

Currents

• A Quarterly Newsletter of the Casco Bay Estuary Project •

Volume 4 No.2

Summer 1995

Clam Flats and Swimming Areas in Casco Bay

We would all like to think that we can go clamming or swimming anywhere in Casco Bay - but that is not the case. These activities have been limited in recent years by the widespread threat of bacterial contamination. Malfunctioning septic systems, overboard discharge systems and boat discharges have closed many shellfish flats to harvesting. Bacterial contamination from sewage also causes closure of swimming areas at Peaks Island and East End Beach in Portland, and there is concern that untested parts of the Bay may also be unsafe.

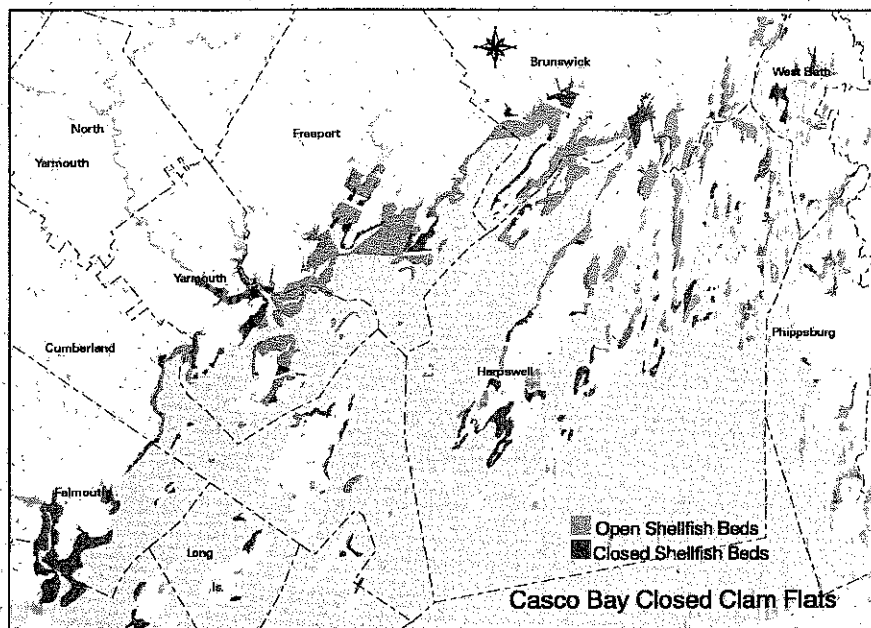
Progress has been made to address these problems. Straight pipes that discharge raw sewage have been removed, and the plumbing code has been revised to regulate design and construction of on-site wastewater disposal (septic) systems. Overboard discharge systems that impact clam flats are being replaced. But more work still needs to be done.

Where Does Contamination Come From?

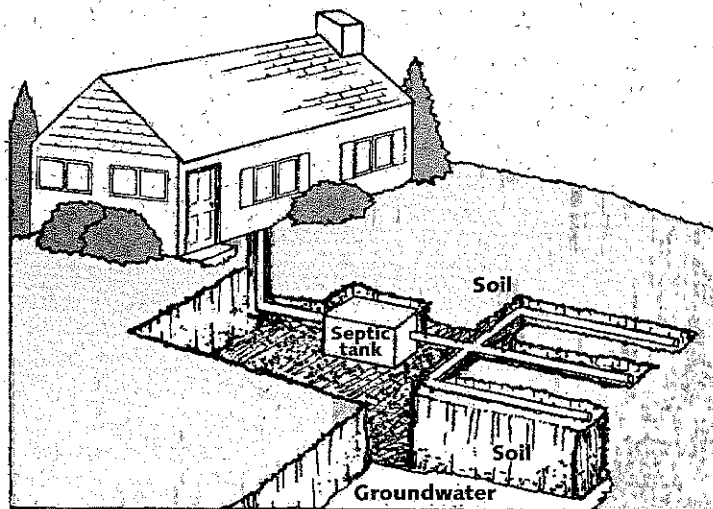
Shellfish flats and swimming areas are closed when elevated bacteria levels indicate the presence of human (or animal) waste, since eating contaminated shellfish or swimming in contaminated water can cause illness. Sources of bacteria include septic systems, overboard discharge systems, municipal and industrial discharges of water, illegal sewage discharge from boats and runoff pollution.

