



Coastlines

2008

Coastlines

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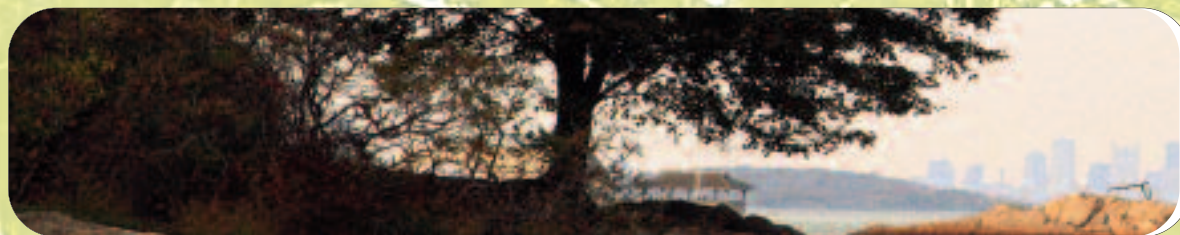


Photo: Christopher Klein

THE

Blue green

ISSUE

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“It is a curious situation that the sea, from which life first arose, should now be threatened by the activities of one form of that life.”

-RACHEL CARSON 1907-1964
[BIOLOGIST, ECOLOGIST, WRITER]

Photo: Christopher Klein



The Blue-Green Connection

Boston Light, Little Brewster Island:
The quintessential New England lighthouse—a timeless symbol of the connection between people, land, and sea.

When I was visiting my brother and sister-in-law in San Francisco a couple of years ago, they told me to only flush the toilet if it really needed to be flushed. *Really needed to be flushed?* What? I am afraid that I am like the neurotic lawyer, John Cage

on *Ally McBeal*, who flushed a toilet that had nothing in it before using it, explaining, “I like a clean bowl.” I am not and will most likely never be an “if it’s yellow let it mellow” person. But I do try to make up for this in other ways. I reuse my resealable snack bags. I keep a glass, a fork, and spoon at work so I don’t have to use disposable utensils or cups. I will go without coffee rather than buying it from any place that serves it in a styrofoam cup. And, when the weather is warm, I save water by turning off the shower for the three minutes that my conditioner takes to (allegedly) work. I recycle my paper products and I don’t put toxins down the drain. But I am very much living on the grid, and have no plans to live off it. Ever.

Climate change, global warming, and man-made environmental problems make headlines on a regular basis and have been the subject of debate in political and personal arenas for years. Regardless of where you stand on these issues, it is clear that life on land (and in the waters) as we have known it is changing. To see a connection between what we do on land impacting the world’s rivers, streams, and oceans, look no further than our bathrooms. Pharmaceutical and Personal Care Products as Pollutants (PPCPs)—i.e., prescription and over-the-counter drugs and products like shampoo and deodorant—end up in the nation’s waterbodies. Researchers believe that the growing phenomenon of gender mutations in some fish species, as well as increased fertility problems in humans, are a direct result of these PPCPs.

We are devoting this edition of *Coastlines* to exploring the blue-green connection. With more than six million people living in Massachusetts alone, never mind the rest of the globe, how can the actions of any one person really make a difference? Well, think about this: if everyone in the Bay State made an effort—even if it’s just with small things like switching to non-toxic cleaning products and using a travel mug for coffee and tea—all the combined efforts could make a difference. Less landfill space, fewer fish kills, cleaner beaches, healthier homes—with a bit of effort, all of these things are attainable. (See *30 Easy, Every Day Tips for a Greener, Bluer World* on page 38 and *Real People Redefining Reduce, Reuse, Recycle* on page 54 for some ideas to add to your routine, or get started with one.) In the words of musician and eco-activist Sting (aka Gordon Sumner), “If you really want to define ‘civilization,’ it should be a culture that doesn’t destroy its own environment.” I’m sure the fish would agree.

Arden Miller
Editor, *Coastlines*





Letter from the Director

How does one reflect on his or her own inner environmentalist?

Everyone has one whether it is an avid environmentalist or an accidental environmentalist.

Reflecting on one's inner environmentalist is a very personal thing. Deep down, everyone knows how much they value the natural environment and most would admit that they care about the health of their surroundings for their own benefit or that of future generations. But how that shows really comes down to how important they view the environment relative to other issues that may have a higher priority in their lives.

A parent with an asthmatic child who lives in an urban environment may care not for the intrinsic value to a healthy environment but rather because the poor air quality makes the child sick. An outdoorsman who enjoys the hunt may not understand the intrinsic value but rather the immediate concern that there is recreation to be had from bagging the biggest buck or the craftiest bear. A market-economy tycoon may not find it particularly important whether his holdings include environmentally forward-thinking companies but rather that everything that has a tangible value may be traded.

But, why do I care? I care because there is something so magical about seeing my children's eyes light up at the inhabitants of the local tidepools or watching them find the elusive sand dollars that were so plentiful in my own youth. There is something so heart-warming in witnessing my son and daughter understand why we choose to use natural, nature-loving landscapes over traditional driveway pavement (more mud tracked into the house, but less stormwater running off our property). There is something so fascinating in watching my children discover the unexpected—from a wayward turtle in our own backyard, to a nesting plover in the dunes.

That's why I care. And personally, I like being a whale-hugging, dune-appreciating, piping plover-watching environmentalist. But I like to also think I am a realist. Not everything in the "movement" is cute and fuzzy. To be successful, we need to focus less on simply protecting an environmental "thing" and more on changing our views and vision by facilitating cooperation. We should focus more on developing economic carrots rather than regulatory sticks—and most importantly, we need to make it easier for all of us to do the small things that will collectively make a big difference (see www.carbonrally.org to get started!).

And your inner environmentalist may have completely different reasons for caring about the future of the coast and the planet. Regardless of your personal perspective, think about this: currently more than 50 percent of the U.S. population lives within 50 miles of the coastline. Any positive changes we can make—or convince our non-eco-freak friends to make—will have cumulative, lasting benefits to our coasts and oceans, and our world. We will have cleaner waters for swimming and fishing, less storm-induced flooding, and more diversity in our tidepools, not to mention cleaner air and greener communities. I often wonder if we give the right message to the younger generation. Do we lead a disposable life? Isn't it really easy and relatively inexpensive to make small changes in our lives that together have a positive impact? What are these changes and how do we get started? How do we get involved? How do we bring others along for the ride? To be successful, we need to work together. This edition of *Coastlines* offers a range of suggestions of things you can do, or teach others to do, to work towards a cleaner, greener future and a vibrant economy...

Leslie-Ann McGee

DIRECTOR, MASSACHUSETTS OFFICE OF COASTAL ZONE MANAGEMENT

Global Climate Change— Leading by Example in Massachusetts

By Ian Bowles, Secretary of the Executive Office of Energy and Environmental Affairs

Wind turbines. Solar power. Fuel efficiency. Biofuels.

These are some of the things we've been talking about in the offices and hallways of the Executive Office of Energy and Environmental Affairs (EEA) since Governor Patrick merged the Commonwealth's environment and energy agencies into one Secretariat in the spring of 2007. The backdrop to these conversations—and to the bold steps we have taken over the past year—is global climate change. What some once dismissed as an unproven theory is now, for most policymakers and citizens, accepted not only as mainstream science, but as an environmental imperative that requires strong action. With headlines increasingly reporting the real-life consequences of greenhouse gas emissions, more and more people are realizing that this is not something we can ignore.

Nowhere is that imperative more evident than along the coast. Rising sea levels and changing weather patterns will accelerate the erosion of our historic shorelines where Massachusetts residents have lived, worked, and played for generations, and threaten their very existence in the future. The coastal resources that make Massachusetts unique are on the front lines of climate change.

With so much at stake, we aren't wasting any time. I am pleased to report that Massachusetts has emerged as a trailblazer in the clean energy arena nationally. We are meeting these challenges head-on with cost-effective solutions that already have us firmly on the path toward a clean energy future.

Governor Patrick set the pace in January 2007, when, as one of his first official acts in office, he brought Massachusetts into the Regional Greenhouse Gas Initiative (RGGI)—a multi-state effort to cut power plant carbon dioxide emissions. Although Massachusetts was the last state to join RGGI, we were the first to release regulations for instituting a market-based, cap-and-trade system that will reduce harmful emissions associated with global climate change. The cap and trade system sets regional limits for power plant greenhouse gas emissions, with each plant required to obtain allowances, or permits, for the amount of greenhouse gas it produces in the course of generating electricity. Massachusetts will sell these allowances to power generators by auction,

and plants that produce a lot of emissions will have to buy more allowances—either at auction or from other lower-emitting plants that find themselves with more allowances than they need. In Massachusetts, proceeds from allowance auctions will be used to fund energy-efficiency and demand-management efforts, reducing energy use and saving money for business and residential consumers.

On the heels of joining the regional climate change compact, in the spring of 2007 the Governor issued an Executive Order creating a “Leading by Example” program that sets ambitious energy-saving standards for state facilities and mandates greater use of renewable energy throughout state government, cutting agencies' energy costs while setting an example for local governments and the private sector. Under the Executive Order, state agencies must reduce overall energy consumption by 20 percent from 2004 levels by 2012 and 35 percent by 2020. Agencies must also reduce greenhouse gas emissions 25 percent by 2012, 40 percent by 2020, and 80 percent by 2050.

To achieve these goals, we are requiring state agencies to increase the percentage of electricity they obtain from renewable sources to 15 percent by 2012 and 30 percent by 2030. For this past winter (2007-08), certain facilities were required to use biofuels for three percent of their heating oil needs. That benchmark rises to 10 percent in 2012. Other Leading by Example requirements prohibit most purchases of energy-wasting

With rising sea levels and increasing frequency and intensity of storms posing an ever increasing threat, Boston's harborfront is on the front lines of global climate change.

“With so much at stake, we aren’t wasting any time... Massachusetts has emerged as a trailblazer in the clean energy arena nationally...with cost-effective solutions that already have us firmly on the path toward a clean energy future.”

incandescent light bulbs, calling on agencies to use energy-saving products, such as high-efficiency lighting and programmable thermostats, and require that new state building construction and major renovations not only meet, but exceed Leadership in Energy and Environmental Design (LEED) building standards.

Conserving water is another important Leading by Example goal. Our agencies are charged with reducing potable water (i.e., water that meets drinking water standards) use 10 percent by 2012 and 15 percent by 2020.

We recently celebrated the accomplishments of this program by presenting Leading by Example Awards to six exemplary agencies, institutions, and municipalities: the Massachusetts Water Resources Authority, the Department of Correction, Cape Cod Community and Bridgewater State Colleges, the city of Boston, and the town of Andover. EEA also began an innovative pilot project to introduce plug-in hybrid technology to the state vehicle fleet, retrofitting at least 10 state-owned hybrids with plug-in technology. Using power from the grid stored on a rechargeable battery to reduce gasoline use, these plug-in hybrids will achieve more than 100 miles per gallon. By embracing it within the state fleet, we hope to jump-start commercialization of this cutting-edge technology in the Bay State.

In addition to Leading by Example, Governor Patrick worked with the Legislature to make Massachusetts a national leader in clean energy by passing important new laws during the 2007-08 session. These include:

- **Green Communities Act** – which promotes a dramatic expansion in energy efficiency, supports the development of renewable energy resources, creates a new greener state building code, removes barriers to clean energy installations, stimulates technology innovation, and helps consumers reduce their electric bills.
- **Clean Energy Biofuels Act** – which makes Massachusetts the first state in the nation to exempt advanced, non-food-based biofuels from state gasoline taxes, creating economic incentives for companies to bring fuels to market that reduce greenhouse

gas emissions. This law also commits Massachusetts to developing a Low Carbon Fuel Standard—which would allow electric cars, plug-in hybrids, and other technologies to compete with various forms of biofuel to reduce greenhouse gas emissions from vehicles—and working with neighboring states to implement this fuel standard on a regional basis.

- **Green Jobs Act** – which establishes a Clean Energy Technology Center to support workforce development, university partnerships, research and development, and entrepreneurship in the growing clean energy industry.
- **Global Warming Solutions Act** – which requires Massachusetts to cut greenhouse gas emissions across the economy by up to a nation-leading 25 percent by 2020, 80 percent by 2050. In addition to cleaning up the environment, the law will stimulate the development of clean energy technologies and jobs. Massachusetts also became the first state in the nation to require alternatives analysis to reduce greenhouse gas emissions in the state environmental review process (MEPA).

Finally, Governor Patrick signed into law legislation that recognizes the connection between our ocean waters and clean energy goals. The Oceans Act of 2008 requires Massachusetts to develop a first-in-the-nation comprehensive plan to manage development in its state waters, balancing natural resource preservation with traditional and new uses, including renewable energy. This new law gives Massachusetts an unprecedented opportunity to manage its offshore assets to maximum effect, preserving its irreplaceable resources while making optimal use of those that are renewable.

In the months ahead, I look forward to working with EEA staff and all our agencies to implement this new legislation and the many other initiatives we have embarked upon to put Massachusetts firmly on the path to a clean energy future—a path that ensures our place as a national leader in energy innovation, while protecting the coastal habitats, clean air and water, and other natural resources that make Massachusetts the truly outstanding place that it is.

THINK GREEN-BLUE ACT ON LAND, AIR, AND SEA

BY ANNE DONOVAN, CZM

Going green has been “hot” since global climate change was catapulted into the media spotlight by Al Gore’s Oscar-winning film, *An Inconvenient Truth* (Best Documentary, 2006). From driving less to installing low-flow toilets to buying dog toys made of recycled soda bottles—there are seemingly endless suggestions on how to be kinder to the Earth. Although change is hard and the options can feel overwhelming—it’s good to know that small, individual efforts can collectively make a big difference—especially for our coasts and oceans. And since it’s all connected (a basic tenet of environmentalism, and of life), many of the actions that can make the biggest difference for the coast actually focus on the land or the air.

Three major challenges facing Massachusetts Office of Coastal Zone Management (CZM)—rising sea levels from greenhouse gas emissions, reduced water quality from urban and suburban land use, and habitat loss from ever-increasing human encroachment—illustrate these green-blue connections.

THE LAND-SEA CONNECTION: RUNOFF

RED FLAGS FOR SWIMMING AND SHELLFISHING

Clam rake in one hand and swimsuit-clad child in the other—a day splashing in the surf while digging up dinner is certainly a treat. In this idyllic summer scene, it’s unlikely that your car’s leaking cooling system is on your mind, let alone your septic system. But maybe they should be . . .

Unlike Las Vegas, what happens on land doesn’t stay on land. Rainfall and snow melt flowing over and through the ground pick up pesticides, animal waste, oil and grease, trash, and other pollutants, carrying contaminants to the nearest water

body. Such runoff is known as nonpoint source (NPS) pollution, and it often carries contamination to coastal waters. This problem is exacerbated with increased development—the greater the impervious surface coverage (i.e., the area with surfaces like concrete, asphalt, and rooftops that prevent water from seeping into the ground)—the greater the quantity and contamination levels of the runoff.

NPS pollution is the number one coastal water quality problem in the United States, and the impacts are felt by all of us. Bacteria from septic systems and pet wastes can close shellfish beds for harvesting and beaches for swimming. Excess fertilizers from lawns trigger algae growth, leading to reduced water clarity and oxygen levels, and ultimately to fish kills and odor problems as the algae decays. Oil and antifreeze from roads are toxic to marine life, directly killing sensitive species and interrupting the food chain. Cigarette butts carried to the sea by storm drains litter the shoreline.

THREE THINGS CZM IS DOING ON LAND FOR THE SEA

1. **COASTAL POLLUTION GRANTS** - Between 1996 and 2007, CZM has awarded more than \$5.5 million for NPS pollution control projects. CZM's Coastal Pollution Remediation (CPR) Grant Program supports projects that assess and address runoff pollution from paved surfaces, or that design and construct boat waste pumpout facilities. (See www.mass.gov/czm/cprgp.htm.) CZM's Coastal Nonpoint Source Grant Program supports efforts to assess NPS pollution impacts, develop local planning tools, educate the public on pollution control strategies, design "smart growth" techniques to reduce pollution, and/or manage septic system or marina pollution. (See www.mass.gov/czm/coastalnpsgrants.htm.) CZM also provides assistance to coastal municipalities on stormwater management planning, water quality monitoring, and other NPS management issues.
2. **COASTAL SMART GROWTH PROGRAM** - Recognizing the connection between land and sea, CZM launched the Coastal Smart Growth Program in 2004. Through the nationally award-winning Green Neighborhoods Alliance, CZM's Smart Growth Program works with a mix of municipalities, developers, realtors, engineers, conservation organizations, and regional and state agencies to promote Open Space Residential Design—a local land-use strategy that uses flexible incentives for developers to preserve open space, promote mixed housing types and land uses, and ensure minimal disturbance to the natural terrain. In addition, CZM promotes Transfer of Development Rights, a regulatory approach that harnesses private market forces to "transfer" development from areas a community wants to protect to areas where growth is encouraged. The Coastal Smart Growth Program also focuses on educating communities and builders on the benefits of Low Impact Development or LID (an integrated approach to site design, stormwater runoff management, and water conservation that protects the natural terrain and water flow and infiltration; see www.mass.gov/czm/smartgrowth).

3. **CLEAN MARINAS** - Marinas, yacht clubs, and boatyards provide critical services to the boating public—maintaining, mooring, fueling, storing, and launching vessels of all kinds. Perched on the edge of the sea, however, marinas can easily contaminate coastal water quality. CZM provides technical assistance to the more than 300 marinas, yacht clubs, and boat yards in the Commonwealth to help them comply with water quality regulations. Specifically, CZM produced and regularly updates the *Massachusetts Clean Marina Guide*, which provides information on cost-effective strategies and practices aimed at reducing marina and boating impacts on the coastal environment. (See www.mass.gov/czm/marinas/guide/macleanmarinaguide.htm.)

THREE THINGS YOU CAN DO ON LAND FOR THE SEA

1. **GO "GREEN" WITH YOUR LAWN** - A super-green, lush carpet of grass that's the envy of your suburban neighbors can cause big water quality problems. Because fertilizers and pesticides applied in excess are washed to rivers, streams, and the sea, limiting their use can make a big difference. Even better, convert manicured lawn to natural meadow, beds of native perennials and shrubs, or forest. You'll save time and money with lower lawn maintenance, and provide nesting, resting, and feeding areas for wildlife—from songbirds to toads to cottontail rabbits.
2. **SCOOP THE POOP** - It's a dirty job, but if you don't do it, you're directly contributing to local water quality problems. Pet waste contains parasites that can cause human (and pet) health problems, and it contributes to beach and shellfish bed closures by elevating bacteria levels. So get a bag and a shovel, and dispose of your pet's droppings properly (ideally by flushing them down the toilet, but at least by throwing them in the trash).
3. **DON'T BE A DRIP** - Oil, gasoline, and antifreeze from cars, trucks, lawnmowers, and boats are highly toxic to marine life. If you notice a leak, fix it immediately to keep these toxins from washing to the sea.

THE AIR-SEA CONNECTION: AIR POLLUTION

SHRINKING SHORES AND MORE

The feel of the wet sand as the waves gently lap your toes is undeniably one of the joys of summer in the Bay State. As you appreciate this shining seascape, are you thinking about how you left your air conditioner running at home or that your family car needs a tune up? Here's why you should . . .

What goes up must come down—and pollutants released to the air often settle on the sea. Called atmospheric deposition, this process transfers nitrogen, sulfur, mercury, pesticides, and other toxics from the air to the ocean. The sources of these air pollutants include burning fossil fuels for power, vehicle emissions, industrial releases of chemicals, and trash incineration.

The air pollution/global warming link also has serious consequences for the coast. Burning of fossil fuels, such as oil and coal, along with widespread forest cutting have led to significant increases of heat-trapping "greenhouse gases" in the atmosphere. Like the glass panels of a greenhouse, these gases insulate the earth and prevent heat from escaping to space. Escalating levels of these greenhouse gasses are increasing global temperatures, melting ice caps and glaciers and warming ocean waters (causing them to expand). The results—rising sea levels and increased frequency and severity of storms—exacerbate shoreline erosion and increase coastal storm damage. (See *CZScience: Sea Level Rise and Shrinking Salt Marsh* on page 72 for more.)

THREE THINGS CZM IS DOING FOR SHRINKING SHORELINES

- I. **STORMSMART COASTS** - CZM launched this nationally award-winning program in 2006 with the hard work of a Coastal Management Fellow funded by the National Oceanic and Atmospheric Association's Coastal Services Center. StormSmart Coasts is based on the No Adverse Impact (NAI) approach, which requires that public and private projects are designed and completed in such a way that they do not: 1) pose a threat to public safety, 2) increase flood or storm damage to public or



CZM's Robin Lacey Named Educator of the Year by Mass Marine Trades

By Anne Donovan, CZM



In recognition of his dedicated work to help marina owners and operators comply with existing and emerging water quality regulations, CZM's Robin Lacey was presented with the Educator of the Year Award by the Massachusetts Marine Trades Association (MMTA) on January 29, 2008. "For almost 10 years, Robin has patiently and proactively educated Massachusetts marine businesses on their responsibilities as stewards of the coastal environment. If one of our member firms is overwhelmed with the complexity of a specific environmental compliance regulation, they can count on Robin to swiftly answer their questions with clear and concise information," said MMTA's Greg Glavin. "In doing so, he has shepherded an entire industry in the direction of environmental compliance solutions that are effective, attainable, and affordable," he continued.

"Robin is firmly committed to helping make all of this easier for the marina operators, who are more than willing to do all they can to keep the water that their businesses depend on as clean as possible," said CZM Director Leslie-Ann McGee. "We are very proud that he was recognized by MMTA for his efforts, and look forward to our continued partnership with them."

For more on clean boating and marina operations, see CZM's Marinas in Massachusetts web page at www.mass.gov/czm/marinas, which includes links to the *Massachusetts Clean Marina Guide*.



private property, and/or 3) strain municipal budgets by raising community expenditures for storm-damage protection, stormwater management, emergency services, and disaster recovery. To help your community prepare for the potentially devastating consequences of sea-level rise, see the StormSmart Coasts website at www.mass.gov/czm/stormsmart.

2. **SMART ENERGY** - Through the Coastal Smart Growth program, CZM works to promote strategies that improve energy efficiency and support energy conservation. Some specific techniques include:

- *Traditional Neighborhood Design and Transfer of Development Rights, which promote building homes near stores and other businesses, reducing car trips and greenhouse gas emissions.*
- *Green Buildings, the utmost in energy efficiency, reducing dependence on fossil fuels.*
- *LID building options, like green roofs, where vegetation is planted on a rooftop (increasing insulation of the building and decreasing fuel consumption for heating and cooling). These plants also absorb carbon dioxide and release oxygen, improving air quality.*

See the Executive Office of Energy and Environmental Affairs (EEA) Smart Growth Toolkit at www.mass.gov/envir/smart_growth_toolkit/pages/mod-energy.html for more.

3. **PROJECT REVIEW** - CZM has the authority to review federal activities in the Massachusetts coastal zone to ensure that they are consistent with our enforceable policies. In addition, CZM reviews and comments on proposed projects that may have coastal and ocean impacts in Massachusetts through state permitting and licensing processes, including Massachusetts Environmental Policy Act (MEPA) review. Through project review, CZM balances development with environmental protection. CZM is responsible for reviewing renewable energy projects in the coastal zone, including the proposed Nantucket Sound and

Buzzards Bay wind energy projects and the tidal current power projects in Nantucket Sound and Vineyard Sound.

THREE THINGS YOU CAN DO TO CLEAN THE AIR FOR THE SEA

1. **SWITCH BULBS** - Replacing your five most-used conventional light bulbs with “Energy Star” bulbs means big savings. According to the U.S. Environmental Protection Agency (EPA), if every household in America made this switch, the reduction in greenhouse gas emissions would be substantial—as much as removing 10 million cars from the road.
2. **UNPLUG** - A staggering but true fact from the U.S. Department of Energy—75 percent of the electricity used to power electronics is drawn when the equipment is turned off! To help your wallet while lowering greenhouse gas emissions, unplug your equipment and/or turn off your power strip!
3. **SLOW DOWN** - The faster you go the greater the wind resistance on your car—reducing your gas mileage. Moderating your driving patterns by reducing the rate of acceleration (and the need for aggressive breaking) makes an even a bigger difference. According to edmunds.com, driving the speed limit can reduce gas usage by an average of 12 percent on a long trip, and letting up on the lead foot saves an average of 31 percent.

THE DEVELOPMENT-HABITAT CONNECTION:

SUBURBAN SPRAWL ❖ WILDLIFE'S FALL

The Adirondack chair cradles your back as you put your feet up and survey your expanse of lawn. All is quiet. Too quiet? Here's why . . .

Centuries of expanding human population in Massachusetts have scarred the natural landscape, with thousands of acres of coastal wildlife habitat transformed to cityscape, ports, homes, cottages, farms, and other developed areas. When Europeans first began to populate these shores in the middle of the 16th century, tens of thousands of Native

Americans inhabited what would ultimately become Massachusetts. By 1930, the state's population grew to 4,249,614—and by 2000, it rose to 6,349,097. Between 2000 and 2005, the Bay State's population increased an additional 1.71 percent, while the number of households increased by 5.39 percent (indicating that housing levels are outpacing population, adding to the development burden). In coastal counties, population growth and household growth far exceed statewide averages, with the exception of population growth in Suffolk County (which represents the population shift out of city centers to the suburbs and beyond).

