

Public Vessel Operator's STUDY GUIDE

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New York State Office of Parks, Recreation and Historic Preservation
Marine Services Bureau
625 Broadway, Albany, New York 12238 • (518) 474-0445 • www.nysparks.com

You have received this manual because you intend to operate your boat for hire. Here are some of the most frequently asked questions.

I want to take people on my boat. Do I need a Public Vessel License?

If your boat is mechanically propelled and you are charging a fee you may need a Public Vessel license. This fee can be direct or indirect compensation. (Refer to page 3)

On what waterways will I need a license?

You will need a public vessel license on all New York State bodies of water except for the Hudson and Mohawk River, NYS Barge Canal, Lake Erie and Ontario, Lake Champlain and Greenwood Lake, Cayuga, Oneida, Onondaga and Seneca Lake, New York Harbor, Long Island Sound and the Great South Bay.

How do I get a License?

You need to be at least 18 years of age and pass the Public Vessel Operator's exam.

Where can I take the Public Vessel Operator's exam?

Public Vessel Operator exams are given at the time of the inspection of the vessel you intend to operate. You may also make arrangements to come to our office in Albany.

What happens if I fail the exam?

You must wait two weeks prior to contacting Marine Services Bureau (MSB) for a retest. Most retests are given in Albany. If it is during the inspection season, you may be able to arrange a retest in the field at an inspector's convenience.

Can I come to Albany to take an exam?

If you need to take the exam and the boat has already been inspected you can take the exam in Albany. In general, this office does not make repeat visits to a boat unless there is a reason to re-inspect the boat. If you want to get an early start on the season you may contact us and take the exam in Albany.

See the last page of this manual for directions and further information.

I have a USCG license; do I need to take the exam?

If you have a current USCG License you will not have to take the Public Vessel Operator's exam. You will need to file an application for a Public Vessel Operator's license, with a copy of all pages of your Merchant Mariner Credential (MMC) and submit a check for \$20.00 for your original New York State Public Vessel Operator's license.

I am a New York State licensed guide; do I need to take your exam and have my boat inspected?

Many individuals who register with the Department of Environmental Conservation as a fishing guide, on the waters noted above, may not be aware that they must meet the requirements of the NYS Navigation Law as well. If you operate a guide service that uses a mechanically propelled boat for either fishing, hunting, or to drop off clients at trail heads or wilderness camps on the waters noted above, you are considered a public vessel.

Where can I get the forms for a Public Vessel Operator's license?

The Application for a Public Vessel License is found on our website www.nysparks.com.

I had an accident with my public vessel, who should I report it to?

Any boating accident involving a Public Vessel must be reported to the Marine Services Bureau. A boating accident can involve any of the following: damage in excess of \$1000, and injury requiring medical attention, or a fatality. The injury need not occur to someone in a boat. If a skier, tuber or swimmer is injured, it is considered a boating accident, and must be reported to this office.

Is there a practice test? No, there is a chapter review at the end of the book.

GENERAL INFORMATION AND THE LAW

DEFINITION OF A PUBLIC VESSEL

As stated by the New York State Navigation Law, the term "Public Vessel" shall mean and include every vessel which is propelled in whole or in part by mechanical power and is used or operated for commercial purposes on the navigable waters of the state; that is either carrying passengers, carrying freight, towing, or for any other use for which compensation is received, either directly or where provided as an accommodation, advantage, facility, or privilege at any place of public accommodation, resort, or amusement. (Section 2.6(a), NYS Navigation Law)

What is direct compensation?

A person has paid you money for a ride on your boat.

What is indirect compensation?

When a person has paid you a sum of money and one of the related services you provide him is a boat and an operator for that boat. Some examples of indirect compensation are:

Fishing guides who use a boat to get his clients to a fishing spot on the lake.

A camp that transports campers to a remote campsite.

A motel that provides transportation to their guest somewhere on the lake by boat.

A camp or a hotel that provides waterskiing to their guests.

An educational institution that provide water transportation for their students in their study programs.

MARINE INSPECTORS

The Marine Inspector has many duties and powers outlined under the New York State Navigation Law (NYSNL). Inspectors are required to annually conduct inspections of all Public Vessels throughout the State. Inspectors also may board any vessel licensed by the State at any time to examine her condition for license and to confirm that the conditions of the Certificate of Inspection and the appropriate sections of the Navigation Law have been conformed to and obeyed.

If the owner(s) or person(s) responsible for the safe operation of the vessel are found to be in violation of the conditions of the Certificate of Inspection or the NYSNL the Marine Inspector has the power to issue a uniform navigation summons to the operator as well as the owner of the vessel and suspend or revoke any licenses used for the operation of the vessel.

The inspector may also call for the seizure of a Public Vessel that is being operated in violation of the NYSNL or being operated by an unlicensed person with the owner's consent.

INSPECTION OF PUBLIC VESSELS

INSPECTION CRITERIA AND CERTIFICATION

Any owner who intends to operate a Public Vessel must contact the Marine Services Bureau (MSB) to request certification of the vessel. The owner will fill out the application for certification of a public vessel found in the back of this manual and forward it to Marine Services Bureau. Along with the application the owner should attach a copy of the vessel's registration and if possible a photo of both the boat and any capacity plate that may be found on the boat. This bureau will assign you a date, time, and location for your inspection. You must confirm ASAP to lock in your slot. During peak inspection season - May, June & July - scheduling may be difficult, and the inspectors may not be able to complete the inspection prior to scheduled operation as a PV.

A Public Vessel must be inspected before it is placed in service and each year thereafter. The inspection includes a complete examination of the hull, propulsion system, control systems, fuel system, ventilation, electrical system, and all required safety equipment. If the vessel is found to be in compliance with all inspection criteria, the inspector will certify the vessel as a Public Vessel. The inspector will also make a determination on the number of passengers the vessel may carry and the manning requirements. All information will be recorded on the vessel inspection report. The top copy of the report, when signed by the inspector and the vessel owner, will serve as a temporary Certificate of Inspection valid for thirty days. Following receipt of payment, a formal Certificate will normally be received within two to three weeks.

For more information on specific inspection criteria consult the applicable chapters of this book or call the Marine Services Bureau. A copy of the inspection report appears in the appendices.

DEFICIENCIES AND FAILURES

Any deficiencies discovered during the vessel inspection will be listed on the inspection report. The quantity and seriousness of the deficiencies will be the determining factor in whether or not the vessel passes inspection. Identical deficiencies in consecutive years will be immediate cause for failure. All listed deficiencies must be corrected prior to placing the vessel in service. This means they must be corrected before the next time you take out passengers. If the vessel does not pass inspection, a temporary permit will not be granted and will require another inspection at a later date.

The owner of the vessel will receive a copy of the inspection report noting all deficiencies and the inspector's instructions for correcting them. When all deficiencies have been corrected, the owner is required to mail a signed, notarized letter to MSB certifying that corrective action has been taken. The inspector may then either schedule a second inspection of the vessel or issue a Certificate of Inspection.

POSTING OF CERTIFICATE OF INSPECTION

The Certificate of Inspection is required to be posted in a conspicuous place on the vessel approved by the inspector (usually the pilothouse). Vessels under ten tons displacement are exempt from the posting requirement; however, the Certificate of Inspection must always be on board when the vessel is operating as a Public Vessel.

Repairs, Major Alterations and Hull Inspections

Whenever repairs beyond basic maintenance and upkeep to any of a Public Vessel's systems are anticipated, the vessel owner should contact MSB, prior to the repairs, to provide information on the nature and extent of the repairs. Based on the information provided the inspector will determine if an inspection is required prior to placing the vessel back in service.

This is especially important if major alterations to the vessel's hull or structure are to be accomplished, or when a propulsion engine receives major repairs or replacement. It is the duty of the owner to promptly report the same to the inspector, so that they may make a thorough inspection, if the inspector determines that such an examination is necessary. *Failure to do so may void the vessel's Certificate of Inspection and delay operation as a Public Vessel until a thorough re-inspection is conducted.*

Any time a public vessel is structurally modified in such a way as to potentially impact the vessel's stability it will be necessary for the owner to have a naval architect or an otherwise qualified professional recertify the vessel's stability to the State. Modifications can include but are not limited to the addition of an upper deck, replacement of propulsion, or any new or added machinery.

At intervals of not more than 10 years, public vessels certified to carry more than 20 passengers shall be hauled in order for the inspector to examine the hull of the vessel and may require a naval architect or an otherwise qualified professional to recertify the vessel's stability to the State. For vessels certified to carry more than 65 passengers the inspector may require a thorough structural and hull survey to be undertaken by a naval architect or qualified engineer. This survey is the responsibility of the owner. Vessels found to be deficient must be corrected or removed from service.

LICENSING OF PUBLIC VESSEL OPERATORS

Public Vessels, when underway, must have on board the licensed personnel and crew required by the Certificate of Inspection. Operating a Public Vessel without the appropriate license is a misdemeanor offense punishable by fine, imprisonment, or both. An owner who permits unlicensed operation is also guilty of a misdemeanor. On all vessels, the license must be carried on board and shown upon request by the marine inspector or a law enforcement officer.

ORIGINAL LICENSE GENERAL REQUIREMENTS AND PROCEDURES

1. All license candidates must complete and sign a license application form. The applicant must provide all requested personal information and information relating to ability, character, education and experience. Failure to provide the requested information is grounds for license denial. Unless

specifically waived by the inspector, all license applicants must pass a written examination. All applicants must meet the following requirements before taking the written examination:

2. Present valid photo identification (driver's license, passport) and proof of age. Non-U.S. citizens must present proof they are legally in the United States.
3. Present evidence of completing a boating safety course approved by the National Association of State Boating Law Administrators (NASBLA). This requirement may be waived for anyone possessing a current U.S. Coast Guard license. Acceptable certificates include the following:

New York Safe Boating Course - www.wearitnewyork.com

United States Coast Guard Auxiliary Courses - www.cgaux.com.

United States Power Squadrons Courses – www.americasboatingcourse.com

Boating Course of Another State - A boating safety certificate issued by another state's government that clearly indicates it was issued for completion of a NASBLA approved boating course.

On-line Boating Courses - There are many online courses currently NASBLA approved. Go to www.nasbla.org/education

Most online courses are not approved by NYS so you may not be able to take the final exam if you list your home state as New York. Enter a surrounding state and continue with the program and remember to print out the certificate after your exam is graded.

This office also recognizes the online boating courses at BoatUS.com and BoaterExam.com. These are free courses that cover New York State Specific information.

4. Applicants must have at least 30 hours of experience operating motorboats of a similar size. This time does not have to be on the particular boat that is being used as a public vessel. This boat could be the applicant's own personal boat.
5. The applicant must demonstrate, on a written examination, a general knowledge of small boat handling, engine operation, Navigation Rules, the New York State Navigation Law, the use and maintenance of safety equipment and a thorough knowledge of emergency procedures such as firefighting, man overboard, flooding, etc. The inspector may also require a practical exam.

Upon successful completion of the written examination and any requirements specific to the type of license being sought, the candidate is issued a temporary license valid for *thirty* (30) days. The official license is normally issued within one month of receipt of payment and is valid for one year from the date of examination. License candidates should contact this office early to request placement on the inspection/testing schedule. It may be necessary for the applicants to travel to Albany if they cannot be accommodated in the regular schedule.

SPECIFIC LICENSE TYPES AND REQUIREMENTS

Master - A Master's license is required for the operation of any Public Vessel that exceeds any of the following criteria: 65-foot length, 50-ton displacement, or 65 passengers. The applicant must successfully exhibit to the inspector, during a practical examination, a thorough knowledge of seamanship, ship handling, Navigation Rules, piloting, emergency procedures, and the accepted practices of supervision and leadership of a vessel's crew. A written examination may also be required. The applicant must also, in most cases, have served at least one season as an Apprentice Master aboard the vessel with a minimum of sixty hours of piloting documented in the vessel's logbook. A letter of recommendation from the vessel's owner must be submitted with each application for a Master's license.

Joint Pilot & Engineer - This license is for use on smaller vessels, not meeting the criteria for a Master's license that requires only one person for safe operation. The applicant must demonstrate, on a written examination, a general knowledge of small boat handling, engine operation, Navigation Rules, the New York State Navigation Law, the use and maintenance of safety equipment and a thorough knowledge of emergency procedures such as firefighting, man overboard, flooding, etc. The inspector may also require a practical exam.

Apprentice Master - This license is normally the first step for personnel seeking a Master's license on larger

vessels. The applicant must demonstrate a minimum of thirty trips (documented in vessel's logbook) as a deck hand on the vessel for which he/she desires a license and demonstrate the same level of knowledge on a written examination as the Joint Pilot & Engineer. If the applicant has held a Joint Pilot & Engineer license for at least one year immediately preceding the application the license can be upgraded to Apprentice Master without examination. Once the license is issued the licensee may begin training as a Master under the direct supervision of a licensed Master. No person may train to operate or pilot a Public Vessel requiring a Master without first obtaining an Apprentice Master's license. All training of an Apprentice Master must be documented in the vessel's logbook for later reference by the inspector.

Engineer - This license is required on those larger vessels having engine spaces which require tending by someone other than the vessel's operator. In general, any vessel meeting the criteria requiring a licensed Master will also be evaluated for the need to carry an Engineer. The final determination will be made based on the following criteria:

- a) Any vessel utilizing steam propulsion systems must carry an engineer.
- b) Any vessel in which the propulsion machinery cannot be completely controlled from the Pilot House must carry an engineer.
- c) All other vessels will be evaluated on an individual basis by the following characteristics:
 - 1) Complexity of the Engineering Plant - This may include but is not limited to: the size, number, and horsepower of the engines; the quantity, rating and complexity of the onboard electrical generating system; the need to utilize shore power when pier side; and the complexity of operating and start-up procedures.
 - 2) Accessibility and proximity of propulsion and auxiliary machinery spaces to Pilot House
 - 3) Whether or not emergency equipment such as fire pumps, bilge pumps, and firefighting systems are controllable from the bridge

Applicants for this license must exhibit, on a written and practical examination, a thorough knowledge of the entire marine plant. This includes but is not limited to basic propulsion theory, systems and operation, electric power generation, sanitary system, fire pumps, steering systems, and related auxiliary gear. They must also exhibit a complete understanding of marine safety and firefighting techniques.

LICENSE	JOINT P & E	APPR. MASTER	MASTER	ENGINEER
AGE (proof required)	18	21	21	21
BOATING SAFETY COURSE	YES	YES	YES	YES
WRITTEN EXAM	YES - JP&E	YES - unless holding JP&E license	May be required at inspectors discretion	YES - general questions re: power plants, firefighting, etc.
PRACTICAL EXAM	Not Normally Required	At Inspector's Discretion	YES - Vessel must be conned under inspectors observation	YES - Must operate and explain various engineering systems
EXPERIENCE	Thirty hours of experience operating motorboats	One season(30 trips) as a deck hand, or 1 year as a JP&E	Serve as an Apprentice Master under the direct supervision of licensed master; min. of 60 hours bridge time, certified in the vessel's logbook.	One season working in the engine room under the supervision of a licensed engineer. Two months required if candidate is a licensed stationary engineer.

WAIVERS FOR LICENSING REQUIREMENTS

Waivers may be granted for some or all of the requirements of a given license. Waivers are not automatic and are granted on case by case basis at the discretion of the inspector. All requests for waivers must be

accompanied by sufficient documentation to support the waiver request. For example, an applicant seeking a waiver based on a current U.S. Coast Guard license must provide a copy of both sides of the license or each page of their Merchant Mariner Credentials with the Application for a Public Vessel License.

LICENSE RENEWALS

All licenses must be renewed annually. Re-examination is usually not required; however, a short open book renewal examination will be given every five years in order to keep all licensed operators up to date on changes in the law and other safety related items. Any licensee who fails to renew his/her license by the expiration date will have until one (1) year to renew the license. For example, if your license was issued June 2, 2018, it would expire June 2, 2019 but you would have until June 2, 2020 to renew without reexamination. *MSB will not notify licensees of impending license expirations.* Failure to renew the license within the one year grace period will require reexamination prior to a new license issuance. No person may operate a Public Vessel beyond the expiration date on the license.

POSTING OF LICENSES

The public vessel license of the operator is required to be posted in a conspicuous place on the vessel approved by the inspector (usually the pilothouse). Vessels under ten tons displacement are exempt from the posting requirement; however, license must always be on board when the vessel is operating as a Public Vessel. Public vessel operators are required to show their license to any law enforcement officer upon request.

SUSPENSION OR REVOCATION OF LICENSES

The inspector may suspend or revoke any license issued pursuant to the provisions of Article 4 of the New York State Navigation Law upon satisfactory proof of: recklessness; carelessness; intemperance; incompetence; willful dereliction of duty; or willful disobedience of any lawful rule, or regulation duly made and promulgated by the Commissioner of the Office of Parks, Recreation and Historic Preservation in the Executive Department of the State New York.

Whenever any license is suspended, the holder shall forthwith deliver up his license to the inspector, who shall retain it until the time of suspension shall expire. Any such suspended person who shall refuse to deliver up such license shall be subject to a penalty of one hundred dollars for each day following such refusal.

CREW REQUIREMENTS

As the passenger carrying capacity increases on a Public Vessel, the need for additional crewmembers to assist the operator increases. In the event of an emergency, the vessel's operator may be too busy with other tasks to personally assist the vessel's passengers. Additionally, larger vessels often require more than the operator to provide a proper lookout, safely dock/undock the vessel, and generally carry out the vessel's routine underway. In such cases the operator must have personnel under his/her direction to carry out the necessary tasks. Realizing this, the following minimum crew requirements have been established by the marine inspectors. *The number of crewmembers required is based on the number deck on the vessel accessible to passenger and the total number of passengers currently on the vessel.*

On vessels required to carry an Engineer, the Engineer may not be counted as one of the crewmembers provided because such duties will interfere with the operation or safety of the engineering plant.

Number of Decks	Minimum Required Crew Persons
Single deck	1
Two decks	2
Three Decks	3
Four decks	4

Number of Passengers on board	Additional Crew Persons Required
Over 100 passengers on board	One Crew person for each additional 50 passengers

Vessels may carry fewer crewmembers when passenger total is lower. However, they may never carry less than the minimum crewmembers shown on the chart above under any circumstances.

NUMBER OF PASSENGERS

The marine inspector determines the number of passengers, licensed personnel, and crew a Public Vessel may carry when the vessel is initially certificated. This is noted on the Certificate of Inspection. It is unlawful to take aboard any Public Vessel a number of passengers greater than the number allowed on the Certificate of Inspection. For every violation of this provision, the Master, Pilot, Joint Pilot & Engineer, or owner shall be guilty of a misdemeanor.

The number of passengers that a vessel can carry will be determined by the marine inspector. Vessels manufactured in accordance with Coast Guard regulations and having a capacity plate will usually be certified at the capacity plate level based upon inspector's discretion. As of 10/3/2005 a manufacturer's capacity plate information will be reviewed and persons allowed to be carried will determined in the following manner:

The total passenger weight listed on the capacity plate will be divided by 174 lbs and the results will be rounded down to the nearest integer. If the total passenger limit listed on the plate is higher, the lower number will be used. This will be the person capacity of the boat.

Larger vessels without a capacity plate will need to undergo a simplified stability or inclining test conducted by a naval architect or an otherwise qualified professional to determine the safe load capacity of the vessel. This will be the responsibility of the boat owner/operator. All stability tests must be witnessed by a state marine inspector.

The maximum number of passengers permitted on any public vessel may be the greatest number permitted by one of three criteria. In no case will the number of persons on board exceed the number determined by the stability test or a manufacturer's capacity plate.

- (1) Length of rail criterion. One passenger may be permitted for each 30 inches of rail space available to the passengers at the periphery of each deck.
- (2) Deck area criterion. One passenger may be permitted for each 10 square feet of deck area available for the passengers' use.
- (3) Fixed seating criterion. One passenger may be permitted for each 18 inches of width of fixed seating.

FEES

VESSEL INSPECTIONS

The inspection fee for each Public Vessel must be paid upon receipt of an invoice issued to the owner/operator regardless of whether or not the vessel passes inspection. The fees are established by the State Legislature and are based upon the displacement tonnage of the vessel as follows:

Vessel Size	Fee
10 tons and under	\$20.00
Over 10 to 20 tons	\$30.00
Over 20 to 50 tons	\$40.00
Over 50 to 100 tons	\$50.00
Over 100 tons displacement	\$100.00

NOTE: Payment must be made by check or money order.

OPERATOR LICENSES

The license fee for each Public Vessel operator's license must be paid upon receipt of an invoice issued to the owner/operator. The operator may choose to renew licenses at the time of the inspection of their vessel or request renewal prior to the inspections by mail or email. The fee is established by the State Legislature.

Original License	\$20.00
License Renewals	\$10.00
Upgrade in license	\$0.00

SOME FREQUENTLY ASKED QUESTIONS

Each summer this office receives a host of questions from camps and new public vessel operators about the status of their public vessel. Here are some answers to some commonly asked questions

- 1. The law states that the license, not a copy of the license, must be carried on board. Due to the nature of boat operation you may be leery of putting the actual documents on the machines themselves you may want to place your license in a "Ziploc" bag to keep it dry. This also applies to the Certificate of Inspection.*
- 2. If the camp has a PWC and a staff member takes campers out on the PWC, it is considered a public vessel. If the camp allows the campers to operate the PWC alone or with other campers onboard, the PWC is not considered a public vessel. The operator must have a state issued boating safety certificate.*
- 3. If you hold a public vessel operator's license you do not need a boating safety certificate to operate a personal watercraft.*
- 4. A public vessel may be taken out for use as a personal boat, such as for counselor use after hours, as long as no campers or paying passengers are on board.*
- 5. If parents or guests of campers are taken out on a boat to watch their child waterskiing, the boat is considered a public vessel.*
- 6. If a parent, neighbor, or a staff member brings a boat to camp and takes campers out for a scheduled and/or organized event, such as water skiing, or fishing, the boat will be considered a public vessel. The boat must be inspected and the operator must have a license.*
- 7. If a staff member without a license that wants to learn how to drive the boat they can operate the boat with a licensed operator observing them in the next seat as long as no campers are on board or being towed. If you have campers on board, a licensed operator must be at the controls. You can have a non-licensed staff member train while pulling other staff members behind the boat.*
- 8. If you rent a boat from a marina for waterskiing or transportation of campers or to fill in for a boat that is being repaired the rental boat will be considered a public vessel and be required to be inspected.*
- 9. Boats that are only used for transporting equipment, groceries, or a rescue boat are not considered a public vessel.*
- 10. The law requires the letters "PV" to be permanently affixed to the boat; there is no provision to allow them to be mounted on a removable placard. If you are using the boat for pleasure you should cover the letters "PV" otherwise the vessel is considered a public vessel.*
- 11. From time to time a livery operator will ask if they can lease or rent one of their public vessels. A rental boat is called a livery vessel. If you bareboat charter a boat from your livery it will not be considered a public vessel. This office considers a bareboat charter an agreement for the rent or lease of a vessel without crew for a period of time. If you or your employees recommend any person, licensed or not to operate that the vessel, the vessel will be considered a public vessel. This would include a person that may ride the vessel and directs the lessee on how to operate the boat. If you are bareboat one of your public vessels the required lettering "PV" must be covered when operating as a livery vessel otherwise the vessel is considered a public vessel.*

REGISTRATION OF BOATS

Registration

New York State law requires that every mechanically propelled vessel operated primarily on the navigable waters of the state or any waters within the boundaries of the state be registered with the Department of Motor Vehicles in accordance with article 48 of the Vehicle and Traffic Law. A mechanically propelled vessel is one equipped with a motor (gasoline, diesel, electric, etc) regardless of whether or not the motor is the primary means of propulsion (i.e. an auxiliary sailboat or a canoe with a trolling motor). Upon registration of the vessel, the owner will receive a registration certificate, indicating the vessel's assigned number, and a set of validating stickers. Vessel registration must be renewed every three years. The requirement for a vessel to be registered is separate and distinct from the requirements of Public Vessel certification but failure to prove that the vessel is properly registered may result in the vessel not receiving certification. Once assigned to the vessel, the registration number will remain with it until the vessel is destroyed or permanently removed from the state.

REGISTRATION CERTIFICATE

The registration certificate is a pocket sized card which contains the name and address of the owner and vessel information such as hull material, propulsion, length, model year, manufacturer, hull identification number, and type of use, in addition to the registration number awarded. It serves as proof that the vessel is registered. It is also proof of ownership unless the vessel is titled or documented. It is required that the registration certificate be on board the vessel at all times when it is in operation.



REGISTRATION NUMBER

Your boat's registration will be a series of numbers and letters. You must display your boat's registration properly so that it is visible on the forward part of the port and starboard sides of the boat when read left to right. The registration must be at least three inches in height, so that it is visible at 100 ft., and it must be in a color that contrasts with the hull color to enhance visibility. The registration number must be permanently attached; this means painted, decals, or stickers. There should be a space or dash between the letters and numbers: NY 1234 XY or NY-1234-XY.

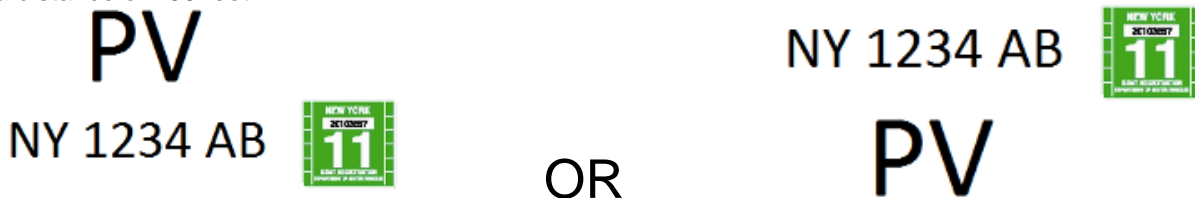


When you register your boat for the first time, and when you renew its registration, you will receive a validation sticker or decal to show that the boat is currently registered. Like the registration certificate, the stickers are valid for three years. They are color coded by year and similar to your vehicle inspection sticker, the month that the registration is punched out. This allows a police officer to know at a glance if the

boat is registered. Place the decal toward the stern of the registration numbers on both sides of the boat.

Public Vessel Identification

When a vessel is approved and certified as a Public Vessel, the letters PV must be displayed above or below the registration number on both sides of the forward half of the vessel. These letters are to be not less than five inches in height and maintained in a legible condition so that they are readily discernible during daylight hours at a distance of 200 feet.



BOATS AND MOTORS

Boat Terminology

BOAT MEASUREMENTS

Length or Length Overall (LOA) — the distance from one end of the boat to the other end. It does not include outboard motors, brackets, or other attachments.

Beam—the width of the boat at its widest point.

Displacement—the weight of water that the boat must push out of the way to float. As you add gear or passengers, the boat's displacement increases and the boat sinks lower into the water.

Draft—the vertical distance from the bottom of the underside (the keel) to the water line.

The draft determines the depth of water in which your boat can operate—the larger the draft, the deeper the water must be for the boat to operate without running aground.

Freeboard—the vertical distance from the waterline to the upper edge of the boat's sides. Boats with low freeboard may take on water in rough conditions or when crossing another boat's wake.

Centerline—an imaginary line drawn from the bow to the center of the stern.

Waterline length—the length of the boat from end to end when it is in the water

Trim —The angle at which a boat rides in the water. A boat may be trimmed so it rides even, down at the stern, or down at the bow.

Knot—a measurement of speed on the water equal to one nautical mile (6076.1 feet) per hour.



PARTS OF A BOAT

Hull—the basic structural shell of a boat.

Bow—the forward (front) part of a boat.

Stern—the after (back) part of a boat.

Keel—the backbone of the boat running from the bow to the stern along the underside of the boat along the centerline.

Transom—vertical surface at the back of the stern which extends across the stern from one side to the other.

Outboard motors are mounted on the transom.

Gunwale—upper edge of a boat's sides (rails).

Bilge—the area beneath the floorboards, or the lowest point of hull in a boat without floorboards.

Cabin—an enclosed portion of the hull.

Helm—the operating station where the operator controls the direction and speed of the boat.

Cockpit—a recessed area in the after deck where the controls of the boat are located.

Rudder—steering device on the stern of the boat.

Throttle—a means of controlling the speed of the boat's engine.

Deck—the name of the floor on a boat.

Propeller—a device with two or more twisted blades that is designed to move a boat through the water. The propeller is connected to the engine by a shaft.

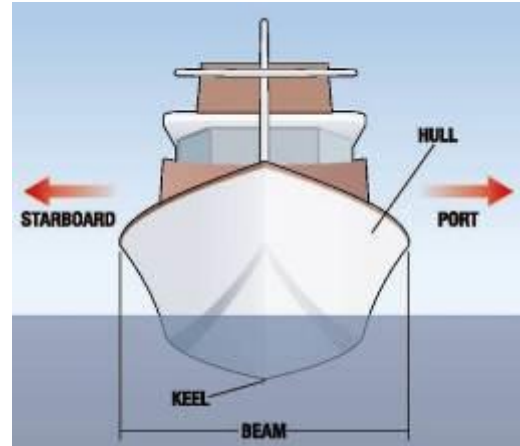
Boat Plug—a device used to close the drain hole in the bottom of the boat.

Shear Pin—a steel pin that fits the propeller to the shaft and is designed to break to protect the propeller.

Winch—a hand or mechanical device used to pull in a rope or a chain.

Hatch—an opening in the boat's deck or hull that allows people or equipment to pass through.

Vent—an opening that allows air to pass through the hull.



DIRECTIONAL TERMS

(Assume you are sitting in the boat facing the bow or front of the boat)

Forward—towards the bow of a boat.

Aft—towards the stern of a boat.

Starboard—the right side of boat.

Port—the left side of boat.

Ahead—in front of the boat or to move forward through the water.

Astern—behind the boat, or to move backwards.

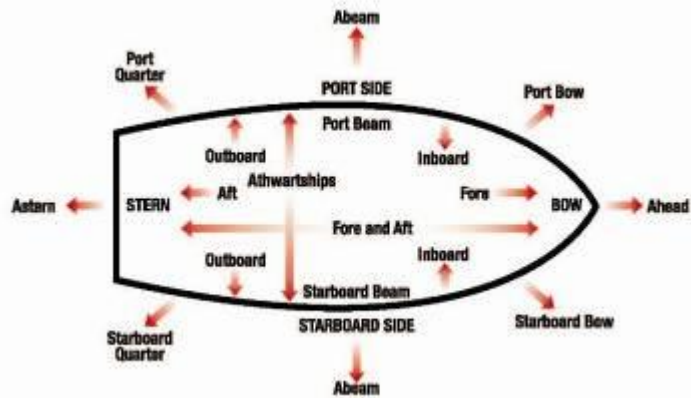
Abaft—behind or toward the stern in the boat.

Abeam—off the port or starboard side of the boat, at 90 degrees to the keel of a boat.

Athwartships—across the boat at a right angle to the keel.

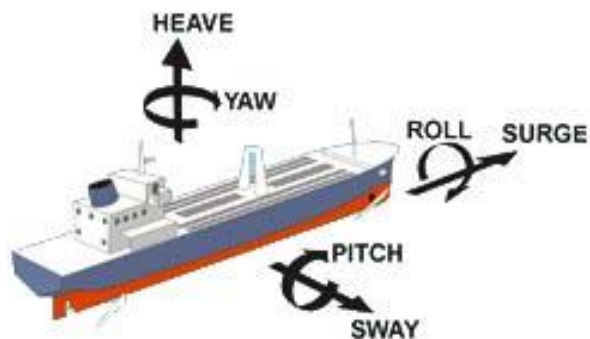
Beam—at the sides of a boat.

Broaching—the turning of a vessel to expose its side to the oncoming waves.



6 Degrees of Freedom

A vessel floating in the water can experience six different motions, about 3 axes; longitudinal (X), lateral (Y), and vertical (Z). Three are considered “translational” movements, measured in distance, and three are considered “rotational” movements, measured in degrees. The translational movements are surge (X-axis), sway (Y-axis), and heave (Z-axis) and the rotational movements are roll (x-axis), pitch (y-axis), and yaw (Z-axis). Rotational movements are especially important on public vessels as they can have a significant effect on vessel stability and have the potential to injure passengers.



Translational Movements

Surge – Vessel movement along a longitudinal (X) axis, forward and aft (from bow to stern). The sea state will accelerate or decelerate the vessel forward or aft.

Sway – Lateral vessel movement from side to side along the Y-axis (port and starboard), for example, if a wake from a passing boat hit your hull and slid your whole vessel sideways.

Heave – Vertical (up/down) vessel movement through the Z-axis. For example when riding over a swell heave would happen when going from being on the top (crest) of a wave, and then “falling” downward to the bottom (trough) of the wave.

Rotational Movements

Pitch – Up/down rotation about the Y axis. If a line was drawn through the middle of the vessel from port to starboard, pitch would be the rotational pivoting around it causing the bow and stern to alternate plunging into the water and then back out. Excessive pitching (pounding) of the bow can cause damage to your vessel and potentially injure passengers. Slowing down may help minimize this.

Roll – A tilting movement from side to side about the X-axis. If a line was drawn down the center of the vessel from bow to stern, rolling would be the angular movement of the vessel tilting along that line from port to starboard. Normally, roll is a back and forth motion. When the vessel tends to be offset to one side or another it can be list or heel. List would be the offset of the vessel due to a weight shift, such as more passengers standing on one side than the other, or flooding. An example of heel would be the offset from turning the vessel hard to one side or the leaning of the vessel due to wind. Vessel stability can be negatively affected if roll becomes excessive. In addition, loose articles and slack (not 100% full or 100% empty) tanks can increase the effect of rolling by shifting weight back and forth every time the vessel tilts. Roll can be minimized by not being broadside to the seas and ensuring loose articles are stowed/secured. A course change to put the weather on the bow may help minimize rolling.

Yaw – Is a rotational movement about the vertical axis. If a line were drawn vertically through the center of the vessel from sky to water, yaw would be the twisting movement around it. Excessive yaw can occur when a

strong current is coming from your stern and can lead to being “set” off your course. Small course changes until the bow stops oscillating from side to side may alleviate this.

Hull Shapes

There are two basic types of hulls: displacement hulls and planing hulls. Each type has its own distinct features and characteristics. A third type, semi-displacement, shares some of the features of both planing and displacement hulls.

All boats are displacement boats when at rest because the boat displaces water in order to float. It is what happens to the hull when power is applied that ultimately determines its type. In addition, each hull type is associated with some basic shapes.

The shape of the hull may also determine the wake that a boat creates. A wake is the moving waves that a boat leaves behind when moving through the water. A displacement hull may have a larger wake due to the box shape of the hull. A boat that is on plane may have a smaller wake when on plane because a good portion of the hull is above or near the top of the water surface.

DISPLACEMENT HULL

A displacement hull displaces a volume of water equal to the weight of the hull and its load whether the boat is underway or at rest. As the boat cuts through the water, the displacement hull creates its own wave system with two wave crests (one at the bow and one at the stern) and a long unbroken trough amidships.

Displacement hulls require less power to move through the water than planing hulls, and generally have a slower top speed. This type of hull provides a very smooth and comfortable ride.

PLANING HULL

At rest and slow speeds, the planing hull operates just as a displacement hull does—it displaces a weight of water equal to the weight of the boat and its load. But as power increases, the shape of the planing hull provides lift that enables the boat to ride upon the bow wave. This is called being “on plane.”

When the boat is on plane it escapes the wave system that limits the speed of boats with displacement hulls. Less of the hull is actually in contact with the water, so there is less water resistance.

The amount of power available determines the top speed of a planing hull, not the waterline length. While it takes a considerable amount of power to get the boat on plane, less power is needed to maintain plane or even to rapidly increase speed once on plane.

Propulsion Engines

OUTBOARD ENGINES

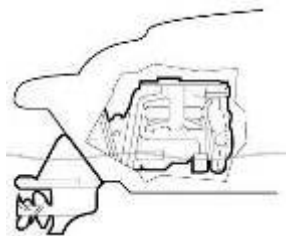
The standard outboard engine is a complete propulsion unit. Boats that use outboard engines don't have rudders, so the boat turns in response to operator's turning of the outboard engine. Most outboard engines are mounted on the transom of the boat.