Septic Systems

Septic systems are the principal form of residential wastewater treatment in areas near clam flats in Falmouth, Cumberland, Yarmouth, Freeport, Brunswick, Harpswell, West Bath, Phippsburg and the Casco Bay Islands. Many systems were installed before the State plumbing code was updated in 1974, and so may provide little or no treatment. Failure in older systems can enable sewage to back up into the house, run off in surface water or seep undetected into groundwater or cracks in the bedrock.

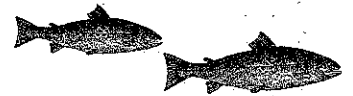


The Casco Bay Estuary Project has determined that in 1994, 36 percent of the clam flats in Casco Bay were closed to shellfish harvesting due to the threat or existence of bacterial pollution.



Typical Bed Septic System Used in Maine

Household sewage (wastewater from sinks, toilets, showers, washing machines and dishwashers) flows into the tank. There the heavier particles settle to the bottom and become sludge. A scum of fats, grease and other lightweight materials rises to the top. Between the sludge and the scum, the remaining liquid (called "effluent") — which is high in nitrogen and bacteria — flows to the leach field where it is dispersed over an area of soil known as the leach field. There the nitrates are somewhat diluted by groundwater, and the bacteria and viruses are filtered and die off. Standard septic systems are designed to treat bacteria, not nitrogen.



The number of malfunctioning septic systems in the Casco Bay area is not known. A septic system's typical 20-year life can be reduced because of inadequate maintenance, overloading, or poor design and construction. Inadequate maintenance results, in most cases, from failure to pump out the sludge at the bottom of septic tanks once every 2 to 5 years. Other maintenance needs include making sure garbage disposal waste does not create excessive solids that clog the leach field, and avoiding septic system cleaning additives that may disrupt the system and result in discharge of contaminants (in addition, many such "cleaners" contain toxic materials).

Overboard Discharge Systems

An overboard discharge system is similar to a septic system except that the leach field is replaced by a combination of a sand filter or mechanical aeration, the use of a chemical disinfectant (chlorine), and discharge of the treated effluent into a water body. Licenses for new overboard systems were prohibited in Maine in 1987. Harpswell has the largest number of overboard discharges, followed by Portland islands and West Bath.

Licensed Wastewater Discharges

Among all the potential sources of nutrients, municipal wastewater discharges contribute the most nitrogen to Casco Bay's ecosystem. However, the more flushing by tides or currents, the less damaging the impact. Flats near combined sewer overflows, municipal sewage treatment plants and other licensed discharge sites in Casco Bay are in the Fore River, Back Cove and Presumpscot River where other contributing factors (e.g., bacteria-laden stormwater runoff from a densely populated area) might cause closure. Permanent closures have also occurred around municipal sewage treatment plant discharges in Freeport and Yarmouth.

Illegal Boat Sewage Discharges

There are about 1,900 boat slips in 19 marinas and 3,400 moorings controlled by towns in the Bay. Illegal discharge of sewage from boats presents a public health problem. Although sewage pumpout is allowed beyond three miles from the coastline (i.e., outside the Bay) it is suspected that many boats discharge into Bay waters. Even though the State's pumpout law requires all marinas to provide pumpout service, few marinas in Casco Bay meet this requirement.

One innovative solution to this problem involves Friends of Casco Bay's new mobile pump-out boat, which will roam the Bay from greater Portland to Freeport, May through September.

Runoff Pollution

Agriculture and domestic sources contribute to the bacterial runoff that can cause clam flat closure. Although many farmers reduce contaminated runoff through improved manure management, bacteria and nutrients from small "hobby farm" operations, domestic pets and wildlife can also result in clam flat closures or excess inputs of nitrogen.

Economic Effects

In 1995 the Casco Bay Estuary Project completed the first-ever study on the economic value of the soft-shell industry in Casco Bay. The ground-breaking study found that in 1994, harvesters landed an estimated 63,805 bushels of clams (at an average price of \$72.95 per bushel) for a total value of about \$4.65 million. It is important to note that this represents production from only about 64% of Casco Bay's clam flats; the remaining 36% were closed because of pollution. Closed clam flats mean lost dollars to the Casco Bay region.

