

# *Lake Champlain* **Boating Manual**

Come aboard to protect the lake



*English/Français*

# Contents

HELP US KEEP THE WATER CLEAN	2
LOW-POLLUTION MARINE ENGINES	3
ENGINE MAINTENANCE	3
FUELING	5
BOAT SEWAGE and GREYWATER DISPOSAL	6
TRASH DISPOSAL	8
BOAT CLEANERS	9
ALTERNATIVES TO TOXIC CLEANERS	12
PAINTS	13
NUISANCE AQUATIC SPECIES	15
WAKES AND WAVES	17
SAFE BOATING	18
COLD WATER BOATING	22
COLD WATER SURVIVAL	23
MANAGEMENT CHALLENGES IN LAKE CHAMPLAIN	25
LCC MEMBERSHIP FORM	27
ACKNOWLEDGEMENTS	28

---

*Produced by the **Lake Champlain Committee** with  
support from the Lake Champlain Basin Program in the  
interest of a healthy, accessible lake.*



**Lake Champlain Committee**  
208 Flynn Avenue, Bldg. 3, Studio 3F  
Burlington, VT 05401  
(802) 658-1414  
lcc@lakechamplaincommittee.org  
website: [www.lakechamplaincommittee.org](http://www.lakechamplaincommittee.org)



## HELP US KEEP THE WATER CLEAN

**B**oats have been an integral part of life on Lake Champlain for hundreds of years. From power cruisers to dinghies, from charter boats to research vessels, from ferries to kayaks, boats provide access to the lake and enhance our work and play. While the effects of a single boat may seem insignificant, when multiplied by the tens of thousands of us that use the lake, the effects can be dramatic. Many boat use and boat maintenance practices such as boat sanitation, bottom painting, surface cleaning, engine upkeep, and general operating habits can have severe short and long-term negative effects on Lake Champlain water quality, shoreline stability, and aquatic life.

For a clean lake, it is essential for each of us to use environmentally sound practices in operating and maintaining our boats. Some of these “best management” practices are straightforward and common sense procedures – such as using on-board trash receptacles – while others involve more complicated decisions and choices. The background information and recommendations in this boating manual will help you make the most of your recreational experiences on the lake and help to safeguard its quality for future users. Thank you!

# LOW POLLUTION MARINE ENGINES

If your boat or personal watercraft (PWC) has an old carbureted two-stroke engine it's time to shop for an upgrade. Today's engines are quieter, more fuel efficient and less polluting than ever. With the old two-stroke engines, for every ten gallons of gasoline consumed, two or three would end up in the water.

Regulations now require all new outboard motor manufacturers to develop cleaner engines. As of 2006 new emission standards for outboard and personal watercraft engines came fully into effect. An additional set of standards applies to engines starting in the 2010 model year and includes sterndrive and inboard engines.

## What you can do

- Select a boat with a fuel efficient, low emission engine or replace your carbureted two-stroke outboard motor with a new, more efficient motor.



# ENGINE MAINTENANCE

If you keep your engine well-tuned it will last longer, use fuel more efficiently, and reduce your fuel consumption. It will also discharge fewer pollutants into the lake. The cleaners, oil, grease, transmission fluid and antifreeze associated with engine maintenance contain toxic elements and metals that are harmful to fish and wildlife and should be kept out of our drinking water source. Organisms that live or feed on the bottom of the lake ingest these contaminants and transmit them up through the food chain until they accumulate in sometimes dangerous concentrations in fish that humans consume. Petroleum hydrocarbons damage fish directly and damaged fish eggs may not develop properly. A single quart of oil can contaminate almost two million gallons of drinking water and cover up to two acres of surface water!

## IT IS ILLEGAL TO USE DETERGENTS IN THE BILGE OR TO DISPERSE SMALL SPILLS ON THE WATER'S SURFACE.

Soap does NOT make fuel spills disappear! It simply disperses the spill into invisible droplets which are difficult to contain and clean up. Emulsified oil can settle into bottom sediments or damage fish gills leading to suffocation.

### **What you can do**

#### ***For both inboard and outboard engines:***

- Refer to your engine manual for proper maintenance.
- Limit engine operation at full throttle.
- Eliminate unnecessary idling.
- Keep your engine well-tuned. Regularly check, clean and flush the engine away from water.
- Regularly check for engine fuel leaks and use a drip pan under engines.
- Inspect rubber fuel lines regularly. Ethanol in gasoline can sometimes damage fuel line hoses in a matter of months. Dry, cracked, or soft and mushy hoses should be replaced immediately. *Replacement hoses should be marked "USCG Type A". The Coast Guard has approved an alcohol resistant fuel line identified as SAE J1527, which is reputed to be three times more alcohol resistant than the SAE J30. Hoses bought at an automotive store may not meet Coast Guard requirements.*
- Avoid or reduce your use of engine cleaners. Although they work, their chemical ingredients are highly toxic. Steam cleaning, if available, is a better alternative.
- Winterize your engine at the end of the season to keep your outboard running well. Consider a good professional service or learn to do the job yourself.
- For winter storage, add fuel stabilizer at storage concentrations (refer to product instructions) and mix the tank well. This practice will allow you to use all your fuel and avoid having to dispose of stale gas in the spring.
- Properly dispose of any hazardous wastes such as oil, anti-freeze, batteries, and fuel either through a marina or on a hazardous waste collection day.

