This online study guide has been approved by Transport Canada strictly on the basis that it meets the requirements of the *Standard for Pleasure Craft Operator Testing over the Internet* (TP 15080E) and the *Boating Safety Course test and Syllabus* (TP 14932E). This approval does not represent confirmation of authorship by the course provider.

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Chapter 6

UNDERWAY

As the operator of a pleasure craft, there are several safety activities in which you should be engaged continuously when underway in order to ensure the safety of yourself, your passengers, and other users of the waterways. These activities include: knowing how to share the waterways with other users, staying clear of divers, maintaining a lookout, maintaining a safe speed, knowing how to use a compass to navigate, monitoring the weather, knowing the locations of local water hazards, and knowing how to tow safely.

The seven chapters of this study guide contain the information that you must know to pass a Transport Canada Boating Safety Test in order to obtain your Pleasure Craft Operator Card (PCOC).

This chapter contains the following sections:

6.1 DEPARTURE

If you have passengers with you, brief them on how to cast off the vessel and how to sit while the craft is moving. Remember that as you pull away from a dock the stern of your vessel will tend to swing in toward the dock as the bow swings away from the dock. Thus, before putting your engine into forward gear always push your boat away from the dock so that the stern is clear by at least one foot (0.33 metres) and the bow is further out from the dock than the stern.

In addition**, the stern of a boat will sit lower in the water when you start to move forward and there is therefore a chance that the propeller will strike bottom**. Thus, know the depth of water where you are operating. When leaving a dock, depart at slow speed, increasing your speed gradually as you move into deeper water. Remember that to make turns, you must turn the wheel more at slower speeds than you do at higher speeds.

A spinning propeller can kill or permanently mutilate or disfigure a person in the water. Motor and propeller strikes can be prevented easily by always adhering to the following safe boating practices:

- **Ensure that no-one is in the water near your boat before putting the motor in gear.**
- **Slow down in congested areas.**
- **Always be alert for the potential presence of swimmers and divers.**
- **Keep well outside of marked or known swimming and diving areas.**
- **Never start a boat motor while the motor is in gear.**
- **Make sure that all passengers are seated before getting underway**
- **Never allow passengers to sit on the bow, gunwales, stern, transom, or swim platform unless the motor is turned off and the boat is not moving.**
- **Never back up to pick up a person in the water.**
- **Never let a person board or de-board your vessel while the motor is running. Always turn off the motor when retrieving a person from the water (i.e.: turn the motor off; do not just take the motor out of gear).**
- **Assign a responsible adult to supervise any small children on board.**

Always remember that a boat does not have brakes and that it has to be moving in order to be steered. Give yourself plenty of separation distance between your vessel and others so that you have enough room (and time) to stop or turn in order to take evasive action to avoid a collision.

Keep away from designated swimming areas when boating; even a canoe or a kayak can injure a swimmer.

6.2 SHARING THE WATERWAYS

Never “buzz” other users of a waterway or try to use your pleasure craft to spray other vessels or swimmers. Some of the worst boating accidents occur when someone misjudges speed or distance while trying to spray somebody (usually a friend or relative) with their boat.

Other dangerous behaviours to avoid when sharing the waterways with other users include:

- Jumping the wakes of other vessels;
- Driving close to other vessels; or
- Crossing in front of other vessels.

The operator of a pleasure craft shall take the following actions when sharing the waterways with others:

1. **Stay well clear of swimmers, paddle craft, wildlife, and waterfront properties**
2. **Adjust your speed to reduce noise whenever possible so as not to be an irritant to other users or to waterfront residents.**
3. **Adjust the speed of your craft so that your wash and wake will not disturb others (such as swimmers and paddle craft), erode shorelines, disturb wildlife (such as nesting waterfowl), or damage property.** Follow the *Collision Regulations* requirements regarding maintaining a safe speed depending on visibility and water conditions;
4. **Know and comply with all boating restrictions (engine power limits, speed limits, etc.) in effect where you are operating**, and
5. Use courtesy and common sense so as not to create a hazard, a threat, a stress, or an irritant to others or to the environment.

To ensure that you can comply with the above restrictions, you should familiarise yourself thoroughly with the handling and manoeuvrability of your vessel so that you are better able to avoid a collision. Practice turning your craft at both low speeds and high speeds.

If your craft has a planing hull, familiarise yourself with how fast it must be going before it lifts out of the water and planes. Remember that a planing hull at low speed plows through the water like a displacement hull and can create a substantial wave (wake) capable of affecting swimmers and smaller craft like canoes and dinghies. A planing hull creates much less wake when it is planing on top of the water. **If the trim on your boat is adjustable, then you should adjust it so that the hull tilts up at approximately a 3-degree angle from the horizontal**.

6.3 STAYING CLEAR OF DIVERS

People in the water, such as swimmers can be difficult to spot from a moving pleasure craft. Special care must be taken to keep a proper lookout in waters frequented by divers. Thus, pleasure craft operators should be sure that they know what a “diver down” flag (International Code Flag “A”) looks like.

If a vessel is engaged in diving, it will indicate that it has a diver down by displaying the blue and white International Code Flag “A” (displayed at left), which means “I have a diver down: keep well clear and proceed at slow speed.” Under Rules 18 and 27 of the *Collision Regulations*, all pleasure craft operators are required to reduce speed and to steer well clear of any vessel displaying a “diver down” flag. Note also that a red and white flag from the *Private Buoy Regulations* is displayed on buoys deployed to mark areas where diving is in progress.

