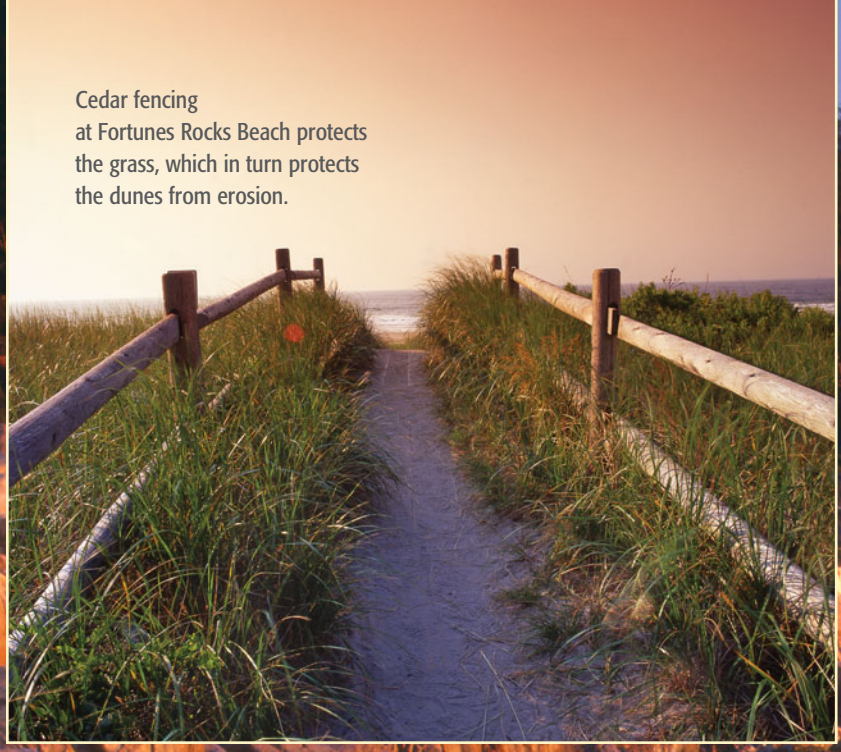
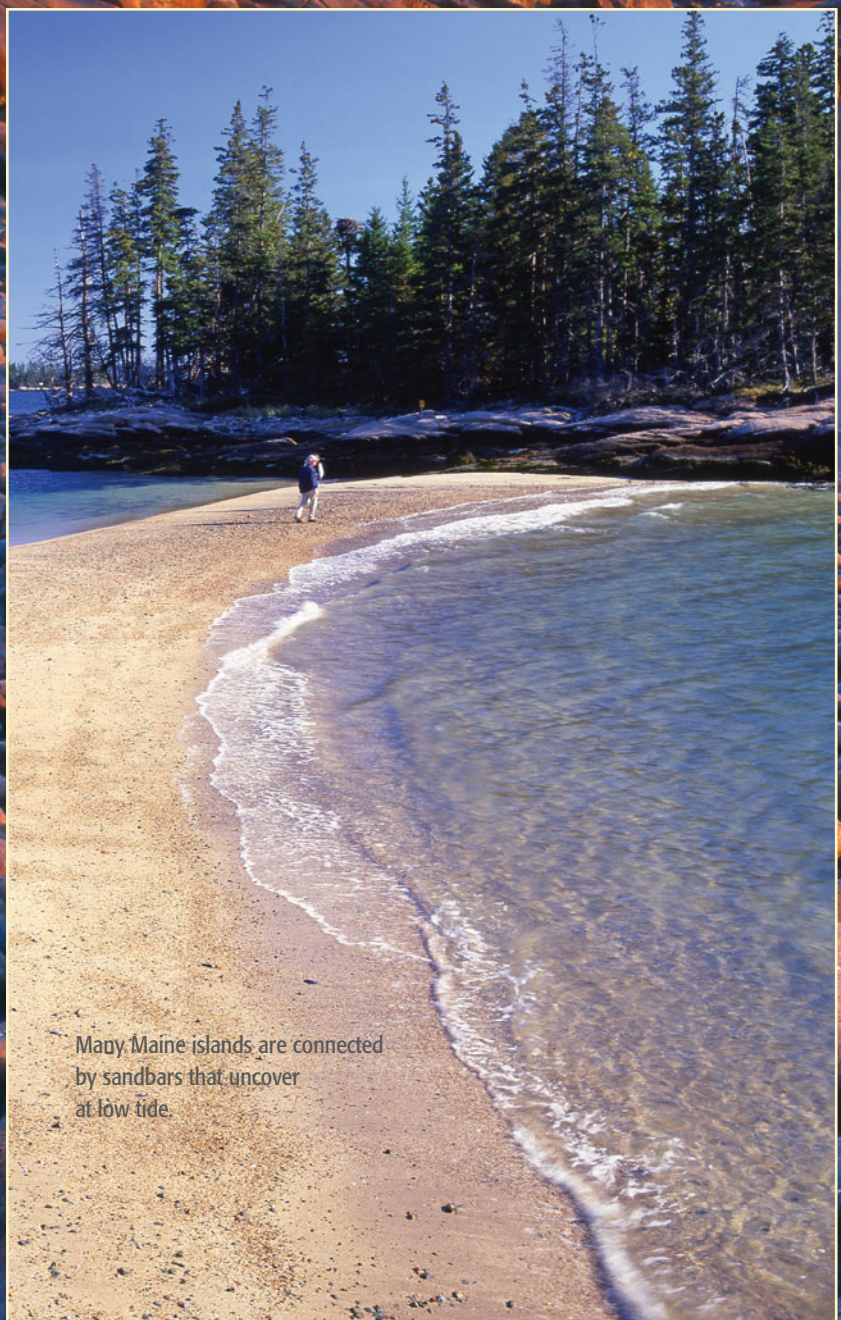