The impacts of this growth and development are destroyed, degraded, and disjointed coastal habitats—such as salt marsh, dunes, eelgrass beds, mud flats, and other areas vital to coastal and ocean species. The consequences for wildlife populations can be substantial. Salt marsh, for example, is one of the most productive ecosystems in the world. The marsh grass and other plant material, microscopic organisms, algae, and decaying matter provide critical feeding and breeding opportunities for migratory birds, fish, crabs, and shrimp, including commercially important species, such as soft-shell clams, striped bass, flounder, menhaden, tomcod, and tautog. Eelgrass beds, which grow in clear waters near the shore, are another critical coastal habitat—providing underwater refuge and breeding areas for fish, crabs, clams, and other invertebrates, including the economically valuable bay scallop and American lobster. Both salt marsh and eelgrass beds play a vital role in maintaining coastal water quality by filtering pollutants and protecting shorelines from storm damage.

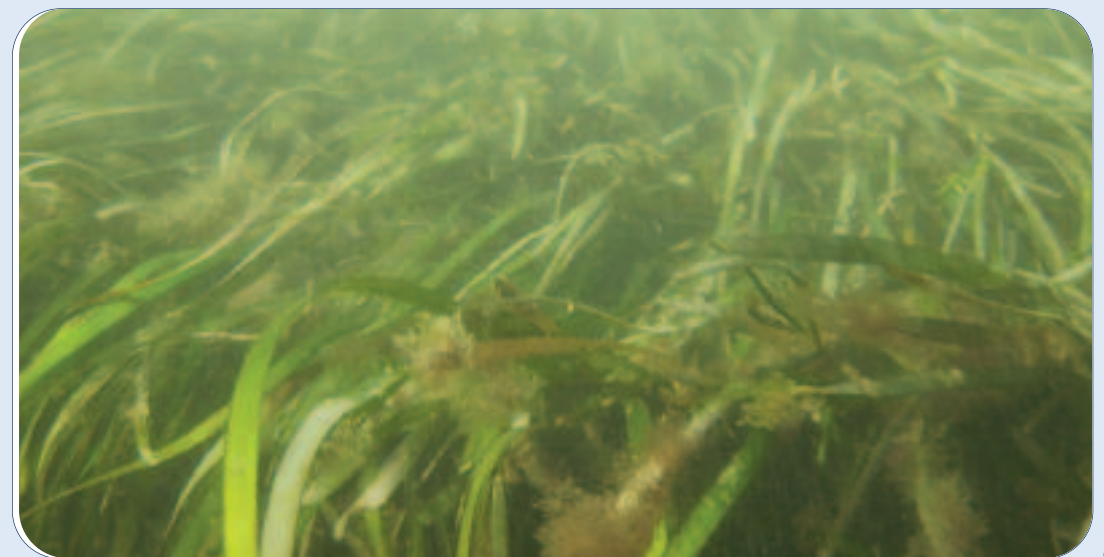
THREE THINGS CZM IS DOING FOR COASTAL HABITATS

1. **WETLANDS RESTORATION PROGRAM** - Since the late 1700s, Massachusetts has lost approximately one-third of its wetlands. Many of our remaining wetlands have been degraded, reducing their capacity to provide wildlife habitat, flood protection, water quality improvements, and other vital environmental services. To address these problems, CZM's Wetlands Restoration Program helps people voluntarily restore

degraded and former coastal wetlands. The program identifies projects, organizes teams, provides technical assistance, secures project funding, and helps manage and coordinate restoration activities from start to finish. See www.mass.gov/czm/wrp for details.

2. **EELGRASS RESTORATION** - CZM actively supports efforts to protect and restore these valuable habitats. For example, CZM was part of an innovative effort that began in 2006 to salvage plants from an eelgrass bed that had to be cleared to make way for a new combined sewer outfall pipe at Pavilion Beach in Gloucester. This project included hundreds of volunteers and partners from CZM, the state's Division of Marine Fisheries, the Massachusetts Institute of Technology's Sea Grant program, EPA, and the city of Gloucester. The project was a tremendous success—especially in increasing awareness about the value of eelgrass to our coastal waters. See www.mass.gov/czm/coastlines/2007/ebbflow/eelgrass.htm for details. CZM and our partners are continuing restoration efforts by analyzing appropriate sites in the Annisquam River in Gloucester to see where eelgrass can be successfully transplanted. Read more at www.mass.gov/czm/docs/pdf/eelgrass.pdf.

An underwater view of eelgrass habitat—this essential part of the coastal ecosystem is a focus of CZM's protection efforts.



Bay State Banning Boat Sewage!

By Anne Donovan, CZM

The solution to pollution is prevention, not dilution. This is the tried-and-true theory behind No Discharge Areas, or NDAs—designated bodies of water where the discharge of all boat sewage, whether treated or not, is prohibited. And Governor Deval Patrick has set the goal of designating all coastal waters of Massachusetts as no discharge.

Boat sewage can contain bacteria and viruses, nutrients, and chemicals that can be harmful to water quality and public health. Even small quantities of microorganisms from boat sewage can introduce diseases like hepatitis to people in contact with the water, and can contaminate shellfish and make them unsuitable for human consumption. Boat sewage, even when treated by on-board sanitation devices, also contains high quantities of nitrogen. Nitrogen fuels the growth of algae—creating water quality and clarity problems in sensitive coastal waters. Finally, the chemicals used in some boat heads are toxic to marine life.

A statewide NDA directly addresses these human health and environmental concerns. To help make this coast-wide boat sewage ban a reality, CZM is working with coastal communities to increase boat pumpout facilities so that proper sewage disposal is more convenient for the boating public. In addition, CZM is coordinating efforts among municipal officials, harbor masters, and nonprofit organizations as they develop applications to the U.S. Environmental Protection Agency for no discharge status of their coastal waters.

See www.mass.gov/czm/nda for details on NDAs, and for more on where you can find a boat pumpout facility, see www.mass.gov/czm/nda/pumpouts.

3. **AQUATIC INVASIVE SPECIES** - Known by many names—nuisance species, exotic species, non-indigenous species, or pests—these plants and animals, including purple loosestrife and the European green crab, have forever changed the ecology and economy of Massachusetts. To address these threats, a variety of state and federal agencies and nonprofit organizations have formed the Massachusetts Aquatic Invasive Species Working Group. With leadership from CZM, this group works to prevent

new introductions, monitor for new invasions, and quickly respond to invasive species that show up in Massachusetts waters before they spread out of control. For more, see www.mass.gov/czm/invasives.

THREE THINGS YOU CAN DO TO TREAD LIGHTLY ON COASTAL HABITATS

1. **GO NATIVE** - Whether landscaping your sandy, shore-side property or inland lot, use native species whenever possible. These hardy plants are adapted to the sometimes-extreme growing conditions of New England, and often require much less watering and fertilizer than exotic alternatives. Also, many of these species provide food and cover for local wildlife, providing sanctuary from suburban sprawl. For more, see www.greenscapes.org and www.massnativeplants.org.
2. **SLOW AND STEADY** - Bay State beaches are crowded places, providing very little real estate for shorebirds and other animals to call home. When walking through these areas, stay on the paths and off sensitive dunes and vegetation. And when driving, slow down and watch for animals, particularly the threatened Piping Plover, whose well-camouflaged chicks like to hunker down and hide in tire tracks on the beach.
3. **DON'T LET THOSE CREATURES GO** - Although exotic animals can be great pets and ornamental plants can make beautiful decorations, many of these species are invasive. In fact, some of the characteristics that make these species desirable, like hardiness and rapid growth, are the same characteristics that allow them to out-compete native plants and animals in the wild. So never release aquarium pets or bait into the water. Also, use native plants and animals in water gardens, since predators like the Great Blue Heron often carry water-garden residents to neighboring habitats. For more on what you can do, see www.mass.gov/czm/invasives/prevent.

A Greener Cleaner

By Arden Miller, CZM

From the days of indoor plumbing through the Industrial Revolution, cleaning products consisted of simple solutions found around most homes. Baking soda, distilled white vinegar, lemon juice, olive oil, and salt used alone, or in some combination, kept interiors clean and made furniture and hard wood floors gleam. It wasn't until after World War II that chemicals—initially developed for warfare purposes—found their way onto grocers' shelves and into people's homes...



AS A POPULAR ADVERTISING SLOGAN PROCLAIMED, "BETTER LIVING THROUGH CHEMISTRY!" People bought it, and bought the products that promised to make whites whiter than white, floors cleaner than clean, and everything else sparkling and sanitized within an inch of its life.

And if today's cleaning aisles are any indication, we're still buying it. There are literally *thousands* of synthetic chemical compounds within cleaning products packaged and marketed to grab your attention. And, according to a 2003 U.S. Geological Survey Study, low levels of compounds from 95 different types of chemicals were found in rivers downstream from urban areas. Most of us have been exposed at one time or another to these compounds, and it is believed that there is a correlation between chemical exposure and medical issues. Many compounds can cause people to develop respiratory problems, and since 1980, there has been a 160 percent increase in asthma among children under the age of 4. Breast cancer rates in the United States are 30 percent higher than in less industrialized countries. Ironic, especially considering that U.S. health care is considered by many to be the best overall health care in the world. And, while it would be virtually impossible to pin this all on better living through chemistry, it does make one wonder if these products that are cleaning our homes are hurting our bodies.

And here are a few more things to ponder... Did you know that dish washing liquid is the #1 cause of children being poisoned? Most are petroleum-based and those pretty colors and scents are not found in nature. Sweet-seeking children have been known to confuse mothballs with candy, resulting in seizures and calls to the poison hotline. Lye and sodium hydroxide, two ingredients commonly found in both oven and drain cleaners, can cause severe corrosion to skin and mucous membranes, and can even be fatal if swallowed. Scouring cleaners designed to quickly clean bathroom and kitchen surfaces often contain crystalline silica, a known carcinogen. And toilet cleaners? Most contain an irritating blend of chlorine and hydrochloric acid; just breathing the fumes is harmful, never mind what happens to the poor fish who have to swim in these things.

But the good news is that if you don't require your whites whiter than white—if a regular white will do—you can get your home and laundry as clean as clean using products that don't harm the environment and don't alter your body's respiratory or endocrine systems. So, instead of hitting the cleaning product aisle in the super market, go to baking goods/condiments...

© Formulas ©

Problem

DULL WOOD FLOORS, SCRATCHED TABLE TOPS AND FURNITURE

STAINLESS STEEL LOST ITS SHINE

DIRTY PORCELAIN

CHROME NEEDS POLISHING

CLOGGED DRAIN

MOLD AND MILDEW ON SURFACES

MOLD AND MILDEW STAINS ON LAUNDRY

RUST STAINS ON SURFACES

STREAKED, DIRTY WINDOWS

DULL BRASS AND COPPER

COFFEE PERCOLATOR DULL, DIRTY

HARD WATER DEPOSITS

PET ODORS IN CARPETS AND UPHOLSTERY

DIRTY CERAMIC TILES

TOILET BOWL RINGS

GRASS STAINS

Solution

1 cup olive oil + juice of one lemon (use soft cloth, rub and polish—keep in a sealed glass jar for re-use, should last 1 month).

Full strength distilled white vinegar on a sponge.

Baking soda on a damp sponge.

1 part club soda and 1 part distilled white vinegar applied w/a sponge.

Boil one cup of water, add 1 cup baking soda and 1 cup vinegar to boiling water (mixture will fizz), and pour down clogged drain. Flush with water. Repeat if necessary until water runs freely.

In a spray bottle, mix 1 drop of tea tree oil with 1 cup of water (or use *Ye Olde Thyme Disinfectant*, recipe right).

Scrub with a paste made with 1 part salt and 1 part lemon juice, let set in sun, wash as usual.

Make paste using 2 parts baking soda, 1 part water, scrub with toothbrush. Rinse well with water.

Mix 1 part vinegar and 1 part water—use as you would glass cleaner.

Mix 1 part lemon juice and 1 part baking soda; make paste and scrub.

Put 4-5 tablespoons of salt where you would ordinarily put coffee, add water, let mixture “brew” as it would if coffee were in it.

Cut a lemon in half and sprinkle baking soda on top; rub over deposits until they disappear.

Mix approximately (exact amounts aren't critical) 4 ounces of hydrogen peroxide, 1/4 cup baking soda, and 1 drop of detergent into 1 quart water. Use immediately (once the hydrogen peroxide and soda become inert, it's no longer effective). Spread over area with odor problem; solution should neutralize smell immediately. Discard unused portion. (You may want to do a test patch first. I would.)

Mix 1 part vinegar and 1 part water and use sponge to clean grungy areas. This solution is safe for most commercial tiles. (Do not use on marble as solution is too acidic for porous surfaces.)

Use undiluted vinegar exactly as you would use a commercial toilet bowl cleaner.

Mix organic enzymes (available at whole food stores) with one tablespoon of water in ceramic or glass bowl, spread paste on the affected area, rubbing it with a toothbrush if seriously soiled. Let sit for an hour, wash as usual. Repeat if necessary.

Thousands of synthetic chemical compounds are found in cleaning products—according to a 2003 U.S. Geological Survey Study, low levels of compounds from 95 different types of chemicals were found in rivers downstream from urban areas.

I think I'd rather have lemon than crystalline silica in my water...

No Plugs Required

Air fresheners are everywhere—you can spray them or plug them in. Some are time-released, and some provide mini-light shows. They account for millions in sales annually, but at what cost? The chemicals that mimic scents of rose and spring dew, mixed with just the littlest bit of ozone, can create a toxic environment that can cause headaches, depression, and hormonal imbalances in men and women. Forget the plugs and light shows; try one of these simple, non-toxin-producing recipes instead.

SAFE SCENTS

Vanilla, cinnamon, cloves, and mint (fresh, or dried) all safely emit scents. In a small saucepan, boil 2 cups of water with any combination of spices that you like. When the mixture has reached a boil, turn it off. Leave the pan out to scent your home as long as the scent lasts. **Vanilla extract** can also remove unwanted smells; simply place a tablespoon of vanilla in an open container next to any area that needs a smell neutralized.

SWEET SPRAY MIST

Using an eyedropper, combine the following **essential oils** (found in most health food stores, or on-line) in a small glass jar: 20 drops **sweet orange**, 10 drops **lavender**, 10 drops **eucalyptus**. Mix together well and combine 4-8 drops of this mixture with one cup of **purified water** in a spray bottle. Use spray anywhere you like, anytime. Store in a cool place, away from sunlight and it should last for 1-2 months.

YE OLDE THYME DISINFECTANT

According to Days of Yore lore, grave robbers who pilfered plague victim's remains rubbed this on themselves to protect themselves from germs. Hopefully, your household tasks aren't quite as gruesome...

2 QUARTS ORGANIC APPLE CIDER VINEGAR
**1 TABLESPOON EACH OF: dried lavender,
rosemary, sage, and mint**

Mix together in a 2-quart jar with a screw top lid, close tightly. Let sit for 4 weeks, then strain out herbs. Pour into spray bottle. Use as spray disinfectant on countertops, door knobs, telephone receiver, etc.

WHAT'S pH GOT TO DO WITH IT?

When it comes to cleaning stains and pH balances, think neutral. Acidity is measured by pH, on a scale of 1 to 14. 7 is the Switzerland of pH; anything above 7 is alkaline, anything below, acidic. When you are cleaning something, you are, in effect, neutralizing its pH. Club soda, an alkaline, will remove coffee and wine stains, which are acidic. Acidic vinegar will neutralize water scale, an alkaline stain.

Swimming, Sunning, and Talkin' Trash: All in a Day at the Beach!

By Betsy Rickards, CZM

You have just reveled in a glorious day at the beach. It's time to pack up and hit the road. You gather your belongings, pick up your trash, and deposit it in the closest receptacle. You wipe your hands clean, proud that you are standing true to your "carry in/carry out" resolution. Great job for not leaving all that debris on the beach. But, throwing away plastic water bottles, newspapers, polystyrene food containers, and plastic bags may not be the best way to protect the marine and coastal environment and all of its inhabitants (including you). Here are some reasons—and suggestions—for making those famous words "reduce, reuse, recycle" a reality at the beach and beyond.





Once in the environment, a glass bottle can take ONE million years to break down; an aluminum can, 80 to 200 years; a plastic bag, 10 to 20 years...

The First Problem: Energy and Resource Consumption

Did you know that in 2006, Americans generated about 251 million tons of trash? Yowh! In fact, the average American discards 4.5 pounds of trash a day, according to the U.S. Environmental Protection Agency (EPA). All that trash originally came from natural resources such as trees, sand, soil, water, petroleum, and metals, many of which are nonrenewable (i.e., they can be used up). When we throw these materials in the trash, they often end up in a landfill where the natural resources cannot be used again. In addition, the energy that went into extracting, transporting, processing, and manufacturing the raw materials and products are lost. We then need to consume more energy to produce and distribute new products. And as we all know—energy consumption means the burning of fossil fuels and the emission of carbon dioxide into the atmosphere, which may ring a bell as being a major contributor of the greenhouse gases that are causing global warming and sea level rise. (For more details, see *CZScience*, page 72.) Rising sea levels and storm wave activity are not great for the stability and longevity of the shoreline. Valuable coastal properties and natural resources could be lost, including that beach you spent your day enjoying. See the coastal connection?

The Second Problem: Air and Water Pollution

Though you may feel a catharsis upon purging your house of garbage by kicking it to the curb on trash day, or dumping it at the local landfill or transfer station, that trash does not just vanish into thin air (even when you burn it!). When trash goes to landfills, it can leach toxins and bacteria into the groundwater and can contaminate stormwater

that drains to coastal waterbodies (even well-designed landfills will eventually fail and leak these contaminants). Landfills also consume a great deal of space and building new landfills is not something one wants (or wants to pay for) in their backyard. On the other hand, incinerating waste substantially reduces the amount of trash that goes to landfills, but has its own potentially harmful side effects. Trash that is incinerated releases greenhouse gases and other emissions that cause air-quality problems, as well as produces other nasty by-products, like ash laden with heavy metals and toxins, which is often put in landfills—causing water quality problems. Basically, it's a no-win situation. Trash going to landfills also leads to our third problem.

The Third Problem: Marine Debris

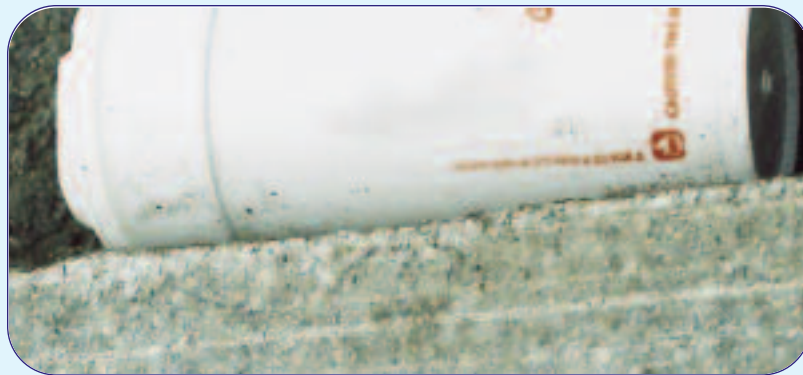
Trash doesn't always make it to the landfill. It can be mishandled, littered, blown into the water, or carried by creeks, rivers, storm drains, and sewers into the ocean. Trash that ends up in the ocean or on the shoreline becomes marine debris, a major threat to our coastal environment and marine life, as well as to human health and safety. Once in the environment, a glass bottle can take one million years to break down; an aluminum can, 80 to 200 years; a plastic bag, 10 to 20 years; a cigarette filter, one to five years; and a newspaper, six weeks. Though one million years for glass sounds like a lot of time, the real threat is the marine debris that is most abundant and floats—plastic.

According to findings from a five-year national study of trash in the ocean conducted by the National Marine Debris Monitoring Program

of the Ocean Conservancy (November 2, 2007), the most abundant debris items found nationally were straws, plastic beverage bottles, and plastic bags. The study also determined that the amount of debris items significantly increased over the five-year period, from 2001 to 2006. Regionally, total debris increased on the East Coast, specifically north of Cape Cod to the U.S./Canada border. Obviously plastic waste is a problem—but, where did it all come from?

More plastic is produced in the United States than the combined output of steel, aluminum, and copper. Unlike organic materials (such as wood and paper) that can be degraded by microbes, plastics are not biodegradable, but may break down into smaller pieces through exposure to sunlight. Some plastics are engineered to last more than 450 years! They are therefore persistent in the environment and are a threat to the health and welfare of many marine animals. Even with

***Styrofoam
can take
hundreds of
years to
break down.***



the signing of the MARPOL (International Convention for the Prevention of Pollution from Ships) Annex V in 1988, making it illegal to dump plastic into the ocean, plastics are still found in the oceans and washing up on shorelines all over the world. As much as 80 percent of the plastics that end up there come from land-based sources.

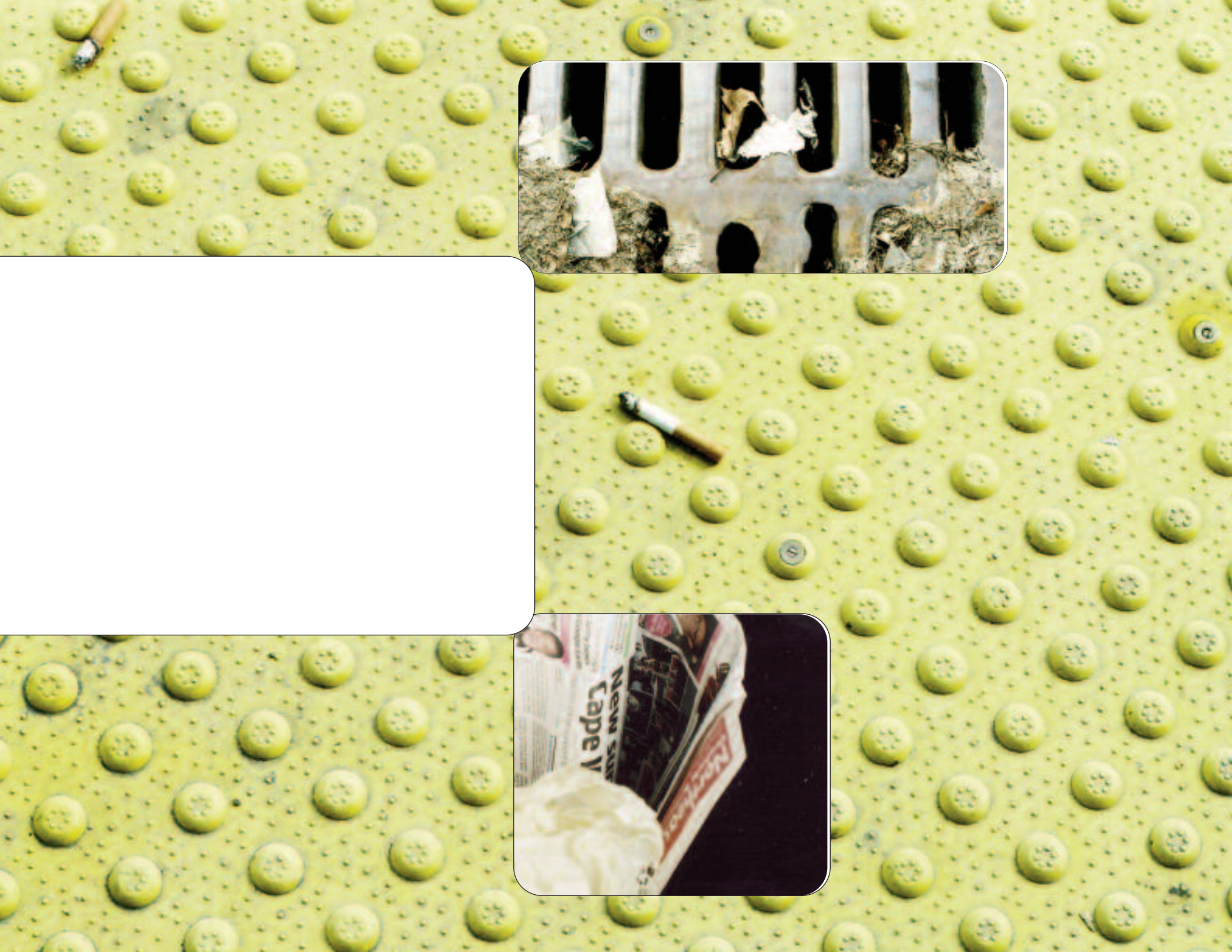
The same qualities that make plastic so popular—its light weight, durability, and strength—also make it especially harmful to marine life. Plastic marine debris affects at least 267 species worldwide, including sea turtles, sea birds, and marine mammals. Many species of seabirds ingest plastic pellets, bottle caps, and other plastic materials. In fact,

plastic particles were found in the stomachs of eight out of 11 species of seabirds in a study off the North Pacific. Fish, mammals, and reptiles also ingest plastic for food (such as sea turtles that consume plastic bags thinking they are jellyfish), with often fatal consequences. Plastics, such as disposable bags, six-pack yokes, and fishing lines have the potential to get caught around the necks, mouths, or bodies of marine animals, hindering their movement, breathing, and feeding, and leading to starvation or strangulation.

Another ill-fated consequence of floating plastic is alien invasion. Organisms have always been able to travel on natural debris such as floating wood, but these materials would only go so far before they degraded or sank. Traveling on plastics allows marine organisms to go farther than they ever have, colonize new areas, and lead to a potential threat to native plants and animals.

How Reusing and Recycling Can Help

Reusing and recycling materials has environmental benefits—starting at the very beginning of a product's life all the way to its final method of disposal. First of all, reusing or manufacturing goods from recycled materials typically requires less energy than producing goods from virgin materials. Take for example an aluminum can. According to the EPA, recycling aluminum saves 95 percent of the energy needed to produce new aluminum from raw materials. The energy saved from recycling one ton of aluminum is also the equivalent of 36 barrels of oil, or 1,655 gallons of gasoline, or the amount of electricity the average home uses over 10 years. Recycling aluminum scrap instead of extracting and reducing bauxite ore to make new aluminum products also significantly cuts air and water pollution (the techniques used to mine bauxite ore are noisy, dusty, and can cause contamination of groundwater supplies). The other great thing about recycling aluminum is that it can be recycled indefinitely (unlike plastic)—particularly important since aluminum is a nonrenewable resource. Another example is paper and trees. Paper is the number one material that we throw away. But waste paper can effectively be turned into raw material for new paper and paper products. A paper mill uses



Each day, across the United States, millions of plastic cups are discarded. Kinda makes me want to buy the world a travel mug.

