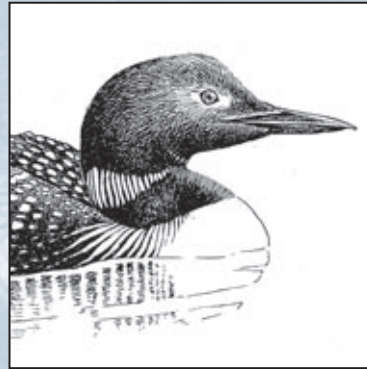


CONSERVING WILDLIFE



in Maine's Shoreland Habitats

MORE ANIMALS LIVE WHERE LAND AND WATER MEET than in any other habitat type in Maine, and hundreds of species depend on such habitat for survival. Yet, humans are attracted to shoreland areas as well, and as Maine's human population continues to grow, this valuable wildlife habitat is diminishing.

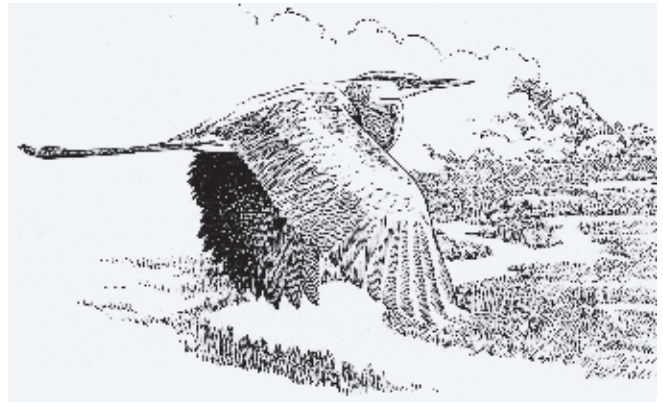
This guide can help Maine communities and individual residents conserve shoreland habitat. It reviews how shoreland habitat is valuable to wildlife, and outlines how communities can use comprehensive plans, shoreland zoning, and other land-use rules to protect it. The information also may help conservation groups identify land for protection, and help landowners conserve and manage wildlife habitat.

The guide makes frequent reference to *Beginning with Habitat*, a cooperative program among Maine agencies and organizations that provides maps and other tools to help local planners incorporate the needs of wildlife in growing communities. Page 8 lists community-planning resources, including habitat maps and management guides, from *Beginning with Habitat*, Maine Audubon, and Maine agencies. It also features a glossary of terms used in the guide.

What is shoreland habitat?

Shoreland habitat is home to more than 60 species of Maine wildlife.

SHORELAND HABITAT, sometimes called **riparian habitat** (see glossary), is found adjacent to vernal pools, wetlands, streams, rivers, lakes, ponds, and coastal waters. More than 60 species of water-dependent birds, mammals, amphibians, and reptiles in Maine require shoreland areas for shelter or a critical part of their life cycle such as feeding or breeding. Shoreland habitat also provides other species access to drinking water, and acts as a travel corridor as well as important core habitat. Up to 85 percent of Maine's vertebrate species use the shoreland zone at some time during their lives. Shoreland habitat also filters runoff from developed areas, helping to maintain clean water that fish, insects, and other aquatic species need. ■



Shoreland habitat, which provides habitat critical to many species (such as the great blue heron), is found adjacent to **vernal pools** (see glossary), wetlands, streams, rivers, lakes, ponds, and coastal waters.

How does wildlife use shoreland habitat?

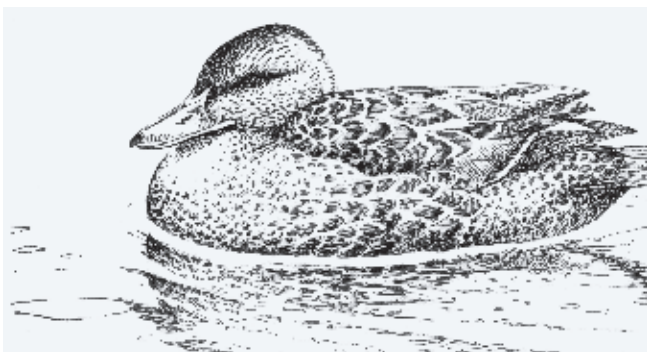
Maine wildlife need shoreland habitat to nest, feed, and raise their young, among other activities.