The outboard engine has many advantages. In general, outboards have an excellent power to weight ratio—so the operator can get a lot of power and speed out of a small engine. These engines are easy to service and replace. They don't take up space in the boat, leaving more room for passengers and gear. On the downside, they are not as efficient or economical to operate as other types of engines.

STERN DRIVE ENGINES

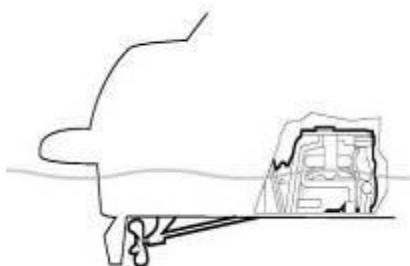
Stern drive engines are also referred to as inboard-outboard (I-O) engines. The engine portion is inside the boat, while the drive unit is mounted on the transom. The drive unit turns and steers the boat, while the engine itself remains stationary. Boats with these engines don't have rudders.

Stern drive engines are generally more efficient, quieter and longer lasting than outboard engines. One disadvantage of stern drive engines is that they take up space in the boat. More importantly, there is a risk of explosion because vapors may gather around the enclosed engine.



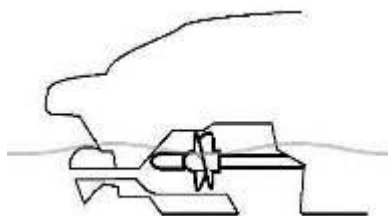
INBOARD ENGINES

Inboard engines and transmissions are mounted entirely within the boat, with only the shaft going through the bottom of the hull. They don't have a complicated lower unit, like the stern drive engines do. Inboards require a rudder for steering the boat. Since the shaft and propeller extend below the hull, these boats usually have a greater draft, and so may be more likely to ground in shallow water. These types of boats also require more skill to maneuver in reverse than boats equipped with outboard or stern drive motors. They commonly have an engine cover that may take up considerable deck space and More importantly, there is a risk of explosion because vapors may gather around the enclosed engine.



WATER JET PUMP ENGINES

The water jet pump engine is basic— just a small propeller (sometimes referred to as an impeller) inside of a casing or housing, connected to an inboard engine by a shaft that passes through a watertight opening in hull. While these engines are traditionally used in personal watercraft, an increasing number of boats have jet pump engines.

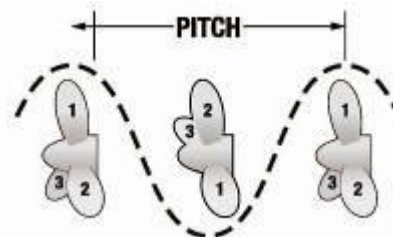


A nozzle directs water flow from the pump to provide directional control of the boat. There is no neutral. Boats with jet pump engines require power to turn and are not responsive at idle speed. They can operate in shallow water and

are highly maneuverable and responsive; however the pump can clog easily.

Propellers

Props operate by rotating and drawing water from forward and around its blades, and forcing the water into a stream away from the stern. This creates a dynamic pressure which moves the boat. The flow of water caused by the prop is called “screw current.”



PROPELLER PERFORMANCE

There are several factors that will affect the way a prop performs. One factor is the propeller's pitch—the distance a propeller would travel in one revolution. Pitch is affected by slip. Slip is the difference between the distance a propeller should move in one revolution through a solid medium and the actual distance it moves through water, a yielding substance. Picture a bicycle wheel moving over the pavement. Now picture it riding through a muddy field. The bicycle will move farther over pavement than it will through the mud—how much farther it moves is the slip.

Cavitation is a condition in which the prop revolves faster without an increased speed (thrust), which causes a loss of power and reduced speed. This happens when a vacuum is created around the prop. Cavitation is usually caused by one of two problems. If the wrong size prop is on the boat the engine may turn the prop faster than the prop should be turned. The prop is spinning but the boat is not moving as fast as it should. You must replace the prop. If the prop sits too near the surface of the water cavitation will occur, you must trim your boat so the stern is sitting deeper in the water.

Be aware of the risk of grounding and damaging your prop when you move from deep water into shallow water. A rapid reduction in speed can cause the stern to drop and the bow to rise, creating a bow wake. As the bow continues to rise, the stern continues to squat (to sink lower), which may lead to your boat grounding.

Rudders

The rudder acts the same on a large vessel as on a small craft. The rudder is mounted directly behind the propeller to use the discharge current to turn the boat. Moving the rudder to the right deflects the discharge current to the right, thus forcing the stern to the left. This action is reversed when the left rudder is applied. At very slow propeller speed there may not be sufficient water flow to exert control over the boat to maneuver it. If other forces, such as current or wind, are acting upon the vessel at the same time, the propeller speed must be increased enough to give water discharge a more powerful thrust against the rudder.

Thrusters

Many boats today are being built standard with thrusters and older and smaller boats are being retrofitted with them. Thrusters come in many shapes and sizes and can make docking and undocking your vessel safer and easier; whether it is 20' or 100'. Thruster types are typically either tunnel, retractable/drop-down, or fixed/external. All thrusters make the vessel more maneuverable, "walking" it sideways without affecting headway/sternway. They can pivot the vessel "on a dime" in small spaces, and help control the vessel when docking/undocking in high winds or current. They are only effective at very slow speeds and are not used when steering in open waters. A thruster is not a replacement for prudent seamanship. If a thruster fails, you do not want to get caught in a bind by relying too heavily on it; stay alert and always use caution when docking and undocking by knowing your vessel's handling characteristics both with and without the thruster(s).

Tunnel

A tunnel thruster requires a tunnel shaped hole or tube to be cut in the bow from port to starboard. The most labor intensive to install, the tunnel must be properly sealed for a watertight fit.



Retractable/Drop down

These are the best choice if you are concerned about drag. These thrusters are only lowered when being used and when underway at high speeds are pulled into the hull leaving a flush bottom.

External

The external type is the cheapest and easiest to install as it simply bolts to the hull and does not require significant structural changes to the bow such as hollowing out a section for a tunnel. These types are typically retrofits onto smaller (20'-30') boats. Though similar in operation to the others, these produce drag as they are permanently in a down position.



BOAT HANDLING AND MANEUVERING

Boat and ship handling require an understanding of the many variable and complex aspects of seamanship. The basic principles involved in handling small boats are essentially the same as those used in handling larger craft. Fundamentally, vessels using outboard or inboard/outboard propulsion are handled in the same manner as inboard vessels of the same size and power.

Every vessel has its own handling characteristics which the operator must learn in order to determine their effect upon handling the vessel. Each phase of motive force, as it reacts on the vessel, has its own peculiarities, and no set of rules can be devised to cover all types. Every vessel has its own power characteristics which the operator must learn in order to determine their effect upon handling the vessel.

The design of a vessel influences the motive forces that move the vessel through the water. Vessel design includes the size and shape of the hull, draft, trim, weight and amount of superstructure. Vessels with shallow draft, low superstructure, and slim design normally handle more easily than vessels with high superstructure, deep draft, and wide beam because they are less affected by wind and current and respond more rapidly to the rudder. Deep draft vessels are normally more affected by currents; large superstructures impose a "sail" effect when maneuvering or when under way.

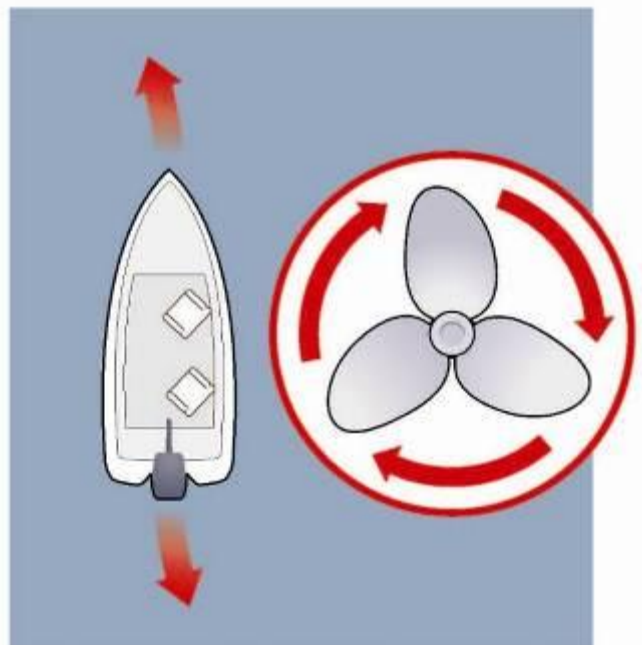
Characteristics or factors, such as the power, propeller, rudder, and design of a vessel affect handling in various ways. For the purpose of illustrating the effects of these factors, it will be assumed that the sea is calm, there is neither wind nor current, and the vessel has a right-handed propeller.

Boat Response to Prop and Rudder

In most boats, the propellers turn in a clockwise motion when the boat is moving forward. This is called right handed turning. When you are moving forward at a low speed, the stern of your boat will swing toward the starboard, and you will notice your bow swinging to port. Think of the propeller as a bicycle wheel, as the propeller (wheel) turns the stern will move to the starboard (right) which makes the bow appear to move to port (left). When you are going astern (backwards) the opposite happens: the stern of a boat will back to port, and you will notice the bow tend to go to starboard. As you increase your speed you will notice this movement less.

STEERING

Mechanically propelled boats are turned—or steered—by changing the direction of the thrust of the propeller. Outboards steer by turning the whole motor with a tiller or a wheel. When you turn the wheel on an I/O drive boat you are moving the lower unit, which houses the propeller. On boats with an inboard motor, the motor and the propeller are stationary. You turn the rudder with a wheel and the rudder moves to direct the propeller thrust either to port or to starboard, rather than the propeller itself turning.



When you use a steering wheel, the boat's bow will move in the same direction as the steering wheel turns. If you are in a sailboat or small outboard boat, the boat will have a "tiller" instead of a steering wheel. The tiller is a handle that the operator uses to turn the outboard or rudder. The movement of the tiller is the opposite of using a wheel. So if you move the tiller to port, the boat will move to starboard, and vice versa.

A boat's movement is similar to that of a car, but cars and boats pivot at the opposite ends. An automobile's turning motion is normally initiated at the front of the vehicle, with the rear following in a reduced arc. The boat's turning motion is initiated at the rear (stern) of the vessel, with the stern always making a greater arc than the bow. You may not notice in open water, but you will notice when you are near a dock. If you are traveling faster the turning response will be quicker. Always remember that a boat doesn't have brakes—slow down before

turning!

GOING IN REVERSE

Some boats are very controllable under sternway, but even these don't behave as well as they do when making headway. Part of the problem is simply the design of the vessel; it's built to go ahead, and to meet the water with the bow. When the propeller is put into reverse, called backing, the discharge current from the propeller reacts against the hull. The discharge current is rotary, therefore, when backing, this current strikes the hull high on the starboard side and low on the port side, exerting a greater force on the starboard side which tends to move the stern to port with the rudder amidships. The flatter the transom, which is exactly the opposite of a point of the bow, the more the force will be exerted on the starboard side.

When you shift into reverse, the propeller begins to push water under the boat and away from the rudder; there is no discharge current flowing from the propeller over the rudder so there is little to amplify the rudder's effect. The majority of propellers are 'right-hand', meaning that they turn clockwise, looking forward, when in forward gear. These right-hand propellers 'walk' the stern to port, in reverse gear. If you apply some right rudder most boats can be made to back in a straight line.

Generally, more reverse rudder is required when your boat begins to move backward and less as it gathers sternway. The key is to minimize using reverse gear — use it very gently, and for the minimum time necessary to produce or to sustain sternway. Knowledge of the handling of a boat's propeller and an awareness of what the stern will do when the vessel is in reverse gear is critical to successfully handling a single screw inboard.

The operator backing a single screw inboard always needs to remain aware of the bow. Air in motion turns the boat, and a brisk breeze can forcefully counter any effect of the rudder when in reverse. The simplest case, backing into the wind, often works out well enough. The exact opposite, reversing with the wind, is uncontrollable in some boats — the bow 'blows off', and even if you can swing it back head to wind, it immediately blows off to the other side.

Outboard, stern-drives, and jet-drive boats do not rely on rudder action to maintain control. Since the propeller is turned when the helm is moved, the discharge current from the propeller or jet drive turns the boat. These boat may be more maneuverable when going in reverse.

TWIN SCREW VESSELS

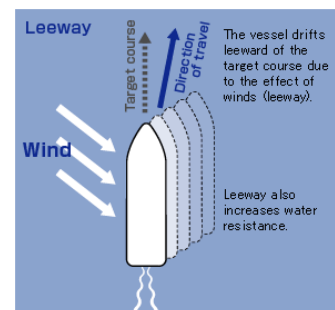
The twin-screw vessel has two propellers—one on each side of the centerline; they are controlled by separate throttle controls. Generally, the propellers are out-turning; that is, the starboard propeller is right-handed and the port, left-handed. This balances the sidewise pressure of the propellers and makes it possible to keep the ship on a straight course without rudder force, especially when backing. Discounting outside influences, the twin screw vessel backs with equal maneuverability to port or starboard.

Effect Of Natural Phenomenon On Handling

There are many forces acting on the vessel such as the weather, sea and current conditions, etc., which must be considered when docking and undocking. Therefore, a firm set of rules cannot be established to guide the operator in any case. However, if the operator practices basic principles of boat handling as outlined above, remember the following safety precautions, and use common sense, no such guide is necessary.

WIND

The wind acts upon the portion of the boat out of the water [freeboard] in much the same way as it acts on the sails of a sailboat. Its effect must be considered when turning, especially at low speeds. In general, there is a higher freeboard at the bow than at the stern. This makes the forward part of the vessel act as a headsail, having some effect when a vessel is going ahead and may make going astern and docking a bit more difficult. Leeway is the leeward motion of the vessel when the force of the wind is acting on it. For example, if you are trying to make good a course of 000° and a Westerly wind is pushing you East, causing you to steer 002°, you will need to account for that by steering 358°.



CURRENT

Current affects the underwater portion [draft] of the vessel. It is especially important because its existence may not always be realized. Currents may shift, accelerate, diminish, or even been reversed by winds blowing steadily in one direction over a long period of time. Observation of the shape of the shoreline and of the

direction in which buoys are leaning will give a good check on the force and direction of the current. The general effect of a current on the underwater body of a vessel is to move it bodily in the same direction as the current is running. When turning in a current, the completion of the turn may have set the vessel well down in the direction of the current, when compared to its position when the turn was started. This movement of the vessel due to the current is called set and drift. The direction which your vessel was moved or is moving (measured in true degrees), is the set, and the speed it was moved (measured in knots) is the drift.



Current should be used to an advantage when docking or undocking a vessel. Steering is always easier to maintain when heading into the wind or a current than when going with it.

SPEED

A rudder can only be as effective as the water that is passing over it. When the vessel is stationary, the rudder has no effect. The faster the vessel is moving, the more turning power the rudder has. As you near a dock you will need to turn the wheel more so that the vessel will turn.

Docking

Docking a boat smoothly and safely requires practice, so try it in open water first to become familiar with the procedures. As you approach a dock go slowly and have your fenders and lines ready. You may want to come to a complete stop, or nearly so, to read the wind and current.

Remember, a boat doesn't steer like an automobile. An automobile's turning motion is normally initiated at the front of the vehicle, with the rear following in a reduced arc. The boat's turning motion is initiated at the rear (stern) of the vessel, with the stern always making a greater arc than the bow.

Try to take advantage of current and wind when docking or approaching a mooring buoy. Use the wind or current to your advantage; it can slow you down like a brake pedal on a car. Motoring into the wind or current is always easier than having the wind or current push you from behind. The wind or current on your stern will push your vessel along and make following a straight course much harder especially at a slow speed. If you have a choice and the wind is greater than the current choose going into the wind.



DOCKING WITH NO WIND OR CURRENT

Approach the dock at an angle of 10 to 20 degrees. You should be headed for a spot slightly forward of the position where you intend to tie up. When you are within about one and one-half boat lengths from the dock, turn the steering wheel away from the dock to angle the boat away from the dock, bringing your boat parallel to the dock. Reverse engine just long enough to stop headway. When the bow is alongside the dock; secure the bow line to a cleat.

DOCKING AGAINST THE WIND OR CURRENT

Approach the dock at an angle of approximately 45 degrees heading for a spot slightly forward of the position where you intend to tie up. When you are about one and one-half boat lengths from the dock, make a tight turn with the steering wheel away from the dock. This will bring your boat parallel to the dock. Reverse engine long enough to stop headway. As soon as the bow is alongside the dock, quickly secure the bow line to a cleat and turn the steering wheel away all the way over from the dock. Kick the engine ahead to bring the stern alongside the dock. This will help pull the stern alongside the dock.

DOCKING WITH WIND OR CURRENT BEHIND YOU

This approach to the dock is similar to approaching the dock with no wind or current. In some case you may not

have to angle into the dock since the forces of nature—the wind and the current—will take you there. Bring your boat parallel to the dock. You may have to turn your wheel to keep your bow from tipping into the dock too fast and reverse your engines to keep you from overshooting your berth (place where your boat is tied up to the dock).

If you don't make it the first time, back off and try again. The more you practice, the better you will become at docking your boat. Remember to use the wind and current to your advantage. Go slow but be ready with your engines to pull away if your landing is not going the way you planned it.

Anchoring

The primary purpose of an anchor is to prevent the vessel from drifting due to the effect of winds, tides, and currents. Anchoring may be used as a part of the vessel's normal routine or its use may be necessitated by an emergency such as to prevent the vessel from running aground following loss of the engines. Proper anchoring under all conditions will help to prevent injury to personnel or damage to the vessel and equipment. In any case, anchorage in a bed of rocks generally does not prove dependable. If you have a chart onboard, it will detail the bottom composition and help determine a suitable area for anchoring.

When preparing to anchor a craft, head into the wind or current; whichever is stronger. Approach at low throttle and use the wind or current as a brake to slow you down. If the wind or current is on your stern, it will swing your boat around before your anchor has a chance to set. It is best to stop and lower the anchor over the bow slowly, rather than heaving it. As you lower the anchor the wind or current should be backing your boat slowly away. When the anchor touches bottom, the crown will help the flukes take hold in the bottom. Ensure that your anchor has taken a good hold of the bottom, and that it isn't dragging. Secure the anchor line to a bow cleat.

You should never anchor by the stern because the transom of a boat is not designed to cut through the water. Water will wash over the stern and swamp the boat.

When raising the anchor the craft should be moved forward until the anchor line is vertical and then the anchor is raised slowly and carefully. All lines should be coiled immediately and the anchor secured when brought aboard.

ANCHOR RODE

"Scope" describes the length of anchor rode you need use to properly anchor your boat. The rule of thumb is that your scope should be five-to-seven times the depth of the water in calm or moderate seas. In heavy weather, increase to seven-to-ten times the water depth. Scope is required to make the pull on the anchor horizontal. The more vertical or upward the pull the more likely the anchor may not hold.

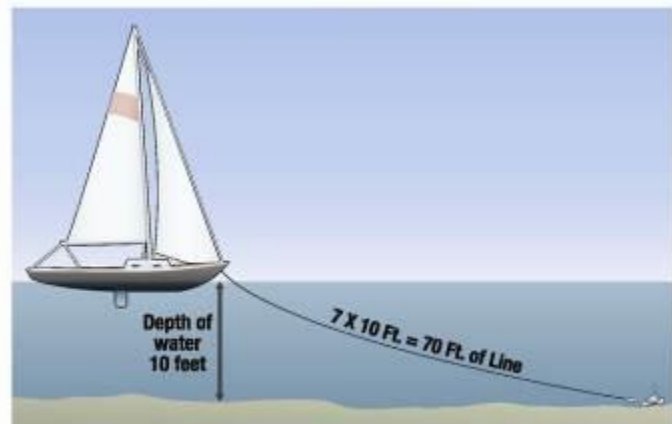
It's best to anchor in shallow water. When determining an anchorage site, a muddy or sandy bottom should be selected over a rocky bottom, if possible as the anchor will have a chance to dig into the softer bottom and provide better holding power. An anchor taking hold in a rocky bottom may occasionally slip loose or become stuck

Your boat may swing in a complete circle around the anchor—be certain that there is room around your selected site for your boat to make a full 360-degree swing.

Knots

There are three standard knots all boaters should know: the square knot, the clove hitch and the bowline. The square knot ties two lines together. A variation is the sheet bend which ties two different size lines together. A square knot is not a good knot for making a loop in a rope.

SCOPE OF 7 TO 1

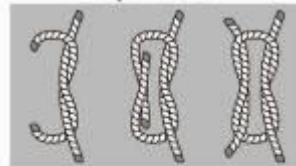


The bowline is best for that job for making a loop in a rope. It will not jam or come undone under a strain.

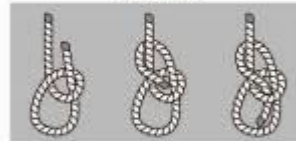
The clove hitch is used to tie a line to a post.

To make fast to a cleat, make a turn under each horn then make a figure eight over each horn and finish off with a half hitch over one horn.

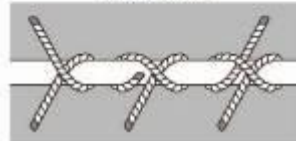
Square Knot



Bowline



Clove Hitch



EQUIPMENT

To protect yourself and your passengers, there is certain safety equipment that the law requires you to carry on your boat. The equipment we will discuss will satisfy the requirements for a water ski boat used as a public vessel. But more importantly, having the equipment we cover in this section, and using it properly, may be vital to survival in an emergency.

US Coast Guard Approval

Throughout this chapter, we will reference safety equipment that is “US Coast Guard Approved”. The purpose of US Coast Guard approval is to confirm that the safety equipment has been tested and been found to meet the regulatory requirements relating to performance, construction, and materials used at the time of manufacture. Each US Coast Guard Approved device will be marked by a label, or a stamp. This mark must be visible and readable in order for the piece to be considered US Coast Guard Approved.

Personal Flotation Device (PFD)

Buoyancy is the force that counteracts the gravitational forces on a person in water. Most of us don't have enough natural buoyancy to keep afloat, so if we fall in the water, we'll sink. In order to stay afloat, we need a personal flotation device, or PFD. PFDs provide additional buoyancy and when used correctly, can keep a person afloat for hours. The person using a properly sized PFD will be able to keep their head above water to breathe without the exertion of treading water. This can be the difference between life and death in an emergency. Lifejackets, life vests, and throwable flotation devices are all versions of PFDs. Each is best in particular circumstances.

Personal flotation devices are categorized in five different types. Each type of PFD has its own characteristics: the amount of flotation it contains; its ability or inability to turn an unconscious victim face up in the water; its intended use; and whether or not it is designed to be worn. The sections that follow describe each type.

TYPE I (OFF-SHORE LIFE JACKET)

A Type I PFD has the greatest required buoyancy (22 pounds in the adult device) and is designed to turn most unconscious persons in the water from a face down position to a vertical and slightly backward position and to maintain the person in that position. This design characteristic greatly increases the chances of survival and recovery. This type PFD is the most effective in rough water. The Type I PFD is easiest to don in any emergency because it is reversible and available in only two sizes; adult (90 lb. or more) and child (less than 90 lb.) which are universal sizes designed to fit all persons in the appropriate category.



TYPE II (NEAR-SHORE BUOYANT VEST)

This device has less inherent buoyancy than the type I device (15.5 pounds in the adult device) and may turn an unconscious victim face up. It is designed so that it will maintain the wearer in a vertical or slightly backward position. It is not suitable for use in rough water and is designed primarily for use where rescue is likely to be quick. Approved Type II devices are of either the bib or yoke design. They are required to be international orange in color. Type II devices are available in a variety of sizes.



TYPE III (FLOTATION AID)

This device has the same amount of inherent buoyancy as the type II device but has little or no righting ability. It is not designed to turn the wearer face up but will float the wearer in whatever position he or she assumes in the water, including face down. This device was designed as a compromise between comfort and capability. It is more comfortable to wear than the Type I or II devices. It was hoped that by being so more people would wear it. It is not suitable for use in rough or cold waters and is intended for use in inland waters where rescue is likely to be quick. The number, design and placement of straps or fasteners vary with manufacturer and model. The Type III PFD is available in a variety of colors and sizes (usually by chest size and weight).



Type IV (Throwable Device)

This type covers a number of devices which are designed to be thrown, not worn, to persons who fall overboard. They can cling to the device until rescued. There are two styles of Type IV PFDs, the ring buoy and the buoyant cushion.

Ring Buoys - Currently, ring buoys are constructed of plastic foam covered with a special coating of rubberized vinyl. All ring buoys must be fitted with a grab line usually constructed of nylon, polypropylene, or other synthetic material which must be orange, white, or black in color. Approved ring buoys must have a minimum buoyancy of 16.5 pounds and must be at least twenty (20) inches in diameter.



Buoyant Cushions - Buoyant cushions are fitted with grab straps and come in a variety of colors. They have a minimum buoyancy of 18 pounds. The cushion is designed to be a grasping device. It is unsafe to wear it on the back since it will actually push the victim's head underwater. For this reason, the warning "DO NOT WEAR ON BACK" is placed on the label.

TYPE V (SPECIAL USE AND HYBRIDS)

A special use device is designed for a specific activity. Work vests, inflatable PFDs, and immersion suits are included in this category. The PFD must be worn and used only under the conditions noted on the label. A Type V PFD may be rated as a Type I, II or III if they have the required minimum buoyancy.

A Hybrid Device is a Type V PFD that uses inflation in addition to some type of buoyant flotation material found in traditional PFD's. To be acceptable for use on recreational craft, the hybrid Type V PFD must be worn.

INFLATABLE PFDs

While the US Coast Guard is now approving inflatable PFDs for use on recreational boats, please keep in mind that while they are comfortable and lightweight, they are not suitable for non-swimmers, water skiers, youths under the age of 16, and riders of personal watercraft.



Inflatable PFDs must have a full cylinder and all status indicators on the inflator must be green or the device does NOT satisfy the requirement to carry PFDs. If you are using a Type V (inflatable) PFD, you must wear it at all times in order to meet the PFD requirements.

PFD Requirements

All PFDs carried on Public Vessels must be U.S. Coast Guard approved, in good serviceable condition and in the quantity, type, and size as shown on the vessel's certificate of inspection. All PFDs must be readily accessible and stenciled with the vessels name or registration number.

WEARABLE DEVICES

All Public Vessels are required to carry a minimum of one Type I Adult size PFD for each passenger and crew member as specified on the vessel's Certificate of Inspection, regardless of how many people are actually on board. In addition to this amount, each vessel must carry an amount of Type I child size PFDs equal to ten percent of the adult requirement. Wearable PFDs must be readily accessible to all passengers.

All water ski boats operated by a children's camp, inspected by NYS Dept. of Health or their representative, will be required to have a wearable type III PFD on board for each person the boat is rated to be carried in lieu of a type I PFD that all other public vessels are required to carry. This PFD shall be worn by all occupants in the boat and the skier. The operator of a water ski boat may wear an inflatable type III PFD in lieu of the standard foam type III PFD. The inflatable PFD may be either a manual or an automatic inflated. At the time of the annual inspection the inspector will check to see if the CO2 cylinder is in place and the indicator pin is installed.

For all other water ski operations, the skier is required to wear a US Coast Guard approved PFD. The boat must carry a USCG Approved Type I PFD for each person the boat is certified to carry.

Note: A skier may wear a NON Coast Guard approved device, such as a neoprene, nylon (or similar material) covered suit or vest specifically designed by a manufacturer for that purpose; however the skier must also wear a wearable Type III PFD.

Note: Inflatable personal flotation devices are not approved for any person towed by a vessel.

THROWABLE/RESCUE DEVICES

All Public Vessels must carry at least one Type IV PFDs, which must be immediately accessible to either the operator or crew. It must be capable of being cast loose in an emergency and shall not be permanently secured to the vessel in any way. A vessel less than 26 feet must carry at least one (1) Type IV PFD; either a ring buoy or buoyant cushion. A vessel 26 feet to 40 feet must carry two (2) Type IVs, either two (2) ring buoys or one (1) buoy and (1) cushion. A vessel 40 feet to 65 feet must carry two (2) ring buoys. A vessel over 65 feet must carry four (4) ring buoys as determined by the Marine Inspector.

General Information about PFD

To be in compliance with the law—and as a matter of basic safety—you must keep your PFD in good condition and readily (easily) accessible. Check your PFDs every time you go boating to ensure that they are free of rot, tears, and punctures. Make sure all the straps are functional. Do not keep the PFD in the plastic bag it came in, this defeats the purpose of having it readily accessible.

Make sure that every passenger has a PFD that fits. An adult PFD is not appropriate for most children, and a child's PFD is not appropriate for most adults. Children's PFDs are rated by weight of the wearer, and are safe only for children weighing 90 pounds or less. Children who weigh more than 90 pounds should wear an appropriately sized adult PFD. Adult PFDs are rated by chest size.

Read the PFD label carefully. Some PFDs are not approved for personal watercraft, water skiing, and similar towed activities. Look for a PFD that is marked for the intended use. For example, if it is not labeled "water ski" or "PWC" find one that is.

CARING FOR PFDs

A PFD that is in poor condition will not work properly. PFDs will last many years given reasonable care. Follow a few simple steps to preserve the useful life of your PFDs.

Store PFDs properly. Don't leave them where they're exposed to direct sunlight; exposure to the sun may cause the shell fabric to weaken, which might cause it to tear when worn. Make sure the compartment is well ventilated and covered to keep them dry.

Use, don't abuse. Use your PFD for its intended purpose. Your PFD is your primary piece of lifesaving equipment; treat it as such and it may someday save your life. Never use your PFD as a boat fender; doing so may cause tears or ruptures. Don't sit on your PFD.

Test regularly. A damaged PFD may not have sufficient buoyancy to keep a person afloat. Check your PFDs often to make sure they are in good condition. Inspect PFDs carefully to make sure all the straps are securely attached and all the buckles and zippers work. A PFD will not work properly unless you are properly strapped into it. Look carefully for tears in the fabric; buoyant material may fall out of a tear and a torn device may become water-logged. Discard torn or ripped devices.

If you are using an inflatable PFD, check the cylinder and lanyard before each use. You should also review the manufacturer's instructions for establishing a maintenance schedule.

Periodically—at least once in the beginning of the season and once at the end—test a PFD in shallow water. To determine whether it has sufficient buoyancy to keep you safely afloat, keep arms and legs below the water's surface and assume a relaxed position. Your head and chin should be above the water's surface. If the device cannot keep you in this position, replace it.

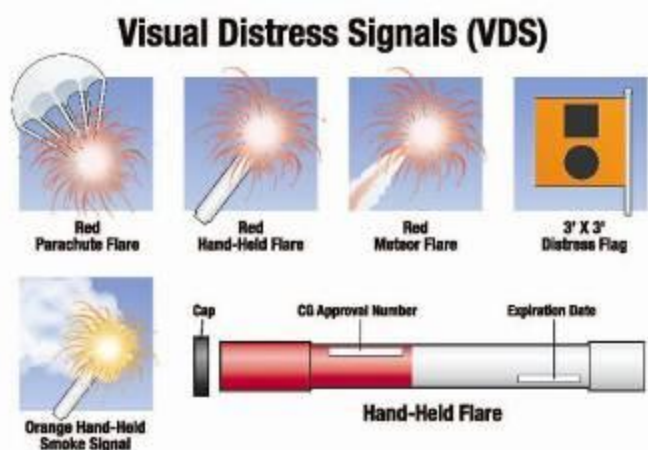
Visual Distress Signals (VDS)

You need to be properly prepared for an emergency, which means you must know how to get help, and when to offer help. All boaters should learn to how to signal others when they are in trouble on the water, and should know how to recognize the visual distress signals of others. When boaters use visual distress signals properly, searchers can locate a boat in difficulty more quickly, reducing the possibility of a minor emergency becoming a tragedy.

All public vessels must carry day and night visual distress signals, regardless of the time of day, and regardless of the distance of the boat from shore.

The signals must be in serviceable condition and readily accessible onboard the boat. The visual distress signals must be US Coast Guard approved. Some visual distress signals become less effective over time; any devices that are marked with a service life must not have expired.

Visual distress signals may be either pyrotechnic or non-pyrotechnic. Pyrotechnic means a device that burns with colored flames. Non-pyrotechnic visual distress signals do not burn. Each type of distress signal has distinct advantages and disadvantages, and no single device is ideal under all conditions or suitable for all purposes.



Pyrotechnic devices include meteor or parachute flares (which are launched into the air), hand-held flares, and hand-held and floating devices that produce smoke. Pyrotechnic devices are excellent distress signals because they are visible from a distance and easy to recognize. However, they produce a very hot flame and can cause burns and ignite flammable materials, so you must exercise caution when using and storing them. These devices generate hot slag as they burn, so when you use hand-held devices you must hold them well overboard to prevent the boat from catching fire.

Pyrotechnic devices carry an expiration date of 3 ½ years, and if your devices are expired, they don't count toward the minimum carry requirement. Purchase the set that has at least three years of service life. When a flare is no longer functional, (waterlogged, missing igniter, broken or partially used) it should be replaced. Store your pyrotechnic devices in a cool, dry location. We suggest a watertight container painted red or orange and clearly marked "DISTRESS SIGNALS" or "FLARES."

NEVER USE ROAD FLARES ON YOUR BOAT! ROAD FLARES DON'T HAVE A HAND GRIP, AND MAY CAUSE FIRES OR INJURY!

Non-Pyrotechnic Devices include flags and electric distress lights. These must be US Coast Guard Approved. For daytime, the distress signal is a 3-foot by 3-foot flag with a black square and ball on an orange background. For nighttime, an electric distress light automatically flashes the international distress signal-SOS.

REMEMBER THAT VISUAL DISTRESS SIGNALS ARE EFFECTIVE ONLY IF SOMEONE IS IN A POSITION TO SEE THEM.

Don't use your pyrotechnic devices unless you see another boat or a plane that may be able to see your signal, or you are close enough to shore for someone on shore to see your signal and take action.

Device Description (USCG Approval No.)	Accepted for Use During...	Number Required
Hand held flares (160.021)	Day & Night	3
Hand-held or Floating Orange Smoke Signals (160.022)	Day only	3
Pistol Launch Aerial Red Meteor or Parachute Flares with approved launcher (160.024)	Day & Night	3
Hand held rocket propelled aerial or parachute red flare (160.036)	Day & Night	3
Hand held orange smoke (160.037)	Day only	3
Floating orange smoke (160.057)	Day only	3
Orange Flag (160.072)	Day only	1
Electric distress light (161.013)	Night only	1

Fire Extinguishers

On most Public Vessels, a portable fire extinguisher will be the first line of defense against a fire on board. It is critical that the operating personnel aboard every Public Vessel possess a thorough knowledge of portable fire extinguishers and their use. This knowledge could be the crucial factor in preventing injury, death and loss of the vessel.

CLASSIFICATION OF PORTABLE EXTINGUISHERS

A portable fire extinguisher is classified in two ways, by the type of fire(s) it will extinguish and by its relative size or effectiveness at fighting a fire. The classification is indicated on the extinguisher label by a letter and numeral designation. The letter corresponds to the classes of fires A, B, or C. All extinguishers approved for marine use must be capable of extinguishing a class B fire. The numerals indicate the relative size or ability of the extinguisher to put out that class of fire.



TYPES OF EXTINGUISHERS

The two most common types of fire extinguishers are dry chemical and carbon dioxide (CO₂). Dry chemical and CO₂ extinguishers are for use on fires caused by flammable liquids such as fuel or grease (class B fires) and electrical fires (class C). Both extinguishers may be used for combustible solids (class A fires) but must be followed up with water to cool any deep-seated fire that may cause a re-flash.

CARRIAGE REQUIREMENTS FOR PORTABLE FIRE EXTINGUISHERS

At a minimum all public vessels are required to carry one B-I fire extinguisher that is U.S. Coast Guard approved for marine use. It must be secured in position with a quick release type bracket designed for use with the model extinguisher used. It must be located so that it is easily accessible to the operator. The operator should check frequently to ensure fire extinguishers are in their proper storage brackets and free of damage and corrosion.

