

BOAT OPERATION

Safe boat operation is coupled with preparation, prevention and practice. Each time before you start out on your next boating trip, follow these guidelines for maintenance, departure, trailering, launching and retrieving, docking, rules of navigation, night operation and anchoring.

PRE-DEPARTURE CHECKLIST

To ensure a safe and problem-free boating experience, make a checklist of items similar to the one below and use it before each trip:

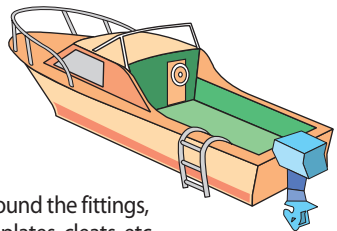
- ✓ **Life jackets:** Examine each life jacket for condition and ensure you have the correct number and sizes, appropriate for the intended activity on board.
- ✓ **Weather:** Check the weather forecast for the area and time frame you will be boating.
- ✓ **Float plan:** Be sure to leave a float plan with a family member, friend, neighbor or a marina operator.
- ✓ **Fuel:** Make certain you have enough fuel and know where you can refuel. Use the one-third rule: one-third tank for your trip, one-third tank to return to dock or launch ramp and one-third tank for emergency use.
- ✓ **Battery and fire extinguishers:** Be sure the engine battery is fully charged and your fire extinguishers are properly charged.
- ✓ **Boat check:** Use the checklist under “Preventative Boat Maintenance” to make sure your boat is in safe, operable condition.
- ✓ **Conduct an onboard safety discussion with passengers:** Everyone on board needs to know in advance what is expected of them and where they can find needed equipment. The discussion should include information on the location and proper use of life jackets (PFDs), fire extinguishers, visual distress equipment and first-aid kit. Explain emergency procedures; rules prohibiting discharging waste overboard; basic operation of the marine radio (if one is installed); other items such as boat operation, weather and/or water conditions, anchoring procedures, docking and line handling, and the dangers of falling overboard and being struck by the propeller.

PREVENTATIVE BOAT MAINTENANCE

Inspecting your boat and equipment before you launch or leave the dock can prevent many possible problems. Examine onboard safety equipment (life jackets, throwable devices (sizes and condition), fire extinguishers, bailers, anchor, etc.), motor, fuel, electrical systems, through-hull fittings and accessory attachments. Follow the owner’s manual for regular maintenance on the boat and equipment; this will pay off by minimizing problems afloat. Here are some other tips:

Hull condition:

- Check for any cracks or crazing.
- Ensure the hull sounds solid.
- Pull on the transom to ensure that it is solid.
- Make sure there is a drain plug and it is in place.
- Drain all water from the engine compartment.
- Check the bilge for any water. Check for cracks, around the fittings, above and below the waterline and around chain plates, cleats, etc.



Rigging and sails:

- Check for signs of wear or fraying.
- Repair small tears or open seams by taping or sewing.
- Keep lines clean and store in a dry area out of the sun.

Engines, fuel tanks and lines, mechanical:

- Follow the manufacturer's maintenance plan.
- Check for fuel leaks from the tank, carburetor, engine compartment and fuel lines.
- Check hose connections for leaks or cracks and make sure hose clamps are secure.
- Examine the ignition safety switch and lanyard for wear and proper operation.
- Check for proper operation of steering and other controls.
- Drain the fuel tank at the end of the season or use a fuel stabilizer.



Check for signs of wear and corrosion:

- Check for cracks or leaks.
- Check for firm hoses, free of leaks and use double clamps.
- Make sure the backfire arrestor is attached and serviceable.
- Check belts, the battery for corrosion and anything unusual.