40 percent less energy to make paper from recycled paper than it does to make paper from fresh lumber. Recycling paper fiber is also cheaper than harvesting and processing virgin fiber from trees, while saving trees. In fact, a ton of paper made from recycled fibers instead of virgin fibers conserves 17 to 31 trees. Trees are known to be a carbon “sink”—meaning they actually remove carbon dioxide from the atmosphere. So not only will recycling paper require less energy for production, but the trees left standing will be able to continue to suck up greenhouse gas emissions and help save our climate, which as mentioned above will help save our coastline. Love those trees... Recycling and re-using materials and diverting wastes from landfills and incinerators will also reduce the negative by-products that lead to air and water pollution, which ultimately affect our coastal and marine ecosystem. And less trash making its way into our marine and coastal waters means less marine debris to impact marine life, the ecosystem, and the aesthetics and safety of our coastline.

Think Before You Throw It Away

REDUCE

A great thing you can do for your environment, your ocean pals, and your health is to first “reduce” your consumption of disposable products and lessen your overall output of garbage. By buying less stuff, you are also helping to reduce the overall consumption and manufacturing of disposable products. Here are some ideas for refocusing your purchase power:

Buy products made from recycled materials - Since a successful recycling system depends not only on a supply of waste to be recycled but also on a demand for the recycled materials, buying packaging or items with recycled content helps the recycling market. Buy items such as 100 percent recycled-content paper, 100 percent reclaimed wood products and other construction materials, post-consumer plastic for decking or carpets, re-manufactured electronic equipment, or recycled glass made into a variety of products, such as birdfeeders, candle holders, window ornaments, and lamps.

Buy products with little or no packaging - Unfortunately, there is high demand for individually packaged items, such as juice boxes and mini-snack packages, all with separate polymer wraps and boxing. Don’t fall prey to this convenience packaging, which is not so convenient for the environment. Instead, try reusing your own containers, reusable bags, or wraps to pack your snacks and drinks. And another tip that can’t be emphasized enough: when heading to your local coffee shop to purchase a cup of java, BRING YOUR OWN CUP! You can pick from an assortment of sizes, shapes, and colors of stainless steel or plastic cups that are available at most stores, and you will be helping to eliminate the thousands of paper or polystyrene cups that end up littering our shores.

Reduce your purchase of bottled water - Many people are afraid to drink tap water. But, municipal water supplies, which are subject to strict water quality standards, are clean and safe. Many brands of bottled water are just plain old tap water in a bottle anyway. Bottled water has all sorts of environmental consequences. First of all, because of its weight, shipping and transporting bottled water requires a great deal of fuel. Second, those plastic water bottles that you buy in bulk because you think they are completely recyclable are actually only “down-cyclable.” Plastic bottles used to hold food and beverages are “down-cycled” into lower grade plastic products, like decking, carpets, park benches, and milk crates, which are more difficult, if not impossible, to recycle. Therefore, those water bottles can rarely be recycled more than once, before coming to the end of their life. So, limit your purchases of these plastic products from the start.

REUSE

Now that you have reduced your consumption of products, the second step is to reuse your items.

Re-use packaging - Use packages such as plastic bags and glass jars more than once (except those plastics that are not safe to reuse for food and beverage). Peanut butter jars are great for storing items, such as small hardware; cream cheese containers are perfect for packing

snacks; kids love to play and containerize things with plastic cups. You can re-use plastic bags for groceries, as garbage bag liners, for dog waste or kitty litter, or diapers, or you can even bring them back to many stores to be recycled.

Pass it along - There is always someone out there who will think that your trash is a treasure! By giving away or selling your items, everyone wins. Many municipalities have swap shops, which welcome any of your discards. Other groups, such as the Salvation Army or veterans groups, will sell your items for their cause. You can try online options such as Freecycle, which shares unwanted products with others, or Craig's List or E-Bay, which allow you to sell your more "valuable" discards.

Give it a new life - Some items deserve a second chance. Take surfboards for instance. Throwing these beauties into a landfill once they are no longer able to catch the waves would be a shame. Recycling these products is nearly impossible, but one way to salvage the boards is to turn them into second-hand commodities. One creative genius makes mosaic tile tables out of them: beautiful, functional, and environmentally favorable. As an aside, surfboard production, which was once a polyurethane, chemical, and toxic-emissions nightmare, is cleaning up its act. Many surfboard companies are producing boards with lower environmental impact, such as with sustainably harvested wood and EPS foam (the only recyclable surfboard foam), and an epoxy that emits very low volatile organic compounds (chemicals that easily evaporate at room temperature) and does not require harsh cleaning materials for clean up. (See www.surfrider.org for more information.)

RECYCLE

As a last measure in your "think before you throw it away campaign," you can recycle many of the items that you haven't been able to reduce or reuse. (For ideas and specifics, see *Things You Can Do to Be Clean and Blue-Green*, page 24.) Nationally, we recycled 82 million tons of municipal solid waste in 2006, thereby reducing the same

carbon emissions as removing 39.4 million passenger cars from the road. And just as important is that recycling these materials reduces solid waste, air and water pollutants, and greenhouse gases that contribute to global warming; conserves our natural resources; and helps to preserve the natural places here on the coast that we value.



Photo: Chris Jordan

We've all been there before. You're standing in the grocery check-out line, and you have just been asked a simple question:

Paper or Plastic??

By Betsy Rickards, CZM

The grocer expects a quick answer, but you pause to consider your options. Your mind wanders into the perplexities of environmental outcomes.... *Paper, biodegradable and easy to recycle, but an awful waste of precious trees. And paper bags consume so much energy to manufacture. But, at least they don't persist in the environment and hurt marine life. But paper bag production can pollute the air and water with chemicals, hmmm.... Plastic, re-usable, but then again—really only once.* But stores are now taking them back. But they are a major source of trash blowing around our towns and floating in our seas. They do require less energy to produce, but then again they are made out of non-renewable petroleum resources. But... Excuse me...paper or plastic? Oh! Your mind snaps back to reality and to the impatient people waiting in line behind you. Just give me paper, please.

If you knew the indigestion I suffered from the plastic bag I tried to eat last year! Oy!



But, was your hasty decision the right one? Maybe, if you are picking between the lesser of two evils and won't reuse or recycle a plastic bag—but maybe not, if you consider your other option: canvas or cloth. More and more people are discovering the convenience, the environmental benefits, and the avoidance of the ultimate conundrum at the check-out counter when they bring their own re-usable bags. In fact, most stores are now supplying them to encourage this environmentally friendly (and cost-effective) alternative.

The issues with plastic and paper are probably not a mystery to you. Those thick and hardy paper bags you get at the grocery store consume trees (as much as 14 million to produce a year's supply). To boot, the amount of recycled content that can be used for these grocery bags is minimal because they require a higher quality paper pulp to bear the weight of groceries. They require more energy than plastic bags to not only produce, but also to recycle. And because paper bags use more raw materials and energy, they come with a higher cost. But that doesn't let plastic bags off the hook. On the contrary, plastic production and processing require the use of toxic chemicals, and the longevity of plastics (as much as 1,000 years for a high-density polyethylene plastic bag) leads to serious threats to our marine ecosystem and wildlife. In one year, Americans go through millions of barrels of oil to make billions of plastic bags. And of those billions of plastic bags, untold millions end up in our oceans, creating hazards for boaters and marine life, not to mention ruining the aesthetic of the coastline. Plastic bags can damage boats when they block water intakes or get caught in propellers, and can be lethal to marine mammals, sea birds, and sea turtles through entanglement or ingestion—in fact, a study of 50 green, loggerhead, and leatherback turtles showed plastic bags to be the main debris item found within their stomachs.

Paper bags may actually be the preferred option for communities on the coast because overall it is better for the marine and coastal ecosystems. In fact, some coastal cities, such as San Francisco, and some markets nation-wide, such as Whole Foods, have even taken steps to ban single-use plastic bags. Other stores charge for plastic bags. Picking the lesser of two evils is no longer necessary given that there is another choice with far fewer negative consequences. By bringing re-usable bags, you are personally preventing thousands of paper and plastic bags from entering the "system." So next time answer the grocer's question with no hesitation and no environmental guilt: cloth, please.



Photo: Arden Miller

Plastic bags can live for up to 1,000 years. And that's a mighty long time.

COASTSWEEP

20+ YEARS OF CLEANER BEACHES *By Robin Lacey, CZM*

Barcaloungers, toilet bowls, rubber boots, pieces of fishing net, **truck tires**, industrial tubing, milk crates, vinyl siding, and **cigarette butts**—these are but some of the items found each year during the Massachusetts COASTSWEEP clean up.

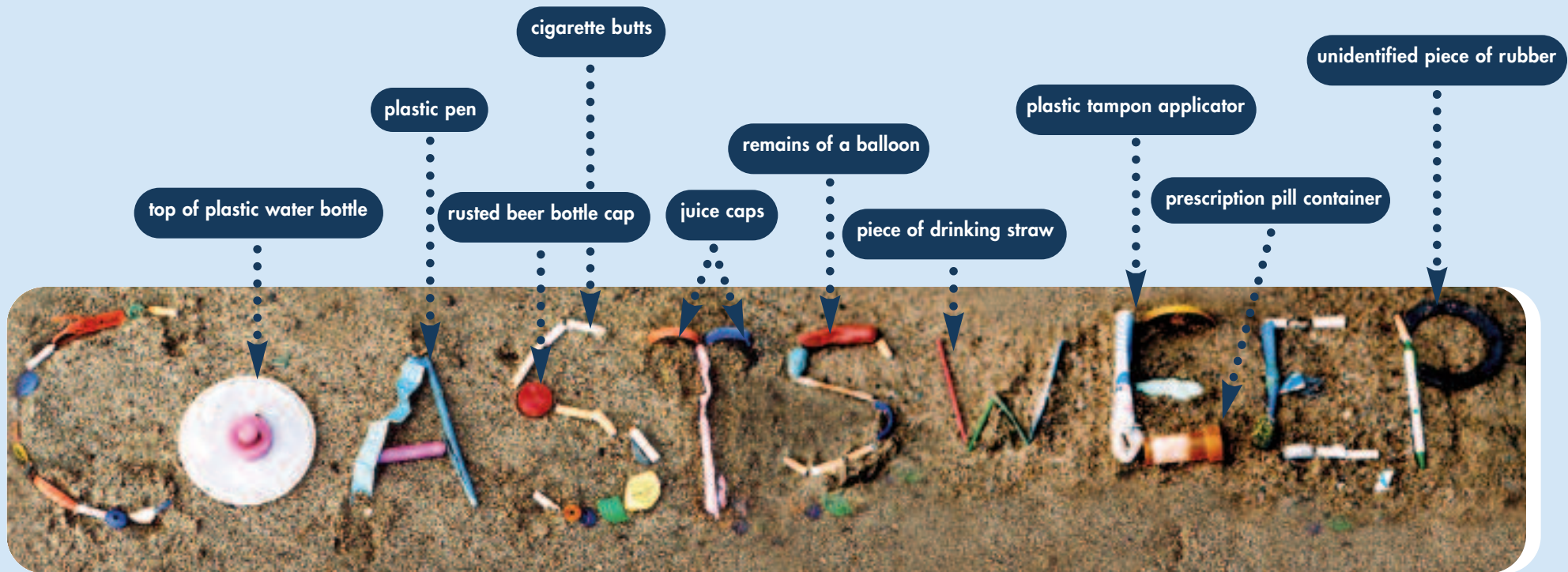
COASTSWEEP is part of an annual event to raise awareness of marine debris and clean beaches from Boston to Bimini. The International Coastal Cleanup (ICC) is sponsored by the Ocean Conservancy and from September-October, hundreds of thousands of volunteers head out to beaches, lakes, and streams worldwide to remove marine debris. Volunteers collect data on the specific types of debris being found. These data allow the Ocean Conservancy to make discoveries about the behaviors that cause the debris. For more information about the ICC, see www.coastalcleanup.org.

volunteers collecting almost two tons of debris along 40 miles of coast. The annual event has grown each year and in 2007, 1,800 volunteers cleaned more than 100 miles of coastline and seafloor—collecting nearly 18,000 pounds of marine debris. The 20th year was commemorated with a kick-off at Carson Beach in South Boston where CZM Director Leslie-Ann McGee and Executive Office of Energy and Environmental Affairs Undersecretary for Environment Philip Griffiths joined local officials, legislators, nonprofit organizations, and 80 dedicated volunteers undaunted by the wet weather and temperatures in the 50s.

In 2006, more than 80 percent of the debris collected came from land-based activities—where litter blown from the streets, parking lots, and ball fields ends up in the water.

In Massachusetts, volunteers have been pitching in to clean up stretches of beaches, marshes, and riverbanks since 1987. September 2007 marked the 20th anniversary of COASTSWEEP, the Massachusetts Office of Coastal Zone Management (CZM) event that began with 391

So, what do these volunteers find at a typical cleanup? In 2006, more than 80 percent of the debris collected came from land-based activities—where litter blown from the streets, parking lots, and ball fields ends up in the water. By contrast, only about 9 percent of the marine



debris is from ocean-based activities, such as boating and fishing. The end result is thousands of tons of various plastic and paper debris littering the world's oceans and beaches. To the right is a list of the top 10 items collected along the Massachusetts coast in 2006.

Whether it is urban trash or abandoned fishing gear, marine debris is a major marine pollution issue. Every year it injures and kills thousands of marine animals that swallow it or become entangled in it. For more information about marine debris and how you can help, see the Coastal Cleanup website at www.coastalcleanup.org.

To get involved in the cleanup efforts here in Massachusetts, see the COASTSWEEP website at www.coastswEEP.umb.edu.

Top Ten Debris Items for 2006			
Rank	Debris Item	Amount	%
1.	Cigarettes/Cigarette Filters	68,066	46.5
2.	Food Wrappers and Containers	11,740	8.0
3.	Caps/Lids	10,650	7.3
4.	Bags	6,406	4.4
5.	Beverage Bottles (Plastic)	5,512	3.8
6.	Rope	5,161	3.5
7.	Cups, Plates, and Utensils	5,032	3.4
8.	Straws/Stirrers	4,881	3.3
9.	Beverage Cans	4,192	2.9
10.	Beverage Bottles (Glass)	3,061	2.1
Totals		146,2	85.2

Trash found on a section of beach in the Boston Harbor spells out COASTSWEEP with a variety of marine debris. And all of the trash was collected from a 25 yard section of beach in less than 10 minutes.



Things You Can Do to Be Clean and Blue-Green...

By Peter Hanlon, Massachusetts Bays Program

Recycling—you want to do the right thing, but what are you supposed to do with that old Macintosh SE? Or all that house paint in the garage? Or that antique can of what appears to be rat poison hidden in the basement corner? As with politics, all recycling is local. So, by far the best strategy for answering your reduce-reuse-recycle questions is to contact your town hall, specifically your community's Department of Public Works (DPW). Read on for some suggestions for what you can do with all that stuff you no longer want...

Curbside Recycling: Chances are good that your community provides those ubiquitous plastic recycling bins for free. Use one for recycling paper (newspaper, magazines, phone books) and cardboard, and another for rinsed out glass, metal, and plastic containers (typically #1-#7). Visit "The World's Shortest Comprehensive Recycling Guide" at www.obviously.com/recycle for recycling information for "regular folks."

Yard Waste: Leaves, grass, plants, shrub prunings, and twigs are not trash! If you can't convert them to mulch or compost them, then they are typically collected on specific dates in late spring to early winter. Visit the Greenscapes Massachusetts website at www.Greenscapes.org for more on how to turn those grass clippings into mulchy goodness.

Furniture: If the furniture you want to get rid of is in good condition, then please donate it to organizations such as the Salvation Army, Big Brothers Big Sisters, or Goodwill Industries to be reused and kept out of the waste stream. Visit Excess-Access online at www.excessaccess.com to learn how to match business and household item donations (furniture, office supplies, and electronics) with the wish lists of nonprofits that can provide pick-ups or accept drop-offs.

Appliances: As with furniture, if you're looking to get rid of working appliances, donate them instead. If they don't work anymore, items such as washing machines, air conditioners, stoves, water heaters, and refrigerators may require your town's sticker and a fee for removal and recycling. Try joining a Freesharing group (www.freesharing.com) in your town to list working appliances that you want to give away. And maybe you can pick up an old-timey popcorn popper while you're at it.

Electronics: Have we mentioned donating your unwanted but working electronic devices? Well we should have. But if you have broken down televisions, computers, cell phones, etc., then your community's DPW may pick them up for recycling if you purchase a special removal sticker. Sign up at www.freecycle.com to find neighbors that are just dying to take that old black-and-white Philco television off your hands. Or if you have a computer to donate, visit Computers for Schools at www.pcsforschools.org to help out local schools and youth organizations.

Hazardous Materials—aka hazmats: Yes, chances are good that you have some hazmats in your home that you'll need to bring in to a special hazardous waste collection day in your community. What could these possibly be? Look for items such as glue, tires, automobile fluids, fluorescent light bulbs, household cleaners, oil-based and latex paints, insecticides, and pesticides. Sorry, but only the kind folks who run the hazardous waste collection usually want things like your unwanted pesticide and paint thinner. (If you live in a town with a dump/transfer station, check your town's web site, or call town hall to see if your town has designated hazmat days.) And there are exceptions: Radio Shack will recycle your old household batteries, used motor oil can be brought back to the store from which you bought it, paint can be donated to local theaters and community organizations, and you can visit www.lamprecycle.com to learn how to recycle any light bulb in your house.

I sure am glad that not all of this stuff ends up at the bottom of the ocean... Although, come to think of it, I wouldn't mind having an old Barcalounger to relax in.

Greenscapes for a Blue Planet

THE GREENSCAPE SCOOP By Betsy Rickards, CZM

It's another sizzling summer day and you can just feel the sun's rays burning into your lawn and browning the grass blades on contact, the heat desiccating your prized annuals and withering your water-loving shrubs. You grab the hose—or better yet—launch the sprinkler and let it run full throttle until the plants appear fully satiated. Yet, it's mid-day and the water just evaporates into the hot air. You consider the consequences—once your grass and plants becomes dehydrated, they will be compromised; the grubs will invade, the weeds will prevail, and you will lose ground against Mother Nature. Why is she undermining your arduous efforts and making your yard the eyesore of the neighborhood?

In an attempt to beat her, you grab the 50 pound bag of fertilizer, search for the spray tubs of insecticides, herbicides, and fungicides, and go out to the field in full protective gear, ready to wage full war. But, something catches your eye—a lovely spiderweb that has been woven between your perennials, a cute wiggly earthworm squirming under a stone, a fluttering, friendly little ladybug landing on your arm, the birds—and their glorious songs—soaring through the air. You realize that the collateral damages could be devastating; environmentalist extraordinaire Rachel Carson would turn over in her grave. You just can't do it. You fall to the lawn chair and release a long sigh of failure... resigned to having a mangy, wilted, brown garden after all.

But wait! It CAN be easy being green and going blue. And it doesn't have to involve killing local fauna, polluting the land and sea,

and depleting the town's water reserve. With a practice that is commonly being referred to as "greenscaping," you can obtain a healthier, eco-friendly landscape with far fewer headaches (and less expense). Fewer figurative headaches because you are spending less time fighting against your garden, and fewer literal headaches because you aren't exposing yourself to toxic fumes!

First thing first, get rid of some of that lawn area. Lawn grasses are difficult to maintain, especially bluegrass, the most common but most fragile lawn grass. If you are trying to grow a uniform culture of bluegrass and it fails, the lack of a back-up grass will leave your yard bare and susceptible to weeds. If you intend to keep your lawn (or portions thereof), over-seed the existing grass with a mix of grass species to help maintain diversity and create a varied resistance to different diseases and insects. A

grass mix that contains fescue grasses is a wise choice. Fescue grasses can survive through droughts and resist insects, hold no particular bias for sunny or shady areas, and won't tarry over growing in various soil types. Not only does this make them easier to maintain, but since they require less water, fertilizer, and pesticides, fescue grasses make for a healthier natural ecosystem. As for fertilizing lawns, grass clippings that remain on the lawn after mowing will break down and add nitrogen and organic matter to the soil. Another obvious benefit to this is that you don't have to bag it and haul it away. If you find that additional nutrients are necessary to supplement the soil and feed the lawn, choose an organic, slow-release, water-insoluble fertilizer and use sparingly.



Apple Pie is so 1975. Low and high bush blueberry plants are hardy enough for New England weather extremes, and tasty enough for pie.

Second, work with the landscape, not against it. Use plants tolerant of your local conditions, keeping in mind water requirements, sun/shade tolerance, insect resistance, and temperature suitability. Native plants (i.e., those that originally grew in this area) are adapted to local conditions, and as a result require less maintenance, watering, fertilizer, and pest control than introduced species. Because natives thrive in the local conditions, they may also out-compete and control unwanted invasive species, such as oriental bittersweet, Japanese knotweed, or goutweed—all of which tend to take over and require a lot of pulling and weeding to keep a tidy appearance.

By incorporating these native plants into your garden, you are taking an important step toward making your life easier and minimizing your costs. But what you might not realize is that you are offering a shared benefit to the ecosystem around you. Native trees, shrubs, groundcovers, and grasses provide shelter, nesting areas, and food for a variety of wild critters—including those hummingbirds and butterflies that you always wanted to attract. These plants also beautify your yard and provide privacy screening (good privacy screens make good neighbors).

By planting native species and avoiding pesticides and fertilizers, you are also helping to prevent detrimental ramifications down the road—literally. Excess fertilizers and pesticides that are not taken up by plants can enter the groundwater or be carried away in stormwater over roadways and other impervious surfaces. The catch basin next to your driveway likely pipes this stormwater runoff, and its nasty ingredients, right to a stream, lake, harbor, or the ocean. The fertilizers can cause nuisance plant or algae growth, while the chemicals can degrade water quality and be hazardous to the health of humans and wildlife. The chemicals that don't run off do what they are supposed to do—kill indiscriminately. The beneficial earthworms that aerate your soil and provide natural nutrients through their castings will be killed off with the grubs. The area becomes a dead zone, devoid of any of the symbiotic life processes that naturally sustain the system. As a result, your garden now relies on, and is addicted to, constant applications of fertilizers and pesticides. Avoiding this chemical dependency from the start will greatly enhance the diversity and survival of your garden ecosystem, ensure the safety of your family that uses the yard, and avoid down-stream damages.

Speaking of water, when it comes time to irrigate extensive lawn areas or water plants that are hydric-loving, you may be wasting precious local water supplies that could be better used for other more important human uses (such as drinking water), or kept in the streams, ponds, and lakes for use by fish and wildlife. To conserve water, you can choose plants that are more drought-tolerant, water lawns and gardens only when necessary, and time the watering early in the morning or later at night (this is especially easy with a sprinkler timer) when moisture won't be lost to evaporation. Mulching around garden beds with materials such as shredded leaves, wood chips, or bark mulch can help retain water in the soils (as well as help keep those weeds at bay). Making use of rainwater in rain barrels is another easy trick (see sidebar). If too much rainwater is your problem (i.e., puddles and pools where you don't want them), you can direct downspouts to "rain gardens," where water-tolerant plants grow within a small depression that allows water to infiltrate into the ground, helping to recharge groundwater supplies and your community's water resources.

When designing a planting plan or considering ways to replace or enhance the plantings within your yard, don't forget to take into account the conditions of your particular site—that is: wind, light, slopes, water flow, and soil type. Hardier trees and shrubs can be placed to provide a wind screen for less wind-tolerant plants; sun-loving plants can provide shade for plants that do not thrive in the direct sun. On steep slopes, deep-rooting shrubs and grasses can be placed to provide stability and uptake of stormwater and groundwater flows. Because healthy soils equal healthy plants, enhance the mineral and nutrient content of your soils with compost materials (which you can easily produce yourself in a compost bin) and aerate soils when they become compacted to allow for better water and root infiltration.

So, you CAN do this after all—a “greenscaped” yard that is the envy of the neighbors without all the harmful side-effects to you, the environment, and coastal and marine life. And although you may want others to think that you have been slaving away in the garden, don't keep it a secret. For the well-being of your fellow gardeners, the community, and the critters on land and at sea, spread the scoop on your greenscape.

For more information on greenscaping practices, see the Greenscapes Massachusetts Program (www.greenscapes.org). Coordinated by the Massachusetts Bays Estuary Association and guided by a diverse group of organizations that collectively form the Greenscapes Coalition, this program is an educational and outreach effort designed to teach homeowners and communities about more environmentally friendly landscaping practices. Their online greenscapes guide provides detailed information on lawn care, alternatives to pesticides and herbicides, composting, water conservation, soil testing, and much more. The program reaches 33 municipalities and more than 150,000 households in Massachusetts.

Another useful resource for home gardeners and landscapers is the UMass Extension Landscape, Nursery & Urban Forestry website (www.umassgreeninfo.org), which includes fact sheets on plant culture and maintenance, a list of prohibited invasive plants, and training opportunities, as well as links to other publications.



*A “greenscaped”
yard means less
pollution in a water
body near you.*

Through Rain, Sleet, and Snow...

By Peter J. Hanlon, Massachusetts Bays Program

Let's compare stormwater to the mail.

Postal carriers pound the pavement and bring mail to our doors. Rain and snowmelt flows off those same streets and into storm drains.

No real problem there.

Sometimes, through no fault of their own, postal carriers bring not-so-welcome mail to our door, such as bills and junk mail. Also through no fault of its own, stormwater whisks trash, car oil, dog poop, fertilizer, and myriad other pollutants that have collected on the street into storm drains and into the nearest waterbody.

Not so good.

