Barnstable
CLEAN WATER
Coalition

A Guide to

CLEAN WATER LIVING

on Cape Cod

Where Community Stewardship and Innovative Science Unite

At Barnstable Clean Water Coalition (BCWC), our mission is to restore and preserve clean water throughout Barnstable

EDUCATE

Engage and inform our diverse community on water quality and quantity issues through scientific research and field work, and at outreach events and presentations that encourage them to be part of the solution.

MONITOR

Conduct water quality sampling and monitoring programs using proven scientific methods to collect qualitative and quantitative data.

MITIGATE

Implement and test new technologies and nature-based strategies to address the issue of nutrient overload, including innovative/alternative septic systems, wetlands restoration, and shellfish propagation.

ADVOCATE

Campaign for positive environmental and regulatory change on the local, state, and federal levels. Encourage community involvement in local water quality, conservation and wastewater related issues.

Introduction

What is more iconic about Cape Cod than our beautiful waters? Whether you love the ocean or a pond view, we have some of the most spectacular spots in the world.

The Cape's waters are in trouble -- threatened by excess nutrients, including nitrogen and phosphorus, and other contaminants that are degrading the water quality in bays, lakes, ponds, and streams, as well as the sole source aquifer that provides our drinking water. This is bad news for everyone. Tourists and seasonal residents visit Cape Cod for our beaches, and property values are linked to water quality. Our blue economy requires healthy waters to produce healthy shellfish and finfish.

What would the Cape be without clean water?

Many people are unaware of the growing problems affecting Cape Cod's waters or the simple steps they can take to help protect them. This guide will explain the issues and offer solutions on what can be done to restore and preserve our waters.

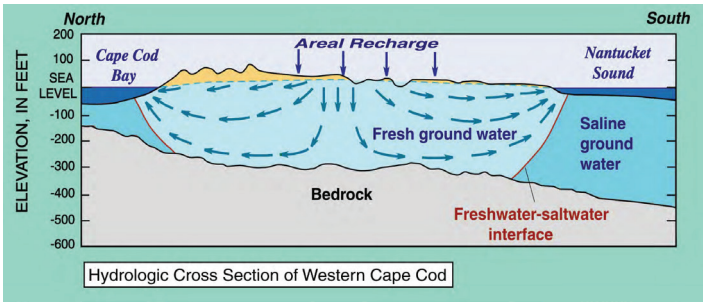
Specifically, it will focus on and address:

- Cape Cod's water source and watersheds
- The nutrients that impact the Cape's aquatic ecosystems
- The primary cause of Cape Cod's water problems
- What you can do to help improve water quality and conserve water

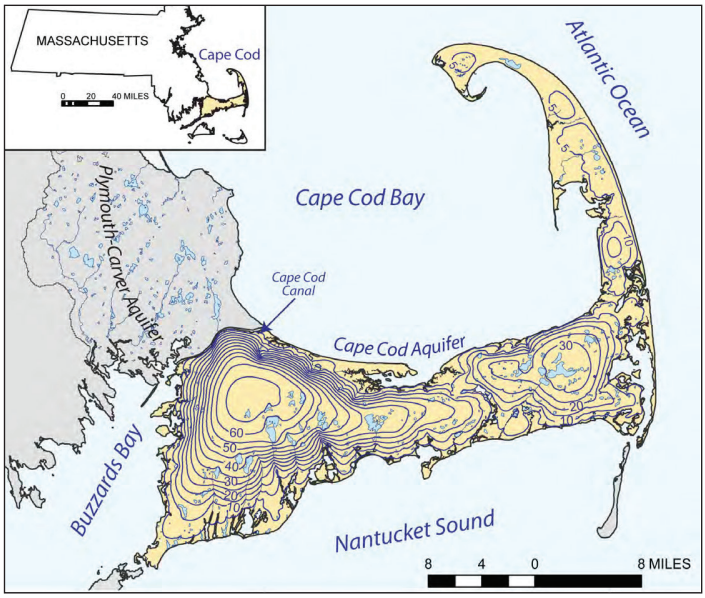
Everyone needs clean water and working together we can all make a difference.