The study also found that in 1994, the soft-shell industry directly supported almost 300 jobs. In addition, 1,252 recreational licenses were granted by the Casco Bay towns of Yarmouth, Cumberland, Freeport, Brunswick, Harpswell, Phippsburg and West Bath. When flats are closed, though, harvesters, dealers and shuckers lose work; restaurants pay higher prices; and more stress is put on the remaining flats open.

Economic benefits of proper sewage disposal extend to homeowners, since proper management and maintenance prolongs the life of the septic system (beyond the 20 year average). A periodic inspection and pump-out cost about \$100, the replacement of a system costs between \$2,500 and \$15,000. A functioning septic system is also important to ensure sale of a house. If the system does not meet required standards, the buyer or lending institution can require that it be upgraded prior to the sale. A record of proper septic system maintenance helps homeowners at the time of sale. Likewise, replacement of an overboard discharge unit with a conventional septic system increases the value of a shorefront property.



Public Health Effects

Consumption of shellfish from a contaminated flat can cause intestinal illness and contraction of viruses. While commercial harvesting of shellfish is carefully regulated, poaching in closed areas endangers potential consumers. Contact with contaminated water can result in infected cuts and scrapes and accidental ingestion of bacteria and viruses.

There are strong economic, ecological and health incentives to reduce the levels of bacteria and nutrients entering Casco Bay. While state and municipal actions have begun to address the sources of contamination, further efforts are needed. The Casco Bay Estuary Project is developing recommendations to open clam flats and swimming areas in Casco Bay. The final recommendations will be part of the Casco Bay Plan.

Here is a sample of what we're recommending:



Action: Provide technical assistance to municipalities bordering Casco Bay to monitor and open public swimming areas.

Action: Provide training for installers and pumpers of septic systems.

Action: Improve local enforcement of the plumbing code in the Casco Bay watershed.

Action: Require proof of legal waste disposal upon transfer of property.

Action: Develop municipal programs to protect water resources and clam flats from septic system discharges through infrastructure and or management.

Action: Review implementation of the national shellfish sanitation program.

This article is based on the Project's more detailed report titled "Clam Flats and Swimming Areas in Casco Bay". This report will be part of the draft Casco Bay Plan. The public will be invited to comment on the Plan this fall.



Habitat Protection In Casco Bay


Many people don't realize that Casco Bay is home to a tremendous variety of living resources. The Bay's different habitats provides critical food, cover, migratory resting and feeding areas, breeding and nursery areas for an astonishing variety of life.

A habitat is an ecological "neighborhood" shared by numerous different species. The productivity of the whole habitat depends on the actions of all the constituent organisms, and — in turn — their health and survival depends on the whole. For members of natural habitats, this knowledge of interdependence carries with it a responsibility. To sustain the health of Casco Bay, we must pursue actions that benefit — not just our own species — but all the "neighboring" plants and animals that share the watershed's ecological community.

Species Diversity and Density in Casco Bay

Casco Bay has long been recognized for its richness and diversity of wildlife. Collecting over 500 specimens from Casco Bay in 1874, the famous biologist A.E. Verrill noted the "great diversity in the character of [the Bay's] bottom...and in the character of the fauna."

Most of that diversity still exists today. To date, approximately 850 species have been identified in the waters of Casco Bay. In 1980, a sample of just one square foot of Casco Bay yielded 86 plant and animal species. A comparison of the density of living organisms in Casco Bay and other similar water bodies around the world illustrates its richness:



The Casco Bay Estuary Project seeks to:

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




Reduce toxic pollution to Casco Bay.

Minimize the loading of pathogens, toxics, nutrients and sediments from stormwater and combined sewer overflows.

Open and protect shellfish and swimming areas impacted by water quality.

Encourage all members of the Casco Bay community to protect Casco Bay by acting as responsible stewards.

