INDICATOR 8

Do the rivers, streams and estuaries in the Casco Bay watershed meet state water quality standards?

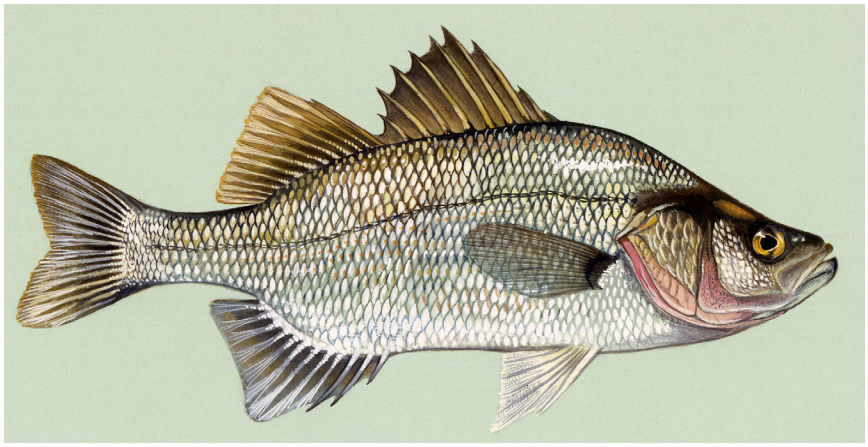
What Are State Water Quality Standards and Why Are They Important?

To manage the water quality in its rivers, streams and estuaries, Maine has enacted laws in compliance with the Federal Clean Water Act of 1972. The four water quality classes established for rivers and streams are AA, A, B and C. Marine waters have three classes - SA, SB and SC - while lakes have the single class GPA. For each class, certain "designated uses" are specified such as swimming, fishing, boating, habitat for aquatic life, drinking water supply, navigation, agriculture, hydropower, industrial process and cooling water. Assigning a water body to a water quality class thus sets both numeric and narrative (descriptive) water quality goals or standards. The standards are different for the different classes, with AA and SA standards being most protective, B and SB aiming to maintain general high quality water and C and SC providing a lower level of protection. Regardless of the water quality classification, the standards for all Maine waters include the goal that they be both fishable and swimmable (Maine DEP 2010). See the table on p. 33 for more detail on classification standards for Maine's waters. Maine's Water Quality Classification law is detailed at http://janus.state.me.us/legis/statutes/38/title38sec464.html

Every two years the Maine Department of Environmental Protection (DEP) assesses the status of its waters and produces an Integrated Water Quality Monitoring and Assessment Report ("305b") report. This report, most recently released in 2010, describes whether waters of the state (where monitoring data are available) meet or fail to meet the water quality standards applicable to their designated uses. The assessment helps the state focus its management efforts in order to maintain the designated uses of Maine's surface waters. For example, the state develops Total Maximum Daily Load (TMDL) plans to improve water quality in waters that fail to meet one or more water quality criteria.

Status: Pollutants and Impacts

Toxics (such as PCBs, dioxins, heavy metals, and pesticides) are by far the greatest cause of impairments to Maine waters. Several statewide "advisories" suggest people limit consumption of certain fish and shellfish from all Maine waters because of possible presence of toxic compounds. Citizens are advised not to eat lobster tomalley due to the potential presence of PCBs and dioxin (which can be concentrated in the tomalley) in Maine's coastal waters. A fish consumption advisory applies to striped bass and bluefish caught in the state. (Bluefish and striped bass, however, are migratory, so contamination may not come from Maine's waters). In addition, consumers are advised to limit consumption of freshwater fish from Maine because of the presence of mercury. The primary source of mercury is atmospheric deposition from power plants and other sources outside of the region. Additional fish consumption advisories apply to some segments of Maine's largest rivers as a result of "legacy pollutants" like PCBs from past industrial activities (Maine DEP 2010).

