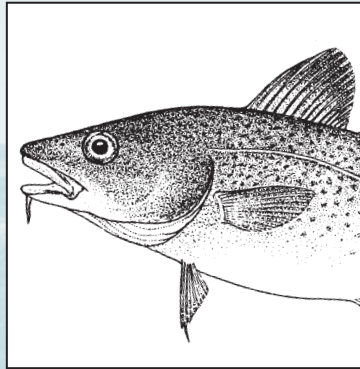


CONSERVING WILDLIFE



MARK MCCOLLOUGH



NEFSC NOAA



MARK MCCOLLOUGH

in Maine's Coastal Habitats

PEOPLE ARE ATTRACTED TO MAINE'S spectacular coast. Forty-four percent of Maine's population lives in the 144 coastal towns that comprise only 12 percent of the state's area. This concentration of people and demand for waterfront property means potential loss of wildlife, habitat, scenic beauty, and recreational and economic opportunity. A healthy coastal zone is critical for hundreds of wildlife species as well as Maine's multimillion-dollar seafood industry. Because all watersheds along Maine's 3,500-mile coast drain into the Gulf of Maine, human activities along the coast and rivers affect the health of the Gulf of Maine ecosystem.

This guide describes Maine's coastal habitats, the wildlife they support, the threats they face, and the ways that towns and land trusts can help protect them. It was developed as a resource of 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. The guide lists resources available from Beginning with Habitat, Maine Audubon, and Maine agencies. Page 12 includes a glossary of terms.

How does Maine wildlife use coastal habitats?

Many species use different coastal habitats for feeding, reproducing, resting and for different parts of their life cycle.

HEALTHY COASTAL HABITATS provide abundant food and important resting areas for many species of fish and wildlife. They also offer attractive coastal vistas and opportunities for hunting, fishing, boating, nature study, and bird-watching. Coastal habitats include the land along the coast; shoreline influenced by the tides; the seabed; and the water in rivers, estuaries, coves, and bays along the coast. Since many coastal habitat types are connected, impacts on one type can critically affect another.

Salt Marshes

SALT MARSHES ARE FOUND ADJACENT to mud flats and along tidal coastal rivers or in protected bays behind barrier beaches and rocky headlands. They are ecological powerhouses that support abundant fish, shellfish, water birds, and other wildlife. By trapping sediment, marshes gradually build up the shoreline and protect it from erosion and storm surges. They maintain and enhance coastal water quality by trapping nutrients and releasing oxygen. Often-overlooked **fringing marshes** (see glossary) provide habitat and buffers from erosion while connecting large expanses of marsh.

WILDLIFE

Plants and animals that live in salt marshes cope with dramatic daily fluctuations in temperature, salinity, and moisture. Cordgrass dominates the low marsh, while salt hay and other plants less tolerant of submersion grow in the high marsh. Many invertebrates such as ribbed mussels and mud snails that burrow into the marsh surface are protected by the leaves and roots of these plants. Many species of birds and mammals find shelter and hiding places in the dense plant growth and feed on the marsh invertebrates there. After salt marsh plants die, they decay and become an important food source for crabs, worms, and other invertebrates at the base of the food chain.

At high tide, mummichogs, silversides, and other small fish swim across the flooded marsh to feed on the decaying

THREATS

- Culverts and dams
- Development
- Docks, piers, wharves, and moorings
- Poor water quality



ETHAN NEDEAU

Salt marshes support many wildlife species in a rich food web. Small fish and snails graze in a lush “forest” of marsh grasses, while clams feed on plankton that grow in the nutrient-rich waters. Small predators include the burrowing clam worm, while great blue herons, other wading birds, and striped bass feed on small fish, worms, and crabs. The outgoing tide flushes nutrients into the ocean, helping to support other food webs along the coast and offshore.

plants and invertebrates. Wading birds such as great blue herons, little blue herons, glossy ibis, and snowy egrets feed on the invertebrates and small fish. Larger fish such as winter flounder and striped bass venture into the creeks to feed on smaller fish and invertebrates. The uncommon Nelson’s and salt-marsh sharp-tailed sparrows, which breed only in salt marshes, build their nests among the marsh grasses and feed on insects and seeds.

Marshes provide vital stopover roosting and feeding grounds

Minks and other mammals use the abundant food supply in the intertidal zone.



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during the long seasonal migrations of 21 species of shorebirds, as well as foraging and shelter habitat for many other bird species. Salt marshes that are especially valuable for migratory shorebirds, wading birds, and waterfowl are protected as **significant wildlife habitat** (see glossary) and as **wetlands of special significance** (see glossary).

Sandy Habitats

THERE ARE ABOUT 70 MILES OF sandy beaches in Maine, 35 miles of which stretch from York to Cape Elizabeth and Phippsburg to Georgetown. The remainder are small pocket beaches in other areas of the coast. Dunes, beaches, and sandy shorelines are challenging places for animals and plants to inhabit because the sand is constantly shifted by wind, waves, and currents.

WILDLIFE

Sandy habitats support some unique and rare wildlife. It is the primary habitat for eelgrass. Commercially important surf clams are found only in this habitat. Tube-building marine worms help to stabilize sand bars. Horseshoe crabs lay their eggs in sandy habitats. Piping plovers and least terns, endangered species in Maine, nest on sandy beaches. Their nesting areas are mapped as **essential habitat** (see glossary). Migrating birds such as sanderlings and semipalmated plovers feed on invertebrates in the sand and **wrack** (see glossary).