BIRDS

Most water-dependent birds nest near water in areas free of human disturbance. Four species of ducks nest in the cavities of large, dead and decaying trees, typically within 600 feet of water. Black ducks, mallards, and green-winged and blue-winged teals also nest in shoreland areas.

Other species that nest in shorelands and feed in adjacent waters include great blue herons, bald eagles (a federally threatened species), and osprey.

Shoreland forests are often adjacent to large tracts of **upland**



Black ducks and many other species of water birds use shorelands for nesting and require a buffer from human activities.



Beavers, otters, mink, and several species of bats also depend on shoreland habitat.

(see glossary) forest. You can expect to see red-shouldered hawks, which typically nest near water, in river-bottom and **wetland** (see glossary) forests larger than 500 acres. Songbirds such as scarlet tanagers, hermit thrushes, and black and white warblers nest in blocks of forest larger than 250 acres, which are often associated with shoreland areas.

MAMMALS

Fourteen wetland-dependent mammals found in Maine use shoreland habitat for feeding, raising young, and traveling.



Maine's wildlife is treasured by residents and visitors alike, helping the state generate more than \$1 billion annually in outdoors-related recreation. Conserving natural areas and directing growth away from important wildlife habitat is essential to Maine's future.

Moose feed in aquatic habitats but require extensive uplands with minimum human disturbance.

Other mammals use shoreland habitat primarily to rest and travel. Otters, beavers, mink, and moose all use shorelands extensively. Beavers are important “ecosystem engineers” that create valuable feeding and breeding habitat for ducks, herons, fish, and amphibians by damming streams. After a beaver pond drains, the resulting “beaver meadow” provides important habitat for woodcock, flycatchers, and other nonforest species.

Because shorelands have a concentration of prey species, predators such as bobcats, red fox, and fishers spend more time hunting in shoreland habitat than in other areas. These animals, plus others such as moose and white-tailed deer, also use shorelands as travel corridors. Several species of bats that hunt insects primarily over open water and wetlands roost in shoreland areas.

AMPHIBIANS AND REPTILES

Maine has several species of amphibians and reptiles that depend on upland habitat near wetlands and other water bodies for survival. In early spring, wood frogs, spotted salamanders, and blue-spotted salamanders lay their eggs in fishless vernal pools, which usually dry by late summer. Wood frogs may wander extensively in upland forests, but spotted salamanders spend the remainder of the year in upland forests within 800 feet of vernal pools. Northern leopard frogs and pickerel frogs move into nearby wet meadows and fields, usually within 200 feet of the wetland.

Maine also has six species of turtles that nest in uplands



Several species of turtles and amphibians, such as this spotted salamander, require both upland and aquatic habitat.

near ponds, rivers, and wetlands. Upland habitat loss and road mortality are the most significant threats to Maine's declining turtle populations—especially for the endangered Blanding's and threatened spotted turtles.

THREATENED AND ENDANGERED SPECIES

Because habitat is continually lost and degraded in Maine, wetland and aquatic species are becoming rare, threatened, or endangered at an alarming rate. Over 55 percent of all frogs, toads, and salamanders are listed as rare, threatened, or endangered in at least one northeastern state. If wetland and shoreland habitat is not adequately conserved, even more species are likely to become rare, threatened, endangered, or locally extinct. Appropriate conservation measures can limit the threats to local populations and species at risk. ■