Length of Vessel	Number of Portable Extinguishers Required
Boats under 26 feet	One B-I
Boats 26 feet to less than 40 feet	Two B-I or One B-II
Boats 40 feet and longer	As directed by the inspector but minimum of three B-I

Notes:

1. At least one extinguisher must be located near the operator's station.

FIXED FIRE EXTINGUISHER

Boats with inboard engines are more susceptible to fires because the engine space is enclosed. The operator cannot see fuel leaks or recognize other potentially explosive conditions as they develop, and it's possible for a fire to take hold without the operator being aware of it. Operators of gasoline inboard powered boats must install an automatic fixed extinguishing system in order to reduce the danger of fire. Lastly, don't forget to ventilate the engine space—blow out any flammable vapors out of the bilge—before starting the engine!

Fixed systems are required on all public vessels with enclosed engine spaces unless specifically exempted in writing on the Certificate of Inspection. The components and installation of a fixed system is dependent upon the extinguishing agent used. The volume of the space to be protected and the relative effectiveness of the agent used determine the size of the system (amount of agent).

Operation of the system may be either manual or automatic. If manually activated, the actuating device must be located outside the protected space near the operator. Automatic operating system must have the actuating device, generally a temperature sensitive device; located as high as possible in the compartment. Never install the actuator of a system in close proximity to exhaust manifolds or turbochargers. Radiated heat may cause premature actuation. All fixed extinguishing systems used aboard Public Vessels must be U.S. Coast Guard approved.

Fixed fire extinguishing systems are total flooding systems that use either carbon dioxide or liquid chemical extinguishing agents. Fixed systems, as the name implies, are permanently installed in compartments where

fire is most likely to occur (i.e. engine spaces). Unlike a portable extinguisher, a fixed system is designed to discharge the entire contents of the cylinder. These systems are ideal for quickly and effectively extinguishing class B fires in enclosed spaces. They are more efficient and much safer than trying to extinguish this type of fire with a hand held extinguisher.

To ensure maximum effectiveness, it is also important to keep all hatches and openings closed to prevent the extinguishing agent from escaping and to keep a fresh supply of air from entering the space. Once the extinguishing agent has been discharged the space should remain closed off for at least 15 - 30 minutes after the fire is out to allow the space to cool. Opening the hatch too soon could cause the fire to re-ignite.

FIRE EXTINGUISHER MAINTENANCE

Fixed extinguishing system components should be inspected periodically to ensure that cylinders are free of corrosion, that discharge nozzles are free of obstructions, and that the system is generally in good working order. In addition, the cylinders or containers holding the extinguishing agent should be removed and taken to qualified personnel to be inspected, weighed, and if necessary recharged. A tag should be attached to the cylinder indicating the date and name of the person performing this inspection. This should be done once every three years.

Damaged or dry-rotted hoses should be replaced. Nozzles should be kept free of obstructions. Extinguishers with pressure gauges should read within the "charged" area (usually green).

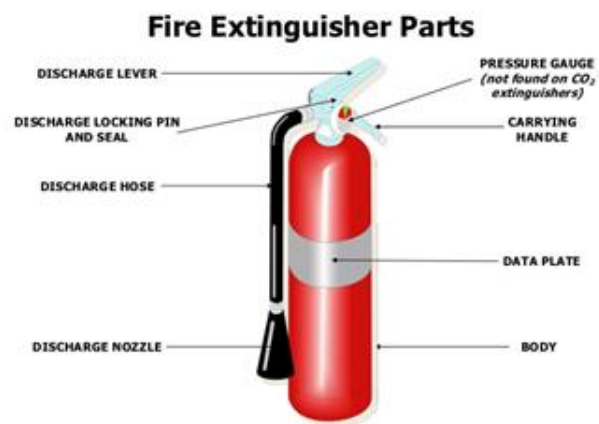
CO2 extinguishers do not have a gauge and must be weighed to determine if it is charged. If the weigh is less than 10% of the weight stamped on the cylinder, the extinguisher must be recharged.

Locking pins and sealing wires should be checked to ensure that the extinguisher has not been used or tampered with since it was last recharged.

WHEN TO REPLACE A FIRE EXTINGUISHER

Fire extinguishers have been partially discharged are not compliant with the law. You must replace a partially discharged extinguisher. If you have doubts about your fire extinguisher, never test it to see if it works. Instead, have it inspected by a professional to determine if it is reliable and in good working order.

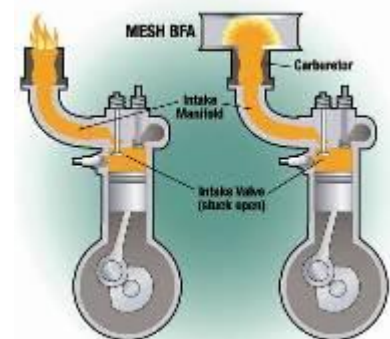
A non-refillable extinguisher is good for 12 years from year of manufacture. This information can be found on the data plate or on the bottom of the extinguisher.



Backfire Flame Arrestor (Gasoline Engines Only)

All gasoline engines with carburetors tend to vent fuel vapor after shutdown. This vapor goes into the engine compartment and will linger for a while. The vapor does no harm as long as there is no source of ignition in the compartment. Sources of ignition can be electric, such as a spark, or a backfire in the engine intake system when you start an engine. On a boat, flames spouting out of a carburetor can ignite fuel vapor in an engine compartment –starting a fire literally before you know it or can respond.

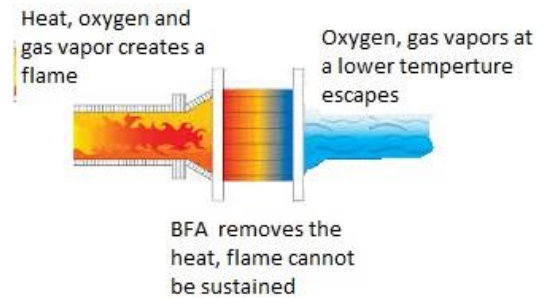
A backfire flame arrestor(BFA) prevents the heat and flames of an engine backfire from igniting any flammable vapors that may be present in the engine compartment. A backfire flame arrestor is required on all inboard gasoline engines with carburetors, and must be attached to the air intake, usually on top of the carburetor. All connections must be flame tight and firmly secured to withstand the vibration and shock of the marine environment and the pressure of an engine backfire.



The device must be US Coast Guard, Underwriter's Laboratory (UL), or Society of Automotive Engineers (SAE) approved. A damaged flame arrestor should be replaced, not repaired.

A backfire flame arrestor may look like an air filter but this is not its primary function. The operating principle of the flame arrestor is to cool and quench the flame, by forcing it between closely spaced metal vanes or screens.

The vanes or screens absorb the heat of the flame; this cools the flame so it will not exit the carburetor. We have not talked about the fire triangle yet, but the BFA removes the Heat side of the triangle so the flame (fire) can no longer exist (page 80).



Check your arrestor periodically to ensure that it still fits snugly against the air intake. The arrestor should be removed and cleaned each season with de-greaser or soap and water to ensure that air flows into the engine properly.

The marine inspector will check to ensure the wire mesh or grid elements of the flame arrestor are not separated or damaged which would defeat its function and that it is securely attached and clean.

The US Coast Guard does not certify or approve the following equipment, but the equipment is required by law:

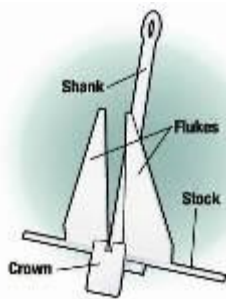
Whistle or Horn

All Public Vessels must be equipped with a horn capable of producing a four-to-six second blast. The horn must be permanently installed in the vessel. It must be electro-mechanical, air, or steam actuated and capable of being sounded by the operator at the helm. Vessels under 39 feet may use a portable air horn in lieu of a fixed horn and it should be within reach of the operator.

If your boat came with a horn, test it regularly. Over time, oxidation build-up inside the horn can diminish the sound level. Consider keeping a portable air horn on your boat, as well as the mechanical horn. The air horn provides a back-up in case the mechanical horn fails to work properly.

Navigation rules require boats to produce sound signals in certain circumstances. You must sound your horn or whistle when meeting head on, crossing and/or overtaking another boat, in times of danger (not distress), and during periods of reduced visibility. See the chapter on Navigation Rules for more information on the required sound signals.

Anchor & Line



All Public Vessels must carry an anchor of an appropriate type, weight, and strength to hold the vessel securely during all weather conditions characteristic to the waterway upon which the vessel will operate.

Anchors are available in a variety of designs and sizes. The most popular anchor used on all but the largest of vessels is the Danforth or lightweight type. A Danforth anchor digs in as you put a strain on it. Its widespread use stems from its superior holding power compared to its relatively light weight. The Danforth anchor has excellent holding ability in mud and sand, and, with caution, can be used on rocky bottoms. It does not hold as well in grassy bottoms, however, neither do most other anchors.

In addition to carrying an anchor, each Public Vessel must have an anchor line of sufficient length and strength to match the anchor and hold the vessel in place. The anchor line must be made up or attached to the anchor at all times. The anchor rode for most vessels usually consists of synthetic fiber line (such as nylon), or chain, or a combination of synthetic line and chain.

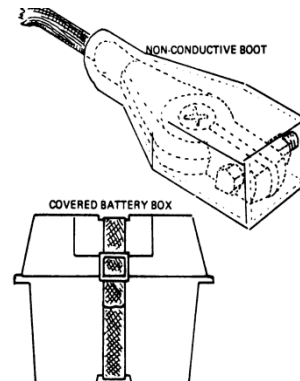
Nylon line works well for an anchor rode. It has considerable strength despite its relatively light weight. Nylon's biggest advantage is its elasticity. It safely stretches 15% to 25% beyond its original length when placed under

a load. The disadvantage of using nylon instead of chain is that nylon's lighter weight on the shank of the anchor does not assist the anchor to "dig in" as well.

Thus, the ideal arrangement is a combination of nylon line and chain. A length of chain is shackled to the anchor which in turn is shackled to the nylon line which makes up the majority of the rode. The chain will provide the weight to help the anchor get a good bite in the bottom and prevent chafing, abrasion, or cutting that a nylon line might suffer when in contact with any sharp objects on the bottom such as rocks or debris.

Storage Battery

The storage battery is a temporary reservoir in which electrical energy is stored as chemical energy and converted back to electrical energy as the battery is discharged to provide power to the engine cranking motor and vessel accessories when the engine is not operating. The battery is recharged when excess electrical current from a generator, alternator, battery charger, or other electrical source, flows to the battery in the opposite direction of the discharge current. The marine inspector will check for compliance with the following:



- a. The battery must be installed in a location where it is easily accessible for maintenance or removal and be **above** the normal level of bilge water accumulation. The compartment or box that a storage battery is installed must be vented to prevent the buildup of hydrogen gas.
- b. The battery will be secured using a strap or other means such that it will not move more than one inch in any direction.
- c. To prevent accidental contact of the ungrounded battery terminal to ground, each battery shall be protected so that metallic objects cannot come into contact with the ungrounded (positive) battery terminal. This may be accomplished by means such as:
 - (1) Covering the ungrounded battery terminal with a boot or nonconductive shield,
 - (2) Installing the battery in a covered battery box, or
 - (3) Installing the battery in a compartment specially designed only for the battery.

Bilge Pump/Bailer

Bilge Pumping System

All Public Vessels are required to have a bilge pump. The bilge pump(s) should be installed as described below and should service all bilge spaces.

MANUALLY OPERATED

Vessels less than twenty-six feet - a minimum of one hand operated bilge pump. A manually operated bilge pump is a portable pump that requires a person to physically operate the pump by hand or foot. It is required to be readily accessible and must have a capacity of at least five gallons per minute (5 gpm). A vessel under 26 ft. may opt to have a power-operated instead.

POWER OPERATED (SMALL CAPACITY)

A vessel 26 feet and over must have a power operated bilge pump that is a permanently installed. The pump may be driven by the main engine, an electric motor or other source of power. It must have a capacity of at least ten gallons per minute (10 gpm).

POWER OPERATED (LARGE CAPACITY)

A vessel 40 feet and over must have a power-operated bilge pump that is permanently installed. The pump may be driven by the main engine, an electric motor, or other source of power. It must have a capacity of at least twenty five gallons per minute (25 gpm).

Automatic or float-activated type bilge pumps are not required but are recommended for pumps that are in spaces not usually manned or if the vessel is going to be left unattended for long periods of time. Automatic pumps, when installed, should be wired directly to the battery and not to the ignition.

Test the bilge pump frequently to ensure that it remains in working order. Turn the switch from the automatic to the manual position to make sure the pump responds as it should. You should also check the automatic float switch by manually raising it to make sure that it turns on the pump. If this switch fails, the pump won't turn on and your boat could take on sufficient water over time to do serious damage. Debris can get stuck in the

mechanism and keep the float switch from operating properly, so check for debris frequently and keep the area clean. Be aware that a bilge pump will distribute spilled fuel into the water.

Navigation lights

For a discussion on what lights your vessel is required to carry see the chapter on Navigation Rules.

Control of the navigation lights on most boats using sidelights and an all-around white lighting scheme [for masthead light and when necessary an anchor light] is typically accomplished with a single switch, usually a marine-grade three-position push-pull switch. The positions are OFF (pushed in all the way), ANCHOR (pulled out to first stop), or UNDERWAY (pulled out all the way).

Some vessels may use a dual-bulb masthead lamp, separate sidelights, and a stern light. These can be controlled with a single, marine-grade, three-position, pull-push switch. A dual-bulb lamp fixture which is normally located at the center console serves a dual purpose as both a MASTHEAD LIGHT when underway (only forward-facing segment is illuminated) and as an ANCHOR LIGHT when at anchor (both forward-facing and stern-facing segments illuminated). The SIDELIGHTS and STERNLIGHT are only illuminated when underway.

Many operators believe that a combination of the masthead and stern light on a separate switch will suffice for an anchor light. An anchor light can only be an all-around white light.

Communications

Every public vessel certified to carry more than ten (10) passengers shall be equipped with either a VHF marine radio or an operational cellular phone. The operator must consider the location of the vessel's operations, the vessel's range, and the availability of persons or services to receive and respond to the vessel's transmissions when the vessel is in use.

Cell phones can be useful in many situations, but a cell phone cannot replace your marine (VHF) radio. In emergency situations, your cell phone call to 911 may be misdirected to shore-based police or fire departments, thus delaying rescue. Rescue boats and aircraft cannot answer your cell phone call. If you must rely exclusively on a cell phone, be certain to enter marine police phone numbers in your phone before you sail. When placing a distress call, give your position, your cell phone number, the nature of the emergency and the number of people on board.

Equipment Marking

All Public Vessel equipment listed in this chapter must be stenciled with the vessels name or registration number. This requirement serves as a means of identification in the event of a casualty, loss, or theft. It further serves to ensure that equipment is not easily transferred between vessels.

The Following Equipment Is Not Required By Law, but Is Useful

FIRST AID KIT

The first duty of an operator is the safety of the crew and passengers. So keep a first aid kit on your boat with enough supplies to handle every kind of minor accident. But keep in mind that a good first aid kit doesn't help much if no one onboard knows first aid. A responsible boat operator will take at least a basic first aid course to learn how to use the contents of the first aid kit, and how to recognize medical emergencies that require professional intervention.

BOAT HOOK

Boat hooks are useful items. The main use of a boat hook is to fend a boat off a dock or another boat. A boat hook can make it easier to pass lines to a dock and you can use a boat hook to retrieve something you drop overboard.

OAR/PADDLE

Carrying at least one oar or paddle is a good practice if you operate a small motor boat. You can use the oar or paddle to row to shore if you have engine trouble. It may not be possible to propel a larger boat this way, so oars and paddles are less practical for operators of larger boats.

EXTRA LINES

Always keep extra line aboard. You never know when you will need to be towed in, or when you may need to tow someone else. Lines are inexpensive and they don't take up a lot of space. Don't let the lack of a line turn a small problem into a serious emergency.

SEARCH LIGHT

Hand held or mounted, a search light is a good tool to have onboard if you operate at night. It can illuminate a dock or object in water at night. It is against the law to shine a searchlight, or similar light, into the pilot house of any other vessel so as to impair the vision of the operator of that vessel while it is underway. Any person found violating this law may be guilty of a class B misdemeanor.

ENGINE CUT-OFF SWITCH

Currently, an engine cut-off switch is only required by law on a PWC, however any person operating a public vessel of any type which is equipped by the manufacturer with a lanyard type engine cut-off switch should attach such lanyard to his or her person, clothing, or personal flotation device as is appropriate for the specific vessel. This simple device can save the life of yourself or your passengers if the operator were to end up going overboard by killing the engine so that you are not run over by an out of control vessel.

SUMMARY OF EQUIPMENT CARRIAGE REQUIREMENTS

Item	Vessels Under 26'	Vessels 26 - 40'	Vessels Over 40'
Anchor	1 of appropriate size	1 of appropriate size	2 of appropriate size
Rode	5 - 7 X depth	5 - 7 X depth	5 - 7 X depth
Horn	Yes-installed or portable	Yes - installed <39' portable allowed	Yes - installed
Bell	No	No	1 bell over 65'
PFD - Adult	1 Type I per person	1 Type I per person	1 Type I per person
PFD - Child	10% of capacity	10% of capacity	10% of capacity
Type IV PFD	1 cushion or ring	2 ring buoys OR 1 cushion and 1 ring	2 ring buoys 4 ring buoys over 65'
Portable Extinguishers	1 size B-1	2 size B-1, or 1 B-II	as directed
Installed/Fixed Extinguishers	Outboard - No Inboard or I/O - Yes	Outboard - No Inboard or I/O - Yes	Outboard - No Inboard or I/O - Yes
Distress Equipment	Yes - see table on page 24 <16' not required except at night. PWC must have flag	Yes - see table on page 24	Yes - see table on page 24
Backfire Flame Arrestor	Outboard - No Inboard or I/O - Yes	Outboard - No Inboard or I/O - Yes	Outboard - No Inboard or I/O - Yes
Blower	Inboard Gasoline Engines	Inboard Gasoline Engines	Inboard Gasoline Engines
Bilge Pump	1 hand or power	1 hand & 1 power	1 or more powered pumps (25gpm) as directed
Log Book and Station Bill	Only on vessels that carry more than 20 passengers		
Communications	On all vessels that carry more than 10 passengers		
Radar	On all vessels that carry more than 65 passengers		

FUELING AND VENTILATION

Proper Fueling Practices

You can greatly reduce the risk of explosion by always following proper fueling practices. Take the following steps whenever you fuel your boat:

- Moor the boat securely to the dock
- Remove all passengers.
- Extinguish all galley fires including pilot lights
- Don't smoke.
- Shut off engines and electrical equipment. *
- Close all hatches and ports.
- Fill portable tanks on the dock, not in the boat.
- Keep fuel nozzle in contact with fill opening.
- Replace fuel fill cap tightly.
- Wipe up any spilled gasoline.
- Check bilges for leakage.



*including your blower

Don't overfill your tank! The tank will overflow and the spilled fuel will pose a fire hazard. Once you've filled the tank, open up all hatches. On an inboard boat, run the blower for at least 4 minutes to rid the boat of stray vapors. Fill portable tanks on the dock to keep gas vapors out of the boat.

After fueling and running the blower, sniff the engine space before you start the engine. If you can smell gasoline, wait a few more minutes before you start the engine. And be sure to always secure your portable fuel tanks before you leave the dock.

NOTE: Outboards are not immune to explosions or fires resulting from gasoline or gasoline vapors in the bilge! Take the same precautions on outboards with enclosed spaces as you would on inboards.

Note: Some alcohol blended fuels may accelerate the deterioration of fuel hoses. Some blends make hoses brittle, which may cause cracking, while others can make hoses soft and spongy, which allows vapors to permeate the hose. This happens most often when boats sit for long periods of time. Contact your dealer/manufacturer concerning possible problems regarding alcohol blended gasoline. "An ounce of prevention is worth a pound of cure" is especially true when it comes to your fuel system. If non-ethanol fuel is available, it is recommended.

Ventilation

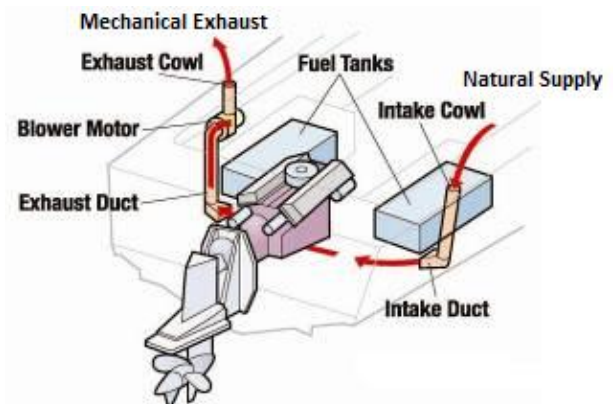
FLAMMABLE VAPORS FOUND ABOARD A VESSEL

Gasoline vapor is heavier than air, so fuel fumes will settle into the lower compartments and bilges of boats. Unless there is a flow of air to push those vapors out, the vapors remain trapped. A spark can ignite the gasoline and cause a fire or explosion.

THE EXPLOSIVE EFFECT OF ONE CUP OF GASOLINE IS EQUIVALENT TO 5 STICKS OF DYNAMITE!

Diesel fuel has a flash point of 140° to 180°F and under most circumstances does not create a hazard. Diesels are safer from the standpoint of explosions as diesel oil vapors are not explosive, however a fire can start if a ruptured fuel line sprayed fuel, gas or diesel, onto a hot manifold.

Hydrogen gas is produced when charging of batteries either when the engine or generator is operating or when the battery is hooked to a charger. Hydrogen is extremely flammable in almost all concentrations and when



ignited burns very rapidly creating a violent explosion. Hydrogen is ten times lighter than air and is easily dissipated under normal circumstances. Adequate ventilation must be provided during charging.

Liquefied Petroleum Gas (LPG) and Compressed Natural Gas (CNG) are two gases that are very flammable and tend to rapidly diffuse throughout the entire vessel in a short time. This makes these gasses similar to gasoline since it is likely that when ignited a fire and explosion will result

LPG is heavier than air and tends to sink to the bottom of a compartment. CNG is lighter than air so it tends to rise to the top of the compartment. This increases the likelihood it will dissipate if a cabin window or overhead hatch is open. Both gases have an odorant added to permit their detection.

The use of LPG and CNG is currently prohibited on public vessel unless a specific exemption is granted for a system that meets the installation standards specified by the American Boating and Yachting Council. The storage of spare gas bottles, of any size, is prohibited.

NATURAL VENTILATION

A natural ventilation system moves the air surrounding the boat through the bilge or area surrounding the engine compartment. The components of a natural ventilation system include an intake to pull in the air supply, and an exhaust to expel it. The natural ventilation system brings fresh air through intake ducts to the area around the fuel and engine compartments, which allows fuel vapors and air to mix. Then the exhaust directs the air/fuel vapor mix overboard. Natural ventilation is not very effective when the boat is stationary.

The intake is a cowling or opening located on the exterior of the boat. It faces forward and is placed above the normal depth of bilge water. The exhaust is attached to a hose or duct that extends to the lower third of the protected space, but it must also be above the normal accumulation of bilge water. The exhaust must empty either into the atmosphere outside the boat or into another ventilated space near an opening or cowling. The exhaust faces aft near the stern of the boat.

In New York State, natural ventilation isn't required on boats of open construction with no enclosed spaces or compartments. But natural ventilation is required for any compartment on a boat that contains:

- a gasoline engine including generators,
- a fuel tank that vents to that compartment (i.e. a portable tank), or
- a permanently installed fuel tank and any wiring or electrical component that is not ignition protected.

MECHANICAL VENTILATION

The primary purpose for mechanical ventilation is to prevent explosions when gasoline is exposed to the atmosphere. A mechanical blower removes explosive vapors, from bilges and enclosed compartments and blows them overboard. A mechanical blower is not needed if compartments are of open construction or open to the atmosphere.

Every gasoline powered Public Vessel, must have a power ventilation system to service each compartment that contains a permanently installed engine (i.e. inboard, inboard/outdrive, generator). Personal watercraft (i.e. Jet-Ski, Sea-Doo, etc.) are exempt from the federal manufacturing standard requiring a blower.

The components of a mechanical ventilation system are very similar to the natural ventilation system. The ducting is the same. You have ductwork to allow fresh air into the compartment and you have an exhaust blower mounted within the exhaust ducting to allow the air to exit the compartment. There will be a switch located at the steering or helm station to turn the blower on and off. This switch is independent of the ignition switch; the blower can be operated without turning the engine on.

The blower must be ignition protected, marine rated, and mounted in an exhaust duct. The blower shall be mounted above the normal level of accumulated bilge water, preferably next to the exhaust opening/cowl. The blower must have an air flow rate and capacity such that it will accomplish a complete change of air in the protected in the four-minute time frame. The duct works in the ventilation system shall be installed with ducts whose intake openings are:

- a) Permanently fixed to the blower (you don't want it falling off)
- b) Located in the lower one-third of the compartment (that's where explosive gases collect)
- c) Above the normal level of accumulated bilge water (if the duct is under water it won't work) and
- d) As nearly as practicable below the engine (s) it serves. (that's where explosive gases collect)

Ventilation cannot be relied upon to remove all flammable vapors emanating from the presence of liquid fuel resulting from fuel system failures or fuel spillage. Boat ventilation cannot create a safe condition when liquid gasoline is exposed to the atmosphere because the liquid will continue to create vapors as long as liquid is present. Wipe up all spilled gasoline on the engine and in the bilges.

A mechanical ventilation system is significantly more effective than natural ventilation, especially when the boat is not moving.

Boat owners are responsible for keeping their boat's ventilation systems in operating condition. Ventilation systems are relatively simple and maintaining them is primarily a matter of making frequent visual inspection. This should include:

- a) Check intake and exhaust cowls for clogging by debris such as insect or bird nests, leaves, etc;
- b) Check intake and exhaust ducts to ensure that they are properly supported free of damage and kinks and are not full of water in flat or sagging sections. Ensure the ends are above normal bilge level. Mice, squirrels, and other small animals find these to be ideal nest locations
- c) Check blower to be sure it operates when the switch is turned on.
- d) Each time, while operating the blower for four minutes prior to starting the engine, place your hand over the exhaust cowl. You should feel a strong rush of air exiting the cowl. If not, something is wrong and a closer inspection should be made.

If any problems are detected, correct them immediately.

IGNITION PROTECTION:

Each electrical component that is in a space where fuel fumes can accumulate must be ignition protected. If an electrical component is in the engine compartment, fuel tank space, or space where there are fuel lines, then the electrical component must be ignition protected. What does ignition protected mean? It means that a spark from the device will not ignite a fuel/air mixture in the same space. In simpler words, it won't cause an explosion. This means that alternators, generators, circuit breakers, battery switches, electric fan motors, electric fuel pumps, distributors, etc. must be ignition protected.

You may be tempted to replace a failed part with an automobile part, because marine engine parts may be more expensive. However, there are major differences especially when it comes to ignition protection. Using auto parts may reduce or eliminate the ignition protection available in your boat, and increase the chances of an explosion or fire.

Marine Parts	Auto Parts
Alternators have sealed electrical contacts to prevent igniting vapors	Alternators have exposed contacts
Distributors: ignition-protected and vent has a flame arrestor to prevent fire causing sparks.	Distributors: create internal high energy sparks
Carburetors: vented to allow overflow to be consumed by engine	Carburetors: leak gas into engine spaces if fuel pump diaphragm fails
Fuel pumps: will not leak if the primary fuel pump diaphragm fails	Fuel pumps: overflow goes into engine space
Fuel tank: must meet the US Coast Guard fuel system standard	Fuel tank: doesn't meet US Coast Guard fuel system standards
Fuel hose must meet UGSG standards	Fuel hose: not meant for enclosed spaces.

ELECTRICAL SYSTEM

Electrical errors are seen on a frequent basis and are a primary cause for fires and explosions on gasoline powered boats. If electrical systems are well maintained, you may have a lesser chance of an electrical malfunctions. Here are a few things that you can do.

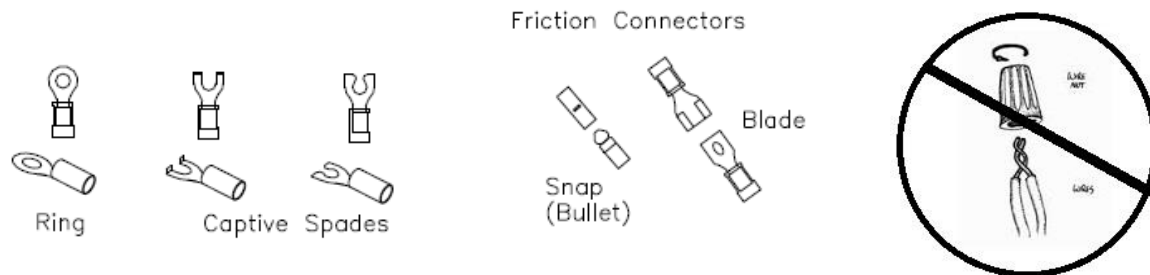
Installation of new equipment requiring electric power must be installed according to manufacturer directions. If the device is designed for marine use the manufacturer should have provided detail instructions and wiring diagrams. If there were no instructions, then the device must be installed according to ABYC Standard E-11 "AC & DC Electrical Systems on Boats. The Marine Services Bureau has a reference copy for your use.

ELECTRICAL DEAD END CONDUCTORS

Remove all conductors; also known as wire, that do not service an electrical device on the boat. Live conductors that are not attached to equipment are a spark and electrocution hazard.

DO NOT USE WIRE NUTS

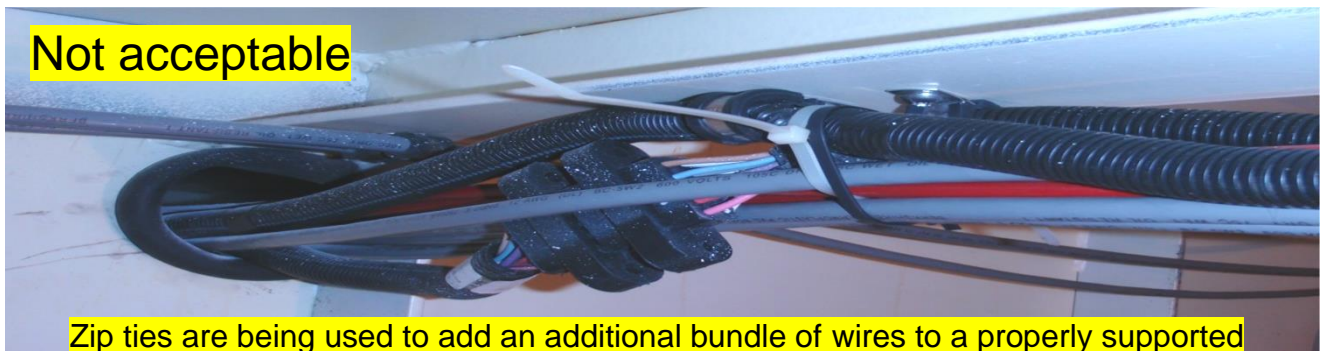
Wire nuts fall off and will allow conductors to separate; you need to use a crimp, a spade, a ring or a friction connector. Solder should not be used as a sole means of attaching wires to a device.



SUPPORT FOR WIRES

On vessels built to ABYC standards a conductor must be supported every 18 inches. The support for conductors on vessels built for commercial operation is every 24 inches. Tying conductors to pipes is not allowed. Tying conductor to other conductors is not allowed. Metal clamps with rubber gaskets should be used in place of wire ties. Wire staples used in homes cannot be used.

ALL WIRE MUST BE "MARINE" RATED.



The use of house wire or speaker wire is not acceptable. Conductors shall be stranded, not solid, copper and must be labeled "marine" or "boat". For AC and especially for DC systems there are formulas you need to use when adding or replacing equipment on board. The Marine Services Bureau can assist you in determining the correct wire sizes.

HARD WIRING APPLIANCES

All electrical devices in a compartment that are used when operating your vessel must be hard wired. Portable devices that are used on an infrequent basis, such as a work light or a shop vacuum need not be hard wired.

USE THE PROPER SIZE FUSE

All circuits must have over current protection (fuse). Do not use a larger fuse if you have an electrical system that keeps tripping your over current protection (fuse).

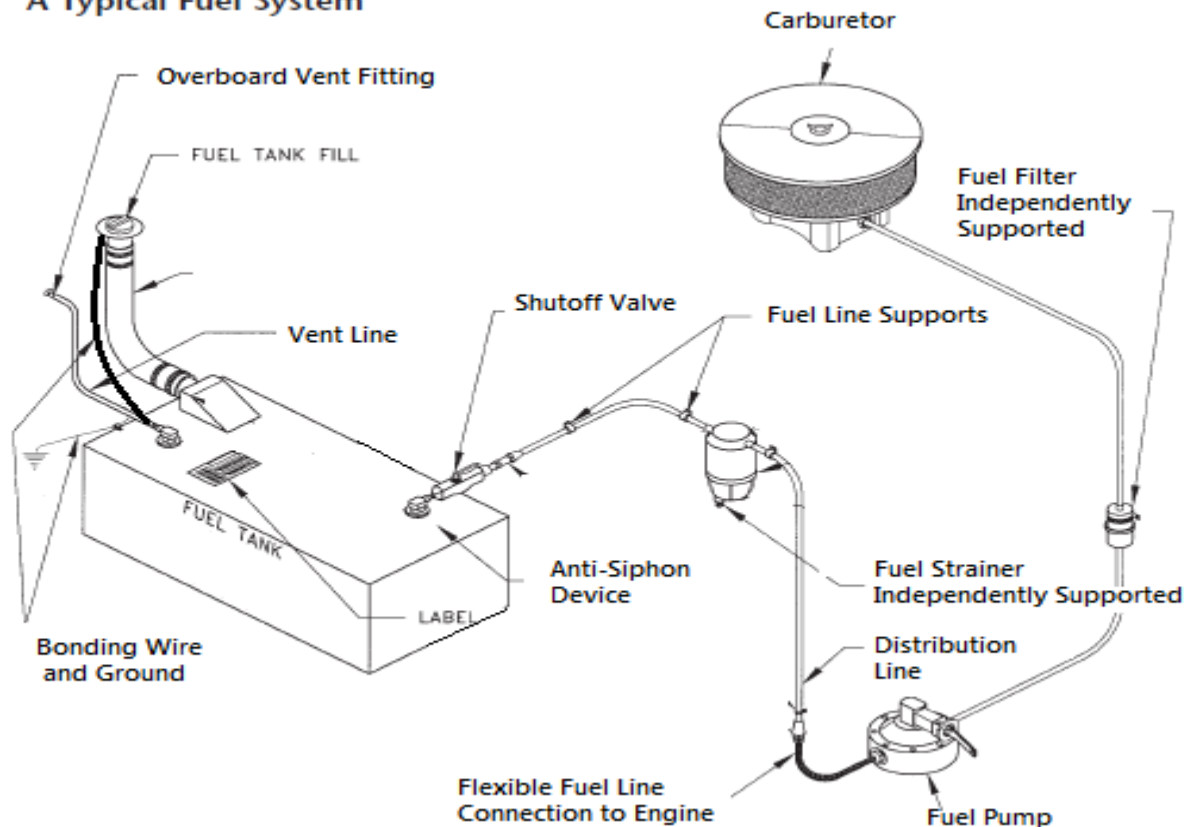
BATTERY CHARGERS

Auto battery chargers are not acceptable on boats. There is a grounding issue with them that the manufacturers have not resolved. Any battery charger used must not have clip on attachments at the battery terminals because of possibility of sparks.

FUEL SYSTEM

Most power-driven vessels utilize either gasoline or diesel engines. The use of these engines brings about the need to store large quantities of fuel on board the vessel and to provide a means of moving the fuel from where it is stored to the engine. This is accomplished by the vessel's fuel system. Fuel system design and installation must comply with the Federal Regulations of the U.S. Coast Guard and the voluntary standards established by the American Boat and Yacht Council, the National Fire Protection Association, and Underwriters Laboratories. The purpose of this chapter is to give the Public Vessel owner/operator a basic knowledge of fuel system operation and safety features, as well as providing background on the inspection criteria for fuel systems.

