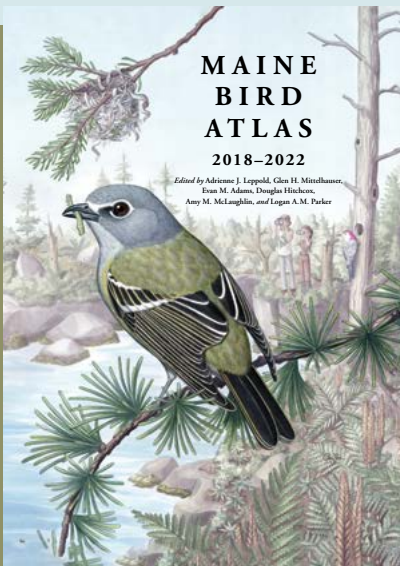




Introducing THE MAINE BIRD ATLAS

BY DOUG HITCHCOX, STAFF NATURALIST



These findings will be explored in greater detail in the upcoming Maine Bird Atlas book. Preorders will open at a virtual Maine Bird Atlas presentation on September 16 at 7 pm and the book is expected to be available in November.



**Maine Bird Atlas
Presentation**

Wednesday, September 16,
7 pm, online

THE WAIT IS OVER! The results of the Maine Bird Atlas are here. Thousands of volunteers searched every corner of Maine between 2018 and 2022 in search of nesting birds, and their millions of observations have been compiled into the Maine Bird Atlas.

This monumental effort gives us a detailed snapshot of where hundreds of bird species are—and aren't—living and breeding in Maine. What's more, we can compare what we've learned against the information from the first atlas (the Atlas of Breeding Birds in Maine) which was completed in 1983, to see how species' ranges have changed in the past four decades. This comprehensive statewide assessment of breeding and wintering birds will help guide and inform management for Maine birds for years to come.

The Maine Bird Atlas was a collaborative effort led by Maine Department of Inland Fisheries and Wildlife, with major contributions from Maine Natural History Observatory, Maine Audubon, Biodiversity Research Institute, and thousands of volunteers. The atlas is not only a bird book, it represents one of the largest natural history collaborations ever undertaken in Maine.

Above photo: Bank Swallow, by Louis Bevier

What's In The Atlas?

One of the primary goals of the atlas was to document the breeding distribution of all birds across the state. To do that, we enlisted the help of thousands of volunteers to survey different areas and report what birds they saw during the breeding season and what behaviors they witnessed. Most atlases around the world follow a similar protocol where different bird behaviors can be put into one of three categories: **Possible**, **Probable**, or **Confirmed** breeding. There is technically a fourth category, for birds that are just observed during a survey and not near any likely nesting habitat—for example, a Great Blue Heron catching rodents in a field, far from any rookeries, would only count as **Observed**.

Within those four categories, the 22 actual breeding codes follow a hierarchy: Codes in the Possible category would denote a bird singing, or simply being in appropriate nesting habitat. Codes in the Probable category record those birds being with a mate, doing a courtship display, or being territorial, and many codes from nest building to seeing a nest with young in it are considered Confirmed breeding activities.

