

# Casco Bay Estuary Project

## HABITAT RESTORATION PROGRAM: Partnerships to Revitalize Damaged Habitats

Habitats are places where plants and animals live, feed, find shelter, and reproduce. For humans sharing natural habitats, the knowledge of interdependence carries with it a responsibility. Human activity can threaten and degrade habitat in numerous ways, through direct loss, fragmentation, encroachment, disturbance, diminished water quality, altered drainage patterns, and barriers.

The Casco Bay Estuary Project (CBEP) is working with citizens, local organizations, and agency partners to restore habitat in Casco Bay and its watershed, benefiting our own species in addition to all the “neighboring” plants and animals that share our watershed ecosystems.

### What is habitat restoration?

Habitat (or, ecological) restoration is essentially restoration of an ecosystem, which consists of *the biota (plants, animals, and microorganisms) within a given area, the environment that sustains it, and their interactions. Ecological restoration is the process of assisting the recovery of an ecosystem that has been degraded, damaged, or destroyed* (The Society for Ecological Restoration, “Primer on Ecological Restoration,” 2002).

### What types of habitat does CBEP want to restore?

Priority habitats identified in the *Casco Bay Plan* (1996) include both the waters and islands of the Bay, and the rivers, streams, and freshwater wetlands of the watershed. Shoreline, saltmarsh, and riparian habitats are part of the aquatic ecosystem and are also priority habitats for the Casco Bay Estuary Project. (For more information on the habitats in the Casco Bay watershed, see the **Important Habitats** table in this fact sheet, back page.)



### What types of assistance can CBEP offer to local Habitat Restoration projects?

- Guidance in developing community support for projects, including facilitation, as resources permit;
- Assistance with project development and planning;
- Technical assistance with implementation strategies and design; and
- Project funding (modest seed funding from Casco Bay Estuary Project and/or assistance with obtaining funding from other sources).

### What habitat restoration activities will CBEP support?

The CBEP Habitat Restoration resources and funds can assist in supporting the full spectrum of activities necessary to restore valuable habitat. Because restoration represents a long-term commitment of land and resources, all involved stakeholders should participate in the decision to undertake a restoration project. A project plan should be developed and follow-up monitoring designed. (See sidebar on next page for more detail.)

## CBEP may be able to provide assistance with the following activities:

- Habitat assessment;
- Consensus-building and convening stakeholders;
- Development of a project implementation plan;
- Design of engineering solutions;
- Implementation including construction;
- Monitoring; and
- Management.

## Examples of implementation activities within the CBEP definition of habitat restoration include:

- Restoration of saltmarsh hydrology;
- Eelgrass planting;
- Control of invasive species;
- Installation of fish ladders and fishways;
- Water quality improvement to enhance aquatic habitat
- Planting riparian and shoreline buffers;
- Nesting island restoration;
- Native species planting and reintroduction; and
- Creation of shoreland buffers.

(See Case Studies insert for examples of local Habitat Restoration implementation projects.)

## What can habitat restoration accomplish? How?

Ideally, restoration attempts to return a damaged or degraded ecosystem to its historic or undegraded condition. This can be established through a combination of historical knowledge of the ecosystem's pre-existing state, studies on comparable intact ecosystems, and analysis of other ecological, cultural, and historical reference information.

In many cases, return to the undegraded condition may not be possible due to permanent alterations resulting from human activity. For example, while improving water quality may enhance fish habitat in a river or stream, long-term changes in water temperature due to runoff from increased impervious surface and loss of sheltering trees may change the species of fish that can be supported. Understanding what the ecosystem was like before it became degraded can, however, help inform the direction of a restoration effort.