Please always keep in mind that it is easy for divers to stray from the immediate area of their diving buoy. Always exercise extreme care (i.e. **slow down**) in waters frequented by divers.

If you see either of the above flags, keep well clear of (at least 100 metres away from) the vessel or buoy marking the diving site, maintain a proper lookout, and proceed at slow speed.

Popular diving areas are not normally indicated on charts. If you are new to an area where diving is popular, you should inquire as to which areas are frequented by divers.

6.4 MAINTAINING A PROPER LOOKOUT

Under Rule 5 of the *Collision Regulations* **every operator of a pleasure craft shall at all times maintain a constant lookout for potential collision hazards and use sight and hearing to detect and avoid any risk of collision with another vessel**.

Whenever operating a vessel, **the operator will use any available means including sight, hearing, (and radar and radio if applicable) to make a full appraisal of whether a risk of collision exists.**

Maintaining a proper lookout requires that someone remain on deck at *all* times when a vessel is underway. A vessel is considered to be underway if it is moving (i.e.: a vessel adrift in a current is considered to be underway)

Besides looking for visual signs of danger, keeping a lookout also involves listening for signals from other vessels. **Be sure to use approved sound signalling devices to warn other vessels of your presence.**

The *Canada Shipping Act, 2001* requires that all operators of all pleasure craft must watch for signals that indicate distress and need of assistance.

6.5 MAINTAINING A SAFE SPEED

It is the responsibility of the operator to at all times proceed at a safe speed while underway.

According to Rule 8 of the *Collision Regulations*, a safe speed is defined as one that allows the operator enough time to take proper and effective action to avoid a collision.

Always remember:
Boats don't have brakes.

An operator must be able to stop his or her pleasure craft within a distance appropriate to the prevailing conditions to avoid a collision. To determine the safe speed for your vessel, you should take into account all of the following factors:

- **The state of visibility – poor visibility can occur due to fog, mist, rain, or darkness; all of which reduce the time one has to react to a hazard;**
- **Traffic density – note the number and types of vessels in your area, as well as their course, speed, and proximity;**
- **Wind, water conditions, and currents;**
- **The manoeuvrability of your vessel; and**
- **The proximity of any navigational hazards – note nearby hazards such as piers, docks, dams, or reefs**.

When you are not in sight of other vessels and you are in or near an area of restricted visibility, you must proceed at a safe speed adapted to those circumstances and conditions and signal your presence by sounding a combination of long- and short-blast sound signals using an approved sound signalling device or appliance.

Wind and water conditions (such as high waves and strong winds) can cause you to lose control of your vessel and increase the risk of injury or loss of life. **Always slow down in bad weather to ensure that you can maintain control of your pleasure craft**. Remember that at higher speeds, a boat needs a greater distance to stop. And because there is less time to react to changing conditions, the operator of the craft must be much more attentive.

Regardless of your speed, you are always responsible for the wake and wash created by your vessel. **You must at all times proceed with caution and at a speed such that wake and wash will not damage or adversely affect**: **other vessels, including anchored vessels, grounded vessels, dredges, and tows;**

- **Small vessels, such as rowboats, canoes, and kayaks;**
- **The shoreline (waves cause erosion of shorelines)**
- **Docks;**
- **Wetlands;**
- **Wildlife (such as nesting waterfowl);**
- **Swimmers or divers; and**
- **Bathing or anchorage areas**.

6.6 USING A COMPASS

A magnetic compass or a compass-bearing device is a navigational aid that can help a pleasure craft operator to determine directions (north, south, etc.), to take bearings on buoys or significant landmarks, as well as to determine a boat's heading (direction of travel).

A compass can be either hand-held or, on larger craft, permanently mounted at the steering station (binnacle) so that the helmsman can refer to it while steering along a bearing (direction of travel).

A compass can be invaluable in finding your way back to shore if visibility becomes reduced due to factors such as fog or mist. **All pleasure craft should carry a magnetic compass or compass bearing device, especially when operating in areas prone to fog and mist.**

Carrying a magnetic compass is not required for pleasure craft that are 8 m (26 ft.) or less in length when they are navigating within sight of seamarks. Pursuant to Section 215 of the *Small Vessel Regulations*, **all pleasure craft navigating outside of seamarks *must* carry a magnetic compass.** Vessels that are 12 m (39.4 ft.) or greater in length must carry a magnetic compass that meets *Navigation Safety Regulations*.

Any magnetic compass is affected by close-by metals, magnets, and electrical devices. Thus, anything with a magnet, including screwdrivers, flashlights, and audio speakers should be kept well away from a compass. All boat electrical wiring should also be kept away from a compass. A compass that is affected in this manner can easily provide false information.

6.7 MONITORING THE WEATHER

Once under way, remember to continue to keep an eye on the weather. Make sure that the conditions that you see match those predicted in weather forecasts for that day.

Summer thunderstorms can strike quickly and unexpectedly. **If the sky starts to look dark and cloudy and conditions are changing rapidly, then head for shore** (check your charts in advance to know where to seek shelter).

Other good indications of approaching bad weather are falling barometric pressure, increasing wind speed, and changes in wind direction (which generally lead to increased wave action).

