



UNIVERSITY  
*of*  
VIRGINIA

Coastal Research Center

# Boating Manual



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## 1.0 Introduction

Boat operation is critical to the achievement of the Coastal Research Center (CRC) environmental research goals. CRC boats are used almost daily and extensively in the Eastern Shore of Virginia's inland and offshore waterways to conduct research year round. Maximizing the efficiency and safety of CRC research operations is bound to safe boating operations and the knowledge and skills of CRC boat drivers.

## 1.1 Purpose

The CRC boating manual is intended to serve as a boat operations and safety guidance document applicable to research operations involving the use of watercraft and is to be used as a training document for boat drivers operating CRC boats. Research staff, faculty, and students can become a certified boat driver, which are able to demonstrate understanding of the CRC manual, considerable in field skill and have local knowledge regarding the research area and boat operations.

All boat drivers must be able to recognize the limitations of the equipment and personnel and make safety decisions utilizing that information to insure the welfare of everyone on the vessel. The boat manual provides policy statements, recommendations, and guidelines but is by no means all-inclusive or universally applicable to all research activities, conditions, practices or exposures.

This manual is intended to assist with all CRC boat related activities in achieving the following areas:

- Maintaining guidelines for boat drivers and thresholds for CRC boat trips.
- Emphasizing the importance of safety for all students, employees and visitors.
- Maximizing the effectiveness and efficiency of research operations.
- Maintaining thorough and transparent boat driver training resources and guidelines.
- Minimizing any undesirable impact that CRC research programs have on the environment
- Keeping costs low while keeping quality of service high.
- Address The sheer size, remoteness and complexity of the marine areas for conducting research.
- Address the severe environmental conditions that exist on the ESVA.
- Address the widespread geographical distribution of CRC research sites.
- Address the communication challenge inherent to working in the marshes and waterways of the ESVA.
- Maintaining qualified personnel in boating operations and emergency management procedures.

## 1.2 Scope

The CRC boating manual applies to all CRC sanctioned research activities involving the use of any type of watercraft.

## 1.3 Minimizing impact on the environment

### **Submerged natural Features and Vegetation**

Vessels should be operated at all times in a manner that would minimize impacts to submerged natural features. Propellers are extremely damaging to bottom life and sediments. Prop “scarring”, which occurs when a propeller cuts through a seagrass bed, results in long-term negative impact on the health of the natural resources in the area. Prop “dusting” which occurs when prop wash blows sediment from the bottom, diminishes water clarity and quality, reduces the amount of light getting to the plants on the sea bottom, re-suspends nutrients up into the water column and causes sediments to settle out on slow moving sessile marine life.

### **Wildlife**

Vessels should be operated at all times in such a way that impacts to wildlife would be minimal. Speed should be reduced when operating in areas where encounters with oyster reefs, clam beds, sea turtles etc. are likely. Boat drivers not familiar with these areas may seek guidance from experienced boat drivers or maintain slow speeds at all times.

## 1.5 Definitions

### **CRC**

Coastal Research Center (CRC) is located on the Eastern Shore of Virginia at, 6364 Cliffs Road, Oyster Va. The CRC is the support facility for all boat trips, boats, boat safety equipment and performs preventative maintenance on all CRC boats.

### **CRC Reservation System**

The CRC Reservation System is used to schedule all boat trips for CRC research purposes.

### **Float Plan**

The CRC Reservation System is used to create a float plan for each boat trip. The float plan includes the date, boat, identifies the captain of the boat, passengers, trip expectations, destination(s), date, departure and return times, vehicle description, and cell phone contact numbers. Float plans are submitted through the CRC Reservation System web calendar and approved by a CRC staff member before the trip is underway. Anyone whose name gets written on the float plan needs to have an emergency contact form submitted in Donna's office (need enough information to find & correlate name to emergency form). For class/group trips, the professor or group leader is to leave a class roster and department contact information with the land contact so we can gather names and in case of emergency.

### **Boat Log**

This document registers permanent characteristics specific to each boat and boat trailer including hull identification numbers, serial numbers, title numbers, registration dates, asset tag ID numbers, USCG certifications, boat specifications, etc. It records information regarding service dates, operation problems that need to be addressed, and checklists for boat safety and emergency equipment.

### **Fuel Log**

This document records fuel used for each boat trip and is kept next to the outdoor fuel tank.

***Boat Driver***

The primary operator of the boat and the person ultimately in command of the boat and any passengers or crew aboard the vessel. The boat driver is ultimately responsible for any aspect of the boat's operation and the safety of the people on board. The boat driver must have a boater safety certificate. The boat driver is the primary contact person for the vessel. When student boat drivers run a boat trip together, the student at the helm is considered the boat driver.