*Note: Used oil can be disposed of in an oil recycling drum at a marina or gas station.*

# FUELING

**P**etroleum-based fuel is a hazardous substance. The best way to minimize its harmful environmental effects is to reduce consumption and prevent spills. Any refueling of watercraft on or near the lake is a potential spill into the water. While one small spill may not seem significant, many small spills can create a large pollution problem. The majority of oil spills come from polluted runoff and other non-point sources such as improperly disposed of used oil, bilge water, outboard motors, and careless fueling.

## **What you can do**

- Keep your engine tuned. Proper ignition timing and clean spark plugs will give you better gas mileage.
- Slow down. Operating at full throttle can increase fuel consumption by 50% or more over mid-range speeds.
- Watch your weight and balance your load. A lighter load needs less fuel to propel it.
- Keep your propeller clean and in good repair. A damaged prop wastes fuel.
- Clean your boat bottom. Growth on your hull increases drag.
- Avoid unnecessary idling. Turn off the ignition whenever you make a stop.
- Take your boat or gas tank to a gas station to refill oil and gas away from the water.
- Use spill-proof containers for gas and oil that you can hold securely and handle easily.
- Do not leave fuel containers on or near docks and shoreline.
- Mix fuel and oil for two stroke engines away from the lake-shore, waterways, and stormdrains.
- Use a funnel with a filter when filling your gas tank. It keeps foreign material out of the engine and helps to prevent spills.
- Close the vent on portable gas tanks when the engine is not in use or when the tank is stored.
- Make sure your boat is stable when fueling. Pump and pour fuel very slowly. Never prop a fuel trigger or leave unattended.
- Install an in-line fuel/air separator. The device prevents fuel from escaping out the vent hole, while letting air through.
- Know your fuel tank capacity and consumption to accurately gauge the amount of fuel you need.

- Avoid overfilling or "topping off" your fuel tanks. Doing so results in gasoline spillage from overflow vents and produces small but toxic slicks in the water. Use a dipstick to check your gas level. Only fill the tank to 90 percent of capacity since fuel expands as it warms.
- Use absorbent fuel collars or "doughnuts" or small petroleum absorption pads when fueling to catch splash-back and the last drops from when the nozzle is transferred back to the fuel dock.
- Wipe up any spills immediately whether they occur at the vent outlet or the nozzle. Dispose of the soiled rags properly at a marina or by placing them in a sealed container.
- Do not use detergents or emulsifiers on fuel spills. They help the oil settle into the bottom sediment.
- Report any discharges of fuel, oil or hazardous substances into the water to the U.S. Coast Guard (1-800-424-8802). In New York waters notify the New York State Spill Hotline (1-800-457-7362), in Vermont waters contact Vermont Emergency Management (1-800-641-5005).

## BOAT SEWAGE and GREYWATER DISPOSAL

**K**eeping the lake clean depends on preventing the direct discharge of sewage from boats. Dumping untreated human waste in the water can:

- Spread disease. Sewage contains bacteria, viruses, and parasites that make humans and animals sick. Improper disposal can ruin anchorages for swimming and close public beaches.
- Promote algae blooms. Sewage contains nutrients such as phosphorus and nitrogen which fertilize algae, creating noxious blooms. Excessive vegetative growth can foul props and destroy fish habitats, and low oxygen can result in fish kills. Much of the lake currently suffers from excess phosphorus.
- Lower oxygen levels in the water. Sewage requires oxygen as it decomposes in the water, robbing fish and other aquatic life of the air they need to breathe.

**IT IS ILLEGAL TO DISCHARGE TOILET WASTE, RAW SEWAGE, AND GREYWATER INTO LAKE CHAMPLAIN.**

According to U.S. Coast Guard regulations, boats are not required to be equipped with a toilet or head. However, if a toilet is installed, it must be an operable marine sanitation device (MSD) that meets Environmental Protection Agency standards.

Any vessel operating in New York or Vermont waters and having a marine toilet on board must have a holding tank. All operational means of discharging toilet waste into the water must be sealed shut, and all discharge hoses disconnected and stored.

**Heads that discharge raw sewage directly over the side are illegal. It is also illegal to use the Y-valve to discharge directly into Lake Champlain waters.** Contact your marina operator if you need assistance in modifying your toilet installation and Y-valves.

Please remember that you are subject to a fine and prosecution if your marine toilet does not comply with these laws. The waters of Lake Champlain are patrolled by the U.S. Coast Guard and state and local police forces and boats ARE checked for compliance.

## **What you can do**

Comply with New York and Vermont's Holding Tank Laws. Disconnect and store your boat's hoses. Port-o-potty wastes should be disposed of in a home toilet or in an on-shore holding tank – never dumped overboard. The material in your holding tank is untreated sewage and is a hazard to public health and water quality. *Remember: Nearly 200,000 people depend on Lake Champlain for drinking water.*

- Use holding tanks or portable toilets and onshore pump-out stations to keep sewage out of the water.
- When planning a trip, check the location of pump-out facilities on your route or near your destination and use them. Consult cruising guides and boating almanacs for pump-out facilities when traveling. Call the facilities ahead of time to verify hours, fees and location.
- Dispose of greywater properly. "Greywater" is rinse water from boat sinks and showers. It is illegal in New York and Vermont to discharge greywater into Lake Champlain.
- Use onshore bath house facilities when you are docked. This will help minimize the need to discharge your onboard system. If facilities are unavailable, make the need known to marina operators.
- Keep your marine sanitation device properly maintained and rinsed.
- Use non-toxic bacterial enzyme-based head treatments. They



- will keep toilet odors down and pump-out lines from clogging by breaking solid human waste into liquids.
- Educate your passengers and crew about environmentally safe boating practices.