Pleasure craft operators need to know how to get weather information updates while they are out on the water. This requires the knowledge and skill to use a marine radio. A receiver for continuous marine weather forecasts can be purchased at most marine supply outlets.

If you get caught out on the water in heavy weather such as a thunderstorm, reduce speed (so as to maintain control of your vessel) and head for the nearest shore that you can approach safely. Make sure that everybody on board dons his or her flotation device (PFD or lifejacket). Secure loose gear but have emergency gear (anchor, bailers, and paddles) ready for use.

If you get caught in a squall, make a note of your compass heading (so that you can return to your course later) and then alter course to point your vessel into the wind.

During heavy weather, try to keep your vessel on a course that poses the least risk of taking a wave onboard. If you must move in a direction that is downwind (such as to approach the nearest safe shore), then make sure that you do not go downwind directly. If you have an open cockpit and you move straight downwind, there is a risk that waves hitting the stern may flood over the transom and swamp your vessel. Thus, take a zigzag course when moving downwind so that you cross waves at a 45 degree angle and the waves do not strike directly against the stern.

6.8 LOCAL WATER HAZARDS

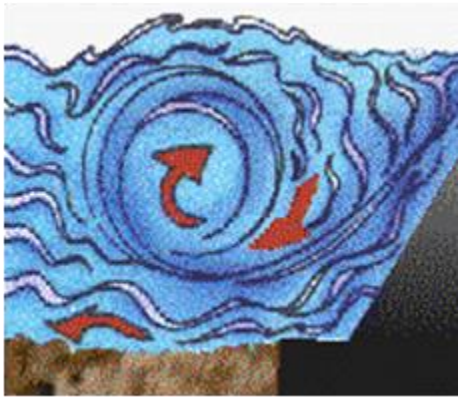
Local water hazards, which may impede the operation of a pleasure craft or increase the risk of injuries or loss of life to persons on board, can include: low-head dams, rapids, sudden winds, tides, currents, white water, overhead cables, bridges; or rapid build-up of high-wave conditions.

Being prepared goes beyond having your boat properly equipped and maintained. Before you travel in a new area, check your marine charts to determine whether you will encounter any overhead obstacles (such as bridges) or underwater hazards (such as reefs or cables). Obtain as much information as possible on the area where you plan to go boating. Reading marine charts in conjunction with publications like Sailing Directions, Tide Tables, and Atlases of Currents will indicate water depths, times of low, slack, and high tides as well as the direction of flow.

If you are boating in an area not covered by marine charts, ask knowledgeable local residents for information on potential water hazards such as low-head dams, rapids, and shoals. For small unstable craft (such as canoes and sailboards), hazards such as rapids, strong currents, and commercial shipping lanes are especially dangerous.

The following is a list of common local water hazards that can impede the operation of your pleasure craft or increase the risk of injuries or loss of life to persons on board:

- **Low-head dams**



Many inland rivers, lakes, and streams are regulated, meaning that a series of low-head dams have been erected at various points in order to maintain a minimum water depth upstream of the dams. These dams are usually relatively small structures that are no more than 4 m (13 ft.) in height. Because of their small size, they do not appear to be dangerous, especially from a boat or canoe upstream. These dams become very dangerous, however, during periods of high runoff (such as in the Spring or after heavy rain events).

Water pouring over the dam falls to the foot of the dam where it piles up and creates a backwash. This backwash creates a strong eddy current that is going upstream near the surface. This backwash drags objects – including people wearing PFDs – back upstream to the face of the dam, where they are then sucked under and drowned. The re-circulating backwash drags you to the bottom of the stream and then releases you to the surface, only to be pulled back upstream to the face of the dam and sucked under again. Low head dams are dangerous whether you approach them from the upstream side (it is easy to get caught by the current and taken over the dam) or from the downstream side (the backwash can pull a boat to the face of the dam where it becomes swamped). Swimmers, anglers, canoeists, and people in motorboats have all fallen victim to this near-perfect drowning machine. Keep well clear of low-head dams.

- **Sudden winds**
  Some valleys can have a funnelling effect on wind, causing its force to be multiplied. Under these conditions, sudden, powerful gusts can overturn a light craft. Keep this in mind when boating on mountain lakes or on water bodies ringed by steep hills.

- **Shoals**
  Shoals are areas of shallow water where a vessel may run aground. Shoals can be numerous in some waterways and, thus, they are often not marked by buoys. Refer to marine charts to verify the locations of all areas of shallow water.

- **Tides or currents**
  If you are boating in an estuary or any other area affected by tides, refer to the tide tables and verify the timing of high, slack, and low tides. Failure to refer to tide tables can result in finding yourself high and dry. Tidal currents can also be a danger to boaters. In some areas, currents collide with each other or run counter to winds, creating dangerous wave conditions.

- **Rapids and strong currents**
  Rapids are stretches of a river or a stream where the water is shallow and fast moving. Because the water is moving so fast, you have little control over your vessel. Control is made more difficult because of standing waves that arise in rapids. A boat swept into a standing wave can be easily swamped or capsized. In addition, large rocks often lie just below the surface. Hitting a submerged rock

can put a hole into the hull, causing it to take on water. **Always steer clear of rapids and strong currents**.