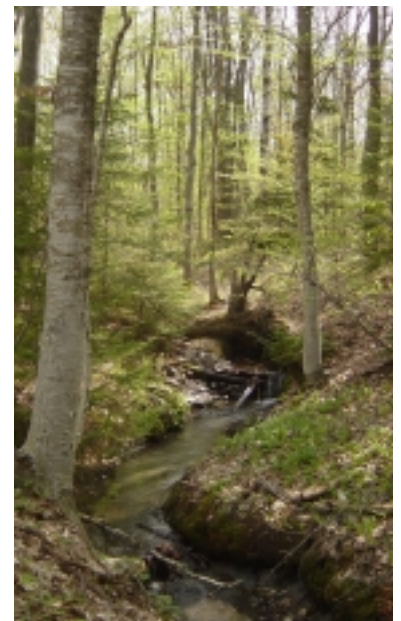
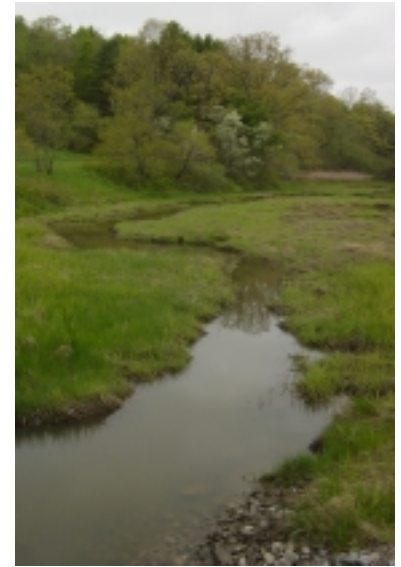
Successful ecosystem restoration takes advantage of the ability of the ecosystem to restore itself to the fullest extent possible. In the simplest circumstances, removing or modifying specific disturbances will allow a system to recover on its own (SER, 2002). For example, removing a man-made tidal restriction will allow species of saltmarsh grasses, present historically, to outcompete newcomer freshwater species like *Phragmites*.

Where native species have been lost completely, it may be necessary to reintroduce native plants and animals and control exotic invasive organisms. In some cases, an ecosystem may require ongoing management to sustain its recovery.

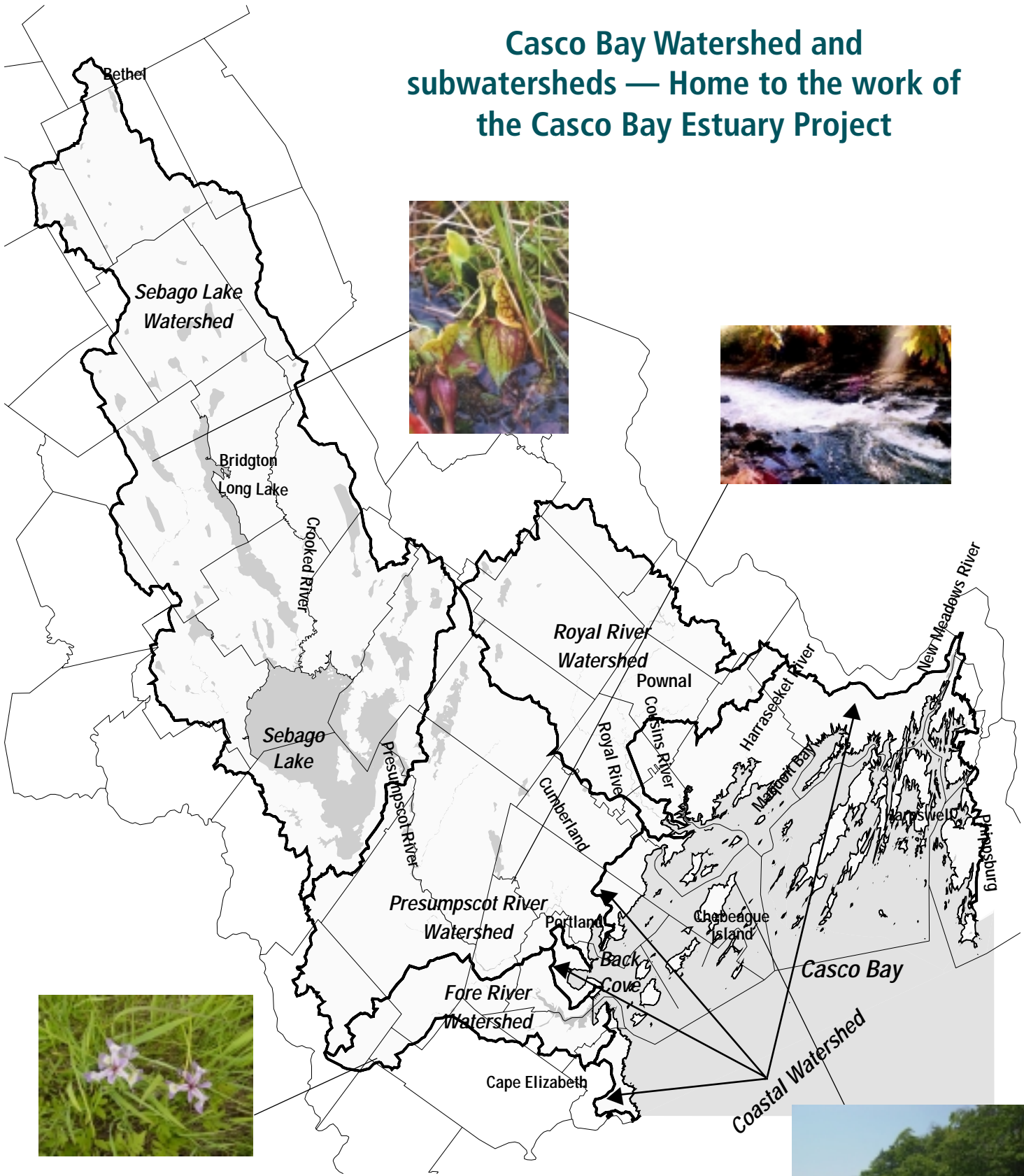
## What indicates a successful ecosystem restoration project?