## TRASH DISPOSAL

**G**arbage in the water or on the shoreline not only mars the natural beauty of the lake, but also harms wildlife, swimmers, and boaters. Victims include birds and turtles that mistake plastic and styrofoam debris for food, swimmers injured by cans and bottles, and fish and waterfowl that die because they become entangled in trash like discarded fishing lines and plastic six-pack rings. In addition, intake valves, propellers, and other moving boat parts can become clogged by garbage. New York, Vermont, and Quebec all have deposits on bottles and cans.

**DUMPING OF ANY MATERIAL IN LAKE CHAMPLAIN  
OR ANY INLAND WATERWAY IS ILLEGAL.**

### What you can do

- Obey the law. Never let trash get thrown, blown, or washed overboard. Bring back whatever you take out, including biodegradable food waste and cigarette butts.
- Leave as much plastic back onshore as is reasonably possible to minimize the chances of it falling or blowing overboard.
- Install garbage and recycling receptacles on your boat and use them. If you put all your trash in one place, it's easy to contain and dispose of when you get back to shore.
- Let guests know where the trash receptacles are and inform them of your policy not to throw anything overboard.
- Use reusable containers and products with less packaging.
- Clean fish at designated fish-cleaning stations, with trash cans and wastewater treatment. If a station is not around, bag the waste and throw it away at home with your other garbage.

- Recycle used monofilament fishing line at your marina or tackle shop.
- Clean up after your pet.
- Leave the lake cleaner than you found it. When possible, pick up litter that you find (with the exception of hazardous materials) and dispose of it properly back on shore.
- Dispose of trash and recyclables in properly designated containers at marinas or other onshore facilities.
- Ask marinas to provide trash and recycling receptacles in convenient locations along the docks if they aren't available.
- Recycle used oil, oil filters, and antifreeze.
- Dispose of used solvents and waste gasoline at a local hazardous waste collection station.



## BOAT CLEANERS

**E**veryone likes a sparkling boat but extra care is necessary to achieve it and protect water quality. While it's tempting to wash a boat with soap or detergents near or in the water, cleaning your boat on land and away from water sources will help ensure the lake continues to sparkle.

Many of the cleaning products and detergents used regularly in homes can be lethal to aquatic life if they are used in and around water. Most detergents, soaps, scouring powders, bleaches, teak cleaners, and fiberglass and bright-work polishers are harmful to fish and wildlife and can threaten water quality. Soaps and detergents work as degreasers by breaking down the dirt and grime. Once broken down, contaminants such as oil become more damaging to aquatic life. Even biodegradable products should be used away from water as some can destroy oils on fish gills and inhibit fishes' ability to breathe. You can avoid the use of soap altogether by keeping your boat waxed and scrubbing and rinsing the deck and hull with fresh water after every trip.

You can easily make your own environmentally-friendly cleaning products from simple and readily available ingredients (see the

table of alternative boat cleaners for recipes). There are also many effective and environmentally sound cleaners available today that are safer for your health and the environment, better for your boat, and usually, less expensive. Encourage your marine supply store to carry non-toxic and phosphate-free products. Be an informed consumer and read product labels carefully before you purchase. Not everything labeled “green”, “environmentally-friendly”, or “biodegradable” is non-toxic to you or the environment. If the label cautions to “wear a respirator and/or gloves”, the product probably is not something to use on or near the lake. Avoid using or buying detergents and cleaning products that contain ammonia, chlorinated solvents, lye, petroleum distillates, phosphorus, sodium, or sodium hypochlorite.

## **What you can do**

- Wash your boat at a commercial car wash where the excess water will be treated or recycled or on a permeable surface away from waterways where the runoff will seep into the ground and be filtered by the vegetation and soil.
- Wash boat hulls above the waterline by hand instead of pressure washing. Use the least abrasive material possible (sponge or soft carpet) when cleaning a vessel in the water. Where feasible, remove boats from the water and clean them where the debris can be captured and disposed of properly to prevent runoff.
- Buy and use biodegradable detergents and cleaning products that will have minimal impact on the aquatic environment. Replace toxic boat cleaners with biodegradable, phosphate-free and chlorine-free products. This will save money and get your boat just as clean while also helping to keep the Lake clean.

*Note: Phosphorus levels throughout Lake Champlain are too high and need to be reduced. Phosphorus is the limiting nutrient for growth in the lake and greatly increases the rate of normal eutrophication (aging).*

- Use all cleaning products conservatively and according to the manufacturers' directions. Twice as much cleaner doesn't work twice as well.
- Avoid in-water hull scraping or any abrasive process done underwater that could remove paint from the boat hull. Colored plumes indicate that paint is being removed.
- Use a mild powder soap and bronze wool to clean teak.  
*Note: Chemical teak cleaners are hard on wood and gelcoat, so you'll be doing your boat a favor as well.*
- Consider covers for exposed wooden parts such as teak railings or hatches. The initial investment will save you time and money on routine wood refinishing.

- Allow wood to fade naturally to gray rather than bleaching it. Rinse with fresh or salt water occasionally to remove excess dirt and grime.
- Use biodegradable soap (one that does not contain phosphates or chlorine) and a top quality scrub brush to clean your boat's deck and hull.  
*Note: For many applications, a good non-phosphate liquid dishwashing soap is an excellent alternative to harsh chemicals.*
- Scrub and rinse your boat frequently with a brush but no soap. This practice will dramatically reduce the need to clean with harsh chemicals.
- If you use toxic chemicals on your boat, do so only while the boat is out of water. If you cannot, plug your scuppers and wipe up any spills or residue immediately.
- Dispose of any boat chemicals and other household hazardous waste properly. Contact the appropriate authorities for current regulations and the nearest disposal sites.
- Thoroughly wash boats taken from the water before transporting them to another body of water to prevent the spread of exotic or non-native plants and organisms.