So just as the mail carrier isn't the one to blame for bringing junk mail to our door, it's not the stormwater itself that causes pollution, but rather things that we leave on the ground that get carried away by the rainfall and melting snow. The solution is pretty simple—pick up our trash, maintain our cars, pick up after our dogs—but helping everyone understand the connection between stormwater and the health of our bays, rivers, and beaches can be difficult.

Think Blue Massachusetts is an outreach campaign designed to help make that connection and inspire stewardship of coastal and inland waters. The Think Blue campaign was created by advertising and environmental professionals, and is coordinated by the Massachusetts Bays Estuary Association (MBEA) with the Think Blue Coalition, a partnership of diverse supporters and sponsors that guides the campaign's implementation.

Since 2006, Think Blue Massachusetts has brought its exhibit (including a 15-foot tall inflatable duck mascot, Stormy) to numerous outdoor festivals. Now, Think Blue is helping volunteers organize Think Blue projects, large and small, in their own communities and neighborhoods. The Think Blue Toolbox, a free online resource, provides a wealth of campaign materials to help create local stormwater outreach projects. The Toolbox consists of professionally produced campaign media (television, radio, and print), access to customized materials and promotional items, project suggestions, and professional guidance.

Stormwater pollution requires a local solution, so volunteers can use their knowledge of local issues to help keep pollutants off of streets and yards so that they don't end up flowing to our rivers, beaches, and bays.

Think of it as giving your mail carrier's back a break by stopping junk mail at its source.



Stormy Says...

Always bring baggies when you walk your dog so you can pick up after he leaves a special "gift." Dispose of it in the trash or flush it (without the bag, of course) down the toilet. Pet waste bacteria is harmful to animals that live in our rivers and oceans and can make our beaches unsafe for swimming.

Checking your car for oil and fluid leaks is a good idea not just for your car, but also to ensure that those fluids don't end up on the roads or your driveway and then wash into storm drains.

If you have a lawn, use as little fertilizer as possible because excess nutrients from fertilizer can leach through the soil into groundwater, or are washed by rain into storm drains. These nutrients can contaminate our drinking water and cause algal blooms in rivers and bays.

Cigarettes are the most littered item in America—176 million pounds of butts end up on the ground each year. And no, they're not biodegradable. Cigarette filters are made with cellulose acetate tow (plastic) and can take up to 20 years to decompose.

For more information, or to join or start a Think Blue! team, visit www.ThinkBlueMA.org.

Roll Out the Rain Barrels *By Betsy Rickards, CZM*

Reusing water in rain barrels is not a new concept. In fact, storing rainwater in cisterns dates back 2,000 years. Only recently, however, did the rain barrel come back into fashion. Due to the ever increasing demands and costs of municipal water supplies, the public is beginning to realize the benefits of harvesting rainwater. Not only does the reuse lower water bills, harvesting rainwater offers environmental advantages—protecting natural water resources and reducing stormwater runoff.

Under typical conditions, rainwater that falls onto a roof runs off or gets routed and directed toward a driveway or roadway, where it goes on a journey through the stormdrain system and finally into a local water body. In the Boston area, the approximately 43 inches of annual rainwater that falls on a 1,000 square foot roof is equivalent to 25,800 gallons of rainwater that drains away to the ocean. The water that runs off is unable to help support plant life and has the potential to carry pollutants (see *Greenscapes for a Blue Planet*, page 25). Furthermore, because the water does not have a chance to settle, infiltrate, and replenish the groundwater supply, the local water reservoir or aquifer (typically providing the municipal water supply) becomes depleted. In the summer when rainfall is low and demand for irrigation, drinking water, and other uses is high, this lack of replenishment often leads to summer watering bans.

The rain barrel is a cask-sized solution to this big problem. Rain barrels are literally barrels that capture rainwater from the roof so that it may be stored or used for watering outdoor gardens, compost bins, and indoor plants; washing your garden tools or your hands; or any other non-potable (i.e., not suitable for drinking) use you can imagine. Now, the rainwater that falls on the same roof during the gardening season (i.e., from March to October, which is approximately 28 inches) will provide you with approximately 16,800 gallons of free water to use on your site as you see fit. To boot, using the water on-site allows it to slowly seep into your landscape and recharge the groundwater.

Rain barrels are not difficult to use, and installation can be performed by a homeowner. The barrel is placed below a downspout (cut to fit) to capture the roof rainwater. The barrel itself can be a clean drum (55 gallon drums are the most common), or one of the many brands of “rain barrels” currently on the market. Many communities and water districts are offering rain barrels at discount prices as part of a grant program from the Massachusetts Department of Environmental Protection. (See www.mass.gov/dep to see if your community is eligible.) These market rain barrels have special adaptations such as a spigot to attach hoses, an overflow hose to direct any overflow away from your foundation, and a screen and cover to preclude the breeding of mosquitoes and to prevent leaves and debris from causing clogs or decay. Maintenance requirements for rain barrels are minimal and consist only of periodic cleaning out of leaves and debris, and regular inspection of the unit, its components, and the gutter and downspouts. Rain barrels should be drained and removed for the winter months to prevent ice damage. So, keep those barrels rolling—and make use of that perfectly good roof rainwater.

Free water from the roof—the runoff from a typical roof provides tens of thousands of gallons of water during the growing season in the Northeast—for big, gorgeous sunflowers, just add sun!



Photos: Miles Freedman





A Landscape Fit for the Sea

By Betsy Rickards, CZM

*“Awake, O north wind, and come, O south wind!
Blow upon my garden that its fragrance may be wafted abroad.”*

—ANONYMOUS

Not everyone willingly calls upon the wind to blow upon their garden. In fact, those that live along the coast generally eschew the thought of awakening the elements that threaten the survival of their natural landscape. The fact is that landforms and landscapes on the coast take a beating. Waves are constantly working to erode and move sands and soils along the shoreline. Winds assault the coastlines, parch the soils, carry damaging salt sprays, and blow sand in all directions. Plants get battered, bent, and torn. Bare and exposed soils are eroded and carried away by the wind, rain, and seas. Under these highly dynamic, migratory, and unforgiving conditions, it is no wonder that even the most seasoned coastal gardeners are overwhelmed and discouraged.

But perhaps these challenges can be overcome by looking to the strategies of the naturally vegetated seascape—after all, these landscapes have weathered many storms over the centuries and have emerged

relatively unscathed. These rugged coastal environments are home to plants such as beachgrass, bayberry, and beach plum that are resilient enough to withstand the battering and bending, not to mention salt, sand, droughts, and nutrient-deficient soils. They have been naturally selected to live in these environments because they have the characteristics that make them most fit to survive the elements.

Accordingly, you as a coastal landscaper should follow suit. By selecting plants that fit the particular coastal niche, and by mimicking nature, you will be able to attain a flourishing coastal landscape at minimal expense of time, money, and labor. And the extra incentives are worth the effort: natural protection from erosion and storm damage, a filter for pollution, habitat for wildlife, enhanced visual appeal of the coastal property, and perhaps even the wafting of a sweet fragrance abroad.

The Extra Incentives

Plants are one of the best natural remedies for erosion control. Plants are able to take up, absorb, and physically slow down surface and groundwater, decreasing flows that can lead to erosion. A thickly planted area can prevent runoff from creating gullies or ruts in the bank, or prevent groundwater seepages that may cause the collapse of the bank. In addition, trees, shrubs, groundcovers, and grasses—particularly native species—can help to stabilize banks, dunes, and other coastal areas with their root systems by structurally reinforcing and binding soils. In contrast, mowed lawn grasses have shallow root systems that do not offer the same stability.

Because of their erosion-control capabilities, plants are an excellent alternative to engineered structures, such as seawalls, riprap, and bulkheads (which are often prohibited in Massachusetts because they stop the movement of sand in the overall system and reflect waves, both of which can damage adjacent beaches and other properties). A protective plant cover can stabilize property that is experiencing serious erosion problems while buffering wave energy and maintaining natural sand transport. But, you need to use live plants—brush, vegetative debris, and other materials placed on the bank or dune act to limit the natural growth and establishment of plants and do not help bind soils.

Landscaping the shoreline also helps keep the bays and harbors clean. Plants help catch and filter sediments and other pollutants that would ultimately run to the sea. Excess sediments can smother coastal habitats like eelgrass beds, and can reduce water quality. Pollutants such as fertilizers and pesticides, oils and greases, and pet waste can pollute shellfish beds and swimming areas. Plants offer a natural defense—capturing, filtering, and transforming many of these pollutants before they reach coastal waters. In addition, since native plants are better adapted to local conditions, there is less need for pesticides and fertilizers that contribute to water quality problems.

Hardy plants that are good for bank and dune stability are also good for wildlife. Bayberries and beach plums provide a valuable source of food for local and migratory songbirds, and their thicket-forming character provides shelter. Dense patches of rugosa rose, chokeberry, low-bush blueberry, bearberry, red cedar, and black cherry provide nesting areas for various bird species, as

well as foraging areas for many species of mammals. Seaside goldenrod has been known to attract fall monarch butterflies. These trees, shrubs, and perennials also preserve the appearance of the natural shoreline, while beautifying and enhancing the sweet aromas of your yard!

Picking Plants to Mimic Nature

To find the right plants for your landscape niche, you need to consider exposure of your yard to the elements. If you live adjacent to a coastal dune, you may find that your yard is frequently overtopped with sand and salt water. American beachgrass works best here because it is tolerant of salt spray, exposure to wind and waves, and accumulations of sand, and it has a thick, fibrous root systems that help build up and stabilize windblown sediments. The roots of plants such as dusty miller, beach pea, and seaside goldenrod are also effective in stabilizing and building up dune sands. In a major storm, these dunes will act as a buffer against waves and flooding.


Hardy, drought-tolerant plants, such as bayberry, rugosa rose, beachplum, and Japanese black pine, are good choices for yards that are a bit more setback from wave action, but still experience high winds and frequent salt sprays—such as in a back dune area (dunes that are behind the dune closest to the beach) or atop a coastal bank. On the slope of a coastal bank, plants or groups of plants with substantial surface area, such as little bluestem, bearberry, and creeping junipers, are appropriate. These plants are low-growing and have good root structures that not only hold them to the steep slopes, but also stabilize the soils. In fact, rows of thick, drought-tolerant grasses planted perpendicular to the slope will not only prevent erosion, but will slow water runoff and allow sediment to be deposited—creating a build-up of the bank.

So, for those coastal landowners who are experiencing landscaping woes, consider employing nature's strategies that have successfully endured the years. Although the coastal forces are certainly those to be reckoned with, locally established plant communities can put up a rather good fight. So next time you call upon the wind, you might want to give him proper warning—after all, with your posse of hardy coastal native plants, he may have finally met his match.

Environmental Reflections on the Best Job in the World

By Michael Dukakis, Former Governor of Massachusetts (1975-1979 and 1983-1991)

I guess I was always an environmentalist, even back in the days when the term didn't exist. As a boy in the 1930s, I was fascinated by the stamps in my stamp collection that celebrated the national park system. The highlight of my young summers was a week at the beach at Scituate—yes, Scituate was where you went for a quick beach vacation in those days.



Sarah Island and Longlee Island (left) are two of the 34 Boston Harbor Islands. In the 1970s, then governor Michael Dukakis orchestrated the purchase of 13 of the Harbor Islands for \$3 million. The islands, now part of a National Recreation Area, welcome more than 350,000 visitors annually.

In addition to our Scituate beach trips, each summer my mother took my brother and me to Nantasket for the day. We would take the boat, and I probably developed my longtime interest in Boston Harbor and its islands while looking out over the ocean during those trips. The Commonwealth's rich history interested me as well. As a teen in the 1940s, I would walk the streets of Boston's historic neighborhoods—from the North End to Beacon Hill—with a copy of Johnny Tremain under my arm, imagining what it must have been like to live in this area when Paul Revere, Sam Adams, and others started the American Revolution.

Don't ask me why these things held such a fascination for me. They just did. And that early appreciation for the special beauty of Massachusetts—its coasts, its harbors, its streets full of history—has been a part of me ever since.

As an adult, I had the opportunity to learn even more about the Commonwealth's unique resources from a lot of very good people. One who stands out was Congressman Joe Moakley. (Elected to the Massachusetts state Senate in 1964, Moakley went on to serve as U.S. Representative for the Massachusetts 4th Congressional District for almost 30 years.) Alone among all of the legislators with whom I served, he was the guy that helped us understand how important Boston Harbor and its islands were to the Commonwealth and its people. And in those days, 13 of those islands were privately owned, the harbor was a cesspool, and even the islands that were publicly owned left

a lot to be desired. In the late 1960s, Joe was the leader in the effort to clean up the harbor and acquire the islands, and with a little help from the rest of us, in 1970 legislation was passed authorizing the state to acquire all of the harbor islands. Despite that legislation, it was not until I became governor in 1975 that the islands became part of the Commonwealth's holdings.

I remember telling Evelyn Murphy, my environmental affairs secretary at the time, to buy them even though we were dead broke and in frightful economic shape. She did—at a total cost of \$3 million for 13 islands! I can't even begin to imagine what their price would be in today's market. And so we began the process of creating a new Harbor Islands State Park system, setting the stage for a joint federal-state partnership and ultimately the highly successful cleanup of the harbor and its sewage treatment facilities.

In short, if you felt as strongly as I did about our environment and our historic heritage, it wouldn't take much to convince you that preserving our coastal and ocean environment was an absolute priority. And it is hard to describe to those of you who are a lot younger than I am (I was born in 1933—you do the math!) just how dramatically public consciousness and public opinion have shifted in the last 30 years to support such initiatives.

To give you an idea of how different the political climate was in the 1970s when I took office: one of the first decisions I had to make as governor was whether or not to order our utility companies to reduce the use of sulphur oil from two percent to one percent, a reduction that would result in less pollution from high-sulphur fuel. The business community was in an uproar at the prospect, arguing that we already had some of the highest utility rates in the country and that any state effort to pull us out of what was one of our deepest recessions since the Great Depression would be hurt by this pro-environment decision.

And nothing beats the day we celebrated the acquisition of Halibut Point in Rockport. I'll never forget it. Despite pouring rain, we signed the bill outdoors—I'll never forget how hard it was raining!—and it remains one of the state's great treasures. Kitty and I still love driving up to the North Shore, buying fried clams along the way, and then going to Halibut Point to eat our clams and gaze out at the ocean and the coastline of three different states all at the same time. If you haven't had that opportunity, then do it, and you will understand why being the governor of this state is the best job in the world.

These days, of course, we face new challenges. Global warming, and what it could potentially do to our remarkable coast if we don't do something about it, is an issue that cannot be ignored. Former Vice President Al Gore is one of my heroes for his leadership on the issue, and if there is any place in the country that ought to consider how seriously global warming could affect our beaches, coasts, and life as we know it, it's New England.

“Global warming, and what it could potentially do to our remarkable coast if we don't do something about it, is an issue that cannot be ignored...”

It was not a politically popular move, but I made the decision to reduce the use of sulphur oil to one percent. Today, we can't even understand why such a thing would be up for debate. We permit only a tiny fraction of the sulphur that was allowed even under the one percent standard, and nobody would have it any other way.

Given how strongly I felt about the environmental health of the Bay State's air and water, signing the Massachusetts Coastal Zone Act in 1983, after beginning the coastal management program in 1978 during my first administration, was a no-brainer. Following up on it with major bond issues that permitted the Commonwealth to acquire South Beach on Martha's Vineyard and South Cape Beach in Mashpee were very special moments in my public life.

In the meantime, all of us can lead by example by being active environmentalists. These days, thanks to the recycling programs set up within many towns and cities in Massachusetts, we recycle much of our waste without giving it a second thought. But chances are good that there are even more things all of us can do in our daily lives—be it something as simple as carrying a cloth bag to the grocery store, to picking out a car based on its fuel efficiency.

For my part, I am still riding the T every chance I get, armed with my senior card and paying 65 cents a ride—the best value, as I like to say, in America. People see me on a subway or streetcar and will say to me, “You're still riding the T?” And I say to them, “I rode it when I was governor. Why wouldn't I ride it now that I am just a civilian?”

The Birds of the Harbor Islands

By Christopher Klein, author *Discovering the Boston Harbor Islands*

The Boston Harbor Islands is considered an Important Bird Area by organizations such as the Massachusetts Audubon Society. A variety of habitats (marine, rock cliff, beach, salt marsh, and forest) support more than 100 species.

Many species of waterbirds nest on the islands. It is common to see large colonies of Double-crested Cormorants, Herring Gulls, Great Black-backed Gulls, and Common Eiders on the rocky shores and scrub habitats of the outer islands. A colony of Least Terns, a state-listed species [of special concern (i.e., could become threatened)] occurs on Rainsford Island.

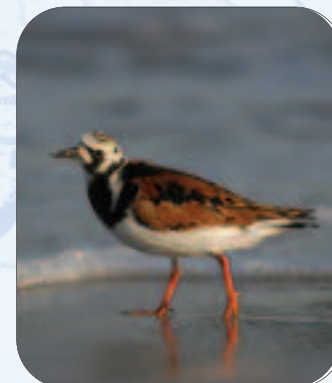
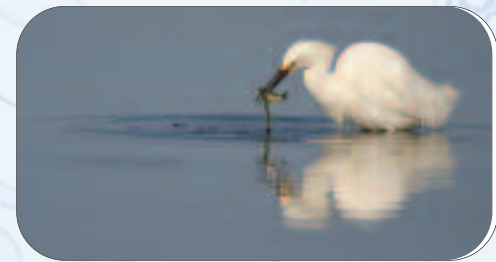
Black-crowned Night-Herons, Snowy Egrets, Great Egrets, and to a lesser extent, Glossy Ibis, breed among the islands as well. These wading birds nest in the trees along the coastline. Sarah Island has the largest wading bird colony in the harbor. Recently, American Oystercatchers were recorded on Slate, Lovells, and Snake Islands.

As suspected, smaller islands have less diverse populations of breeding landbirds than larger islands. It is believed that Peddocks Island has as many as 34 breeding species. Landbirds such as Song Sparrows, Red-winged Blackbirds, and Yellow Warblers are common to the area. The more widespread Savannah Sparrow can be found nesting on the restored grasslands of Spectacle Island.

Migrating shorebirds are most commonly found on Snake, Rainsford, and Great Brewster Islands from July through August. In the past, sightings have included Black-bellied Plovers, Purple Sandpipers, and Ruddy Turnstones.

Park managers use the size of the breeding bird populations and the number of nests, eggs, and chicks to gauge the environmental health of the park. Breeding season occurs from May through the end of July. The public is asked to respect this delicate stage in the life cycle and not to disturb the colonies while they are at work.

Bird lovers should check out eBird, a database for birdwatchers. Contributing your observations will help scientists understand species distribution and movement patterns in Massachusetts and across the continent. www.ebird.org.



A glimpse of some of the more than 100 kinds of birds found on the Boston Harbor Islands. Clockwise: Eider (female), Snowy Egret, Ruddy Turnstone, and Purple Sandpiper.





Conservation Commissions in Action on the Coast

By Betsy Rickards, CZM and member of Marblehead Conservation Commission from 2000–2008

The Conservation Commission. For those coastal residents who face them with development proposals, the name evokes fear or maybe frustration; for those who live next to the proposed development, the name conjures up hope for protecting the land, their view, or the seashore critters; for those who don't live near a resource area, the name suggests...wait, who?...and what's a resource area? Let me take the opportunity to clear up the role of a Conservation Commission within a coastal community—for those who know them, those who think they know them, and those who don't know they exist.

A CONSERVATION COMMISSION IS AN APPOINTED VOLUNTEER BOARD consisting of everyday residents who dedicate many hours each month to promote stewardship of local conservation lands and to implement the Massachusetts Wetland Protection Act and Regulations, as well as any local wetland bylaws. (For state laws and regulations, go to Massachusetts Department of Environmental Protection's website at www.mass.gov/dep/water/laws/regulati.htm; see your municipality's website for local bylaws.) These wetland requirements cover many different resource areas, including coastal beaches, dunes, banks, barrier beaches, coastal land subject to flooding, and port areas, as well as inland resources, such as bordering vegetated wetlands, rivers, and vernal pools.

While they're at it, Conservation Commissions also implement stormwater management standards to stop unpleasant pollutants from entering coastal waters, and oversee compliance and coordination with other state and federal permitting agencies that deal with such issues as fisheries, water quality, and public tidelands. For coastal communities, where the entire shoreline is a resource area, the Commission must manage a profusion of project reviews that require an entirely different, and usually very complex, set of rules for protecting these moving, shifting, and changing coastal landforms.

To do all this, your average coastal Conservation Commissioner must attend training seminars to learn coastal processes and delineations, hydrology, fisheries and shellfish biology, plant and soil science, and engineering and construction methodologies. They must become skilled at interpreting plans and legal documents—i.e., laws, regulations, and policies. They must adhere to administrative procedures and open meeting and conflict of interest laws, and they are obligated to deliberate and reach a fair decision for every project. They must take a hard line against those who disregard the regulations, and often engage in contentious battles with applicants, abutters, and sometimes each other.

It is not always an easy job and volunteers are rarely praised for their efforts. But, for those unsung heroes who persevere, the reward is that every hearing, every deliberation, every permit is one small step toward protecting the coastal (or inland) ecosystem from further human disruption. With all the buzz about global climate change and sea level rise, coastal Conservation Commissions can be satisfied that they have been working long and hard at the local level to protect the resources that reduce erosion and storm damage, prevent pollution of the waterbodies, and preserve habitats. The combined efforts of these Conservation Commissions help maintain those natural sedimentary

To avoid adverse impacts to the shoreline from the construction of this house, a local Conservation Commission maintained a no-build setback from the coastal bank, encouraged the planting of native coastal species, and implemented standards to control stormwater from draining into the ocean and onto adjacent properties.



processes to stave off storm damage and protect development; protect stabilizing vegetation along banks and dunes to control erosion, filter pollution, and offer habitat for fish and wildlife; and reduce (or set back from the shoreline) the footprint of a house and driveway to minimize the risk of flooding and reduce the amount of polluted runoff that enters the stormdrains and the harbors, bays, and ocean.

These benefits are shared by all coastal townspeople, as well as tourists and visitors. Unbeknownst to a coastal homeowner now, a setback requirement may spare a house the fate of falling into the ocean when sea levels rise! Call them martyrs or call them rosa-rugosa-huggers, the Conservation Commission is the first line of defense for our local resources, and in sum, for the entire Commonwealth and its coastal waters. So, if you're thinking about what you can do to support the environment, you may want to consider a stint on the board. Joining your Conservation Commission is one of the best avenues to reach out at the local level to influence smart development along the coast, and bear positive effects on the natural resources around you. Looking for a piece of action (environmental action!) need not take you on a trek to witness the melting of the ice caps—you may accomplish just as much from a trip out your back door to a local Conservation Commission meeting.

Photo: Betsy Rickards



30 Easy, Every Day Tips for a Greener, Bluer World

By Arden Miller, CZM

Recognizing how vital coastal and marine resources are, and how many people want a piece of them, the U.S. Congress passed the Coastal Zone Management Act (CZMA) in 1972 to help balance human activities (development of wharves, dredging harbors, building waterfront property) with ecological conservation (there are sea creatures, like the prehistoric horseshoe crab, that have been making these areas home since way before there was a Congress to pass laws to protect them). In 1978, Massachusetts became the first state along the eastern seaboard to receive approval from the National Oceanic and Atmospheric Administration (NOAA) for its coastal zone management plan. Since that time, the Massachusetts Office of Coastal Zone Management (CZM) has helped find the balance on issues—from monitoring the spread of invasive species like rock snot to making sure that new developments along Boston’s Harbor Walk have public space—that affect coastal Massachusetts.

But protecting the coast is not done by CZM alone. As one presidential hopeful once said, it takes a village. Or, in the case of Massachusetts, a mix of government agencies, coastal and inland residents, scientist, and volunteers. There are things everyone can do to get involved: COASTSWEEP, the annual beach clean up organized by CZM (see article on page 22 and www.coastswep.umb.org) is an easy and fun one. There are numerous volunteer groups looking for intrepid observers of all ages to monitor species, wetlands, and more. And there are many little things most everyone can do every day that will help lessen debris, protect marine life, and make our water and air cleaner. **So here’s to 30 years of officially recognizing that the coast is a valuable resource worthy of protection, and 30 tips you can use to make the next 30 even healthier...**

a brief history of coastal zone management }



EAT YOUR VEGGIES! - If the average person replaces meat meals with vegetables, soy products, and pasta every other day for a year, an estimated 487 pounds of CO₂ would be saved annually (source: www.eartheasy.com). So have a peanut butter (or soy butter) and jelly sandwich instead of a turkey club. For each day you pack a PB&J for lunch, you save around 2.5 lbs of CO₂.

SOFT CELL - Charge your cell phone in the car while driving instead of at home; you'll use energy already being created by the running engine.



BABY SWAPPING - Not the actual babies, but their clothing. Since they grow so fast, and Juicy Couture can be expensive, look for baby items at thrift stores and on-line clothing swap sites. On many swap sites, your baby can get used "new" clothes for the cost of shipping (and you can off load your child's outgrown clothing at the same time).

GREEN ROOFTOPS - More and more commercial buildings are benefiting from plant-topped rooftops (water is soaked up by plants, lessening stormwater runoff, and owners see a 20-60 percent savings in heating and cooling costs thanks to the natural insulation)—and they are becoming more economically feasible for homeowners. For a list of Massachusetts companies that install green roofs, see www.greenroofplants.com/green_roof_links.htm.

CFL YOUR L-I-F-E - Compact Florescent Lightbulbs come in just about any size and shape, even dimmable. They cost more, but more than pay for themselves. (According to *Consumer Reports*, each CFL saves \$24-45 over its lifetime.)



1978 - Massachusetts is the first state on the eastern seaboard to receive federal approval for its coastal management plan.

1979 - CZM begins its regional program, providing liaisons to work directly with coastal communities and coordinate regional initiatives.

