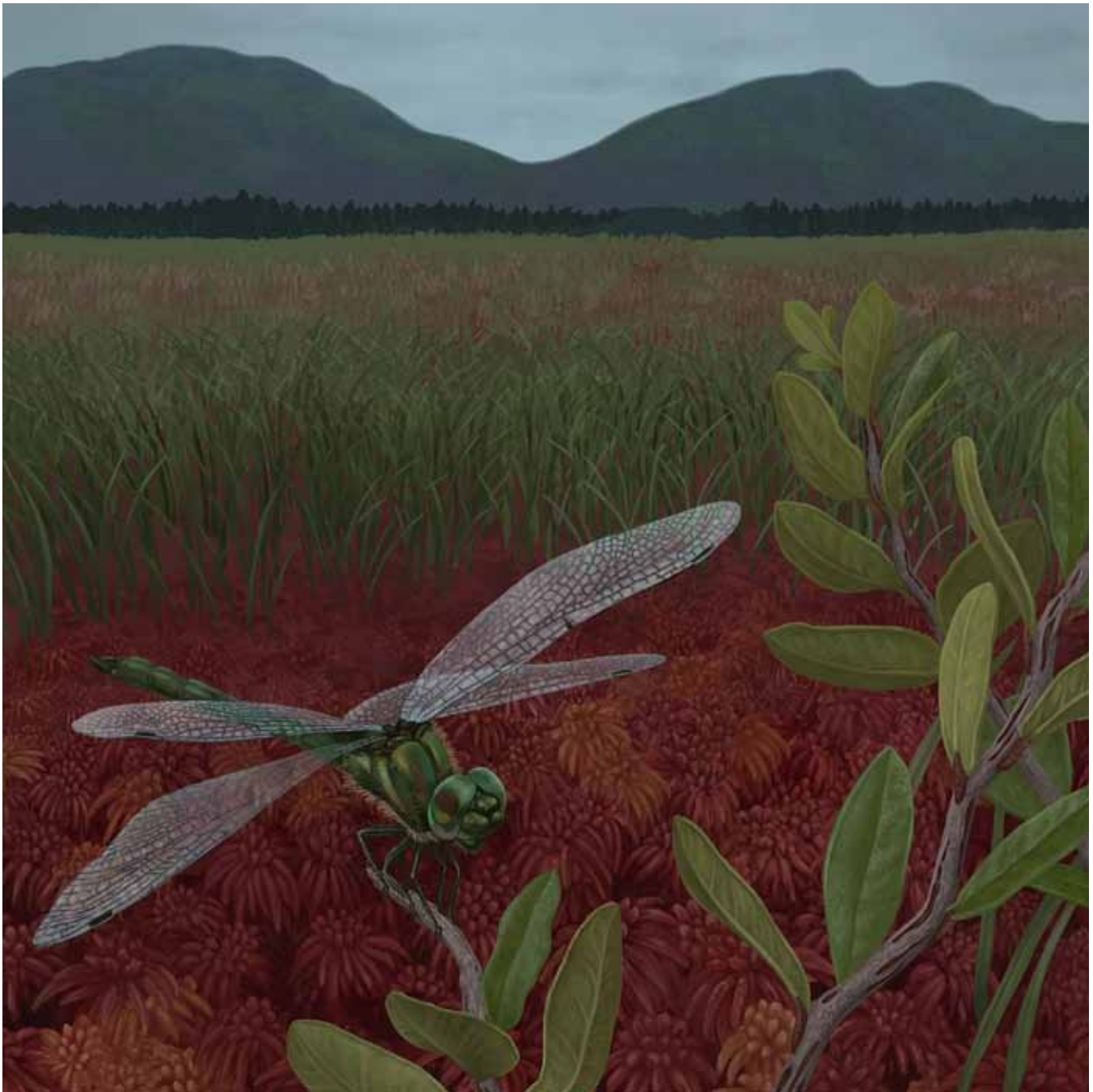


Featured Species: Bicknell's Thrush (*Catharus bicknelli*), balsam fir (*Abies balsamea*), painted trillium (*Trillium undulatum*)

Habitat and Natural Features: The highest elevational gradient of all the reserves, containing excellent examples of successional wetland systems as well as good examples of beech-birch-maple forest and montane spruce-fir forest communities

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Number Five Bog (Somerset County)



Featured Species: Quebec emerald dragonfly (*Somatochlora brevicincta*), leatherleaf (*Chamaedaphne calyculata*), inland jack pine (*Pinus banksiana*)

Habitat and Natural Features: Designated as a National Natural Landmark for its special features; includes the largest stand of inland jack pine in the state and helps protect the 92-acre Bog Pond, one of the largest ponds entirely within a peatland in Maine, as well as 15 miles of shoreline of Moose River, a Class A Maine River.