Mean Density of Organisms/Square Meter



Casco Bay	8,743
Gullmars Fjord, Sweden	4,198
Mystic River, Massachusetts	3,000
Lambert Bay, South Africa	1,153
Delaware Bay, Pennsylvania	722

Casco Bay's wealth of marine and coastal organisms include:

- 150 species of waterbirds, whose population ranges up to 32,000 at peak times of the year;
- 15,000 pairs of seabirds, including common eiders, herring gulls, great black-backed gulls, double-crested cormorants, common terns, & black guillemont nest on approximately 80 islands in Casco Bay;
- Nesting sites for the endangered Roseate tern;
- Hundreds of wintering loons and grebes;
- 33 species of shorebirds and thousands of migrating sandpipers, plovers, and related species;
- One of the most important winter waterfowl populations on the Maine coast, including eiders, black ducks, and mallards;
- Over 50 pair of nesting osprey, a nesting pair of bald eagles and occasional peregrine falcons;
- Over 2,000 harbor seals
- Migrating whales, porpoises, and dolphins;
- A wide variety of fish — skates, flounder, haddock, cod, bluefish, striped bass, bluefin tuna, pollack, and others;
- The largest and densest eelgrass beds (important submerged vegetation) mapped to date in the state of Maine are found in Casco Bay.



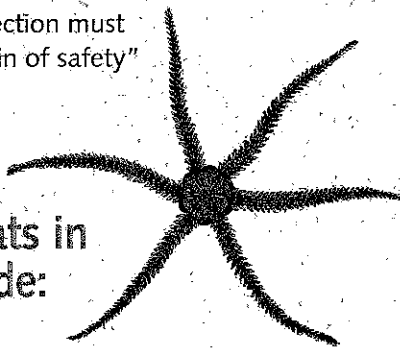
Prime Habitats Are Important

While Casco Bay can be considered the habitat for all these species, each plant and animal tends to concentrate in limited sections of the Bay and its watershed. Some ecological features — such as island and tidal flats — are particularly important sources of food and shelter for numerous wildlife species.

The needs of plants and animals vary over their life spans. For example, juvenile fish often inhabit the protected and rich waters of the Bay's estuaries, moving to deeper waters when they mature. The species' habitat requirements, however, tend to remain constant. For example, herons always need tall trees in which to nest and eelgrass always requires shallow clear water. The way a species uses a given set of resources, however, may change over time. Which rookeries herons use, or which mudflats they feed on, can vary depending upon the availability of food, the existence of cover (to provide protection from predators), and the population level of competitors.

This variability makes it difficult to define exactly which habitats are most important, and how much of these habitats must be protected. What is appropriate one year may be clearly inadequate the next. Environmental planning for habitat protection must therefore include a "margin of safety" to account for possible future needs.

Important habitats in Casco Bay include:

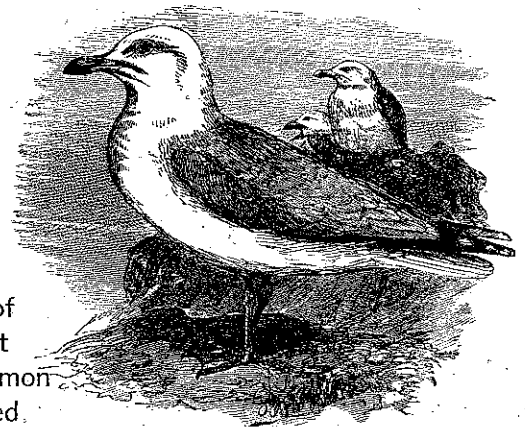


Marine and Estuarine Waters.

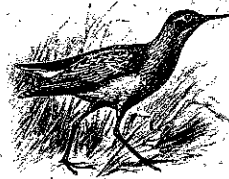
The marine habitats of Casco Bay (which covers almost 200 square miles) can be separated into subtidal areas (those always under water) and intertidal areas (those areas between extreme high and low tides that are routinely exposed to air). Creatures such as lobsters, crabs, sea urchins and worms share the bottom with "bottom-feeding" fish such as flounder, cod, pollock, sculpin and skate. Above them swim herring, pogy and shad, feeding on phytoplankton and zooplankton. In the summer months tuna, bass, mackerel and seals frequent the Bay's waters.