THREATS

- Development
- Dredging
- Poor water quality
- Shoreline stabilization
- Wildlife disturbance

The **amphipods** (see glossary) that migratory birds feed on are found only in this habitat and no other, making it a valuable resource for stopovers. Sandy beaches also provide essential resting and foraging areas for gulls, terns, and 23 species of shorebirds. Sandy shores that are especially valuable as feeding and resting areas for migratory birds are protected as significant wildlife habitat.

Rocky Habitats

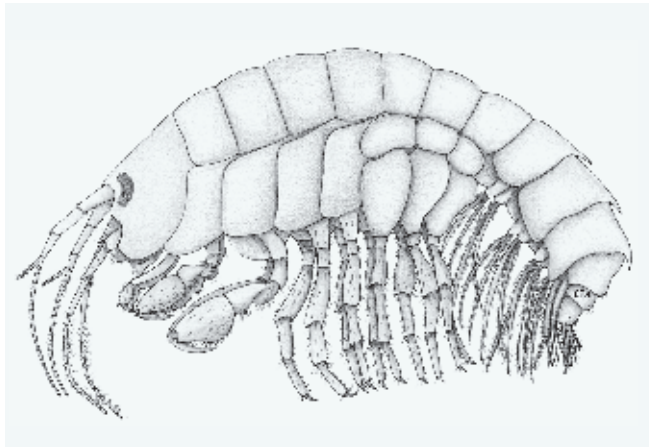
MAINE'S ROCKY COAST—its ledges, boulders, and cobble and pebble beaches—offers diverse habitats with secure places for algae and invertebrates to attach, and hiding and living spaces for fish and wildlife. Rocky habitats can have the highest species diversity of any coastal habitat.

WILDLIFE

Abundant rough periwinkles are only found in the highest rocky intertidal zone, overlapping with blue-green algae that form a slippery black band. Below it is a white band of barnacles and the dog whelks (carnivorous snails) that eat them.

At the mid intertidal zone, brown algae such as rockweeds and red algae such as Irish moss and false Irish moss dominate. The brown and red algae often grow thickly and provide food and cover for invertebrates such as sea urchins, rock and Jonah crabs, and fish such as juvenile herring, pollock, and winter flounder. Commercially important common periwinkles and limpets graze on algae, while sea stars prey on mussels. Smooth periwinkles are found below.

In deeper water, rockweed is replaced by red algae and kelp



ETHAN NEDEAU

Amphipods are a major food source for migratory birds.

forests. Some unique species and many of the species found in the mid intertidal zone also occur in deeper rocky habitat. Lobsters depend upon rocky habitat for hiding places while breeding and shedding.

At mid and low tide, wintering purple sandpipers feed extensively among the algae, especially false Irish moss, as well as on amphipods and periwinkles. Gulls and crows also feed in the rockweed. At high tide, small fish, harlequin ducks, eider ducks, and terns all hunt in this rich habitat. Many mammals including otter, mink, raccoon, and deer use the nutritious and abundant food supply in the intertidal zone, particularly in the winter.

Above the water, hundreds of Maine’s rocky islands provide predator-free nesting habitat for seabirds. Some rocky ledges and gravel or cobble shorelines provide resting and feeding areas for migratory shorebirds and migratory land birds. Important seabird nesting islands and migratory shorebird staging areas are protected as significant wildlife habitat.

Mud Flats

COMMON IN MAINE, mud flats occur in both intertidal and subtidal areas protected from waves, such as shallow bays and coves. Rivers, streams, and naturally eroding upland bluffs provide the sediments that form mud flats. These rich habitats support large populations of shellfish, marine worms, and countless other invertebrates. Mud flat plants and animals are exposed to extreme changes in salinity and temperature, especially at low tide. Because oxygen is often available only in the top few inches of a flat, invertebrates living in the mud either stay near the surface or use tubes or burrows to get oxygen.

- THREATS**
- Culverts and dams
 - Docks, piers, wharves, and moorings
 - Development
 - Dredging
 - Poor water quality
 - Shoreline stabilization
 - Wildlife disturbance

WILDLIFE

Mobile animals found on deep muddy bottoms include snails, northern shrimp, red hake, and winter flounder. Clams and mussels are important commercial shellfish living in this habitat. Dense concentrations of crustaceans found in some mud flats, especially amphipods, are a major food source for migratory birds such as semipalmated sandpipers, short-billed dowitchers, semipalmated plovers, and greater and lesser yellowlegs.

Mud flats in Maine are critical feeding grounds for 25 species of shorebirds, six species of herons, and two species of egrets. Mud flats also provide valuable wintering habitat for large concentrations of American black ducks and Canada geese. Especially valuable mud flats are protected as significant wildlife habitat for shorebirds, waterfowl, and wading birds.

- THREATS**
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Shellfish Beds

CLAMS, BLUE MUSSELS, HORSE MUSSELS, and oysters form beds in sandy, muddy, and rocky habitats. In order to feed, shellfish take in water, algae, and other small particles, a process that can improve water quality but also can concentrate biotoxins in their tissues. Blue mussels and other shellfish are tested for the presence of biotoxins and bacteria to determine if they are safe for human consumption. Shellfish beds that are not safe are closed to harvesting.

- THREATS**
- Dredging
 - Moorings
 - Poor water quality

WILDLIFE

Shellfish beds provide hiding places for small invertebrates and attachment sites for barnacles, snails, and algae. Shellfish are eaten by crabs, sea stars, whelks, moon snails, and sea ducks such as common eiders and harlequins. Mussel beds are often found in areas designated as significant wildlife habitat for tidal waterfowl and wading birds. Mammals such as raccoons, otters, and fisher venture into the intertidal zone and feed on mussels.