How Maine Wildlife Uses Shoreland Habitat

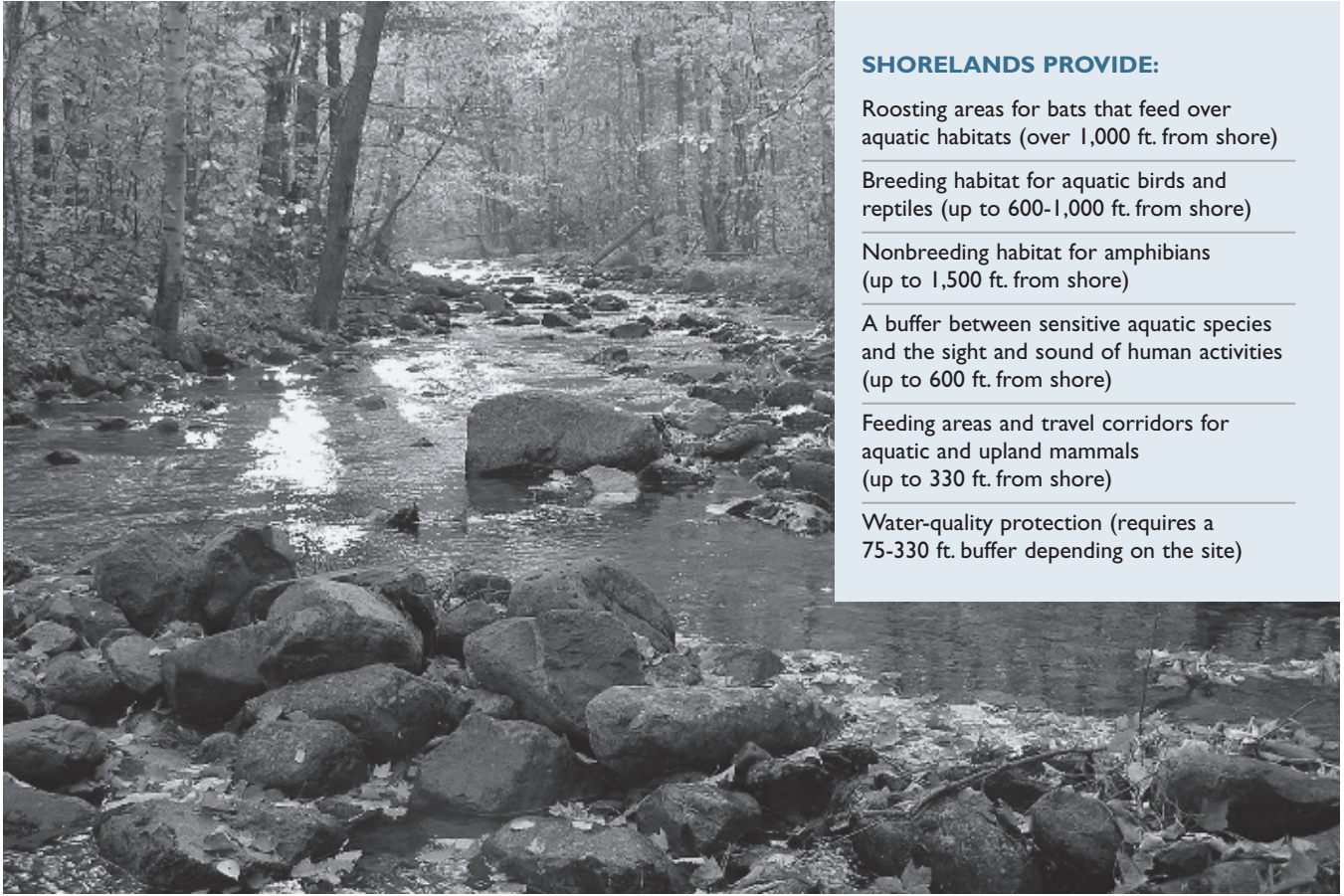
Wide Shoreland Habitat Conservation Area (600 ft. or more) ¹	
Wood turtle	Nests in dry, sandy uplands typically within 900 ft. of slow-moving streams
Spotted turtle², Blanding's turtle²	Nest and travel in uplands; feed and winter in vernal pools, small streams, and wetlands ³ in Southern Maine. The Maine Department of Inland Fisheries and Wildlife recommends conserving habitat within ¼ mile of known populations.
Spotted salamander, wood frog	Breed in vernal pools but reside in adjacent forest. Biologists who study vernal pool species recommend no site disturbance within 100 ft. of the pool and limiting development to 25 percent of the zone from 100-750 ft.
Northern leopard frog, pickerel frog	Move into wet meadows and fields near wetlands after the breeding season. Dispersing juveniles may be found up to 2,600 ft. from water.
Great blue heron	Nests in colonies, typically near water but sometimes in uplands. Sensitive to development within ¼ mile.
Osprey, bald eagle²	Nest in large trees up to three miles from water, usually within 2,300 ft. State rules require a ¼ mile buffer around eagle nests.
Moose	In summer, feeds in wetlands, rivers, and ponds in extensive forests. Typically requires blocks of forest 1,000 acres and larger.
Bats (red, silver-haired, little brown myotis, small-footed myotis, eastern pipistrelle)	Forage over open water (streams, ponds, wetlands) and roost in forests within 1,100 ft. of water. Roosting and nesting habitat varies by species and includes large trees with cavities or loose bark and canopies of large deciduous trees.
Wood duck, common goldeneye, hooded merganser, common merganser	Nest in cavities in large trees typically within 600 ft. of inland streams, rivers, lakes and ponds. Limited by availability of cavity trees.
Mallard, black duck, green-winged teal, blue-winged teal	Nest on ground in dry or marshy areas, typically within 600 ft. of water. Very sensitive to human disturbance and susceptible to predation from pets and other animals.