1980 - The Oil Spill Contingency Planning Program is inaugurated and administered by CZM—funding regional plan development, training, and oil spill containment equipment.

1981 - CZM receives a federal planning grant to lay the foundation for the Waquoit Bay National Estuarine Research Reserve.



WELL, I'M NOT SURE ABOUT THE GROOM, BUT I DO LOVE THE GREEN - If you are getting married, or know someone who is, this link has a lot of great eco-

friendly wedding ideas: [www.care2.com/](http://www.care2.com/greenliving/green-weddings-say-i-do-to-green.html)

[greenliving/green-weddings-say-i-do-to-green.html](http://www.care2.com/greenliving/green-weddings-say-i-do-to-green.html).

And for the super-green bride-to-be, look on-line for wedding dresses made from organic silk, or go vintage.

CLEAN OUT YOUR MAILBOX - Stop all that junk mail from clogging up your mailbox! Register at www.catalogchoice.org and you'll never have to look at another *Barn of Pots* catalogue again!



TOAST YOUR INNER ENVIRONMENTALIST WITH ORGANIC WINE - What makes a wine organic? The vineyards that produce the grapes use owls, bats, hawks, ladybugs, and songbirds instead of insecticides to control pests—this makes for a naturally tasty wine, and means that chemical by-products are not ending up in our water bodies. There are a number of U.S. vineyards employing these natural techniques, and an increasing number of restaurants and stores are carrying organic brands. If your favorite wine store or restaurant does not, ask them to. Who knows—someday they could hold an organic wine tasting in your honor.

CLEANER OCEANS/CLEANER BOATS - Using non-toxic cleaning agents to keep your Boston Whaler sparkling means cleaner water for the whales. Exterior surfaces (chrome, windows, decks, stainless steel, and plastic) can be cleaned with a solution of one part vinegar: two parts water. Interior wood surface can be polished with either almond or olive oil. Brass can be cleaned with a mixture of equal amounts vinegar, salt, and water. Lastly, fiberglass stains can be banished with a paste made of baking soda and water (rinse with lemon or lime juice).



KILL INSECTS WITH KINDNESS - Or at least keep them away with natural deterrents. A list of non-chemical, natural insect repellents is available at: www.eartheasy.com/live_natpest_control.htm.

1982 - CZM releases a report on PCB (polychlorinated biphenyl) pollution in the New Bedford area, which leads to Superfund designation and millions of dollars in cleanup funding.

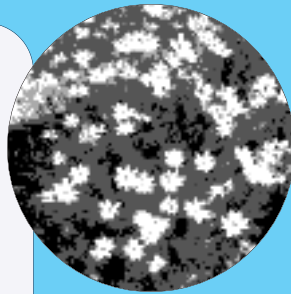
1983 - The Massachusetts Legislature formally designates CZM as lead state agency for implementing the coastal program.

1984 - Massachusetts wins a lawsuit to halt oil and gas lease sales on Georges Bank.

1985 - The Buzzards Bay Project, administered by CZM, becomes one of the first four National Estuary Programs in the country.

1986 - CZM launches a Harbor Planning Program to coordinate technical and financial assistance to coastal communities.

GO NATIVE - If you have a yard or outdoor space, buy plants that are native to Massachusetts. They will be able to withstand temperature shifts typical of New England, and require no-to-little watering (the average sprinkler uses five gallons of water/minute, which adds up fast!). For a list of native plants, see: www.fhwa.dot.gov/environment/rdsduse/ma.htm.

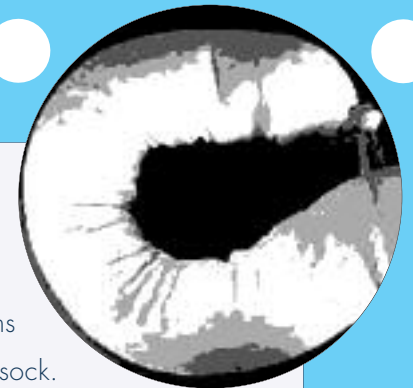


GIVE YOUR CLOTHES THE COLD SHOULDER (Er, cold cycle) - With the exception of cloth diapers and really, really greasy stuff, cold water will get your clothing just as clean as warm or hot, and will save you money and reduce your carbon footprint. (During an average wash cycle, 80-90 percent of the electricity used goes toward the water heater.)

EVITE, IT'S THE NEW INVITE - If you are having a party, or hosting a social event, consider sending invitations via email, or using evite (www.evite.com)—it's free and easy to use, and saves postage and paper. For more formal events that need that old-fashioned touch—weddings, baht mitzvahs, and coming out parties—use recycled paper made from post-consumer waste for your invitations. Better yet, use recycled paper made with plant seeds; your guests can plant the invite (it's biodegradable!) and remember you forever (or at least as long as the plants live on).



SOCK IT TO ME! - If you have a boat, you can decrease the chances of oil leaking into the oceans by always using a bilge sock. Socks are inexpensive—in some communities, they are even free—and easy to use. For a how-to tutorial, see www.mass.gov/czm/marinas/bilge-socks.htm.



1987 - CZM releases *Passive Retreat of Massachusetts Coastal Uplands Due to Relative Sea-Level Rise* and completes digital maps showing projected sea-level rise for three harbors.

1988 - CZM chairs the Boatyard Preservation Program Committee, which develops a strategy to protect the limited number of existing boatyards from dwindling further.

1989 - CZM completes the first historical shoreline change digital mapping project for the Massachusetts coastline, covering the years from 1850-1978.

1990 - The Massachusetts Bays Program, administered by CZM, becomes the state's second National Estuary Program .

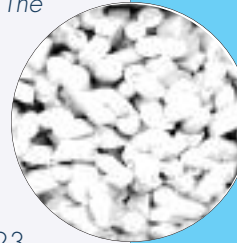
1991 - CZM develops and deploys the Rapid Response and Storm Damage Survey Team to help speed disaster aid after Hurricane Bob and the "Halloween" storm.

LOVE THE LOW FLOW - When it's time to replace your toilet, go low flow. Traditional toilets use 3.5 gallons/flush, whereas a low-flow uses 1.6 gallons. The math on this one is easy; you are using less than 1/2 of what you used to use by going low flow. (The average person uses 27,300 gallons of water flushing their toilet/year...)



ONE WORD FOR YOU SON: PLASTICS -

Yes, plastics were the wave of the future when Dustin Hoffman's character in *The Graduate* was given this piece of advice. And they still have their place in our lives, but all those little packing peanuts? If you don't want yours to become landfill, there are 23 places in Massachusetts where you can drop your peanuts off for re-use. To find out where, go to: www.loosefillpackaging.com.



THE POWER OF THE GREEN -

Money talks, so send the message that you are in favor of renewable energy sources by telling your power company you want to switch to green power. In most cases, the additional cost each billing cycle is \$5. Sending the message that you are willing to invest in renewable energy? Priceless.

KEEP THE HEAT IN YOUR HOT WATER - If you aren't ready for a solar water heater, you can still make a huge difference just by setting your hot water heater to 120 and wrapping it in a water heater insulating blanket. Instructions can be found at www.eere.energy.gov/consumer/your_home/water_heating/index.cfm/mytopic=13080.

GOT STEEL? - Steel, found in many appliances and cars, is North America's most recycled material. To find out if there is a steel recycling receiver near you, see

www.recycle-steel.org/database/

[main.html](http://www.recycle-steel.org/database/main.html) or call 1-800-

876-7274 x201.



1992 - With CZM assistance, the coastal waters of Wareham are designated as the first boat sewage No Discharge Area on the East Coast.

1993 - Stellwagen Bank is designated as the first National Marine Sanctuary in New England.

1994 - CZM develops *Guidelines for Barrier Beach Management in Massachusetts*, the nation's first guide to balancing competing uses on barrier beaches.

1995 - CZM produces the *Aquaculture Strategic Plan*, forming a framework for the the aquaculture industry, and releases *The Massachusetts Coast Guide*.

1996 - CZM launches its first website, providing easy access to information on coastal issues and CZM programs.

DRY CLEAN GREEN - For years, drycleaners have used petroleum-based cleaning agents. The by-products can cause air pollution and pollute the soil and water. And do you really want petroleum-based residue next to your skin? A relatively new dry-cleaning process that uses nontoxic silicone is being used at close to 20 Massachusetts drycleaners. To find one: www.greeneearthcleaning.com/roster.asp.



TRAVEL GREENER - When you go on a trip, look for an eco-friendly hotel. If you cannot find one, or have a preferred hotel that you don't want to give up, consider keeping the same bed linens and towels for the duration of your stay. If you are flying, buy your tickets online and use e-tickets (i.e., you check in electronically with your credit card) instead of the traditional paper tickets. You'll cut down on paper use, and if the e-ticket is lost, it's easier and cheaper to replace.



BEAUTY IS ONLY SKIN DEEP, BUT EVERYONE NEEDS TOOTHPASTE! - Do you know that a lot of beauty products (even things like unscented lotion) contain toxic chemicals? The good news is that you can replace these with natural ones. This non-profit environmental consumer product site can tell you what dangerous things lurk in your lotions, shampoos, lipsticks, and mouthwash, and rates products' risks so you can choose the toxic-free alternative in the future. To find your medicine cabinet's risks, please go to www.cosmeticsdatabase.com.



1997 - CZM is one of the first four states in the country to receive federal approval for its Coastal Nonpoint Source Pollution Control Plan.

1998 - CZM and MassAudubon develop the award-winning Green Neighborhoods initiative, reshaping suburban development to minimize environmental impacts.

1999 - Gloucester becomes the first of the "four ports" assisted by CZM to complete its municipal harbor plan to revitalize its waterfront.

2000 - CZM and Woods Hole Oceanographic Institute Sea Grant hold the Science and Management of Dock and Pier Construction Workshop to support local management efforts.



CROCK POTS ARE HOT - Unlike orange shag carpet, not everything from the 1970s is tragic. Slow cooking meats or making stews and soups in crock pots is a far more efficient use of energy than stove top simmering. Not to mention, there's just one pot to clean up after the meal is done—a nice bonus for your water bill and the person who has to do the dishes. And, thanks to the on-line crock pot devotees of the world, you are mere mouse clicks away from an astounding variety of modern day recipes.

SOY-A-NARA PETROLEUM CANDLES! - Replace paraffin candles with soy candles; they don't pollute the atmosphere (traditional wax candles are made with petroleum by-products), and they are slower to burn, so they last longer. Many stores carry soy candles (if your local candle store doesn't, request them). For the more ambitious/crafty, there are do-it-yourself sites on-line that can walk you through the joys of making your own candles of soy.



THE FABRIC OF OUR LIVES - When buying new clothing and sheets, look for organic cotton. Non-organic cotton is grown and processed with toxic chemicals. In places like Uzbekistan (the second-largest cotton exporter in the world), high rates of TB and cancer and ecological devastation from toxic chemical dust are directly linked to cotton production.



Photo - Pants On Line: Miles Freedman

SLOW AND STEADY - While the turtle doesn't always beat the hare, you will win by obeying no-wake speed limits while boating by reducing wake-induced erosion of fragile salt marshes and other shoreline habitat.



2001 - CZM kicks off the Clean Marine Initiative, providing cleaner boat engines to municipalities, free bilge socks and pumpout information to boaters, and technical assistance to marinas.

2002 - CZM leads the effort to complete the *Massachusetts Aquatic Invasive Species Management Plan*, which sets management priorities and provides an implementation timeline.

2003 - Staffed by CZM, the Massachusetts Ocean Management Task Force is charged with developing recommendations for a comprehensive approach to managing ocean resources.

2004 - CZM launches the Coastal Smart Growth Program to support real-world growth management that protects coastal resources and public safety.

2005 - CZM creates Coast Guide Online, with 22 maps and brief descriptions of nearly 400 coastal public access sites from Salisbury to Hingham.

IT'S THE (REALLY) LITTLE THINGS - No one wants lint on their clothing. But if your dryer's air ducts are clogged, you'll have lint and your dryer (Energy Star or not) will be using more energy than it has to. Remove the ducting from the rear of the dryer and take it outside. Spray the inside with a pressure washer or suck out the gunk with a wet/dry vacuum. When it's dry, reconnect to dryer. Doing this a couple times a year saves you money—on average \$3/month—and means about 200 pounds of carbon emissions won't be released into the atmosphere.



'CUZ THEY DON'T ALWAYS KEEP GOING AND GOING AND... There are many sites that accept your rechargeable batteries (from power tools, laptops, cameras, and more) and old cell phones, keeping them out of the waste stream. I found 21 locations in Boston alone. To see if there are sites in your area, go to www.rbrc.org/call2recycle.



PAINT IT LOW-VOC - If you have a paint project, purchase zero or low-VOC (volatile organic compounds) paints. Your air will be cleaner (according to the U.S. Environmental Protection Agency, indoor air is one of the top five hazards to human health and paints are among the leading culprits), and the environment will be less volatile.

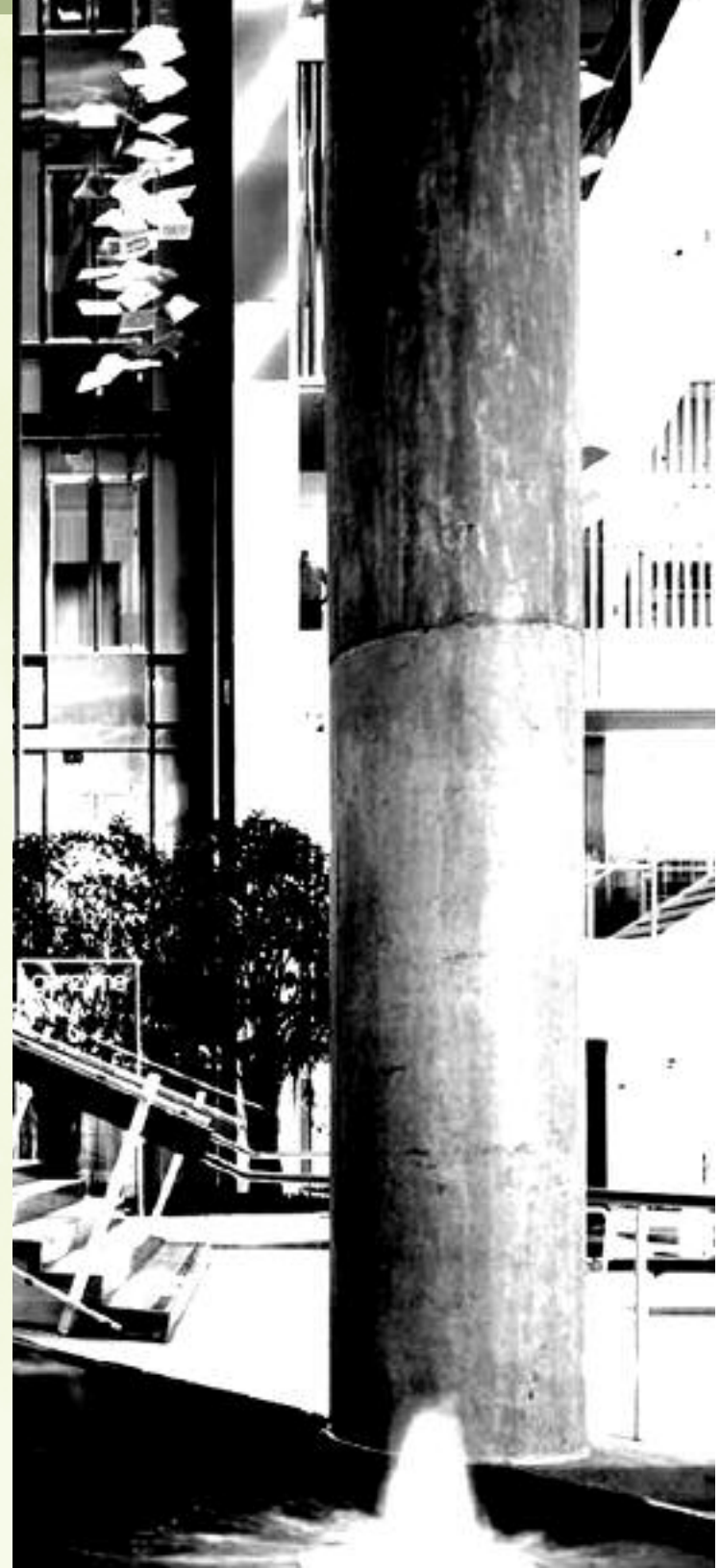
QUE ES FREEGAN?? - You don't have to embrace every aspect of recycling to appreciate getting free stuff. Give your unwanted stuff a new home, and look for things you need by joining the Freecycle Network. Membership is free, and there are more than 4,000 groups across the globe. It's all about keeping that StairMaster you never use out of a landfill...



2006 - The Coastal Hazards Commission is launched to address erosion, flooding, sea-level rise, and other coastal hazards issues that threaten coastal development.

2007 - COASTSWEEP, the statewide beach cleanup sponsored by CZM, celebrates its 20th anniversary and the work of thousands of volunteers in cleaning up hundreds of miles of shoreline.

2008 - CZM introduces StormSmart Coasts, a program designed to support local efforts to protect people and property in coastal floodplains from erosion and storm damage.



Greener Green, Inc.

The Business of Building Green

By Andrea Cooper, CZM

In the United States, buildings account for our 65 percent of electricity consumption, 36 percent of energy use, 30 percent of greenhouse gas emissions, 30 percent of raw materials use, 30 percent of waste output (136 million tons annually), and 12 percent of drinking (“potable”) water consumption. Sounds like a black hole of consumption and pollution. But it doesn’t have to be that way. And, fortunately for the planet, “green buildings” are sprouting up all over the United States. Since 2002, Massachusetts has been very active in this movement, and the momentum is definitely showing no sign of slowing down.

So what exactly is a “green” building and why are they preferable to conventional buildings? Simply stated, a green building is an environmentally responsible, profitable, and healthy place to live and work. In fact, there are national standards for the design, construction, and operation of an officially certified green building. It’s called Leadership in Energy and Environmental Design (LEED), and was developed by U.S. Green Building Council in 1993. LEED is a national rating system for sustainable site development, water savings, energy efficiency, materials and resources selection, and indoor environmental quality. Each LEED rating standard is a tool for measuring the financial, environmental, and public health benefits for building owners and occupants. (Check out: www.usgbc.org for more information.)

Photo: Genzyme

Among the many LEED-certified buildings in Massachusetts, one that stands out is the Genzyme Corporate Headquarters in Cambridge. Sustainable site design, energy efficiency, water conservation, and recycling are just some of the reasons this building earned the highest LEED rating—platinum. Located close to an MBTA transit station and multiple bus routes, employees easily access public transportation. The building incorporates the use of “green” power from renewable sources, including solar. Efficient energy systems that monitor and control heat, humidity, and fresh air reduce energy consumption by nearly 40 percent compared to a conventional building of the same size. The toilets installed in the building are “dual flush” fixtures that can use different amounts of water depending on the need, and the urinals are waterless. Approximately 25 percent of the roof area is covered with a green roof system landscaped with low-maintenance succulent plantings, irrigated by direct rainfall. Overall, the building uses one-third the amount of water that a conventional building would use, for a savings of approximately 525,000 gallons of water annually.

The building that is home to Genzyme has an abundance of natural light through more than 800 operable windows, a 12-story open atrium design with a skylight, and direct views of the outside from 80 percent of the work spaces. Careful consideration of building materials resulted in the use of 23

Genzyme's atrium (left) is 12-stories high and provides an abundance of natural light.

Energy Star: Not Just another Pretty Graphic



Energy Star is a joint program of the U.S.

Environmental Protection Agency and the U.S. Department of Energy that identifies energy-efficient products and practices. As further incentive to builders, those that complete Energy Star homes are eligible to receive a \$2,000 federal tax credit per unit, in addition to other incentives for heating or renewable energy production. Builders also receive free consulting and training for subcontractors as participants of the program. Buyers may also qualify for energy-efficient mortgages.

Did you know that green roofs can help reduce road runoff pollution to coastal waters?



What's a roof?



percent recycled materials. More than 60 percent of the materials used were from local sources, and all the virgin woods used came from forests that are managed specifically for harvest (i.e., not taken from pristine or mature undisturbed forests). Additionally, 93 percent of the construction waste materials were recycled. For a virtual or group tour, see www.genzyme.com/genzctr/genzctr_home.asp.

The creation of a green building demands a collaborative design and construction approach between developers and tenants. In return for the investment of planning time, the building is cheaper to run (due to cost saving in energy and water usage), can command premium rents, contributes a higher quality of life for workers and greater employee retention, and delivers environmental and community benefits. Such benefits include lower air pollution, reduced heat island impact (i.e., the phenomenon in which city temperatures are hotter than rural temperatures due to the heat that is trapped by rooftops, roads, and parking areas), and attractive open space.

But, building green doesn't have to be limited to LEED-certified urban skyscrapers. How about a green home in the 'burbs? In Tynsborough, Massachusetts, Carter Scott of Transformations, Inc. completed a five-lot subdivision, Marla Circle, which incorporates water quality and conservation techniques, green building materials and



energy-efficient features. Rain gardens and naturally vegetated areas filter and infiltrate stormwater runoff into the groundwater to preserve drinking water supplies. In each home are 2.4-kilowatt photovoltaic systems (converting sunlight into electricity—saving money and reducing global warming), paint with low-toxic fumes, prefinished oak flooring, high-performance furnaces and windows, and Energy Star-certified lighting (see Energy Star sidebar, left). All together, these homes are at least 30 percent more energy efficient than their conventional counterparts.

Completed in 2005, the Marla Circle homes (priced at \$439,000 to \$489,000) sold quickly, meaning the developer had lower carrying costs and better bottom-line profits. Both buyer and builder went green with no remorse! For more information, contact R. Carter Scott, President of Transformations, Inc., at rcarterscott@msn.com or (978) 597-0542.

What's ahead? Global warming predictions have everyone thinking about going green. The United States Green Building Council has noticed the progress made in Massachusetts and is holding their 2008 conference in Boston. State agencies like the Massachusetts Office of Coastal Zone Management (CZM) are working directly with municipalities to institute sustainable development principles for green growth. But, we still have much to do and one step forward would be an increase in the demand for the design, construction, and operation of green buildings. When there is an overwhelming demand to own or rent green commercial and industrial buildings, office spaces, homes, apartments and condominiums, more developers will service that demand. Wouldn't it be great if green became the conventional standard for all buildings when my infant grand-baby is old enough to buy her first home (with a spare room for Nana, of course)?

Leading by Example: Living with Ed By Arden Miller, CZM

To the millions of weekly viewers who tuned in to watch the Emmy Award winning drama *St. Elsewhere* (ABC, 1982-1988), Ed Begley Jr. is probably best known for his role as Dr. Victor Ehrlich. Since then, Begley has been seen in a variety of popular film and television shows, including *Six Feet Under*, *Best in Show*, and *Batman Forever*. But elsewhere, he is best known for his environmental activism. Long before the Prius was a glint in the automotive industry's eyes, Begley was tooling around Hollywood in an electric car (when he had to travel a distance too far to bike, that is).

"As environmental issues become more pressing, there are two possible responses: forget about it and hope that government and corporations will figure it out, or take action yourself," has been Ed's call to action. And take action he does. In addition to driving his electric car (a converted VW Rabbit), he lives in a house powered by solar panels and has further reduce his energy consumption with a variety of energy-efficient measures, including compact fluorescent light bulbs, a timed energy-saving thermometer, and double-pane windows for installation.

Since 2006, he's had an eco-reality show on Home and Garden Television (HGTV), *Living with Ed*, where he shares information about energy-reducing, earth-enhancing things people can do on a range of budgets. In this eco-reality show, he covers topics such as: keeping cool without air conditioning, growing your own organic produce, using water-powered garbage disposals, building with recycled materials, cleaning with products that don't harm the environment, finding flooring materials made from sustainable and recycled materials, and more. Following each episode, HGTV's web site lists product and contact information to help home owners everywhere embrace greener, healthier living. Like Ed and his electric car, it looks like eco-trends are here to stay...

For More Information

LIVING WITH ED: HGTV (check local cable listings for showtimes)

Tips and Resources

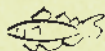
www.hgtv.com/hgtv/shows_hlwed
Living Like Ed (Random House, 2008)
available at local book stores



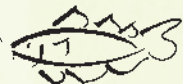
"As environmental issues become more pressing, there are two possible responses: forget about it and hope that government and corporations will figure it out, or take action yourself."

- ED BEGLEY JR.

I'm glad there are people on land who care about what happens to those of us who live in the water.



I know! Imagine how clean our water would be if *everyone* cared.



Well, let's not get *too* carried away. They are only human after all...



*“When you are coming up to the house, your view
isn’t cluttered with poles and electric wires.
You just see the trees.”*

*-VERNA DELAUER
On the aesthetic advantage
of living off the grid*





Living Off the Grid

By Arden Miller, CZM

For Joshua Cline, it began 18 years ago with the purchase of a 200-acre family homestead and conservation easement in Stoddard, New Hampshire. The easement constricted prohibited electric power lines that would sully the landscape. Even if this constriction hadn't been in place, the mere cost to have them installed—\$30,000 in 1989—would have made him re-think the power source. But instead he came up with a solution that benefited his wallet and complied with the easement: modular solar panels. If it weren't for the solar panels on the roof, and on posts in the ground, the post-and-beam house would be taken for an early 1800s New England farm house. In 2001, Cline's wife, Verna DeLauer, moved in and the couple has been navigating a life together off the grid ever since.

Q: What does “living off the grid” mean to you?

Josh: In a nutshell, it's a lifestyle change. Anyone could do it, but it takes more thought—you have to think about your energy consumption all the time. The first thing I do when I come home at night is check on the batteries to see how much power we have left. Because we are so aware of the amount of energy we are consuming, we have to make decisions on a daily basis about where to conserve.