A Typical Fuel System

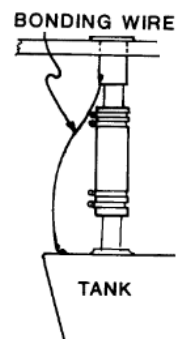


FUEL FILL

The fuel fill system and associated deck fitting provide the means to fill the fuel tank. The fuel fill line shall run as directly as possible from the deck opening to the top of the fuel tank with as few bends as possible. A short straight section is ideal. The fuel fill deck opening must be located a minimum of 15 inches from any ventilation opening and positioned such that no fuel can enter the vessel if an overflow occurs while fueling. All connections in the fuel fill line must be liquid and vapor tight. If a flexible hose is used for the fuel fill located in the engine compartment it must be USCG Type A or B hose [SAE J1527 Marine Fuel Hose]. The deck plate at the opening must have a permanent marking to indicate the type of fuel. The hose should be positioned so it is self-draining into the fuel tank.

GROUNDING/BONDING WIRE

A metal fuel tank and any metallic part of the fuel fill system that comes into contact with the fuel must be bonded to the vessel's grounding system. When flexible hose is used anywhere in the fill system a grounding wire must connect metal fittings that the hose separates. These wires must not be clamped between the hose and the fitting because this will allow leakage of fuel. Since it is possible to static electricity generated by flowing fuel a properly grounded fuel system will dissipate a spark which could result in an explosion. This is also why the nozzle of the fuel pump must be kept in contact with the fill opening when fueling.



VENT LINES

Every installed fuel tank must be fitted with a vent line to allow the escape of fuel vapors when filling the tank and to prevent a vacuum from forming in the tank as the fuel is used. It must be completely

independent of the fuel fill pipe or line. The vent line must be connected to the highest point of the fuel tank. If a non-metallic material is used for the vent line it must be a USCG Type A or B Hose. The hull termination fitting for the vent line must be located at least 15" from any hull opening to prevent fuel vapors from reentering the vessel and to prevent fuel overflowing from entering the vessel. The opening itself must be fitted with corrosion resistant, cleanable flame screens. The flame screen must be designed so that a spark or flame near the vent opening will not ignite vapors in the line allowing flames to reach the fuel tank and cause an explosion. It must be emphasized the vent line is not intended to be a fuel overflow. The practice of using it as such is a poor one that is both dangerous and a violation of the oil pollution laws.

FUEL TANKS

Fuel tanks are generally made from aluminum, steel or plastic. Gasoline fuel tanks are required to have all openings, such as fill and vent line, fuel distribution line and fuel level sender, on the top of the tank only. Drain plugs at or near the bottom are prohibited. Fuel tanks must be installed so that there is not more than ¼" of movement in any direction.

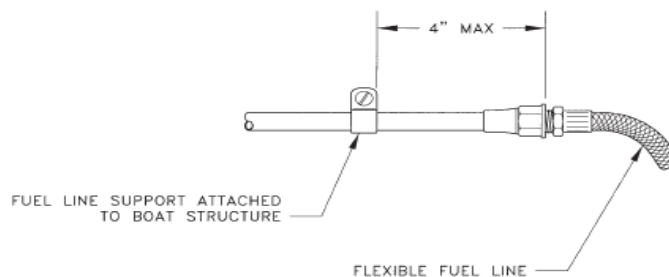
Foamed-in aluminum fuel tanks can crack and they may develop leaks over time. Because it's difficult to access the fuel tanks on many of today's recreational boats, it's not easy to detect a fuel tank leak. So be "nosy"—check the engine compartment frequently for the smell of fuel. Keep track of how much fuel you're using. If you smell fuel in the engine compartment, or if it seems you're using more fuel than you would expect, get a professional to check. Fuel leaking into your bilge is an explosion waiting to happen.

DISTRIBUTION LINES

If metal is used for any portion of the fuel line (except for fittings) from the tank connection to the engine connection (usually at the fuel pump), the metallic fuel line portions must be seamless, annealed: Copper; Nickel copper (Monel); or Copper-nickel. No other metals are permitted. Metal fuel lines used on the engine, i.e. the fuel line from the fuel pump to the carburetor, may be made of materials other than those listed. This line is usually supplied with the engine.

Metallic fuel lines are relatively rigid and need protection from vibration. This is particularly true for the fuel lines attached to the boat structure that run from the fuel tank to the engine. If a rigid fuel line is connected directly to the engine, unusual stress is likely to be transmitted to its connections, probably resulting in leakage. A flexible portion of fuel line is required to connect the metallic fuel line that is attached to the boat to the engine connection.

To prevent damaging stresses on the metallic fuel line at the connection of the flexible fuel line, there must be a means of support for the metallic fuel line within four inches of the connection. This support must be installed wherever a flexible fuel line is used and attached to a rigid metallic fuel line. The closer the support is to the end of the metallic fuel line, the better the protection of the metallic fuel line.



HOSES

Marine hoses are one of the most critical pieces of equipment on your vessel. They are found in every system from fuel to potable water and should be inspected regularly for signs of wear such as abrasion or corrosion, leaks, kinking, and tight connections; damaged hoses should be replaced immediately. Depending on the system the hose is servicing, the effects of a leak, rupture, or disconnect can vary from small mess, to fire, to flooding.

Routing

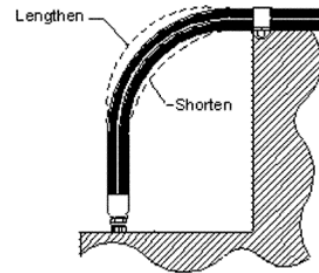
If you need to replace or install a hose, proper routing should be planned both to ensure safe working functionality as well as achieve maximum service life. Keep in mind, when routing and installing these hoses, they are not under strain or pressure. Once underway with systems running, the hoses need to withstand conditions such as:

- Temperature fluctuations of the engine space and fluid inside them
- High pressures
- Vacuum pressure
- Motion
- Vibration

Choosing a quality hose from a reputable manufacturer which meets Society of Automotive Engineers (SAE) standards and is specifically labeled and rated for that system, will help minimize the likelihood of encountering any number of issues.

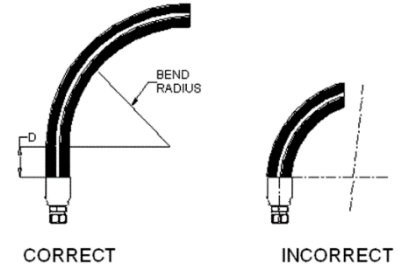
Hose length

When measuring hose length, keep a small amount of slack to allow for expansion & contraction, shortening & lengthening, and movement & vibration. (Fig. A) Under pressure, a hose may lengthen and the slack will ensure it does not burst under tension or pull loose from its fitting.



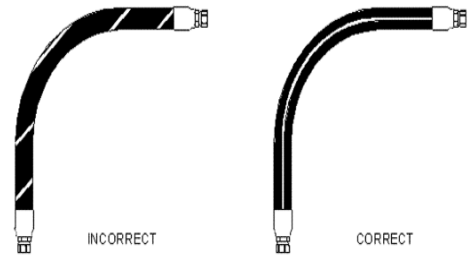
Hose bends

The hose manufacturer will provide a recommended minimum bend radius which should be followed when installing the hose. (Fig. B) Using angle adapters and/or multiple hoses will also assist in removing strain from the hose to prevent kinking and tight bends.



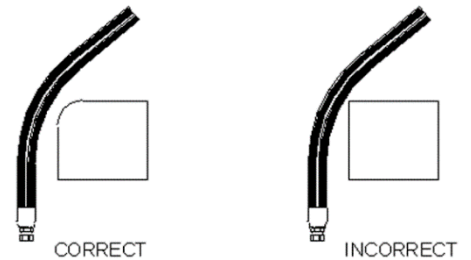
Hose twists

When connecting the hose, ensure it is not twisted. (Fig. C) When the system starts and the hose comes under pressure, it is possible for the pressure to force the hose straight, thus loosening the connection/fitting nut. Over time, the hose can disconnect or burst due to the strain.



Abrasive influences

In the same way a line under strain can chafe on sharp points, a hose in contact with a surface can cause abrasive wearing/chafing. (Fig. D) If the hose cannot be routed using multiple hoses and/or angle adapters to avoid this, a protective sleeve or hose guard on the contact spot should be used.



Hose Age – Follow the manufacturer recommendations for hose life expectancy and replacement schedule. A good practice is to write the date of installation on the hose when installed as well as make a record in your maintenance log. When in doubt as to the integrity of the hose, replace it.

(diagrams from SAE J1273 2004-08) 1

TYPES OF HOSES

Hydraulic

If your boat does not have a tiller, cable, or other mechanical steering system, a leak in your hydraulic hose will likely lead to steering loss. This hose connects the hydraulic pump to the ram which connects to the boat’s rudder or outboard and allows you to have steering capability. Run a clean rag over these hoses to check for leaks and make sure fittings are properly secured. Hoses will typically be of nylon construction, reinforced with fiber and a polyurethane saltwater-resistant covering.

Potable

Potable water hoses must be safe, non-toxic, and free from contamination and corrosion. Polyester-reinforced clear PVC hose is commonly found in these systems; however, it should be noted that in sunlight, these clear hoses can promote algae growth. Other options are hard plastic hoses such as polyethylene or copper pipe.

Bilge

Heavy duty reinforced hose should be used for your bilge as you never know what may wind up being pumped through it! When you need to get water out of your boat quickly, you don't want an issue with this very critical hose. Corrugated hose may be used but keep in mind, dirt and debris can be caught and build up in the ridges and reduce functionality. Use a hose with the same diameter as the pump output; anything smaller can diminish output.

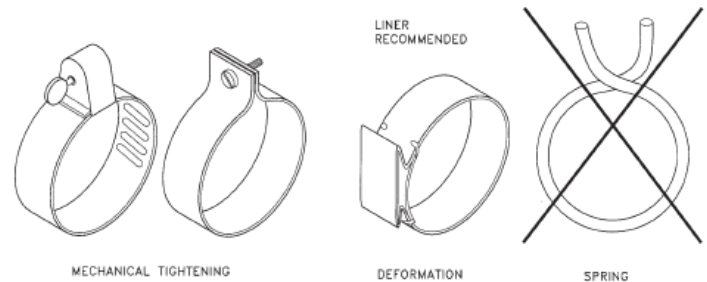
Sanitation

The two most important attributes of this hose are that it is of high quality to withstand vacuum pressure, and it is impermeable (will not allow gas or liquid to penetrate) to prevent foul smell from escaping. A quality sanitation hose will be of thick 2-ply construction reinforced with wire and Ethylene Propylene Diene Monomer (EPDM) or Styrene-Butadiene Rubber (SBR).

CONNECTIONS

Hose connections may be made by swaged sleeve, sleeve and threaded insert, or hose clamp. In general, a hose clamp is commonly seen in a fuel system due to ease of installation. Attachment of clamps is usually made using normal shop tools. The clamp usually has a mechanically operated tightening mechanism such as a screw or bolt but may require a specific means of deformation to secure the connection. A hose clamp is usually slipped on each end of the hose in a loosened condition, the hose installed and the hose clamp tightened. The fuel fill and vent lines must be double-clamped, fuel distribution system is required to have only one clamp at each connection.

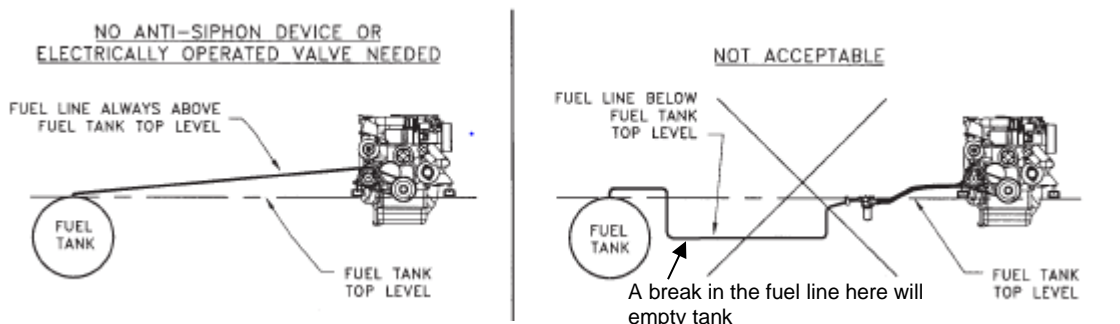
A clip, strap, or hose clamp used anywhere in the fuel system must resist corrosion. The surfaces in contact with the fuel line must be smooth and their edges such that there will be no cutting or wearing of the fuel line. All materials are corrosion resistant to a degree; however, all stainless steel, plated steel, and plastic coated steel are accepted.



ANTI-SIPHON

“Anti-siphon protection” is a term applied to the means of preventing the siphon action of permitting fuel to continue to flow out of the fuel tank in the event there is a break or rupture in a fuel distribution line, or if a fitting in the fuel line loosens, creating a leak. “Anti-siphon protection” may be accomplished by one or more of the following methods:

- Keep all parts of the fuel line from the fuel tank to the fuel line connection at the carburetor above the level of the top of the fuel tank. Practically, the fuel pump and fuel filter(s) must also be above the tank top.
- Install an anti-siphon device at the tank withdrawal fitting. The fuel distribution line may then run below the level of the tank top.



VALVE

FUEL FILTER

Fuel filters and strainers may not use the attached fuel lines for their primary means of support. Many fuel filters and strainers have brackets designed to provide support. If brackets are not provided as part of the fuel filter or strainer, clips, straps or other means must be employed to support the fuel filter or strainer independent of its connected fuel lines.

FUEL PUMP

A diaphragm pump is the usual type of fuel pump found on marine engines. They are designed to prevent fuel from leaking into the interior of the boat or into the bilge if the main diaphragm fails. Automotive fuel pumps are vented. In a vehicle, fuel leaking from a ruptured diaphragm falls harmlessly on the ground; in a boat, this type of pump would allow leaking fuel to accumulate in the bilge.

DRAIN LINES

Fuel tank drains, valves or plugged tee fittings in fuel lines, and drain or bleed valves at engine connections for the purpose of draining fuel from the system are prohibited. Fuel filters and strainers may have a servicing plug or screw fitting; however, they must be either a tapered pipe-thread type of plug, or a screw-type of plug provided with a locking means other than a split lock washer.

ACCESS

All fuel system fittings, joints and connections must be accessible for inspection, removal and maintenance. This requirement does not apply to fuel tanks, only to the fuel tank fittings. Long runs of fuel hose likewise must be accessible for inspection, but only the fittings must be readily accessible. Access may be gained by means of removable panels, hatches, ports, doors, removable seats, removable consoles or other means designed for such access. It is intended that these items be reached without cutting portions of the boat. Bolts and screws may be removed in order to move panels, flooring, furnishings and other items to gain access.

TROUBLE SHOOTING [NOT ON TEST]

Engine does not run		
Cranking System	Ignition System	Fuel System
Engine should turn over when key is turned. Check: <ul style="list-style-type: none">✓ Discharged or dead battery✓ Loose or corroded connections✓ Battery switch turned off✓ Check fuses✓ Throttle in neutral	Must have good spark at the plugs. Check: <ul style="list-style-type: none">✓ Distributor cap and rotor✓ Coil and distributor leads✓ Breaker points✓ Shorted tachometer✓ Emergency cutoff system✓ Spark plug wires	Fuel pump should squirt fuel into the carburetor when throttle is advanced. Check: <ul style="list-style-type: none">✓ Fuel tanks, valves and lines✓ Dirty flame arrestor✓ Clogged fuel filters✓ Choke stuck
Engine Runs Improperly		
Check the following : Ignition System, Fuel and carburetor system, Lubrication system, Cooling system Drive system and propeller, Transmission or coupler		

SAFE LOADING AND POWERING

Most fatal boating accidents occur when someone ends up in the water unexpectedly. All too often, these accidents occur because operators try to carry more passengers and gear than their boat can safely handle. Boats will become unstable, and the risk of an accident will increase, if you fail to follow some simple safety precautions when boarding, loading, or powering. It is especially important to follow safe loading and powering practices when handling small boats.

Passenger Capacity

The carrying capacity of a public vessel will be determined by an inspector in the Marine Services Bureau. When bringing a passenger boat into service on New York State Waters the owner must be able to present the Marine Service Bureau with stability information for the boat. If your boat is less than 20 feet in length the capacity plate will serve as a guide. If your boat is over 20 feet and less than 20 passengers a letter from the manufacturer stating the designed carrying capacity will be acceptable. All vessels carrying more than 20 persons must provide either a stability booklet provided by a naval architect, or a USCG Coast Guard Stability Letter. If neither of these is available the boat will be subjected to a simplified stability test or an inclining experiment.

The Capacity Plate

Federal law requires manufacturers to install a capacity plate on all single hull motorboats under 20 feet in length. The capacity plate must be located where it is visible to the operator and should provide the following information:

- ✓ Maximum number of persons and total passenger weight, or
- ✓ Maximum weight capacity of people, gear, and motor, and
- ✓ Maximum engine horsepower on boats designed for outboard motors only.

The weight of a person for stability calculations is 174 pounds in New York State. Manufacturers use different passenger weights to calculate person capacity. Because of this, the max number of passengers listed on the capacity plate may be higher than the capacity assigned by the inspector. To avoid confusion we suggest calling our office to confirm capacity before buying a vessel or equipment. If you are operating a PV for scuba diving add 80 lbs for each person to your calculations.



The marine inspector will take into account the number of seats that are fixed to the boat. The inspector may measure seating area and allow 1 person for every 18" of continuous seating.

Other Factors to Consider

A capacity plate provides the maximum limits for loading and powering a boat. But these are the limits in normal conditions; you must consider other factors that affect the capacity and stability of a boat in order to make a prudent decision about your boat's capacity in the prevailing conditions. They include:

- ✓ State of the sea: If the weather or water conditions are rough, you should carry less weight. This allows the boat to ride higher in the water, thus reducing the chances of water entering the boat.
- ✓ Activity planned: If you plan an activity that requires equipment and movement in the boat, like fishing or water-skiing, you need to balance the number of passengers with the amount of equipment. If there is a lot of equipment and a lot of passengers, you run the risk that someone may trip and be injured.
- ✓ Other Gear: If you are carrying gear of any substantial weight, you will not be able to carry as many people safely. Consider the total pounds capacity, including persons, gear, supplies, etc. As a general rule you should remove one person from the boat's rated capacity for each 150 lbs you carry.

Safe Loading

If a marine patrol officer believes a boat is overloaded (which is considered reckless operation), the officer has the authority to send the boat back to shore. Overloading can lead to disaster, and it can certainly ruin a pleasant day on the water. Abide by your boat's capacity rating.

Person Capacity for Water Ski Boats

The person being towed is considered a passenger on the boat and, accordingly, you must have a seat available on your boat for that person or persons. This is not only the law, but it is common sense: if a person being towed becomes tired, sick or injured and can no longer be towed safely, he or she must be able to come aboard. This is a crucial consideration when determining your carrying capacity. If you are towing a multi person tube there must be a seat available for each person. The number of people in the boat and the number on the tube can never be greater than the capacity that the marine inspector has certified the vessel for. And remember, if you plan to tow a tube or skier with a personal watercraft, it must be rated for at least three persons: the driver, an observer, and the skier.

Ballast Tanks on Water Ski Boats

Some boat manufacturers can supply devices to enhance the wake. Some manufacturers have the weight of the ballast calculated into the weight capacity of the boat. If the manufacturer has not calculated the weight of the ballast tank, the number of persons allowed on board will be decreased. For every 174 lbs of water ballast you must deduct one person from the vessel; one gallon of water is 8.35 lbs. If you use an aftermarket ballast tank you will need to contact the Marine Services Bureau so that we can calculate the appropriate person capacity of your boat.

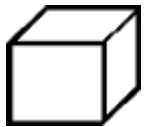
STABILITY

What is Stability

Stability is the tendency of a vessel to rotate one way or the other when forcibly inclined whether by winds and/or seas so as to resist capsizing by returning to an upright position after being heeled over. Many forces influence the stability of a vessel in the water and each vessel will react differently to heeling forces. Vessel operators should be aware of how the design of their vessel interacts with external forces of nature and affect its stability. If the vessel was built and loaded correctly, outside forces may cause the vessel to temporarily roll from side to side, but the vessel will return to an upright position by itself.

A vessel stays afloat by offsetting two forces of nature. The force of gravity attempts to push the boat down into the water, while the force of buoyancy of the water will be pushing the hull up. As long as the buoyancy is greater than the gravity, the vessel will float. A vessel's resistance to capsizing is dictated by how these two forces act on the vessel.

EXAMPLE OF GRAVITY -VS- BUOYANCY



1 ton of steel



1 ton of steel

If the cube of steel is placed in water it sinks. There is not enough displaced volume for the forces of buoyancy to act upon. If the cube of steel is formed into a boat's hull and is placed in the water it will float. The larger volume of the boat's hull allows the forces of buoyancy to support the hull's weight.

The boat's hull will sink to a draft where the forces of buoyancy and the forces of gravity are equal.

STABILITY AT WORK

If an outside force such as a wave caused this boat to heel over to one side, And if the weight of the boat and its contents have not changed, or shifted, then the center of gravity (G) will remain in place. But look at the "B", the center of buoyancy, it has moved in the direction of the lower side. The point labeled "M" on the diagrams is a point to which G may rise to and still permit the boat to possess positive stability.

When a boat is inclined, the center of buoyancy shifts off centerline while the center of gravity remains in the same location. Since the forces of buoyancy and gravity are equal and act along parallel lines, but in opposite directions, a rotation is developed. This is called a righting arm (GZ), two moments acting simultaneously to produce rotation. This rotation returns the boat to where the forces of buoyancy and gravity balance out.

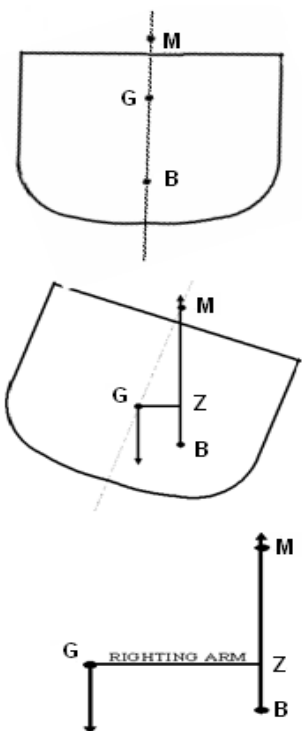
The Righting Arm is the best measure of a boat's overall stability. It describes the boat's true tendency to resist inclination and return to equilibrium.

As long as the G remains below the M then there will be available Righting moment to right the vessel. Once G is centered over the M then the vessel will capsize.

STABILITY CONDITIONS

Following damage, the boat will assume one of the following three stability conditions:

- ✓ Positive Stability - As the boat is inclined, Righting Arms are created which tend to return the boat to its original, vertical position.



- ✓ Neutral Stability - As the boat is inclined, no Righting Arms are created
- ✓ NEGATIVE STABILITY - As the boat is inclined, negative Righting Arms (now called Upsetting Arms) are created which tend to capsize the boat.

Weight Movements

How a vessel is loaded has the largest impact on the stability of the vessel.

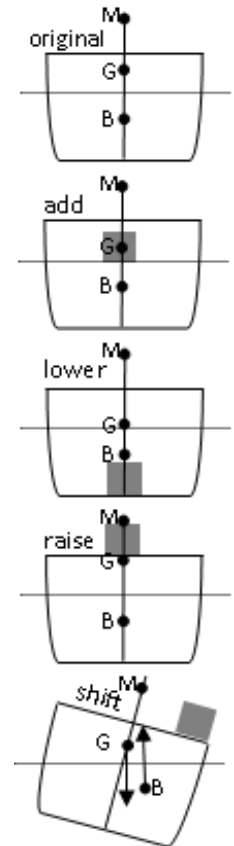
Adding a load - Adding weight above a boat's center of gravity will adversely change its stability. If the center of gravity is raised too much, the boat may become unstable. As a result, less force is required to capsize the vessel.

Removal of a load - Removal of weight from below the center of gravity also decreases stability. The center of gravity will rise to a higher level decreasing the righting arm of the vessel resulting in a vessel with a quicker roll period.

Shifting a load - Shifting weights vertically, no matter where onboard it is, will always cause the boat's center of gravity to move in the same direction as the weight shift. When you raise a weight it will cause a rise in G, decreasing your stability. This is the reason passenger limits are put on upper decks of public vessels. The more passenger weight kept on the main deck the better the stability of the boat.

Shifting weight horizontally - Adding a weight off centerline, will always cause the boat's center of buoyancy to move in the same direction as the weight shift. The boat's center of gravity will move off centerline and the boat will develop a list. A weight shift causing the boat's center of gravity to move off centerline will always reduce the stability of the boat.

Whenever weight is added, moved, or removed on a boat, the boat's center of gravity rarely moves in only one direction. Fortunately, the effects are cumulative.



Vessel Stability – Warning Signs AND PRECAUTIONS

The most important factors in preventing a boat from capsizing are a well-designed, maintained, and loaded vessel and an experienced operator and crew. Preventing an unstable vessel condition and being able to recognize the warning signs when such a condition does occur can save lives. You should be on constant watch for loss of stability.

- ✓ Be aware of external forces – wind, waves, and water depth. Always check the weather forecast before departure. Avoid rough weather conditions. Do not get underway if storms are imminent.
- ✓ Don't overload your vessel. Be aware of the amount of weight added to your vessel and available freeboard. Distribute the passengers and cargo evenly.
- ✓ Prevent water from entering the interior of your vessel by keeping hatches, doors, and windows closed, as practicable, when underway. Large amounts of bilge water can diminish a vessel's righting ability.
- ✓ **Any water shipped on board must be removed as quickly as possible.**
- ✓ Adjust course, speed, or both as practicable to minimize vessel motion, rolling in particular.
- ✓ Avoid sharp turns or turns at high speed when loss of stability is possible.
- ✓ Avoid taking swells on your quarter as they can roll your vessel.

STABILITY WARNING SIGNS

- ✓ Observe the stability and roll of your boat. Make sure the vessel's movement and reaction to sea conditions is normal, steady, and safe. Avoid Broaching, putting your vessel parallel to the swells.
- ✓ Check to make sure your boat is visibly stable before you leave the dock. It should not be listing to port or starboard or trimmed excessively by the bow or stern.
- ✓ Observe freeboard and check for flooding. A flooded vessel may appear stable when it is in fact not.
- ✓ Make sure the passengers remains seated during the voyage.
- ✓ Make sure that bilge level alarms are operational. Unusual operation of bilge pumps may indicate an excessive amount of water is entering the interior of the vessel. Remember that bilge pumps are not designed to handle major water intake. If your alarm sounds, head for the nearest shore.

A combination of prevention efforts and awareness of the warning signs of instability, along with operator knowledge, can accomplish a great deal in reducing instability and capsizing.

PREPARATION FOR GETTING UNDERWAY

As a licensed public vessel operator, you are responsible for the safety of all your passengers. It's crucial to have a plan, and to be prepared for emergencies. Remember that you can't walk away from an accident on your boat. Consider how you will respond to any problem or emergency before you set sail. Inform a reliable person of your plans so that someone can sound the alarm if you don't return when expected.

Reading the Weather

The responsible Public Vessel operator must be constantly mindful of his course and have his senses tuned to changing weather conditions. Storms cause their greatest havoc when the operator is not prepared for them. In general, public vessels should not leave the dock when there is knowledge that a storm is on its way.

Weather is never certain. There are no rules or sayings that are always true. A dark sky may not create a weather disturbance, and the clearest day may develop a storm in just a few moments.

Weather changes usually move from west to east in this part of the country. Chances are, that a storm to the west will be upon you soon. Storms to the north or east occasionally pass over, but this cannot be depended upon and generally when a storm is suspected, Public Vessels with passengers should head for the nearest port or protected harbor.

Be alert to shifts or changes in the direction of the wind. When the wind shifts it generally means that a weather change is on hand.

Clouds can also be a good weather indicator. High clouds are generally associated with good weather. Lower cloud formations usually mean rain. Dark cumulonimbus clouds with high vertical development indicate a thunderstorm is imminent.

There are three elements of weather that concern the boater: temperature, precipitation, and wind. Be alert to any changes in these weather conditions, and head to shore if bad weather is brewing.

TEMPERATURE

When warm air meets cold air in the atmosphere, severe weather conditions result. South winds often bring warm, moist air into a region. If the weather has been cool, when the warm, moist air flows over much colder water, soil or snow, dense fog often forms. With light winds, the fog near the ground can become thick and reduce visibility to zero.

Air temperatures also can spur the development of lightning, which is more prevalent when air temperatures are hot. Lightning is a serious hazard to boaters, and you should get off the water in a lightning storm, if possible. See the discussion below for safe practices if you must wait out a lightning storm on the water.

PRECIPITATION

Precipitation may take the form of rain, hail or snow. Although boating in the rain or snow isn't necessarily pleasant, the main danger is that precipitation can reduce visibility. It may also cause smaller boats to fill with water faster than the bilge pump can remove it.

WIND

Wind is probably the key element of weather affecting boaters. Wind creates waves that can affect your ability to steer a course, and affects your ability to maneuver, anchor and dock your boat. If the wind or waves are strong enough they can capsize your boat.

Weather Safety

Always check the weather before getting underway. Use the local TV news, the Weather Channel, the Internet, radio, or newspaper. Check your VHF radio or portable AM/FM radio during your voyage to stay up-to-date while underway. Be especially alert for Small Craft Advisories. These indicate conditions like strong winds of up to 33 knots (38 miles per hour) and/or sea conditions dangerous to nearly all recreational boats regardless of size.

If storm warnings have been issued for your waterway it would be prudent to cancel or delay any trips until the weather report is clear. Because you are a licensed professional you must recognize actions that can put your vessel and passengers in danger. You may feel comfortable to start your trip, and plan to stay closer to shore in case of emergency but weather forecasting is a prediction, and predictions don't always work out for the best.

Once you're on the water, always keep an eye to the sky. Watch for worsening weather conditions, like increasing or shifting winds, or increasing or darkening clouds. If a storm is developing, make sure that everyone is wearing a PFD. Stow or secure all unnecessary gear and turn on the running lights.

If a storm catches you on the water, you have two choices—make for the nearest shore, or try to weather the storm on the water. The best course of action is to head for safety on shore, if possible. If the shore is too far away and you're forced to ride out the storm on the water, keep the boat's bow headed into the waves and wind.

Lightning is a dangerous part of bad weather. At the first sign of lightning—or even the distant rumble of thunder—boaters should lay fishing rods flat on the deck and lower or remove antennas. If possible, get to a safe harbor. Being on open water during a lightning storm can be a terrifying and dangerous experience.

Current

Most bodies of water have a current, and current can affect the way your boat handles. Current will have an impact on most boats' ability to maintain course or speed, and may limit maneuverability during docking or anchoring. A current is the flow of water moving continuously in a certain direction. A simple example is the moving water in a stream. When moving downstream the current adds to the boat's speed—making the shore pass by more quickly but rudder response may be diminished. When going upstream, the boat's speed will decrease but rudder response will improve.

Boating Checklists

A simple checklist can help you ensure that you have all of the proper equipment and supplies you need on board. It's a reminder to confirm that all of your mechanical and electrical equipment is functioning properly. It's all about minimizing the risk. If you're well-prepared, you're more likely to have a safe, enjoyable boating trip—and you'll be ready to respond to an emergency, breakdown, or other problem.

Supplies and Equipment

Create your own checklist taking into consideration how you plan to spend your time on the water (such as fishing, water skiing, cruising), the conditions you expect to face (check the weather forecast), and the expected length of your voyage (hours, all day, overnight). At a minimum, your list should include all the safety equipment and back-up mechanical equipment that your boat requires. In addition, your checklist should include the operations you must complete before setting out on the water:

- Are the fuel tank(s) and hoses in good condition?
- Do you have enough fuel? (Use the one third rule—one third out; one third to return; and one third in reserve)
- Is the oil level OK?
- Are there any leaks apparent in the bilges?
- Did you check the local marine weather forecast?
- Is the electronic equipment (VHF, Radar, GPS, etc.) working properly?
- Are the battery, lights, horn, motor, blower, and bilge pump all in good working order?
- Is the propeller and/or outdrive in good condition and free of weeds and debris?
- Is the boat plug in? (Remarkably, people forget to check the boat plug all the time!)
- Is gear properly stowed and secure?
- Do you have the correct number and type of PFD's for all of your passengers? Are they serviceable and accessible?
- Are all your passengers seated?
- Have you informed all your passengers about basic emergency procedures?

Make a thorough list and check it twice—if you do, you'll have a great time on the water, and will be able to handle most problems that may arise.

Pre-Departure Requirements

Prior to the start of operations daily, the owner/operator of the vessel is required to completely inspect the vessel and its systems for proper operation. This includes, but is not limited to, inspection of all voids and below deck spaces, ensuring the proper operation of bilge pumps and alarms, ventilation blowers, pumps, watertight integrity, steering systems, communications, navigation lights, horns and safety equipment. If equipped with radar, the master shall test the radar and all communication equipment on board. If an engineer is carried on board, the communication device used between the engineer and the master shall be tested. The wheel should be turned over to ensure the rudder is free. If a logbook is required, all inspections and tests shall be noted.

Clear communication with your passengers is critical. Letting your passengers know your rules, including how to behave in an emergency, can help prevent some accidents from occurring.

Prior to getting underway the operator of the vessel must make a safety and security announcement throughout the vessel. This announcement must include information with respect to the location of lifejackets and instructions on how to put them on. In addition, the location of fire extinguishers and life rings or cushions should also be pointed out.

Vessels with a second deck that have passenger limitations should also make note of that fact during this announcement. Check to see if any of your passengers know any first aid procedures. Passengers should also be advised to be aware of any situation or security concern aboard the vessel and report such concerns to the crew. Well-informed passengers make a safe voyage more likely, and are the first line of defense in an emergency!

Preventative Maintenance

Developing sound preventative maintenance practices will reduce the likelihood of problems or emergencies while underway. A conscientious boater will keep the boat in good condition by following manufacturer recommended maintenance schedules and by checking the engine, trailer, and electronics on a regular basis. In this way you can spot and correct potential problems before they cut short a day out on the water. Your marine dealer or mechanic can help customize this schedule to your particular boat's needs.

The owner of a public vessel shall maintain a separate maintenance log for each vessel used in the water ski operations. The maintenance log shall include information on annual inspections and daily maintenance. The maintenance logs shall identify when equipment components were put into service, repaired, or taken out of service. This logbook may be stored in the place of business or on board the vessel.

DAILY INSPECTIONS

Before the owner/operator of a public vessel starts taking passengers on any day, the owner/operator must ensure a thorough inspection is made of all machinery and equipment to be used that day, to ensure the equipment is in a safe working condition. Inspection shall be conducted as per manufacturer's instructions. The owner/operator must enter the results of this inspection in the maintenance log for that boat. The owner/operator shall note the following—

- the date of the inspection,
- the equipment found to be unsafe and taken out of service, and
- the reason the equipment was unsafe and taken out of service.

EMERGENCY REPAIRS

Good preventative maintenance and proper planning will greatly reduce—but can never eliminate—emergency repairs. Learn how to do some small repair jobs yourself so that you can get back to shore and out of danger if there is a problem. Carry a basic tool kit (wrenches, pliers, screw drivers, duct tape) and some important spare parts (spark plugs, drive belt, shear pins) and learn how to handle:

- broken drive belts
- broken pipes or hoses
- broken shear pins
- oil leaks
- taking on water

Bilges

A vessel's bilge, being the lowest point in the hull, probably receives a greater amount of abuse than any other part of the vessel. Everything that leaks or spills eventually finds its way into the bilge, and mixes with stagnant fuel and oil, perhaps a few rusty nuts and bolts, and a hefty accumulation of dirt and dust. Fuel and oil in the bilges constitute both a fire and pollution hazard and may also be an indication of a problem in the engine, fuel, or lubrication systems. Dirt and debris in the bilges may clog the inlet of the bilge pump causing it to burn up or lose suction. The bottom line is that dirty bilges are hazardous, unacceptable, and unnecessary. A dirty bilge may indicate a lack of good engineering practices, and if bad enough, may be grounds for failing the inspection.

BILGE CLEANING

Bilges should be cleaned as often as necessary using bilge cleaning solution, soap, or detergent with water. If oil or fuel consistently shows up in your bilges you should isolate the source, correct it, and then clean the bilges. When bilge cleaning is completed, the washings or slops should be properly disposed of ashore as they will likely contain substances which may pollute the water.