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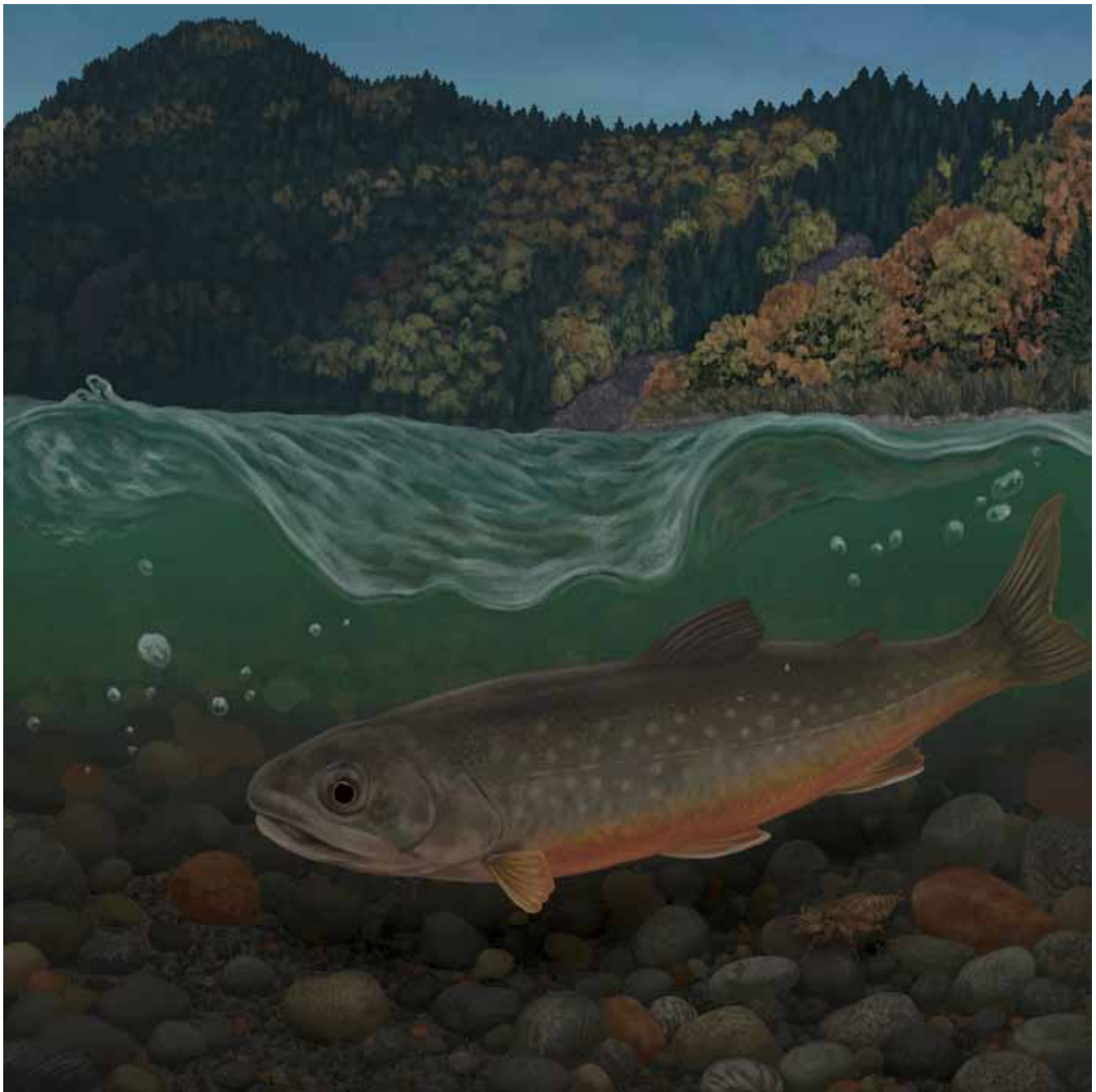
St. John Ponds (Somerset County)

Featured Species: A male moose (*Alces americanus*), beaked sedge (*Carex rostrata*), purple pitcher plant (*Sarracenia purpurea*)



Habitat and Natural Features: Includes First (Lower and Upper), Second, and Third St. John Ponds and Robinson Pond, which are part of a chain of shallow lakes at the headwaters of the St. John River in the North Maine Woods. The 275-acre wetland on Third St. John Pond is considered an exemplary Streamshore Ecosystem.





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Deboullie (Aroostook County)

Featured Species: Arctic charr (*Salvelinus alpinus*)



© Noah Oppenheim

Habitat and Natural Features: Includes the shorelines of 11 ponds and habitats like acidic sedge fens and northern white cedar swamps that give way to spruce slope forests, northern hardwood forests, and exposed talus, as well as several stands of old-growth spruce. Also contains some of the only intact native populations of landlocked Arctic charr in the continental U.S. and several plant species that are of conservation concern, including Arctic sandwort, northern woodsia, and few-flowered spikerush.

Compounding Threats to Maine's Wildlands

As Maine faces growing threats from development, pollution, biodiversity loss, and climate change, it is increasingly important to protect at-risk animals and plants, and to ensure ecosystems remain intact.