What is an Aquifer?

An aquifer is an underground area of sediment and rock that contains groundwater. Cape Cod has a sole source aquifer that supplies all our drinking water. The aquifer has six lenses of groundwater that are replenished by rain and snowmelt. Due to the porosity of the Cape's sandy soils, our aquifer is at high risk from contaminants that enter the groundwater from runoff and recharge. Contaminants include fertilizers, pesticides, and contaminants of emerging concern (CECs), including pharmaceuticals and personal care products. CECs are increasingly being detected at low levels in surface water and groundwater and there is concern that these compounds may have an impact on aquatic life.



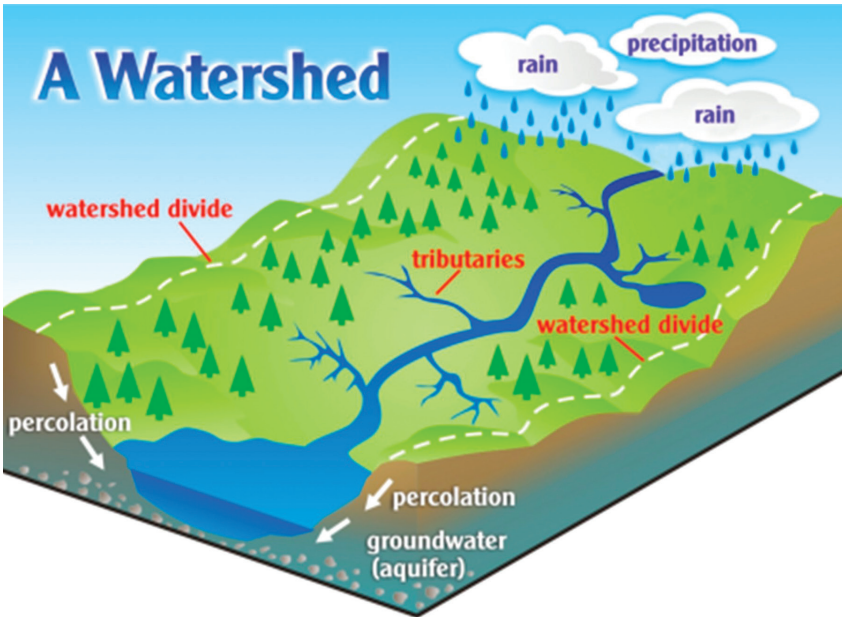
Hydrologic Cross Section of Western Cape Cod



Graphics courtesy of USGS

What is a Watershed?

A watershed is all the land that drains and moves water, including rain and snowmelt, downhill into a body of water such as a pond, lake, or bay. Surface water collects and flows over the land as runoff into streams and rivers, while groundwater moves more slowly underground.



A watershed acts like a giant collection bin funneling water and everything else the water contacts on the surface or underground as it flows downhill and downstream. All water flowing through the watershed collects nutrients and contaminants that ultimately end up in our ponds, streams, and coastal waters. Nitrogen and phosphorus are two nutrients that are especially concerning given their impacts on Cape Cod's aquatic ecosystems.

Nitrogen and Phosphorus

Both nitrogen and phosphorus are naturally occurring elements. Nitrogen, the most abundant element in our atmosphere, is crucial to life. It is found in soils and plants, in the water we drink, and in the air we breathe. Phosphorus is found in small amounts in the earth's crust, including rock formations and ocean sediments. Both nitrogen and phosphorus are nutrients that limit the growth of plants in aquatic ecosystems. The amount of each of these nutrients controls how fast algae and aquatic plants grow in saltwater (nitrogen) and freshwater (phosphorus).