Eelgrass Beds

EELGRASS GROWS IN SANDY or muddy habitats, forming beds that can grow or shrink over time. Eelgrass is one of the few flowering plants that lives submerged in salt water, its one- to six-foot-long leaves creating underwater jungles

and providing attachment sites for invertebrates and some algae. Eelgrass beds produce oxygen, improve water quality by filtering sediments and excess nutrients, reduce shoreline erosion by absorbing waves, and provide food and shelter for fish.

WILDLIFE

Pinhead-sized larval blue mussels attach onto eelgrass leaves. Fish such as pollock feed on sand shrimp and other invertebrates in eelgrass beds, while winter flounder and cod use them as nurseries. Waterfowl that feed on eelgrass include American black ducks, Canada geese, and Atlantic brant. Wading birds and shorebirds prey on invertebrates and small fish hidden in the eelgrass jungle. Dense eelgrass beds are often found in areas designated as significant wildlife habitat for tidal waterfowl and wading birds.

Most dead eelgrass collects on the ocean bottom, where worms, bacteria, and fungi decompose it, particularly in late summer and autumn. The nutrients are released into the seawater and used by other plants and animals.

- THREATS**
- Docks, piers, wharves, and moorings
 - Dredging
 - Poor water quality

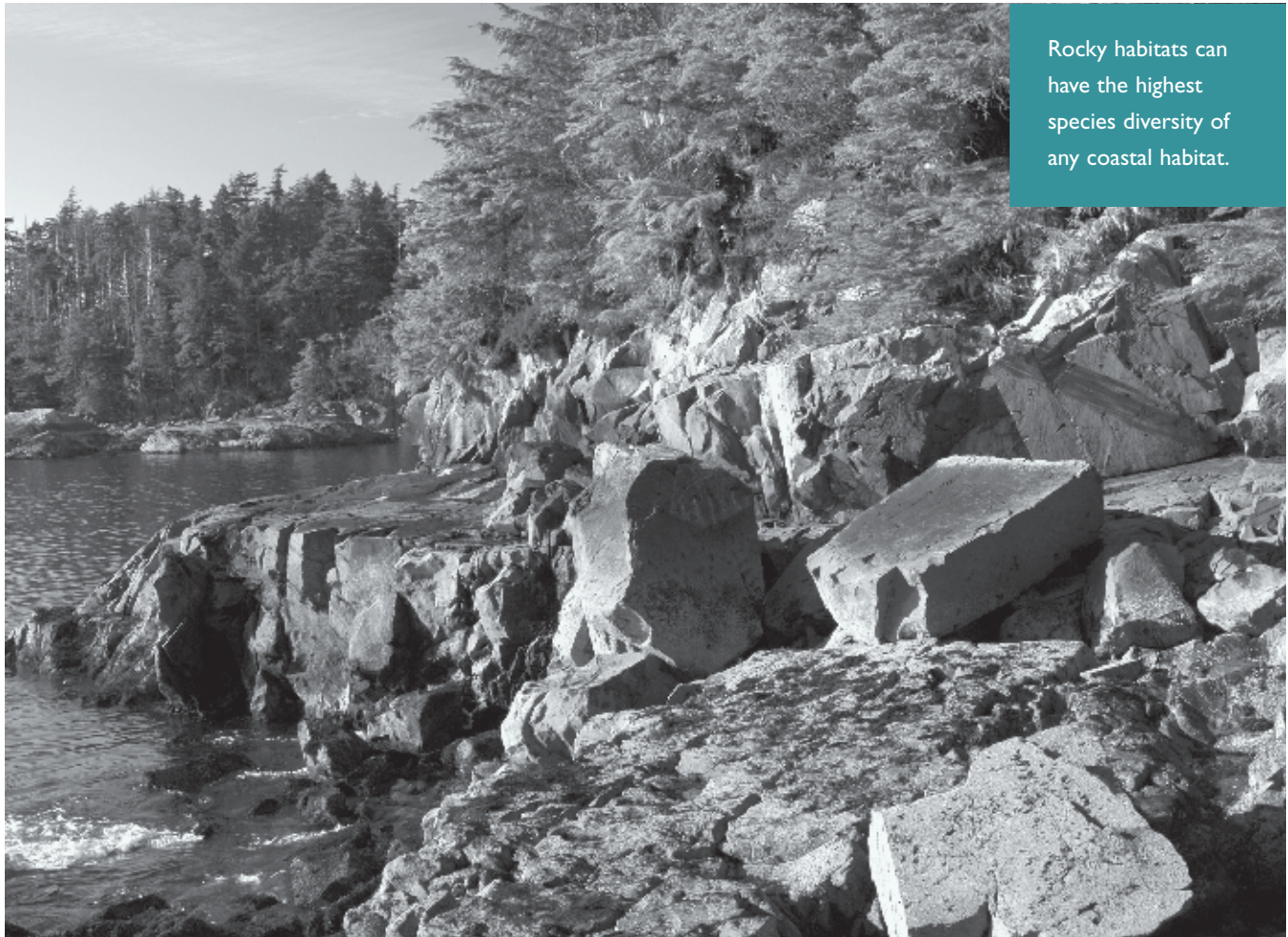
Kelp Forests

KELP IS THE COMMON NAME for many species of large, brown algae that grow in shallow, subtidal rocky habitats. Like eelgrass beds, kelp forests provide food and shelter for invertebrates and fish, as well as surfaces onto which other algae can attach. Kelp forests may prevent shoreline erosion by reducing waves and currents.