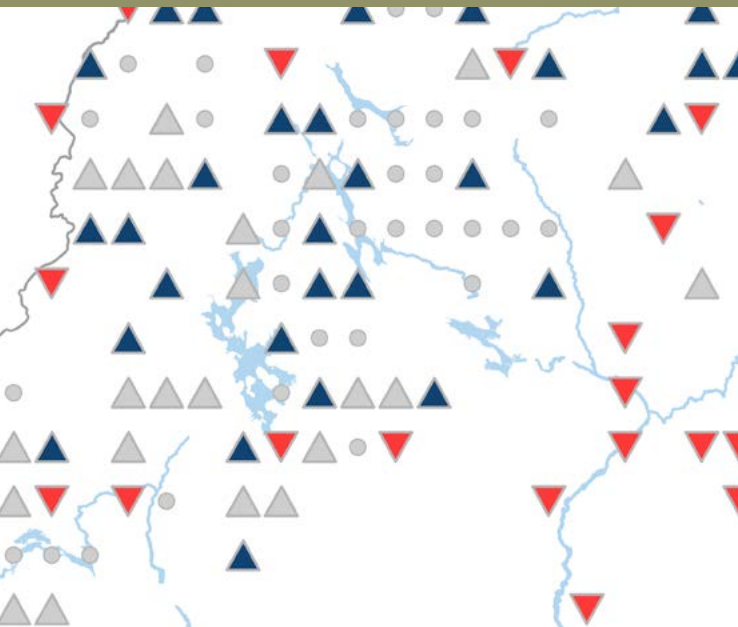


The other important piece is the size of our survey units: the state was divided into roughly 9 square mile “blocks”, and we asked observers to spend at least 40 hours across multiple parts of the breeding season in each block. There were some exceptions to the amount of time spent, mostly in blocks that were too difficult to access, so we also assessed the total number of species observed and the percentage of those that were Probable or Confirmed before we decided if a block was adequately surveyed, or “complete.” Dividing the state into these blocks results in more than 4,000 total blocks, which simply couldn’t all be covered, so one out of a grouping of six blocks was considered a “priority block” and with at least every priority block completed, we could extrapolate the findings to get statewide coverage. In maps that are published in the atlas, breeding evidence is represented with those four categories at the block level.

The atlas documented and revealed a number of changes—some quite dramatic and others just plain surprising! An important aspect of bird atlases is that they look at **all** species, not just the rare and threatened, so we get valuable data that may prove what was previously based on anecdotal evidence alone, or may even unveil new trends not seen before. The data reveals a unique story for each species. The following pages present just a tiny sample of species whose status has changed since the 1983 atlas, with information about what’s driving their movement.



THE MAINE BIRD ATLAS



Map Legend

These change maps from the atlas compare new results to those in the first atlas.

-  A **RED ARROW DOWN** shows breeding in the first atlas but no evidence in the second.
-  A **GRAY CIRCLE** means there was breeding in both atlases.
-  A **BLUE ARROW UP** means there was breeding in the second atlas but not in the first atlas.
-  A **GRAY ARROW GOING UP** means there was breeding in the second atlas but that area wasn't surveyed adequately in the first atlas.

(These maps use a larger grid than the atlas blocks, instead showing USGS topograph quads because that was the survey size used during the first atlas.)

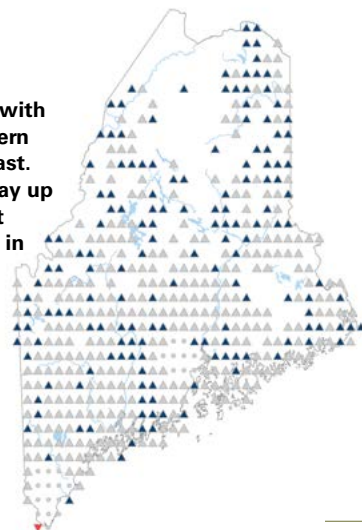
REGULATORY PROTECTION

Wild Turkey



Most people are aware of the recovery of the Bald Eagle, which increased 179% since the 1983 atlas thanks to the banning of DDT and protections afforded by the Endangered Species Act. However, an even greater success was the reintroduction of Wild Turkey, which increased by 1,560%! Wild Turkeys were extirpated from Maine in the late 1800s, wiped out by unregulated hunting. It would take multiple efforts to reintroduce birds, taken from Vermont, but they were recorded breeding in York and Waldo counties during the 1983 atlas. Now they have been found breeding in every county, notably using logging roads to access heavily wooded areas in northern Maine they historically didn't reach. The first regulated turkey hunting season began in spring 1986, and now 6,000-7,000 birds are harvested each spring.