Nutrient Overload

Nitrogen and phosphorus becomes a problem when there is an excess of either in our estuaries, bays, ponds and lakes. This excess, called nutrient overload, can lead to an increase in microalgae (phytoplankton, cyanobacteria), macroalgae (seaweeds) and plant growth. On Cape Cod, nutrient overload in our waters has resulted in a rise in algal growth including invasive seaweeds in our estuaries and cyanobacteria blooms in our ponds and lakes. This excess algal growth lowers oxygen levels, decreases water clarity (cloudiness), and results in poor water quality. The dead and decaying algae covers and suffocates native aquatic vegetation, including eelgrass.

The main sources of nitrogen in Cape Cod's waters include:

- Septic system wastewater, specifically our urine (80%)
- Stormwater runoff, which can include animal waste and bacteria (10%)
- Fertilizers used on lawns, gardens, golf courses and farms (10%)

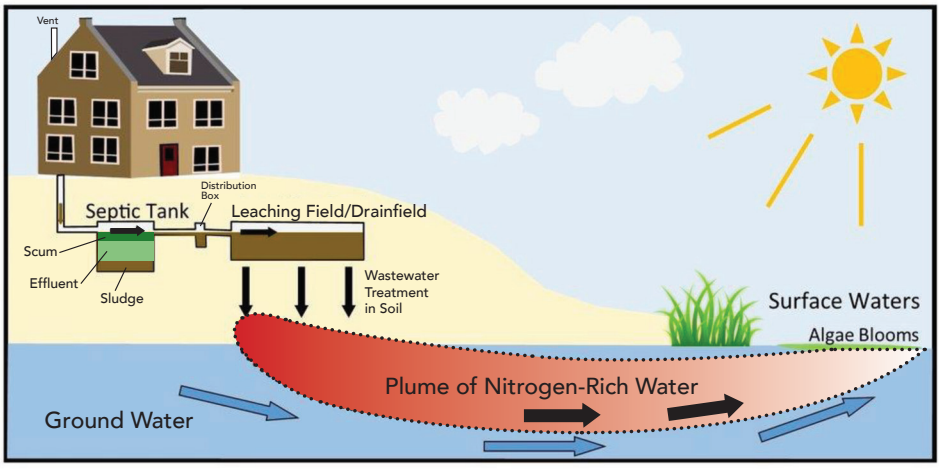
Phosphorus sources also include fertilizers, along with baking and cleaning products, such as automatic dishwasher detergents.

Septic System Wastewater

Only 25% of homes on Cape Cod are hooked up to a municipal sewer system, which carries wastewater to a centralized treatment center. This treatment center separates solids from liquids, kills most bacteria, uses other bacteria to digest the wastes, and releases clear effluent into the leaching fields and ultimately into the groundwater.

Title 5 Septic Systems

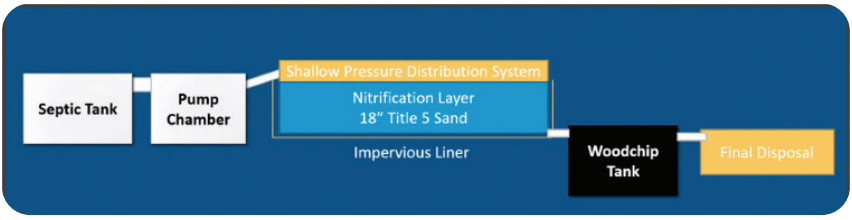
The majority of homes on Cape Cod - approximately 70,000 households - use a traditional, on-site septic system which is commonly known as a Title 5 septic system. Wastewater from your toilet, shower, sink, dishwasher and washing machine leaves your house and flows into the underground septic tank or cesspool. The heaviest solid waste, called sludge, sinks to the bottom. Fats, oils, and proteins form a floating scum layer of lighter solids at the top of the tank. The liquid layer in the middle called effluent contains our urine. Only the partially treated effluent flows from the tank into the leaching fields/pits. This nitrogen-rich effluent travels through the soil and groundwater, ultimately ending up in our lakes, streams, bays, and coastal waters.