Forest-interior birds (red-shouldered hawk, wood thrush, hermit thrush, red-eyed vireo, black and white warbler)	Red-shouldered hawks nest in bottomland forests of more than 500 acres near wetlands, ponds, and rivers and over 3,000 ft. from the nearest house. Forest songbirds prefer blocks of mature forests 250 acres or larger, which are often associated with shoreland areas. As forest is converted to other uses, larger patches (500+ acres) are preferred by some species.
Medium Shoreland Habitat Conservation Area (330–600 ft.)	
Snapping turtle	Inhabits ponds, rivers, marshes, and tidal fresh water with muddy bottoms. Nests in open upland sites with light soils within 400 ft. of water.
Star-nosed mole	Feeds in wet, mucky soil within 330 ft. of water.
Beaver	Feeds on deciduous trees within several hundred feet of ponds and slow-moving streams.
River otter	Home range may encompass up to 50 linear miles of waterways.
Mink	Dens in uplands under logs, rocks, or tree roots adjacent to water.
Bobcat, red fox, coyote, fisher	Prey on animals within the shoreland zone and use shorelands as a travel corridor. Research in Maine has shown that these species are found within 330 ft. of water 85 percent of the time.
Narrow Shoreland Habitat Conservation Area (75–250 ft.)	
Brook trout, landlocked salmon, Atlantic salmon⁴	Found in coldwater streams, ponds, and lakes in forest-dominated watersheds. A forested buffer that increases with slope, runoff potential, and declining canopy cover will minimize stream sedimentation. Within this buffer harvesting that leaves a well-distributed stand and an uncut buffer of 25 ft. wide or more will moderate stream temperatures and provide food to stream animals. Clearing forests for other uses within the watershed is detrimental to coldwater fisheries.
Dusky salamander and spring salamander	Inhabits edges of intermittent and small perennial forest streams. Significant population declines occur in watersheds that are less than 80 percent forested.
Tree swallow	Nests in tree cavities within 300 ft. of water.