***Boat Crew***

These people assist the boat driver and carry out any duties assigned to them in order to aid in boat operation. When student boat drivers run a boat trip together, the student not at the helm is considered crew.

***Boat Passengers***

People on the boat that do not have an assigned role with the operation of the boat.

***Land Contact***

The primary contact person on land for an active boat trip. Land contacts must be in the local area. Their responsibilities are to know return time (and verify safe return), be reachable by phone, be prepared to support decision making by the driver, and coordinate response in case of issues.

***Site Director***

Staff member overseeing research operations at the Coastal Research Center.

## 2.0 Boat Scheduling, Cancellations, Limitations, and Accommodations

### 2.1 Parameters for Boat Trip Scheduling

CRC boat trip requests are made through the CRC Reservation System online. CRC staff will process and schedule boat requests. When approved, the boat trip will be scheduled on the CRC calendar. The boat driver will post their float plan at the CRC and will mark the trip as completed or otherwise in the CRC request site once finished.

### 2.2 Parameters for Boat Trip Cancellations

For the safety of researchers, equipment, and staff, boat trips will be canceled if any of the following criteria are met:

- **Winds** sustained over 15 mph or gusting over 20 mph
- A **Small Craft Advisory** is in effect, meaning wind speeds of 21 to 33 knots with seas expected to produce hazardous wave conditions to small craft
- **Lightning** and thunder is reported or forecast within 25 miles within 3 hours of a scheduled boat trip
- **Restricted visibility** induced by fog, snow, rain, etc
- **Ice or freezing** conditions. This includes wind chill temperatures below 32 degrees or air temperature below 35 degrees.
- Other **extreme weather conditions**, such as dangerous heat. Dangerous heat is defined as air temperature over 90 degrees or a heat index over 100 degrees.
- For further information regarding accommodations to allow for fieldwork in more extreme conditions, see section 7.0 of the Boating Manual

The site director, in consultation with staff and researchers, may advise the cancellation of trips or implement maximum time in the field during conditions of concern.

Cancellations may also be necessary in cases of

- Boat system **failure** (mechanical, electronic, trailer, or otherwise)
- Boat Driver **illness**, though we will always attempt to find a replacement boat driver to keep research on schedule.

The Boat Driver retains the right to cancel boat trips based on any of the criteria above or other endangering conditions, including trips that are in progress. Only a blanket cancellation of boat activities by the site director supersedes driver's judgment. The Boat Driver will continually monitor the weather conditions before each trip and try to alert the scheduled boat crew of any cancellations as far ahead of their trips as possible. Students and researchers should be encouraged to contact their Boat Driver at any time with any questions or concerns about their upcoming boat trips; only urgent needs will be addressed outside of work hours.

## 2.3 Boat Underway Limitations

Operation times

- **Sunrise to 1 hr before sunset** (back at the dock)
  - Helpful estimation: Distance of sun from the horizon can be estimated as each finger width is approximately 15 min til sunset (when sun is 3 fingers above the horizon, you have approximately 45 min until sunset).
  - Our boats are NOT equipped with running lights.

Limited weekend trips – With prior staff approval. A staff land contact is required.

## 2.4 Accommodations for boating in extreme conditions

### 2.4.1 Off-Season Boating Policy:

The Off-Season Boating Policy is applicable to all winter boat trips (December-March) as well as shoulder seasons (September-November & April-May). The following cold water policies have been put in place to ensure the safety of students and staff in the field.

- Trips will be canceled if there are ice or freezing conditions. This includes wind chill temperatures below 32 degrees or air temperature below 35 degrees.
- When temperatures are close to freezing, more than one person will be on the boat at all times. The researcher counts as the second person when they are sampling only from the boat.
- Boat requests must be put in at least two weeks in advance. Backup days will be discussed, as weather cancellations are common. It is strongly recommended to schedule boat trips in the morning and plan to be back in the early afternoon. This provides more flexibility to extend time on the water before returning to the dock and enough time for assistance to reach you before dark if anything goes wrong.
- Field attire must include additional layers to stay warm. While the air temperature may be in the 50's or 60's, when the boat is underway, temperature drops significantly. If sampling is being performed in the water, a warm jacket and other dry layers are essential. Hats and gloves are required, not optional.
- Captain will perform regular check-ins throughout the field day at one hour intervals. If it is determined that one or more individuals need to return to the dock, the captain and staff land contact will collectively decide if it is possible to return to the dock and then take the rest of the crew back out to continue sampling. These decisions are decided in a risk-averse manner, especially due to the fact that the ride in is often the coldest part of the day.
  - If a large group is in the field, an anonymous check-in is done by asking everyone to close their eyes and hold up their hand, showing on a scale of 1-5 their level of comfort. Raising a 5 indicates that an individual feels warm and secure and is prepared to continue fieldwork. Raising a 1 indicates that the individual needs to return to the docks now and cannot continue. If any individuals raise a 2 or lower, the



- group is given 10 minutes to wrap up their tasks and the group returns to the dock, no questions asked. No individual will be called out or targeted if they raise a 1 or 2.
- If a small group is in the field, the captain will check in with each passenger individually. Staff may elect to end field work early if they see reason for safety concerns, even if researchers have not requested an early return.