- **Underwater Cables and Pipelines**
  Underwater cables and pipelines can cause problems when anchoring. An anchor can become so firmly snagged on an underwater cable or pipe that attempting to weigh anchor can cause the boat to capsize. Normally signs are erected on shore to indicate where a cable crosses a body of water. The locations of underwater cables are also indicated on marine charts.

- **Overhead obstacles**
  Overhead obstacles include hazards such as power lines, cables, and bridges. The operator of a vessel with a high superstructure or a mast must be mindful of how much clearance he needs to get his vessel under an obstacle safely. Hitting an overhead obstacle can be expensive; it can also be extremely dangerous. If a boat mast hits a power line, for instance, it is possible for a person on board to be electrocuted.

- **Rapid build-up of high wave conditions**
  In large water bodies, **when waves move from deep water into water that becomes shallow suddenly, the height of the waves can increase dramatically and rapidly**. The situation can be worsened by wind. This is a common problem along Canadian coastlines and on some large inland lakes. Also, **if you are approaching shore to seek shelter from storm waves, keep in mind that the waves will gain in height as you move into shallower water**.

- **Debris from shorelines after heavy rains or stream-, river-, creek-rise**
  Whenever operating your vessel you should always be on the lookout for floating or partially submerged objects such as lumber, logs, and deadheads. **You should be especially vigilant for debris after heavy rains when run-off or swollen streams, creeks, and rivers can carry floating or partially submerged debris into navigable waterways.**

6.9 SUN, WIND, MOTION SICKNESS, AND ALCOHOL

When operating a pleasure craft it is important for the operator to take into account the fatiguing effects that being on the water can have on both the operator of a vessel and the passengers.

Separately or combined **the effect of the motion of a vessel, sunlight, waves, wind, sound, and alcohol can reduce significantly the ability of a person to operate a pleasure craft and can negatively affect all persons on board in terms of their alertness, balance, co-ordination, reflexes, judgement, response time, eyesight, and hearing.** One can even suffer mild nausea (motion sickness).

A safe boater is one who keeps the above fatigue factors in mind, takes steps to reduce their effects, and recognizes their symptoms when they occur. Some preventive steps to take are to be well rested before going out on the water. Also, wear sunglasses to reduce the effect of sunlight glaring on the water and wear sunscreen to protect your skin from the sun. Also, drink water or juice.

Alcohol Consumption

Never consume drugs or alcohol before or while operating a pleasure craft. Under the *Criminal Code of Canada* it is an offence to operate a pleasure craft if you have a bloodstream alcohol concentration greater than 0.08 (i.e.: more than 80 milligrams of alcohol per 100 millilitres of blood). Under the *Criminal Code of Canada*, the penalties for impaired driving while operating a boat are the same as for impaired driving while operating a car. Thus, in legal terms, driving a boat is no different from driving a car (except that many boats can go faster and no boats have crash protection or brakes).

In most provinces, the law allows the consumption of alcohol in only three locations: a licensed establishment, a licensed event, or a private residence. Drinking alcohol or having open alcohol containers is just as illegal on a boat as in a car.

In addition, in most provinces you will lose your driver's permit if you are found to be operating any motorized vehicle (such as a car, an ATV, a snowmobile, or a pleasure craft) while impaired (i.e.: if you have a bloodstream alcohol concentration that is greater than 0.08).

The consumption of alcohol in a pleasure craft is much more dangerous than most people realize. Fatigue, sun, wind, and the rocking motion of the boat will dull your senses. Alcohol significantly intensifies this effect, thus reducing your reaction time, your judgment and, consequently, your ability to navigate your craft safely.

It is just as dangerous (and illegal) to operate a pleasure craft while under the influence of drugs or alcohol as it is to drive a vehicle on land while intoxicated. Keeping this in mind, wait until the day of fishing or hunting has ended before having a drink. Never forget that you are responsible not only for your own safety but also for the safety of others on board.

Did You Know? Drinking one alcoholic beverage on board a boat is equivalent to drinking three on land.

6.10 ANCHORING

Anchoring is a safety measure that one can take when weather forces you to take shelter near shore or when your craft is disabled and the anchor is needed to keep you from drifting into more serious trouble.

It is important to ensure that the anchor, anchor line, and cable fittings that you buy are the right type and size for your vessel. If your pleasure craft's anchor and its cable are not of the appropriate weight and size, then wind, water, and bottom conditions can combine to cause your vessel's anchor to drag, leaving your pleasure craft to drift. This is especially dangerous if you are asleep on board or swimming nearby. Thus, **length of stay (for an hour? overnight?) is the most important factor to consider when anchoring**. Ensure that your pleasure craft is well anchored and keep watch on it when you are not on board to detect signs of dragging.

The type and size of boat anchor that you select are dictated by the bottom conditions where you will be anchoring, the type and size of your vessel, and the wind and wave conditions in the area. Anchor sizing guides (provided by every manufacturer) will help you determine the right anchor size for your vessel.