1. Desired conservation zone width may vary with species present and site characteristics. For detailed shoreland habitat management information and guides, see page 8. You also may want to contact a regional biologist.

2. Threatened or endangered species. Check Beginning with Habitat maps for possible locations (see page 8) and, if species are present, consult with Maine Department of Inland Fisheries and Wildlife.

3. Wetlands, as used here, includes only those wetlands with seasonal or permanent standing water that provides aquatic habitat, such as vernal pools, swamps, marshes, bogs, and fens.

4. Recommended buffers for Atlantic salmon extend up to 330 ft. depending on site conditions.



SHORELANDS PROVIDE:

Roosting areas for bats that feed over aquatic habitats (over 1,000 ft. from shore)

Breeding habitat for aquatic birds and reptiles (up to 600-1,000 ft. from shore)

Nonbreeding habitat for amphibians (up to 1,500 ft. from shore)

A buffer between sensitive aquatic species and the sight and sound of human activities (up to 600 ft. from shore)

Feeding areas and travel corridors for aquatic and upland mammals (up to 330 ft. from shore)

Water-quality protection (requires a 75-330 ft. buffer depending on the site)

How does shoreland habitat protect aquatic species?

In addition to providing habitat for many water-dependent species, shorelands directly benefit aquatic species by buffering their habitat from human activities.

STREAMSIDE FORESTS HELP MAINTAIN water quality necessary for healthy populations of brook trout, stream salamanders, freshwater mussels, mayflies, and other insects. These forests shade the water and keep it cool, which helps maintain adequate oxygen levels. The forest floor absorbs runoff, pollution, and sediment that can smother clams, harm water quality, eliminate habitat for aquatic insects, and destroy fish spawning beds. Forested **buffers** (see glossary) also supply leaves that are the primary source of food in stream ecosystems. Aquatic insects that feed on fallen leaves and twigs are the primary food of trout and young salmon. Shoreland buffers also screen sensitive species such as waterfowl and beavers from the sight and sound of human activities.

CREATING AQUATIC BUFFERS

Forested buffers of 75-250 feet are generally suitable for maintaining water quality if managed to maintain shade and prevent eroded soil from reaching the water. The width of the buffer should increase depending on the slope, the potential for runoff, and/or the amount of disturbance outside the buffer. Maintaining an uncut area 25-35 feet wide adjacent to the water body is the best way to ensure that large logs and limbs will fall into the stream and provide important cover for fish to rest and hide. When protecting aquatic buffers, it's also critical to consider the cumulative impacts of development within the **watershed** (see glossary). For example, studies have shown that populations of brook trout and dusky salamanders decline significantly when forest cover in stream watersheds is reduced to less than 80 percent. ■

How can you protect shoreland habitat?

Your community can develop an effective plan to conserve shoreland habitat.

The recommendations below can help communities develop town- or region-wide plans that steer development toward suitable areas while conserving shoreland and other important wildlife habitat. Plans should be supported by land-use regulations and voluntary measures such as land-conservation agreements.

1. Identify shoreland habitat areas.

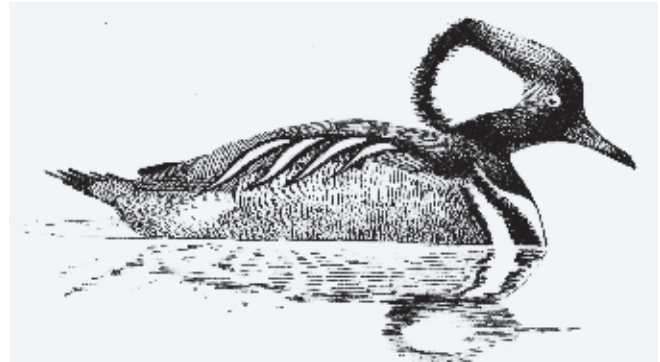
The Beginning with Habitat program provides maps (for most Maine towns) and other basic information to help design a landscape for wildlife. Maps show water resources and riparian habitat, high-value plant and animal habitat, and undeveloped habitat blocks. Use them, along with the chart on page 4, to identify which of the following three habitat areas shoreland wildlife in your community requires:

Wide shoreland habitat (600 feet or more): A band of shoreland habitat 600 feet wide or more is adequate for most shoreland species. This wide area is especially important where streams, wetlands, ponds, and other water resources overlap with areas of extensive beaver activity, concentrations of species with wide shoreland habitat requirements, and/or high-value animal habitats and large undeveloped habitat blocks (more than 500 acres) shown on the Beginning with Habitat maps. Vernal pool wildlife will benefit most from shoreland habitat 750 feet wide; bats, osprey, bald eagles, and turtles will benefit most from 1,000 feet or more. Wide shoreland habitat areas greatly benefit upland wildlife as well.