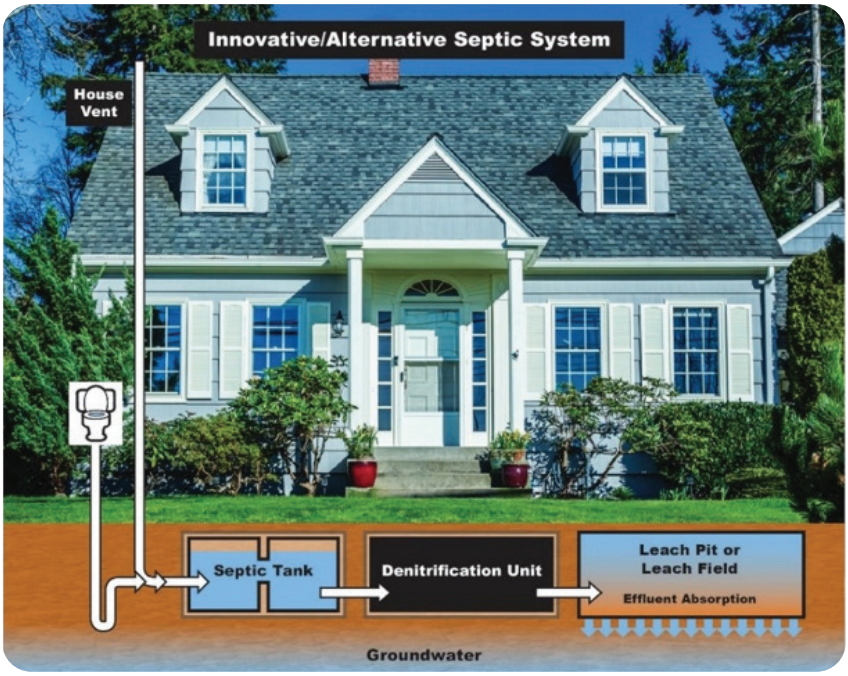


Innovative/Alternative Septic Systems

To function properly, septic tanks should be inspected and pumped at least every two to three years to remove solids that cannot be broken down. A properly maintained septic system can last up to 20-30 years.

Another way to treat wastewater uses advanced technology in conjunction with a Title 5 septic system and is referred to as an innovative/alternative (I/A) septic system. These types of systems (pictured below) are designed to remove higher levels of nitrogen from the effluent before it reaches the groundwater. I/A systems facilitate the cycling of nitrogen into harmless nitrogen gas using aeration and carbon sources.





Graphics courtesy of US EPA and MASSTC

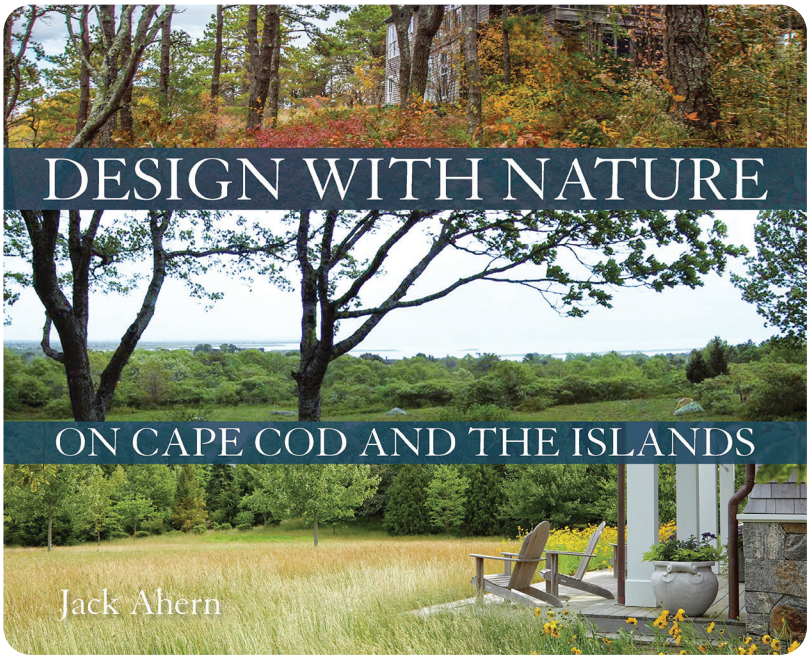
Stormwater Runoff

Runoff from rain and snowmelt carries excess nutrients, other pollutants (including oils and salts), and sediment along paved roads and parking lots (impermeable surfaces) into storm drains and waterways. Paved and hard surfaces increase the amount and transport of runoff.