Verna: You can do anything living “off the grid” that you can do on the grid, it just requires forethought. Things like hair dryers require a lot of power, so that's something I've reduced. I could use it, and I have, but when you see just how much energy using a hair dryer for 5 minutes takes, it's a sacrifice I'm willing to make.

Q: Are there visible signs of an “off the grid” life in or around your home?

Josh: The house faces south on top of a hill (for maximum exposure to the sunlight), and it's very open inside so that the heat from our wood burning stove can travel (walls block heat). There are some walls—the bathroom certainly has walls! We have a lot of plants to increase air quality, and there's a closet in the basement for the batteries that are all wired together. But we have most of the same stuff everyone else has. We are not suffering; we have a 27-inch LCD screen TV and a full basement.

Verna: The house looks like part of the landscape, and Josh used antique wood and tools to build the house, so other than the solar panels and more contemporary open inside, it really does look like an 1830s farm house.

Q: What was the most difficult adjustment you've had to make?

Verna: When my family and friends visit, I want them to be comfortable even though we can't always have a TV on or throw some popcorn in the microwave. We'd run out of power if they did that, so there's a balance to strike. I must admit, though, that I do miss microwave popcorn.

Josh: For me, it's the batteries. They need to be monitored daily, which can be time consuming, and every four to five months I need to put on goggles and rubber gloves—the batteries are full of hydrochloric acid—and check their water level and clean them. The other thing that isn't always easy is limiting shower time. Since it takes water to shower, and water takes energy to pump, there are no half-hour showers! I have my routine down to 3 minutes. Other than that, well, we don't have a toaster—toasters use a ton of energy—so sometimes I miss having toast. We can make it over the gas stove, but it's just not the same.

Q: What was the easiest part of being off the grid?

Josh: Our power never goes off. During the big ice storm of 1996, the neighbors were without water and heat and had to move into temporary shelter. We didn't even blink. We may need to think about our power usage, but we always have it.

Verna: It's nice aesthetically; when you are coming up to the house, your view isn't cluttered with poles and electric wires. You just see the trees.

Q: Have your costs increased or decreased since going off the grid?

Josh: The initial investment in solar panels was around \$9,000, and every 10 years the batteries get replaced. But, other than that...well, I am not familiar with current electric rates, but I'm pretty sure we're saving money if you amortize the original investment over all the years here. Also, since this is not a traditional house set up, the property is assessed at a tax rate that is 30 percent lower than a traditional one.

Q: What have you learned from living this way?

Verna: Living this way increases your overall awareness about your own actions, and transfers into other areas of life. Visiting family, on vacation, and on business trips I am aware of the resources that I'm using in a way that I wasn't before. I will admit that on business trips, I sometimes take advantage of being able to take a longer shower, and being able to blow dry my hair!

Q: Anything you would do differently if you had it all to do over again—advice for those who are considering going off the grid fully or partially?

Josh: I would advise people to buy as big of a solar system as they can afford from the start. Figure out your household's energy needs, then add on 25 percent. You'll be glad you did!



Photo: Joshua Cline

These Bills Are Killing Me! *By Robin Lacey, CZM*

With oil more than \$3 per gallon and other energy costs skyrocketing, the winter of 2007 was a budget buster for many citizens of the Commonwealth. Future pricing is uncertain, but there is one thing you can count on: using less oil, gas, and electricity will help both your wallet and the environment. Chances are there are many things you can do to increase the energy efficiency of your home and achieve significant savings.

Where do you start? An energy audit should be the first step to assess how much energy your home consumes and determine steps you can take to make your home more efficient. An audit will reveal where your house is losing energy, determine the efficiency of your home's heating and cooling systems, and may also show ways to conserve hot water and electricity. You can perform a basic energy audit yourself, or have a professional do a more thorough audit. Check with your provider—some companies offer their services for free, and others will perform the audit for a small fee.

The U.S. Department of Energy (DOE) has produced an online *Consumer's Guide to Energy Efficiency and Renewable Energy* that presents efficiency information including a section on Do-It-Yourself Home Energy Audits (see www.eere.energy.gov/consumer/). In Massachusetts, the MassSAVE public/private partnership provides free professional audits, rebate offers on recommended energy improvements, and low- or no-interest loans for improvements. Go to www.masssave.com for more information.

While the audit alone does not save any energy, it provides a starting point to tackle your home's energy consumption. The rebates and loan programs offered through your energy providers can help lessen the cost. In addition, the practices and Energy Star products recommended through an audit will not only enhance your home's energy efficiency, lower your utility bills, and increase comfort—by using fewer natural and man-made resources, they help to lessen your impact on the environment.

Links/Sources:

Energy Star www.energystar.gov

U.S. Department of Energy Office of Energy Efficiency and Renewable Energy

A Consumer's Guide to Energy Efficiency and Renewable Energy www.eere.energy.gov/consumer/

ENERGYguide Home Analyzer www.energyguide.com

NStar Residential Efficiency Home Page
www.nstaronline.com/residential/

Natural Gas Residential Efficiency Programs
www.gasnetworks.com/efficiency/resid_energyaudits.asp

Mass Save
www.masssave.com

Take Your Energy Use by the Reins and Lower Your Bills

By Robin Lacey, CZM

I personally had an energy audit of my home done in the spring of 2006 and was surprised to find that my family's high heating bills were due to lack of insulation (the house is only 50 years old), single-pane windows, and an inefficient boiler. Also, our central air conditioning system was more than 30 years old, so electrical bills were very high in the summer. Based on the audit recommendations, I have replaced 16 windows, air sealed the entire house, insulated the attic and walls in the older part of the house, installed a new 94 percent efficient boiler with an indirect hot water heater, and replaced the ancient air conditioning system and ductwork. As a nice side bonus, I received rebates on just about everything I did. The insulation work was done through NStar and was very inexpensive. Also, much of the work was financed through a \$15,000 no-interest loan provided through MassSAVE. You can find out about all these programs by visiting the MassSAVE website at www.masssave.com.

*We like the Energy Star.
They make less of that
icky stuff that gets into
the water.*



REAL

PEOPLE

REDEFINING

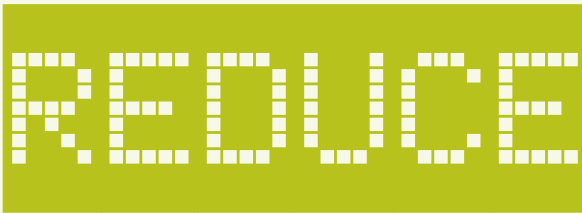
By Arden Miller, CZM, and Peter Hanlon, Massachusetts Bays Program

*As the environment makes the nightly news headlines regularly, a lot of phrases associated with being an environmentalist—“eco-friendly,” “green,” “environmentally conscious,” “sustainable development,” “carbon offsets,” “eco-sensitive choices,” “carbon footprint”—get bandied about so often that they become just another “think outside the box” cliché. And who needs clichés when we’ve got actions? **The following quotes are the answer to: “What do you do in your daily life to conserve resources?”***

“WE CHANGED ALL OF THE BULBS IN THE GOVERNOR’S OFFICE FROM REGULAR INCANDESCENT LIGHT BULBS TO ENERGY STAR COMPACT FLUORESCENT LIGHT BULBS, KNOWN AS CFLS. CITY YEAR VOLUNTEERS THEN WENT INTO LEGISLATORS’ OFFICES AND MEETING ROOMS TO DO THE SAME. SWAPPING 1,000 INCANDESCENT LIGHT BULBS IN THE STATE HOUSE WITH 1,000 COMPACT FLUORESCENTS WILL, BY ITSELF, SAVE TAXPAYERS \$15,000 A YEAR, CUT ELECTRICITY CONSUMPTION BY 128,000 KILOWATT HOURS, AND REDUCE CARBON EMISSIONS FROM POWER GENERATION BY 56 TONS. IT’S A SMALL START, BUT SUCH SMALL STARTS ADD UP TO BIG SAVINGS—IN OUR POCKETBOOKS, AND FOR OUR ENVIRONMENT.” –Governor Deval Patrick (Milton, MA)

“I usually walk to work. Now I have a state car when I need it during the day, but in my last job I used Zipcar. Last year, I got an energy audit at home from my electric utility. I’d already done a lot of energy efficiency upgrades—insulation, compact fluorescents, and all the rest—so they didn’t have a lot to suggest. But I did take their recommendation of a programmable thermostat, which automatically turns down the heat and air conditioning when no one’s at home, and I recently got an Energy Star washer and dryer for my house—they save a lot of energy and water (my two-year-old daughter produces a lot of laundry!).”

–Ian Bowles, Secretary, Executive Office of Energy and Environmental Affairs (Charlestown, MA)



“In the summer, when we go to the beach, I am militant about gathering up our trash to bring home to recycle. My kids think I am nuts (or embarrassing), but it’s a good way to make a small positive step toward clean beaches—and it keeps the seagulls away from my head!” –Leslie-Ann McGee, Director, Massachusetts Office of Coastal Zone Management (Kingston, MA)

“I’ve been fixing up our family cabin in Vermont and have thus far used several different recycled materials. Support posts and countertops came from fir and poplar trees downed by wind. The ceiling boards and exposed beams came from a 150-year-old local barn that was being dismantled. For the porch railings and spindles, we are using Christmas tree trunks that I collected from the Marblehead Transfer Station (aka the dump) and de-limbed after the holidays. Our insulation is “Ultratouch” from The Green Depot (Stoneham, MA), which is 85% post-industrial recycled natural fibers.” –Reese Rickards, Vice President, Morgan Stanley Private Wealth Management (Marblehead, MA)

“At Improv Asylum, we’ve rewired our stage lighting system to get rid of redundant electrical work, purchased new lighting cans, and replaced older bulbs with more energy-efficient versions. Now the lighting uses nearly a quarter of the energy that was required before. Oh, and my car stinks of beer from recycling all the theater’s beer cups...a small price to pay for recycling as long as I don’t get pulled over on the way home.” –Norm Laviolette, Co-owner, Improv Asylum (Duxbury, MA)

“A really simple one to start with: turn the water off when you brush your teeth. You’ll save about 20 gallons of water a week, which can add up to a lot of water!” –Julie Kramer, DJ WFNX 101.7 (Boston, MA)

“I have a little American flag on a tooth pick that I got off of a cupcake. I stuck it behind my thermostat at the beginning of the winter and every time I go to turn it up I remember the men and women fighting in the war. Then I go put another sweater on.” –Richard Downey, Dance Instructor, Harvard University (Roxbury, MA)

“I am addicted to Starbucks and go there for coffee at least once a day. Our recycling staff recommends reusable coffee mugs, so I bought a stainless steel travel mug and use that now. And a side bonus: the steel keeps the coffee hot for a very, very long time. I got out of a two-hour meeting the other day, and the coffee I bought before the meeting was still warm. Love that!” –Anthony Abruzese, Internet Strategy Unit, Department of Environmental Protection (Boston, MA)

"I got a water purifier for my faucet at home, and drink the purified tap water rather than buying water in big plastic containers. At work, I keep a ceramic coffee mug and use that instead of disposable ones."
–Paul Denning, Director Media Relations, MIT Sloan School of Management (Watertown, MA)

"I ride my bike to work, even when there's snow on the ground. Well, not when there's a major snowstorm, but a few inches of snow has never stopped me." –Joshua Wilson, Quality Assurance Engineer (Brookline, MA)

"I don't subscribe to a newspaper—I read the news on-line instead. And I carry around a re-usable metal water bottle instead of buying bottled water when I'm traveling."
–Kelly McCutcheon-Adams, Director, Institute for Healthcare Improvement (Cambridge, MA)

"Instead of using bubble wrap or plastic peanuts, I use my recycled shopping bags and periodicals as packing insulation when sending things to clients."

–Jim Hill, Photographer (Lowell, MA)

"I can't take credit for this one--I heard it on NPR, but it's worth sharing because it's so simple and brilliant. If you just move the tabs on all your Word documents from an inch to half an inch on each side--just enough to clear the amount the printer prints out--and then single space the documents, over time Word users can save about a zillion trees and gallons of water!"
–Elissa Traher, Graphic Designer/Owner of Traher Design (Lexington MA)

"Instead of using paper bags, my husband and I pack our kids' lunches in re-usable cloth bags—they've had the same ones for nearly 3 years now! We also use Thermoses instead of disposable juice boxes."
–Rebecca Perlo, Physician Assistant, Lahey Clinic (Arlington, MA)

"I've stopped driving aggressively. It started as a safety and stress-reduction thing. Then I read about how much more gas you consume with all the quick accelerating and braking. I try to remember that when I'm tempted to get back at someone for cutting me off."
–Rachel Eastwood, Graphic Designer & Production Manager, Harvard Medical School (Melrose, MA)

"Sadly, the E Street Band does not often...ever... play backup during my shows. For that reason, my dependable backup boombox ("The D.A.") is powered by rechargeable batteries. The D.A. then comes alive... like a spirit in the night." –Pat Healy, Lead Singer, Uke Springsteen (Somerville, MA)

"I put all my non-meat kitchen scraps, non-recyclable paper, and yard waste (grass clipping, leaves, etc.) into a compost bin in my backyard. I toss in some peat moss and lime from time-to-time, and stir it every few weeks. A good compost pile actually generates its own heat and will often be steaming on cool days. I empty it into my garden twice a year (usually in the fall and spring)." –Ethan Nedeau, Owner of Biodrawversity (Amherst, MA)



“I save plastic bags from the grocery store and use them to dispose of cat litter.” –Adriana Jenkins, Public Relations Consultant (Watertown, MA)

“When the skunks dug up our grub-laden lawn, we tilled it and planted a wildflower meadow with native flowers and grasses. The upkeep is easy—it just needs to be mowed every other year. We watered it at first, but stopped once the plants got established. And the grubs are gone without any pesticides—and the birds love it!”

–Jim McGrath, Registered Nurse, Brockton Visiting Nurse Association (Easton, MA)

“I sold my car and walk everywhere. It took some getting used to at first, but I don’t miss the parking tickets! I have also been training for the Boston Marathon, so I will sometimes run to my destination instead of taking a cab. I’m getting more exercise, and saving money at the same time.” –Jodi A. Wolin, Chief Development Officer, Massachusetts Children’s Trust Fund (Boston, MA)

“I figured since every month I was panicking and paying my bills at the last minute, I might as well request the paperless billing option to avoid horrendous late fees. I saved some trees and my sanity. Everyone wins!”

–Cathleen Carr, 1/2 of the comedy duo Two Girls for Five Bucks (Somerville, MA)

“I travel a lot, whether for work or bird watching around the globe. So before I leave home I make sure to turn my thermostat down to 52 degrees, unplug my television (it still draws electricity even if it’s off), and set my water heater to its ‘vacation mode’ to minimize how much energy my house uses while I’m away.” –Jan Smith, Executive Director of the Massachusetts Bays Program (Marblehead, MA)

“I don’t have a place in my yard for compost, but my city recycles lawn clippings, so I put all my compostable items (kitchen scraps, paper, etc.) out with my lawn clippings.” –Tim Dreher, Owner, Dreher Physical Therapy (Newton, MA)

“My husband and I have always recycled the obvious paper stuff, but we’ve been expanding upon that lately. Basically, we recycle every scrap of paper or cardboard that we bring into our house—food boxes, bread inserts (e.g., the piece of cardboard that holds English muffins in their bag), the cardboard around a pack of sausages, egg and berry containers, the cardboard the drycleaner puts in the shirt—as long as it doesn’t have food scraps stuck to it, we recycle it all, down to the empty toilet paper roll!”

–Sari Kalin, Nutritionist (Arlington, MA)

“Emerson College’s recently completed Piano Row Residence Hall and Max Mutchnick Campus Center has been **LEED certified**. With the new facility, we had an opportunity to show how effective green construction methods can be, and by promoting development density, energy efficiency, and even employing rainwater collection, we feel we have been able to do just that.” –Tim Douglas, Assistant Director of Undergraduate Admission, Emerson College (Boston, MA)

“I installed a ‘set-back’ thermostat for about \$25 that will save me a lot of money on heating, and whenever possible, I bike instead of driving.”

–Todd Callaghan, Water Quality Specialist, Massachusetts Office of Coastal Zone Management (Somerville, MA)

“I pick up boxed scrap paper from a copy center in Boston and give it to my kids for drawing. After they use it, we recycle the paper.” –Lori Nollet, Graphic Designer (Cambridge, MA)

“I love to garden—both vegetables and ornamental plants. However, I do not like to use the hose to water my plants because I am concerned about my personal water use. Instead, **I collect water from my roof to water the garden, hanging plants, and perennials**. I have not used the hose to water my plants in years—not even during our recent hot, dry summers! Observing where water flows from my house has led to more vegetation around my home and less water in my basement. It is amazing how such a small effort of gathering rainwater can limit my impact on the water supply. (One note of caution: Standing water is prime mosquito spawning habitat. Cover your rain barrels. [I use a reused screen from an old door] to prohibit mosquitoes from laying eggs. Also, keep a vigilant eye on your standing water, as mosquitoes are crafty and will find any way into your rain barrels. If you see a mosquito larvae or pupae in the water, get a dip net and remove it.)” –Tony Wilbur, Marine Ecologist, Massachusetts Office of Coastal Zone Management (Beverly, MA)

“At home and in my business, I buy local products whenever possible. Also, I always try to carpool to shows and meetings with other local merchants.”

–Cory Clarke, Saucy CEO, Shootflying Hill Sauce Company, Inc. (Brookline, MA)

“WHENEVER POSSIBLE, I HANG CLOTHES OUT TO DRY. IF THE WEATHER ISN’T COOPERATING, I USE THE DRYER UNTIL THINGS ARE DAMP, THEN I HANG THEM UP TO AIR DRY. I ALSO HAVE SPECIAL DRYER BALLS—AS SEEN ON TV!—THEY REALLY DO DRY THINGS FASTER BY MAXIMIZING AIR CIRCULATION.” –Miles Freedman, IT Director, Greater Media Boston (Boston, MA)

“MY SON CALEB HAS COLLECTED SOME INTERESTING JUNK OFF THE STREET ON OUR WALKS, AND HE ACTUALLY MADE A REALLY COOL COLLAGE OUT OF IT FOR A FATHER’S DAY PRESENT ONE YEAR. A COUPLE OF OUR INTERESTING FINDS THIS YEAR INCLUDE A SQUASHED CELL PHONE AND A RHINESTONE BABY PHAT HEART-SHAPED EARRING. SO, WE’RE REUSING AND CLEANING UP THE NEIGHBORHOOD!” –Dana Ortegon-Spillors, Freelance Writer (Jamaica Plain, MA)

BUYING POWER:

Think Globally, Eat Locally

By Peter Hanlon, Massachusetts Bays Program

Buying groceries—it used to be so easy. A few coupons and some catchy jingles were all we needed to guide us toward what to eat for the following week. Perhaps inevitably, with more people concerned about their carbon footprints, the trips up and down the grocery aisle have become a bit trickier. The journey that food takes from the farm to our plate has finally become a hot topic at the dinner table.

A couple of points to stir the discussion: The average U.S. meal comes from five different nations and food now travels 1,300 miles on average from farm to market. Unfortunately, those off-season salads and fruits leave some big carbon footprints* all over our kitchen.

The response from many conscientious shoppers has been to eat locally grown and raised foods whenever possible. Those dedicated to this way of eating refer to themselves as “localvores” (the New Oxford American Dictionary “2007 Word of the Year,” by the way). Many choose locally grown food to cut down on the need for a lot of carbon dioxide-emitting transportation, thus shrinking their carbon footprint. However, calculating the climate change benefits of eating locally can be incredibly complex. For example, is food transported a short distance in small trucks less fuel-

consuming than food shipped long distance via railroad? Researchers have begun applying Life Cycle Assessment (the valuation of the environmental impacts of a product) to food production to help account for all elements used in growing food, from fertilizer to packaging to fuel to warehousing. But until this assessment becomes part of standardized packaging, consumers are left to navigate the aisles of the grocery store or co-op armed with their own best-guess assessments.

Perhaps the one assessment that doesn't require a lot of thought is this: eating both locally and seasonally has very straightforward benefits for both foodies and farmers. Farmers who sell directly to local consumers can focus on freshness, nutrition, and taste instead of the shelf life of their crops. Eating locally can help local economies

***Carbon footprint:**

A measurement, in carbon emissions, of the impact of our actions in terms of the contribution made to global climate change.

because farmers who sell to local customers receive the full retail value of their crop. Buying directly from local farmers also encourages the use of farmland for farming, preserving open space and keeping sprawling development in check.

Even if you're not ready to jump headfirst into eating entirely locally, you can take smaller steps, such as eating at restaurants that serve local food, shopping at farmers markets, or subscribing to Community Supported Agriculture (see *Meet a Burgeoning Localvore*, page 62).

"Early spring starts with asparagus and rhubarb, and segues into late spring with local strawberries and baby vegetables. Early summer we see more baby vegetables, baby root vegetables, and the greens that start coming in. By late summer the greens continue, the hearty greens appear, as do full-size veggies such as cukes, zucchini, and eggplant. Then the best part comes when we continue with awesome field greens and veggies— and the arrival of the heirloom tomato is a truly special time. Let's not forget about the corn and peaches and berries. Now we hit early fall and all of the aforementioned veggies are around and

Buying locally already has a profound effect on Massachusetts farms. According to the Massachusetts Department of Agricultural Resources, there are 6,075 working farms in the state, 80 percent of which are family owned, and they sell \$31 million worth of farm products per year directly to consumers.

Buying locally already has a profound effect on Massachusetts farms. According to the Massachusetts Department of Agricultural Resources, there are 6,075 working farms in the state, 80 percent of which are family owned, and they sell \$31 million worth of farm products per year directly to consumers.

Many restaurants are introducing their patrons to the quality and freshness of local food. Andy Husbands, the chef and owner of Tremont 647, a restaurant in Boston that incorporates many locally grown ingredients, characterizes New England foods within an eight-season cycle:

we also see the gourders (pumpkins, hubbard squash). Late fall, only the gourds and winter greens, such as kale, remain. Finally, in winter and late winter let's just say we have to be *very imaginative*. Generally it's cellar vegetables like gourds and potatoes and garlic."

Okay, so it might be near impossible for many of us to replace that occasional winter orange with, say, a potato, but a few changes to our eating habits can go a long way toward putting fresher food on our tables, supporting local farms, and maybe, just maybe, shrinking our carbon footprints a little.

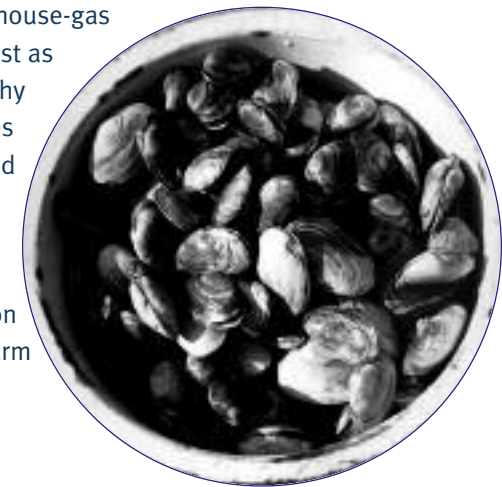




Don't Forget Local Seafood!

By Peter Hanlon, Mass Bays Program

The collapse of the Atlantic cod fishery in the 1990s is a well-known environmental and economic disaster in New England. Recently, however, fishermen and scientists have banded together to develop creative new strategies to resume a sustainable, local-scale cod fishery on Cape Cod. Dozens of fishermen, organized through the Cape Cod Commercial Hook Fishermen's Association, created a cooperative to fish under a fixed quota using only hook and line. Not only is this style of fishing more sustainable and better managed, but "day boat" cod—fish caught close to shore and offloaded daily—typically travels from ocean to kitchen in less than 36 hours, making it highly prized by high-end restaurants and fish markets. Local fishermen don't have to transport seafood long distances, saving on greenhouse-gas emissions and refrigeration costs. And just as local farms help rural economies, a healthy local fishery benefits coastal communities and encourages interest in preserving and protecting local waterways. There are public health benefits as well, because local advisories provide Massachusetts consumers with up-to-date information on mercury and other pollutants that can harm local waterways and fish populations.



More info:

The Monterey Bay Aquarium's Seafood Watch program (www.mbayaq.org/cr/SeafoodWatch.asp) provides a consumer-focused overview of the sustainability of nearly all major fisheries.

The Cape Cod Commercial Hook Fisherman's Association (www.ccchfa.org) works to build sustainable fisheries and represents the traditional communities that rely on this resource.

*If you must eat me, I
would appreciate it if you
serve me with locally
grown vegetables.*



Buying a share in a community farm allows the shareholder to have fresh, locally grown produce on a regular basis.



Meet a Burgeoning Localvore

By Peter Hanlon, Massachusetts Bays Program

Marc Carullo, better known in the Massachusetts Office of Coastal Zone Management as the GIS guy, has been eating a lot more locally thanks to Community Supported Agriculture. Marc lives in Sandwich, Massachusetts, and is in the midst of his second year as a shareholder of the Bay End Farm in Bourne. For a list of Massachusetts CSAs, see the Northwest Organic Farming Association's website: www.nofamass.org/programs/csa.php.



How does Community Supported Agriculture (CSA) work?

Marc Carullo: A shareholder, member, or subscriber to a CSA farm enters into a partnership with a farmer where s/he makes a commitment to purchase a share of the season's harvest, thereby covering a portion of the annual cost of operating the farm.

My personal experience with my CSA farm, Bay End Farm in Bourne, has been awesome. They provide a big ole bag of fresh, certified-organic veggies, herbs, and fresh cut flowers to members every week from mid-June to the end of October. Pickup is always fun as one gets to chat with the farmers, whether sharing veggie preparation and storage tips or grander life experiences. Let's not forget the weekly newsletter with suggested recipes and humor to boot.

Do you find that the foods you receive dictate what you cook that week/month?