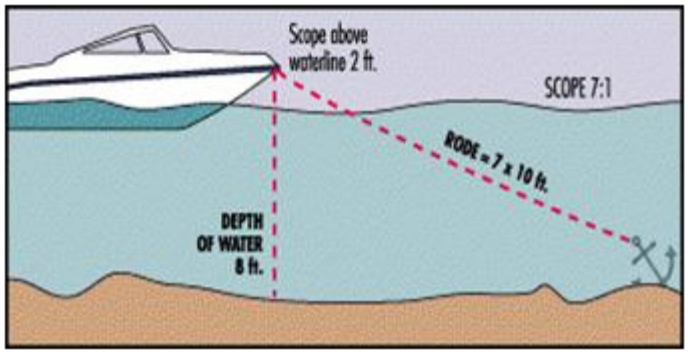
To ensure that you are able to get an anchor to set into the bottom, it is recommended that you have at least two types of anchor on board. And it is highly recommended that one of your anchors be large enough to deal with adverse weather conditions).

According to the *Small Vessel Regulations*, your anchor must also be attached to at least:

- **15 metres of chain, cable, or rope if your pleasure craft is not more than 9 metres in length.**
- **30 metres of chain, cable, or rope if your pleasure craft is more than 9 metres in length but not more than 12 metres in length.**
- **50 metres of chain, cable, or rope if your pleasure craft is more than 12 metres in length.**

Note: The shackle pin on your anchor line must be equipped with a locking device. If your anchor's shackle pin has a locking device, remember to ensure that the locking device is properly secured.

When you anchor your pleasure craft, you must verify that the water has sufficient depth for your hull to clear the bottom yet not be too deep for your anchor line. If you are in an area affected by tides, do not forget to consider depth changes caused by a rising or falling tide. Also, make sure that your anchorage provides enough "swing room" for your boat to swing safely on the anchor line if the wind shifts direction.



When anchoring your vessel, ensure that you provide enough scope. **Scope** is the ratio between length of the anchor **rode** (rode is the combined length of chain and rope attached to the anchor) and the depth of the anchorage. The amount of scope required depends on weather conditions. **A scope of 6:1 is adequate in fair weather and ideal for most overnight stays in calm conditions**. A scope of 8:1 is preferable if wind or waves are expected. **A scope of 10:1 is necessary in storm conditions**. The more sheltered your anchorage, the less scope that you require. The illustration above depicts a scope of 7:1.

Before deploying an anchor, always verify that one end of the anchor line is attached securely to the vessel and that the other end is attached securely to the anchor. This may seem like obvious advice, but many anchors and anchor lines have been lost by boaters who just assumed that the anchor and line were well attached to the boat.

The anchor should be lowered from the bow slowly, not thrown over. Play out enough anchor line so that the length deployed is at least six times the depth of the water, then tie off the line on a cleat. Once the line is secured, back up your vessel slowly until the anchor line goes taut. This indicates that the anchor is set into the bottom.

Anchors come in many styles. Common types of anchors include:

1. **Lightweight (Danforth) anchors**
2. **Mushroom anchors**
3. **Grapnel anchors**
4. **Kedge (navy) anchors**
5. **Claw (Bruce) anchors**
6. **Plough anchors**

1. **<u>Lightweight or Danforth anchors</u>** – These anchors are commonly used on small recreational boats. They have two long flukes that pivot and bury under tension and are relatively lightweight for the amount of holding power that they provide. They work best in firm sand, gravel, or mud. These anchors are not recommended for bottoms that are rocky, grassy, or clay.

2. **Mushroom anchors** – These anchors are meant for permanent mooring and are not suitable for normal use on a recreational vessel as this anchor can weigh several thousand pounds.

3. **Grapnel anchors** –These anchors are commonly used on very small boats such as canoes, as they do not have much holding power. These anchors have four or more arms that are designed to hang up or snag on brush and outcroppings on the bottom. They work well in rocky areas but do not work well on mud, sand, or gravel.

4. **Kedge or navy anchor** – This traditional style of anchor is generally only used by large ships since this type of anchor requires significant weight and size to hold a boat. This traditional anchor style works well in grassy or rocky bottoms where one arm can penetrate a crevice l.

1. **Claw or Bruce anchors** – These single fluke anchors with their uniquely shaped claw allows a boat to swing in full circle without breaking loose. Claw anchors hold well in sand, rock, and mud.

2. **Plough anchors** – Plough anchors are popular for cruisers as they offer good holding power in many different bottom conditions such as sand, rock, mud, clay and grass and tend to reset themselves well.

Reminder

The type of anchor(s) that you select for your pleasure craft will depend on the holding power you need (which is related to weather conditions and the size of your craft) and the type of bottom that exists where you expect to anchor. It is a good idea to equip your craft with more than one type of anchor so that you can set your anchor in more than one type of bottom.

Some tips on anchors:

1. **Never set an anchor over the side or over the stern of a boat under 6 m (20 ft.) in length**. If waves build up, a boat with an anchor deployed at the side or stern could be swamped and sink.

2. It is a good idea to attach an anchor chain between an anchor and the anchor line. The anchor chain weighs down the anchor and helps it set into the bottom.

3. It can also be a good idea to use a **kellet** on your anchor line. A kellet is a weight attached partway down an anchor line to keep the top part near vertical in orientation, thus decreasing the angle between the anchor rode and the bottom, thus helping the anchor to set into the bottom.

6.11 TOWING ACTIVITIES

Under the *Small Vessel Regulations*, the rules governing water-skiing apply to all towing activities, including barefoot skiing, tubing, knee boarding, wakeboarding, and parasailing.