Medium shoreland habitat (330-600 feet): Medium shoreland habitat areas should be identified and conserved along water courses where wildlife—especially mammals—feed, raise young, and travel between large blocks of undeveloped habitat. A medium shoreland habitat area also will provide habitat for some nesting hawks and forest songbirds.

Narrow shoreland habitat (75-250 feet): Most existing shoreland zoning falls into this category. Narrow shoreland habitat areas maintain water quality and provide a vegetated screen that limits disturbance to aquatic wildlife. Soils, slopes, and adjacent land use determine how wide the habitat should be. The area also is important for certain frogs and salamanders.

Development, particularly cumulative development, in the shoreland areas described above is likely to diminish the value of wildlife habitat. In most cases where a range is suggested, the larger **setback** (see glossary) will maximize habitat conservation.



The hooded merganser, which nests in tree cavities up to 600 feet from shore, is one of many species whose habitat is not adequately protected by shoreland zoning and other laws.

2. Use shoreland conservation tools.

Conserve wide, medium, and narrow habitat areas by tailoring the following tools to the needs of your community and wildlife habitat:

❑ **Enforce protection required by state law.** Maine's mandatory Shoreland Zoning Act and Natural Resources Protection Act represent the minimum level of shoreland habitat protection. Consistent local enforcement of setbacks, clearing standards, and erosion control measures that state laws require will reduce habitat loss and water-quality impacts.

❑ **Adopt local ordinances more protective than state law.** State law allows communities to adopt local ordinances equally or more effective than Maine shoreland zoning and natural-resource protection laws, which set minimum standards that municipalities must adopt to protect water quality and aquatic habitat. Municipal shoreland zoning ordinances must, for example, regulate land-use activities within 250 feet of great ponds, rivers, freshwater and coastal wetlands, and tidal waters; and within 75 feet of certain streams. But shoreland zoning is not required for small perennial streams, intermittent streams, and small wetlands, and the Natural Resources Protection Act requires only a minimum buffer (25-75 ft.) around them. Therefore, a community might want to establish an ordinance requiring larger building setbacks and special protection for these important shoreland habitats. The Maine Department of Environmental Protection must review and approve communities' proposed new standards. Proposed changes in coastal communities must address the coastal management policies cited in 38 M.R.S.A., Section 1801.