The two pockets where turkeys were first reintroduced show well with the gray circles in southern Maine and in the Midcoast. While there are many gray up arrows (areas that didn't have adequate coverage in the first atlas), we do know there were no turkeys there so you can imagine all of these as blue!



CLIMATE CHANGE

Boreal Chickadee

Photo: © Oliver W Patrick, iNaturalist



The Bird Atlas data revealed many species expanding their ranges northward in the past 40 years—Carolina Wren, Red-bellied Woodpecker, Northern Cardinal, Tufted Titmouse, and more—as well as a host of species retreating north from the southern edge of their ranges. Boreal Chickadees formerly bred in boreal spruce forests south to Penobscot Bay, but they're rapidly moving north, likely following climate-sensitive insect prey. 2022 seems to be the last "good" year for Boreal Chickadees in Washington County with eight reports. In reports collected since the atlas data, 2023 and 2024 only had single reports, with 2 reports in 2025. As of the first half of 2026, no Boreal Chickadees have been reported in Maine east of Interstate 95.

The pocket of red in the Downeast region is alarming, as these chickadees have lost a lot of ground since the first atlas. The mixture of changes, apparently up, down, and stable in adjacent quads in the northwest could be from habitat changes, or likely due to effort: Boreal Chickadees can be hard to find!



LAND USE CHANGE / REGENERATING FORESTS

Fox Sparrow

Photo: © wanderingeden, iNaturalist



There are a couple of species bucking the northerly trend by showing a southward shift into the state. Fox Sparrows are most frequently encountered in Maine as migrants passing through and visiting your backyard feeders in March/April as they go north, or November/December as they go south. If you are willing and able to venture to the mountains in northwestern Maine, you can find them singing from dense spruce-fir stands at high elevations, and now more than ever! The 1983 atlas recorded Fox Sparrows breeding at just two sites—notably the first time they had ever been found nesting in Maine—but this time around they were detected in 95 blocks. This expansion is likely linked to the increase in young spruce-fir stands from less clearcutting and is also being recorded in New Hampshire, Quebec, and Nova Scotia. It is also worth noting this species is expanding northward as well.

It is interesting to see that at the two spots where Fox Sparrows were found in the first atlas, they were NOT found in the second (note the two red arrows). Despite that, they moved into most of the other mountains in northern and western Maine.



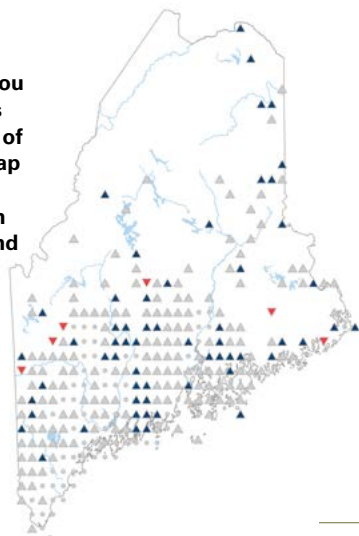
LAND USE CHANGE / SUBURBAN GROWTH

Northern Cardinal



Northern Cardinals are an example of a common trend among many birds that are moving north in the state. Climate change is a major contributor to the northward shift in most species, but the suburbanization of southern and coastal Maine has also benefitted species like the Northern Cardinal. Cardinals thrive in the kinds of dense shrubbery we plant between our houses, and readily accept food from backyard bird feeders. Cardinals were rare in the state until the 1950s and were only recorded breeding in the southern half of the state, in mostly coastal or suburban areas, during the 1983 atlas (as marked by the gray circles on the map). Now, their northward spread is shown with the abundance of up arrows, and the association with human development is shown with the newly occupied blocks following the Interstate 95 corridor and then Route 1 north from Houlton to Fort Kent. This is also emphasized by the lack of records in the North Maine Woods, and the same associations can be picked out at a smaller scale looking at Washington County.