LEAVE A FLOAT PLAN

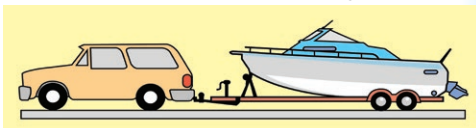
Let others know before you go: A float plan should be filled out and left with a reliable person before you leave on all boating trips. The plan lets others know where you are going, when you expect to return, who is going with you and what emergency measures or rescue organization should be notified in the event you do not return as scheduled. Remember to contact the person you left the float plan with when you return. In addition to leaving a paper copy of a float plan behind, many boaters are also providing e-mail versions of their float plan with others. *Complete the float plan at <http://www.fishandboat.com/Boat/Boating/Documents/FloatPlan.pdf> before going boating, and leave it with a friend.*

TRAILERING

Trailering is a package deal, which

includes the boat, trailer, hitch and tow vehicle. Everything must be compatible. The tow vehicle hitch must match the trailer ball. The hitch should be mounted to the frame of the towing vehicle. Do not use bumper hitches. Trailer tires must have sufficient load-bearing capacity and be appropriate for the trailer. Practice is a key aspect of trailering. Before taking your boat on the road, use an empty parking lot to practice turning, parking and backing up. Before towing your boat:

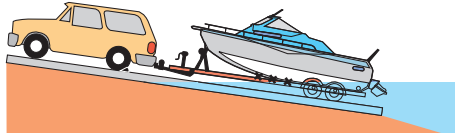
- Check your tires.
- Make sure your wheel bearings are greased.
- Ensure the trailer hitch is firmly on the trailer ball, and it is latched and secured with a pin or lock.
- Cross and attach the trailer safety chains to the tow vehicle in an "X" pattern. They should not drag (required by law).
- Make sure your lights work with your vehicle (required by law).
- Secure the winch, other tie down straps and any loose items.
- Always carry a spare tire for your trailer.



LAUNCHING AND RETRIEVING

Prepare your boat well away from the boat ramp so you do not block ramp traffic. Before you launch, it is helpful to make sure you have not missed any important points:

- Put the plug in.
- Raise the motor.
- Disconnect trailer wiring and tie-downs.
- Tie a line to the bow to maintain control of the boat.
- Slowly back your boat trailer into the water and set the emergency brake.
- Disconnect and secure the winch and safety chain from the bow.
- Push or motor the boat off the trailer while somebody holds the bow line.



Retrieval is the opposite of launching.

BOARDING

Stability is very important when boarding a small boat. Wearing a life jacket when boarding is a common sense safety precaution. Passengers should steady the boat from the dock or shore while the operator boards. Maintain three points of contact when boarding and moving about. Once in, the operator should steady the boat for others. When boarding, everyone should keep his or her weight as low and as close to the boat's center as possible. Holding onto the gunwales is the best way for boarders to keep steady.

Equipment and gear should be loaded onto the boat one item at a time, handing it to someone already on board. The load should be evenly distributed and secured so it doesn't shift.

BOAT TRIM

Boat trim (the way a boat floats) is vital in a small boat. Weight should be distributed in the boat to keep the bow light. Keep the boat from listing (leaning to one side) by distributing weight equally from side to side. Sudden, sharp turns should be avoided and the boat's capacity must never be exceeded.

BOAT HANDLING

All boats handle differently and inexperienced operators need hands-on practice with a capable teacher to become proficient in handling their boat. A motorboat is most easily maneuvered going against the current or wind. When moving with the current, the boat must be going faster than the speed of the current to maintain control and maneuverability. Boats do not have brakes. To reduce speed quickly, the motor should be put in reverse and power applied. Stopping in this manner requires practice to avoid water washing in over the stern. Consult the owner's manual for the boat and motor for proper procedures.

DOCKING

Docking is a very difficult maneuver, especially for the new boater. Learning to dock also requires practice with a capable teacher. When docking, a boater must keep in mind that the boat's steering mechanism is located at the stern (back), which will move first, followed by the bow (front of the boat). Docking is similar to landing an airplane; you must encounter a fixed object but do so softly without inflicting damage. At the same time, environmental conditions such as current, wind and waves can make your approach more complicated.

Depending on the situation, docking procedures vary. Fenders, mooring lines, a boat hook and a heaving line should be ready. The approach to the dock should be planned.

If possible, the boat should be headed into the current and/or wind to slow down and to more easily control it. A common method when docking in current is to slip the boat sideways bit by bit toward the dock, pier or slip. When docking correctly, the boat feels like it is moving in slow motion. After docking, a line should be secured from the dock to the bow of the boat. The current will hold the boat against the dock while the remaining lines are tied off.

A docking light is a flood or spotlight type of light permanently installed or permanently mounted on a motorboat that is used to illuminate a boat's forward course of travel. For specific information on illegal use of docking lights, *see page 15*.