# Alternatives to Toxic Cleaners

<b>Aluminum Cleaner</b>	Two tablespoons cream of tarter in one quart hot water
<b>Bleach</b>	Borax or hydrogen peroxide
<b>Brass Cleaner</b>	Worcestershire sauce or paste made of equal parts salt, vinegar, and water; rinse off
<b>Chrome Cleaner</b>	Apple cider vinegar to clean; baby oil to polish
<b>Copper Cleaner</b>	Lemon juice and salt
<b>Deck and Floor Cleaners</b>	One cup of white vinegar in two gallons of water
<b>Detergent and Soap</b>	Vegetable or citrus-based soaps and plenty of elbow grease
<b>Drain Opener</b>	Pour vinegar and baking soda in drain and follow with boiling water
<b>Fiberglass Cleaner</b>	Baking soda paste or baking soda toothpaste
<b>General Cleaner</b>	Baking soda and vinegar or lemon juice mixed with borax paste
<b>Head Cleaner</b>	Baking soda and a toilet brush
<b>Mildew Remover</b>	Paste of equal parts lemon juice and salt or vinegar and salt
<b>Scouring Powder</b>	Baking soda or salt or rub with half a lemon dipped in Borax and rinse
<b>Shower Cleaner</b>	Wet surface, sprinkle on baking soda and scrub with a scouring brush
<b>Varnish Cleaner</b>	Half cup each of vinegar and water
<b>Window Cleaner</b>	One cup white vinegar in one quart warm water, rinse and squeegee
<b>Wood Polish</b>	Use almond or olive oil or a mixture of three parts olive oil and one part white wine vinegar (interior wood only)



## PAINTS

One of the most challenging problems for boat owners is keeping boat bottoms free from growth. A clean hull is important for better boat speed and greater fuel efficiency for motor boats. Sanding and painting can be messy tasks, and require care and precaution to avoid polluting the water. Generally, boat bottoms are coated with an anti-fouling paint. These paints work by releasing toxic chemicals from the hull into the surrounding waters and can cause serious damage to the aquatic ecosystem. Some of the toxic metals in the anti-fouling paints – including mercury, arsenic and tributyltin (TBT) – have been partially banned or restricted by federal law.

**IT IS ILLEGAL TO SELL AND/OR USE TBT  
PAINTS ON BOATS AND OTHER WATER  
VESSELS IN NEW YORK AND VERMONT.**

TBT can be absorbed by fish through their gills and accumulate to high levels in lake bottom sediments. Studies indicate that human exposure to TBT can trigger a variety of health problems including cancer and compromised immune systems.

There is also concern about the quantity of volatile organic compounds (VOCs) in commonly used marine paints. Many marine paints and varnishes contain solvents and other ingredients that evaporate out of the paint while the film is curing. These solvent fumes are toxic to people and also contribute to ozone formation. Research paints before purchasing. Look for alternatives to toxic "soft" bottom paints such as paints with polyurethane, Teflon or silicone and other hard antifouling coatings. Their slickness inhibits organisms from attaching. Choose products with low or no VOCs. Consider storing your boat out of the water to prevent fouling and eliminate the need for bottom paint.

Always plan for maintenance so that it's done all at once when your boat is out of the water. Consider using a licensed, reputable boat yard or contractor to undertake repairs that include paints, varnishes, and epoxies. These facilities are equipped to control air emissions while painting, collect and treat debris from hull cleaning, and recycle or properly dispose of all types of hazardous waste.

## **What you can do**

- Read labels before buying products. Use water-based or non-toxic paints and solvents. Consider alternative products such as electronic anti-fouling devices. Watch for new products that are environmentally safe. Share information with other boaters.
- Follow the law and do not use paints containing TBT.
- Wear appropriate protective clothing (hat, gloves, and safety glasses) and invest in a high quality respirator – not a dust mask – if you paint your boat yourself. *Remember: If you can smell and taste a solvent, damage to your body has already begun.*
- Do all maintenance away from waterways.
- Place drop cloths underneath your boat and in your work area to catch scrapings, dust and loose particles.
- Never sand in a heavy breeze when the particles could become airborne and inhaled or deposited directly into the water.
- Keep all paints, thinners, brush cleaners, etc. away from the water and dispose of them carefully to avoid washing chemicals into the lake.
- Dispose of scrapings, dust particles, and oil-based paints and solvents at a household hazardous waste facility. Cans of water-based paint may be opened until dry and disposed of with regular trash.
- Wait 60 days after a new application of hard bottom paint before cleaning.



# NUISANCE AQUATIC SPECIES

**M**any species have been accidentally or purposefully introduced to Lake Champlain and subsequently caused major changes in the lake's ecosystem. Of those exotic species whose origin of introduction to Lake Champlain is known, over 60 percent entered via canals with the majority of those coming through the Champlain Canal. The Champlain Canal connects Lake Champlain directly to the Hudson River system, and indirectly to the Great Lakes by the Erie Canal.

Mats of non-native plant species can clog the waterway and impair recreation. Major "problem plants" in Lake Champlain include Eurasian watermilfoil (found throughout the lake) and water chestnut (dominant in the South Lake). Both are introduced species and their presence often changes the natural lake environment. These plants out-compete native plants, often forming dense stands or clusters which displace fish and wildlife, reduce lake currents and cause silt buildup; which in turn makes swimming difficult or dangerous, reduces aesthetic quality, and inhibits boating and fishing.