State and federal pollution laws allow severe penalties for the discharging of any substance containing oil, fuel, or other petroleum distillates into any waterway. Any discharge of oil or other substance which produces a slick or sheen on the water must be reported to the New York State Department of Environmental Conservation's Oil Spill Hotline at 1-800-457-7362,

Toolkit

Keep a toolkit on your boat and in your vehicle to handle small repairs. Your kit should include standard tools like pliers, a ratchet set, screwdrivers, etc, and some important spare parts (spark plugs, drive belt, shear pins). If your boat uses a trailer, the toolbox should also keep trailer specific items (bearing grease, electrical tape, scissors, tire pressure gauge) and replacement parts (bearings, pins, light bulbs, boat plug, etc).

THE MARINE ENVIRONMENT

Protecting the environment should be second nature to all of us. Your “green” practices ashore should continue aboard. On the water, every action that you take impacts others sharing the waterway: your neighbors who live along the shore, your fellow boaters, the fish and aquatic plants that live in the water, and the animals that depend on the shoreline for their habitat. As in any aspect of boating, common sense and common courtesy should guide your behavior. But there are some special steps you can and should take to preserve our waterways. Marine sanitation devices, bottom painting, engine maintenance and proper trash disposal habits can all have an impact on the quality of the water in which we boat.

Oil Pollution

Huge, sea-going oil tankers aren't the only boats that can befoul our waters and shores with oil spills and oil pollution. Some of the pollution in our waterways is caused by recreational boats—by your boat and your neighbor's boat. But there are steps you can take to reduce the amount of pollution your boat causes. A poorly maintained engine will leak more oil into the water, so keep up with the manufacturer suggested maintenance schedule. Don't pump oily bilge water over the side; collect it and dispose of it properly on shore. Check your hoses frequently for leaks and replace them if necessary. If you spill oil in the boat, wipe it up right away. Use an oil absorbent pad or “sock” in your bilge when you're traveling.

New York State Navigation Law prohibits the discharge of oil in New York waterways. If your boat spills oil, no matter how small the spill, contact the NYSDEC within 2 hours of the oil spill at (800) 457 7362.

The federal Water Pollution Control Act bars the discharge of oil into waters under federal jurisdiction. It also requires boats 26 ft. and greater in length on waters of federal jurisdiction to display a 5 X 8-inch placard in the engine space stating the requirements of the law. If your boat discharges oil while sailing in federal waters, report the discharge to the US Coast Guard at (800) 424-8802.

Littering

Bring your trash back to shore and dispose of it properly! Plastics, especially fishing line, nets, and six-pack wrappers can be deadly to fish and mammals that live in or near the water. All litter—even so-called biodegradable litter—sullies the beauty of our waterways. Bring a garbage bag with you and use it for non-recyclable trash. Keep recyclables separate and place them in recycling bins at the marina, or bring them home to recycle. Pick up other people's litter and return it to shore with your trash and recyclables. If something flies out of your boat, stop and retrieve it. (Pretend it's a person and practice a man overboard drill!)

Littering isn't just disgusting and discourteous, it's illegal. New York State law prohibits dumping of trash or any garbage into the waters of the state. Conviction of this offense is a misdemeanor punishable by up to a \$100 fine and/or up to 1 year in jail.

Aquatic Hitch hikers

Aquatic invasive species (AIS), including both plants and animals pests, are easily carried by trailered boats and can infect new water bodies if care is not taken. AIS are non-native species (plants and animals) and are a tremendous threat to all lakes. They can impact water quality, the ecology of a lake, recreational enjoyment of that lake, and even affect the local economies which depend heavily on that lake. Some AIS have no control, and have long-term impacts on water bodies which have no cure.

Some lakes are contemplating boat inspections as an essential part of preventing the inadvertent transport of aquatic invasive species. Lake George is the first lake to have mandatory vessel inspection and if needed, your boat and trailer washed and decontaminated. So, in order to help the health of the bodies of water you operate on, arrive with a clean, drained, and dry boat and trailer.

NAVIGATION RULES

The “Navigation Rules” are a set of internationally accepted standards that govern the way all mariners should operate their boats when on the water. The rules require that every operator conduct his/her boat in a prudent manner, at a safe speed, and while constantly using all means available to maintain a proper lookout. They also establish rules for navigation and actions to avoid collisions between boats. To be a safe and courteous boater, you must learn the Navigation Rules!

Definitions

The Navigation Rules incorporate the following definitions:

Boat—includes every description of watercraft, including non-displacement craft and seaplanes, used or capable of being used as a means of transportation on water (any water craft that can float and be directed from point A to point B).

Power Driven Boat—a boat that uses mechanical force to propel it through the water.

Sail Boat—a boat that uses wind force in sails to propel it through the water. When a motor is used to move a sailboat, outboard or inboard, it is considered a power-driven boat.

Stand-On Boat—the boat that is required to maintain course or speed when it encounters another boat.

Give-Way Boat—the boat that must change course and/or speed when it encounters the Stand-On boat.

Underway—a boat that is not at anchor or made fast to the shore or aground. A boat is considered underway even if it is just floating and not under propulsion.

When the term “sailboat” is used in this section, it means a boat that is moving through the water by sail alone. When the term “motor boat” is used, it means a boat that is moving through the water by a mechanical means; in most cases a motor, but it could include a boat using a sail and a motor.

When the term “boat” is used, it includes motor boats, sailboat, and manually propelled boats.

Safe Speed

Every boat must proceed at a safe speed at all times so that the boat has the maximum possible time to take proper and effective action to avoid a collision. In determining what speed is a safe speed, consider the following factors:

- visibility,
- traffic density,
- the maneuverability of the boat in the prevailing conditions,
- weather conditions, including the speed and direction of the wind and the state of the sea,
- the speed, strength and direction of the current,
- the proximity of navigational hazards, and
- the depth of water.

Safe speed is not determined by the horsepower of the vessel.

Maintain Proper Lookout

Collisions are the most common type of boating accident. The first and most effective step in preventing a collision is watching the water. Maintaining a proper lookout is the key to avoiding a collision. Who is out there? What are they doing? What direction are they going? Every boat must maintain a proper lookout at all times.

Proper lookout consists of using sight, hearing, and all other available means to be aware of your surroundings. Look all around you frequently and be aware of what other boats are doing. At night and in the fog you may hear another boat before you can see it. If the weather is foggy, or traffic is heavy, have a friend help you keep a lookout. If you have radar, use it along with sight and sound.

Be aware that even the best operator will be a less effective lookout as the day wears on. Fatigue tends to narrow a lookout’s vision, hampering or even destroying his or her effectiveness. To combat fatigue, use a scanning method. Cover the horizon in a series of steps and cover the water from the bow out to the horizon in similar steps. Look all around the horizon and know what boats may be coming up behind you. To reduce the effects of glare, wear top quality sunglasses and apply non-reflective finishes on the forward portions of your

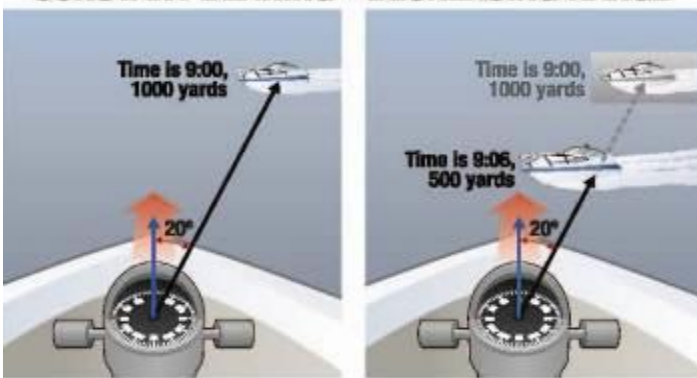
boat. Also, don't hesitate to ask someone else to keep an eye out, or steer, particularly in confined water. A second set of eyes will help spot things you may have missed.

The requirements for a proper lookout are stated in the Navigation Rules: "Every boat shall at all times maintain a proper lookout by sight and hearing as well as by all available means appropriate in the circumstances and conditions so as to make a full appraisal of the situation and the risk of collision."

How do you recognize the risk of collision?

When you see another boat, watch its path of movement over time. If the bearing (angle between you and the other boat) does not appear to change and the range (the distance between you and another object - in this case another boat) decreases, there is a risk of collision. This is called Constant Bearing, Decreasing Range or CBRDR for short. CBRDR is easily recognized when you meet another boat head on or when you approach a boat from behind. When a boat is crossing your direction of travel you need to pay attention to what the other boat is doing until it is passed and clear. If the bearing between you and another boat decreases, the other boat will pass ahead of you. If the bearing between you and another boat increases, the other boat will pass behind you.

CONSTANT BEARING - DECREASING RANGE

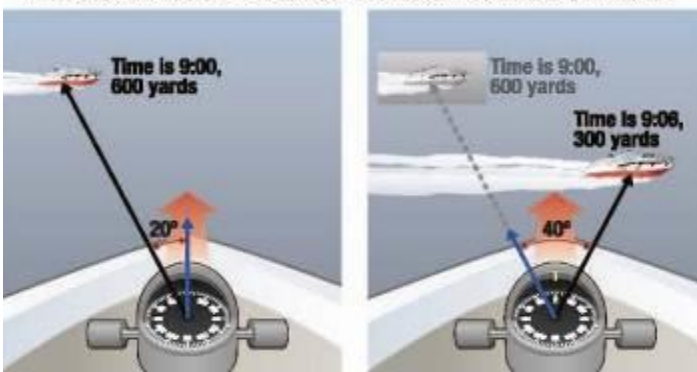


ACTION TO AVOID COLLISION

All operators must use their best efforts to avoid collisions. Hopefully the other operator also sees that a collision is possible, so he or she will be trying to avoid collision too. Any action you take must be big enough and soon enough that the other boater can see that you have taken the action. In practical terms, this means you should:

- Allow ample time,
- Back off quickly on the throttles,
- Make a large turn, and
- Use good seamanship
 - pass far enough away,
 - watch out for other traffic and
 - maintain your actions until you are well past and clear of the other boat.

CHANGE IN BEARING - DECREASING RANGE



GIVE-WAY BOAT'S ACTIONS

If you are operating the give-way boat, take early and substantial action to keep well clear. In most cases, you will have several options to avoid collision: you can turn, reduce speed, stop, or reverse engines. If you find that you are the give-way boat, you must take an action significant enough so that the other boater knows that you have taken action. You must take the action in ample time and follow good seamanship. That means moving away from the other boat and maintaining that course until you are well past and clear.

ACTION BY STAND-ON BOAT

If you are the stand-on boat you aren't required to take evasive action—that is, you must maintain your course and speed. However, if it's clear that the other boat is not giving way as it should, you must take action to avoid a collision, even though you are the stand-on boat. In that case, take evasive action and sound the danger signal. See the discussion of sound signals, below. Don't be stubborn! Slow down, stop or make a maneuver. Even if you are entitled to maintain your course and speed, be prepared to yield. Remember that your fellow boaters may not know these rules as well as you do and may not know the correct action to take.

Whenever in doubt that a risk of collision exists, assume that it does exist and take the appropriate actions

Traffic Situations

There are three types of traffic situations that can lead to collisions: head on, crossing, and overtaking. There are rules for each; knowing how to handle your boat, and being able to anticipate how the other boat will react, will reduce the possibility of collision.

The first two traffic rules apply when two motor boats are in sight of each other, meaning that one motor boat can observe the other motor boat with the naked eye. You may be wondering why only motor boats for head on and crossing situations, see “Hierarchy of Boats” for an explanation.

HEAD- ON SITUATION

If two motor boats are proceeding straight—or nearly straight—towards each other, they are “meeting head on.” In this situation, each boat must give way to the other. In other words, they are both give-way boats. Both boats should alter course to starboard (right). At night, you will see the other boat’s sidelights and the masthead light(s).

CROSSING SITUATION

If the path of two motor boats will cross each other without a change of course, the boat that has another on its starboard (right) side is the give-way boat. The boat to starboard is the stand-on boat. The stand-on boat should maintain course and speed. The give-way boat must take evasive action by turning to the right (generally the best option), reducing speed, or stopping. If the give-way boat turns to port it will be turning into the path of the stand-on boat. If the give-way boat speeds up, it will probably just hasten the collision.

At night, the give-way boat will see the stand-on boat’s port (red) sidelight and the stand-on boat will see the starboard (green) light of the give-way boat.

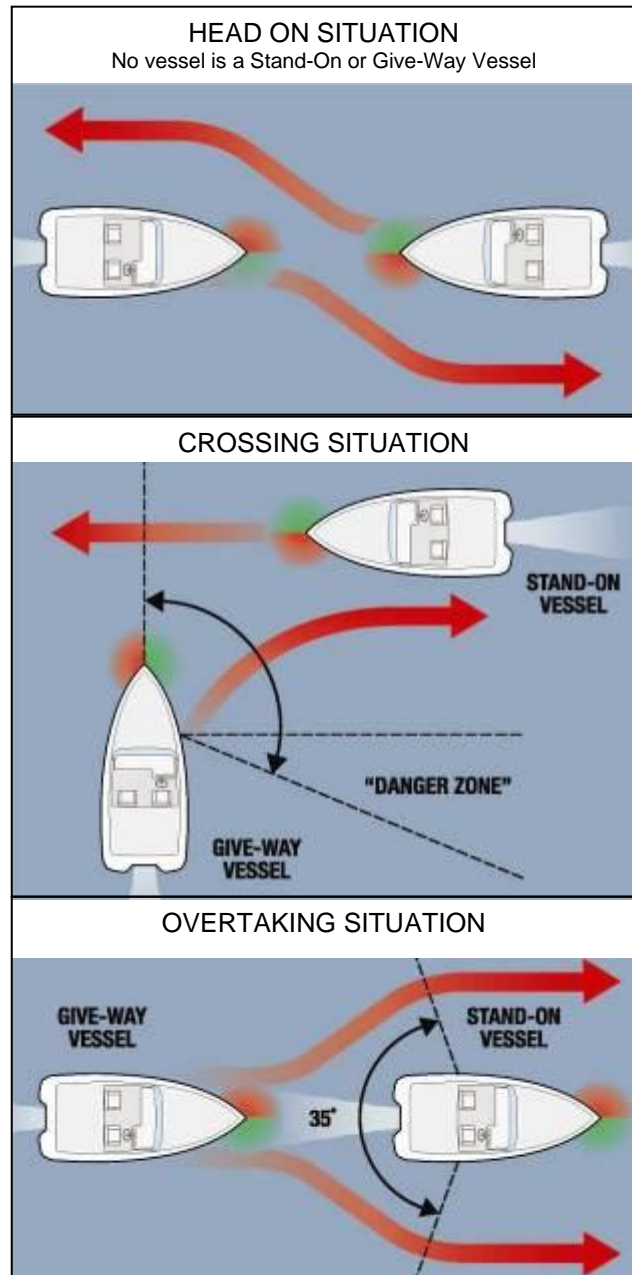
IF YOU SEE A RED LIGHT, STOP! IF YOU SEE GREEN, PROCEED!

OVERTAKING

When one boat, motor or sail, comes up behind another boat, we say the passing boat is overtaking the other. The overtaking boat is the give-way boat. The boat being passed is the stand-on boat. The stand-on boat maintains course and speed while the give-way boat must take action by turning either to starboard or port. The give-way boat must also stay out of the stand-on boat’s way until well past and clear.

At night, if you are the give-way boat you will see the stand-on boat’s stern (white) light. If you are the stand-on boat, you will see the give-way boat’s masthead (white) light and both sidelights (red & green) behind you.

Here’s an easy way to remember if you are a stand on or a give way boat. Picture your boat as a clock with your bow at 12:00 and your stern is 6:00. If a boat is approaching you between 12 and 4, this is a crossing situation and you are the give way boat. If the other boat is approaching and is between 8 and 12 you are the stand on boat. If the boat is between 4 and 8 this is an overtaking situation and you are the stand on vessel. If the approaching boat is at 12:00 you are the give way vessel – depending on the course of travel of the other boat – this could be an overtaking or a head-on situation.



Maneuvering and Warning Signals

Safe and competent boaters learn the language of sound signals. Sound signals let boats within sight know how you intend to maneuver, and warn other boats that can't see that you are there. You can also use sound signals to declare danger or distress. If the path of your boat will lead you into close quarters with another boat, you must exchange sound signals.

Sound signals are either short blasts or prolonged blasts. You must learn how to give and recognize the following sound signals which let other boaters know how you intend to maneuver:

Crossing and maneuvering signals

(Short blasts are one second in duration)

One short blast means: "I intend to leave you on my port side." You will alter your course to starboard (right).

Two short blasts mean: "I intend to leave you on my starboard side." You will alter your course to port (left).

Three short blasts mean: "I am operating astern propulsion." Or, in other words, you have put the vessel in reverse, also known as "backing down."

Five or more short blasts is the danger signal. Use it when you doubt that enough action is being taken to avoid collision.

(Prolonged blasts are four to six seconds in duration)

One prolonged blast means that a boat is leaving its slip.

One prolonged blast may also indicate a vessel coming around a bend in a river or channel.

A vessel nearing a bend or an area of a channel or fairway where other vessels may be obscured by an intervening obstruction shall sound one prolonged blast. This signal shall be answered with a hearing around the bend or behind the intervening obstruction.

When a power-driven vessel is leaving a dock or berth, she shall sound one prolonged blast

Upon hearing the one or two blast signal of the other boat shall, if in agreement, repeat the same whistle signal back and take the steps necessary to affect a safe passing. If, however, from any cause, the other vessel doubts the safety of the proposed maneuver, she shall sound the danger signal and each vessel shall take appropriate precautionary action until a safe passing agreement by sound signal is made.

Overtaking signals

One short blast means: "I intend to overtake you on your starboard side"

Two short blasts mean: "I intend to overtake you on your port side"

SIGNALS TO ATTRACT ATTENTION

If it is necessary to attract the attention of another vessel (other than in distress) you can sound your horn or whistle in a way not to be mistaken for a maneuvering signal, such as sounding more than six short blasts. You may want to warn boat traffic near you that you are picking up a skier, or that a boat is coming to close where someone may be swimming.

VESSELS NOT IN SIGHT OF ONE ANOTHER (RESTRICTED VISIBILITY)

"Restricted Visibility" means any condition in which visibility is restricted by fog, mist, falling snow, heavy rainstorms, sandstorms, or any other similar causes.

The sound signals for vessels in or near an area of restricted visibility are:

A power-driven vessel making way will sound: One (1) prolonged blast every 2 minutes

A power-driven vessel underway but stopped and not making way will sound: Two (2) prolonged blasts in succession (2 seconds in between) every 2 minutes

A power-driven vessel towing, sailing, or engaged in fishing will sound: One (1) prolonged followed by two (2)

short every 2 minutes. *This can be remembered because - . . is "D" in Morse code. These vessels are Doing work.

A vessel being towed (if manned) will sound: One (1) prolonged followed by three (3) short. _ . . . is "B" for

Being towed.

VESSELS IN SIGHT (NOT RESTRICTED VISIBILITY)	
Action	Sound signal
Meeting or crossing: "I intend to leave you on my port side" Overtaking: "I intend to overtake you on your starboard side"	One (1) short ■
Meeting or crossing: "I intend to leave you on my starboard side" Overtaking: "I intend to overtake you on your port side"	Two (2) short ■ ■
"I am operating astern propulsion"	Three (3) short ■ ■ ■
Danger/in doubt	Five (5) or more short ■ ■ ■ ■ ■
Leaving a slip/dock/berth	One (1) prolonged -
Nearing a bend	One (1) prolonged -

VESSELS IN OR NEAR RESTRICTED VISIBILITY		
Type of vessel	Sound signal	Time interval
PDV* underway, making way	One (1) prolonged -	Not more than 2 minutes
PDV* underway, not making way	Two (2) prolonged - -	Not more than 2 minutes
Not under command, restricted in ability to maneuver, at anchor, engaged in fishing, engaged in towing	One (1) prolonged followed by two (2) short - . .	Not more than 2 minutes
Vessel being towed (if manned)	One (1) prolonged followed by three (3) short - . . .	Not more than 2 minutes

* Power-Driven Vessel

Hierarchy of Boats

Crossing and meeting situations determine what actions two power-driven boats must take when in sight of each other and a risk a collision exists. What do you do when you come upon a sailboat or a vessel that is broken down?

Rule 18 of the Rules of the Road seeks to establish order based on the work or function of the vessel at the time when encountered by another vessel. The determining factor is the maneuverability or the type of work the vessel is engaging in. This order may alter the requirements of each vessel to avoid a collision.

Here's the order with the least maneuverable at the top. An easy way to remember this is using the saying:

"Only New Reels Catch Fish So Purchase Some"

A boat being **o**vertaken, always has the right of way, and is the stand-on vessel.

A boat **n**ot under command. (The vessel is unable to maneuver, broken down. This vessel is not in distress.)

A boat **r**estricted in its ability to maneuver. (A boat tending a diver or preparing to tow a boat)

A vessel **c**onstrained by draft that can only safely maneuver within the channel

A boat engaged in commercial **f**ishing, not sporting fishing (see discussion below).

A **s**ailboat under sail not using a motor or engine

A **p**ower-driven boat

A **s**eamplane must stay out of the way of all other vessels.

So, what does this mean? You are in a powerboat in a crossing situation with a sailboat is on your port side. Are you the stand-on or the give-way boat?

In general, the boat that is more maneuverable has the responsibility to get out of the way of less maneuverable boats; they are considered a give way vessel. So who has the responsibility to move out of the way?

A power-driven boat underway must keep out of the way of:

- A boat not under command
- A boat restricted in its ability to maneuver
- A boat engaged in fishing
- A sail boat

A sailing boat underway must keep out of the way of:

- A boat not under command.
- A boat restricted in its ability to maneuver.
- A boat engaged in fishing

And so on down the list.

THIS LIST IS NOT A SUBSTITUTE FOR GOOD COMMON SENSE!

A seaplane on the water shall, in general, keep well clear of all boats and avoid impeding their navigation. However, in the circumstances where risk of collision exists, a seaplane shall comply with the Navigation Rules.

There's one exception to this hierarchy: overtaking. The overtaking vessel is the give-way vessel no matter what; the hierarchy of privilege doesn't apply.

So, you are in a motorboat going across the lake. You turn around and you see a sailboat coming up behind you very fast. You determine there is a risk of collision. Who is the give-way vessel?

What is considered a fishing boat?

In the section above "a boat engaged in fishing" is given preference over a sailboat and a power driven boat underway. The Navigation Rules considers a fishing boat to be a commercial fishing boat, generally a trawler, and in some instances a troller. A commercial fishing boat will have apparatus such as a net, dredge or a long line towed behind the vessel which acts as an impediment to the maneuverability of the vessel; common sport fishing boats do not fall within this category. As general courtesy, you may want stay out of the way of a sport fishing boat.

Here's a question, you see a fishing trawler heading from its dock and proceeding to its fishing area; do you have to stay out of its way? No; although she is a fishing vessel, she is not considered a "vessel that is fishing" if she is not engaged in fishing at the time. She would be simply a power driven vessel.

Many on-water situations will involve more than two boats operating under less than ideal conditions. All mariners should exercise good seamanship and operate at a safe speed. If you are ever in doubt as to the intentions of another boat, immediately sound the danger signal, reduce your speed, stop, or reverse the engines until the danger of collision passes.

The Navigation Rules don't address kayaks, canoes or other manually propelled craft. Good seamanship, common courtesy and consideration of any special circumstances should dictate which boat gives way when a sailing or motor boat encounters a manually propelled craft.

Restricted Visibility

Restricted visibility means any condition in which fog, mist, falling snow, heavy rainstorms, sand storms, or any other similar circumstance limits your ability to see your surroundings clearly. As you encounter restricted visibility determine your location on the lake while you have some visibility left.

Boats not in sight of one another when navigating in or near an area of restricted visibility must travel at a speed that is safe in the prevailing conditions. What is a safe speed in restricted visibility? You want to be able to stop within ½ the distance of the current visibility. If the visibility is 100 feet then you need to reduce your speed to be able to stop within 50 feet.

If you have radar on board it must be turned on. If your radar detects another object—indicating there is a risk of collision—you must take action to avoid the collision in ample time.

If you hear another boat’s fog signal and it seems to be coming from forward of your beam, reduce your speed. Keep going as slowly as you are able while staying on course, and navigate with extreme caution until the danger of collision has passed.

IF OPERATING IN REDUCED VISIBILITY, NAVIGATE WITH EXTREME CAUTION, PROCEED AT A SAFE SPEED, AND KEEP A SHARP LOOKOUT FOR LIGHTS AND A SHARP EAR OUT FOR SOUND SIGNALS!

Operating Near Commercial Boats

As a general rule, avoid hampering the progress of any large commercial vessel even if you believe you have to maintain your course and speed. Large commercial vessels are restricted to the deeper navigable channels whereas your boat may safely operate in relatively shallow water. If you feel that you must stay within the marked channel for whatever reason, always observe good seamanship and keep as far to the right side of the channel as is safe and practical for your boat.

Navigation Lights

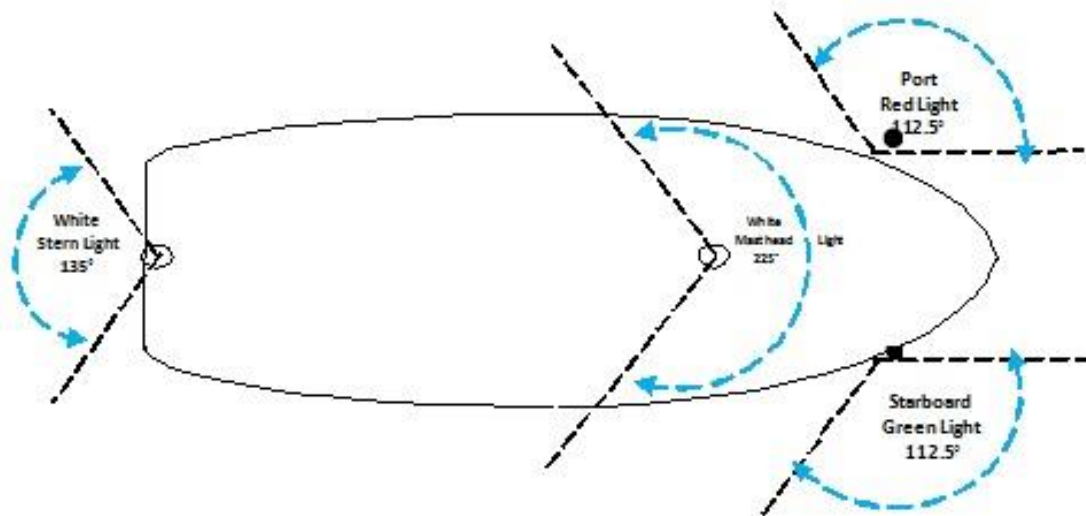
Navigation lights are not to help you see where you are going, but rather to help other boats see you, and determine your direction, length, or activity. All boats underway (not tied to the dock or at anchor) must display their navigation lights at all times between sunset and sunrise, and during daylight periods of reduced visibility.

Remember the difference between a motor boat and a sail boat? Keep this in mind as you study this section on navigation lights.

Type of Light	Characteristics	Visible From:
Masthead	White light	Dead ahead to 112.5 degrees on either side for a total of 225°
Side lights	Green on starboard side Red on port side*	Dead ahead to 112.5 degrees on respective side.
Stern	White light	Dead astern to 67.5 degrees on either side, for a total of 135°
All around	Red, White, Yellow or Green	Visible 360 degrees all around the horizon.
Tow Light	Yellow Light	Same as a stern light

*Some people use the phrase 'port wine is always red' to help remember that the port sidelight is red, and the starboard sidelight is green.

Note: Battery operated, clamp on, navigations lights may not meet the standards for vessel lighting



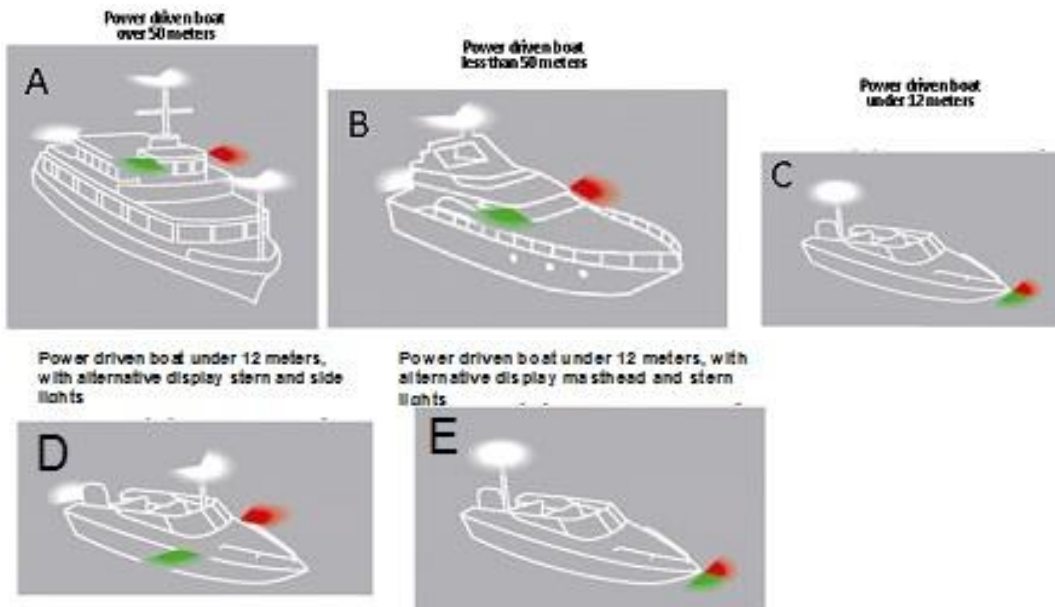
The type of lights your boat must have depends on the size and type of the boat.

All motor boats, regardless of length, must have a masthead light, side lights, and stern light. Once the length of boat is over 50 meters, an additional masthead light is required [figure A]. Up until that point the only difference is the placement of lights.

A boat less than 50 meters must show a separate masthead and stern light and the red side lights on the port side and the green light on the starboard side [figure B].

A boat less than 12 meters can mix up the display in different ways. A boat less than 12 meters may show the masthead light and the stern light in one light, generally an all-around light on a pole [figure C].

Or they can separate them out into two lights, a masthead and stern light, with separate lights, the red on the port side and the green on the starboard side [figure D], or the side lights in one light on the bow [figure E]



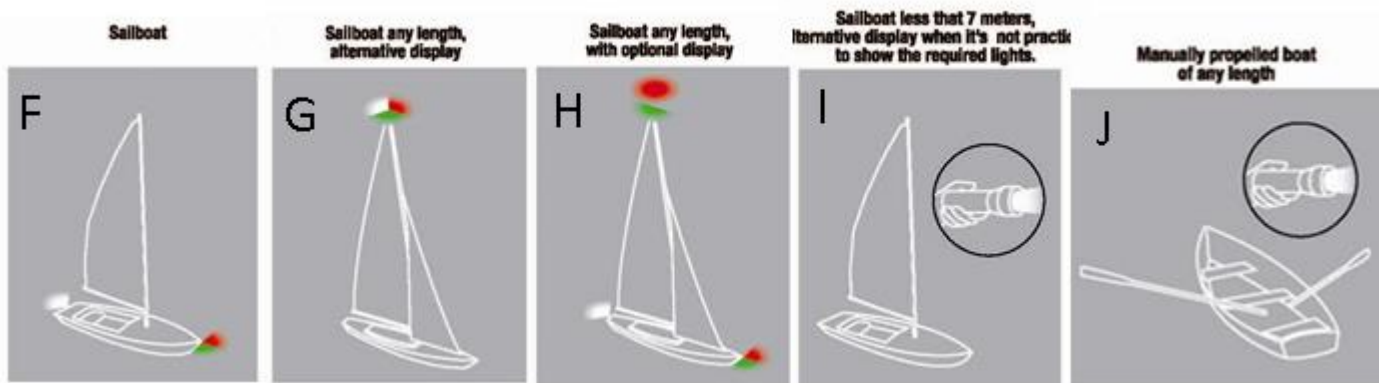
The important part to remember is a motor boat will show a masthead light, a red and green side lights, and stern light after sunset and during periods of restricted visibility.

Sail boats, not operating with mechanical power, must have side lights and stern lights, but are not required to have a masthead light [figure F].

In a sailing vessel of less than 20 meters in length the lights prescribed for sailboats may be combined in one lantern carried at or near the top of the mast where best seen [figure G]. The combined lantern may be carried in lieu of the required side lights and stern light.

If the sailboat is not carrying the combined lantern in the previous paragraph, it may exhibit at or near the top of the mast, where best seen, two all-around lights in a vertical line, the upper being red and the lower green [figure H].

Sailboats less than 7 meters [figure I] and manually propelled boats [figure J] may exhibit the side and stern lights required on a sailboat or carry a white lantern to show in time to prevent a collision.



Confused? Just remember this:

If you see a red and green light, sail boat is coming toward you. “Red over green, sailing machine”

If you see a red, green and a white light a mechanically propelled boat is coming toward you.

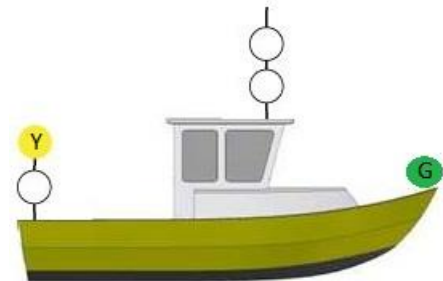
If you see a red light you are looking at the port side of a boat, it is going from right to left.

If you see a green light you are looking at the starboard side of a boat, it is going left to right.

If you only see a white light you are looking at the stern of a boat, a boat at anchor, or a manually propelled boat.

SPECIAL LIGHTS

A masthead light is not required when a public vessel is towing another vessel. A towboat shall show, in addition to her sidelights, two white masthead lights in a vertical line, one over the other, not less than one meter apart and a yellow tow light above the stern light. The vessel being towed shall only carry sidelights and a stern light, but not the masthead light.



When police boats are engaged in law enforcement or public safety activities such as boat stops, pursuits, and emergencies, or when towing, they’ll show flashing blue lights. Only boats operated by law enforcement agencies may use flashing blue lights.

Boats engaged in government sanctioned public safety activities can show alternating yellow and red flashing lights. Public safety activities include safety patrol for a marine regatta, search and rescue actions, and assisting disabled boats. This light does not give the boat any special privileges.

Water Ski boats

The operation of a water ski boat is not specifically covered in the Inland Navigation Rules. A water ski boat is not granted any special status on the water, but other boats may, as a general courtesy, stay out of the way of a ski boat. A water ski boat is considered to be a power driven boat and must follow the rules that are applicable to them. A power driven boat must stay out of the way of:

- Sailboats when operating by sail alone,
- Commercial fishing boats engaged in trawling,
- Vessels restricted in their ability to maneuver,
- Vessels not under command,
- And manually propelled boats

When in a situation where a collision may occur, a water ski boat must abide by the rules for head on, crossing and overtaking situations. If in doubt of the other vessel's intention you shall sound the danger signal.

Remember, if you are the operator of a 16' boat, while towing a skier 75' behind, you should think of the vessel as being 91' in length when considering safe turning radius, speed, or maneuvers that must be made to comply with the Navigation Rules. If you are required to make a turn to avoid a collision due regard shall be given to the skier being towed; an increase in speed when turning may swing the skier in front of the other vessel.

Boat Operator's Responsibility on the water

In any case it is up to the boat operators to ensure that their vessels are operated in a prudent and safe manner. Boat operators must adhere to the Navigation Rules and must take into consideration anything that may cause a collision. Operators are reminded to keep in mind Rule 2 "Responsibility" when they are on the water.

"Rule 2 "Responsibility (a) Nothing in these Rules shall exonerate any vessel, or the owner, master, or crew thereof, from the consequences of any neglect to comply with these Rules or of the neglect of any precaution which may be required by the ordinary practice of seamen, or by the special circumstances of the case.

(b) In construing and complying with these Rules due regard shall be had to all dangers of navigation and collision and to any special circumstances, including the limitations of the vessels involved, which may make a departure from these Rules necessary to avoid immediate danger."

As a seasoned operator, you may be aware of the Navigation Rules, but many boaters are not. Do not assume that they will know what you are capable of doing when put into a collision situation. Assess all information that you have, such as your vessel maneuverability, wind speed and direction, proximity to shore and other objects before you make your decision as to what you need to do to stay out of danger.