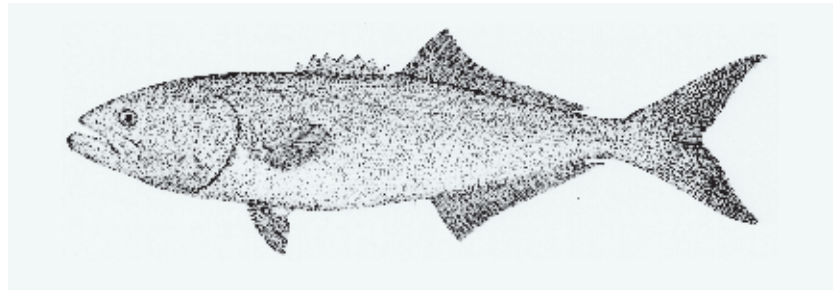
WILDLIFE

Green urchins, periwinkles, and limpets graze on tiny animals that often cover kelp blades. Filter feeders such as sponges, sea squirts, and acorn barnacles live in kelp forests along with fish such as rock gunnel, lumpfish, and Atlantic herring, which attach their eggs to kelp fronds. Lobsters are often found in kelp forests; the cover provided may protect juvenile lobsters from predators. Clumps of dead kelp and other seaweeds, called wrack, often wash onto beaches, where they host insects and amphipods that are important foods for many shorebirds, including piping plovers, least sandpipers, and sanderlings.

- THREATS**
- Docks, piers, wharves, and moorings
 - Dredging
 - Poor water quality



Rocky habitats can have the highest species diversity of any coastal habitat.



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Numerous species, such as bluefish, live in the water column.

Water Column

THE **water column** (see glossary) of the Gulf of Maine links all of Maine’s marine and estuarine habitats. It is a dynamic habitat that includes both brackish water (a mixture of salt and fresh water) and salt water. Plankton (microscopic plants and animals) that live from the water surface down to the limit of sunlight form the base of the food chain for animals in the ocean. In addition, these microscopic plants produce about 70 percent of the oxygen in the atmosphere.

THREATS

- ❑ Poor water quality

WILDLIFE

The water column is a nursery for many bottom-dwelling species such as barnacles, lobsters, urchins, and clams, which release their young to drift in the water. The young eventually settle out of the water onto the seabed and transform into the more recognizable adult forms. Numerous species such as jellyfish, squid, bluefin tuna, bluefish, mako sharks, and the endangered northern right whale live in the water column. Many seabirds including the Atlantic puffin, razorbill, and most terns depend upon small fish, squid, shrimp, and other creatures that live in the water column. ■

Coastal Species by Habitat

SALT MARSHES

- Ribbed mussel, mud and salt marsh snail, crabs, worms, grass shrimp
- Mummichog, silverside, winter flounder, striped bass, stickleback
- Great blue heron, little blue heron, glossy ibis, snowy egret, Nelson’s and saltmarsh sharp-tailed sparrow

SANDY HABITATS

- Moon snail, sand dollar, surf clam
- Winter and summer flounder, Atlantic halibut
- Piping plover, least tern, sanderling, semipalmated plover

ROCKY HABITATS

- Barnacles, dog whelk, periwinkles, limpets, sea stars, mussels, American lobster, amphipods, worms, crabs, brittlestars
- Juvenile herring, pollock, winter flounder, rock gunnel
- Gulls, crows, herons, eider duck, peregrine falcon, Atlantic puffin, razorbill, Leach’s storm petrel, black guillemot, common eider
- Seals, mink, otter, deer, raccoon

MUD FLATS

- Amphipods, mussels, clams, crabs, brittle stars, northern shrimp, soft-shelled clam, blue mussel, blood and sand worm
- Red hake, winter flounder, alewife, rainbow smelt, Atlantic mackerel
- Greater and lesser yellowlegs, whimbrel, red knot, black duck, Canada goose, 25 species of migrating and resident shorebirds

SHELLFISH BEDS

- Blue mussel, horse mussel, oyster, barnacles, snails, crabs, sea stars, whelks, moon snail
- Common eider, harlequin duck, bufflehead, greater scaup, common goldeneye

EELGRASS BEDS

- Larval blue mussel and bay scallop, sand shrimp, worms, crabs, amphipods
- Pollock, winter flounder, striped bass
- Black duck, Canada goose, Atlantic brant, piping plover, sanderling

KELP FORESTS

- Green urchin, periwinkles, limpets, sponges, sea squirt, acorn barnacle
- Rock gunnel, lumpfish, Atlantic herring

WATER COLUMN

- Phytoplankton; zooplankton, larvae of barnacles, fish, American lobster, urchins, clams, squid, shrimp, jellyfish
- Bluefin tuna, bluefish, mako shark, sand lance, alewife, capelin, swordfish, sunfish
- Atlantic puffin, razorbill, terns
- Northern right whale

Please note that this is a representative sample of coastal species in Maine.



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Minimizing Threats to Coastal Wildlife and Habitat

Human activities can significantly harm coastal habitats, but it is possible to minimize impacts.

Online resources are also accessible at www.beginningwithhabitat.org and www.maineaudubon.org.

Culverts and Dams

BY CREATING PHYSICAL BARRIERS in rivers and salt marshes, culverts and dams reduce tidal flow, oxygen, salinity, and natural sources of sediment that build marshes. Culverts and dams also disrupt the travels of fish as well as some mammals and amphibians, change the flow of water along beaches and flats, and alter rates of erosion.