DOCKING TECHNIQUES

Although there are subtle docking differences between propulsion systems and watercraft, the following guidelines apply to most docking conditions:

- 1. Survey the dock:** Look for moving boats and traffic, available hands, and the locations of cleats or pilings.
- 2. Visualize your approach:** Determine which side is better. Identify what lines you intend to use and who will do what.
- 3. Plan an exit strategy:** If things don't go according to plan, back out and try again rather than continue a flawed approach. Also consider approaching from another direction or selecting another dock. Plan for a no-escape situation: If you get into a situation from which escape is difficult, use spring lines with dock hands or fellow boaters on the dock to help keep you in control.
- 4. Approach slowly,** docking is no place for speed. Relax and stay focused.
- 5. Use only the power necessary** to move the boat and maintain control. Alternating between idle speed in gear and drifting in neutral is one way to slow your movement. Apply very brief bursts of power to help with steering and then shift to neutral to limit your speed.
- 6. Deploy boat fenders or other devices to protect the hull.**
- 7. Use a boat hook** to pull the boat closer to dock. If someone is available, hand them a line. Do not jump from the boat to dock.

Additional docking tips for specific situations.

With Wind or Current Ahead. Approach at a moderate angle (about 15 to 20 degrees) slowly and with fenders and lines at the ready. As you touch the dock, reverse power to halt your advance and hand a line to a dock hand. If no dock hand is available, use a boat hook or have a crew member step (not jump) from the boat to the dock to secure the line.

With Wind or Current Behind. In this situation, your big concern is pin wheeling if the wind or current takes the stern, so do not tie the bow first. Slow your approach by throttling back. Your angle should be a slight 5 to 10 degrees—coming alongside the pier. Reverse throttle slightly to still your approach; tie an aft quarter spring line. Then, tie your bow; tie remaining lines.

With Wind or Current Off the Pier. This is more challenging. You will need to increase the angle of your approach and use just enough power to reach and hold the dock. Now have a crew member toss the line to a dock hand or carefully step on the dock to secure the line. You will be using power against a spring line to pull the boat parallel to the dock and hold it until you are secured by lines.

With Wind or Current Toward the Pier. Line up next to the pier and let the wind take you in.

DEPARTING

When departing, your boat will naturally point into the current or wind—whichever is dominant. If the current is strong, be prepared to counter it, especially if there are boats astern of you.

Untie the line and toss it from the bow, making sure the line is far enough away that it won't foul the propeller. It's easiest if a member of your crew does this for you, because you may need to apply some power in forward gear to maintain your position. If you have to do this yourself, get to the helm quickly to take control. Do not apply propulsion and leave the helm to go to the bow.

Once you're free, drift backward until you have clearance. Apply light forward throttle while also turning to go around rather than over the mooring line. Once you've moved to the side, power away.

BOAT NAVIGATION RULES

The navigation rules contained in this handbook are a summary for which a boat operator is responsible on inland waterways and Lake Erie. Additional and more in-depth rules apply regarding various types of waterways (such as International Waters and Western Rivers) and operation in relation to commercial vessels and other watercraft. It is the responsibility of a boat operator to know and follow navigation rules. In those states where Inland Rules do not apply, the equivalent International, Western Rivers or Great Lakes rule(s) may be substituted. For a complete listing of the navigation rules, refer to the document "Navigation Rules" published by the U.S. Coast Guard (COMDTINST 16672.2 Series). This is available through the U.S. Government printing office or online at www.navcen.uscg.gov. Refer to the state laws where you intend to boat for state-specific navigation requirements.

The purpose of the navigation rules (rules of the road) is to prevent collisions. Since there are no traffic lines and few signs on the water, boat operators must make choices. Common sense is required, but boaters must also know the rules of the road. Operators are responsible for:

- The safety of all passengers in the boat.
- The boat's wake and any damage caused by it.
- Maintaining a proper lookout and operating at a safe speed for the conditions.
- Using good seamanship, which is the foundation of the navigation rules.

PROPER LOOKOUT

Boat operators must maintain a proper lookout at all times when operating a boat. Collisions and other types of accidents can be avoided by scanning all around the boat for swimmers, other boats and obstructions. Listening for dangerous situations is also a part of maintaining a proper lookout. Passengers should be asked to assist.