BOAT OPERATIONS

Law Enforcement

Every owner or operator of Public Vessels must show certificates, licenses, equipment, etc., to any law enforcement officer upon request. When a summons is issued to a Public Vessel owner or operator, a copy is sent to the inspector who may take further action. When a vessel fails to pass inspection and a Certificate of Inspection is terminated or denied, local law enforcement agencies are notified.

Several different law enforcement agencies enforce the state navigation laws. The local Sheriff's department, as well as the State Park Police, State Police, the Department of Environmental Conservation, and local Harbormasters, Bay Constables and Police Departments work together to ensure compliance with state and local laws. Violations of state laws carry fines and/or imprisonment.

Speeding

New York State Law requires that all boats maintain a speed of 5 miles per hour or less when within 100 feet of shore, a raft, a dock, or an anchored or moored boat. The only vessels exempt are vessels used for the purpose of enabling a person engaged in waterskiing to take off or land. On some specific bodies of water the 5 mph limit has been extended to 200 feet, and on several lakes there are daytime and nighttime speed limits. Local ordinances may further regulate the speed of boats operated within specific areas. Check with authorities regarding local regulations.

All boats must proceed at a safe speed for the conditions of weather, traffic, proximity to shore, operator experience, and boat handling characteristics. When no speed limit is posted, operate your boat safely so as not to endanger others. You must be able to stop your boat safely within the clear space ahead.

Always be aware of your wake. Remember that you are responsible for any damage your boat's wake causes. There are local laws that may regulate your speed by the size of your wake within certain areas commonly referred to as a "no wake zone." Reduce speed when passing marinas, docks or other boats, to minimize any disruption your wake may cause.



Reckless Operation

Reckless operation of a boat is against the law and is a misdemeanor offense. Operating recklessly means failing to exercise due care to prevent injury to persons or property, or operating in a manner that may endanger the life, limb, or property of any person. Reckless operation may be the result of operator ignorance, inattention, indifference or carelessness. Some examples of reckless operation include:

- operating at a high speed in a congested boating area or in restricted visibility,
- following another boat too closely,
- operating too closely to swimmers or divers,
- towing skiers in an unsafe or crowded area,
- operating near dams,
- cutting through a regatta or marine parade,
- overloading a boat, and
- allowing passengers to ride on the bow, gunwale, or transom while making way.

Water ski equipment shall never be used or operated in a manner so as to endanger the safety of persons or property. It is illegal for the driver to operate any vessel so as to cause the water skier to collide with an object or person. It is also illegal for the skier to use the water skis so as to collide with an object or person. Passing the tow line over another vessel or skier, or navigating between a vessel and its tow is also prohibited by law.

Bow Riding

Bow riding means that passengers are seated on the boat's bow, gunwale, transom, or any area not intended to accommodate passengers while the boat is underway. Bow riding is extremely dangerous. If the boat hits a large wake or wave, or makes a sudden, sharp turn, the person riding the bow may be thrown overboard. Captains must insist that their passengers take a seat, and stay in that seat, while the boat is underway.



WHY IS RIDING ON THE BOW OR GUNWALE DANGEROUS?

A person who is bow riding is in danger of falling overboard and being injured by the boat or the boat prop even if the boat is moving at slow speed. A boat in a no wake zone moves about six miles per hour which means it will proceed about nine feet in a second. At low speed, your motor boat's bow will ride high, obstructing your view. It will take at least two seconds for the helmsman to react if a person falls into the water from the bow—assuming that the helmsman sees the accident and can react immediately. In that time, the boat will move forward 18 feet and it will take another second or two for a propeller to actually stop turning. So in the best case scenario, the person will be in danger of being injured by the moving prop for at least five seconds after falling overboard—and in those five seconds, the person is unlikely to be able to move far enough away from the prop to avoid the danger.

Even if the person who falls overboard manages to avoid the prop, he or she risks injury and/or drowning. For example, a person may strike his or her head on the underside of the boat and be rendered unconscious. It may take a few moments to turn the boat around to pick up the person overboard. All these risks are magnified if the boat is moving quickly.

Boating While Intoxicated

Alcohol will affect a person's judgment and may lure him into performing maneuvers well beyond his ability. After a drink or two, people tend to lose their inhibitions and feel they can do things they normally wouldn't or can't do.



No persons may operate a vessel, on the waters of New York State while intoxicated or while their ability to operate such vessel is impaired by the use of alcohol or drugs. Public Vessel operators are held to a higher standard than other boaters: blood alcohol content as low as .04% constitutes a violation, as opposed to a B.A.C. of .08% for others. The law calls for heavy fines and/or imprisonment on all convictions of operating while intoxicated. In addition, a Public Vessel operator may have his license suspended or revoked.

Boating while under the influence of alcohol is illegal and dangerous. Alcohol's effects intensify on the water. Even small amounts of alcohol greatly impairs function in three critical areas: balance, coordination, and judgment. Environmental stressors such as glare, heat, vibration, and engine noise can induce fatigue. The combination of alcohol and boats can be lethal.

Alcohol can induce recklessness because it depresses the ability to process information from various sources. You may develop a "tunnel vision" perspective blocking out critical visual information. In addition, your ability to judge speed and distance becomes impaired by alcohol which limits your ability to track moving objects. Alcohol also reduces your night vision. You can lose the ability to differentiate between red and green. The intoxicated boater is a dangerous hazard, especially after dark.

Falls overboard are one of the leading causes of boating fatalities. A boat is a constantly moving platform, even in calm water under normal conditions a passenger may be thrown off balance by the vessel's motion. After only a couple of drinks, the effect on balance and equilibrium may result in a fall within the vessel or overboard.

Drinking also impairs your ability to react quickly if you do fall overboard, and reacting quickly and appropriately increases your chance of rescue. Alcohol will make it more difficult to reach for and put on a PFD, and will increase disorientation upon entering the water. If you're impaired, when you hit the water you may swim down rather than up—many an excellent swimmer has drowned this way.

Local Laws

New York State Law allows cities, towns, and villages to regulate speed and boat operations out to 1500 ft. from shore. Local laws may also restrict towing sports at certain times during the day and in certain areas. To find out what the local laws are in your area, contact the local marine patrol or local government.

Termination of Voyage

Law enforcement officers may terminate the voyage of any boat—including a rowboat or canoe—if they find an imminently hazardous condition aboard the boat. If the continued operation of the boat will likely cause an accident or physical injury, an imminently hazardous condition exists. The officer will direct the operator of the boat to stop and proceed immediately to dock at the nearest available safe anchorage, dock or mooring. The imminently hazardous condition must be corrected before the boat may proceed.

The following are examples of conditions that a law enforcement officer may consider imminently hazardous:

- Insufficient PFDs
- Overloaded boat.
- Operating a boat while intoxicated.
- Fuel in the bilge.



Hours of operation - Water Ski

Participating in any towing sport is prohibited during the hours between sunset and sunrise.

Courtesy

It is important to show courtesy towards other boaters. Avoid close quarter situations and give fishing boats, sailboats, and manually propelled boats a wide berth. Stay well clear of swim areas, boats towing people on water skis or similar devices, and away from diver flags. Don't create excessive wakes or spray other boaters. Don't fish in channels. Lending assistance to fellow boaters also shows courtesy and respect to others on the water.

Courtesy toward shoreline residents can be shown by observing "no wake" speeds near docks, moored boats, or swim platforms and avoiding high speed operation within close proximity to the shore and congested areas. Keeping radios and other noise low when anchored close to shore and engine noise reduced or muffled (particularly in the early morning or late at night) also shows courtesy to those who live close to the water.

Fatigue

The Coast Guard has conducted tests to determine how operating a boat contributes to impairment of faculties. The motion of the boat, vibration, engine noise, wind, sun, and spray all tended to fatigue the operator. The alert boatman, after several hours underway in a small boat, without the consumption of alcohol, suffered reduced capability. In fact the operator, after 3 or 4 hours on the water, suffered reduced ability to observe and react similar to the condition he would have been had he been drinking. This effect is commonly referred to as boater's hypnosis or boater's fatigue. The addition of alcohol to these stress factors intensifies the effect of the hypnosis, causing a person who has not been drinking heavily to feel as if they are intoxicated, increasing the likelihood of an accident.

Tests indicate that combinations of daytime stressors (excluding alcohol and/or drugs) do affect the boater's performance adversely. Most of those tested felt they performed at a higher level than the test results indicated. It can cause a person's reaction time to slow down. All the daytime stressors, except sun glare, can be nighttime stressors. Additional nighttime stressors include reduced vision caused by problems with dark adaptation, glare from the moon, or background lighting from the shore or the boat. Background lighting can also cause the lights of other boats or navigation aids to be blocked out. Additionally, there is the stress caused simply by the difference between nighttime and daytime operation. Any of these nighttime stressors can cause pressures similar to panic.

NAVIGATION

Methods to determine the intended travel of a vessel on the water have changed dramatically over the last 50 years. From a chart and a compass to GPS, Chart Plotters to iPhone applications navigation still requires careful study and knowledge of the body of water you are operating on. All these methods still rely on the basic compass and a chart.

The nautical chart is one of the mariner's most useful and most widely used navigational aids. Navigational charts contain a wealth of information of great value to you as a boat operator. They show channels, depth of water, buoys, lights, lighthouses, prominent landmarks, rocks, reefs, sandbars, and much more useful information for the safe piloting of your boat. The chart is the most essential part of all navigation equipment.

Navigational charts feature coastline characteristics, points of interest, rocks, wrecks and obstructions, and describe the type of bottom. Not all waterways have been charted, but if a chart exists, you can find it at the Office of Coast Survey of the National Oceanic and Atmospheric Administration, or NOAA. The web address is: <http://nauticalcharts.noaa.gov/>

COMPASS ROSE

Charts are oriented with True North at the top. Nautical charts usually have one or more compass roses printed on them. These are similar in appearance to the face of the compass (compass card) and, like the compass card, are oriented with True North at the top. Directions on the chart are measured by using the compass rose.

SOUNDINGS

Nautical charts describe the characteristics of the bottom of a body of water—information that is vital to the boat operator. The chart uses combinations of numbers, color codes, and underwater contour lines to mark channels, hazards and other bottom characteristics. The numbers on the chart represent “soundings,” or measurements of the depth of the water at average low tide. Since the greatest danger to navigation is during low tide, a number of the depths of low tide are averaged to produce the average low tide.

Contour lines (also called fathom curves) connect points of roughly equal depth and provide a profile of the bottom. These lines are either numbered or coded according to depth using particular combinations of dots and dashes. Generally, the shallow water is tinted darker blue on a chart, while deeper water is tinted light blue or white. Depth of water may either be in feet, meters or fathoms (a fathom equals six feet). The chart legend will indicate which unit (feet, meters or fathoms) is used.

SYMBOLS FOR BUOYS

The basic symbol for a buoy, which is an aid to navigation and is discussed in depth in the next section, is a diamond and small circle. The small circle denotes the approximate position of the buoy mooring. The diamond is used to draw attention to the position of the circle and to the description of the aid. The initials “N” or “C” will indicate the shape of the buoy: (N) Nun Buoys, and (C) Can Buoys. If the buoy is painted red, the diamond will usually be indicated in red on the chart; if the buoy is painted green, the diamond will be green and so on. Other markings by the buoy symbol may indicate a buoy identifier, a sound signal, or note that it is a lighted buoy. The buoy may not be in the charted position; buoys can shift due to currents, storms, or even boats.

THE COMPASS

A marine compass consists of magnetized needles that are fastened to a graduated card which is then mounted on a pivot permitting free rotation. Rotation upon the pivot allows the magnetized card to align itself in a northerly and southerly direction. This assembly is then placed into a sealed bowl which is filled with a low freezing point liquid. The liquid serves to slow the rotation of the compass so that constant spinning and wandering does not take place with each minor change in course.

To permit readings based on magnetic north, a permanent point of reference is necessary. This is accomplished by scribing a line on the forward part of the compass bowl known as the lubber's line. The entire compass assembly is then mounted so that the lubber's line is parallel to the keel of the craft. The compass is generally divided either by degrees (360) or by 32 equal points of 11 1/4 degrees each. The vessels heading or course is that point or degree indicated by the "lubber's line." The most important thing to remember is that the vessel, including the compass bowl and lubber's line, revolves about the compass card, and not reverse of this situation.

COMPASS ERRORS

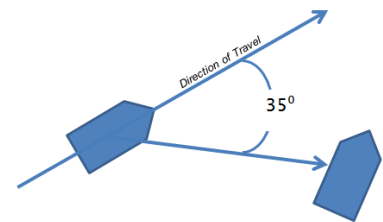
A compass depends upon the magnetic forces from the magnetic north pole of the earth. A compass should be mounted in a position that keeps it away from iron, steel, electrical devices and wiring, and other magnetic sources. These materials may cause reading errors. When a compass is mounted it is necessary that daylight practice be undertaken by running known courses until all error is known or you have complete confidence in the compass. The compass should always be relied upon when visibility is limited and navigation aids either lacking or obscured.

RELATIVE BEARINGS

Relative bearings are used to describe the angle between the bow of your boat and the position of another vessel. It is called relative because it changes as you or the other boat moves. Imagine you are on a lake. If you are in the middle of the lake and the bow is pointed north, a house on the eastern shore would be 90° from where the bow of your boat is pointed. Now turn your boat to the west and the house would now be at 180° relative to where your bow is pointed. Now if you swing your boat so the bow is pointed at the house the relative bearing is now 0° . The house did not move, the direction of your boat did. It's a bearing 'relative' to the boat or another object, rather than a compass direction.

Relative bearings are useful in tracking other vessels to determine a proper course of action in accordance with the Navigation Rules. A relative bearing can also be used to determine when a course or speed change is necessary depending upon a point on the lake, "When Big Nose Rock bears 145° change course to North".

Relative bearings are always measured from the bow of the boat (0°) clockwise through 360° . If an object is abeam on the starboard side, it has a relative bearing of 90° . If the object is directly behind the boat, astern, the relative bearing is 180° , and if the object is abeam on the port side the relative bearing is now 270° .



DEAD RECKONING NAVIGATION

Even though you operate on an inland lake it is still a good idea to learn about dead reckoning. It is a way to have knowledge of where you may be on a lake in relation to hazards, turning points and other locations on a chart.

Dead reckoning is a method of estimating the position of your vessel from a previously determined position by knowing where you started from and then count how far you went and in what direction over a period of time. I took three steps east then 11 steps north in 15 minutes. Dead reckoning determines the boat's approximate position using the course, distance, and time travelled without correcting for factors such as wind, sea conditions and current. The difference between the dead reckoning position (where you think you are or will be at a certain time) and where you actually are/end up is the set & drift; the speed and direction which you were offset by the seas.

Dead reckoning is handy in times of reduced visibility to be able to make it back to the dock in the rain or dark. In the time of an emergency it will allow you to give the rescuers a better idea of where you may be on the lake. It allows you to anticipate when you may arrive at a point where you must change course or speed during the trip. You will be able to estimate your arrival at any place on the lake.

AIDS TO NAVIGATION

Public Vessels operating on New York's waterways rarely operate outside the sight of land. An operator who knows the waters on which he is operating will have little difficulty identifying his position based on prominent landmarks and geography. All the operator really needs is some means to identify the waters in which it is safe to operate. This means is provided on nearly all state waters by aids to navigation (ATONS), specifically buoys.

Markers placed on New York State waters are placed in a system that was devised for use on lakes, ponds, and rivers within state boundaries. The system employs two basic kinds of waterway markers - regulatory markers and channel markers. Some markers may be lighted, especially those in critical or particularly dangerous locations.

Markers are held in place by chain and anchors. Most marker will stay in position but heavy weather, vandals, unusual swells can move the buoy off position.

Buoys

All markers installed by the state are buoys. Some markers installed by local governments and law enforcement agencies may be in the form of signs or day markers placed on shore or structures near the water.

SHAPES

Buoys used on state waters are of three basic shapes.

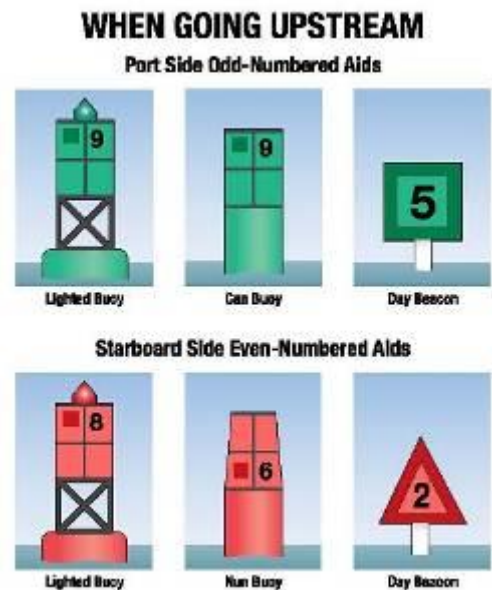
A “can” buoy is cylindrical in shape, like an oil drum. It is green in color and if marked will have an odd number.

A “nun” buoy has a blunted conical shape. It is red in color and if marked will have an even number.

“Spar” buoys are slender with a tapering shape. They are narrower and rounded at top and much smaller than a can or nun. They may be used in place of a can or nun or as winter replacements.

If either a can or a nun buoy is lighted, the color of the light will be the same as the color of the buoy—green for a can buoy and red for a nun buoy. Spars are never lighted.

An easy way to remember the shapes, color and number of buoys is this silly little sentence: Even Red Nuns carry Odd Green Cans.



Head of Navigation

A thorough understanding of the term "Head of Navigation" is essential to any discussion of waterway markers, their placement, and their use. On a large body of water such as the ocean, Long Island Sound or Great Lakes you proceed toward the head of navigation as you enter port or return from sea. On a river you proceed toward the head of navigation when going upstream. When operating on an inland lake the head of navigation is the inlet to that lake. If there is more than one inlet, usually the largest one will be designated as the head of navigation. If there is doubt as to where the head of navigation is located for a particular body of water talk with the local marine patrol or the agency responsible for buoyage on that waterway.

Channel Markers

Channel markers are utilized in areas where safe navigation may only occur within a limited area of the available water. The buoys will usually be used in pairs to mark a channel where the most water is available and where most vessels may safely pass.

When in a channel proceeding toward the head of navigation (upstream), the red buoys lie on the boat's starboard (right) side while the green buoys lie on the port (left) side. A commonly used memory device to remember this is Red Right Returning. This means that the RED buoys will lie to your RIGHT (starboard) side when returning to port. Always remember to pass between the red and green buoys. This will ensure that you stay in safe water that is deep enough to permit navigation

Regulatory Markers

Regulatory markers consist of buoys and signs which provide general information, information pertaining to rules and regulations affecting the area, or indicate local dangers to navigation. Regulatory markers are white buoys or spars with orange symbols. The orange color makes the marker visible at a distance alerting the boater to approach with caution. The shape of the symbol on the buoy indicates the marker's purpose. Lettering on the marker may be present to provide specific information on the nature of the danger or control

indicated. There are four types of regulatory markers.

VESSEL EXCLUSION AREA MARKERS

A marker using a diamond with a cross in the center indicates a vessel exclusion area. All vessels are prohibited from entering the marked area. This type of marker is usually used to indicate swimming areas, waterfalls, or other areas where entering the area could have a severe or life threatening impact upon the vessel operator or other persons in the area.

DANGER BUOYS

Danger buoys use a diamond symbol to convey their meaning. They may be used to mark the location of rocks, wrecks, submerged logs, or other hazards to navigation. When a marker is located near shore, do not pass between the buoy and the shore. A ring of buoys will mark large offshore obstructions while a single buoy may mark smaller obstructions. Always stay well clear of any danger buoy.

VESSEL CONTROL OR REGULATION MARKER

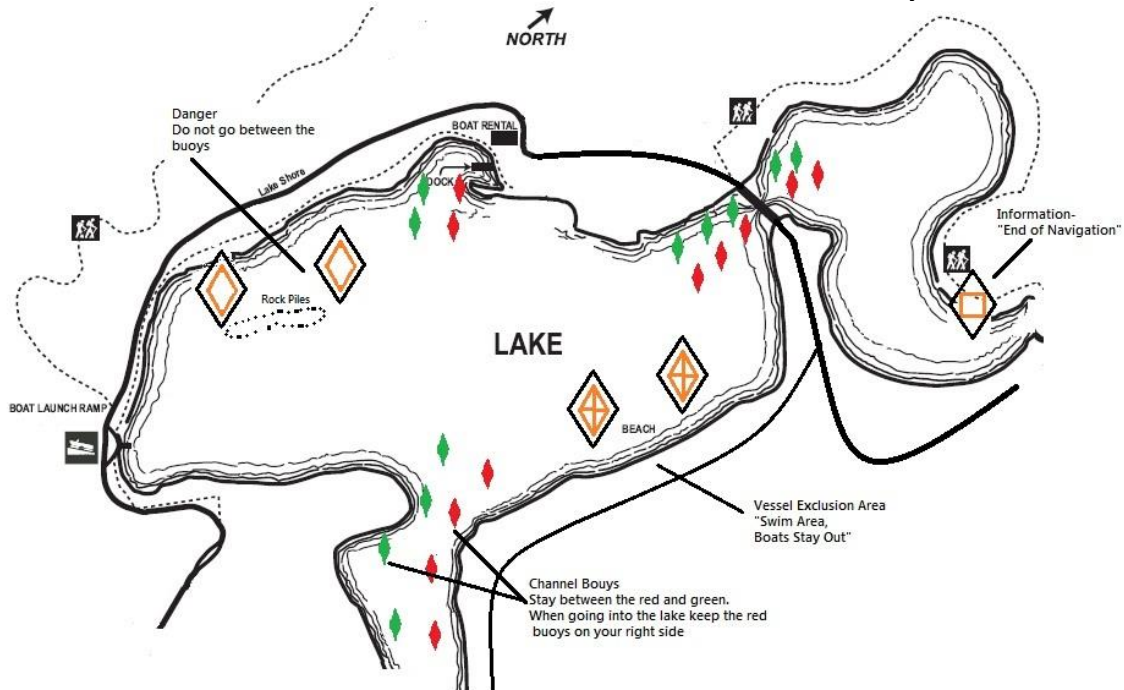
A marker using a circular symbol indicates an area where vessel operation is restricted or regulated in some manner. The most common use of this type of marker is to indicate speed limits or no wake zones. Violating the restriction indicated on the marker is a violation of the law.

INFORMATIONAL MARKERS

Markers used for informational purposes only will utilize a square symbol to indicate their purpose. These markers have no navigational significance and may be used to give directions, a location, or distances. They are similar in use to highway exit or services signs



Waterways, just as roads, are marked to provide direction, advise caution, and to point out specific hazards. Understanding the waterway marking systems is important as these markers will assist in navigation, mark safe waters, and convey important information to the operator. There are two different navigational aid marking systems in use in the U.S, one for tidal and ocean waters, and one for inland waterways.



PERSONAL WATERCRAFT

Personal Watercraft Defined

The New York State Navigation Law defines a personal watercraft as "a boat which uses an inboard motor powering a water jet pump as its primary source of motive power and which is designed to be operated by a person sitting, standing, or kneeling on, or being towed behind the boat rather than in the conventional manner of sitting or standing inside the boat."

The two key elements that distinguish a PWC from other boats are its water jet pump propulsion, and the fact that the operator sits or stands on the machine rather than in the machine.

General Information about Personal Watercraft

A personal watercraft is classified as an "inboard motorboat under 16 ft." That means that the same rules and requirements (with the exception of certain on-board equipment) that apply to similar sized motorboats also apply to PWC, including:

- Registration
- Navigation Rules
- Boating While Intoxicated
- Speed limits
- Reckless Operation
- Persons being towed behind—skiing, tubing, etc.*
- Pollution
- Noise

*Note that if a PWC tows a skier or tube, it must be rated for at least three persons – operators, observer and skier—and that the observer must sit facing the skier. PWC owners can purchase a device that allows the observer to hold on securely and balance while sitting backwards.

Propulsion System

The water jet drive is located on the bottom of the hull. Water enters the drive unit through a grate which keeps debris from being sucked into the impellers.

The impeller draws the water in through the grate and adds pressure, or thrust, to the water. This causes the water to shoot out of the machine in a jet. A steering mechanism, connected to the handlebars or steering wheel, directs the water as it exits from the machine. Some water jet systems are designed with a clamshell mechanism that allows the PWC to operate in reverse. The clamshell lowers behind the water jet, and directs the water forward rather than back. This effect is very limited and should not be used as a brake! It is designed for use in slowing your PWC down when you are trying to maneuver into a dock or onto a trailer.

Steering

As discussed above, the handlebars or steering wheel are connected to the jet pump nozzle, and as the handlebars turn, so does the water jet. The thrust from the water pushes the stern in the opposite direction, turning the machine in the desired direction. This is effective at all speeds except idle. At higher speeds, you can steer by shifting your weight to one side or the other, which causes the craft to turn in the desired direction, as the stern slides in the opposite direction. Using the handlebars and moving your body will help you make very sharp, quick turns. However, the turn can be too quick or sharp, and you can easily lose control and be thrown from your machine. Be cautious!

A PWC will not respond to handlebar movements when you release the throttle. Unlike a traditional boat, a PWC needs thrust to turn the craft. A PWC has no rudder, and will continue in the direction it was headed when the throttle was released.

Speed

You control speed on a PWC with a finger or thumb control on the handlebar. This is usually a spring loaded mechanism, and it will return to idle when you release it. The harder you squeeze, the faster your machine will go. You must remember that your PWC will not respond to handlebar movements once you release the throttle; when there is no water moving through the jet, you lose steering control. There is no prop, rudder or any other component extending beneath the hull of a PWC to control direction. If you release the throttle at high speed you will continue in the direction in which you are heading, crashing into anything in your path.

Stopping

PWC have no braking mechanism. Simply put, if you wish to stop your PWC you must either execute a sharp turn or allow the craft to glide to a stop. At 60 M.P.H. it will take a PWC nearly 300 feet to glide to a stop, depending on the operator's weight and other factors. Practice stopping to get a clear idea of how long it takes you to stop on your machine. Slow down well in advance when you are nearing shore or a dock.

Required Equipment

PWC used as public vessels are not subject to the same equipment carry requirements as other public vessels, but there is some required equipment you must carry and it will be provided by the manufacturer. This includes a backfire flame arrestor, natural ventilation (the US COAST GUARD rules exempt PWC from having an engine compartment blower), and a muffled exhaust system. All new PWC should come from the manufacturer in compliance with all equipment regulations. The operator is responsible for maintaining the equipment in a way that assures continued compliance.

The operator must provide one US COAST GUARD approved Type I, II, III, or V personal flotation device (PFD) of the proper size that is to be worn by each person onboard or towed. It is in your best interest to wear a PFD that is designed specifically for PWC operation when you're riding a PWC or water skiing. The PFD is constructed of stronger fabric, stitching, and may have more straps across the chest. Remember that an inflatable PFD is not acceptable when operating, riding on or being towed by, a PWC.

Lanyard & Kill Switch

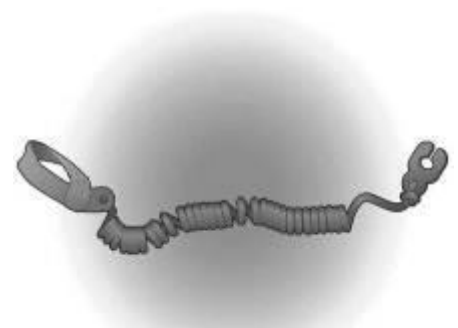
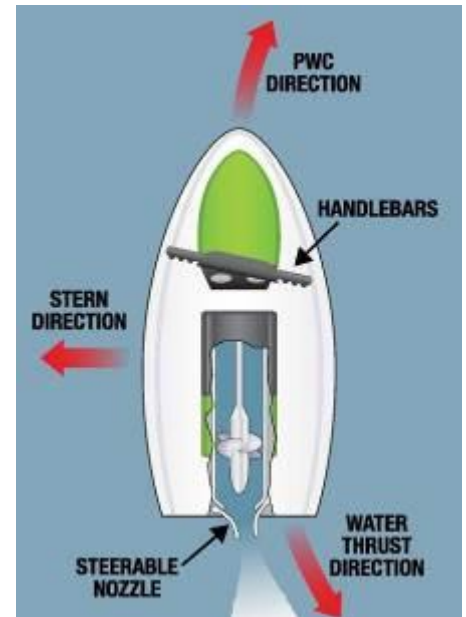
Most new boats and PWC come from the manufacturer with an engine cut-off switch that you can attach to your PFD with a lanyard. This will turn the engine "Off" whenever you move far enough away from the operator's position to activate the switch. If you fall off the PWC, it will stop, rather than proceeding on without a rider. This will allow you to right the craft and re-mount. Before you leave the launch area, pull on the lanyard to make sure the engine stops. Then make sure you attach it to your PFD securely before you leave the launch area.

If the machine is equipped with a lanyard engine cut-off system, the lanyard must be attached to the operator and the shut off button. Many manufacturers of outboard engines and boats are adding cut-off systems as standard equipment.

The operator also must carry:

- a sound producing device, such as a horn or whistle that is audible for at least one-half mile and capable of sounding for a duration of two or more seconds; and
- a fluorescent orange flag (1 square foot minimum) or any US COAST GUARD approved visual distress signal.

New York State law does not require you to carry a fire extinguisher, but federal law (and the law of surrounding



states) requires a fire extinguisher on all motorized boats, including PWC's. So if you ride in tidal waters or the major rivers in the state, you must carry a fire extinguisher. Because it is the safest and easiest course of action, State Parks recommends that you carry a fire extinguisher on board your PWC at all times.

Once you gather all of the required equipment for your PWC, consider other gear that can make your outing more enjoyable. This includes footwear, goggles or sunglasses, a wet suit, and gloves.

Operating Restrictions

If you're operating a PWC, the same laws regarding reckless operation that apply to all boats apply to you, too. In addition, New York State law specifically defines three actions as reckless operation of a PWC:

- weaving through congested traffic;
- jumping the wake of another boat at an unreasonably or unnecessarily close distance or when visibility around the other boat is obstructed; and
- swerving at the last possible moment to avoid collision (playing "chicken").



PWC are prohibited within 500 feet of a swimming area unless the opposite shore is less than 500 feet away, or when launching or returning to the launch. If you are riding a PWC within 500 feet of a marked swimming area under one of these exceptions, you must keep your speed under 10 miles per hour. Remember that ALL boats must follow the 5 MPH speed limit when within 100 feet of shore.

PWC are prohibited from operating between the hours of sunset and sunrise and during periods of reduced visibility.

Avoiding Hazards

Remember, it's not possible to steer a PWC when you release the throttle, and that fact can create dangerous situations. When facing a potential collision hazard, you may attempt to slow and turn the craft by releasing the throttle and turning the handlebars away from the hazard. But, because PWC have no rudder, turning the craft requires engine power. If you slow down too much, the craft continues on a straight course directly towards the hazard, regardless of the way you're trying to steer it.

Slowing down and trying to turn is instinctual; you must overcome the urge to do this and learn proper evasive maneuvers. When approaching a hazard, continue engaging the throttle and execute a turn away from the danger. You must practice this in order for it to become a second nature.

Fire

If your PWC catches fire, the safest course of action is to jump off and swim clear of the machine. If the fire is small enough and your fire extinguisher is readily obtainable, you may try to put the fire out. However, fighting a fire is very dangerous and it is not worth risking injury or your life for your machine.

BOATING RELATED ACTIVITIES

Water Skiing & Other Towed Activities

The Public Vessel operators using their craft for water skiing and other related towing activities must exercise extreme caution in its operation. They are responsible not only for the safety of the boat and its passengers but also for the safety of the towed individual and other water users in the area. Consequently, the laws that cover them are not only those that would apply to any Public Vessel, but also those that apply specifically to vessels involved in these type of activities. Failure to comply with either group of these laws can lead to revocation of operator's license in addition to other penalties.

Persons engaged in any activity involving the towing of persons behind a boat, including, but not limited to waterskiing, knee boarding, wakeboarding, bare footing, and parasailing must observe the following:

- ✓ There must be an observer in addition to the operator in every boat towing a water skier, at least 10 years of age.
- ✓ These activities are prohibited between sunset and sunrise.
- ✓ Any person being towed behind a vessel must wear a USCG approved Personal Floatation Device.

Water Ski Boats

Water skiers may be towed by a boat or a personal watercraft (PWC). OPRHP does not differentiate between boats and PWCs as towing "vehicles". A PWC used for towing must be of appropriate size to carry a minimum of three persons.

Since all boats perform differently due to size, weight, horsepower, engine type, hull configuration, etc., NYS requires overall length of approximately 15 ft., except for PWCs.

Operators shall ensure that the vessel being used to tow a water-skier has the performance necessary to obtain and maintain the required boat speeds to safely tow skiers under normal water and weather conditions.

TOW LINE ATTACHMENT

Boats shall be equipped with a towing pylon or a towing cleat on the centerline of the boat. Most manufactured ski boats will have a pylon mounted approximately amidships, and towing cleats mounted in the area of the transom. Aftermarket pylons may be located in other positions but must follow the boat manufacturer's and pylon manufacturer's guidelines. Tie down points on the transom may be used for tow harness as long as the transom is solid and the tie down points have sufficient backer plates. Do not attach a tow line to a deck cleat; it may not have the strength to withstand the pull of a skier. The pylon shall be of sufficient height to keep the tow line out of the way of the engine hatch, outboard motor, or gunwale.



BOAT ENGINES

Either inboard, I/O, or outboard power may be used. A tow boat shall be maintained to keep the occupant and skier safe. Drivers must be aware of the safety of persons in the water when operating an I/O or an outboard; the propeller is at the transom of the boat. An inboard's prop is under the boat and it is much harder to be reached by a person in the water.

The Ski Team

DRIVER

The driver must be a licensed public vessel operator.

The driver's primary responsibility is to ensure that the course of the vessel is constantly clear of obstructions and safe for the traverse of the person towed. The driver's attention shall be directed to the operation of the vessel and serving as a lookout for traffic and other hazards that could endanger the towed individual or the vessel. The driver shall not serve as an additional pair of eyes to observe the towed individual. This is why the law requires an observer and the driver must respond to the information relayed to him by the observer.



It is important for the driver of such a vessel to remember that he receives no special consideration under the Navigation Rules. Therefore, should a situation arise he must respond as any other vessel under power. Other vessels may, out of courtesy, stay clear of you but are not required to do so.

In general, when bringing a water skier or person towed from the shore or a dock area, the driver shall take a direct course into the operating area only after being completely assured that the course is clear for entry. He or she shall use only sufficient power to proceed to the area and to carry on those activities required in this form of recreation. The ability and desires of the person towed as relayed through the observer should govern boat speed. The driver shall not use excessive speeds at any time. The boat shall not make unnecessary sharp turns while towing a person. The driver is responsible for ensuring that proper instruction and safety principles are observed at all times.

OBSERVER

Any vessel involved in water skiing or towing an individual must carry an observer in addition to the driver. The observer must be at least ten years of age and is charged with the sole responsibility of observing the person towed from takeoff through landing to ensure that the skier maintains control. This includes observing, in addition to the person towed, the boat's wake, the tow lines, and any other important factors which may directly affect the performance or safety of the skier. The observer must relay this information to the driver of the vessel so that he can take appropriate action.

Though a rear view mirror is not a required piece of equipment, it can be helpful. A mirror will allow the driver to glance back to check on the skier as the boat accelerates. Once the skier is up on the skis the driver shall watch the water ahead of the boat and occasionally use the mirror to look for boats coming up behind them. The mirror shall not be used in place of an observer.

SKIER

The skier is responsible for his or her own well-being; he or she must ski safely within their abilities. The skier should have established hand signals with the observer so that they can communicate with each other.

The driver and the observer must be trained to recognize the capabilities of the skier to undertake activities being engaged especially as they increase in difficulty. The skier should let the driver know his or her ability prior to skiing, and any physical handicaps, including sight limitations so that the driver can adjust to the skier's conditions.

The skier must watch the water ahead at all times but also be aware of what is around him. A skier shall never try to ski in front of or come along side of another boat. Keep in mind that a skier can be charged with reckless operation!