Fertilizers

Fertilizers containing nitrogen and phosphorus enter the aquatic environment through runoff, erosion, and groundwater flow. The influx of nutrients to surface waters accelerates the growth of microorganisms and aquatic plants, resulting in algal blooms (eutrophication) and poor water quality.

We all care about our local waters, and we know you do too. The following pages offer suggestions and tips for what you can do to help!



Visit the BCWC website (BCleanwater.org) for informative resources, including books and videos.

How to Be Water-Wise

Think twice before you dump: Everything that goes in your sink, shower, tub, and toilet flows down the drain into your septic system, which ultimately ends up in our groundwater and drinking water.

Only flush toilet paper – do not flush paper towels, diapers, baby wipes, feminine products, and medications down your toilet.

Get your septic system inspected and pumped every two to three years.

Try not to overload your septic system with too much water at once – if possible, space out loads of laundry and run your dishwasher at a different time.

Use high efficiency dishwashers, washing machines and showerheads that all use less water. Run dishwashers and washing machines with full loads only.

Check for leaks and make sure all faucets, both indoors and outdoors, are turned off when not in use.

Limit garbage disposal use, which contributes excess grease, solids, and organic matter to your septic system.

How to Be Water-Wise *(Continued)*

Compost fruit and vegetable waste, eggshells, and coffee grounds instead of putting them in the garbage disposal.

Properly dispose of household hazardous wastes (paints, cleaners, chemicals, fuel, and other toxic liquids) instead of pouring them down the drain. Check with the Barnstable County Department of Health for their Household Hazardous Waste collection days in towns across the Cape.

Dispose of unwanted medications safely at drop boxes located at all Cape Cod police departments.

Wash your car at a car wash instead of in your driveway, which will reduce runoff of soapy water and pollutants like oil and grease into storm drains and groundwater.

Install an innovative/alternative (I/A) septic system that uses nature-based technology like woodchips and sand to treat wastewater and remove more nitrogen than traditional septic systems.

Go Natural and Grow Native

Choose native plants that are adapted to Cape Cod's climate and sandy soils. Most native plants are low maintenance, drought tolerant and require little to no watering, fertilizers, or pesticides. The deep, extensive roots of many native plants stabilize soil, prevent erosion, and retain moisture.

Native plants are defined as being found in the U. S. prior to European settlement. Invasive plants are non-native and outgrow and outcompete native plants for space, sunlight, and nutrients. Common invasive plants on Cape Cod include purple loosestrife, multiflora rose, Asian bittersweet, phragmites, tree of heaven, garlic mustard, Scotch broom, and Japanese bamboo.

Plant with pollinators (bees, butterflies, birds, bats and more!) and other wildlife in mind.

Use native perennials and shrubs that will last more than one season and are generally resistant to pests.

Visit the BCWC website (BCleanWater.org/resources) for a list of native New England shrubs, plants and grasses.

Visit local garden centers and nurseries that sell native plants and can provide advice on what will grow best in your yard.

Go Natural and Grow Native *(Continued)*

Mulch plants and garden beds with leaf mulch to retain moisture and suppress weeds.

If you live on or near the water, plant a natural 100 ft. wide vegetative buffer between your yard and the water. The buffer helps reduce and capture stormwater runoff, filter nutrients and other pollutants, prevent shoreline erosion, and improve water quality.

Rethink your driveway and the pathways around your house. Avoid using hard-paved surfaces that are impervious. Choose soft permeable surfaces like porous asphalt, paving stones, gravel, shells, or groundcover plantings that allow water to filter down into the soil.

Plant a rain garden in your yard to collect rainwater and filter stormwater runoff from your house. Rain gardens capture and filter nutrients and contaminants from rain and snowmelt before they enter our groundwater and waterways.