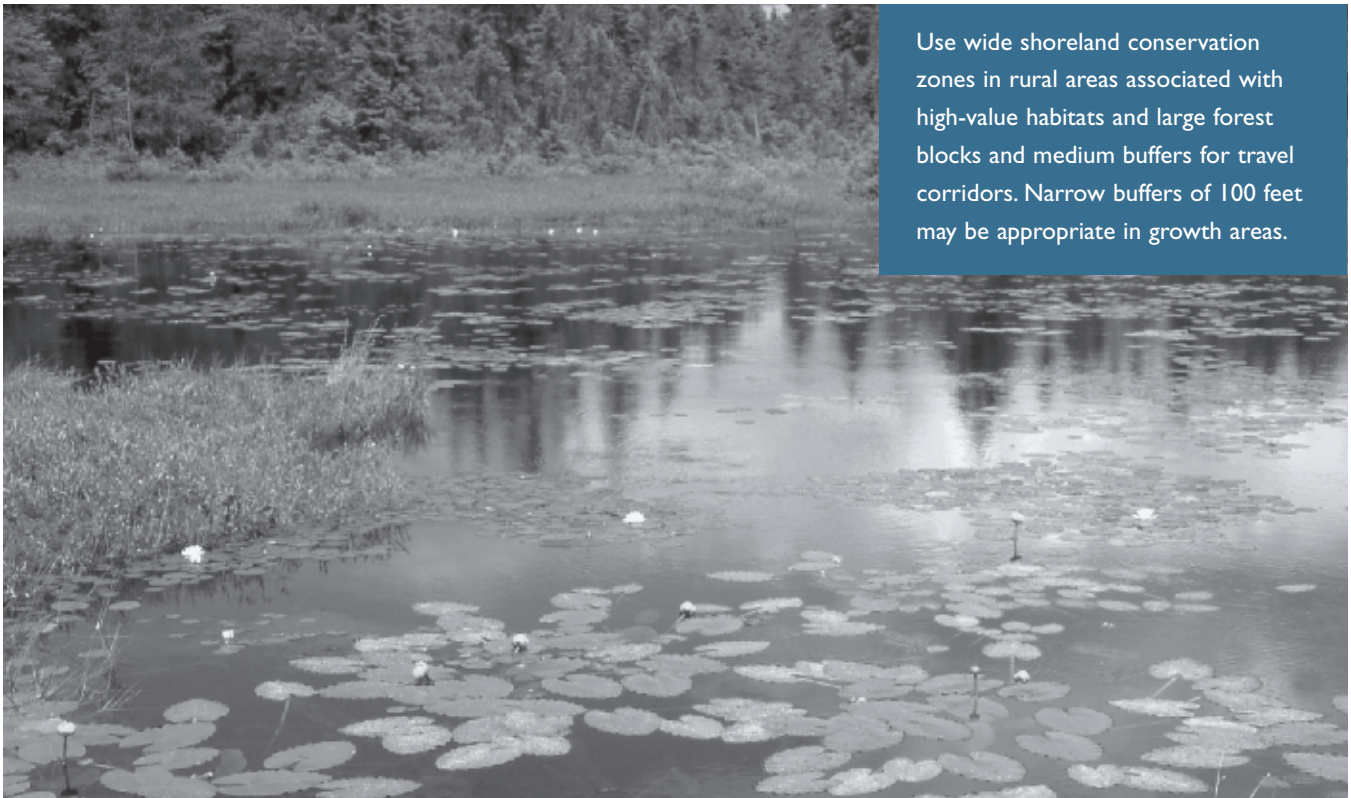
❑ **Cluster development.** Subdivision ordinances can be modified to require or provide incentives for cluster development sited away from valuable wildlife habitat. When development near high-value animal habitat or large habitat blocks cannot be avoided, concentrate development on small lots near existing roads to maintain adequate shoreland habitat, large blocks of forest, and wildlife travel corridors.

❑ **Use other growth management tools.** Use community zoning ordinances or other growth management tools such as transfer of development rights to focus development in designated growth areas and away from important shorelands, high-value plant and animal habitat, and large habitat blocks. Generally, the larger the habitat block, the more valuable it is for wildlife.

Please consider adopting the following recommendations:

❑ **Limit clearing of vegetation.** Manage shoreland areas as natural wildlife habitat. Enforce clearing standards between buildings and the shore, including maintenance of native ground cover and shrubs. Follow “best management practices” for forestry and agriculture (detailed recommendations are included in the habitat management guides referenced on page 8). In general, do not expand existing agriculture, but do explore opportunities to provide wider forest buffers that will minimize impacts from runoff from fields.

❑ **Minimize disturbance.** Dogs, cats, and human activities extend the footprint of development well beyond areas cleared for house lots, sometimes by more than 250 feet. Ground-



Use wide shoreland conservation zones in rural areas associated with high-value habitats and large forest blocks and medium buffers for travel corridors. Narrow buffers of 100 feet may be appropriate in growth areas.

❑ **Create land conservation partnerships.** Towns can work with land trusts or other conservation groups and landowners to permanently protect important wildlife habitat through the voluntary donation or sale of land or land conservation agreements.

❑ **Educate.** Provide landowners with educational materials on the value of shoreland habitat and development options to minimize impacts on it.

3. Adopt land-use management recommendations.

Establishing shoreland habitat areas and improving enforcement of shoreland zoning are great ways to help conserve an array of native Maine wildlife species. However, proper management of these areas is essential to maximize their value for wildlife.

nesting birds such as thrushes and ovenbirds are particularly vulnerable to disturbance and predation from pets. Keep dogs leashed and cats indoors to minimize disturbance to ground-nesting birds, deer, and other animals. Squirrels, jays, crows, raccoons, and other animals that thrive in backyard habitats also prey on eggs and nests. Minimize the amount of food available to squirrels and other small predators, for example by using baffles on bird feeders and not leaving pet food outside.