MC: Yes, and this adds to the experience! My girlfriend and I receive a full share (advertised as enough veggies for a family of four) once a week. The variety of veggies changes as the growing season progresses. Our bag o' veggies is certainly heavy with a variety of leafy greens early in the season and autumn veggies (e.g. squashes) later in the season. Fortunately, many varieties of the leafy greens persist throughout the season. We have become increasingly resourceful in preserving vegetables, as we sometimes have difficulty keeping up with the weekly bounty.

Any food you get that you prefer just stayed on the farm and off your plate?

MC: No way, but I'm not all that picky! I love trying new foods and new preparations for foods that are familiar to me. A couple of CSA firsts for me were kohlrabi slaw and yummy garlic scape pesto. I've heard members of other CSAs speak of tiring from too much repetition. Though I love kale, I couldn't eat it everyday for months.



A Few Ideas for Where to Go Local:

Restaurants:

FarmFresh.org offers a guide to restaurants that feature local foods:

www.farmfresh.org/food/restaurants.php

Cooking Schools:

Stir (Boston) (stirboston.com/index.php, 617-423-7847)

Farmers' Markets:

To find a farmer's market that is convenient to you, check out Massachusetts Department of Agriculture's online Farmers' Market list www.mass.gov/agr/massgrown/farmers_markets.htm

Community Supported Agriculture:

Appleton Farms (Ipswich) (www.appletonfarms.org)

Bay End Farm (Bourne) (<http://bayendfarm.com>)

Busa Farm CSA (Arlington) (www.busafarm.com)

Belmont CSA (Belmont) (781-507-6602)

Green Meadows Farm (South Hamilton) (www.gmfarm.com)

Find more at www.nofamass.org/programs/csa.php

Pick Your Own! What could be better on a crisp fall day than a crisp, pesticide-free, organically grown apple? Check the link above for pick-your-own local apple orchards.

Photo: Sheila Conboy



Photo: Christopher Klein

*Ebb
& Flow*



The Remains of the *H.M.S. Somerset* By David Trubey, BUAR

When most of us think about the ocean landscape, we imagine sandy beaches, dunes, squawking gulls, and perhaps a rustic fishing shanty.

Typically, shipwrecks are a part of the coastal landscape that remain hidden—underwater mysteries, seen by the occasional scuba diver. But sometimes Mother Nature chooses to offer us a peak at these mysterious remnants of another time and place...

In January of 2008, Wellfleet residents and visitors were intrigued by the appearance of shipwreck remains on the Cape Cod National Seashore following a powerful coastal storm.

Although certainly not an everyday site, shipwrecks appear and disappear along Massachusetts beaches on a fairly regular basis, particularly in the winter months in high energy zones such as outer Cape Cod and Plum Island to the north. While some wrecks are pushed ashore from deeper waters, others are carved out of the beaches by extreme tides and wave action. Most of these wrecks can be attributed only to a certain time period, but few are identifiable by name. Fortunately, for purveyors of nautical history and shipwreck enthusiasts alike, this particular wrecked vessel was one of the few with a known identity: the *H.M.S. Somerset*.

Launched in 1748 at H.M. Dockyard, Chatham, England, the *Somerset* was fitted out as a guard ship. At 160 feet in length and 42.5 feet in breadth, this three-masted wooden sailing ship was equipped with 64 guns and considered to be a third-rate man-of-war ship (i.e., it was equipped to fight, but not to the extent of a first- or second-rate man-of-war ship). *Somerset* spent its service career in England until 1774, when it left for the North American station. Once in New England, *Somerset* spent its time in Boston Harbor asserting the presence of the Royal Navy and keeping a watchful eye on any vessel believed to be assisting the rebel cause. The vessel is perhaps best known for its activity following the Battle of Lexington and Concord and in the Battle of Bunker Hill. According to British reports, it was the *Somerset*, anchored in the ferry channel between Boston and Charlestown, that provided the only protection for the British soldiers returning to British-occupied Boston after their loss in Lexington and Concord on April 19, 1775. Ironically, Paul Revere rowed past the *Somerset* before his famous ride through the Middlesex countryside. In fact, Henry Wadsworth Longfellow describes the vessel in eerie detail in his poem, "Paul Revere's Ride:"

*The Somerset, British man-of-war;
A phantom ship, with each mast and spar
Across the moon like a prison bar,
And a huge black hulk, that was magnified
By its own reflection in the tide.*

In the Battle of Bunker Hill on June 17, 1775, the *Somerset* fired its guns toward the American's newly constructed fortification; however their effectiveness is a matter of debate. Many accounts suggest that despite their tremendous power, the vessel's cannons could not be elevated high enough to reach the hilltop ramparts and proved little more than a loud nuisance to the Americans preparing for battle.

In the three years that followed the Battle of Bunker Hill, *Somerset's* crew turned their attention toward forcing the French fleet from the northeast coast. To that end, *Somerset* was reportedly chasing a French vessel, which was making its way toward Boston, when it was driven onto the shores of Cape Cod near Truro on November 2, 1778. In his 1887 work entitled, "The Wreck of the 'Somerset,' British Man-of-War," E.A. Grozier describes the scene colorfully:

The Somerset found herself on a lee-shore, in more danger than she had ever been from the guns of her enemies. She struggled to weather the Cape. . . . The merciless wind beat upon her and wrought havoc with her sails. The billows broke over her. The incoming current of the tide seized her. She drifted helplessly in the trough and struck upon the outer bar. . . . For hours the Somerset pounded upon the bar, and the blinding seas broke over her. Her boats were washed away, crushed like egg-shells and tossed in fragments on the shore. . . . Gun after gun was run through the ports and magazines of solid shot thrown overboard to lighten the ship. Finally at high tide, a succession of great waves lifted the frigate from the bar, bore her over the intervening shoals and landed her, a dismantled wreck, high upon the beach.

Although at least 21 sailors perished attempting to escape the foundering ship via long boat, much of the crew survived the violent grounding. As the sky cleared the following day, a detachment of militia marched to the site and under the command of Captain Enoch Hallett, the survivors of *Somerset* were taken as prisoners of war. Together with their American guards, some 480 men marched through the November cold from Truro to Boston, a trip of more than 100 miles on today's roadways! In the meantime, the remains of the vessel were put under the charge of Colonel Doane. According to some accounts, the soldiers at the site had their hands full in controlling the riotous groups from Provincetown and Truro, which had each laid claim to the shipwreck spoils, including various artillery, supplies, and the personal effects of the officers and crew. It was the fledgling American government, however, that determined the division of the man-of-war's remains. Naturally, *Somerset's* guns were the first items to be salvaged. The larger pieces of artillery were taken away to help fortify Castle Island in Boston Harbor and ramparts in Gloucester and on the coast of Maine. Once the government finished with its salvage effort, *Somerset* was turned over to the local residents who reportedly removed anything else of value, including iron bolts, chain plates, and even deck planking for firewood. The large hull timbers that remained were eventually buried by the shifting sands of Dead Men's Hollow, but they have been uncovered on at least two other occasions over the last 230 years by storms—once in 1886 when some 60 feet of hull timbers were visible, and most recently in 1973 on the Cape Cod National Seashore.

Although the remains of the infamous *Somerset* have not been seen for three decades, they are a part of the Cape Cod seashore and will one day appear again and another generation can ponder the history and the mystery behind the skeletal remains.

A ship "wreck" to you is a luxury
high-rise for me and my friends.



Shipwrecks: Under-the-Sea Landscapes with Environmental Implications By David Trubey, BUAR

In Massachusetts waters, where there have been an estimated 3,000 reported wrecks since 1626, shipwrecks are a part of the ocean environment. The vast majority of these wrecks have yet to be located; however, advancements in technology for mapping and monitoring the seafloor are making this task easier and more affordable. With more wrecks being visited than ever before, due largely to continued growth in the popularity of diving and the abundant shipwreck information available on the internet, many questions have been raised regarding the impact of wrecks on the environment. What happens to a vessel after it wrecks can provide some answers to these questions.

Obviously, vessels such as ocean-going and coastal oil tankers have the potential for tremendous environmental disaster if they ground and leak their cargo. The *Argo Merchant*, a Liberian tanker, ran aground on Nantucket shoals in December 1976 and split in two, spilling 7.5 million gallons of bunker oil (i.e., oil used for powering ships) into the sea. More recently, in April 2003, the tank barge *Bouchard No. 120* ran across rocks south of Westport, Massachusetts. With a 12-foot hole in its hull, the vessel leaked 98,000 gallons of fuel oil into Buzzards Bay, a mess that would eventually spread to more than 90 miles of shoreline. But, many wrecks don't make headlines. It is not uncommon for a ship to run afoul in shallow waters and have its contents, which could be anything from lumber to machinery to fine china, salvaged shortly after sinking. Once plucked of their valuables, they are left on the bottom. Through the natural processes of deterioration and colonization, these wrecked vessels are transformed from their original function to habitats (see www.mass.gov/czm/coastlines/2004-2005/habitat/s_wrecks.htm for more on this topic). In some instances, even wrecks with dangerous cargo and materials may stabilize on the ocean floor and, as long as they are not disturbed, pose a minimal threat to the environment. One such vessel is the *Empire Knight*, a British freighter containing mercury, among other cargo, which struck Boone Island Ledge, Maine, broke in two, and sank in February 1944. While mercury was recovered by divers, an estimated 16,000 pounds is believed to have settled within the cargo hold. Sampling showed negligible traces of mercury in the sediment around the wreck, supporting the conclusion that ecological risks are not imminent provided the site is not disturbed by such activities as dredging, fishing, and diving. With this in mind, it is important for shipwreck divers to be aware that their exploration of a wreck could impact its stability and have a negative effect on marine life that considers the vessel's remains home. When in doubt, the best rule of thumb is to take nothing but pictures and leave nothing but bubbles.



Outsmarting the Storm

The Massachusetts StormSmart Coasts Program

By Wes Shaw, CZM

Every year storms pummel the coast of Massachusetts. While many of us equate the term “storm damage” with legendary once-a-century storms, it doesn’t take a major storm to wreak havoc—a relatively minor storm hit Cape Cod in April of 2007 and opened up a breach in a protective barrier beach.

The growing breach has already claimed half a dozen structures (and hasn’t stabilized as of the time of this writing). Some towns on the South Shore flood during occasional extreme high tides if there’s even a moderate wind pushing water towards the shore.

Storms in Massachusetts aren’t new, nor are the problems that come with them, but as the coast becomes increasingly developed, more and more homes and other buildings are in harm’s way. There is more than \$660 billion of insured property in Massachusetts coastal areas—the third highest of any state in the United States susceptible to hurricanes. Some climate change computer models

suggest that predicted changes in global climate will increase both the frequency and strength of storms in coastal regions of the world, and that rising sea levels will worsen their damage.

While these challenges are enormous, the most powerful means of addressing them—careful land use—is in the hands of local governments in a home rule state like Massachusetts.

StormSmart Coasts

In the spring of 2008, after more than a year of development, Massachusetts launched the StormSmart Coasts program (mass.gov/czm/stormsmart) to help communities find ways

It has been predicted by climate change scientists that both the frequency and severity of storms in coastal areas will increase in the future.



When development is planned using the No Adverse Impact (NAI) approach, property is less likely to suffer severe storm damage.

Outdated and poorly designed shoreline protection strategies have caused beaches to shrink in many areas of the Bay State.

to address coastal storms and flooding. While the program was developed with extensive input from municipal officials (conservation commissions, boards of health, zoning boards, departments of public works, planning boards, and others) and targets those who work at the municipal level, it also provides information for anybody interested in making their coastal homes, neighborhoods, and communities safer.

Instead of reinventing the proverbial wheel, StormSmart Coasts is designed to tap into existing information and tools from around the country and to gather real-world solutions that have been tested in other areas facing similar challenges. In some cases, innovative (but generally unpublicized) solutions come from other coastal communities within Massachusetts.

Rather than providing a prescriptive set of rules and regulations, StormSmart Coasts offers communities a menu of options from which to choose. Options range from information on existing legal requirement to links providing examples of progressive regulatory language that has been tested (and upheld) in court.

No Adverse Impact (NAI)

The cornerstone of StormSmart Coasts is the concept of No Adverse Impact (NAI). NAI was first articulated by the Association of State Floodplain Managers, a national non-profit organization of floodplain experts. The group was struggling with how to help communities protect people and property from flooding and erosion while respecting public and private property rights. NAI is not a set of laws or rules, but a simple “good neighbor” or “do no harm” approach to land management that communities can embrace in various regulatory or non-regulatory ways (including planning, zoning, and permit review). Essentially, it says that no person may use his or her land in a way that causes harm to anyone. A simple idea, but one with many benefits, including that it:

- **Reduces risk to people and public and private property:** Better planned and designed development and public infrastructure is less likely to cause and suffer damage during storms and flooding. An NAI approach can help protect the beaches that are critical to many communities’ economies.

- **Lowens flood insurance rates:** Many NAI-type activities help reduce flood risks, and some of these can lead to significant reductions in flood insurance premiums. For example, elevating buildings higher than the minimum height requirements of the National Flood Insurance Program (a federally administered program) can save homeowners thousands of dollars in insurance costs while adding only minimally to construction costs.
- **Saves money:** Less damage means lower post-storm community cleanup costs, fewer demands on limited public officials’ time, and reduced strains on public resources.
- **Reduces conflicts with property owners:** NAI doesn’t say “no” to development. It says “yes, if you design and build it in such a way that it doesn’t increase the risk to other properties.” It is a common-sense approach that seeks to protect everyone’s property by only allowing projects that eliminate or mitigate their impacts.



Instead of reinventing the proverbial wheel, StormSmart Coasts is designed to tap into existing information and tools from around the country and to gather real-world solutions that have been tested in other areas facing similar challenges.

- **Increases the capacity to bounce back after a storm:** Less storm damage means less downtime and less costly clean up, which is especially important for small, locally owned businesses that may otherwise struggle to stay solvent during frequent or prolonged closures.
- **Clarifies land-use objectives:** By adopting NAI principles, communities can articulate their overarching goals and help bring consistency and predictability to permitting.
- **Preserves quality of life:** The NAI approach can help preserve the quality of life in communities by ensuring that community resources, including beaches, public parks, and other open spaces, are there to be enjoyed by future generations.

The NAI approach is also legally robust. The legal system has long recognized that one of the primary functions of government is to protect people and property. (See *The Public Trust Doctrine in Massachusetts Coastal Law* on page 81 for more.) Courts at all levels agree that nobody ever has the

right to use his or her property in a way that harms others. Consequently, when a regulation is designed to prevent harm it is not taking away rights because the right to cause harm never existed. Courts have upheld this logic even when regulations drastically reduce the market price of a piece of property.

For example, a 2005 ruling by the Massachusetts Supreme Judicial Court found that the town of Chatham had the right to prevent a land owner from building a home in an area that was likely to flood and require evacuation, especially after the town testified that such an evacuation would put not only the residents, but also the town's emergency response teams, at risk. Additionally, concerns were voiced that the home, if built, could be destroyed by a storm and floated into other surrounding properties, increasing damage there. The court's decision noted that the legal system "was never intended to compensate property owners for property rights they never had." (For more information on this case, see *StormSmart Coasts Fact Sheet 3: A Cape Cod Community Prevents New Residences in Floodplains*, available on the StormSmart Coasts website).

In an interesting accompanying trend, communities are increasingly being sued and held liable for permitting development that ends up causing harm (e.g., inadequate stormwater systems that increase flooding on other properties). Courts seem to be suggesting that communities not only have the right to prevent potentially harmful development—they have the responsibility to do so.

Despite all the storms and the problems that arise from them, coastal communities are here to stay. The question is not if but how people are going to be able to safely live near the sea. While it's unlikely that we will ever find simple answers, there are many things that communities can do, and do now, to make living and working in coastal areas safer. The StormSmart Coasts program will continue to gather the best ideas from around the world so that local officials have answers to that age old question, "What can I do?"

For more information, see the StormSmart Coasts website at mass.gov/czm/stormsmart.

An ounce of prevention is worth a pound of cure...



Sea Level Rise and Shrinking Salt Marsh

By Peter Phippen, *Eight Towns and the Bay*, and Anne Donovan, CZM

Situated on the North Shore of Massachusetts—covering more than 25,000 acres from Gloucester to Salisbury—sits the Great Marsh. This Commonwealth coastal jewel is the largest contiguous salt marsh north of Long Island, New York. More than marsh, however, the area includes barrier beaches, dunes, tidal rivers, estuary, mudflats, and islands.

But with sea levels rising, what is the likely future of the Great Marsh? This article looks at some of the basic science behind sea level rise and salt marsh dynamics, and discusses some of the likely impacts to this important region. The key message: All we do to think green/go blue can make a real difference in the Bay State’s own backyard, helping to ensure that shoreline ecosystems like the Great Marsh are here for future generations to enjoy.

Rising Seas/Sinking Shores

The Intergovernmental Panel on Climate Change (IPCC), which was established by the United Nations Environmental Programme and the World Meteorological Organization in 1988, is made up of more than 2,500 scientists from around the world. The IPCC estimates that in the next century, sea levels will increase by one-half to two feet. This wide-ranging estimate is based on uncertainty about the quantity of

greenhouse gases that will be emitted during that time (see *Global Warming for Dummies* on page 75), as well as questions about the mechanics of sea level rise.

Global warming causes sea levels to rise by...

- Raising ocean temperatures, increasing the volume of ocean waters as the warmer water physically expands.
- Melting glaciers and ice caps, increasing the quantity of water in the ocean.
- Melting of the Greenland and Antarctic ice sheets, which not only hold vast quantities of water, but also could collapse into the ocean and cause substantial displacement of water and rapid sea level rise.

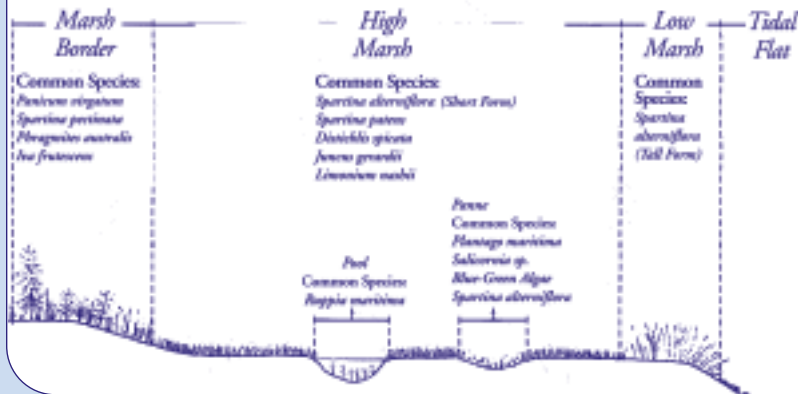
In addition to rising global sea levels, the tectonic plate that Massachusetts rests on is subsiding, resulting in relative sea level rise rates that are even more extreme. According to Climate’s Long-Term Impacts on Metro Boston (CLIMB)—a 4-year, million dollar research effort funded by the U.S. Environmental Protection Agency and conducted by experts from Tufts University, the University of Maryland, and Boston University—relative sea levels in



The Great Marsh as seen from above—expanses of estuary, salt marsh, and beach.

Photo: Stephen Gersh

A Mature Northeastern Salt Marsh



This diagram shows the major plant zones and dominant species, but see *Tiner (1987), Mitsch and Gosselink (1993), or Bertness (1999)* for a full description of salt marsh vegetation patterns.

figure 1

Massachusetts rose by almost a foot over the last century. Their estimates indicate that by the end of the 21st century, relative sea levels in the Boston area will rise from two to three feet. (More than double the sea level rise from the last century—data taken at the Boston Tide gauge indicate that sea levels rose 0.87 feet from 1921 through 1999.)

At the lower end of the estimate, flooding would primarily occur only during storms. However, even moderate storms with 2-foot storm surges (which typically occur several times a year in Massachusetts) would flood Boston's Financial District and parts of East Boston, South Boston, and Charlestown. For more on the CLIMB project, see www.tufts.edu/tie/climb and for a Boston Globe slideshow of potential flooding impacts in Boston, see www.boston.com/news/multimedia/interactive_bostonflood/.

The Birth and Growth of a Salt Marsh

Salt marshes develop in sheltered coastal areas that are protected from severe wind and wave action, allowing fine sediments (sand and silt) to be deposited and plants to

take root. In Massachusetts, one of the first plants to take hold in these areas is *Spartina alterniflora* (smooth cordgrass), whose seeds are dispersed by wind and water. *Spartina alterniflora* is a perennial plant that develops extensive root systems, called rhizomes, which stabilize sediments and reduce erosion. As this plant establishes itself, it forms dense stands that trap sediments and buffer wave energy and currents, promoting further development of the infant salt marsh.

Bacteria and fungi slowly decay the organic matter trapped by a growing stand of *Spartina alterniflora*. Over time, the accumulation of dead and decaying marsh plants and other material results in the formation of peat (organic matter that only partially decomposes because of the lack of oxygen in waterlogged environments). Through years and years of peat accumulation, the elevation of the young marsh increases enough to reduce flooding frequency. Once this occurs, high marsh plants can become established, allowing a greater diversity of salt marsh plants to grow.

Salt Marsh: From Stable to Shrinking

A mature salt marsh has a well-defined low marsh and high marsh that continue to expand seaward and landward over time. As the height of the sea gradually increases, so does the reach of tidal waters—providing growth conditions that favor salt-marsh plants over terrestrial vegetation and allowing the marsh to expand. The gradual process of peat buildup also provides the appropriate growing medium for these plants. Unfortunately, coastal development at a marsh's edge can prohibit its landward movement—and with human-induced climate change (see *Global Warming for Dummies* on page 75)—sea level rise is beginning to exceed salt marshes capacity to build up peat levels. The result is that rising sea levels are leading to shrinking salt marshes.

When the peat-formation process does not keep pace with increasing sea levels, parts of the marsh become submerged. Ultimately, this kills the plants and degrades the edges of the marsh, making it more vulnerable to continued rising sea levels.

In a stable sea level situation, salt marshes expand on the gradually increasing layers of partially decayed plant matter called peat.



Potential Impacts in the Great Marsh

As sea level rise rates accelerate, the marsh system becomes destabilized. The inundated plants are no longer provided with optimal growing conditions, making the marsh susceptible to greater levels of erosion and flooding. The cycle of destabilization increases over time, and landward areas once protected from storm damage by the marsh system become increasingly vulnerable.

As shown in Figure 2, as sea level rise increases, much of the area around Crane Beach (an important barrier beach in the Great Marsh system) will flood. As these areas are transformed to open water, many benefits of the system will be lost. Important habitats for fish, shellfish, and birds will be drowned; space for beach recreation will be reduced; and storm-damage prevention to inland areas will be compromised.

The rate of sea level rise is not fixed, however, and humans are having a big impact on global warming through release of greenhouse gases (see *Global Warming for Dummies* on page 75). To do what you can to help sustain the Great Marsh, see the feature section of this edition of *Coastlines*—and think green . . . go blue!

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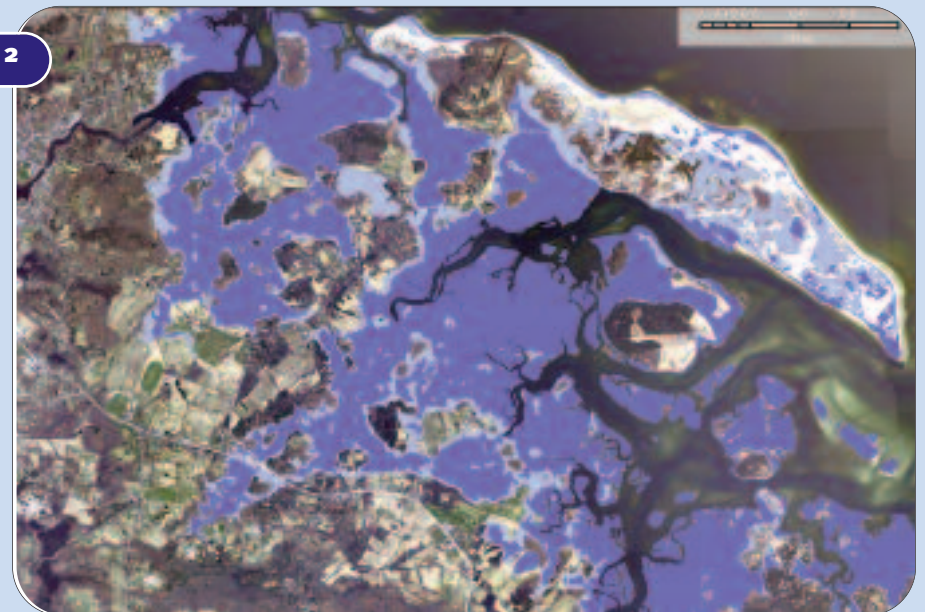
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Peter Phippen provides technical assistance to the nine communities of the upper North Shore—promoting coastal stewardship, working to develop environmental initiatives and implement outreach and education strategies, and developing grant proposals to secure funding—on behalf of the Eight Towns and the Bay Local Governance Committee of the Massachusetts Bays Program.

figure 2

Looking into the future of sea level rise shows the potential for a drastically different land/sea-scape around the Crane Beach area of the Great Marsh. The blue coverage shown here depicts low-lying areas with potential for inundation. Areas with the lowest elevation (darker blue) will be the first to experience the effects of sea level rise.