HOW YOU CAN HELP

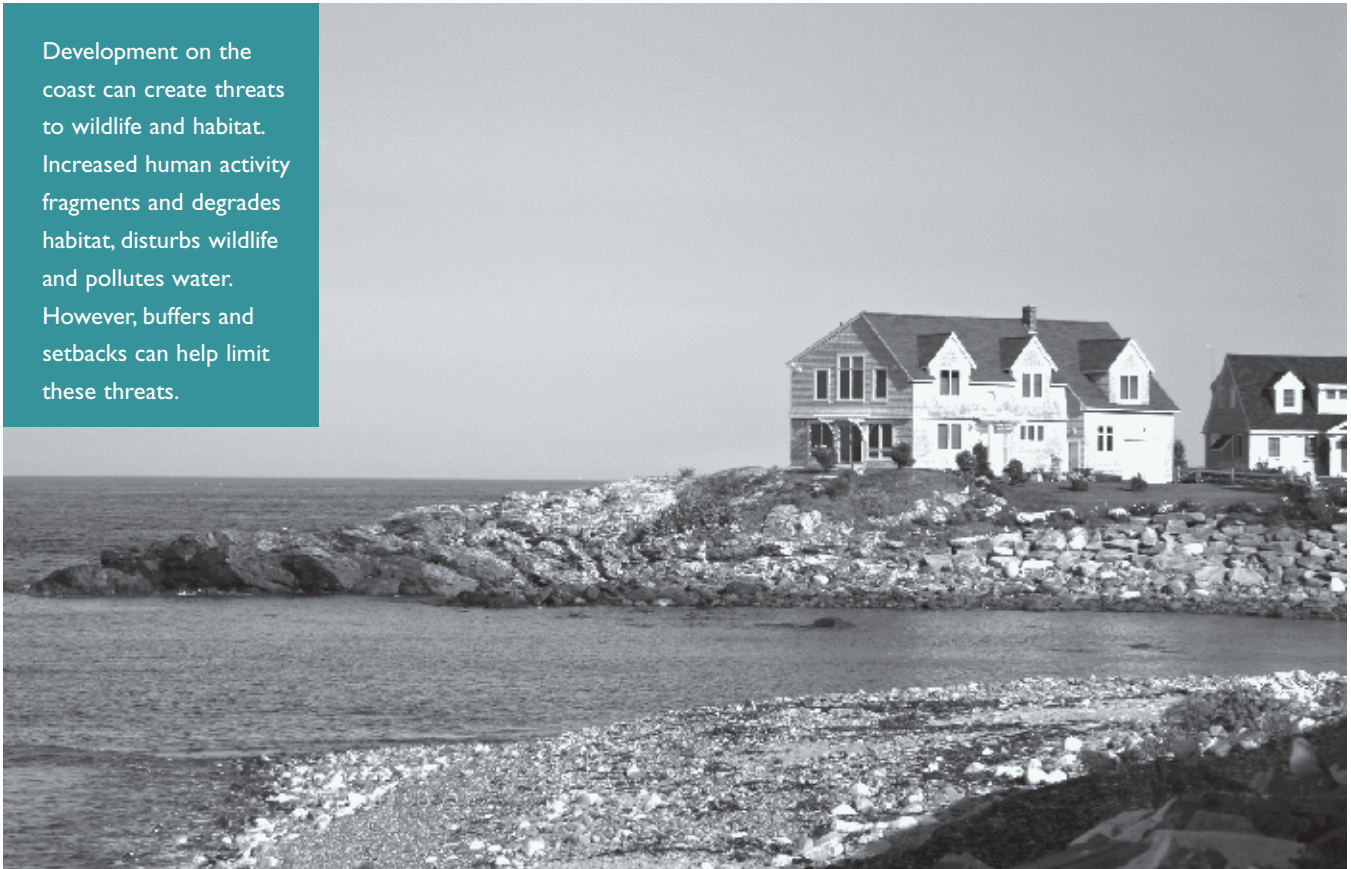
- ❑ Follow best management practices when building or repairing roads. Install new culverts and replace old with ones designed to allow fish and wildlife to pass through.
- ❑ Use correctly sized culverts to promote tidal water flow and salinity in salt marshes.
- ❑ Identify river and stream dams that can be removed.

- ❑ Work with state and federal agencies to improve fish passage by adding or improving fish ladders or constructing nature-like fishways around dams.

RESOURCES

- ❑ *Massachusetts Riverways Program*, Massachusetts Department of Fish and Game, (617) 626-1540, www.mass.gov
- ❑ *Fish Passage Guidelines*, Maine Department of Transportation Environmental Office, (207) 624-3100, www.maine.gov-images.informe.org/mdot/environmental-office-homepage/pdf/Fish_Passage_Policy_Final_2nd_Edition_w_cover2.pdf
- ❑ *American Rivers Dam Removal Toolkit*, American Rivers, (860) 652-9911, www.americanrivers.org

Development on the coast can create threats to wildlife and habitat. Increased human activity fragments and degrades habitat, disturbs wildlife and pollutes water. However, buffers and setbacks can help limit these threats.