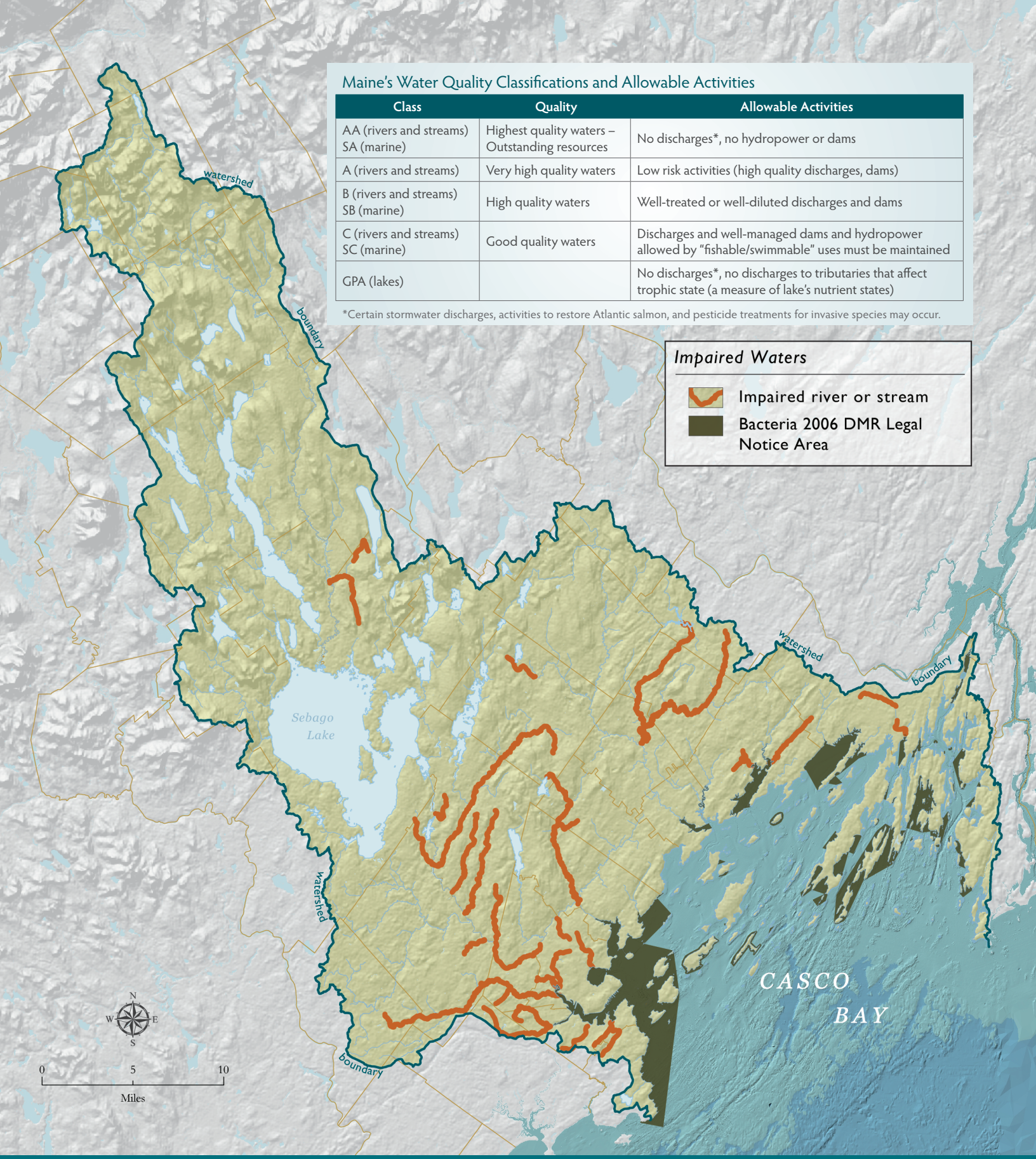


Duane Raver

Consumption advisories and consumer guidance have been issued by Maine Center for Disease Control (CDC) for all fish caught in Maine fresh waters, including white perch, pictured above, because of mercury pollution.

Some estuarine areas like Portland Harbor also have local toxic pollution problems due primarily to "legacy pollutants" from past activities such as papermaking, gasworks, tanning and metal working. In addition, PAHs and heavy metals (such as lead, copper and zinc) continue to enter the coastal environment due to urban development and boat-related activities.

Pathogen pollution affects many Casco Bay water bodies (see Section Two).



Maine's Water Quality Classifications and Allowable Activities

Class	Quality	Allowable Activities
AA (rivers and streams) SA (marine)	Highest quality waters – Outstanding resources	No discharges*, no hydropower or dams
A (rivers and streams)	Very high quality waters	Low risk activities (high quality discharges, dams)
B (rivers and streams) SB (marine)	High quality waters	Well-treated or well-diluted discharges and dams
C (rivers and streams) SC (marine)	Good quality waters	Discharges and well-managed dams and hydropower allowed by "fishable/swimmable" uses must be maintained
GPA (lakes)		No discharges*, no discharges to tributaries that affect trophic state (a measure of lake's nutrient states)

*Certain stormwater discharges, activities to restore Atlantic salmon, and pesticide treatments for invasive species may occur.