AIDS TO NAVIGATION (ATON)

The closest things to signs on the water are aids to navigation. The purpose of ATON is to help boaters avoid problems on the water and for navigation when used in combination with a nautical chart. ATON includes buoys and daymarks (or dayboards). The U.S. Aids to Navigation System has been adopted by the Commission for use on all Commonwealth waters. Boaters should learn this system and presume nothing. Navigational aids are often moved by the Coast Guard, the PFBC, storms, heavy currents or vandals.

In the U.S. Aids to Navigation System, markers designate the edges of a channel and the direction of open water. The colors of these markers are



**BOATS KEEP OUT!**

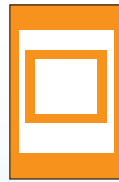
Nature of danger may be placed outside crossed diamond such as dams, swim areas or rapids.

**DANGER!**

Nature of danger may be indicated inside the diamond shape such as rocks, shoals, dams, construction or stumps.

**CONTROLLED AREA!**

Area as indicated in circle such as speed limit, no fishing, no anchoring, ski only, slow-no wake, no prop boats or no ski.

**INFORMATION**

Tells directions, distances, places, food, repairs, supplies and other non-regulatory messages.

**MOORING BUOY**

White with reflectorized blue band. May have white light or reflector.

**CHANNEL**

Lateral System. Buoy on port side facing upstream.

**CHANNEL**

Lateral System. Buoy on starboard side facing upstream.

**MID CHANNEL**

Lateral System. Pass close on either side.

important. Red markers indicate that boaters should navigate with the markers on their starboard (right) side when traveling upstream. Remember the slogan "Red, Right Return," to find your way home to port. Green markers indicate that boaters should navigate with the markers on their port (left) side when traveling upstream. Red markers have even numbers and green markers have odd numbers.

To aid visibility, these buoys may also have lights that match their color. Further distinction between buoys is recognized by their shape:



• **Nun buoy:** These are cone-shaped red buoys with even numbers and mark the edge of a channel on a boaters starboard (right) side when entering from the open sea or heading upstream.

• **Can buoys:** These are cylindrical-shaped green buoys with odd numbers and mark the edge of the channel on your port (left) side when entering from the open sea or heading upstream.



Information and regulatory markers are used to alert boaters of various warnings and regulatory matters. These regulatory markers are white can buoys with orange shapes and black lettering.

SAFE SPEED

A boater's speed of operation will vary according to the weather, water conditions, time of day or night, other boat traffic and individual boat characteristics. Safe speed allows the operator to be in control and take correct action to avoid a collision.

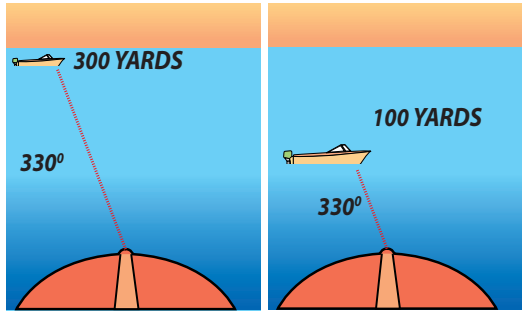
RISK OF COLLISION

A risk of collision exists when there is the possibility that two boats will arrive at the same point on the water at the same time. The first indication of a risk of collision is when one operator notices that another boat has a constant bearing (or constant relative position) and a decreasing range (the other boat is getting closer). When this occurs, the Rules of the Road make one boat either a stand-on (privileged) vessel or a give-way (burdened) vessel

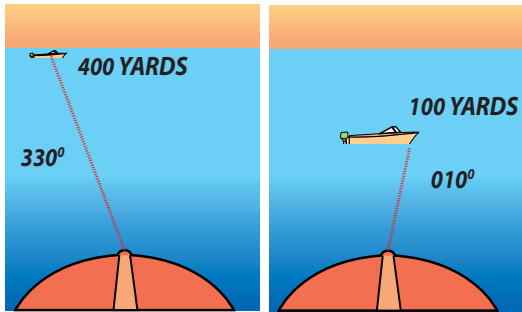
(explanation follows). The risk of collision ends when both boats have avoided the collision by proper action under the rules and are moving safely away from each other.