Zebra mussels blanket rocks and archaeological artifacts, obstruct water intake pipes, suffocate native mussel species, and foul boat hulls and engines. Water chestnuts' seeds and zebra mussels' shells can cut bare feet so swimmers should use caution. Spiny waterflea, tiny crustaceans with a long barbed tail, have recently been found in Lake Champlain. They compete with fish for food and collect in masses on fishing lines. Numerous other invasive species have proliferated in nearby waterways and could enter Lake Champlain unless precautions are taken.

Non-native species frequently move from one waterbody to another attached to boats or in anglers' bait buckets. Disease organisms like Viral Hemorrhagic Septicemia (VHS) can be spread between waterbodies in infected bait fish. Before leaving or entering Lake Champlain, make sure there are no pieces of mud or plant material stuck to your boat. At an early life stage (veligers) zebra mussels are microscopic; to prevent spreading them, empty water that has splashed into your hull as best you can. Empty any bait buckets on land before leaving a waterbody. Never release live bait into the water or release aquatic animals from one waterbody to another.



**IT IS ILLEGAL TO TRANSPORT ANY AQUATIC PLANT OR PLANT FRAGMENT, ZEBRA MUSSELS, OR QUAGGGA MUSSELS IN VERMONT, AND ILLEGAL TO POSSESS ZEBRA MUSSELS AND WATER CHESTNUT IN NEW YORK.**

**What you can do**

***Inspect, clean, drain and dry to prevent the spread of aquatic invasive species.***

- Inspect your boat, trailer, equipment, clothing, and dogs carefully and remove all visible mud, plants, fish/animals. Discard anything you find in an appropriate trash container on dry land.
- Clean your boat and equipment with hot water greater than 140 degrees F. If hot water is not available, spray everything with high-pressure water. Do not allow wash water to flow into any waterbody or storm sewer.
- Drain all water from the boat and areas that typically get wet including engine cooling systems, bilges, live wells, anchors, the inside of trailer frames, and equipment such as bait buckets.

*Note: Adult zebra mussels can live from several days to two weeks in moist, shaded areas of boats and trailers.*
- Tip outboard motors up and out of the water when not in use. This will allow water to drain from the cooling passages, although it may not completely drain some systems. Inspect cooling water intakes and small spaces around the propeller before each use and remove zebra mussels and vegetation.
- Disassemble between the seacock and the engine on inboard motors, and inspect for mussels and clean the motor at the end of the season. Replace the pump's impeller if there is reason to believe shell or plant fragments have entered the system.
- Dry the boat and trailer in the sun for at least FIVE days (preferably longer) before launching into any waterbody.

*Note: If you must use your boat sooner, rinse off the boat, trailer, anchor, anchor rope and chain, bumpers, engine, etc. with tap water or at a carwash.*
- Don't move bait or other fish from one water to another. Discard unused bait in the garbage on dry land.
- Learn to identify invasive species. If you suspect that invasive species have spread to a new location, report it to the appropriate authorities.

# WAKES AND WAVES

**A**s a boater, you are legally responsible for your wake.. Boat wakes contribute to shoreline erosion, especially in smaller bays and rivers and can disturb fish, wildlife and aquatic plants. Personal watercraft (PWC) have an especially high potential for causing shoreline erosion since they can be launched from a beach and the combination of a jet and shallow draft enables them to go very fast in shallow water. Wakes from both boats and PWC can lead to larger, more frequent waves on shore which stirs up sediments and erodes the shoreline. This creates navigation hazards for swimmers and other watercraft, particularly smaller craft such as canoes, kayaks, day sailors, and paddle boards. **Shorelines and speed don't mix.**

Most species of aquatic plants, fish, and water dependent wildlife are born, reproduce and die in the *littoral zone* – the shallow transitional zone from the land to water. Wildlife also use *riparian areas* – the upland vegetated area next to water – for feeding or cover. These are also the areas where most people access the lake and stir up sediments when launching boats or PWCs. Clear water is an important attribute for all lake users and is essential for healthy aquatic life. Stirred up sediments from boats affect aquatic organisms' ability to breathe, find shelter, forage and reproduce. Churned up sediments may also release nutrients that are stored in the sediments and contribute to algae blooms. As boats or PWCs move through the shallows, the propeller or jet can directly impact aquatic plants by cutting shoots or uprooting them entirely.

**IN NEW YORK, THERE IS A FIVE MILE PER HOUR SPEED LIMIT WHEN 100 FEET FROM THE SHORELINE, DOCKS, PIERS, RAFTS, FLOATS OR ANCHORED BOATS. IN VERMONT, THERE IS A FIVE MILE PER HOUR SPEED LIMIT WHEN 200 FEET FROM THE SHORELINE, ANYONE IN THE WATER, OTHER BOATS OR CRAFT, ANCHORED BOATS WITH A PASSENGER, ANCHORAGES AND DOCKS, AND SWIMMING AREAS.**

## What you can do

- Observe speed limits and operate your boat at a speed that causes no wake on shore.
- Reduce your boat speed before reaching speed buoys and obstacles.

- Travel away from the shoreline if your boat has a deep wake to avoid endangering swimmers, eroding the shoreline and creating legal liability.
- Stay out of the shallows.
- Keep your boat's wake minimal in bays and shallow areas.
- Slow down for windsurfers, paddlecraft and sailboats. Your wake can make other boats and watercraft difficult to control.