Plants are an important part of the food chain in subtidal waters. One particularly sensitive plant, eel grass, requires shallow, clear water and is considered an indicator of environmental health. Casco Bay has the largest and most dense concentrations of eelgrass mapped along the Maine coast, with over 7,000 acres of beds. The most important beds are near the mouth of the Royal and Cousins Rivers.

Islands. Based on mapping done by the Casco Bay Estuary Project, Casco Bay contains 758 islands, many of which are important habitat for the common eider, double-crested cormorant, herring gull, great blue heron and common roseate tern. Sixteen islands support more than 15 percent of the state's nesting seabird population.



Rivers and Streams. Casco Bay is fed by four major rivers: the Presumpscot, Royal, Stroudwater and Fore and a vast network of streams that flow into these rivers or directly into Casco Bay. Throughout the watershed there are more than 1,356 miles of rivers and streams that offer habitat to muskrat, beaver, river otters, belted kingfisher, black ducks, spotted sandpipers, shad, trout, pickerel, and salmon. Streams offer important habitats for the early life stages of juvenile fish, and anadromous fish like alewife and smelt use them for spawning.



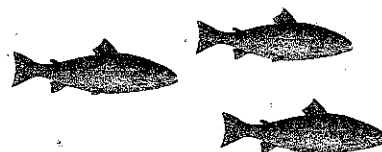
Freshwater Wetlands.

Freshwater wetlands range from marshes dominated by grasses to swamps dominated by trees. They are critical habitat, particularly for deer, beavers, muskrats, raccoons, wood ducks, American bitterns, great blue herons, green herons, leopard frogs, painted turtles and salamanders.



How Habitats Are Threatened

Habitat can be disrupted by humans in many ways. Most involve development in one form or another. Habitat threats include direct loss, fragmentation, changing water conditions, encroachment, changing drainage patterns, creating barriers, disturbance, and dragging for groundfish, mussels, and sea urchins. Population and housing trends for the Casco Bay area suggest that these threats will continue and will likely get worse.



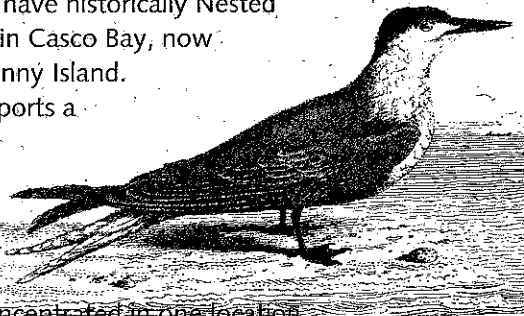


The population of the lower Casco Bay watershed increased by 51,000 people (almost 24%) between 1970 and 1990, bringing the total to almost 270,000. Although growth has slowed in recent years, still the area is projected to have 290,000 people by the year 2000. From 1970 to 1990 the number of housing units in the Casco Bay watershed increased by almost half — twice the rate of population.