Development

CONSTRUCTION OF HOUSES AND commercial properties is a major threat to coastal wildlife and habitat. High-density housing along beaches has destroyed more than two-thirds of Maine's piping plover nesting areas. Not only does development destroy habitat, but it degrades remaining habitat by fragmenting land into parcels too small to support many species. In addition, fragmentation eliminates important wildlife travel routes in lands adjacent to the coast. The presence of humans and pets in developed areas makes the remaining patches of habitat less suitable for wildlife. Development can increase the adverse effects of sedimentation, erosion, and pollution from fertilizers, pesticides, and other chemicals. Development on land adjacent to salt marshes can make the marshes more favorable to invasive species such as *Phragmites*, a tall perennial grass that provides poor wildlife habitat.

HOW YOU CAN HELP

- ❑ Work with local land trusts and government agencies to identify and conserve valuable wildlife habitats.
- ❑ Enforce all **setback** (see glossary) and **buffer** (see glossary) requirements in your town's shoreland zoning ordinance.
- ❑ Consider increasing setbacks where needed for water quality and habitat.

- ❑ Identify and conserve shoreland habitat areas that deserve greater protection than provided by shoreland zoning (see resources below).
- ❑ Limit clearing of vegetation along the shore. Well-vegetated buffers are one of the most cost-effective tools for coping with **nonpoint source pollution** (see glossary) and provide important wildlife habitat and travel corridors.
- ❑ Limit development adjacent to marshes. Unnaturally high levels of nitrogen come from human activities next to the marsh.
- ❑ Plan for sea-level rise by limiting development adjacent to the shore so that natural coastal vegetation, especially marshes, can spread into the uplands over time.

RESOURCES

- ❑ *Conserving Wildlife in Maine's Shoreland Habitats*, Beginning with Habitat, (207) 287-8042, www.beginningwithhabitat.org
- ❑ "The Space Between," *The Gulf of Maine Times*, www.gulfofmaine.org
- ❑ Invasive species Web site, Maine Department of Environmental Protection, (207) 287-7688, www.maine.gov/dep

Docks, Piers, Wharves, and Moorings

PHYSICAL STRUCTURES, EVEN TEMPORARY ONES, block sunlight and reduce growth of salt marsh and marine vegetation such as eelgrass and rockweed. Physical disturbance from foot traffic can encourage invasive species, especially in fringing marshes. Increased human activities in the intertidal zone can cause pollution (such as spilled fuel) and stir up sediments that, when they settle, may smother eelgrass, kelp beds, and boulder and ledge habitats. Moorings and boat anchors can dislodge portions of shellfish beds and increase their susceptibility to invasive species. They also scrape gaps and damage roots in eelgrass beds. Human activity on docks, piers, and wharves can disrupt wildlife feeding and roosting areas.

HOW YOU CAN HELP

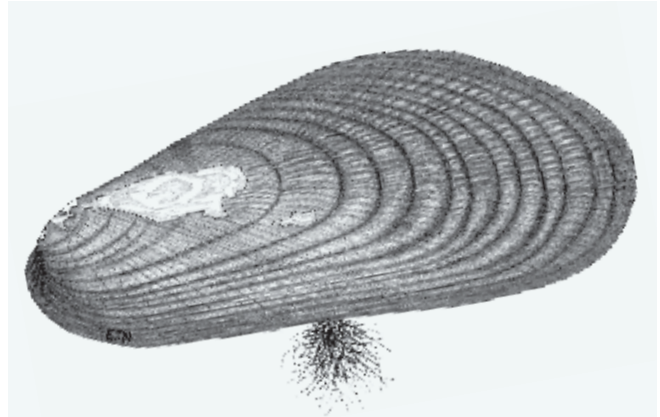
- ❑ To minimize shading vegetation, require that piers be narrow, elevated high above the marsh, and oriented in a north/south direction.
- ❑ Decrease the number of docks by encouraging community and shared docks.
- ❑ Minimize use of wood preservatives, paints, and stains.
- ❑ Do not store floats or boats on marshes.
- ❑ Avoid creating pathways on marsh vegetation.
- ❑ Encourage towns to regulate dock placement and design through zoning overlays, subdivision controls, building codes, ordinances, harbormaster control, and/or dock registration programs.
- ❑ Limit moorings and anchor chains in eelgrass beds.
- ❑ Post and enforce no-wake zones in shallow waters to prevent boats from stirring up sediments.



Minimize shading vegetation by maximizing dock height and minimizing width.

RESOURCES

- ❑ Residential dock and pier management Web site, National Oceanic and Atmospheric Administration, www.ocrm.noaa.gov/czm/dockpier.html
- ❑ *The Importance of Eelgrass*, Maine Coastal Program, (207) 287-1486, www.maine.gov/spo



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Moorings and boat anchors can dislodge portions of shellfish beds in which species like the ribbed mussel grow.