STAND-ON AND GIVE-WAY VESSEL

Under the Rules, the stand-on vessel is required to maintain its course and speed. The give-way vessel is required to stop or slow down or, when overtaking, to pass the other vessel in a safe manner. Under no circumstances should the stand-on vessel assume that the give-way vessel is going to take the action required to avoid a collision. Both operators are required to avoid a collision in any situation.



CONSTANT BEARING - DECREASING RANGE

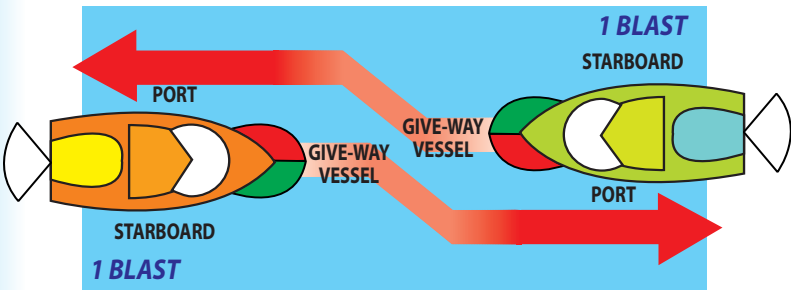


CHANGE IN BEARING - DECREASING RANGE

RULES FOR POWER-DRIVEN VESSELS UNDERWAY

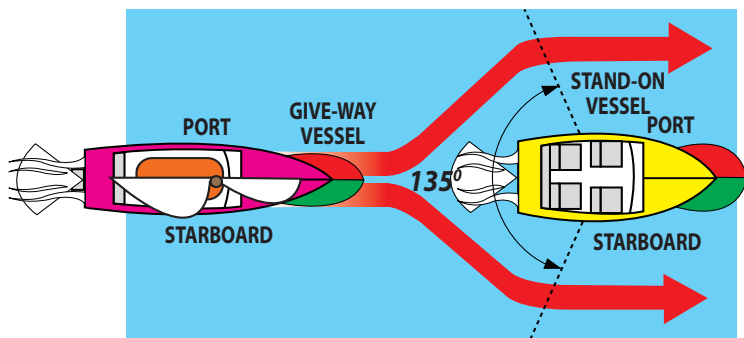
HEAD-ON (MEETING) SITUATION

When two boats meet head-on, both boats are required to turn starboard (to the right) to avoid the other. At night, a head-on situation exists when both the red and the green running lights are seen at the same time. Lights required on boats are explained previously in this handbook. Sound signals used when maneuvering are explained on page 27.



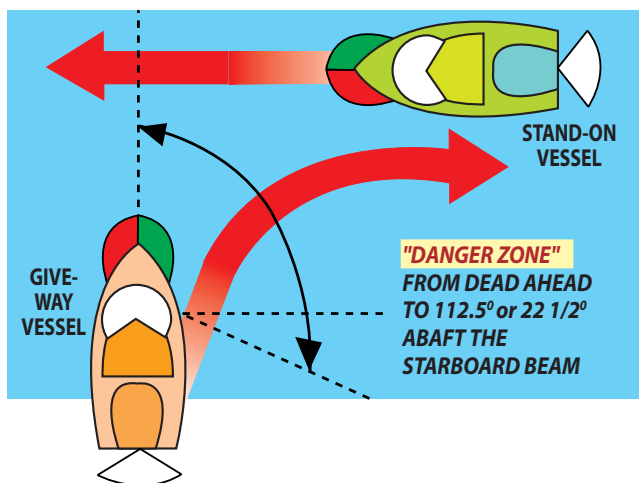
OVERTAKING (PASSING) SITUATIONS

The boat being passed is the stand-on vessel. It must maintain its course and speed while the overtaking (give-way) vessel passes by. The overtaking boat is always the give-way vessel, and it may pass on either side.



CROSSING SITUATION

All boats have a danger zone from dead ahead (12 o'clock) to 4 o'clock (112.5 degrees) starboard (the right). In a crossing situation, the boat in the danger zone (ahead and to the right) is the stand-on vessel. The give-way vessel must stop or slow down and let the stand-on vessel continue on. If the give-way vessel does not take the required action in this or any of the other situations, then the stand-on vessel operator must be prepared to take action to avoid a collision.