Skier Signals

VERBAL COMMANDS

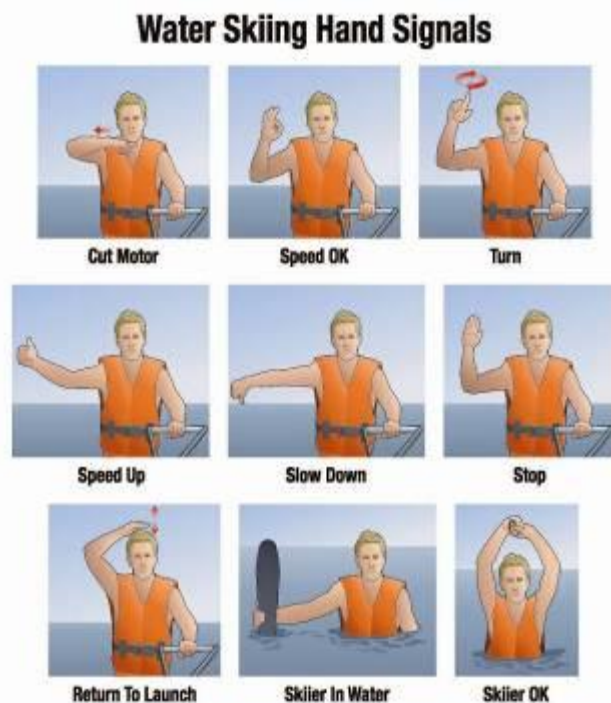
Before the driver engages the engine at the start of a run verbal communication can be effective. The observer and boat driver should wait on the skier to signal they are ready or not for the boat to pull them out onto the water. The driver should yell, "Ready?" The skier will shout back "Hit It" for the driver to accelerate, or the skier will respond with "Wait" if they are not in position to continue. The words "Go" and "No" shall never be used because they sound very similar which could lead to confusion.

VISUAL COMMANDS

Hand signals are an extremely important form of communication while waterskiing, a water-skier yelling instructions over the noise of the boat motor can be nearly impossible to hear. Unsuccessful communication by the skier can be frustrating and dangerous. Skiers will communicate with the boat's observer using a variety of hand and arm signals. Each operation must have a set of signals that are known by the driver, observer and the skier.

The following signals are common signals that are used.

1. Cut Motor: Make a cutting motion across your throat with one hand while holding the handle with the other hand.
2. Speed OK: The skier joins his thumb and finger together at the tips forming an "o" while holding the other fingers up.
3. Turn around: Point your finger upwards; you can also make small circles with it while pointing towards the sky and holding the handle with your other hand.
4. Speed up: Point the thumb upwards while holding the handle with the other hand.
5. Slow down: Point the thumb downwards while holding the handle with the other hand.
6. Stop: Hold arm out with forearm bent upwards, palm open and fingers pointing up.
7. Return to the dock/starting point: Pat the top of your head several times while holding the handle with your other hand.
8. Skier in water: Hold ski upright in water.
9. Skier is OK after a fall: Skier reaches up with both hands and clasps them over his head.



Operation

All boats towing skiers shall be operated in a careful and prudent manner, and at a reasonable distance from persons and property so as not to endanger the life or limb or the property of any person.

WHERE TO SKI

Minimize the danger of collisions with other boats or skiers, or fixed objects, by staying out of congested areas and heavily traveled lanes. Avoid skiing close to shore, around bends, or in shallow water and stay away from known fishing areas. DO NOT drive the boat through swimming or restricted areas.

When towing a skier, you must have at a minimum of 100-feet of unobstructed water on either side of the boat to allow for the skier to swing from side to side. Unobstructed does not mean 100 feet from shore, rather 100 feet from any boat, dock, mooring, structure, buoy or any other object the skier could make contact with.

At no time shall a driver or any passenger ride or sit on the gunwales or on the swim platform of the vessel while underway.

No person shall operate a boat towing a skier within a water area which has been clearly marked by buoys or

some other distinguishing device, as a bathing or otherwise restricted area provided that this rule shall not apply in case of emergency.

Fallen Skier

A fallen skier must clearly signal that he/she has not been injured. The signal, by which a fallen skier indicates that there is no injury, is to wave both arms above the head with the hands clasped. This signal indicates the skier is OK and does not need assistance. If this signal is not given, then the driver shall assume the skier is injured and move in to evaluate. The driver must realize that some skiers may take a moment or so to assess themselves before giving the OK signal. A dazed or confused skier may thrash about in the water with the arms above their head in such a way that may be mistaken for an OK signal or an OK signal may be given out of sheer habit but the skier may actually be injured.

In any case, a decision must then be made by the driver and observer if they are able to properly handle the situation or if help is needed.

Immediate action:

If a skier or skiers fall, the observer will immediately alert the driver and watch the fallen skier(s) for the "all OK" signal. The observer will start to recover the tow line while the driver shall start to slow down before making a turn to recover the fallen skier. Another method is to let the tow line trail in the water behind the vessel and the operator swings around so the line is dragged to the skier. The driver will approach with caution on the driver's side so the skier is always in view.

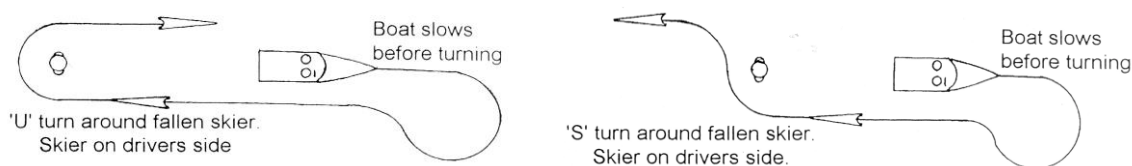
Injured Skier

If a skier falls and is injured, proceed with caution. Any injury may be aggravated by trying to pull the person from the water and onto the boat. The driver or the observer may need to get into the water to support the skier until help arrives or the nature of the injury is known. See Section for emergency plans.

Uninjured skier:

If the skier is uninjured and intends to board the boat, the driver will shut the engine off when the boat nears the skier and the observer will assist the skier as necessary to load his equipment and come aboard. Once the skier(s) have been loaded they will inform the driver that they are all clear to head back to the dock.

If the skier intends to continue skiing, the observer will pass (toss) the handle to the skier and watch the rope as it is pulled out of the boat to ensure that there are no knots, tangles or snags, inform the driver when all the slack is out of the ropes and if there are fallen skiers during takeoff.



Towable Objects (aka Water Toys)

Towing an inflatable object (tubes) instead of skis or boards has become very popular. Being towed on a tube is much easier for the person being towed; no technique to be learned, all the person has to do is hold on tight. These towable objects can be a lot of fun if the driver knows the proper driving techniques and puts them into practice. Ski boats are usually used to tow tubes which are designed to carry at least one rider and usually more.

Tubes that are designed to lift off the water surface may not be pulled behind a public vessel.

TOW ROPES

Tow ropes, or more commonly referred to as tube ropes, are specifically designed with higher break strengths and less stretch than standard water ski ropes. These ropes are designed for the number of riders the tube is designed to pull. Purchase a two person tube rope for a tube that is designed to pull two people, a three person tube rope for a tube that is designed for three people and so on. Never pull a multi-rider towable with a rope

that is not recommended for the size of the tube, no matter how many people you have on board! Tube ropes are designed with a loop at both ends for quick connection and should never be tied to a towable or boat harness. The rope is connected to the water toy itself and the passenger holds onto the sides of the toy. Always check with the manufacturer of the tube for tow rope specifications.

OPERATIONS

Driver should know the hazards involved when towing people on a tube. Tubes are free sliding objects on the water surface that have no fins. These objects slide across the water surface with the pull of the boat and the boat driver, rather than the rider, in control. The riders have no control of the path of the equipment and it must be clearly understood that the boat driver determines what happens to the equipment.

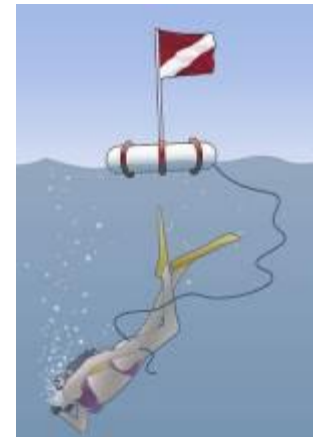
Many serious accidents have occurred because riders of inflatable equipment have been sent into collision with other boats, docks, or shore banks when drivers do not allow sufficient turning room and sufficient water depth. If a rider is ejected you want to know the rider will not strike something above or below the water surface. It is recommended that all riders of inflatable devices to wear protective helmets. Serious injuries have occurred when unprotected heads have banged together during falls.

The operation conditions of towing a tube are very similar to towing a skier.

Scuba and Skin Diving

All boat operators should be aware of the two flags which indicate the presence of divers in the water.

Always be on the look-out for the “diver down” flag, which is red with a white diagonal stripe, as shown to the near right. It will be attached to a float or a boat. This flag indicates that there is a diver in the vicinity, and that boats should keep at least 100 feet away. Be aware that while the diver should be within 100 feet of the flag, divers can drift with the current and they may be further away. Pass these flags as widely as possible, and be on the lookout for air bubbles indicating the divers' position.



You may also see the “alpha flag,” which is required to be flown, or a rigid facsimile of the flag, by the operator of a dive boat when conducting dive operations. The “Alpha” flag is left half white, right half blue, and the right edge has a triangle cut out of it. Boats flying this flag have restricted maneuverability.

Other boats must keep at least 100 feet away from either flag unless the boat is actively servicing divers on the surface or below. It is the diver's responsibility to stay within the 100 foot buffer zone of the divers flag. Boaters must give a wide berth to boats displaying the alpha flag. If it is necessary that you must come within the safety area, approach the flag or boat with caution and communicate with anyone you see.

ACCIDENTS AND EMERGENCIES

Accident Prevention

You can prevent many accidents if you clearly communicate with your passengers and stress safety. Before you allow passengers on your boat, explain your rules. Before you cast off, show them where you keep your safety equipment, and make sure they know how to use it. Find out if any of your passengers have any knowledge of first aid procedures. Well-informed and well-behaved passengers help ensure a safe voyage. However, not all accidents can be avoided. The following section discusses different types of accidents and emergencies and the appropriate response for each.

Accident Reporting

Just as there are laws and rules about reporting automobile accidents, there are laws and rules about reporting boating accidents too. If you are involved in an accident with another boat, you and the other operator(s) must exchange information: the name, address and contact information of the boats' owners and operators, and the name of the companies that insure the boats and the owners' insurance policy numbers. If the other operator involved in the accident leaves the scene before exchanging information, report the accident and that the other operator left the scene to law enforcement as soon as you can.

(a) Immediately after the addressing of resultant safety concerns, the owner, master, or operator of a public vessel involved in an accident shall notify the Marine Services Bureau as well as local marine patrol if any person onboard suffered injury beyond first aid, died or disappeared, or if damage to the vessel(s) or property is in excess of \$1000.

(b) If a public vessel is involved in any marine casualty, including but not limited to the following list, which creates either a hazard to navigation or endangers the safety of a vessel and/or its passengers when underway, the incident must be reported.

(1) A grounding, collision, or allision where damage to the vessel is suspect whether intentional or unintentional,

(2) Loss of main propulsion or primary steering, or any associated component or control system, that reduces the maneuverability of the vessel;

(3) An occurrence materially and adversely affecting the vessel's seaworthiness or fitness for service including but not limited to fire, flooding, failure of or damage to the fixed fire extinguishing systems, lifesaving equipment, auxiliary power generating equipment, or bilge pumping systems;

Report all incidents to a Marine Inspector at 518-474-0445 as soon as practicable. The inspector may request a written follow-up. If you fail to make the accident report to Marine Services you may be liable for a violation punishable by a fine. You can download an accident report form from the Boating Resources section of the State Parks web site: www.nysparks.com.

Emergency Response

If the vessel must be abandoned, is in immediate danger of sinking, or there is a major fire, put out a distress call by the quickest means available (VHF radio, cell phone call, visual distress signals, etc). This step must be accomplished first so that if the vessel sinks and the crew and passengers end up in the water, authorities will know what has happened and can initiate rescue procedures.

The next step is to reduce the immediate threat to life, limb, or the vessel. The order in which casualties are handled depends upon the situation. The casualty which poses the most danger should be handled first. For example, if a fire breaks out and someone is burned, the first priority should be to extinguish the fire to prevent it from spreading causing more injuries and possibly sinking the vessel.

The vessel's operator/master has the responsibility for making this decision based on the situation. If the accident or mishap is minor and there is no immediate threat which may require outside assistance steps 1 and 2 may be reversed.

In any event the operator must contact the local marine patrol or other law enforcement agency to inform them of the accident so that an investigation may be conducted. This should be done prior to leaving the accident scene, if safe and practicable.

Gather all information pertaining to the accident (i.e. names, addresses of parties involved and witnesses, location, time of day, weather conditions, etc) In order to complete a written report in detail. It may be supplemented by additional materials such as witness statements, photographs, etc.

Rendering Assistance (Good Samaritan Law)

The state Navigation Law requires any vessel operator to render assistance to any other vessel in distress. The type and level of assistance provided depends on three criteria:

Safety - The operator should not endanger his or her vessel, passengers or crew

Capability - The operator is not required to render assistance that is beyond the capability of his or her vessel and equipment, or beyond his or her skill level

Practicality/Necessity - The operator is required to render assistance to the extent it is practical and necessary



According to Section 41.3 of the Navigation Law:

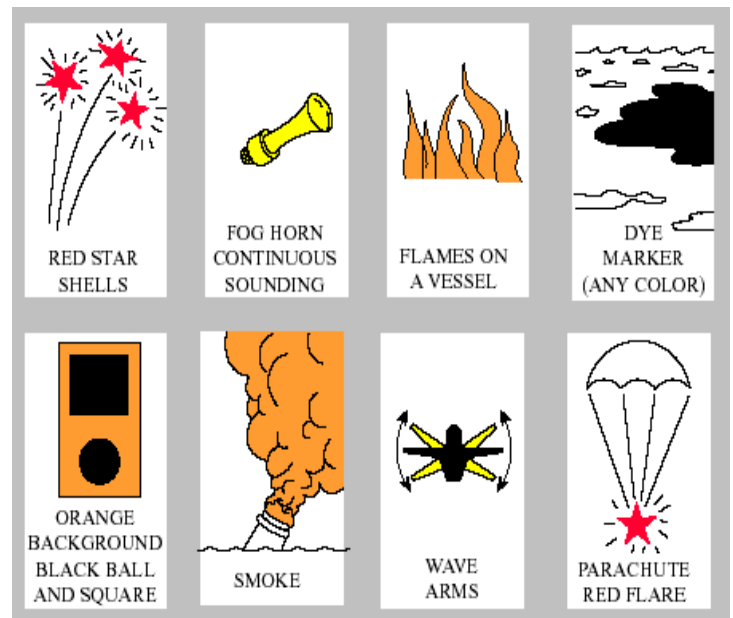
“It shall be the duty of every master or pilot of any boat to render such assistance as he can possibly give to any other boat coming under his observation and being in distress on account of accident, collision or otherwise.”

That means that if you come across another boat that is in distress, the law requires you to assist that boat to the best of your abilities. You are excused from this duty only if rendering assistance would:

- endanger your boat;
- endanger your passengers;
- interfere with other rescue efforts or law enforcement; or
- cause further or more extensive damage.

You should know how to recognize a boat in distress. Keep in mind that the operator of a boat in distress may have exhausted his supply of visual distress signals, and may be trying other means to get your attention. Here are a few clues that a boat may be in distress:

- flashing lights, including mirrors,
- smoke (other than from a grill),
- continuous sounding on horn,
- any form of SOS, whether visual or audible, or
- people on board trying to attract attention by waving arms, etc.



Even if you don't see something that looks like a distress signal, be aware of how other boats on the water with you are operating and how their passengers are behaving. You may observe that a boat has a severe list (leaning over), or is sitting unusually low in the water. A sailboat may have its mast or boom down. Perhaps there are people jumping up and down, waving their arms or towels, clothing, PFDs, or bed sheets. Passengers may be yelling to attract attention. Move closer to

investigate any behavior that seems unusual to determine whether the other boat needs help.

The box above describes some internationally recognized signals for distress.

Capsizing and Falling Overboard

Approximately 75% of all boating deaths are the result of a boat capsizing or someone falling overboard. In almost all of these cases, that person's life may have been saved if only he or she were wearing a PFD. When the water is cold, a PFD is often the only chance you'll have for survival because the shock of the cold water makes swimming or holding your head up above the surface very difficult. The first thing you need to do is get a PFD in the water for the victim.

Capsizing

Overloading your boat may lead to capsizing. Adhere to the limits on your boat's capacity plate, and use common sense. The risk of capsizing increases when the weather is rough or the current is hazardous, so be particularly cautious in difficult conditions. You also increase the risk of capsizing if you allow passengers to move around while underway, or make sharp turns at high speeds, which can throw a person out of a boat, or heel the boat over to an unstable state.

RESPONDING TO A CAPSIZE

If you're in a boat that capsizes, grab a PFD immediately if you're not already wearing one. If your PFDs aren't by your side (readily accessible), grab something that floats, such as a seat cushion or a cooler. Take a head count to see who else is in the water with you, and note how many people are wearing their PFDs. Try to help anyone who doesn't have a PFD find something that floats to hang onto. Stay with the boat; the shore is probably farther away from you than it looks. If you can, climb into or onto the boat—this is where rescuers expect to find you. Wait until help arrives. If you have a workable radio, send out a distress message. Save your pyrotechnic distress signals until you see other boats in your area.



Man Overboard Rescue Sequence

Whenever a vessel carrying passengers is operating, the possibility of a person falling overboard exists. This danger is increased as more passengers are carried, particularly if they are inexperienced around boats and the water or have been drinking alcoholic beverages. Anytime someone falls overboard an emergency condition exists. The degree of danger to the victim is dependent upon several factors. The operator of the vessel must act immediately upon receiving the word that someone has fallen overboard.

Every Public Vessel operator should have a plan for a man overboard recovery and it should be practiced frequently by the operator and crew. Any man overboard procedure should include the following steps.

1. The first person to see or realize that someone has fallen overboard should toss a ring buoy, buoyant cushion, or anything that floats. The floating objects will provide something for the victim to cling to and it will provide a reference point for the operator to steer towards.
2. That person shall pass the word either directly to the operator or, on larger vessels, by relaying the word through another crew member that someone has fallen overboard. The word to be passed is, "Man Overboard, Port/Starboard side!". The person announcing the man overboard should attempt to keep the victim in sight at all times and call out relative bearings (page 60) and range to the operator. Pointing at the MOB and keeping your finger pointed at them will help to not lose sight of them. It will also help other people onboard see them and keep their eye on them as well.
3. The immediate danger to the victim is from the vessel itself. Depending on where the person fell over in relation to the vessel, the possibility exists that the victim may be struck by the vessel's hull, rendering him unconscious, or worse, seriously injured by the propeller. On a large vessel, the operator's first action should be to turn the vessel sharply in the direction over which the person fell (i.e. turn to port for a victim falling over the port side). This is to throw the stern and the propeller away from the victim thus preventing

injury. This action is less critical on smaller vessels since it is likely that the vessel will be past the victim by the time the operator gets the word. In any case you will want to turn your vessel around to begin the recovery; do not stop your engine(s) until you are in a position to complete the rescue.

4. The operator should sound more than six short blasts of the horn or whistle as a signal to attract attention. A call should be made using VHF marine radio or other available means to request assistance from the local marine patrol and for medical assistance for the victim upon the vessel's return to shore. If you cannot locate the man overboard you should not leave the area until relieved by local authorities who will take over the search. If you must leave the area, a marker should be anchored in the area to indicate the rough location of the victim's position. Some GPS' have a "MOB" button that can be pressed as soon as you see/hear that there is a MOB. This will put a mark on your electronic chart and make note of the Lat & Long of that position so that you can A) get back to that spot and B) report it for assistance.

RECOVERY MANEUVERS

Once the vessel operator has taken his initial action he should continue maneuvering to pick up the victim using one of the following methods.

ONE TURN METHOD

This method should be used during daylight hours when visibility is good and the victim can be kept in sight. After executing the initial turn, the operator continues a sharp turn in the same direction thus completing a full circle. As the operator nears completion of the circle, he should begin to adjust course and speed to make his approach on the victim for recovery. This method is very simple and works very well on vessels that are very maneuverable. It is also the fastest recovery method.

WILLIAMSON TURN.

This method is best used by larger boats during conditions of reduced visibility (i.e. darkness, fog, rain, etc.) or when the time the person actually fell overboard is unknown. The primary advantage of the Williamson Turn is that it returns the vessel to its original track on the reciprocal heading thus increasing the chances of finding the victim by backtracking through the "same" water. After putting the wheel hard over, the operator continues turning sharply until the vessel is 60 degrees off the vessel's original heading. Without steadying on a new heading, the operator then shifts the helm to turn sharply in the opposite direction until the vessel is on the reciprocal heading of the original track. The vessel should be kept at full speed until the maneuver is complete at which time the vessel should be slowed and the search for the victim begun.

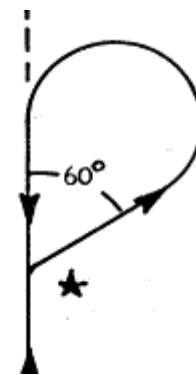
THE APPROACH.

There are two recommended approaches for picking up someone who has fallen overboard. In an upwind approach the vessel is maneuvered to a position upwind of the victim with the vessel aligned such that it will drift down towards the victim. This eliminates the need, in most cases, to use engines to maneuver the vessel next to the victim. The disadvantage to this approach, particularly for smaller vessels with a shallow draft, is that the vessel may drift over the victim and it may not be advisable when the water is rough or with strong winds.

A downwind approach is started downwind of the victim. The bow is pointed into the wind or current whichever is stronger and enough power is used to maintain positive control of the vessel while maneuvering toward the victim. The disadvantage is that there is a limited amount of time to recover the victim before wind and/or current cause the vessel to drift away from the victim.

Remember, the engines must be kept in neutral while the victim is alongside the vessel. Also, if the vessel goes beyond the victim, **NEVER** back down towards the victim.

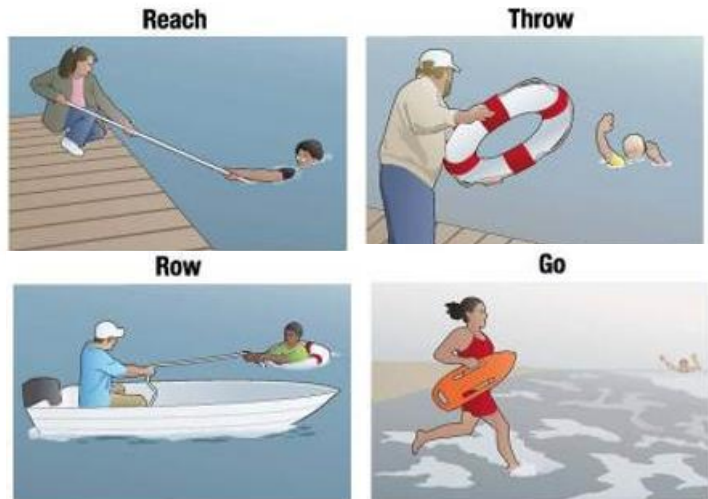
The method used to get the victim back on board depends on the condition of the victim. If the victim is conscious and uninjured, recovery is much easier. If the victim is injured, unconscious, or incapable of grabbing the rescue line this situation requires the use of a rescue swimmer. The rescue swimmer should be warmly dressed and wearing a PFD with a safety harness or tending line attached. Care must be taken when bringing the victim back aboard not to aggravate any injuries that may have been incurred during the fall overboard. Necessary first aid should be administered and all victims should be treated for shock whether they are conscious or not. All persons who have fallen overboard should be examined by a doctor.



GOING IN THE WATER FOR A RESCUE

If you ever need to help someone in the water, whether you're in a boat or on shore, remember this rescue sequence: Reach, Throw, Row, and Go. The idea behind the rescue sequence is to keep the rescuers out of the water if possible because once another person enters the water; the situation becomes much more dangerous. Not only is another person exposed to potentially dangerous currents, waves, and boat traffic, but the victim may panic and prevent the rescuer from helping him or her—sometimes victims accidentally drown their rescuers! Always try other methods before entering the water to attempt a rescue.

REACH—If the victim is able and is close enough to shore or your boat, try to guide him or her to swim to safety. When the person is near enough, try to reach him or her with a pole, ladder, stick or other long item. Reaching for the victim keeps you out of the water and out of harm's way.



THROW—Using the throw method, you attempt to rescue the victim from shore, or your boat, by throwing a line or floating objects. After safely anchoring yourself, you can pull the victim to safety without ever having to enter the water yourself.

ROW—In this method you use a boat to approach the victim and help him or her out of the water. Be careful, or the victim may capsize your boat! The victim may be tired and will require help getting on board your boat. If you're thinking about a row rescue, consider your boat's capacity—don't overload your boat and put yourself at risk!

GO—This is the most dangerous method, and you should only attempt it if there is absolutely no other choice, or if you are a trained lifeguard. Enter the water wearing your PFD and a flotation device for the victim to hang onto. Be aware that when you make personal contact with the victim, he or she may panic, grasp at you, and drag you under the water. Be prepared for this. Push the PFD toward the person, tell them to grasp it and tow the person in.

Don't underestimate the effort that swimming to safety with the victim will require—if you're unsure that you'll be able to make it, don't attempt it!

Cold Water Immersion and Hypothermia

Cold water is deadly. A body immersed in water with a temperature of less than 70°F will become incapacitated quickly. If the water is cold—50°F or less—an average adult has only a 50% chance of surviving a 50 yard swim. The problem is not just hypothermia. Cold water can kill in four ways:

Stage 1 is Cold Shock. This stage occurs immediately upon entering the water, and can last from 30 seconds to 5 minutes. Cold shock affects breathing. It causes uncontrollable intakes of breath, increased breathing rate, reduced ability to hold your breath, and an increase in heart rate and blood pressure. This inability to control breathing can cause drowning and is the primary reason that wearing a PFD when the water is cold is critical. The PFD will keep the head above water, and allow the victim time to regain control over breathing.

Stage 2 is Swimming Failure. This happens after a person has been in cold water for 5 to 30 minutes. Even excellent swimmers can go into swimming failure. A person in swimming failure loses manual dexterity, cannot coordinate breathing and swimming strokes, and suffers a loss of muscle coordination. This will result in difficulty holding the head above water, which can lead to drowning.

Stage 3 is Hypothermia. Cold water cools a body about 25 times faster than cold air does, and swimming in cold water causes the person to lose heat 50 times faster. Being immersed in cold water is much worse than

being out in freezing air without a coat. Immersion in cold water will cool the body's core temperature, which affects the brain, heart, and internal organs. It usually takes about 30 minutes for hypothermia to set in fully. A person suffering from hypothermia will shiver intensely and suffer reduced blood flow to the extremities and skin. In later stages of hypothermia, the sufferer experiences loss of consciousness and heart failure.

Stage 4 is Post-rescue Collapse. People rescued from cold water often may not survive the experience. Cold exposure may create significant changes in the body's physiology leading to dangerous heart rhythms which may cause death. Exposure to cold water is a critical medical emergency; call trained rescue personnel immediately!

TREATMENT OF VICTIMS

If you are involved in a rescue of a person who has been exposed to cold water, lay the victim on his or her back. Handle the victim gently, remove wet clothing, and wrap the victim in warmed, dry blankets if possible. Bring the victim indoors, or into a warm vehicle, or if you're in a boat, into an area that is as protected from the elements as possible. If the victim is alert and responsive, and hot packs are available, apply them to the neck, armpits and groin area. You may give the victim a warm drink, but nothing with alcohol or caffeine as these may induce erratic heart rhythms. If the victim is unconscious, incoherent or unresponsive, do not use hot packs, (you could burn their skin). And don't give the victim anything to drink.

If you cannot protect the victim from the elements and you have no warm blankets or clothes to wrap the victim, share your body heat by lying full length next to the victim. Do not rub the victim's skin and don't let the victim walk or exercise. Make the victim stay still; you need to protect the victim from developing potentially dangerous heart rhythms. As noted above, never allow the victim to have alcohol!

Surviving immersion

A PFD is critical to your survival, so wear one whenever you're boating on cold water. If you fall into the water, don't shed your clothes unless they're causing you to sink; clothing will help your body retain its warmth in the water. Try to be still in the water because movement will cause faster heat loss. Get out of the water as soon as possible, but don't try to swim to shore; it's usually farther away than it looks. Climb on top of an overturned boat or any other floating debris, and try to get the attention of the nearest boat.



If you're stuck in the water with nothing to climb onto, adopt the "HELP" position: Heat Escape Lessening Position. Wearing your PFD, curl into the fetal position to the extent possible while keeping your nose and mouth out of the water. This will help slow the body's heat loss.

If you are unable to get out of the water, and someone else is in the water with you, you can work together to retain body heat by huddling together. Again, this is most effective if you are wearing your PFD.

Grounding

Grounding your boat can damage it and injure you and your passengers. Pay attention to the buoys and channel markers; they are there to show you the areas of safe passage for your boat. Be as familiar as you can with the waters that you are sailing. If a navigation chart for the waterway is available, get one and use it. If you have a depth sounder or fish finder, these also can help you to avoid hazards on the bottom.

If you ground your boat, first make sure you did not put a hole in your hull. If your hull is intact, remove extra weight from the boat in order to refloat it. Pull the boat gently away from the obstruction, but do not try to back it out under power—you might damage the hull. If you're in an area where there are tides, wait for a high tide to float your boat. If you cannot re-float your boat yourself, call for assistance or use your visual distress signals to alert other boats of your accident.

Collisions

If you have a collision, put on your PFD's and call for help or use visual distress signals. Check passengers on your boat and the other boat for injuries. Common collision injuries are propeller cuts, broken bones, and head, neck and spinal injuries. Check whether there has been damage to fuel lines or a fuel spill. If so, try to repair the lines and do what you can to clean up any spilled fuel. Do your best to avoid creating any sparks that might ignite spilled fuel.

Propeller strikes

Propeller strikes can cause terrible, damaging injuries. A typical recreational boat propeller can travel from head to toe on an average person in less than one tenth of a second. With care, you can avoid propeller injuries. If your boat has an engine cut-off switch lanyard, wear it at ALL times. If the lanyard is removed from the switch, the engine will shut off, reducing the risk of injury. Be very careful to ensure that water skiers are away from the stern before starting the boat's engine. Assign someone to keep track of the skier's location and make sure the skier is well away from the boat before giving the operator the signal to start. Consider installing a propeller guard, a safety device that surrounds the propeller for your boat. Check over the stern before starting your boat to make sure there's no one in the water. This is especially important if you're in a slip in a marina. Keep a constant lookout for swimmers in the water. Never let anyone exit or board your boat if the key is in the ignition. Even when idling, the prop can spin.

Fires

A fire on a vessel is a serious matter. Unlike a fire on land the vessel's occupants cannot simply evacuate the building and stand clear until the local fire department arrives and puts out the fire. On a vessel the fire must be extinguished or people will end up in the water where the danger of drowning or death by hypothermia exists. If a fire occurs aboard a public vessel it must be attacked quickly, aggressively, and effectively. If not, it will spread rapidly and get out of control, endangering everyone on board. While speed is critical to gaining control of a fire, it does no good if the fire is attacked with the wrong agent or using poor techniques. This section will provide a basic understanding of the tools and techniques needed to effectively extinguish a fire.

FIRE PREVENTION

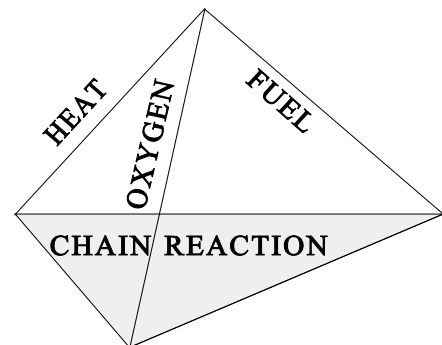
The federal government, through the U.S. Coast Guard, has enacted several regulations that govern the construction of recreational and commercial vessels. Most of these regulations were specifically designed to prevent fires and explosions aboard boats. They cover the installation of fuel systems, electrical systems, ventilation of engine and fuel tank compartments, back fire flame arrestors on gasoline engines and the installation of ignition protected electrical components. The net result is that most vessels are relatively safe when they leave the factory. It is the responsibility of public vessel owners and operators to ensure their vessel remains safe to carry passengers. The best way to keep a vessel safe from the dangers of an onboard fire is to prevent a fire from occurring in the first place. Preventing fires is not really that difficult. It only requires awareness of the causes of fire, attentiveness to recognize the hazards and action to eliminate them.

NATURE AND CHEMISTRY OF FIRE

As defined above, fire is a chemical reaction. Fire may also be referred to as combustion. Controlled combustion can be very useful. It is used in stoves to cook food and in furnaces to heat homes. It is also the process by which engines operate. When a fire is not controlled it can be destructive and deadly.

In order for a fire to occur, all four of the following elements must be present:

- Fuel (any combustible or flammable material)
- Oxygen (21% of the atmosphere)
- Heat (initially from an ignition source)
- Chemical Chain Reaction (reaction generates enough heat to become self-sustaining)



A four sided pyramid shape called the fire tetrahedron graphically represents this method of explaining fire. Its base represents the chemical chain reaction that sustains combustion. The three sides represent the three other elements necessary for combustion to take place. Fire

cannot exist or start if one of these four is missing. (As discussed in the section covering Backfire Flame Arrestors) Once started, a fire will grow in size and intensity at an increasing rate as long as all four elements are available. In order to extinguish a fire one or more of the elements represented by the tetrahedron's sides must be removed.

The following measures should be taken to prevent these fires from occurring:

Observe proper fueling practices: The potential for fire or explosion aboard a boat is greatest when taking on fuel. Observing the procedures listed in the fuel systems section of this guide will significantly reduce this risk.

Properly maintain equipment: Poorly maintained engines that leak fuel or oil greatly increase the risk of fire or explosion. A fuel leak from a fuel line under pressure will create an atomized spray that readily mixes with air. A backfire flame arrester that is dirty or damaged may not function properly and permit flammable vapors in the engine space to ignite.

Use proper ventilation procedures before starting gasoline engines: Always run the exhaust blower for at least four minutes prior to starting the engine.

Use good housekeeping practices: Keep bilges clean and free of oil. Wipe up fuel or oil spills immediately.

SPONTANEOUS IGNITION

Spontaneous ignition is a phenomenon that under the right conditions many common materials may cause a fire without an ignition source. An example of spontaneous ignition that could occur aboard a vessel might be a rag that has been used to wipe up oil or oil based paint that has been discarded in the corner of a work area, engine space, or storage area where it is warm and there is little ventilation. The oil on the rag will begin to oxidize or chemically react with the surrounding air. Oxidation is a natural process that produces heat. The heat causes the remaining oil to oxidize faster which in turn produces more heat. If there is no ventilation to dissipate the heat it will increase around the rag. Eventually, the rag may become hot enough to burst into flames and ignite any flammable materials nearby. Good housekeeping and proper disposal of materials subject to this phenomenon is the best way to prevent a fire from occurring.

ELECTRICAL HAZARDS

Electricity is a safe and convenient source of power for essential equipment and many conveniences aboard a vessel. As a vessel ages, worn, misused, or poorly wired electrical components may create a fire hazard in the form of heat or a spark. To avoid this hazard, the following practices should be observed:

Only use electrical components designed for the marine environment: Electrical components that are installed in engine or fuel tank compartments must be ignition protected.

Don't "jury-rig" or overload electrical circuits: Poor or loose electrical connections can cause overheating and sparking which could ignite the wire insulation or nearby flammable materials.

Newly installed equipment must be properly wired and connected in accordance with accepted standards.

Multiple appliances or equipment should not share a single outlet or circuit through the use of power strips and similar devices. This will overload a circuit that could generate enough heat to cause a fire.

A light bulb that is accidentally broken while energized will create a spark that could ignite any flammable vapors present. For this reason, all light bulbs on public vessels must have a cover to prevent material from contacting the bulb. In spaces where flammable vapors may be present, a glass globe and metal cage is required to prevent breakage of the bulb.

TYPES OF FIRES

Class A fires are fires of organic materials that leave an ash, like wood, paper, cloth, fiber rope, etc. You can fight this type of fire using any type of extinguisher. Always follow up by dousing the burning material with water to prevent re-ignition.

Class B fires are burning liquids, like fuel and oil, and generally occur in the bilge. Carbon dioxide or dry chemical extinguishers work best on these fires. You should never use water; dousing a class B fire with water

will spread the fire rather than extinguish it.