*Note: Be especially mindful of wind-powered craft on light air days. Motorboat chop can make sailing in light wind extremely difficult.*

- Avoid disturbing wildlife, especially nesting and feeding birds.
- Look back at your wake from time to time, and get a feel for its shape and height at different speeds. Adjust your boat speed to minimize your wake and avoid it breaking on the shoreline and creating an impact. You'll save fuel as well as reduce your affect on the waterway.



## SAFE BOATING

**T**he boat operator is responsible for safety and all activity aboard the boat. This includes controlling boat speed, obeying no wake and limited wake restrictions and all environmental laws, refraining from careless and reckless operations, controlling boat noise, and other general boater courtesy. Boaters should respect the rights of other people who live, recreate, or work on the water.

Fatalities and serious injuries can happen anywhere on Lake Champlain. Many of these can be prevented by sobriety and common sense. Weather changes quickly on the lake. Be prepared to take shelter swiftly. Exercise good judgment in all your boating activities; the lake can be unforgiving if you make mistakes. Always be aware of what weather is coming. Listen to the

weather on your VHF radio on Channel 02 or carry a weather radio and monitor the weather frequently. The National Oceanic and Atmospheric Administration (NOAA) is another good resource to check before you head out on the water. Go to [noaa.gov](http://noaa.gov) and use the search option for Lake Champlain.

As with any large body of water, the lake can be a safe, comfortable waterway one minute and a dangerous one the next. In certain areas of the lake, wind can create large waves. Every year, boats are swamped when bad conditions arise before they can get off the water.

## **What you can do**

### **File A Float Plan**

Always file a float plan with a reliable friend or family member on land whenever you head out for a day trip or extended journey. Keep that person informed of changes to your itinerary. The float plan should include:

- Anticipated itinerary including departure and end locations, planned stops or destinations and when you expect to return.
- Back up plans for inclement weather or other emergencies.
- Emergency contact information.

### **Marine Radio**

- Equip your boat with a VHF radio and keep Channel 16 FREE. Use Channel 16 only for emergencies or for placing a call. Switch to another channel for conversation.

### **Distress Call Procedures**

- Make sure the radio is on.
- Select Channel 16.
- Press/Hold the transmit button.
- Use English.
- Clearly say: MAYDAY MAYDAY MAYDAY.
- Note your vessel name and description, position and/or location, nature of the emergency, and number of people on board.
- Release the transmit button.
- Wait for ten seconds, if there is no response, repeat the MAYDAY call.
- Have all persons put on life jackets.

## Personal Flotation Devices (PFDs)

- Carry a Coast Guard approved personal flotation device (PFD or life preserver) for each person aboard your boat. Regularly check your PFDs for rips, tears, and holes, and to see that seams, fabric straps, and hardware are okay. There should be no signs of waterlogging, mildew odor, or shrinkage of the buoyant materials. If you have an inflatable PFD, check to ensure that the auto-inflation mechanism is working properly, because otherwise the PFD is worthless. Whatever type of PFD you use, be sure that they fit all passengers properly and that everyone knows how to use them, before you leave shore.

*Note: Anyone under the age of 12 must wear a life preserver at all times while on the water. Nine out of ten drownings occur in inland waters, most within a few feet of safety. Most of the victims owned PFDs but died without them. A properly fitted, buoyant PFD can save your life, only if you wear it.*

- No matter what the air temperature, when the water is cold, always wear your PFD!
- Trial test your PFD in shallow water. Try on your PFD to ensure that it fits comfortably snug. To check for buoyancy in the water, relax your body and let your head tilt back. Your PFD should keep your chin above water and allow you to breathe easily. If your mouth is not well above water, get a new PFD or one with more buoyancy.

*Note: Your PFD may not act the same in swift or rough water as in calm water. The clothes you wear and the items in your pockets may also change the way your PFD works.*

- Pay special attention to outfitting children with PFDs. Teach them how to put on a PFD and help them get used to wearing one in the water to avoid panic if they fall overboard.

*Note: To work right, a PFD must fit snugly on a child. To check for a good fit, pick the child up by the shoulders of the PFD. If it fits properly, the child's chin and shoulders will not slip through.*

## Boat Registration

- Register all boats with motors regardless of use. Call the Motor Vehicles Department for registration information.

## Navigation Lights

- Recreational vessels are required to display navigation lights between sunset and sunrise and during other periods of reduced visibility such as fog, rain, and haze.
- Know the U.S. Coast Guard lighting requirements for your type of watercraft.

## Rules of Right-of-Way

- Know and observe boating rules for right-of-way. Sailboards are viewed as vessels in the eyes of the law and have the same responsibilities as larger boats.
- Be aware that the lake is an increasingly popular spot for canoes, kayaks, paddleboards, and other human-powered craft. Kayaks ride particularly low on the water and can be difficult to see in sun glare or waves. Pay constant attention to the water in front of you, especially when traveling at high speeds. Avoid high speeds when visibility is compromised by sun, waves, or fog. Keep on the lookout for groups of paddlers and respect their right to share the lake with you.
- Do not approach within 100 feet (200 feet in Vermont) of a craft or object displaying either an Alpha flag (one white and one blue vertical bar) or a Diver's flag (red with a white diagonal stripe). These flags indicate divers below. Lake Champlain has a number of underwater preserves, unique archaeological sites, and a growing diver population.

## Alcohol and Boating

- Do not mix alcohol and boating. Under federal, New York and Vermont state law, and Quebec provincial law, boaters under the influence of alcohol can be arrested for Boating While Intoxicated (BWI).