This really shows that where you find people, you can also find cardinals as they've taken advantage of suburban sprawl. This map nearly perfectly matches with a human population density map of Maine, and you can see how cardinals follow Route 1 and Interstate 95.



LAND USE CHANGE /

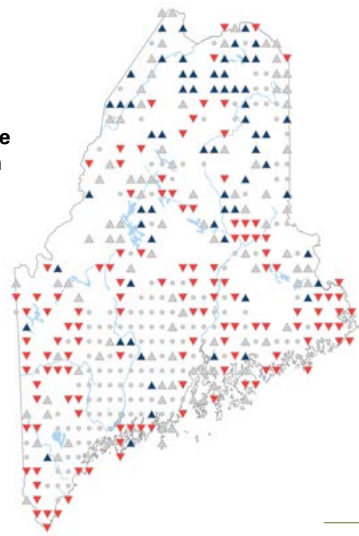
SUBURBAN GROWTH AND CLEARCUTTING

American Kestrel



American Kestrels nest in large trees with cavities, often created by woodpeckers, and require large open spaces for foraging. In Maine, much of that open habitat was created by agriculture, but the loss of farms and conversion to suburban housing since the 1983 atlas has led to a decline in kestrels (the exact opposite of the Northern Cardinal). However, northern Maine witnessed a surprising increase in kestrels. They show up in areas where foresters were clearcutting due to spruce budworm around the time of the 1983 atlas, but now timber companies have mostly switched to "shelterwood harvests," and in these places, snags suitable for kestrel nesting are left standing. Habitat isn't the only challenge for kestrels, however, as insects (their primary food) are experiencing significant population declines, and exposure to contaminants like rodenticides also pose risks.

Kestrels appear to be retracting on all sides of their historic range but there is a "core" of stable breeding (gray circles) in the central interior and western foothills. The increased range into northern Maine is evident by all the up arrows, and especially the cluster of blues.



CLIMATE CHANGE / HABITAT LOSS

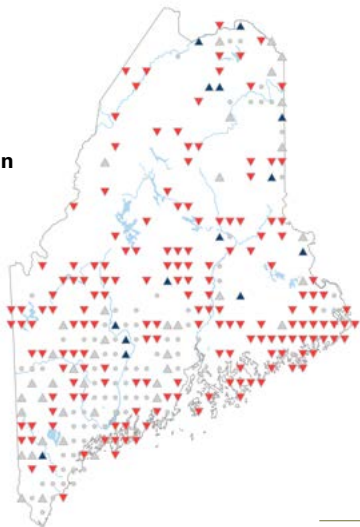
Bank Swallow

Photo: Louis Bevier



Bank Swallow is a once abundant species that nested across the state during the first atlas, and certainly wouldn't have garnered much attention at the time. But since then, we've seen a large decline in aerial insectivores across the board, and Bank Swallows also struggle with habitat loss and a lack of adaptability to climate change. There has been a 65% drop in area occupied since the 1983 atlas, a finding that was significant enough for the state to list this species as Threatened under the Maine Endangered Species Act in 2023.

There is no sugarcoating just how much of the historic range of Bank Swallows that has been lost. They are persisting in the central interior and, surprisingly, on the southern coast.



MATURING FORESTS

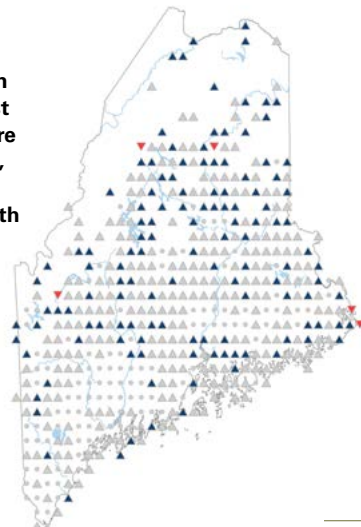
Pine Warbler

Photo: Doug Hitchcox



At a quick glance, the Pine Warbler map appears to show a familiar pattern of a species range shifting northward, but their story is a bit more interesting because of their habitat requirements. As the name implies, Pine Warblers nest in pines, particularly mature Eastern White Pines. So while our changing climate is a factor, this species better shows how much the forests are maturing. Pine Warblers generally favor taller, older trees for nesting, and atlas data showed a positive correlation between species abundance and canopy height.