Global Warming for Dummies

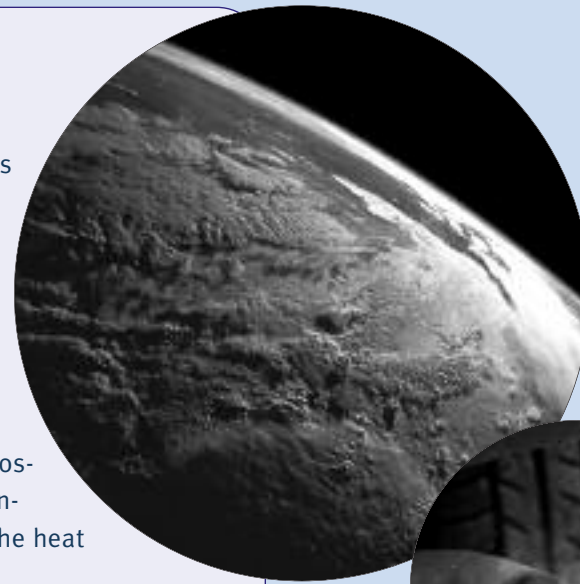
By Anne Donovan, CZM

Earth's atmosphere is made up of gases that form a protective layer that makes life as we know it possible on earth. Along with keeping the air we breathe from escaping to space, the atmosphere traps and holds the sun's energy to keep the earth warmer than the vast coldness that surrounds the planet. Of the sun's energy that reaches the earth, about 30 percent is reflected back into space by the atmosphere. The remaining 70 percent of this energy passes through the atmosphere and is absorbed by atmospheric gases, land areas, and the ocean. As this heat is later radiated off these surfaces, some escapes to space. The rest of this heat is trapped by substances in the atmosphere, keeping the planet warmer than space (just like the inside of a greenhouse stays warmer than the surrounding air when the glass panels keep the heat from the sun's rays from escaping).

Earth's climate has always been changing. "Global warming," however, refers to the extreme and relatively sudden changes that are occurring as a result of the human-induced buildup of "greenhouse gases" in the atmosphere. This buildup increases the capacity of the atmosphere to trap the sun's energy, causing global temperatures to rise. The primary greenhouse gases released by humans include:

- **Carbon dioxide (CO₂)** - Burning organic material (like wood, coal, and oil) releases CO₂, and because CO₂ absorbs the infrared radiation that typically escapes the earth's atmosphere, it is a critical component of rising global temperatures.
- **Nitrous oxide (NO₂)** - NO₂ is released from nitrogen-based fertilizers and combustion, and even though the amounts released by human activity are much smaller than CO₂, NO₂ absorbs about 270 times as much energy, making it a major contributor in global warming.
- **Methane** - Human-induced sources of methane include burning of coal, raising livestock animals (which produce methane as a product of digestion), growing rice (bacteria from rice paddies also release methane), and the decomposition of organic matter in landfills. Methane acts like CO₂ in the atmosphere, but traps even more heat.

Source: *How Global Warming Works* at <http://science.howstuffworks.com/global-warming.htm>.



*So many sources
of pollution, it's a
wonder people
can breathe!*



For the third consecutive year, volunteers and state employees joined forces to help migrating river herring reach their mating destination. Mary Griffin, Commissioner of the Department of Fish and Game, works with a bucket-brigade volunteer to give the fish a lift..



One Small, Man-Made Leap for Herring... One Large Leap Forward for the Mystic River

By Todd Callaghan, CZM

On May 25, 2007, dozens of volunteers and state employees joined together in the Third Annual Herring Bucket Brigade to manually lift migrating river herring above the Mystic Lakes dam to their desired spawning grounds in Upper Mystic Lake.

The bucket brigade arose as an outreach effort to help make people aware of the river herring's plight, and to create momentum to expedite a long-overdue reconstruction of the dam between Upper and Lower Mystic Lakes. The dam poses a particularly difficult problem for the migrating herring because they are drawn to the rushing water spilling over it in the spring, but there is no way for them to access the lake on the other side. In the two previous years, a few thousand fish were lifted over the dam by a handful of volunteers. The fish were caught in nets by quick-handed volunteers standing among concrete fragments at the dam's toe. The netted fish were then transferred to water-filled five-gallon pails, hoisted by rope up to the top of the dam, and poured down a chute to the lake on the upstream side of the dam. Biologists from the state's Division of Marine Fisheries oversaw the event and counted the fish as they were poured into the chute.

The 2007 event, hosted by the Medford Boat Club, saw a total of 19,358 fish lifted over the dam, greatly surpassing the number transferred in the previous two years combined. While the number lifted over



the dam is only a fraction of the fish that are estimated to spawn in the Mystic River, the effort furthered the visibility of their plight to state representatives, the head of the Department of Fish and Game, the head of the Executive Office of Energy and Environmental Affairs, and many local people who live around the lake.

But what happens to the fish once they get to the other side? While the herring bucket brigade began as an outreach event, the sheer number of spawning-crazed herring that were lifted over the dam begged the

Dams be damned! Volunteers enable river herring to bypass a dam to reach the Upper Mystic Lake by pouring them down a chute.

question: Were the herring spawning on the other side? Was all of this effort for naught?



Between June and August of 2007, I teamed up with Brad Chase, a state anadromous fish biologist, and Mary Beth Dechant, the monitoring coordinator for the Mystic River Watershed Association, to determine if Upper Mystic Lake was suitable for the development of young herring. Chase had just developed a standard operating procedure for performing river herring spawning assessments that the team applied monthly from June to September. The team collected data on dissolved oxygen, temperature, pH, water quality, and other measures. They also made visual observations of fish passage barriers at the dam and the types of sediments available for egg-laying along the shores (e.g., sand, gravel, cobble, and presence or absence of algal sheets). Three sites, one adjacent to shore, one in the middle of the lake, and one in between the other two, were monitored, while an additional site or two somewhere else in the lake was chosen each time monitoring was conducted.

Upper Mystic Lake has been studied extensively over the years, so it was known that the lake was deep (up to 80 feet) and that it harbored toxic metals, such as arsenic, in its cold and silty depths. But relatively little was known about the condition of the water column at the surface and edges, areas where juvenile river herring might feed. Data from this effort confirmed that there was a region of low

dissolved oxygen in the lake. What was surprising was the extent of this low oxygen area. At depths past 15–25 feet, the amount of oxygen dissolved in the water column was less than that which can support river herring, or any creature needing oxygen for that matter. In fact, on several instances when the calibration drift caused by the extreme change in temperature and pressure between the surface and the bottom of the water occurred, the dissolved oxygen meter gave readings of less than zero! This area of low dissolved oxygen spread out to lake's edges, up to 30 feet from shoreline. While the uninhabitable depths seemed daunting, the team's data indicated that the lake did have areas of good habitat for river herring, especially along the edges of the lake, within 30 feet of shore.

Visual inspection of the lake's edge identified sediments that were deemed suitable for egg laying and development, according to Chase. As validation that Upper Mystic Lake does in fact offer suitable river herring spawning habitat, the study team noticed schools of several hundred to thousands of juvenile herring in Upper Mystic Lake, some of which were leaping out of the water.

While it was good news that the herring that were lifted by the volunteers were spawning in Upper Mystic Lake, the bad news was that no water was flowing over the dam in August and September, when the juvenile herring needed to get back downstream. A bucket brigade for the juveniles would have been futile because their bodies are so fragile that handling them would likely induce massive mortality. Chase decided that it would be best to wait for an October rain to wash the fish over the dam and downstream so they can venture out to the ocean. To address this outward migration challenge, the Department of Conservation and Recreation has made a commitment to rehabilitate the dam and hopes to implement the plan by the 2010 spawning season. The new dam will include a fishway that has been designed so that the bucket brigade can retire and the young-of-the-year river herring can happily swim downstream to the ocean.

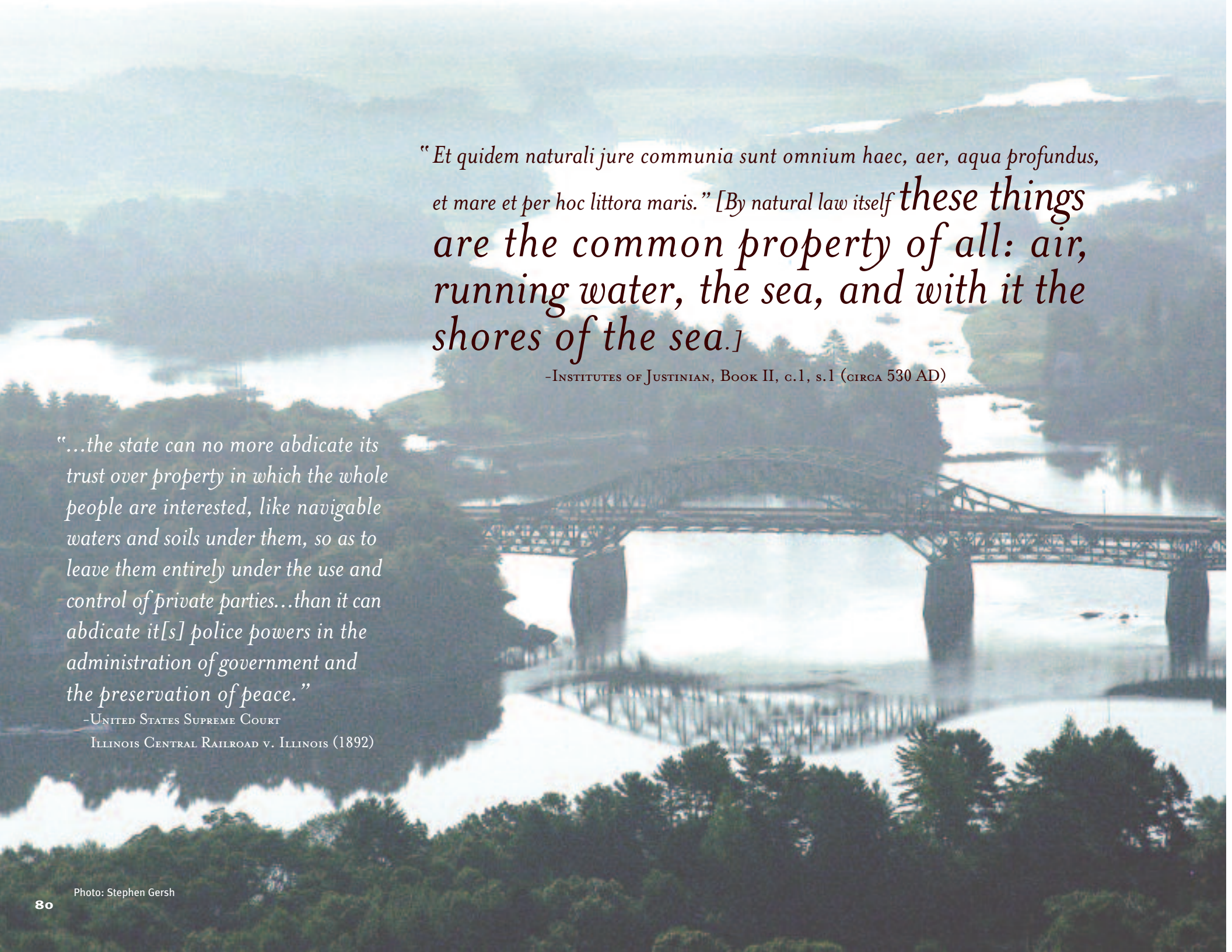
Thanks for the lift!

Yeah—that was fun!





Todd Callaghan from the Massachusetts Office of Coastal Zone Management (and author of this article) and Priscilla Geigis (Director of State Parks and Recreation, Department of Conservation and Recreation) along with a group of volunteers net river herring at the base of Upper Mystic Lake Dam. Water and herring-filled buckets are hoisted to the top of the dam, where the fish are then poured into a chute that delivers them safely to their intended spawning area in the lake.



“Et quidem naturali jure communia sunt omnium haec, aer, aqua profundus, et mare et per hoc littora maris.” [By natural law itself these things are the common property of all: air, running water, the sea, and with it the shores of the sea.]

-INSTITUTES OF JUSTINIAN, BOOK II, c.1, s.1 (CIRCA 530 AD)

“...the state can no more abdicate its trust over property in which the whole people are interested, like navigable waters and soils under them, so as to leave them entirely under the use and control of private parties...than it can abdicate it[s] police powers in the administration of government and the preservation of peace.”

-UNITED STATES SUPREME COURT

ILLINOIS CENTRAL RAILROAD V. ILLINOIS (1892)

The Public Trust Doctrine In Massachusetts Coastal Law

By Dennis Ducsik, CZM

NO PLACE ON EARTH IS SO SUPREME PUBLIC AS THE OPEN OCEAN. Where else can it be said that the overall well-being of society has never been subordinated to that of any individual or special interest group? The sea is a commons, as open to everyone as any town square in New England, and it is fortunate that we have at our disposal a powerful tool to keep it so—the Public Trust Doctrine.

Grounded in Greek philosophy, as ancient as western civilization itself, this doctrine originated in the second century writings of a Roman jurist whose pronouncements were later codified into Roman civil law by the Emperor Justinian. [See quote, left.] In turn, Roman civil law influenced the jurisprudence of England after the Magna Carta, when the courts embraced the notion that while the Crown had general power of ownership over the realm, any lands under the ocean lying seaward of the high tide mark were an exception. Such lands—we call them “tidelands” in Massachusetts—were declared to be held in trust for the common benefit of the public, for commerce, fishing, and other activities in which all citizens were free to engage. As a fixture of English “common law” (i.e., judge-made), the doctrine was brought to the American colonies and ultimately inherited by every coastal state as it came into the Union.

Today, the 1900-year-old concept of sovereign ownership of tidelands subject to a public trust is still among the most important and far-reaching doctrines in American property law, for two reasons. First, by virtue of holding public property rights out to the 3-mile limit of the U.S. territorial sea, each coastal state has far greater latitude in protecting societal interests than is generally the case on land, where most property is owned privately and government regulation must operate within the constitutional limits of the so-called “police power.” Second, American courts for more than three centuries have reiterated that the trust, as the word implies, is so solemn an obligation of government that it cannot be extinguished, even though title to the lands in question might be conveyed to private parties in certain circumstances. [See quote, left.]

Here in seafaring Massachusetts, the Public Trust Doctrine has had a profound influence on our law of the sea and shore. From the Great Colony Ordinance of 1641-47, to General Law Chapter 91 of 1866, to the Ocean Sanctuaries Act of 1970, to the Public Waterfront Act (amending Chapter 91) in 1983, and most recently to the Oceans Act of 2008, our Legislature has always been in the forefront nationally by enacting progressive legislation on behalf of trust-protected rights. The same holds true for the Massachusetts Supreme Judicial Court, which has issued a long series of landmark decisions reaffirming the solemnity of the trust, from *Commonwealth v. Alger* (1851) to *Boston Waterfront Development Corp. v. Commonwealth* (1979) to *Moot v. DEP* (2007), with scores of other important rulings in between.

Imagine Justinian’s satisfaction, had he had even an inkling of how his words would survive through the ages, and especially so here in the Commonwealth of Massachusetts!

Provincetown's quaint accommodations, pristine beaches, fresh seafood, and colorful flowers and culture make this historic Cape Cod fishing village a very popular vacation spot.





Focus on Coastal Towns: Provincetown

By Arden Miller, CZM



Sometime between 16,000 and 20,000 years ago, melting glaciers retreated from what is now the Atlantic, and in the area we call the East Coast, a distinctive curling land mass resembling a human arm was formed. The arm sheltered a bay with depths up to 206 feet, and became a popular destination for fish, whales, and humans looking to explore new worlds, or find shelter from existing ones. Originally inhabited by the Wampanoags and Nausets tribes (who were primarily agriculturists and fishermen), the earliest known explorers to this area were the Vikings.

According to Norse legend, they found the harbor's shelter conducive to repairing Thorwald Ericson's boat, and stuck around at least long enough to build a stone wall. (Carbon dating, and style, attribute this wall—discovered in Provincetown in 1805—to Vikings, and estimate that it was built c. 1007 A.D.) Nearly 600 years later—in 1602 if you crave exact details—English explorer Bartholomew Gosnold, inspired by the notable number of cod fish (*Gadus morhua*), a valuable staple in early diets, named this area Cape Cod. Using Gosnold's map, *Mayflower* Captain John Smith entered the snug harbor in 1620, and the Pilgrims made their first landing not on Plymouth Rock, but rather onto the shores of the very tip of the arm: Provincetown.

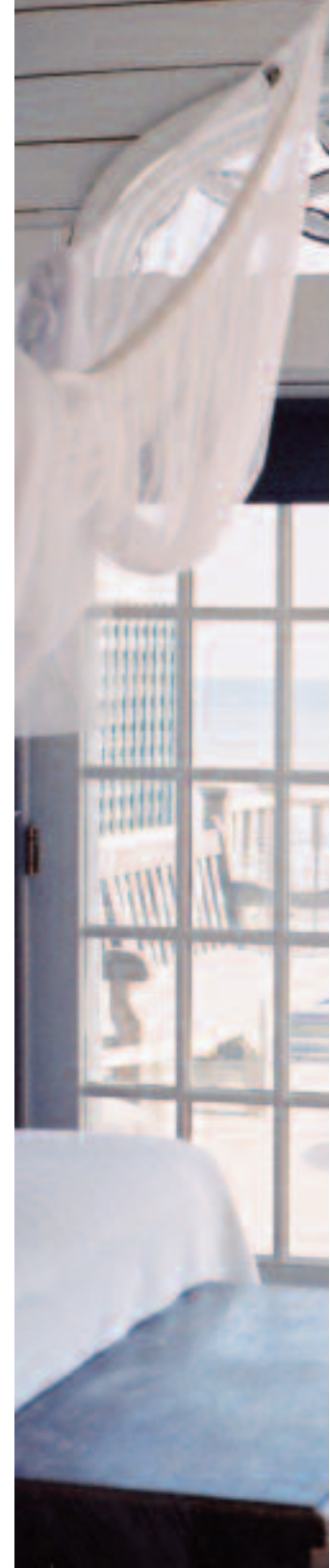
Rejected as a place to settle by the Pilgrims (they chose to go across the Bay into Plymouth instead), the "Province Lands," as they were originally called, have since been embraced by many. Through the 1700s, the fertile fishing grounds around Provincetown attracted a steady stream of fishermen to the area. But it wasn't until after the American Revolution (1775-1783), when an influx of Portuguese sailors hired to sail on U.S. ships settled in town, that Provincetown developed into the Cape's main commercial fishing center. From the early to the mid-1800s, a steady flux of immigrants, mostly from Portugal, moved to town to find work on fishing and whaling boats. With the maritime industry growing, associated maritime trades people—sail makers, riggers, blacksmiths—and their families made a living, and a home, here. By 1875, with working crews operating 61 ocean and coastal fishing vessels, 54 long wharves, 56 whaling ships, and as many as 700 ships crowded into the harbor at any given time, Provincetown was the largest working harbor in the state (sorry Boston!). As a whaling center, it was second only to New Bedford, its fishing industry second only to Gloucester, and the 3,475 residents had the distinction of living in the wealthiest town per capita in Massachusetts. And then, an act of nature, or a twist of fate, changed Provincetown's future history.

In 1898, the Portland Gale—a vicious storm named for the fishing boat *Portland* it completely annihilated—did serious damage to Provincetown.

(For more information, and some great photos of the ship's remains, see www.stellwagen.noaa.gov/maritime/portland.) More than half of the wharfs, many of the properties close to the water, and numerous jobs, were destroyed. Rebuilding and recovery was gradual, but thanks to the lovely views, established businesses in town, and fresh salt air (not to mention mentions in then-popular publications such as the *Saturday Evening Post*), this developing 9.7-square-mile area was able to fill the economic gap with a new industry: tourism. By the early 1900s, this quaint fishing village—126 miles and worlds away from Boston—became a popular resort destination for people who summer (as a verb). It also caught the attention of a number of artists, writers, poets, and an assortment of their supporters and friends. The Provincetown Players, a forward-thinking theater company, established themselves in 1915 and produced a number of works, including those by such notable scribes as Eugene O'Neil, Edna St. Vincent Millay, and Djuna Barnes.

And where you find writers and actors, artists aren't far behind. In 1935, abstract modernist Hans Hoffman opened his Summer School of Art (he already had a well-established art school in Manhattan). Classes were packed, and artists of all styles came to Provincetown to study and participate in his critiques. This mix of artists and writers with the pervasive "live and let live" Bohemian attitude attracted many to the area, including Pulitzer prize-winning playwright Tennessee Williams, who spent several summers there in the 1940s working on his award-winning dramas, *A Street Car Named Desire*, *Night of the Iguana*, and *The Glass Menagerie*. Other creative forces have added to the unique flavor of Provincetown over the centuries. Past and present full- and part-time residents include Village Voice founder and National Book Award winner Norman Mailer; Pulitzer Prize-winning author Michael Cunningham, Poet Laureate Stanley Kunitz, abstract expressionist painters Jackson Pollock and Willem de Kooning, and *MAD Magazine* cartoonist Al Jaffee.

Honoring the arts, Provincetown celebrated its 100th anniversary as America's oldest art colony in 1999. To mark the occasion, the





Provincetown International Film Festival—now an annual 4-day event—was established. Past Festival participants include John Waters (writer of the Tony award-winning *Hairspray*, and writer/director of *Pink Flamingos* and *Serial Mom*, among others), acclaimed singer Connie Francis, and actresses Kathleen Turner and Lili Taylor.

Walking down Commercial Street today, the past and present comfortably mingle. Within a few blocks on the pedestrian-friendly street, you can purchase freshly baked Portuguese rolls, browse antique and art stores, enjoy samples of home-made fudge, wonder why a shop selling water pipes and tie-dyed shirts is called “Spank the Monkey,” and have a mug of chowder made with local clams while listening to show tunes sung live at a piano bar.

But it’s not just all art, fudge, and culture. The term “the great outdoors” could have been coined for Provincetown. Nearly two-thirds of the land is part of the Cape Cod National Seashore. Designated as protected public land by President John F. Kennedy in 1961, the 40 miles from Orleans to Provincetown are an ecological treasure chest. Sand dunes, pristine beaches, sea grass, wildlife habitat, marshes, and wild cranberry bogs can be explored on bike, foot, or (with permits) by over-sand vehicle. And at the very tip of it all, just two and a half miles from the center of Provincetown, is Race Point—one of the few places on the East Coast where you can watch the sun set into the water. Want some history and information with your pretty sight-seeing hike? The National Park Service offers a number of informational guided tours along the Cape Cod National Seashore. (See Resources at the end of this piece for details.) If you’ve had enough nature, or it’s raining, the Pilgrim Monument awaits. The 252-foot granite tower with a museum at its base has been educating locals and tourists about Provincetown’s role in American history since 1910. Exhibits change regularly, and the hardy can climb to the top and enjoy panoramic views of the area. Whales, once hunted primarily for their oil (forget the eco-saver coil bulb, this was pre-electricity), are now admired from a safe distance. The *Portuguese Princess* whale watch has a research scientist from the Center for Coastal Studies (a nonprofit organization based out of Provincetown that studies and protects whales and other marine life) aboard each excursion.

Today, the year-round population of around 3,400 sees as many visitors over the course of just one week during the summertime. There are weekends, festivals, and lodgings geared toward most every type of tourist. Seriously. In addition to summer concert series, assorted fundraising events and benefits, and house and garden tours, here’s a sample from the 2008 calendar: Yankee Lambda Car Show and Parade, Gays for Patsy Spring Stomp, Provincetown Portuguese Festival, King Hiram’s Masonic Full Moon Party, International Women’s Flag Football Tournament, Blessing of the Fleet, Tennessee William’s Festival, Leather Weekend, Norman Mailer Society Conference, and Holly Folly (see Provincetown Calendar under Resources for links to details, dates, and associated costs).

If you are the planning type, you will want to check the Provincetown calendar to see what is scheduled during the week, and make advanced reservations. Or, if you like to be surprised and are looking for a fun daycation, the high speed ferry—90 minutes from Boston to Provincetown!—can take you there and back in a day. Either way, you are sure to see what has attracted such a wide range of people to this unique coastal community over the centuries.

Resources

Providence Calendar of Events:

www.provincetowntourismoffice.org/provincetown-events.php

Activities

National Park Service guided tours: www.nps.gov/caco/planourvisit/events.htm

Whale Watch cruises and marine eco-excursions:

www.provincetownwhalewatch.com

Pilgrim Monument & Provincetown Museum:

www.pilgrim-monument.org/t3/index.php

Bike rentals: www.ptownbikes.com/ptb/rentals

Getting There

www.bostonharborcruises.com (fast ferry): www.boston-ptown.com

Lodging

Cape Cod Lodging Directory: www.capecodtravel.com/lodging/

*“The sea, the great unifier, is man’s only hope.
Now, as never before, the old phrase has a literal meaning:
we are all in the same boat.”*

-JACQUES YVES COUSTEAU 1910-1997

[FRENCH NAVAL OFFICER, ECOLOGIST, EXPLORER, CONSERVATIONIST]





A Note on the Paper Stock

OR

“PRINTED ON RECYCLED PAPER” – WHAT DOES IT MEAN?

EACH YEAR, MORE THAN 2 BILLION BOOKS, 350 MILLION MAGAZINES, AND **24 billion newspapers** ARE PUBLISHED. The average American uses approximately one 100-foot-tall Douglas fir tree worth of paper and wood products annually. Across the United States, close to **35% of the solid waste collected by municipalities is made up of paper products**. These days, most cities and towns have regular recycling days, and most schools, businesses, government agencies, and municipal buildings have recycling programs in place.

But what happens to the recycled paper? Paper that is clean and dry (be it from magazines, old telephone directories, cereal boxes, shopping bags, books, newspaper, or cardboard containers) can be turned into fibers that can be used to make new paper products. **In 2007, nearly 37% of the fiber used to make new paper products came from recycled fiber.* This is great, but this number could be greater if the demand for recycled paper increased.**

THERE ARE THINGS EVERYONE CAN DO TO INCREASE THE DEMAND FOR RECYCLED PAPER. If you make purchasing decisions in your home, school, or office, always buy paper with the highest recycled content that your project and budget will allow (*ironically, recycled paper can cost up to 10% more than its virgin counterpart*). Send notes (*on recycled paper of course*), email, or call magazines and newspapers you subscribe to requesting that they use recycled paper. (*For more ideas, see <http://www.conservatree.org/learn/CanDo.shtml>.*)

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