The regulations require that a spotter be on board at all times to monitor the person being towed. The regulations also require the following:

- **There must be a seat available for each person being towed** – This is required in case recovery is necessary. Thus, only personal watercraft that are designed to carry three or more people can be used for towing a person.
- **Towing activities are not allowed from one hour after sunset until sunrise**.
- A vessel towing water skiers or others cannot be remotely controlled.

Water-skiers should always be able to control the actions of the towboat via hand signals. There is a set of standard hand signals that should be used by all water-skiers in Canada. The operator of a vessel should know these hand signals and should verify that both the water skier and the spotter also know the signals. Standard hand signals for water skiing are presented below.

Hand signals for use by water-skiers in Canada.

6.12 PROTECTING THE AQUATIC ENVIRONMENT

Humans have had such an impact on the environment that many ecosystems are reaching or have exceeded their capacity to absorb and break down pollutants. Wherever possible, **we must avoid exerting adverse impacts on the environment**.

For the purposes of this course, the term aquatic environment means all the components of a body of water and includes:

- All organic and inorganic matter and aquatic organisms; and
- All interactions between the components of the body of water.

In Canada, the aquatic environment is protected by a number of federal and provincial acts and regulations. The major federal statutes that carry provisions to protect the aquatic environment include the following:

- *Canada Shipping Act, 2001*
  http://laws-lois.justice.gc.ca/eng/acts/c-10.15/
- *Canadian Environmental Protection Act*
  http://laws-lois.justice.gc.ca/eng/acts/c-15.31/
- *Fisheries Act*
  http://laws-lois.justice.gc.ca/eng/acts/f-14/
- *Navigation Protection Act*
  http://laws-lois.justice.gc.ca/eng/acts/N-22/
- *Transportation of Dangerous Goods Act*
  https://www.tc.gc.ca/eng/acts-regulations/acts-1992c34.htm

The *Fisheries Act* has been in existence since 1868 and is Canada's oldest environmental statute. It provides for the protection of fish and their habitat from alteration or destruction and is likely the environmental statute of most concern to pleasure craft operators.

Pollution from vessels takes many forms, including spilled fuel, oil, cleaning compounds, sewage, and garbage. Any activity that impacts on natural watercourses has the potential of violating provisions of the *Fisheries Act*. Activities that impact on fish habitat can include pumping oily bilge water into a waterway or using toxic paint on the hull of your vessel. Thus, for pleasure craft operators, one of the most important provisions of the *Fisheries Act* is subsection 36(3), which states:

> **"No person shall deposit or permit the deposit of a deleterious substance of any type in water frequented by fish or in any place under any conditions where the deleterious substance or any other deleterious substance that results from the deposit of the deleterious substance may enter any such water".**

A deleterious substance is any material, such as your vessel's black water, that can have a negative impact on fish or on fish habitat. Thus, it is illegal to dump black water (sewage), oil, waste oil, garbage, antifreeze, and hazardous chemicals including toxic cleaning products (always use environment-friendly cleaning products).

Besides it being an offence to deposit or permit the deposit of a deleterious substance in a waterway, it is also an offence to fail to report the deposit of a deleterious substance, and it is also an offence to fail to take reasonable measures to prevent the deposit of a deleterious substance, or to fail to take quick action to begin to remedy the effects of a deposit.

To report a spill or deposit of a deleterious substance, consult the list of 24-hour emergency telephone numbers at this web site:
http://www.ec.gc.ca/ee-ue/default.asp?lang=En&n=EED2E58C-1

6.13 SOME GREEN BOATING TIPS

The following green boating tips are recommended by Transport Canada.

1. **Keep your bilge clean … don't pump oily water overboard**
   Bilge water can contain small amounts of fuel, lubricants, antifreeze, or other chemicals that get washed down into a vessel's bilge. Pumping a deleterious substance such as contaminated bilge water into a harbour or near a shoreline is an offence under the *Fisheries Act*. Instead, **contaminated bilge water should always be pumped into a container and then taken ashore to be disposed of properly**.

2. **Use bilge sorbent instead of detergents**
   Do not use detergents when cleaning out your bilges. Instead, use bagged sorbent materials. Sorbent materials are commercially available that absorb both fuel and oil (but not water). Used sorbent materials should be disposed of properly at a licensed facility on land.

3. **Do not pump your sewage (black water) into waterways…use a holding tank**
   The law (and common sense) dictate that **you must not pump sewage into confined waterways such as harbours or near shorelines**.

4. **Observe local and federal sewage regulations**
   Local regulations invariably forbid pumping holding tanks into harbours or near shorelines. In addition, on the Great Lakes as well as on all inland waters in Canada, if a vessel is equipped with a head (toilet), then it must also be equipped with a holding tank to contain the wastes until they can be properly disposed of on shore.

5. **Dispose of your garbage ashore**
   Never throw garbage overboard. The worst type of garbage is plastic, which is durable, strong, and floats. **Plastic six-pack carriers and plastic shopping bags are particularly heinous and annually cause the deaths of <u>hundreds of thousands</u>** of aquatic animals. Do not litter, **bring your garbage home**.

6. **Use smart cleaning products**
   All cleaning activities on a boat should be executed using cleaners that can be broken down by the environment. Use detergents sparingly, even biodegradable cleaners are hard on the environment. **Never use detergents that contain phosphate**. **Phosphate is a nutrient that can promote population explosions among aquatic micro-organisms**. This leads to a severe drop in dissolved oxygen in water, killing fish.