Cedar fencing
at Fortunes Rocks Beach protects
the grass, which in turn protects
the dunes from erosion.



Many Maine islands are connected
by sandbars that uncover
at low tide.

THE STATE OF MAINE'S

Beaches

Some are accessible, some are not. Some are stable, some are not. Some are clean, some are not. All are our responsibility.

BY CATHERINE SCHMITT

SUMMER'S HERE, and the living is easy. The sun and sand are calling, and the kids are begging, "Let's go to the beach!" You pack your beach bags, fill the cooler, slather the kids with sunscreen, and pile into the car (or boat, of course).

Where are you going to go? Which of Maine's 35 miles of sandy beach, less than one percent of the state's total coastline, will you visit?

When we think of the beach, we think of sand. A regular supply of sand is required for a beach to exist. Sand grains are small and light enough to be carried by ocean waves, yet heavy enough to be left behind as the tide recedes. Currents and wind push the sand around until it eventually reaches dynamic equilibrium, and a beach is born. Most of Maine's sand beaches are concentrated in the southern part of the state from Kittery to Cape Elizabeth, where the coast is parallel to the line of the sea's waves, which bring sand to the shore.

Rivers provide the material for many beaches along the Atlantic Coast, but in Maine, rivers are an important source for only two beach systems: the Kennebec River brings sand to Popham Beach, and the Saco River supplies Old Orchard Beach.

The rest of Maine's beaches are pockets of gravel and cobble; they were formed as bedrock and glacial deposits were eroded and reworked by the action of ocean waves. Acadia National Park's Sand Beach is an exceptional example of this weathering. While Maine has nothing like the tropical beaches formed from the carbonate shells of marine organisms, a few beaches in the state—among them Acadia's Sand Beach, and those on Merchant and Marshall Islands—have a large percentage of shell.

They don't call it the rocky coast of Maine for nothing. Photos by Sara Gray(3)

To have a popular Maine beach such as Kennebunk Beach, pictured here, to yourself, visit during off-peak hours.

BEACH ACCESS can be a challenge in Maine, where only a small percentage of the shoreline is publicly owned. A recent study by the Island Institute found that nearly 60% of Maine's coastal access is in private hands. Thus, there is no guarantee that the public will be able to make use of it.

The threat of private development has led to an increase in the rate of coastal land conservation. The Land for Maine's Future Program has helped preserve more than 25,000 acres of coastal land. The number of boat access sites has also increased, although rising land values along the coast are making conservation more difficult.

Access to the water is further limited in Maine by a law known as the Colonial Ordinance, a remnant of our historical ties to Massachusetts, which extends private ownership of the shore to the low tide line. Public rights to use the intertidal zone area are restricted to "fishing, fowling, and navigation."

Maine's residents and millions of summer tourists visit the state's 135 or so public beaches each year, and in some cases, they continue traditional, customary use of private beaches. Changing demographics and demands on Maine's shorefront have increased conflict and in some cases have resulted in the loss of public access to private coast.

WHILE BEACHES are perhaps fixed in the human imagination, they are highly dynamic environments, always changing in response to the whims of wind and wave. The beach you remember from last summer might look very different this season. One strong April storm can transform a beach, carrying sand away or breaking through the dunes to the other side.

Since 1999, the Southern Maine Beach Profiling Program has monitored the shape of beaches. Each month, volunteers return to their favorite beach to measure height, topography, and special features, and submit their data to the Maine Geological Survey.