❑ **Provide a buffer between recreational trails and water.** Trails may be designed to provide occasional water views but should not run directly alongside water bodies for any significant distance. Trails should avoid hawk nests and deer wintering areas or be closed during sensitive seasons. ■

Need more information?

Communities and conservation groups interested in implementing the recommendations in this guide should seek additional information from the sources below. Communities may also want to consult with a biologist who can help interpret Beginning with Habitat maps and other sources of ecological information and develop a local conservation plan.

HABITAT MAPS AND INFORMATION

- Beginning with Habitat, (207) 287-8042, www.beginningwithhabitat.org
- *State significant plants and natural communities*: Maine Natural Areas Program, (207) 287-8044, www.mainenaturalareas.org
- *State significant wildlife*: Maine Department of Inland Fisheries and Wildlife, (207) 287-8000, www.maine.gov/ifw
- *State shoreland zoning and water quality protection*: Maine Department of Environmental Protection, 1 (800) 452-1942, www.maine.gov/dep
- *General wildlife, vernal pools, forestry*: Maine Audubon, (207) 781-2330, ext. 222, www.maineaudubon.org
- *Local land trusts*: Maine Land Trust Network, (207) 729-7366, www.mltn.org

HABITAT MANAGEMENT GUIDES

Consult the following guides for details on how to manage shoreland habitat.

- From Maine Audubon; (207) 781-2330, ext. 222; www.maineaudubon.org
- *Best Development Practices: Conserving Pool-breeding Amphibians in Residential and Commercial Developments in the Northeastern United States* (2002), \$10
 - *Forestry Habitat Management Guidelines for Vernal Pool Wildlife* (2004), \$8
 - *Focus Species Forestry: A Guide to Integrating Timber and Biodiversity Management in Maine* (2004), \$8
- From the Maine Department of Environmental Protection; (207) 287-7688; www.maine.gov/dep
- *Strategy for Managing Nonpoint Source Pollution from Agricultural Sources and Best Management System Guidelines* (1991)

- *Maine Erosion and Sediment Control BMP Manual* (2003), DEPLW 0588
- *Stormwater Management for Maine: Volume I, Stormwater Management; Volume II, Phosphorus Manual; and Volume III, BMP Technical Design Manual* (2006), DEPLW 0738
- *Brightwork, A Best Management Practice Manual for Boatyards and Marinas*, DEPLW 037 482005
- *Camp Road Maintenance Manual: A Guide for Landowners* (2004)

From the Maine Forest Service; (207) 287-2791; www.maine.gov/doc/mfs

- *Best Management Practices for Forestry: Protecting Maine's Water Quality* (2004)

From the Maine Department of Transportation; (207) 624-3000; www.state.me.us/mdot

- *Best Management Practices for Erosion and Sediment Control* (1997)

Glossary

Bottomland: Low-lying areas near rivers.

Buffer: An area of natural vegetation that filters runoff before it enters a stream or other water body. A disturbance buffer screens sensitive wildlife from the sight and sound of human activities.

Riparian habitat: The transition zone between uplands and water bodies or unforested wetlands.

Runoff: Water that travels over the soil surface before entering a wetland or water body.

Setback: An area between the water's edge and a building and/or cleared area.

Upland: An area that does not have seasonally saturated soils or wetland vegetation.

Vernal pool: A fishless pond, often dry by late summer, that provides breeding habitat for wood frogs, spotted or blue-spotted salamanders, or four-toed salamanders.

Watershed: The land area that feeds a stream or river.

Wetland: An area with soils that are saturated near the surface during part of the growing season and plants that are adapted to those conditions.

CREDITS AND ACKNOWLEDGEMENTS

Researched and written by Robert R. Bryan, Maine Audubon forest and wetlands ecologist, and Barbara Charry, Maine Audubon wildlife biologist. Drawings by Mark McCullough, Hampden, Maine. All are copyrighted.

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Maine Audubon works to conserve Maine's wildlife and wildlife habitat by engaging people of all ages in education, conservation, and action.