*Note: Don't drink and drive a boat. As many as 80 percent of all boating accidents involve alcohol. Alcohol works to lower your body temperature faster when you're in the water. If you've been drinking, you will not survive as long in cold water.*

## Boating Safety Courses

- Take a boating safety course. Further education can prevent many boating problems and accidents.

*Note: In New York, completion of a boating safety course is required for individuals born on or after 5/1/96 in order to operate a motorboat. In Vermont, completion of a boating safety course is required for everyone born after 1/1/74. Children under 12 years of age may not operate a boat with a motor of more than six horsepower.*

## Courtesy

- Enjoy your outings on Lake Champlain and respect the rights of others to use and enjoy the lake as well, both now and in the future.



## COLD WATER BOATING

**T**he cool weather months can be some of the most wonderful times to be on the water, but only if you are well prepared. The weather can change quickly and dramatically. Take extra precautions before heading out in cold temperatures.

### What you can do

- **File a float plan and follow it.** Leave as detailed a plan as possible with a reliable friend or family member and tell them you will check in with them when you get back to land. If they don't hear from you, they'll know to call for help and where to send rescue personnel.
- **Dress for the water temperature.** Water can drain your body heat 25 times faster than air so protect yourself from possible immersion regardless of how warm it feels outside. Wear a wicking fabric next to your skin, insulating layers and a waterproof outer layer. Don't wear cotton. It's one of the worst fabrics when it's cold and damp.
- **Fix it first.** Do your maintenance work in advance. If it's your first trip of the season be sure your craft is in good working order before heading out.
- **Prepare for the worst.** Bring emergency supplies and be well equipped with blankets, food, water, warm clothes, communication and location devices, including a VHF radio, GPS and emergency positioning radio or personal locator beacon (PLB). Don't depend on a cell phone but if you bring one, keep it dry and pre-program it with rescue numbers.
- **Have a dress rehearsal.** Go over the exact location of all the safety gear before you leave the dock. If you're boating with others discuss how to make emergency calls and who's going to do what if someone falls overboard.

- **Wear a flotation coat or deck-suit style PFD.** They are better than vests in cold water because they cover more of your body. You lose your ability to stay afloat in cold water quickly. Your life jacket or PFD helps keep your head above water. It can increase your survival odds by hours.
- **Keep one hand on the boat.** You can lose dexterity and balance quickly when exposed to cold air. Fine-motor tasks like pressing buttons on electronics, opening a latch, or tying a knot are harder to do when it's cold. Always have one hand on a grab rail for support when walking around the deck or along the rails.

## COLD WATER SURVIVAL

**C**old water, less than 70 degrees, can lower your body temperature. This is called hypothermia. If your body temperature goes too low, you may pass out and then drown. Water temperature, body size, body fat, and movement in the water all contribute to cold water survival. Small people cool faster than large people. Children cool faster than adults.

### What you can do

- When in cold water, don't swim unless you can reach a nearby boat, fellow survivor, or floating object. Swimming lowers your body temperature and even good swimmers drown while swimming in cold water.
- Pull yourself up on any nearby floating object that is large. The more your body is out of water, the warmer you will be.
- Keep your head out of water to lessen heat loss and increase survival time.
- If there are others in the water, huddle together for warmth. Keep a positive outlook as it will improve your chances of survival.
- Keep your PFD on at all times. Even if you become hypothermic, it will keep you afloat.





# How Hypothermia Affects Most Adults

<b>Water Temperature Degrees Fahrenheit/ Celsius</b>	<b>Exhaustion or Unconsciousness</b>	<b>Expected Time of Survival</b>
32.5°F/0°C	under 15 minutes	under 15 to 45 minutes
32.5-40°F/0-4°C	15 to 30 minutes	30 to 90 minutes
40-50°F/4-10°C	30 to 60 minutes	1 to 3 hours
50-60°F/10-16°C	1 to 2 hours	1 to 6 hours
60-70°F/16-21°C	2 to 7 hours	2 to 40 hours
70-80°F/21-26°C	2 to 12 hours	3 hours to indefinite
over 80°F/over 26°C	indefinite	indefinite



## MANAGEMENT CHALLENGES IN LAKE CHAMPLAIN

**O**verall Lake Champlain is a healthy waterbody. It provides a source of drinking water for nearly 200,000 people; it is one of (if not the) largest lakes whose level is not actively regulated; and it supports a thriving fishery and abounds with wildlife. Nonetheless, there are significant threats to lake health and management challenges to overcome to ensure a healthy future. You can do your part by following the recommendations in this manual and taking an active part in lake stewardship.

### Algae Blooms

At times portions of Lake Champlain can be pea soup green due to algae blooms. The situation is most acute in shallow bays, particularly Missisquoi and St. Albans. Algae thrive in warm, undisturbed water high in nutrients, particularly phosphorus. Summer provides the warmth; muggy still days prevent water from circulating; and nutrients come off the land around the water. The largest sources of nutrients are livestock, eroding streambanks, and urban runoff. Limiting nutrient loading from these sources is the key to preventing algae blooms.

Sometimes algae blooms may be composed of species that produce potent toxins. It is almost impossible to tell by looking at a bloom whether it has toxic species or not. Some dogs have died after swimming in algae blooms and then licking the toxins off their fur. For people, short term exposure to algae toxins can cause diarrhea, vomiting, abdominal pain and rashes. Longer term exposure (such as ingesting water that is high in algae toxins) can result in liver or neurological damage. To avoid risk, don't swim or bath in or drink water that has a visible scum or in areas where there are warning signs about blue-green algae blooms.