Class C fires carry a current; they happen when live, energized electrical wiring or equipment ignites. Using a carbon dioxide extinguisher is best, as it will cause the least damage to the energized electrical gear. Dry chemical is effective for extinguishing these fires, but leaves a residue. You should never use water around electrical equipment; it will conduct electricity and can electrocute you and your passengers.

Fire Extinguishers

Fire extinguishers pose the first, and sometimes only, line of defense against fires on most recreational boats. As discussed earlier, you must carry a fire extinguisher as required by law, and carrying more than one so that you have a spare extinguisher is always a wise decision. Make sure your equipment is in working order and maintained according to the manufacturer's instructions. Check your extinguishers frequently to ensure they carry a full charge and that the nozzle is clear of debris. Mount fire extinguishers in a readily accessible location, ideally near the operator.

FIRE EXTINGUISHING AGENTS

An extinguishing agent is a substance that will put out a fire. Every extinguishing agent operates by attacking one or more sides of the fire tetrahedron. The specific actions involved are the following:

Cooling: Reduces the temperature of the fuel below its ignition temperature. This is a direct attack on the heat side of the fire tetrahedron.

Smothering: Separates the fuel from the oxygen. This can be considered as an attack on the edge of the fire tetrahedron where the fuel and oxygen sides meet.

Oxygen dilution: Reduces the amount of available oxygen below that needed to sustain combustion. This is an attack on the oxygen side of the tetrahedron.

Chain breaking: Disrupts the chemical process that sustains the fire. This attacks the chemical chain reaction base of the fire tetrahedron.

WATER

Water is the best means of extinguishing a class A fire. Water extinguishes a fire by cooling. It soaks and cools the burning material and is more effective than any other extinguishing agent at absorbing the heat produced by the fire. Obviously, the supply of water available to fight a fire on a vessel is unlimited.

Water is the best means of extinguishing a class A fire. A hose with a nozzle that can produce both a spray and a straight stream of water is ideal. The fire can be approached using the spray on the flames. This provides a greater cooling effect than a straight stream because the fine droplets quickly absorb heat and turn to steam. Once the flames have been knocked down, the straight stream can be used to break up the burning material and cool the embers.

A water spray can also be effective against class B fires. A straight stream of water should **NEVER** be used on a class B fire. It will cause the burning liquid splatter and spread. **WATER POSES AN ELECTRICAL SHOCK HAZARD WHEN USE ON A FIRE; BE CAREFUL WHERE YOU USE IT.**

CARBON DIOXIDE (CO₂)

Carbon dioxide extinguishes fire by smothering it. It is a colorless, odorless gas that does not support combustion. Carbon dioxide is about 1.5 times heavier than air. It blankets the fire and dilutes the surrounding air until the oxygen content is too low to support combustion. Although this property makes CO₂ an effective extinguishing agent, it can create a suffocation hazard to personnel if used in a confined area.

Carbon dioxide is most effective when discharged into a confined space where it can't be easily dissipated by air movement or from spreading out over a large area. It works very well in fixed extinguishing systems used in enclosed engine spaces because it can flood the compartment and completely displace the oxygen. When fighting a fire topside, or other open area, the vessel should be maneuvered to minimize the wind. The fire should be approached from upwind so that the CO₂ drifts over the fire.

Carbon dioxide is effective on class B fires and is also an excellent choice for extinguishing class C fires because it is not conductive and does not leave a residue that may damage electrical equipment. CO₂ may be used to initially extinguish a class A fire but should be followed up by soaking the burning material with water to cool any "hot spots" which could cause it to re-ignite.

DRY CHEMICAL

Dry chemical agents extinguish a fire by interrupting the chemical chain reaction. These extinguishers contain alkaline-based powdered chemical agents combined with other chemicals that allow them to flow freely when discharged. When discharged, the chemicals form a dense powder fog that quickly covers the burning material.

Dry chemical agents leave a residue which, when combined with the abundant moisture in the marine environment, may have a corrosive effect on machinery or electrical equipment. They are considered non-toxic but a dense cloud of the agents may cause breathing difficulties. The agents may also be irritating to the moist tissues of the lungs, mouth, nose and eyes.

Dry chemical agents are very effective on class B and C fires. They are the best choice for class B fires because they settle on the surface of the burning liquid and are not easily dissipated like carbon dioxide. Their use on class C fires is less desirable than CO₂ because of the corrosive and insulating effect on the equipment.

When using this agent on a large or deep-seated class A fire it is best to follow up with water to ensure re-ignition does not occur.

LIQUID CHEMICAL EXTINGUISHING AGENTS

Clean Agents quickly blanket and extinguish the fire by interrupting or breaking the chemical chain reaction. It is capable of penetrating difficult to see and hard to reach areas. It leaves no residue after discharge and won't damage electrical equipment. Clean Agents are more effective than carbon dioxide.

Clean Agents fall into two categories, halocarbons and inert agents. Both types of agents are designed for use in portable extinguishers and fixed extinguishing systems.

Halocarbons are chemical compounds primarily extinguish a fire by cooling it at the molecular level. There is also a secondary effect on the chemical chain reaction.

An inert gas agent extinguishes a fire by creating an inert atmosphere and reducing the oxygen level in the space below the level necessary to sustain combustion. In this regard, they are similar to carbon dioxide and pose the same asphyxiation hazard in confined spaces.

The properties of liquid extinguishing agents vary but most are design to be very effective against Class B and C fires. Some may also be effective on Class-A fires but, like dry chemical agents, and CO₂, it should be followed up with water. Before using any liquid extinguishing agent aboard a Public Vessel check the label. Make sure it is Coast Guard or Underwriters Laboratories approved for marine use.

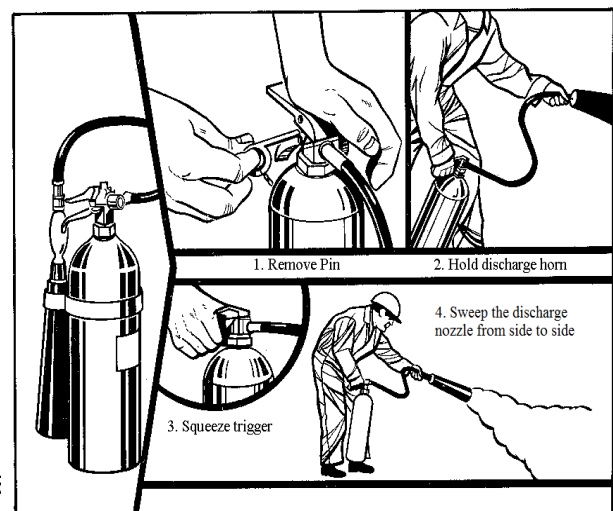
Discovering a Fire

If you have a fire on your boat, don your PFDs immediately if you're not wearing them already. They may not be accessible later, and they increase your chance of survival if you must abandon the boat. Try to position the boat so that the wind blows the fire away from the boat. Meanwhile, radio or call for help, and use your visual distress signals.

USING PORTABLE FIRE EXTINGUISHERS

A fully charged and well-maintained portable extinguisher is of little use if the operator or crew of the vessel does not know how to use it properly. The effective range and duration (continuous burst) of a portable fire extinguisher depends on the agent used and the size of the extinguisher.

The basic technique used for fighting a fire with a portable extinguisher, however, is the same regardless of the type or size used. If the fire is in a visible area of the boat use your extinguisher to fight the fire using the PASS method:



- P**ull the safety pin,
- A**im the nozzle at the base of the flames,
- S**queeze the handle in short (½ second) bursts, and
- S**weep the nozzle from side to side.

If the fire is in the engine compartment the operator should immediately shut off the engines, generators, and ventilation systems in the affected compartment. This will ensure that:

- Fresh air will not be sucked into the fire area thus feeding the fire more oxygen.
- If it is a fuel fire, more fuel will not be pumped into the fire.
- Firefighting agents being used to extinguish the fire are not vented to the atmosphere before they can be effective.

Keep the compartment shut. If you peek to check the compartment you invite fresh air (oxygen) back into the space which could allow for a re-flash. Have patience until you are sure the fire is out.

If the fire is out of control, abandon the boat. Get clear of the fire, but stay in the vicinity as it will help rescuers locate you. Make sure you and all your passengers have a PFD on before you enter the water

WHEN THE FIRE IS EXTINGUISHED

Provide assistance and emergency first aid to those passengers and crew in need of it. Next take any steps necessary to prevent a re-flash. If the fire was in an enclosed space protected by a fixed extinguishing system, the space should be kept tightly closed to prevent the escape of extinguishing agent and the entrance of fresh air until the area has cooled sufficiently (usually a minimum of 30 minutes). If the fire was a class A fire thoroughly soak the area with water. Only after the fire area has cooled, open all hatches and accesses and thoroughly ventilate the space to remove extinguishing agents and any flammable vapors that may be present. Now assess the damage to the vessel. If the vessel can be safely operated, return to shore as soon as possible. If the vessel cannot be safely operated, anchor and radio for assistance or use a visual distress signal to get help.

Carbon Monoxide (not Carbon Dioxide, CO2)

Carbon monoxide (CO) is a colorless, odorless, and tasteless gas that readily mixes in air. It is produced when there is an incomplete combustion of a carbon-based fuel such as gasoline, propane, charcoal, or oil. Sources of CO on your boat may include engines, gas generators, cooking ranges, and space and water heaters. Carbon monoxide can accumulate anywhere in or around your boat. Be aware that CO can remain in or around your boat at dangerous levels even if your engine is no longer running!

Carbon monoxide (CO) enters your bloodstream through the lungs, blocking the oxygen your body needs. Prolonged exposure to low concentrations or very quick exposure to high concentrations can kill you. Early symptoms of CO poisoning include irritated eyes, headache, nausea, weakness, and dizziness. CO poisoning is often confused with seasickness or intoxication, so those affected may not receive the medical attention they need.

"Station wagon effect" or back drafting.



Another vessel's exhaust.
CO from the boat docked next to you, or while you are idling at the dock



EMERGENCY TREATMENT FOR CO POISONING

CO poisoning or toxicity is a life-threatening emergency that requires immediate action. The following is a list of things that should be done if CO poisoning is suspected. Evaluate the situation and ventilate the area if possible.

- Observe the victim(s).
- Administer oxygen, if available.
- Contact medical help. If the victim is not breathing, perform rescue breathing or approved cardiopulmonary resuscitation (CPR), as appropriate, until medical help arrives. Prompt action can mean the difference between life and death.
- Shut off potential sources of CO, if possible. Evacuate and ventilate the area.
- Treat symptoms of seasickness as possible CO poisoning. Get the person into fresh air immediately. Seek medical attention-unless you're sure it's not CO.
- Never sit, teak surf, or hang on the back deck or swim platform while the engines are running. Teak surfing is NEVER a safe activity.
- Never enter areas under swim platforms where exhaust outlets are located unless the area has been properly ventilated.
- If swimming from your vessel, stay well clear of exhaust areas and ensure that your engine and generators are off.
- When docked, or rafted with another boat, be aware of exhaust emissions from the other boat.

Never allow anyone to hold on to the swim platform while the boat is in motion! This practice, called “teak surfing” or “platform dragging,” puts the person at risk for CO poisoning, propeller injury, and drowning.

SHOCK

Shock is a condition that may be brought on by severe injuries, cold water immersion, trauma, or lack of oxygen. Symptoms of shock include pale or bluish skin that is cold to the touch. This is especially notable on the inside of the mouth and lips, under the eyelids, and at the fingernails. The skin may be moist and clammy. The victim is weak and the pulse is usually rapid and weak. The victim's breathing may be shallow and rapid or deep and irregular. As shock progresses the victim may become apathetic and unresponsive (or slow). The victim may have a vacant expression on his face and the pupils will be dilated (large). The victim will eventually lose consciousness.

Treatment for shock includes getting the victim to lie down, elevating the feet, and keeping them warm. The main objectives are to improve blood circulation, ensure adequate oxygen supply, and to maintain body temperature. Medical attention should be obtained as soon as possible.

EMERGENCY RESPONSE PLAN

An emergency response plan should be implemented so that in the case of an emergency no time is lost in providing any needed medical care. This plan need not be lengthy in detail but should include as many emergency response teams and local law enforcement agencies as possible. A copy of this plan should be on board at all times, and a copy given to each organization involved.

An emergency response plan should have the following:

- a) A listing of phone numbers for:
 - 1) Vessel's Owner/Operator
 - 2) Ambulance Squads in Localities
 - 3) Fire Departments
 - 4) Local Marine Patrols/Law Enforcement Agencies
 - 5) Hospitals
- b) A listing of radio channels and call signs of (2) thru (5) above.
- c) A listing of locations with directions where your vessel can land along its route if the need arises for passengers to be evacuated.
- d) A chart showing locations of possible landing sites showing all major and minor roads leading to and from landing sites.



APPLICATION FOR CERTIFICATION OF A PUBLIC VESSEL

Name of Public Vessel Operation	
Name and Address of Owner	Winter Address of Owner
Street Address	Street Address
City, State Zip	City, State Zip
Phone Number	Phone Number
Fax Number	Fax Number
Website	Email Address

What bodies of water are you operating on?		Location of your boat for the inspection	
Type of Service: <input type="checkbox"/> Passenger <input type="checkbox"/> Dining <input type="checkbox"/> Mail <input type="checkbox"/> Skiing <input type="checkbox"/> Fishing <input type="checkbox"/> Other _____		Vessel Name	
Registration Number	Vessel Manufacturer		
Hull Number (12 Characters)	Hull Material: <input type="checkbox"/> Wood <input type="checkbox"/> Steel <input type="checkbox"/> Aluminum <input type="checkbox"/> Fiberglass <input type="checkbox"/> Other, explain		
Engine Manufacturer	Color	Year Built	
No. of Engines	Length ft.	Weight lbs.	
Engine No. 1	Horsepower	Engine No. 2	Horsepower
Fuel: <input type="checkbox"/> Steam <input type="checkbox"/> Gas <input type="checkbox"/> Diesel <input type="checkbox"/> Electric	Fuel Tank Capacity		
Fuel Tank Material <input type="checkbox"/> Plastic or <input type="checkbox"/> Metal	If Twin Tanks: Port::____Gals Stbd:____Gals		
Type of Propulsion <input type="checkbox"/> Outboard <input type="checkbox"/> Jet Pump <input type="checkbox"/> Sail Auxiliary <input type="checkbox"/> Inboard <input type="checkbox"/> I/O <input type="checkbox"/> Paddle Wheel		<p>The manufacturer of a boat 20 feet and less is required to affix a capacity plate to each vessel they produce. Many manufacturers over 20 feet will affix the same type of plate.</p> <p>The capacity place looks like this:</p> <div style="border: 1px solid black; padding: 5px; text-align: center;"> <p>MAXIMUM CAPACITIES</p> <p>7 PERSONS OR 1050 LBS.</p> <p>1400 LBS. PERSONS, MOTORS, GEAR</p> <p>130 H.P. MOTOR</p> <p>THIS BOAT COMPLIES WITH U.S. COASTGUARD SAFETY STANDARDS IN EFFECT ON THE DATE OF CERTIFICATION</p> <p>ABC BOATS XYZ MANUFACTURING, INC. ANYWHERE, USA 99999</p> </div> <p>If your boat has a capacity plate, fill in the blanks</p> <p>_____ below. persons or __ lbs.</p> <p>_____ lbs. persons, motor, gear</p> <p>_____ H. P. motor</p>	

New York State Office of Parks, Recreation and Historic Preservation
Marine Services Bureau

Albany NY 12238

Remarks: _____

I hereby apply for a certificate of Inspection to operate the public vessel described above. I certify that I am familiar with the provisions of the New York State Navigation Law, that I consider my vessel to be safe in every respect and that the foregoing information is true and correct to the best of my knowledge.

Date _____ Signature of Owner _____

INFORMATION AND INSTRUCTIONS

The Marine Services Bureau cannot schedule an inspection of this boat until this form is received. Please send the completed form ASAP so that you can be placed in the inspection schedule.

Complete all applicable sections of this form and be sure it is signed by the owner.

Mail the application to:
 NYS Parks
 Marine Services Bureau
 Albany, NY 12238

Do not send any money with this application. Fees will be collected on the day of inspection.

Notification of date, place and approximate time of inspection will be sent to the public vessel owner.

<u>For Office Use Only:</u>	
Capacity Granted	_____
Date	_____
Initials	_____

<p>HOW MANY PEOPLE WILL MY BOAT BE ABLE TO CARRY? .</p> <p>NYS Parks uses 174 lbs per person.</p> <p>To figure the number of persons your boat can carry you need to divide the total weight capacity on the capacity plate by 174lbs and round down. This will be your maximum capacity unless it exceeds the max person capacity on the plate. If the number exceeds the person capacity on the plate we will use the lower number.</p> <p>.Example from the plate on the front of this application: 7 persons or 1050lbs</p> <p>$1050/174 = 6.03$ persons</p> <p>This office will round down this number to 6 persons for safety purposes. This boat would be rated at 1 operator and 5 passengers.</p>

USE ONLY COAST GUARD APPROVED EQUIPMENT
 Avoid costly mistakes and purchase the CORRECT type of equipment.

Contact the Marine Services Unit at (518)474-0445 if you have any questions.

INSPECTION CRITERIA

This is a list of items that will be checked at the time of inspection. This is not a complete list but rather an overview of what the marine inspectors will be looking for.

Adult & Child PFDs: Not in original plastic bags. No rips or tears, straps and buckles in place. PFDs stowed within easy reach. If PFDs have bags of kapok, when squeezed the bags do not lose air

Anchor Line: suitable sized anchor with line attached. Line should be of sufficient length for the body of water, free of knots, tangles and not frayed.

Backfire Flame Arrestor: attached tightly to the carburetor, no bent vanes, clean to the touch.

Battery: Strapped down, at least the positive terminal is covered and compartment vented.

Bell: required on boats over 65 feet. Must be mounted, able to be rung from the operating station and make a clear bell like sound.

Bilge System: when operated water is discharged over the side.

Bilge: Have bilges clean, inspector will operate the bilge pump and oil shall not be discharged into the lake.

Electrical System: Marine wire used, no wire nuts, unused wiring removed. All circuits run through a main panel and overcurrent protection [fuses] used. Grounds run through the DC negative bus or the engines negative terminal. All wiring supported every 18 inches.

Engine: clean, hoses not crimped collapsed or cracked

Engine Control and Steering: throttle moves forward and reverse smoothly. Steering wheel turns smooth and free. Rudder turns in response to the wheel. Hydraulic lines and rams do not leak. All equipment properly mounted and supported.

Equipment Marked: all required safety equipment is marked with owners' name, vessel's name or registration number.

Fixed Fire System: Mounted high in compartment, vial or metal link intact; if equipped with a gauge the needle must be in the green.

Fuel Lines: supported, tight connections, no cracks or split flexible hose, properly clamped. Clamps are made or

Horn: Air horn assembled and canister charged and clear sound produced. Electrical connections in good shape, clear sound produced when switched turned on. Mouth whistles not allowed.

Hull: no visible cracks or holes, decks supported.

Navigation Lights: Lights show bright when switch is turned on. Anchor light shows separately from masthead and stern light configuration.

Portable Fire Extinguisher: Mounted in bracket, nozzle clear, hose attached and not cracked; if equipped with a gauge the needle is in the green area

PV Displayed: the letters PV are at least 5" in height and located above or below the registration number.

Registration Number is permanently attached on each side of the bow, with the validation decal to the stern of the number.

Registration: current registration certificate is on board

*Seating: seating is adequately supported, 18" of continuous seating for each passenger onboard
Type IV PFD: in good shape, USCG Approved, grab ropes or straps intact.*

Ventilation Blower: Mounted in the engine compartment space, marine rated, exhaust not blows air into engine compartment, duct connected to exhaust side of blower.

Ventilation Ducts: Attached to exhaust cowlings, not collapsed, split, cracked, clear of debris and water and terminates above bilge water.

Visual Distress Signals: Three flares in good shape, dry, label intact, and past expiration not expired. For Day time use only vessels, orange flag a minimum of 3 ft. by 3 ft.

For vessels over 10 passengers

Communication: VHF Radio or cell phone on board and operational.

For vessels over 20 passengers:

Communication: VHF Radio or cell phone on board and operational.

Logbook, Emergency Response Plan, Station Bill, Pre-departure Script

For vessels over 65 passengers:

Communication: VHF Radio or cell phone on board and operational.

Logbook, Emergency Response Plan, Station Bill, Pre-departure Script

Radar

For vessels over 100 passengers

Communication: VHF Radio or cell phone on board and operational.

Logbook, Emergency Response Plan, Station Bill, Pre-departure Script

Fire Pump

Top 10 Deficiencies Found During Public Vessel Inspections

1. Place the letters PV on each side of the bow.

Public Vessels are required to be identified by the letters "PV". These letters are to be 5 inches in height and placed either above or below. The letters are to be permanent and a contrasting color to the hull.

Marine Services Bureau may have the letters for those boats that do not have them.

PV

2. Place additional adult Type I PFDs on board.

You are required to have enough adult type I PFDs for the number of people your boat is rated for, including the operator and crew. You are also to have 1 child type I PFD for every 10 adult PFDs. If you have 20 adults PFDs you will need 2 child's PFDs.

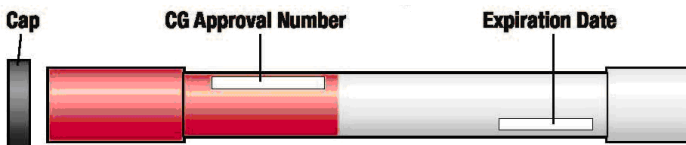


3. Strap battery down.

A battery has to be strapped down or placed in a box securely fixed to the deck. The battery should not be able to move more than 1 inch in any direction. The positive terminal must be covered. The wires must be connected to the terminals with a standard hex bolt, not a wing nut or a spring clamp. Battery chargers may not use spring clips to the battery terminals. A battery shall not be placed within 12 inches of any metallic fuel line. The only exception to this rule is a fuel line that is shielded; a battery cover is not a shield since it is removable.

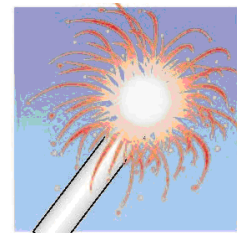


4. Replace visual distress signals

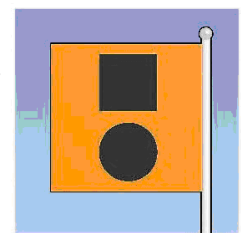


Hand-Held Flare

All vessels, pleasure and public, must carry visual distress signals when they are under way. If the boat is used only during the day, an orange flag that measures 3 square feet with a black square and black circle will suffice. If you operate at night, in the early morning, evening dusk or periods of poor visibility you must have nighttime distress signals. In most cases PV operators use 3 hand held or aerial flares. Flares have a 3 ½ year shelf life, check your flares before your inspection, if they are due to expire during the summer purchase a new set before your inspection.



Red Hand-Held Flare



3' X 3' Distress Flag

5. Original registration certificate not on board

All mechanically propelled vessels must carry a current original vessel registration. The law does not allow for copies of the certificate to be carried.



6. Gas tank, gas lines not accessible

All gas lines and tanks must be made accessible for inspection each year. The inspection starts at the gas fill cap and terminates at the engine. You will have to show that there are two clamps on the fuel fill line at the fill and at the tank. This hose may not be cracked or kinked. There must be a ground wire from the fill to the tank that is continued to the DC grounding bus or the negative terminal on the engine. A brown stain on the underside of a gas line may be a sign of a hose ready to fail.

7. Bilge pump not operating

All public vessels, except for most pontoon boats, are required to carry a bilge pump. For small vessels this can be accomplished with a hand operated pump. All other vessels are required to have a powered operated pump. Check your pump before the inspection, make sure that it turns on and can pump water over the side. If there is a float switch, make sure that it is able to turn the pump on. Make sure that the intake is not clogged with debris or any of the hoses are collapsed.



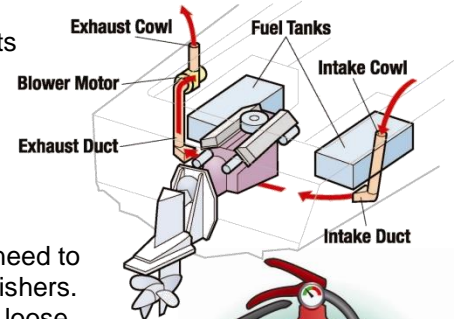
8. Navigation lights do not work

Check all lights and make sure they work before the inspection. If they worked in the morning when you showed up and do not work for the inspection, you probably have a problem with the wiring harness and/or the light fixture. If you do not operate at night let the inspector know so that an operation exception will be noted on your Certificate of Inspection.



9. Ventilation system need repair.

Ventilation ducts need to be attached to the intake or exhaust cowling. Ducts may not be crushed, kinked, or torn. Exhaust blowers must work, if the flow out the exhaust cowling is not felt, check that the fan is turning in the right direction and that the duct is not clogged, has a mouse nest or filled with water.



10. Not enough fire extinguishers

The Certificate of Inspection for your boat will tell you the number that you need to carry. The inspector will visually and physically inspect your portable fire extinguishers. A dry chemical extinguisher will be turned upside-down to see that the powder is loose, the gauge, hose and nozzle will be checked. Portable extinguishers must be mounted in order to be counted. Fixed fire extinguisher systems must be accessible for a visual inspection. Fixed canisters should be weighed each year to ensure the proper amount of agent is available.



Differences between the information presented in your boating education class and the material in the public vessel operator's guide.

Personal Floatation Devices [PFD]

In your boating class you were taught that you would only need a type I, II, III or V USCG approved for each person on board. As a public vessel operator you must carry one adult type I PFD for each person listed on the vessel's Certificate of Inspection. If your vessel is used exclusively for water skiing you may ask for an exemption to carry type III PFDs if they are worn by everyone onboard including the operator.

In general a boat over 16 feet will require a type IV [throwable] PFD. A public vessel of any length must carry a type IV PFD. Depending upon the size of the boat and the number of passengers it may be required to carry more than one type IV PFD.

Fire Extinguishers

On your personal inboard boat you may carry a fixed fire extinguisher but on a public vessel it is required in the engine compartment of all inboard boats no matter what type of fuel is used.

Bilge Pump

There is no carriage requirement for a bilge pump on a personal boat. On a public vessel a hand pump capable of 5 gpm is required on board boats up to 26 feet in length and a mechanical pump on all others. In most cases boats less than 26 ft. carry a mechanical pump. A bucket is not considered a hand pump.

Horn

Most boats other than open boats come with a mechanical horn mounted on the steering console. The regulation for a pleasure vessel under 39 feet is a horn or a mouth whistle. On a public vessel a mechanical horn is required regardless of length; a mouth whistle is not an option.

Capacity Plate

A public vessel operator must not carry more than the amount stated on the vessel's Certificate of inspection. The manufacturer's capacity plate is taken into consideration in determining the number of people that may be carried.

BWI

As a licensed operator you held to a higher standard and are required to operate with a BAC less than .04%.

Paperwork

In addition to the registration certificate that all boaters must carry you must carry your Public Vessel Operator' License and the vessel's Certificate of Inspection.

The requirements outlined in this manual are based on federal and state regulations and industry standards. This office relies on three national organizations when making regulations for safe boat operations.

The United States Coast Guard (USCG) regulates the construction and inspections of commercial vessel, domestic and foreign on the waters of federal jurisdiction. The USCG regulations are within the Code of Federal Regulations (CFR). Title 33, Subchapter S discusses small boat manufacturing; Title 46 CFR regulates the construction, inspection and operation of commercial boats on waters of federal jurisdiction. The regulations can be found on line at:

<http://law.justia.com/cfr/title33.html> and <http://law.justia.com/cfr/title46.html>

The American Boat and Yacht Council (ABYC) is a not for profit organization that develops safety standards for the design, construction, repair and maintenance of recreational boats. ABYC provide basic marine electrical and boat systems classes for the general boat owner wanting to know more about their boat. They also have classes for professional boat builders and boat mechanics. Their website is www.abycinc.org.

The National Fire Protection Association (NFPA) is charged with creating and maintaining minimum standards and requirements for fire prevention and suppression activities, training, and equipment. The Marine Services Bureau reviews the following NFPA standards:

NFPA 10, Standard for Portable Fire Extinguishers

NFPA 302, Fire Protection Standards for Pleasure and Commercial Motor craft

NFPA 306, Standard for the Control of Gas Hazards on Vessels

NFPA 2001, Standard for Clean Agent Fire Extinguishing Systems

Their website is www.nfpa.org.

The Marine Services Bureau has a copy of these standards for your reference.

For more information

This manual is intended to be a study guide for you to attain a passing grade on the public vessel operator's licensing exam. This manual contains the basic information for operation, systems and maintenance of a boat. The only way to become a more knowledgeable operator you must find information beyond the boating safety course that you were required to take and this manual. Here are some options that you might pursue.

United States Coast Guard Auxiliary (USCGA) and the United States Power Squadron (USPS) provide higher level of classes beyond the basic boating safety courses. For list of the classes and when and where they may be held you need to go to their websites.

USCGA www.cgaux.org, USPS www.USPS.org.

On our book shelf

- Chapman Piloting & Seamanship, Charles Husick
- Boat Mechanical Systems Handbook: How to Design, Install, and Recognize Proper Systems in Boats
Dave Gerr
- Boatowner's Mechanical and Electrical Manual, Nigel Calder
- Boat Builders Handbook, USCG only available on line
http://www.uscgboating.org/regulations/boat_builders_handbook_and_regulations.aspx

CHAPTER REVIEW

PUBLIC VESSEL LAW

Describe what a Public Vessel Operator must do:

- For a vessel inspection
- About deficiencies and failures?
- What repairs must be made to a boat?
- What an operator must do when a modification is made to a PV?

Describe the licensing requirements for a Public Vessel Operator

- Original license,
- Renewal license and
- Suspension of license

What is the difference between a Joint P&E, Engineer, Apprentice and Masters License?

REGISTRATION

What boats need to be registered?

Describe the display of registration numbers

How can you tell which boat is a Public Vessel?

BOAT AND MOTORS

Know boat terminology

BOAT HANDLING

How does a propeller work?

What is pitch?

What does slip and cavitation do to affect the speed of the vessel?

What is the primary job of the rudder?

What happens to the vessel when you go forward or back without a rudder?

What is the difference between single and twin screw?

How do the wind, sea conditions and current affect the boat?

What portion of the boat is affected by wind and current?

What are the proper docking procedures?

How do you anchor a boat?

How do you moor a boat?

EQUIPMENT

What equipment is USCG Approved?

What does "Accessible" mean?

What are the 5 types of personal flotation devices (PFDs)?

What is the difference between a type IV PFD and the other types of PFDs?

What is the PFD carriage requirement for a public vessel?

What is VDS?

What do you have to carry on a public vessel?

What is an anchor rode and how long should it be?

What type of horn/whistle must be carried on a public vessel?

What is a Backfire Flame Arrestor (BFA)?

What type of Public Vessel must carry one?

Where is the bilge located?

What do you find in the bilge and why can it be hazardous?

What types of bilge pumps can you find on a boat?

What type of bilge pump is required on a Public Vessel?

What does a Marine Inspector look for when inspecting this equipment?

FUELING AND VENTILATION

What are the proper steps before, during and after fueling?

What types of flammable vapors are found on a boat?

What is Ventilation?

What is an open boat?

Which are hazardous and why?

When is power ventilation required?

When is powered ventilation not required?

What are the parts of a powered ventilation system?

When must you use power ventilation?

What must you do when you encounter strong odors of gas?

What maintenance needs to be done to a powered ventilation system?

Why is ignition protection important?

FUEL SYSTEMS

What is the difference between a permanent and a portable system?

What are the different parts of a fuel system and why each is important?

Why is the fuel system grounded?

How many and what type of clamps can be used on fuel connections

SAFE LOADING

Where do you find the number of people allowed on a public vessel?

What is the important difference about a water ski boat?

WEATHER

How does weather affect a boat?

What does a public vessel operator have to be vigilant about when it comes to weather?

Why is a shift in wind important to the vessel operator?

NAVIGATION RULES

Know and understand the definitions in this chapter.

When you need a lookout?

What is safe speed?

How to determine Risk of Collision?

What actions to avoid a collision?

Know what to do in each of these situations:

- Overtaking?
- Crossing?
- Head on?

How do you determine if you are the give-way or stand-on vessel in the above situations?

What actions can a give-way or stand-on vessel take in the above situations?

As a public vessel what types of vessels must you keep out of the way of?

Know your maneuvering and warning signals and how you would use them in the above situations.

What color lights do you see on a vessel?

Where on the boat is each light located?

BOAT OPERATION

What is reckless operation?

What is Boating While Intoxicated?

What constitutes an accident and what must a PV Operator to do?

NAVIGATION

What is a compass and how does it work?
Know the uniform State Waterways Marking System.
Buoy shapes, colors and lights
Channel markers
Regulatory Markers

PERSONAL WATERCRAFT

What is it and why is a PWC different than a boat?
Where can a PWC operate?
What equipment must a PWC carry as a public vessel?
What operations are unlawful?
What is meant by off throttle steering?

BOATING RELATED ACTIVITIES

What is the law regarding people engaged in water-skiing?
What is the water-ski team and what are their functions?
What equipment must be carried on a water-ski boat?
Know your hand signals
What do you need to look for on the water to know that a diver is in the area?
What special precautions must you take when you are tending a diver?

ACCIDENTS AND EMERGENCIES

When do you need to report an accident?
What do we mean by "aid in distress"?
Why is the fire triangle different from the fire tetrahedron?
What are the three classes of fire?
What are the four fire extinguishing agents and how do they attack a fire?
What are the carriage requirements for portable extinguishers?
How do you use a portable extinguisher?
What is a fixed fire extinguisher system?
What type of public vessel must carry a fixed system?
What are the hazards with each of the four extinguishers?
What is an emergency response plan?
What are the two dangers of a man overboard?
What response do you take in a man overboard situation?

- Initial response
- Recovery maneuvers
- Recovery

What steps are taken by a public vessel operator when encountering a fire onboard?

Directions and Contact Information

Directions to Marine Services Bureau, Office of Parks, Recreation, and Historic preservation (OPRHP)

The OPRHP Headquarters is located in downtown Albany at 625 Broadway, between Orange and Columbia Streets, with easy access from Interstate highways I-787 and I-90. Inside access to the building is restricted to employees, their invited guests, and attendees at public meetings. Visitors will need to register at one of the two security desks (located at the front and rear entrances to the building) upon arrival.



You must contact this office at least 48 hours prior to arriving at 626 Broadway.

Driving Directions

From southbound I-787, take the Colonie Street exit, go straight through the first traffic light and continue on the Water Street overpass, then turn right onto Orange Street. The building will be on your left. There is a public parking garage on your right, and metered parking and a pay lot located on Broadway.

From northbound I-787, take exit 4 (Downtown Albany, Route 9 North), proceed north on Quay Street (Corning Preserve access road), stay in the right lane and follow signs for Colonie Street. Turn left at the traffic light at Water Street, continue on the Water Street overpass, then turn right onto Orange Street. The building will be on your left. There is a public parking garage on your right, and metered parking and a pay lot located on Broadway.

From I-90, take the exit for I-787 south, and follow the directions above.

From the New York State Thruway, take exit 23 to I-787 north, and follow the directions above.

Area Parking

The parking garage behind 625 Broadway does not have any public parking spaces. Public parking is available for a fee at a number of nearby lots, including the Quackenbush Square Garage on Orange Street, right across from 625 Broadway. Metered parking is also available on most nearby streets. Maps, rates, and garage contact information are available on the [Albany Parking Authority](#) website (see link in right column). The blue arrows on the map show a bus line.

Examination dates and times

From May 1 through September 1 written exams will be given at the offices of the Marine Services Bureau on Tuesdays and Thursdays at 10AM and 2 PM. At other times of the year the test may be given any day at 10 AM or 2 PM. Applicants shall give at least a two day notice prior to the date they want to take an exam. Names of all applicants must be given so that the building security office can be notified of visitors that will need access to the second floor.

Do not arrive too early. If you are more than 10 minutes early please wait in the car or find something to do. We do not have a lounge where you can wait.

Contact Information

NYS Parks
Marine Services Bureau
Albany, NY 12238

518-474-0445

Email: nyspublicvessels@parks.ny.gov