SOUND SIGNALS

Sound signals should be made when within hearing distance of another vessel to indicate your intentions when meeting, crossing or overtaking them. Your signal should receive a response signal from the other vessel indicating their agreement or disagreement with your intentions.

Short Blast- one-second duration **Prolonged Blast**- 4 to 6 seconds duration

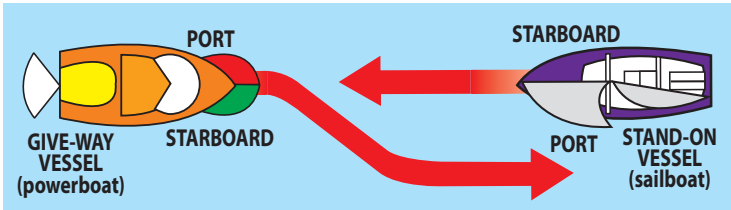
1 Short Blast- I intend to leave you on my port side (boat turns right).

2 Short Blasts- I intend to leave you on my starboard side (boat turns left).

3 Short Blasts- I am operating in reverse (astern propulsion).

5 or More Short Blasts- Doubt or danger (danger signal used when the other vessel's intentions are not understood or where the other vessel's indicated course is dangerous).



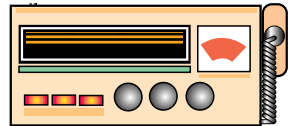


OTHER IMPORTANT RULES OF THE ROAD

- A power-driven vessel must give way to any sailing vessel that is under sail only (no auxiliary power propulsion).

Exceptions:

- When a sailboat is overtaking a power-driven vessel (power-driven vessel is the stand-on vessel and maintains course and speed while being overtaken).
- When a sailboat is approaching a boat at anchor (the power-driven vessel remains anchored).
- In narrow channels, recreational vessels under 65 feet long must not hamper the operation of large vessels that cannot operate outside the channel. Boats should operate as near to the outer limit of the channel that lies on its starboard (right) side as is safe and practicable.
- Vessels restricted in their ability to maneuver, such as tugs with barges, ferryboats, commercial fishing boats with nets or lines out or boats at anchor, are stand-on vessels.
- Vessels not under command (usually because of mechanical problems and are unable to steer) or constrained by their draft are stand-on vessels.
- On a river, a boat operating upriver (against the current) gives way to a boat operating downriver (with the current). A boat operating across the current gives way to boats operating both upriver and downriver.



VHF RADIO

A VHF (very high frequency) radio is used to communicate with other boaters, the Coast Guard, commercial vessels, draw bridge tenders and lock operators. A VHF is not required to be U.S. Coast Guard approved. Recreational boaters are not required to carry VHF radios, but they are highly recommended on larger waters, such as Lake Erie. The Federal Communications Commission (FCC) regulates their use. Recreational boats less than 20 meters in length are NOT required to have a station license to operate a VHF radio unless they travel to foreign ports or transmit to foreign stations. Use of a VHF radio is enforced by the U.S. Coast Guard.

There are many channels on the VHF, but recreational boaters are given access to only a few.

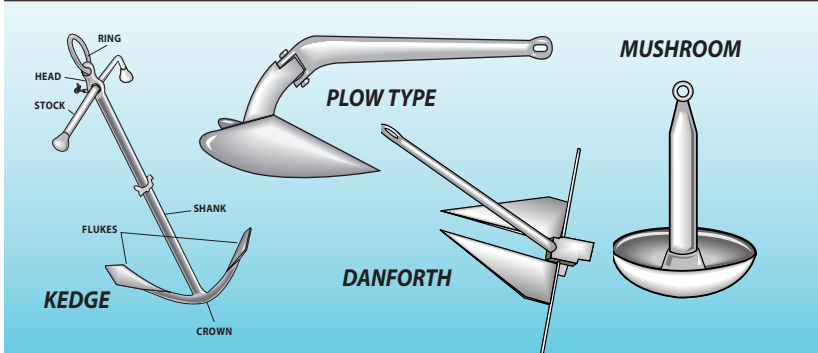
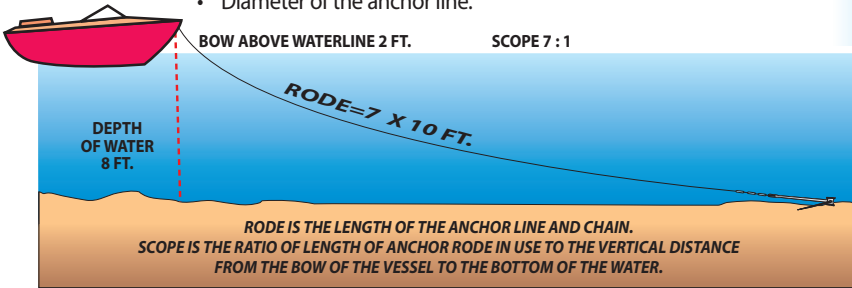
6	intership safety communications only
9	commercial and non-commercial intership, ship to coast and alternate calling channel
13	ocean-going vessels, bridge tenders, tugs while towing, locks
16	distress safety and calling, call Coast Guard, establish general contact
24-28, 84-88	public telephone calls (to call the marine operator)
68, 69, 71 and 78	non-commercial intership and ship to coast (recreational boat working channels)
72	non-commercial intership only