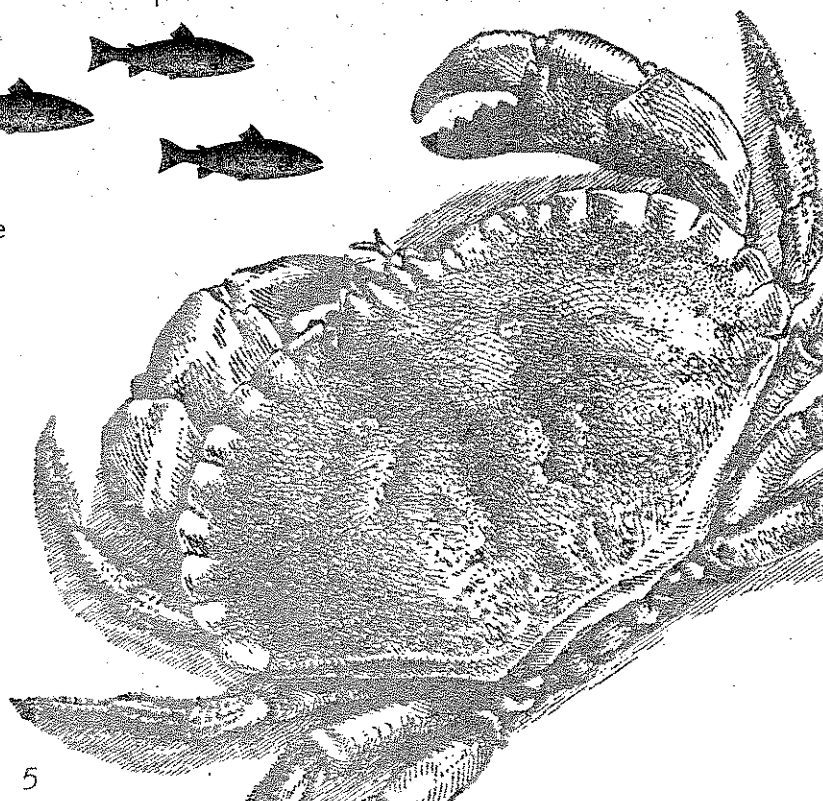
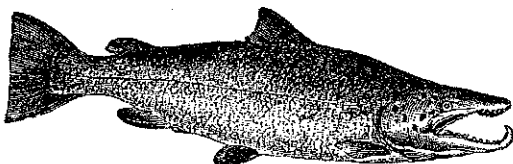
All this has had its effect on Casco Bay habitats: there has been a loss of wetlands, loss of habitats and encroachment near habitats. Wetlands are the only habitat type to be carefully studied for changes over time; however, the kinds of problems affecting wetlands are being faced by all the priority habitats — islands, rivers and streams, and the Bay itself.

The loss of habitat eventually leads to the decline of species populations. Examples of species in Casco Bay that have suffered because of changes to their habitats and other causes include:

- Terns, which have historically Nested several islands in Casco Bay, now only nest on Jenny Island. This island supports a productive population, but is vulnerable because all nests are concentrated in one location.



- A sediment sample in the Fore River found only two animals per square foot, compared to an average of 874 animals found in other parts of the Bay.
- Rainbow smelt used to spawn in the Presumpscot River, but dams now block the use of the river.
- Alewife, an anadromous fish that uses freshwater rivers and streams for spawning and is an important food source for other fish and mammals, has declined drastically in numbers.
- Quahogs and American oysters, found in Back Cove and the Fore River by A.E. Verrill in 1873, are gone due in part to high levels of contamination.
- Atlantic salmon has declined due to overfishing and habitat destruction.



Although a range of federal and state regulations exist to address habitat and species protection, more effort is needed. The population and housing trends point to the need for ensuring that the habitats of Casco Bay and the species that use them are considered as development and other activities occur. Care and consideration on our part can ensure we act in ways compatible with the natural resources we value.

The Casco Bay Estuary Project is developing recommendations to better protect habitat in Casco Bay. The final recommendations will be part of the Casco Bay Plan. Here is a sample of draft recommendations:

Action: Develop a coordinated approach to non-regulatory conservation activities that focuses on working with landowners to encourage voluntary private landowner actions to protect habitats.

Action: Collect and distribute information on habitat locations, values, and uses to and from local governments, state and federal agencies, and interested groups.

Action: Provide technical assistance to local governments and local groups to protect habitats.

Action: Develop a grant program to support local government and local group habitat protection activities.

Action: Support the adoption of municipal protection measures to protect the habitat value of all natural watercourses.

Bay links

Once Again... Pumped Your Septic Tank Lately? Get Your Discount Coupon!

If you're using a septic system, there are a few important things you should know. Proper maintenance can save you a lot of money and a large-scale mess. One of the most important things you can do is have your septic system pumped out every three to five years. This simple precaution can add years to the life of your system, and save you a bundle in the long run. From an environmental perspective, you'll be doing your local water supply a world of good by pumping out your tank regularly. And if you live on the coast, you'll help keep coastal waters and clam flats clean.

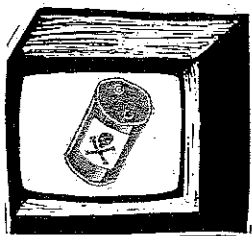
To encourage residents to maintain their septic systems, a coastal-wide education program has been launched by the Casco Bay Estuary Project, the Maine State Planning Office, the Department of Environmental Protection, and the Maine Department of Economic and Community Development. To motivate septic system owners a \$10-off coupon for septic system inspection and pumping from participating companies is available.