## Urban Runoff

Besides nutrients, urban stormwater runoff can be a source of bacteria, oils and grease, litter, heavy metals, and various other pollutants. Problems are most noticeable following heavy rains and in Burlington Bay, Mallets Bay, Shelburne Bay and Cumberland Bay due to their densely developed watersheds. Swimmers should consider avoiding these locations in the day or two immediately following heavy rainstorms.

Managing the effects of stormwater involves slowing and cleaning the rain that falls on developed land and eliminating the sources of pollution within the watershed. For example, to prevent nutrients from entering stormwater avoid over fertilizing lawns, to prevent oils and greases make sure your boat and car are tuned up and have no leaks.

## Fish Consumption Advisories

High levels of mercury and PCBs in some fish have led Vermont and New York to warn anglers about eating certain sizes and species. Mercury comes predominately from incinerators and coal-burning electricity generators in the Midwest. PCBs were outlawed in the 1990's, but are still working through the ecosystem. A major effort to remove PCB-laden sediments from Cumberland Bay in Plattsburgh was completed in 2000. Twelve years later consumption advisories were lifted for some of the affected fish species.

Toxins are most likely to effect young children and women of child-bearing age since the chemicals interfere with development. Concentrations tend to be highest in the largest fish and in top predators like lake trout, salmon, and walleye. Check New York and Vermont Health Department websites to stay apprised of fish consumption health advisories.

## What You Can Do

- Follow the boating tips in this manual to avoid contributing to water quality problems.
- Take the Lake Champlain Committee's *Lake Protection Pledge* (Go to LCC's website at [www.lakechamplaincommittee.org](http://www.lakechamplaincommittee.org) and click on the "Get Involved" tab) and commit to actions that prevent nutrients, sediments and toxins from getting into the water.

***See earlier section on Nuisance Aquatic Species for further information on management challenges and actions to take.***



# Lake Champlain Committee Membership Form

**T**he **Lake Champlain Committee** (LCC) has been working for a clean Lake Champlain since 1963. We are the only non-profit citizens' group solely dedicated to a healthy, accessible lake. LCC works for drinkable water, swimmable beaches, edible fish, and appropriate public access through advocacy, education, and collaborative action. LCC also maintains the *Lake Champlain Paddlers' Trail* to provide a recreational corridor for human-powered craft. If you boat, fish, swim, or drink the waters you have a stake in Lake Champlain's future and a role to play in protecting its health. With your support, we can do even more to improve water quality. Please become a member today!

- ☐ Yes! I/We want to join the Lake Champlain Committee (LCC) in protecting Lake Champlain so that future generations may enjoy its wonders.

Enclosed is my/our membership donation of:

☐ \$45   ☐ \$100   ☐ \$250   ☐ \$500   ☐ \$1,000   ☐ Other \$\_\_\_\_\_

*Please fill in the following.*

Name(s) \_\_\_\_\_

Address \_\_\_\_\_

Town \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

Phone(s) \_\_\_\_\_

Email \_\_\_\_\_

- ☐ Send the current edition of the *Lake Champlain Paddlers' Trail Guidebook and Stewardship Manual* (donations of \$45 or more).  
☐ Contact me/us about volunteering.  
☐ Email LCC's monthly e-newsletter.

***Mail your completed form and check to:***

***Lake Champlain Committee***  
208 Flynn Avenue, Bldg. 3, Studio 3F  
Burlington, VT 05401  
Phone: (802) 658-1414  
Email: [lcc@lakechamplaincommittee.org](mailto:lcc@lakechamplaincommittee.org)  
Website: [www.lakechamplaincommittee.org](http://www.lakechamplaincommittee.org)



**Compiled and written by Lori Fisher**

**French translation by Maurice Poitras and Isabelle Côté**

**Select artwork by Bonnie Acker**

**Photographs by Carolyn Bates**

**M**any thanks to the following people, businesses, organizations and agencies for their help with this publication: Bonnie Acker, Jason Balmer, Boat U.S. Foundation, Judy Bond, Isabelle Cote, Mary Dearborn, John Freeman, Mary Griswold, Alexa Hachigian, Colleen Hickey, Jurij Homziak, Bill Howland, Gary Kjelleren, Pierre Leduc, Sharon Murray, J.M. O'Brien, Maurice Poitras, Anya Rose, Ben Rose, Kevin Rose, Jessica Rossi, Mark Saba, John Stabb, John Underhill, Mike Winslow, Boat U.S. Foundation, Chesapeake Bay Foundation, Lake Champlain Basin Program, Lake Champlain Sea Grant, Lake George Association, Lake Whatcom Management Program, New England Interstate Water Pollution Control Commission, New York Department of Environmental Conservation, New York State Police, Quebec Ministry of Natural Resources and Wildlife, Shelburne Shipyard, Small Boat Exchange, United States Coast Guard, United States Environmental Protection Agency, Vermont Agency of Natural Resources, Vermont Boat & Marine Association, Vermont Department of Public Safety, Vermont State Police Marine Division, Westport Marina on Lake Champlain.



*This publication was partially funded and prepared under the authority of the Lake Champlain Special Designation Act of 1990, P.L. 101-596 through the U.S. Environmental Protection Agency. This publication does not signify that the contents reflect the views of the States of New York and Vermont, the Lake Champlain Basin Program, New England Interstate Water Pollution Control Commission or the U.S. Environmental Protection Agency.*