Dredging, Dragging, Scraping, Pipe Laying, and Mining

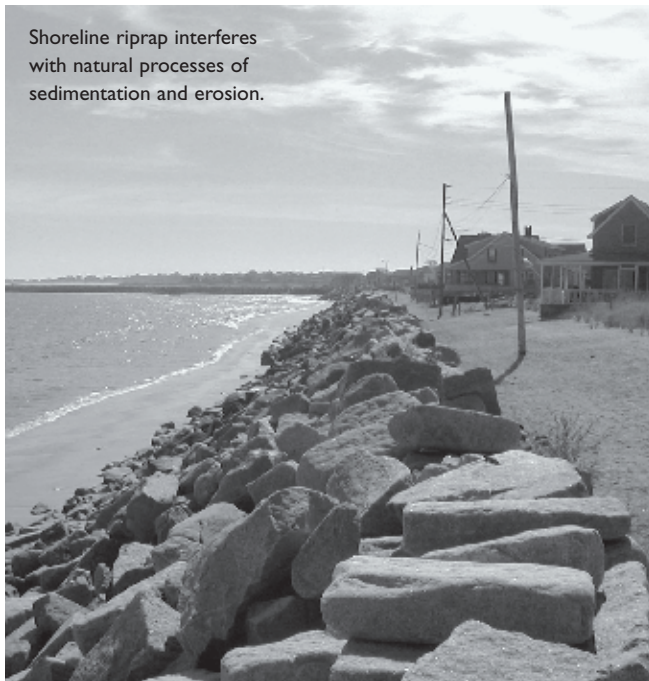
DREDGING, DRAGGING, AND SCRAPING on the seabed can transfer toxins and nutrients from sediments into the water. Agitated sediments can smother vegetation when settling back to the sea floor. Sediment removal from channel dredging and scraping may lead to increased coastal erosion and loss of breeding, resting, and feeding habitat for shorebirds. Dragging kills kelp, eelgrass, and invertebrates and reduces shelter for marine wildlife. Pipe laying degrades habitat, and pipe discharge may be harmful. Mining for sand and gravel can destroy habitat.

HOW YOU CAN HELP

- ❑ Participate in public hearings on projects that occur in or adjacent to sensitive areas (e.g., coastal wetlands, beaches with nesting habitat, eelgrass beds). Ask how the project might affect these important wildlife habitats.
- ❑ Before a dredging project begins, identify sensitive habitats and develop a plan that avoids negative impacts.
- ❑ Work with commercial fishermen to reduce harmful impacts from activities such as mussel dragging.

RESOURCES

- ❑ *Negative Effects of Commercial Mussel Dragging on Eelgrass Beds in Maine*, USGS Patuxent Wildlife Research Center, (207) 622-8205, www.pwrc.usgs.gov



Shoreline riprap interferes with natural processes of sedimentation and erosion.

Poor Water Quality

STORM WATER, SEDIMENTS, AND POLLUTANTS from construction sites and homes, wastewater treatment plants, septic systems, industrial discharges, oil pollution (from boats refueling, bilge water, and poorly maintained engines), ocean dumping, overboard discharge, and airborne pesticides all harm water quality. Too many nutrients in water leads to algal blooms, decreased oxygen in the water, and blocks light. Poor water quality makes eelgrass susceptible to wasting disease. Because they tend to be poorly flushed, mud flats are particularly vulnerable to water quality problems. Toxic pollution can kill plants and animals or cause disease, neurological damage, immune system weakness, and reproductive failure in wildlife.

HOW YOU CAN HELP

To prevent nutrient overload:

- ❑ Contain storm water discharge. Explore state grant opportunities for sewage and nonpoint source pollution control (see grant resources below).
- ❑ Maintain a vegetated buffer as required in the shoreland zone. Manage for healthy shrub and herbaceous growth.
- ❑ Consider expanding shoreland zone setbacks from 75 feet to 125 feet in sensitive coastal areas.
- ❑ Consider adopting ordinances that expand shoreland zoning to include small perennial and intermittent streams. Protection of freshwater wetlands and small streams enhances quality of the water before it reaches coastal wetlands.

- ❑ Maintain septic systems by pumping tanks at least once every three years. Consider adopting an ordinance similar to that in Brunswick, Maine, requiring regular septic tank pumping in sensitive coastal areas (see resources below).
- ❑ Post signs at town landings reminding pet owners to pick up pet waste.
- ❑ Encourage homeowners to replace overboard discharge systems (see grant resources below).
- ❑ Eliminate soil disturbance and use of fertilizers, especially near salt marshes.
- ❑ Install devices to control erosion from activities such as homebuilding, roadwork, and agriculture. Inspect and maintain erosion control devices regularly.

To prevent the spread of toxic pollutants (pesticides, chemicals, and heavy metals) through the food chain:

- ❑ Encourage citizens and businesses to follow best practices for lawn care, landscaping, and marina, boat yard, and golf course management (see resources below).

RESOURCES

- ❑ Maine Department of Environmental Protection grants and loans Web site for non-point source pollution and sewage, www.maine.gov/dep
- ❑ Brunswick zoning ordinance (see section 209.3.4 subsurface waste disposal systems), www.brunswickme.org/planning
- ❑ Bayscaper, Friends of Casco Bay, (207) 799-8574, www.maine.gov/agriculture/pesticides/bayscaper
- ❑ *Best Management Practices for Marinas and Boatyards*, Maine Department of Environmental Protection, (207) 287-7688, www.maine.gov/dep
- ❑ Maine Clean Boatyards and Marinas Program, Maine Coastal Program and Maine Marine Trade Association, (207) 773-8725, www.mmtaonline.com
- ❑ *What Sanctuary Status Truly Means: An Overview of the Audubon Cooperative Sanctuary Program for Golf Courses*, Audubon International, (518) 767-9051, www.audubonintl.org

Shoreline Stabilization

SAND AND MUD FLATS NEED continual sources of fine-grained sediment from upland and coastal erosion such as naturally eroding bluffs and long-shore transport. Without such renewal, flats may erode away. Jetties, **groins** (see glossary), and shoreline **riprap** (see glossary) interfere with natural processes of sedimentation and erosion. In addition, while these structures are intended to protect individual properties,



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Encourage towns to leave wrack on the beach as a rich food source for wildlife such as piping plovers.

they can endanger nearby homes and beaches by intensifying wave energy and carrying sand offshore, increasing erosion in some areas and sand deposits in others. As sea level rises, physical barriers such as seawalls prevent salt marshes and other shoreline habitats from shifting landward, which may lead to habitat loss or shrinkage.

