Species Focus
of conservation concern

Bridle shiner
Once common throughout the Atlantic seaboard, the bridle shiner is now absent from much of its former range. A state-threatened fish in New Hampshire, the bridle shiner depends on submerged aquatic vegetation for cover and spawning. They may be found along the shorelines of large lakes, the backwaters of large rivers, or in small headwater streams with healthy aquatic vegetation. In New Hampshire, the bridle shiner appears to have disappeared from some lakes due to habitat loss from shoreline development, but in other lakes the reasons are not as clear. Declining water quality from fertilizers, non-native fish introductions, and water level fluctuations at dams may play a role in the bridle shiner's decline.


Bridle shiner

Bald Eagle
Bald eagles live beside the waters of lakes and larger rivers, year-round. They depend on large trees along the shore for both nesting and winter roosting. Eagles nest early, as their chicks require a long period to grow and learn to hunt. They eat live fish in the summer, and in the winter they scavenge dead animals or prey on ducks or fish in open waters like the Connecticut, Merrimack and Androscoggin rivers. Viewers should stay at least 300 feet away from nests and winter roosts, and landowners should leave large trees standing along shorelines, even if dead, as these are ideal nest and perch sites.


Bald eagle

Common Loon
Common loons are a threatened species in New Hampshire. They use lakes and ponds over 50 acres for breeding. Although restored to much of their former range though intense conservation efforts, they are still very vulnerable to human disturbance. Loons nest at the edge of the shore on a mound built a few inches off the ground. Loons on the nest are extremely sensitive to disturbance and will abandon their nest, eggs or chicks when boaters, including paddlers, come too close. Abandoned eggs and chicks are then vulnerable to predators. Shoreline development should stay 600 feet away from loon nests.


Common loon

Eastern pond mussel
Freshwater mussels are among the most threatened animals in North America. While a number of mussel species are common along the shorelines of New Hampshire waters, eastern pond mussels, a species of conservation concern, are found in only a handful of ponds in southeastern New Hampshire. Most freshwater mussels are good indicators of ecosystem health because as filter feeders, they are sensitive to pollution, habitat alteration, and changes in fish populations. Dams and impassable culverts that limit fish passage restrict the spread of freshwater mussels.


Eastern pond mussel

Wildlife found along shorelines
The wildlife species listed here are closely associated with shoreline habitats, but many other species will use shorelines at some time during the year. Be on the lookout for these and other species that use shorelines, and follow stewardship guidelines to help maintain or enhance these habitats. Species of conservation concern—those wildlife species identified in the Wildlife Action Plan as having the greatest need of conservation—appear in **bold** typeface.

- **American eel**
- **Bald eagle***
- Bank swallow
- **Banded sunfish**
- Belted kingfisher
- **Bridle shiner***
- Bullfrog
- **Common loon***
- Common merganser
- Crayfish
- Dragonflies and damselflies
- Eastern chain pickerel
- Eastern kingbird
- **Eastern pond mussel**
- Eastern spotted newt
- Great blue heron
- Mink
- Moose
- Musk turtle
- **Northern harrier****
- Northern water snake
- **Osprey**
- Otter
- Painted turtle
- Raccoon
- **Redfin pickerel**
- Ring-billed gull
- Spotted sandpiper
- Snapping turtle
- Warbling vireo
- White sucker
- Wood turtle
- Yellow perch

*state-threatened species
**state-endangered species

Where to get help
If you have information about a wildlife species of conservation concern, contact NH Fish & Game's Wildlife Division at 603-271-2461. Contact the UNH Cooperative Extension Wildlife Specialist at 603-862-3594 for technical assistance for landowners or your community.

Publications and assistance on forestry and wildlife topics are available through the UNH Extension Educators in Forest Resources in each county. Contact information for each UNH Cooperative Extension office is provided below. Additional publications, contact information, resources, and web versions of all brochures in the Habitat Stewardship Series are available on the UNH Cooperative Extension website at: **nhwoods.org.**

Belknap County	603-527-5475	Grafton County	603-787-6944	Rockingham County	603-679-5616
Carroll County	603-447-3834	Hillsborough County	603-641-6060	Strafford County	603-749-4445
Cheshire County	603-352-4550	Merrimack County	603-225-5505	Sullivan County	603-863-9200
Coös County	603-788-4961				

Authorship
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About the Habitat Stewardship Series
Much of the land in New Hampshire is privately owned. These individuals are the primary stewards of our wildlife and forests, and also our clean water, scenic views, fresh air, natural and cultural heritage, and recreational resources. The Habitat Stewardship Series has been created to help landowners and land managers recognize the habitats critical for wildlife species at risk, and to illustrate the role private landowners can play in sustaining those species through conservation, management, and sound land stewardship.