Collect stormwater from roof runoff in a rain barrel and use to water your gardens and plants.

Rethink Your Cape Cod Lawn & Landscape

Leave the trees, shrubs, moss, and natural groundcover on your property.

Consider reducing the size of your lawn and planting more gardens and shrubs featuring water-friendly native plants.

Choose an ecological alternative to traditional, high maintenance lawn grasses. Low mow turf species like fescues are more drought tolerant and require minimal mowing.

Mix up your property by planting colorful, clump-forming native grasses like Little Bluestem and Purple Love Grass that need minimal watering once established.

Use grasses that require little or no water, fertilizers, and pesticides.

Reduce the use of fertilizers and pesticides, or better yet, use none. If you do fertilize, use organic or slow-release WIN (water insoluble nitrogen) fertilizer, or choose brands with reduced nitrogen and phosphate content. Check out the three numbers on fertilizer bags (N-P-K) that represent the Nitrogen-Phosphorus-Potassium content. Lower numbers and zeros are best.

Rethink Your Cape Cod Lawn & Landscape *(Cont'd)*

Only fertilize lawns once a year in the late summer (Labor Day).

Mow your lawn on the highest lawnmower setting, about 3".

Recycle grass clippings by leaving them on the lawn to return nutrients to the grass.

Use less or no water at all – particularly during drought conditions.

Water once a week, early in the morning to avoid water loss to evaporation. A healthy lawn only needs about an inch of water a week to promote deep roots. Frequent irrigation encourages shallow roots.

Switch to drip irrigation, it is more efficient and less wasteful than conventional sprinkler systems.

Check your irrigation system and make sure sprinkler heads are directed at your lawn and gardens and not on paved surfaces.

Pick up and properly dispose of pet waste from your yard and where you walk your pet, as this waste contains nitrogen, phosphorus, and harmful bacteria.

Green Boating Tips

Safely remove sewage from your boat's holding tank or portable toilet via a pump-out station or pump-out service.

Avoid using chemicals or bleach in your holding tank.

Rinse your boat using a scrub brush or power washer instead of detergents. If you trailer your boat, rinse and scrub your vessel when it is pulled out of the water to reduce the risk of transporting invasive species.

Use water-based paints rather than copper-based paints. Try natural cleaners like lime juice, borax, baking soda or if needed, biodegradable soaps. Use water-based paints and VOC-free solvents instead of copper-based paints.

Clean and paint your boat when it is out of the water to prevent spilling products into the water.

Use absorbent materials along with a brush and broom to clean your boat work area rather than hosing it down. You will save water and reduce runoff.

Keep your bilge water clean by using a bilge sock or oil-absorbent pads to collect oily waste and chemicals from the surface water. Do not use detergents to clean bilge water.

Green Boating Tips *(Continued)*

Be careful not to overfill your tank when fueling – fill slowly and carefully.

Use an absorbent cloth to catch and clean up drips or spills of gas and diesel rather than using soap, which can end up in the water and cause more problems.

Check for oil and other fluid leaks on your boat and keep your engine well-tuned.

Reduce your speed and wake to reduce erosion along shorelines and salt marshes.

Keep trash contained and out of the water. Remove trash from your boat for disposal on land.

Learn about proper anchoring techniques and conservation moorings to lessen your boat's impact on aquatic benthic communities.

Recycle winter shrink wrap from your boat to help reduce plastic waste.

Have a tip for us? Join the conversation online using #CleanWaterMatters and share your favorite tips.

Want to get involved? Contact us today to volunteer and make a difference.

Stay connected! Join our email list at BCleanWater.org

Let's work together to make changes that will help restore and preserve clean water throughout Barnstable.

Engage in local and regional politics to help guide clean water policies, including comprehensive wastewater management planning in your town.

Support BCWC and our work to protect local waters.

Donate online at BCleanWater.org

Barnstable Clean Water Coalition

P.O. Box 215
Osterville, MA 02655
508-420-0780

BCleanWater.org
info@bcleanwater.org