Impaired Waters

- Impaired river or stream
- Bacteria 2006 DMR Legal Notice Area

Impaired Waters in the Casco Bay Watershed

Marine waters of Casco Bay and streams and rivers of the Casco Bay watershed that do not meet water quality standards are called "impaired waters." All streams in Maine are impaired because of elevated levels of mercury, derived primarily from sources outside the state. All marine waters are impaired because the possible presence of toxic chemicals has led to recommendations that people limit consumption of certain fish and of lobster tomalley. Waters shown on the map have additional water quality problems. Marine waters impaired because of bacteria are displayed as DMR's 2006 Legal Notice Areas; in some cases only a portion of the legal notice area is impaired. (For details, see text and supplemental information at www.cascobayestuary.org/sotb2010.html)

Nutrients (nitrogen and phosphorus) may also become pollutants when present in excess, leading to excessive phytoplankton growth or intertidal mats of "green slime" (*e.g., Ulva intestinalis*) along the coast. Nutrients also trigger decreased levels of dissolved oxygen and impacts to aquatic life (Maine DEP 2010).

Toxic chemicals, low dissolved oxygen and other stressors have an impact on the suitability of habitat for fish, invertebrates and other aquatic life. One way Maine DEP assesses whether rivers, streams and wetlands are meeting aquatic life standards is by monitoring the aquatic macroinvertebrate community. Those aquatic organisms – primarily insects – can serve as indicators of water quality because species vary with respect to their sensitivity to pollution and disturbance. For example, the larvae of stoneflies, mayflies and caddisflies are highly sensitive to pollution. Of intermediate tolerance to pollution are the larvae of dragonflies, damselflies, dobsonflies and blackflies. More severely polluted or disturbed habitats may contain only tolerant organisms like midge larvae, snails and/or leeches (Maine DEP 1999, 2008).

Friedrich Böhringer

Stonefly larvae are sensitive to pollution and are one of the organisms that disappear from polluted streams.

The water bodies in Casco Bay and its watershed that are impaired are shown on p. 33.

What Are the Trends?

Overall, water quality in the watershed is good and has remained so over time. There has been little change in the number of water bodies impaired by pollution in the Casco Bay watershed since the 2005 *State of the Bay* report. More urbanization in the lower watershed may increase nonpoint source loads and lead to decreased water quality in the future unless new impervious surface is minimized or its impacts are mitigated. Urban streams are especially vulnerable to development pressure (see Indicator 3).

Solutions and Actions to Help Meet Water Quality Standards

CBEP and its partners are working to assess and reduce the loading of pollutants to Casco Bay and its watershed. For example, Maine DEP has developed TMDL water quality improvement plans for many of the impaired waters in Casco Bay. Most recently, US EPA approved a Maine TMDL that includes bacterial loading reduction strategies for both freshwater and marine waters (DEP 2009). A regional mercury improvement plan (a TMDL) was approved by US EPA in 2007. The state of Maine is also working to reduce local mercury sources. To address nitrogen impacts in the state's coastal waters, Maine is working with US EPA to establish coastal nutrient water quality criteria.

In addition to monitoring and assessment activities, Maine DEP manages the National Pollutant Discharge Elimination System (NPDES) program, which regulates permitted point source discharges into the state's waters. Casco Bay communities in the federally mandated Municipal Separate Storm Sewer System (MS4) program are working collaboratively to reduce pollution from stormwater (see Indicator 3). Both Portland and South Portland are working to reduce the frequency and volume of combined sewer overflows (see Indicator 4).

Nonpoint source pollution reduction is being addressed, for example, by educational outreach through the state and the Nonpoint Source Education for Municipal Officials (NEMO) program. Federal Section 319 grants are awarded by the state to reduce nonpoint source pollution through development of management plans and on the ground source reduction. The Long Creek Restoration Project is an innovative state and local partnership focused on reduction of nonpoint source pollution to a major urban stream. CBEP's Urban Stream Initiative is working with local partners to assess and address pollution impacts to those vulnerable water bodies.

Throughout the Casco Bay watershed, citizen steward programs like those of Friends of Casco Bay, Presumpscot River Watch, Maine Volunteer Lake Monitoring Program and Lakes Environmental Association continue to collect monitoring data to assess the health of our waters and to support Maine DEP's efforts to manage water quality. CBEP has provided financial support to each of those groups.