Ed and Sue Mulkern are experienced monitors of Wells Beach. "We love the beach, and always enjoyed walking on the beach," explained Sue Mulkern, "Pro-

courtesy Maine Sea Grant(3)

Scientists use aerial photographs to study the distribution of sand at the mouths of rivers.

filing was a great way to give back, and it has amplified our enjoyment of the beach, especially in winter."

"Profiling has inspired us not only to notice small changes in the beach—puddles, ripples, scour marks around pebbles—but to seek out information that has taught us even more, and given us an appreciation for what is there," explained Ed.

Sometimes, the effects of storms are trumped by the impact of humans. In Saco Bay—the largest sand beach and salt marsh system in Maine—coastal engineering over the last 140 years, coupled with a rise in sea level, has led to significant changes in shoreline positions and sand supply, resulting in property loss and increased flood hazards. The U.S. Army Corps of Engineers built a jetty at Camp Ellis in 1869 in an attempt to stabilize the mouth of the Saco River and provide safe navigation for ships traveling to upriver textile mills. But research, funded in part by Maine Sea Grant, has found that the jetty, now 1,668' long, has instead impeded the natural flow of sediment north along the shore. Today, tens of thousands of cubic meters of sand from the Saco River are diverted farther offshore and into deeper water, eventually piling up at Pine Point in Scarborough. The result has been accelerated erosion at Camp Ellis, which loses two to three feet of beach every year and where a total of 32 homes have been lost in the last 100 years. The area was hit hard by the 2007 Patriot's Day storm, and $28 million has been authorized by Congress to conduct a mitigation project.

Water-quality monitors learn their craft.

The Saco Bay seawall.

Saco Bay is an extreme example of how human intervention can have unintended consequences for beaches, but other shorelines are vulnerable as well. About half of Maine's sandy beaches are similarly "armored" with hard structures, such as seawalls that limit the natural formation of beaches and dunes. These areas are vulnerable to the accelerated sea-level rise and intense storms that accompany climate change. All of Maine's sand beaches are eroding, and as the 2007 Patriots Day storm showed, most of Maine's developed beaches are at risk of damage from a truly large storm that comes at the time of an astronomically high tide. Climate scientists predict that what was once defined as a "100-year coastal storm" could occur every two to three years in the Northeast in the near future.

Sara Gray (left)

Jeff Scher

Each year, Coastal Cleanup volunteers remove tons of trash and debris from Maine's beaches.

In response, Maine established rules for development in sand dune systems. The forward-looking nature of the rules, which are based on an anticipated two-foot rise in sea level over the next century, have earned the state national recognition. The Department of Environmental Protection regulates the density and location of development, and the size of structures; the rules promote removing seawalls, restoring dunes, and elevating structures or relocating them landward.

PEOPLE THINK of Maine beaches as wild and pristine, yet some Maine shorelines can get just as trashed as those in more populated places. The evidence is supplied every September, when volunteers taking part in the International Coastal Cleanup remove trash and debris from beaches and underwater areas. During the 2007 cleanup, close to 2,000 volunteers removed 8,338 pounds of trash from more than 100 miles of Maine beach and shoreline. Among the haul were 2,700 plastic bags, 341 balloons, 2,000 glass bottles, 2,000 bottle caps and lids, 5,307 food wrappers and containers, 1,000 buoys and floats, 4,000 pieces of rope, and more than 13,000 cigarette butts.

Where does this stuff come from? People on shore, people at the beach, people on boats, accidents at sea.

Marine debris regulation falls largely under the International Convention for the Prevention of Pollution from Ships, which restricts ocean dumping, depending on the type of garbage and distance from land. The law completely prohibits the disposal of plastics at sea, yet despite these and other prohibitions, large quantities of debris, including plastics, continue to foul the world's beaches and oceans.

Marine life is especially at risk from a type of garbage that isn't picked up during the coastal cleanup because it's practically invisible: teeny-tiny bits of plastic. According to the Ocean Conservancy, the world now uses 230 million pounds of plastic annually, and bits of plastic are widely distributed throughout the oceans. They float on the surface, drift in the water column, and sink to the sea floor. They are ingested by birds, seals, fish, and squid, and move through the food web. As plastic breaks down, toxic additives, including flame retardants, antimicrobials, and plasticizers, may be released into the ocean or into the animals that ingest the plastic.

Debris rides the ocean's currents, collecting in eddies and gyres, such as the quiet waters around the Bermuda Triangle, where researcher Jim McCleave, professor emeritus at the University of Maine, recently sailed to study the migration of eels. "In the Sargasso Sea," he reported, "a

thousand kilometers from anywhere, in almost every patch of seaweed bigger than a couple of square meters, there is trash—pieces of Styrofoam, foam coffee cups, plastic bottles and jugs, flip-flops, and more. It's rather depressing."