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University of New Hampshire Cooperative Extension

Sustainable Forestry Initiative

These brochures are printed on paper derived from sustainably managed forests.

Shorelines

Habitat Stewardship Series
NEW HAMPSHIRE WILDLIFE ACTION PLAN

Recognizing
shoreline habitat

The shorelines of lakes, ponds, and rivers are valuable real estate in New Hampshire, but their importance as wildlife habitat is also significant. The qualities that make shorelines attractive to wildlife may be very different from what makes them attractive for boating and swimming.

Shorelines with extensive, mature forests along the shore are critical yet rare habitats in New Hampshire. High quality shorelines are usually found in places undisturbed by buildings, roads, docks, lawns, or heavy recreational activity. At the water's edge, native aquatic vegetation (plants growing in or under the water), submerged rocks and boulders, and dead trees that have fallen in the water are all features of high quality shoreline habitat. These habitat features become less common as housing density increases around lakes, ponds or rivers.

Underwater vegetation is particularly valuable as cover for wildlife, especially in larger lakes and ponds where wave action or deep water limits the amount of shoreline where plants can grow. Look for plants whose foliage appears to float at the surface or under the water, such as pond lilies, pondweeds, coontail, bladderwort, and native milfoils.

The best shoreline habitat has large areas of diverse underwater vegetation such as coontail and bladderwort mixed with aquatic plants such as pickerelweed and yellow pond lily that grow in scattered stands. When these features are found near deep water, shoreline wetlands, and upland forests, the shoreline habitat becomes a productive hunting ground for great blue and green heron, otter, mink, and larger fish such as eastern chain pickerel and yellow perch.

Yellow pond lily

Why are shorelines important?

The quality of shoreline habitat may be the single biggest influence on the abundance and variety of wildlife that live in or around a water body. Lakes, ponds and rivers with plentiful natural vegetation and undeveloped shorelines surrounded by large blocks of forest will support the greatest number of wildlife species. By comparison, water bodies dominated by docks, stabilized banks, lawns, beaches, houses, and heavy boat traffic support far fewer wildlife species.

Water quality protection

Pollution from widespread sources like roads, houses, and cars (as opposed to factories and other "point sources") is the number one threat to water quality in lakes and ponds in New Hampshire. Native shrubs and trees growing along shorelines help protect the water from soil erosion, runoff, pesticides, chemicals, and excess nutrients. These pollutants kill fish, promote the growth of aquatic weeds, and muddy the water, all of which diminish the value of the lake, pond or river for homeowners, boaters, anglers, swimmers, and wildlife alike. Once a lake, pond, or river has been degraded, it can be difficult to restore its quality.

Natural vegetation

Land along shorelines is critical wildlife habitat. Loons need undisturbed shoreline for nesting at the water's edge. Warbling vireos and song sparrows nest in the branches of shoreline trees and shrubs, and common mergansers use hollows in dead trees. Even trees and shrubs in front of a home can provide valuable cover for passing animals and minimize disturbance to ducks and loons swimming by. Forested shorelines allow forest animals such as moose or raccoons to use the water and food available at the shore.

Dead trees in the water provide habitat for young and adult sunfish, and underwater branches serve as attachment sites for pickerel frog and green frog eggs. Partially submerged tree trunks make excellent sunning spots for painted turtles. Important as it is for wildlife, downed wood from fallen trees is a rare habitat element on developed shorelines, as it's usually removed as an impediment to boating and swimming. Some bare shorelines, such as those along large, fast-moving rivers that are regularly scoured by water and ice, can still be important habitat for wildlife such as dragonfly larvae, bluegills and freshwater mussels.