7. **Take care when refuelling**
   To prevent spills when refuelling, you should push the dispenser nozzle well into the tank. And **do not try to top off your tank** when refuelling. Clean up any spilled fuel with a paper towel, do not simply hose the spill into the water. If you are topping up the oil in your motor, use a funnel to reduce spillage. **Wipe up all spills**.

8. **Use only paints that are approved for marine use.**
   For years boaters have coated their hulls with anti-fouling paints containing toxic substances which inhibit the growth of aquatic organisms on hull surfaces. Although legislation reduced the allowable amount of toxic materials in these paints, it is still advisable not to use them at all. Be sure that the paint you are using is approved for marine use. Better yet, **keep your hull waxed. Also clean it periodically during the boating season as well as when you pull it out of the water for the winter.** If you must use anti-fouling paint, do not throw empty cans and leftover paint into regular garbage. Instead, take them to your community's toxic waste disposal centre.

9. **Avoid shoreline erosion by minimising your wake and propeller wash.**
   Canadian regulations (and common courtesy) require that **all pleasure craft operators should moderate their speed when near shore to ensure that their wake and wash are minimised so as not to cause shoreline erosion, damage to property, or disturbance to other users**.

10. **Report any pollution when you see it.**
    Under Canadian regulations **all pollution incidents and evidence of pollution must be reported promptly to Transport Canada or the Canadian Coast Guard**.

11. **Prevent the introduction and spread of invasive species**
    Invasive non-native species in our water systems are one of the greatest threats to the biodiversity of Canada's waters, wetlands, and woodlands. To prevent the spread of invasive species, boaters need to take the following precautions:

    - Inspect and remove fouling plants and animals from the boat, anchor, trailer, equipment, and fishing tackle after leaving a body of water.
    - Drain water from the motor, bilge, and transom wells after leaving the water.
    - Never release live bait into a body of water, or release animals from one area to another.
    - Wash/dry all fishing tackle, nets, boat and equipment to kill harmful species. Some species (such as zebra mussels) can survive for several days out of water, so it is important to:
      - Rinse your boat and all equipment with fresh water
      - Dry your boat and all equipment for at least five (5) days, before transporting it to another body of water.

End of Chapter 6

Chapter 6 Review Quiz

The questions included in the following quiz are not sample questions taken from actual tests. They are provided merely to acquaint you with the breadth and depth of knowledge required to pass a Transport Canada Boating Safety Test. Merely memorizing these questions and answers will not be adequate preparation to pass the Boating Safety Test; you must acquire an understanding of the material contained in all seven chapters of this free course. Everything in this course is a potential test question.

QUESTIONS

1. **According to the *Collision Regulations* being a courteous boater includes:**
   a.) no littering
   b.) keeping noise to a minimum
   c.) watching one's wake so as not to damage shorelines
   d.) all of the above

2. **What should the operator of a pleasure craft do when sharing the waterways with other users (other boaters, anchored vessels, swimmers, shoreline users, etc.)?**

3. **An example of negligent or reckless operation would be:**
   a.) excessive speed in a congested area
   b.) operating under the influence of alcohol
   c.) operating in a swimming area
   d.) all of the above

4. **What should you be doing when operating your pleasure craft near swimmers?**

5. **What signal is represented by the International code flag "A"?**

6. **What does the term "safe speed" mean?**

7. **According to the *Collision Regulations*, what factors must be considered in determining "safe speed"?**

8. **The purpose of maintaining a proper lookout is to reduce the risk of a collision. What actions constitute keeping a proper lookout?**

9. What is the purpose of having a magnetic compass on board?

10. Low-head dams are dangerous because:

a.) the current will carry a boat over the top
b.) water circulation at the base of the dam tends to trap a boat against the face of the dam and keep it there
c.) the hull and motor will be damaged
d.) all of the above

11. If you are caught on the water in foul weather, you should:

a.) stay where you are
b.) reduce speed and head for the nearest safe shore that can be approached safely
c.) head out to the middle of the water body
d.) abandon your vessel and swim to shore

12. In some provinces, what situations can result in your Pleasure Craft Operator Card being taken away from you?

a.) Operating your pleasure craft during a storm
b.) Operating your pleasure craft while it is unseaworthy
c.) Operating your pleasure craft while impaired
d.) None of the above

13. In some provinces, what situations can result in your motor vehicle driver's permit being taken away from you?

a.) Operating your pleasure craft during a storm
b.) Operating your pleasure craft while it is unseaworthy
c.) Operating your pleasure craft while impaired
d.) None of the above

14. What are factors to consider when choosing which anchors to buy?

15. What is the most important factor to consider when choosing which anchor to deploy?

16. What is the minimum length of anchor line required for your pleasure craft?

17. Is a small fuel or oil spill such a big deal?

18. During what hours are water-skiing activities allowed?

19. **Water-skiers should always be able to control the actions of the towboat through:**
    a.) yelling
    b.) foot signals
    c.) hand signals
    d.) large signs

20. **What are the responsibilities of an operator when towing a person or persons?**

21. **What is a deleterious substance?**

22. **For boaters, what is the most important section of the Fisheries Act?**

23. **Can detergents containing phosphates be used near water? Why or why not?**

24. **When must a vessel be equipped with a holding tank?**

25. **How should you dispose of the contents of a holding tank?**

ANSWERS

1. d.)