An ecosystem has recovered when it can sustain itself structurally and functionally. The Society for Ecological Restoration *Primer on Ecological Restoration* (2002) outlines the key characteristics of a restored ecosystem, paraphrased and summarized below. Even when not fully realized, these characteristics can serve as benchmark goals towards which a recovering ecosystem should be moving.

- The plant and animal communities include the species that were present historically and include **native species** to the fullest extent possible.
- The plants and animals needed to develop and maintain a **functioning ecosystem** are present (for example, there is an adequate supply of food for restored native species).
- The physical environment can sustain **reproducing populations** of the key species necessary for continued ecosystem stability or development through time.
- The ecosystem is functioning normally and is resilient enough to **endure normal periodic stress** (for example, fluctuations in weather).
- The ecosystem is **interacting successfully with the larger landscape** which surrounds it, and threats from the surrounding landscape have been reduced as much as possible.
- The restored ecosystem is as **self-sustaining** as a similar undisturbed ecosystem. Note that a normal ecosystem may change over time as part of normal ecosystem development and may fluctuate in response to stress and disturbance.

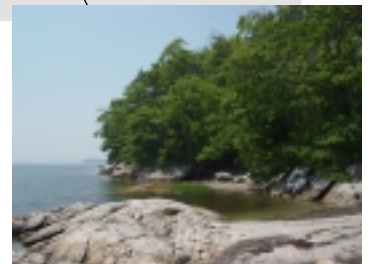


# Casco Bay Watershed and subwatersheds — Home to the work of the Casco Bay Estuary Project



To learn more about the Casco Bay Estuary Project Habitat Restoration Program and to explore partnership opportunities, contact: Casco Bay Estuary Project • 207/780-4820  
E-mail : [cbep@usm.maine.edu](mailto:cbep@usm.maine.edu) • [www.cascobay.usm.maine.edu](http://www.cascobay.usm.maine.edu)

Credits: Diane Gould, copy; Julie Motherwell, design; Karen Young and Lakes Environmental Association, photography.