Chris Bartlett, a marine extension associate in Eastport, recalled a similar experience from Alaska. "I pulled up on a beach in the Tongass National Forest," he said, "miles from the nearest community. The shore was covered with many years' worth of plastic debris, much of it of Asian origin. After that, I picked up trash on the shore all around our remote hatchery for two and a half years and it never stopped coming."

No doubt every well-traveled sailor has a similar tale.

YOU'VE GAINED access to a beach, it hasn't eroded, and it appears pretty clean. And now comes the bottom line: Is the water safe for swimming?

The number one reason for the contamination of Maine's beaches is bacteria from humans and animals, which gets into the water through malfunctioning septic systems or sloppy hygiene. A system is in place, however, to protect public health at swimming beaches.

With support from the Environmental Protection Agency, the Maine Healthy Beaches Program monitors coastal swimming beaches for bacteria that indicate the presence of disease. When bacterial counts are exceeded, program staff work with beach managers to assess the area and determine the health risk, often posting a swim advisory, depending on conditions at the time.

According to program coordinator Keri Lindberg of Maine Sea Grant and University of Maine Cooperative Extension, the number of advisories has gone down in recent years. "For a while," said Lindberg, "advisories were going up as our monitoring and notification procedures improved—and possibly because of heavy rains in 2005 and 2006—but we have seen improvements

Here's what you can do to help preserve Maine's beaches

- Explore the science of Maine's beaches with the Maine Geological Survey: www.state.me.us/doc/nrimc/mgs/explore/marine/beaches/contents.htm
- Become a beach profiler: 207-646-1555 ext. 115 for more information.
- Check the water quality status of your beach at www.mainehealthybeaches.org
- If you have a septic system, make sure it is maintained and regularly pumped out.
- Clean up after your pet wherever you go.
- When boating, know where your waste goes, and make sure it does not go directly into the water. The Clean Water Act prohibits dumping of untreated sewage within three miles of shore, and no sewage of any kind can be discharged into certain sensitive waters designated No Discharge Zones. Currently, Casco Bay is one of five no-discharge zones in Maine. If you have a flow-through treatment system (Type I or Type II Marine Sanitation Device), make sure it is working and that all your waste goes through the system. Use

what you can do *continued...*

enzyme-based products in your holding tank and don't dispose of fats, solvents, oil, emulsifiers, disinfectants, paints, poisons, phosphates, or diapers in your MSD.

- If you have a holding tank, pump it out at one of the more than 75 pumpout stations in the state. Find a list at: www.maineboats.com/mdep
- Encourage your local marina to get a pumpout station and to take the Clean Boat yard/Clean Marina pledge.
- Take your trash ashore for proper disposal; ask your marina to provide trash cans or a dumpster.
- Report any illicit discharges to the local harbormaster.
- Participate in the International Coastal Cleanup during Coastweek, September 19-26, 2009. Visit www.maine.gov/spo/coastal/projects/coastweek/cleanup.htm to find a beach cleanup in your area.
- Get involved with dune-restoration efforts on your favorite beach.
- Before building on the coast, consult the DEP about approved construction techniques.

in water quality over the past few years at eight beaches where we have identified pollution sources. The biggest improvements have been a result of addressing malfunctioning subsurface wastewater disposal systems [septic systems] and improvements to storm-water systems."

Boaters have responsibility for keeping beaches healthy, too. According to the Maine Department of Environmental Protection, the untreated sewage from two recreational boaters in one weekend puts the same amount of bacterial pollution into the water as the treated sewage of 10,000 people.

Lindberg is working with partners to implement a Healthy Boating Campaign in Camden Harbor, based on anecdotal evidence that bacteria counts tend to be higher when more boats are in the area. Unsanitary boating practices are difficult to detect and enforce, said Lindberg, and require education and community action. Lindberg has seen results from such programs elsewhere in the state. "The Kennebunk River Action Committee was successful in siting a new boat pumpout facility and raising awareness at a local level," she said, "and I think it has helped improve water quality."

HUMANS ARE DRAWN to beaches. We flock to them and share the sand, pulled toward the edge, perhaps by memories of the origins of humankind in an ancient sea. Maine's beaches are one of the state's most popular tourist destinations, attracting millions of people every year. Our strands are cared for by many dedicated volunteers and staff of state and federal programs, and our affinity for the shore suggests that we each have a responsibility of stewardship. Then those who come after us, decades or even centuries from now, will echo the call, "Let's go to the beach!"

Catherine Schmitt is the communications coordinator for the Maine Sea Grant program.