References

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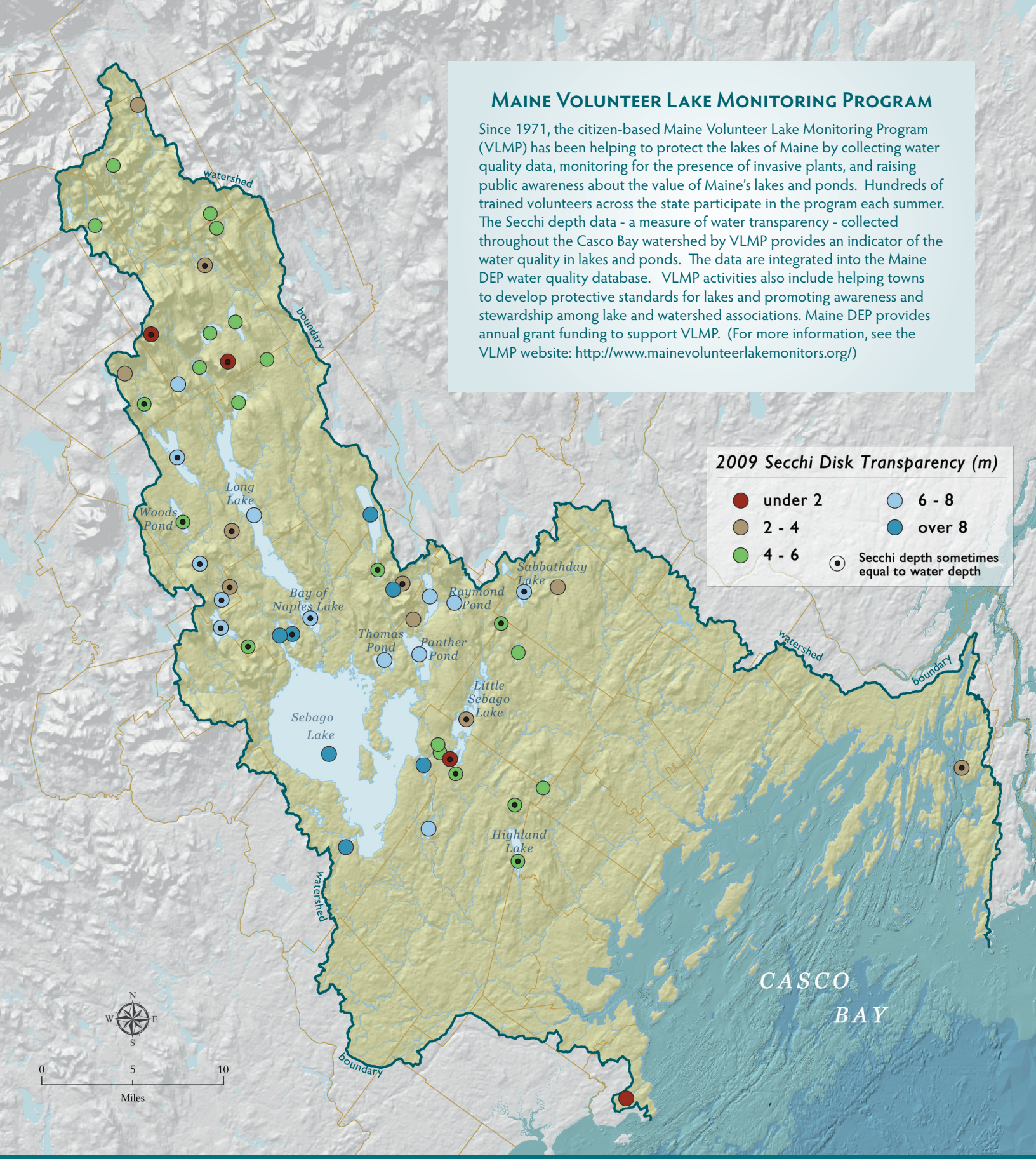
Maine Volunteer Lake Monitoring Program

Since 1971, the citizen-based Maine Volunteer Lake Monitoring Program (VLMP) has been helping to protect the lakes of Maine by collecting water quality data, monitoring for the presence of invasive plants, and raising public awareness about the value of Maine's lakes and ponds. Hundreds of trained volunteers across the state participate in the program each summer. The Secchi depth data - a measure of water transparency - collected throughout the Casco Bay watershed by VLMP provides an indicator of the water quality in lakes and ponds. The data are integrated into the Maine DEP water quality database. VLMP activities also include helping towns to develop protective standards for lakes and promoting awareness and stewardship among lake and watershed associations. Maine DEP provides annual grant funding to support VLMP. (For more information, see the VLMP website: http://www.mainevolunteerlakemonitors.org/)



Lake Water Transparency

Average Lake Transparency in Casco Bay Watershed, 2009. The map illustrates the average transparency of lakes in the Casco Bay watershed monitored by VLMP. Among the larger monitored lakes and ponds that Maine DEP considers to be at risk of future impairment by development in the watershed are Bay of Naples Lake, Highland Lake, Little Sebago Lake, Thomas Pond, Sabbathday Lake, Woods Pond, Panther Pond, Long Lake, Raymond Pond and Sebago Lake (Maine DEP 2006).