For your \$10-off coupon and names of participating septic system cleaning companies in your area, call the Casco Bay Estuary Project at 828-1043.

Educational Video Available

The Casco Bay Estuary Project has produced a 15-minute long video about major environmental issues facing the Bay, which is available at no charge to the public. The video provides a brief overview about toxic sediment contamination, threats to clam flats, loss of habitat, polluted stormwater runoff, and the importance of



stewardship. We thank P.D. Merrill, Charlie Poole, Joe Payne, Chris Heinig, Dana Wallace, Jeff Jordan, and George Flaherty for being part of the video. For information on getting a video call the Project at 828-1043.

Coastweek is Coming!

Don't Forget — Coastweek '95 happens September 30 - October 7. For information on how to do your share of cleanup on Maine's coast call the Maine Coastal Program at the Maine State Planning Office at 287-3261.

Safe Home Program Information Available

Free information on how to protect the safety of your home drinking water, your health and your family is now available thanks to a joint project by University of Maine Cooperative Extension and the Maine Department of Environmental Protection. The goal of the program is to provide Maine citizens with information to protect home environments and prevent ground water contamination. SAFE HOME PROGRAM fact sheets and work sheets help you understand:

- Lawn and garden care
- Household wastewater
- Household hazardous waste
- Well construction and maintenance

Residents of the Royal River watershed (which is within the Casco Bay watershed and includes all of New Gloucester and part of Yarmouth, Cumberland, Pownal, Durham, Gray, Raymond, Poland, and Auburn) can get a free water test kit if they fill out the survey form in the packet.

To get your information packet and information about the free water test contact Cooperative Extension at: University of Maine Cooperative Extension, 495 College Avenue, Orono, ME 04473 (tel. 1-800-287-0274, ask for Nancy Bowington).



Nonpoint Source Pollution Compendium Now Available

A catalogue listing dozens of publications about all aspects of nonpoint source pollution is now available. This publication provides a brief summary and ordering information for information on nonpoint source pollution and volunteer activities, construction/development, education, erosion and sediment control, farming, forestry, groundwater, and watershed planning. To order this free resource publication contact Scott Lussier at New England Interstate Water Pollution Control Commission at 255 Ballardvale Street, Wilmington, MA 01887 (tel: 508-658-0500).



Ways Boaters Can Help Protect Casco Bay

1. Observe local and federal marine toilet rules.
2. Always pump out on shore if you have a holding tank.
3. Know and use legal bottom paints.
4. Use biodegradable cleaning agents when possible.
5. Don't litter on water. Bring it home.
6. When fueling, don't top tanks, and be sure to mop up any spills.
7. Keep your motors finely tuned.
8. Control your bilge water.
9. Watch your wake and propeller wash, which contributes to shoreline erosion and can also stir up sediment and reduce light essential to submerged aquatic vegetation.
10. Do not discard fishing line overboard.



Address Correction Requested

04103

Portland, ME

312 Canco Road

Casco Bay Estuary Project



Project Update

The draft Casco Bay Plan is almost here! After four years of research on Casco Bay, working with communities in the watershed on grant projects, and a lot of hard work by Project committees and staff, the draft Casco Bay Plan will be issued this fall for public comment. You will receive information about the public comment meetings to be held in November and December, 1995.

What will be in the Plan? A lot! It will describe the status of the Bay, and variety of draft actions on:

monitoring the health of the Bay;

providing appropriate and needed assistance to communities to reduce pollution;

changing regulations to better protect the Bay;

public education; and planning and assessment.

In the winter of 1996 the final Casco Bay Plan will be submitted to Governor King and the U.S. Environmental Protection Agency for approval. Implementation of the approved Plan will begin in the latter part of 1996.

Currents is produced quarterly by the Casco Bay Estuary Project and is funded by the U.S. Environmental Agency (E.P.A.) and the State of Maine.

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Special Thanks to Randall Landry for Design & Layout