Marine weather (WX-1, WX-2, WX-3) stations broadcast the latest available weather information from the National Weather Service continually. Forecasts are updated every six hours or more often as conditions require.

ANCHORING

It is essential that every boater becomes proficient in anchoring. Some anchoring considerations include:

- Type and weight of the boat.
- Character of the bottom in the area you are boating (rocky, sandy).
- Average depth of the water.
- Strength of the wind and current.
- Diameter of the anchor line.



There are different types of anchors: kedge for rocks and heavy grasses, burying for sand and mud, mushroom for permanent moorings. The two questions boaters should ask themselves about anchoring are: which type of anchor will they need, and how much rode (the length of the anchor line) is necessary?

Anchors hold best when the pull of the rode on the anchor is as near to horizontal as possible. The holding power of an anchor increases as the scope ratio increases. A ratio of 7:1 is standard; 10:1 is better in rough water. For example, if boating in 8 feet of water and the bow is 2 feet above the waterline, 70 feet of rode is recommended. Boaters should carry at least two anchors. A smaller, lighter anchor is good for use in calm weather and for positioning a boat, and a larger anchor is best for bad weather or when anchoring overnight. **Never anchor from the stern, especially in current or waves.** The anchor line should be tied to the bow. The end of the anchor rode (called the bitter end) must be secured to the boat

To anchor, the boat should be headed into the wind or current. The engine is then reversed, or the boat is allowed to back off. When the boat begins to drift backward, lower the anchor from the bow (front of the boat). No one should be standing on any part of the anchor line. When about a third of the rode is out, the rode is tied off to a forward cleat to make the anchor dig into the bottom. Once the anchor digs in, the remaining rode is let out. A sight bearing is then taken on some stationary objects to make certain that the anchor is not dragging on the bottom.

Anchors can also be used as safety devices in an emergency situation. The operator may drop the anchor quickly to avoid running aground in the event the boat loses power. Make sure the anchor and line are stored in an easily accessible place.

Exercise caution when “weighing” (pulling up) anchor. The combination of anchor pull, current and weight can swamp a small boat. The anchor should be lifted as vertically as possible. As it is lifted, it can be washed. Take care that it does not hit the side of the boat.

LOCKS AND DAMS

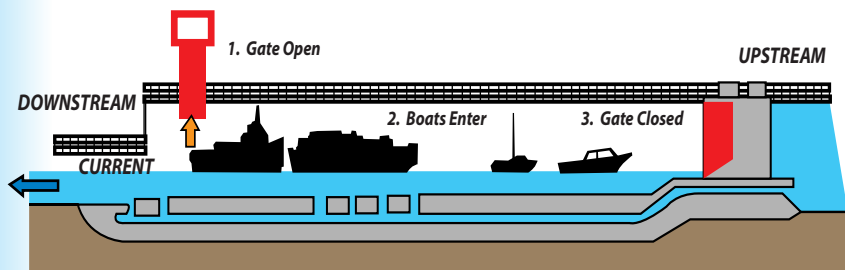
In Pennsylvania, locks and dams are located on the three rivers in and near Pittsburgh (Monongahela, Allegheny and Ohio rivers). The dams provide a navigable channel for river traffic. Locks are a means of passing vessels through the dams. The locks in Pennsylvania are built and maintained by the U.S. Army Corps of Engineers.