HOW YOU CAN HELP

- ❑ Avoid using seawalls, groins, jetties, and riprap. Allow bluffs to shift and erode naturally, sand to move along the shore, and salt marsh, mud flats, and sandy habitats to migrate inward as sea level rises.
- ❑ Expect that erosion will continue where it already occurs. Plan new development well inland from eroding shorelines.
- ❑ Consider relocating structures such as decks, gazebos, and stairs away from the edges of eroding bluffs.

RESOURCES

- ❑ Maine Geological Survey, coastal geology
Web site, www.maine.gov/doc

Wildlife Disturbance

MIGRATORY SHOREBIRDS FLY THOUSANDS of miles to their breeding grounds in the spring and to their wintering areas in the fall. To survive, they stop to feed at salt marshes, mud flats, beaches, and other coastal habitats. If the feeding birds are disturbed by people, boats, or pets, they may not survive migration. Similar disturbance can cause nesting seabirds to abandon their nest sites. Increased use of beaches by people and their pets may cause piping plovers and least terns to abandon their nests, and garbage left behind by beachgoers attracts nest predators such as gulls, crows, and skunks.

HOW YOU CAN HELP

- ❑ Work with local land trusts and government agencies to conserve valuable wildlife habitats (see grant resources below).
- ❑ Keep boat activities far enough away from seabird nesting islands that birds are not flushed from their nests (generally more than 660 feet).
- ❑ Minimize noise, human activities, and pet traffic at important feeding and resting areas during migration.
- ❑ Keep pets away from nesting areas.
- ❑ Encourage towns to leave wrack on the beach as a rich food source for wildlife.

RESOURCES

- ❑ “Piping Plover and Least Tern Information Sheet,” Maine Audubon, (207) 781-2330, www.maineaudubon.org/conservatrisk/pplt.shtml
- ❑ *Maine’s Endangered and Threatened Wildlife*, Maine Department of Inland Fisheries and Wildlife, (207) 287-8000, www.maine.gov/ifw
- ❑ *Island Ethics: Recognizing and Protecting Colonial Nesting Seabird, Waterbird, and Waterfowl Islands in the Gulf of Maine*; U.S. Fish and Wildlife Service, Maine Department of Inland Fisheries and Wildlife, and Maine Coast Heritage Trust; (207) 781-8364
- ❑ Habitat protection grants:
Land for Maine’s Future Board, www.state.me.us/spo/lmf;
Maine Coast Heritage Trust, www.mcht.org;
The Nature Conservancy, www.nature.org;
U.S. Fish & Wildlife Service, www.fws.gov/northeast/gulfcoastmaine

Need more information?

- Beginning with Habitat maps and fact sheets (for help in identifying important coastal habitats in your town or region), (207) 287-8042, www.beginningwithhabitat.org
- Gulf of Maine Council on the Marine Environment, www.gulfofmaine.org
- *Gulf of Maine Marine Habitat Primer*, Maine Coastal Program, (207) 287-1486, www.gulfofmaine.org
- *Gulf of Maine Habitat Restoration Strategy*, Gulf of Maine Council on the Marine Environment (207) 287-1913, www.gulfofmaine.org
- *Maine's Coastal Wetlands*, Maine Department of Environmental Protection, (207) 287-7688, www.maine.gov/dep
- Maine's Natural Resource Protection Act, Maine Department of Environmental Protection, (207) 287-7688, www.maine.gov/dep

Glossary

Amphipods: Commonly known as beach fleas, these small shrimp-like crustaceans feed on detritus and algae and live within the wrack, algae, or sediment of all intertidal zones.

Buffer: An area of natural vegetation that filters runoff before it enters a water body.

Essential habitat: Areas providing physical or biological features essential to the conservation of an endangered or threatened species in Maine, such as nest sites or important feeding areas that may require special management considerations. Designation of Essential Habitat simply establishes a standardized review process within existing state and municipal permitting processes. Activities of private landowners are not affected by Essential Habitat designation unless they require a state or municipal permit, or are funded or carried out by a state agency or municipality, in which case they must be evaluated by the Maine Department of Inland Fisheries and Wildlife.

Fringing salt marsh: A narrow band or patch of salt marsh in the high intertidal zone.

Groin: A structure that juts out into the water generally perpendicular to the shoreline and is built to restore an eroding beach.

Nonpoint source pollution: The overland runoff from diffuse sources and the pollution it transports.

Riprap: Large stones placed along a shoreline to stop erosion.

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.

Significant wildlife habitat: Areas mapped or identified by the Maine Department of Inland Fisheries and Wildlife and protected under Maine's Natural Resources Protection Act: state or federal endangered or threatened species habitat; deer wintering areas; seabird nesting islands; critical spawning and nursery areas for Atlantic salmon; significant vernal pools; high- and moderate-value waterfowl and wading bird habitat; and shorebird nesting, feeding, and staging areas. Permits are required for certain activities that occur in significant wildlife habitats.

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

Water column: All the water between the sea floor and surface.

Wetland of special significance: Under Maine's Natural Resource Protection Act, all coastal wetlands (tidal and subtidal lands, including all areas below debris line left by tidal action; all areas with vegetation tolerant of salt water; any swamp, marsh, bog, beach, or flat subject to tidal action; and portions of sand dunes). Permits are required for actions that may alter the wetland.

Wrack: A mix of dead seaweed, eelgrass, and debris that collects on the shore and provide a rich source of food for wildlife.

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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.