This map shows an interesting gradient from the areas along the coast where Pine Warblers were breeding in both atlases, with many gray circles. Then there's a wide swath of gray and blue up arrows where they've moved as forests have matured since the first atlas.



THE MAINE BIRD ATLAS

NEW SPECIES BREEDING IN MAINE

Fish Crow

Nearly identical to American Crows except for a more nasal call, Fish Crows have been steadily expanding northward.



Photo: Doug Hitchcox

Merlin

These small falcons have expanded their breeding range in recent decades to include urban areas across New England.

Sandhill Crane

The Eastern Flyway Population of these massive birds is returning after near-extirpation in the 19th century. Maine's first breeding record came in 2000.



American Oystercatcher

Always scarce in the northeast, oystercatchers were extirpated from Maine in the 1800s but conservation efforts have brought them back with the first nesting in Maine in 1994.

Clay-colored Sparrow

A species of the prairies, they occasionally wander to Maine and when they find the right habitat—and a mate—they have successfully nested, the first time in 1996.

King Rail

This is a secretive marsh bird that rarely is detected in Maine but amazingly has a few sporadic breeding records, including one confirmation during the Maine Bird Atlas.



Photo: Luke Seitz

Common Murre & Manx Shearwater

These two pelagic species, spending most of their lives at sea, have benefited from seabird restoration work. Murres returned to nesting on Matinicus Rock in 2018, after a 130-year absence. Manx Shearwater (*pictured above*) has been nesting on Matinicus Rock since 2009, for a long time the only known breeding location in the United States.

A handful of species have begun breeding in Maine since the 1983 atlas.



Great Egret

Great Egrets began breeding on Stratton Island in 1994. For egrets that nest in colonies, there are just a few islands suitable for breeding.



Photo: NBII

Redhead & Ruddy Duck

These two are very rare breeders in the east, but Aroostook County agriculture has helped create surprising duck hotspots with breeding confirmed in 2008 and 2005 respectively.



Red-bellied Woodpecker, Carolina Wren, Orchard Oriole, Eastern Screech-Owl

This batch of birds has all been expanding northward in response to climate change.

What Happens Next?

While the completion of the Maine Bird Atlas feels like a great accomplishment, as we now have the most comprehensive assessment of breeding and wintering bird activity ever compiled, it also is the beginning of so much opportunity. This project not only gives us a new dataset to analyze, it also provides comparisons to the past.

We have already used it to add much-needed protections for species like Bank Swallow (Cliff Swallow, Saltmarsh Sparrow, Blackpoll Warbler, and Bicknell's Thrush were also added to Maine's Endangered Species Act list in 2023) and we can identify species seeing declines that can be helped *before* needing to be listed.

The first atlas did have some shortcomings, especially due to the lack of coverage in remote areas of the state. The Maine Bird Atlas greatly benefited from the increased interest in birding, technological innovations like eBird, and financial support from Maine Department of Inland Fisheries and Wildlife which allowed this project to reach 100% coverage of priority blocks across the state. This sets an even better baseline for future comparisons, and we hopefully won't have to wait 50 years for the next atlas!

The results of this project are meant to help guide and inform management decisions and support habitat protection efforts for Maine birds. We hope it also encourages further inquiry, research, and analysis to expand our understanding of the natural resources here in Maine. We want this data to be used! An online data portal is being developed for use by the public, conservation practitioners, students, land managers, or anyone who wants to be able to access and build upon this work.