Rich breeding grounds

Painted turtles bask on logs in the water

Coves and shallow areas with aquatic vegetation are used as nursery and spawning habitat for many fish, including the state-threatened bridle shiner. A lack of vegetation will ultimately affect fish diversity in a lake or pond. Young fish, insects, and amphibians living in shoreline habitats attract hawks, herons, ducks, mink, raccoons, and northern water snakes which all forage along shorelines. Predatory fish, including bass, pickerel, pike, and creek chubsuckers all forage in aquatic vegetation. Sunfish spawn in circular depressions in shallow water and crayfish are abundant in rocky shallows. Lake shores and shallow ponds are also the home of musk turtles, painted turtles, and snapping turtles. Aquatic plants provide cover for aquatic invertebrates such as snails and dragonfly larvae, which are in turn fed upon by fish and other predators. Filter-feeding freshwater mussels burrow in the fine silt trapped by aquatic plants.

Threats by invasive plants

Invasive plants such as variable milfoil and fanwort threaten the diversity of plants and wildlife in New Hampshire. Invasive plants take over native vegetation and offer less-valuable habitat and food sources for many species of wildlife. When large mats of invasive plants die, they deplete the water of oxygen, which also threatens wildlife.

Stewardship Guidelines
for shorelines

- **Conserving land from additional development around shorelines** is critical for maintaining healthy lake and river ecosystems, as these are some of our most degraded habitats. Land conservation of these high-value properties requires strong and stable public and non-profit funding, community partnerships, and financial investment by landowners and voters.
- Landowners around lakes, ponds and rivers should understand and **follow all laws** pertaining to the development, alteration, or cutting of vegetation along shorelines, including the Comprehensive Shoreland Protection Act (see www.des.nh.gov).
- Existing New Hampshire shoreline laws don't explicitly protect wildlife habitat. **Responsibility for protecting and restoring wildlife habitat rests instead with individual shorefront property owners.** If every shoreline owner maintained a portion of their shoreline for wildlife habitat, it would have huge benefits for fish, wildlife, water quality and the aesthetics of our lakes, ponds and rivers. Two publications by UNH Cooperative Extension can help shoreline landowners find the right balance for their property: *Landscaping at the Water's Edge*, and *Integrated Landscaping: Following Nature's Lead*. Other recommendations include:
  - Leave forest undisturbed within at least 100 feet of the shoreline,
  - Retain views by cutting tree branches at view level, leaving the forest floor as undisturbed as possible,
  - Loons, eagles, and other large wildlife will benefit from 300 feet of undisturbed forest along shorelines,
  - On land, leave standing dead and downed trees for nesting and perching wildlife,
  - In the water, leave fallen trees, aquatic plants, and large boulders to provide habitat for aquatic wildlife.

Great blue heron

- **Winter draw-downs** happen on many lakes and ponds to allow for work on docks or to prevent flooding. These water fluctuations can negatively affect wildlife. Freezing temperatures destroy the roots of aquatic plants. Sudden draw-downs may destroy the eggs of fish and adult amphibians. Owners should work with other landowners and lake associations towards management policies that benefit the ecology of the lake or pond.
- The eroding force of **boat wakes** can destroy sensitive shoreline habitat. Plants rooted in fine sandy bottoms are especially vulnerable to waves. Especially on large rivers, boat wakes can disrupt and kill dragonflies as they emerge from their larval stage underwater. Boaters should be aware of their effect on shoreline habitat and reduce their speed near coves or shallow water.
- **Installing a dock requires a permit** and should be done with minimal disturbance of aquatic vegetation. Consider partnering with neighbors on jointly-owned docks to help reduce the number of man-made structures along the shore.

Boats can help habitat by reducing their wake

- **Avoid the use of fertilizers, lime, pesticides and herbicides near any water body**, and follow all laws, including the Comprehensive Shoreland Protection Act, related to the use of these substances. Many pesticides and herbicides are toxic to aquatic organisms. Excess fertilizer also threatens wildlife and water quality through a process called "**eutrophication**." Excess nutrients from fertilizers increase algae growth which clouds the water. The algae then die and decompose, causing a drop in oxygen in the water, which in turn can lead to large-scale fish die-offs.
- **Help stop the spread of invasive aquatic plants.** Always inspect your boat, motor, trailer, and recreational equipment for tag-along plants before launching and after exiting a lake, pond or river. Remove all tag-along plants and dispose of them away from the waterbody.
- **Man-made ponds are a poor substitute for natural ponds and lakes.** However, landowners can improve the habitat and water quality of man-made ponds by following stewardship recommendations for natural shorelines.