## What are the important aquatic habitats of Casco Bay and its watershed? How are human activities impacting them?

Habitat Type	Example Species	Example Human Impacts
<b>Marine and estuarine waters</b> Marine habitats of Casco Bay cover 229 square miles (over 146,000 acres).	<ul style="list-style-type: none"> <li>• Terns, eider ducks</li> <li>• Pollock, sculpin, winter flounder, skate</li> <li>• whales, dolphins, porpoises</li> </ul>	<ul style="list-style-type: none"> <li>• Oil spills</li> <li>• Marine debris and entanglement in fishing gear</li> </ul>
<b>Intertidal and subtidal mud flats</b> Mud flats are the most characteristic intertidal habitat in Casco Bay covering 11,582 acres	<ul style="list-style-type: none"> <li>• Soft-shell clams and worms</li> <li>• Piping plovers, great blue herons</li> </ul>	<ul style="list-style-type: none"> <li>• Creation of barriers (e.g. causeways) to tidal circulation</li> <li>• Toxic pollution in both sediments and water</li> </ul>
<b>Elgrass beds (and other submerged aquatic vegetation)</b> Eelgrass, which covers 5% or 7,000 acres of Casco Bay, is an important indicator of ecosystem health.	<ul style="list-style-type: none"> <li>• Flounder, striped bass, eels</li> <li>• Lobster, crabs, scallops</li> </ul>	<ul style="list-style-type: none"> <li>• Nutrient loading and increased turbidity of water</li> <li>• Physical disturbance from boat propellers and anchors</li> </ul>
<b>Rocky intertidal habitat</b> Casco Bay boasts 500 acres of rocky shoreline habitat.	<ul style="list-style-type: none"> <li>• Periwinkles, mussels, barnacles</li> <li>• Crabs, starfish, sea urchins</li> <li>• Seaweeds</li> </ul>	<ul style="list-style-type: none"> <li>• Loss of habitat due to docks and piers</li> <li>• Introduction of invasive species (e.g. Asian shore crab)</li> </ul>
<b>Salt Marshes</b> Critical functions of saltmarshes include providing nursery habitat for marine species; mitigation of flooding and storm surge; and filtration of water pollutants.	<ul style="list-style-type: none"> <li>• Mummichogs</li> <li>• Snowy egret, herons</li> </ul>	<ul style="list-style-type: none"> <li>• Restriction of tidal flow due to roads and bridges</li> <li>• Filling, ditching, and draining of saltmarshes</li> </ul>
<b>Islands</b> Casco Bay contains 758 islands, islets, and exposed ledges at mean high tide.	<ul style="list-style-type: none"> <li>• Seals</li> <li>• Terns and plovers</li> <li>• Osprey</li> </ul>	<ul style="list-style-type: none"> <li>• Elimination of waterbird nesting habitat due to development</li> <li>• Disturbance by humans and introduced predators</li> </ul>
<b>Rivers and Streams</b> There are more than 1,356 miles of rivers and streams in the Casco Bay watershed.	<ul style="list-style-type: none"> <li>• Muskrat, beaver, river otter</li> <li>• Atlantic salmon, alewife, river herring, shad, smelt</li> </ul>	<ul style="list-style-type: none"> <li>• Obstruction of flow due to dams, roads, etc.</li> <li>• Soil disturbance and increased flooding cause erosion of shoreline buffers</li> </ul>
<b>Freshwater wetlands</b> Freshwater wetlands in the Casco Bay watershed include bogs, wooded swamps, and vernal pools.	<ul style="list-style-type: none"> <li>• Herons, bitterns, ducks</li> <li>• Frogs, salamanders, turtles</li> <li>• Moose, deer, raccoons</li> </ul>	<ul style="list-style-type: none"> <li>• Introduction of invasive species (e.g. purple loosestrife)</li> <li>• Filling and draining of wetland habitats</li> </ul>



### THE CASCO BAY PLAN, 1996

**HABITAT GOAL:** *Minimize adverse environmental impacts to ecological communities from the use and development of land and marine resources.*

#### **HABITAT OBJECTIVES:**

- No net loss of aquatic and island habitats.
- Habitats in Casco Bay should be of a quality that does not have an adverse effect on the structure and function of the biological community.
- The miles of rivers, streams, and coastal waters meeting water quality standards shall increase annually

### A few of our Habitat Restoration Partners:

Maine Coastal Program/Maine State Planning Office, Maine Department of Environmental Protection, National Oceanographic and Atmospheric Administration (NOAA), Natural Resource Conservation Service, U.S. Fish and Wildlife Service Gulf of Maine Coastal Program, U.S. Environmental Protection Agency, Friends of Casco Bay

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