2. The operator of a pleasure craft shall take the following actions when sharing the waterways with others:
   - Stay well clear of swimmers and properties
   - Adjust your speed to reduce noise whenever possible so as not to be an irritant to other users or to water-front residents.
   - Adjust the speed of your craft so that your wash and wake will not disturb others (such as swimmers and water-skiers), erode shorelines, disturb wildlife (such as nesting waterfowl), or damage property.
   - Follow the *Collision Regulations* requirements regarding maintaining a safe speed depending on visibility and water conditions;
   - Know and comply with all boating restrictions (engine power limits, speed limits, etc.) in effect where you are operating, and
   - Use courtesy and common sense so as not to create a hazard, a threat, a stress, or an irritant to others or to the environment.

3. d.)

4. When sharing the waterways with swimmers, the operator of a pleasure craft shall operate at low speed and stay well clear of swimmers. In addition, no craft (sail-driven or power-driven may enter a swimming area delineated by swimming buoys).

5. Diving underway

6. A safe speed is one that allows the operator enough time to avoid a collision.

7. To determine the safe speed for your vessel, you should take into account all of the following factors:
   - The state of visibility – poor visibility can occur due to fog, mist, rain, or darkness; all of which reduce the time one has to react to a hazard;
   - Traffic density – note the number and types of vessels in your area, as well as their course, speed, and proximity;
   - Wind, water conditions, and currents;
   - The manoeuvrability of your vessel; and
   - The proximity of any navigational hazards – note nearby hazards such as piers, docks, dams, or reefs.

8. The actions that compose maintain a proper lookout include: Using all available means to detect the risk of a collision, keeping someone on deck at all times when underway, listening for navigation signals from other vessels, and watching and listening for distress signals

9. A magnetic compass or compass bearing device is a navigational aid that can help a pleasure craft operator to determine directions (north, south, etc.), to take bearings on buoys or significant landmarks, as well as to determine a boat's heading (direction of travel). A compass can be either hand-held or, on larger craft, permanently mounted at the steering station (binnacle) so that the helmsman can refer to it while steering along a bearing (direction of travel).

10. d.

11. b. - reduce your speed to maintain control of your [pleasure craft.

12. d.)

13. c.)

14. The type and size of boat anchor that you select for purchase are dictated by the most likely bottom conditions where you will be anchoring and the type and size of your vessel. Anchor sizing guides provided by every manufacturer will help you determine the right anchor size for your vessel. To ensure that you are able to get an anchor to set into the bottom, it is recommended that you purchase at least two types of anchor. And it is highly recommended that one of your anchors be large enough to deal with adverse weather conditions.

15. Although the type and size of boat anchor that you select are dictated by the bottom conditions where you will be anchoring, the type and size of your vessel, and the wind and wave conditions in the area, the most important factor is the length of stay (are you staying for an hour or overnight?). If staying overnight or leaving your boat to go ashore you must use an anchor with the most holding power to ensure that it does not drag if weather conditions deteriorate in your absence

16. The ideal ratio between cable length and depth (referred to as "scope") depends on weather conditions. **A scope of 5:1 is adequate in fair weather and ideal for most overnight stays in calm conditions**. A scope of 8:1 is preferable if wind or waves are expected. **A scope of 10:1 is necessary in storm conditions**. The more sheltered your anchorage, the less scope that you require. The length of your anchor line depends on the length of your pleasure craft. According to the *Small Vessel Regulations*, your anchor must be attached to at least:
    - 15 metres of chain, cable, or rope if your pleasure craft is not more than 9 metres in length
    - 30 metres of chain, cable, or rope if your pleasure craft is more than 9 metres in length but not more than 12 metres in length.
    - 50 metres of chain, cable, or rope if your pleasure craft is more than 12 metres in length.

17. Any size of spill of fuel, oil, or cleaning compounds can have long-term effects and represents deposition of a deleterious substance in a waterway. Besides it being an offence to deposit or permit the deposit of a deleterious substance in a waterway, it is also an offence to fail to report the deposit of a deleterious substance, and it is also an offence to fail to take reasonable measures to prevent the deposit of a deleterious substance, or to fail to take quick action to begin to remedy the effects of a deposit.

18. Towing activities are allowed from sunrise until one hour after sunset.

19. Hand signals

20. The operator must be accompanied by a responsible person (spotter) to monitor the status and hand signals of the person being towed.

21. A deleterious substance is any material, such as your vessel's black water (sewage) that can have a negative impact on fish or fish habitat. Thus, it is illegal to dump black water, oil, waste oil, garbage, antifreeze, and hazardous chemicals including toxic cleaning products (always use environment-friendly cleaning products.

22. Subsection 36(3), which states: "No person shall deposit or permit the deposit of a deleterious substance of any type in water frequented by fish or in any place under any conditions where the deleterious substance or any other deleterious substance that results from the deposit of the deleterious substance may enter any such water".

23. Never use detergents that contain phosphate. Phosphate is a nutrient that can promote population explosions among aquatic micro-organisms. This leads to a severe drop in dissolved oxygen in water, killing fish.

24. Any vessel with a head (toilet) must be equipped with a holding tank.

25. Never discharge a holding tank to a waterway. Holding tank contents must be pumped to a receiving facility on shore.