Climate change and biodiversity are interlinked global challenges driven by human activity. Worldwide, one million species are vulnerable to extinction.¹ One-third of terrestrial species in the U.S. are threatened with extinction, and one-third of Maine species are highly vulnerable to climate change.^{2,3} According to the National Audubon Society, 52% of Maine's 230 bird species are vulnerable to climate change across seasons.⁴

Climate change is increasing the intensity and frequency of storms and average annual temperatures,⁵ which will affect Maine's forests, watersheds, and the wildlife that inhabit them over the coming decades. Because of climate change, the types, abundance, and distribution of tree species in Maine's forests will likely shift. Our forests will have fewer sugar maple, red maple, and birch trees and more American beech trees. Spruce and firs will decline as a result of less snow and milder winters. Forests will also become more susceptible to fire, drought, pests, and invasive species.^{6,7}

For fish and wildlife, scientists predict that changes to habitat will force many species to retreat northward or to higher elevations or will otherwise need to seek refuge to survive. The most vulnerable Maine habitats are alpine and montane systems, peatlands, northern river shores, spruce flats, and cedar lowlands. Alpine habitats make up a very small portion of Maine but host a disproportionate number of species of greatest conservation concern. Pests, such as ticks, and pathogens will become more common because winters will be shorter and milder, creating problems for wildlife, such as moose, and plants that the pests parasitize. In between storm events there will be periods of drought, causing more frequent drying or warming of wetlands, vernal pools,



© David Small
Harlequin Ducks

and cold-water pools used by numerous fish and wildlife species at various life stages. Drought and higher ambient temperatures will increase the temperature of waterbodies, which may contribute to harmful algal blooms that are lethal to certain cold-water fish, like wild native brook trout.⁸

Development pressure is one of the biggest threats to wildlife habitat in Maine, a state that contains globally significant bird habitat and is part of one of the world's last remaining contiguous temperate broadleaf-mixed forests. Southern and coastal Maine had higher rates of conversion of open space to development than northern and western Maine.⁹ In 2020 and 2021, real estate interest spiked in all of Maine, but unlike in previous decades, average home prices in rural Maine went up, too, indicating greater interest in second homes and camps in the Unorganized Territories (UT). According to the Land Use Planning Commission, building permits in the UT dramatically increased in 2020 and have remained above average throughout 2021.¹⁰

Rising to the Challenge of Saving All the Pieces

The promise of the ecological reserve system to save all the pieces has not fully been met. Only a portion of all habitat types are under conservation, leaving many important habitats and the species they support vulnerable, especially in southern Maine. New ecological reserves in southern Maine where there are relatively high rates of rare, threatened, and endangered plant and animal species would also create accessible recreation opportunities in the part of the state where the majority of the population lives.

The designation of additional ecological reserves across Maine is needed to open the door to greater protection of biodiversity and wildlife habitat. By expanding these public lands, Maine will also be taking steps toward meeting its climate goals, specifically in conserving 30% of Maine land by 2030 and focusing conservation on high biodiversity areas that support habitat connectivity and ecosystem health.¹¹ Protecting Maine's biodiversity strongholds will increase resilience to climate change and provide critical habitat for wildlife that live in and migrate through Maine. While private organizations have stepped up to purchase and manage land and water in the state as ecological reserves, Maine should lead by example.

The State must prioritize the designation of new ecological reserves to demonstrate the public benefit of these lands and to be a strong partner with private organizations in meeting the promise to save all the pieces.

Thank you to the Maine Natural Areas Program and Maine Department of Inland Fisheries and Wildlife for providing reference photos and for reviewing the illustrations for scientific accuracy and realism.

About the Artist

Placing a special focus on at-risk species and wildlands, artist Zoe Keller weaves drawings that explore the interconnectedness of fragile, vanishing ecosystems. By highlighting the biodiversity at risk in an era of human-driven mass extinction, Zoe's work aims to inspire reverence for the natural world and action to defend what we have left. View Zoe's art on Instagram @zoekellerart or visit zoekeller.com

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About the Author

Melanie Sturm is the Forests & Wildlife Director at the Natural Resources Council of Maine.

¹ <https://www.un.org/sustainabledevelopment/blog/2019/05/nature-decline-unprecedented-report/>

² https://www.fs.fed.us/rm/pubs_journals/2020/mrs_2020_dietz_m001.pdf (pg. 4)

³ https://www.manomet.org/wp-content/uploads/old-files/BwHSummary_021914.pdf (pg. 2)

⁴ <https://www.audubon.org/climate/survivalbydegrees/state/us/me> (State Brief pg. 4)

⁵ <https://nca2018.globalchange.gov/>

⁶ <https://climatechange.umaine.edu/wp-content/uploads/sites/439/2020/02/Maines-Climature-Future-2020-Update-3.pdf> (pg. 19)

⁷ <https://online.fliphtml5.com/gkqg/jqys/#p=1> (pg. 231)

⁸ *Id.* (pg. 49 and 192)

⁹ An assessment of accomplishments and gaps in Maine Land Conservation, May 2021 draft 2021 (shared by MNAP via email)

¹⁰ <https://www.nrcm.org/blog/development-predictions-pandemic-smart-planning/>; LUPC Director's Report November 10, 2021

¹¹ Climate Action Plan *Maine Won't Wait* (page 14) https://www.maine.gov/future/sites/maine.gov/future/files/inline-files/MaineWontWait_December2020.pdf

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