At locks, the lockmaster is in control and will signal your boat to enter with a horn or a light system.

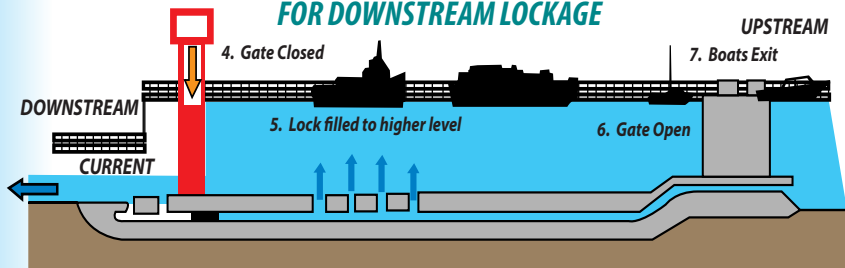
There are priorities (of boats) set for safe and efficient passage:

- military craft
- mail boats
- commercial passenger craft
- commercial tows
- commercial fishermen
- pleasure boats

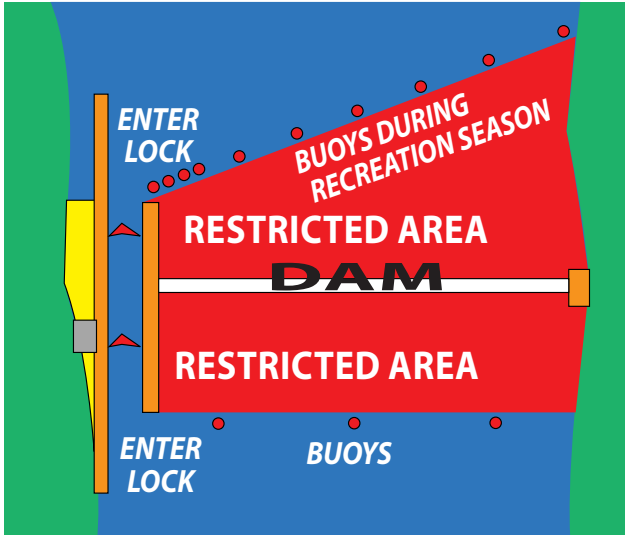
Before entering a lock, the boat should stop at least 100 yards from the lock entrance. The lockmaster can be signaled by the boater with a long and short blast of the horn, on the marine radio (channel 13) or with a signaling device on the lock wall. Once the lockmaster has been signaled, the boat must stay clear of the lock chamber until signaled to enter. Fenders and mooring lines (minimum of 75 feet) should be ready. Once inside the chamber, the lock lines are adjusted with the water levels. The boat must not be tied fast to the lock wall. Life jackets should always be worn.



HOW LOCK SYSTEMS OPERATE—REVERSE PROCEDURE FOR DOWNSTREAM LOCKAGE



TYPICAL FIXED-CREST DAM



LIGHT SYSTEM

THE ONE THAT IS FLASHING IS THE LIGHT TO OBEY.

1. Red - Stand clear, do not enter.
2. Amber - Approach the lock under full control.
3. Green - Enter the lock.
4. Amber/Green - Enter the lock with caution.

BOAT THEFT

Small boats are very vulnerable to theft. Titled boats are easier to identify and much more difficult to sell illegally. Boat dealers and other purchasers are more certain that someone offering a titled boat for sale has the legal right to do so.

BOAT AND MOTOR THEFT PREVENTION CHECKLIST

- ✓ **Secure it.** Store your boat and motor in a secure location. Use a hitch lock to secure your boat trailer. Lock your outboard motor to your boat with a motor lock or chain and padlock.
- ✓ **Mark it.** Use an engraving tool to mark your boat, motor and the marine equipment with a unique identification (driver's license number, etc.). Hide your engraved identification in a location where it is not easily found.
- ✓ **Record it.** Keep a record of your boat and motor's make, model and serial numbers.
- ✓ **Report it.** Immediately report any theft to your local police and to the Pennsylvania Fish & Boat Commission, Division of Licensing and Registration, in Harrisburg, at 1-866-262-8734. Reporting your loss to the police and PFBC may lead to its recovery in the event someone attempts to sell or register it.