### 2.4.2 Extreme Cold

- If the air and water temperatures add up to less than 100°, work in the water is discouraged. If there is a scientifically-driven reason for sampling in cold conditions, then accommodations must be approved by staff in advance. In general, the following additional safety measures must be met to ensure the safety of the person in the water.
  - Use of a dry suit (available upon request) or a wetsuit 5mm or greater. Attached hood, booties, and gloves are highly recommended and are required if the researcher will be submerged during work. See water temperature ratings to guide wetsuit selection.
  - The crew will provide insulated containers of hot water to warm extremities; it can also be poured into wetsuits before or after sampling in the water. Note: Do not use boiling water, as this does not cool down enough during the day and will scald your skin.
  - To ensure that the person spending time in the water does not experience hypothermia, both the time spent in the water and the number of sites visited per day must be limited. Expect shorter field days. Discuss with staff what may or may not be feasible to ensure proper sampling.
  - The captain will not assist with in-water sampling and must stay on the boat to ensure the safety of the person sampling in the water. If sampling is performed on the boat, assume that the captain will assist.
  - Float coats are required and are provided.

#### Water temps steady below 10c/50f

Year	Spring	Fall
2005	3/23/05	11/26/05
2007	?	11/17/07
2008	3/23/08	10/27/08
2009	3/26/09	11/28/09
2010	3/17/10	11/8/10
2011	4/3/11	11/12/11
2012	3/12/12	11/4/12
2013	3/30/13	11/13/13

#### Hypothermia Chart

IF THE WATER TEMPERATURE (F) IS:	EXHAUSTION OR UNCONSCIOUSNESS	EXPECTED TIME OF SURVIVAL IS:
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32.5	Under 15 Minutes	Under 15 - 45 Minutes
32.5 - 40.0	15 - 30 Minutes	30 - 90 Minutes
40.0 - 50.0	30 - 60 Minutes	1 - 3 Hours
50.0 - 60.0	1 -2 Hours	1 - 6 Hours
60.0 - 70.0	2 - 7 Hours	2 - 40 Hours
70.0 - 80.0	3 - 12 Hours	3 Hours - Indefinitely
OVER 80.0	Indefinitely	Indefinitely

### 2.4.3 Extreme Heat

- Post on community board & Float Plan board
  - Integrate Risk Assessment tool
    - Discuss safety checks on our own judgements
    - Should co-captains or staff lead the trip
  - drinking water minimums?
  - cooler just for ice?
  - extra water
  - extra electrolytes
  - rules for captains - not counting/working in the water? Maybe
  - Safety checks & safety briefings to reiterate symptoms of heat exhaustion
-

## 3.0 Boat Safety and Operational Guidelines

This section establishes policies that all Boat Drivers and Crew must make the prevention of an injury or an accident a number one priority.

*Boat Driver and Crew must make every effort to ensure establishment of the safest working environment possible.*

There are many hazards associated with boat operations and many ways for personal injury to occur. Some injuries occur suddenly due to human error, equipment malfunction or from changing environmental conditions. Injuries can also occur from long-term exposure. The following safety considerations must be adhered to in order to assure that this policy is enforced.

### 3.1 Required Motor Boat Safety Equipment and Planning

#### **Float Plan:**

A float plan is a written document including the date and time of departure, time of return, list of passengers and boat driver, destination, and a land contact person who will alert others if you do not return on time. The information on a float plan is what searchers will use if you do not return from your boat trip so it is imperative that all float plans are up to date in real time.

The boat driver is responsible for posting your float plan for each trip on the white board in the hallway leading to the staff office. Include the expected time underway/return, the boat driver names of all crew members, the starting and ending points of each trip, boat name, and the name of the land contact. All passengers listed must have an emergency contact form submitted in Donna's office.

#### **Communications:**

The boat driver will post their float plan at the CRC. The CRC will be the central hub to establish if teams have arrived safely or if a research team may need assistance for non-emergency boat related incidents. For any emergency type situation, where life is threatened, the U.S. Coast Guard should be notified with a VHF and the EPIRB activated. To ensure that the research team can communicate during non-emergency or emergency situations, each vessel should have at least a working VHF radio and a cell phone. It is the responsibility of the boat driver to make sure during the pre-departure briefing that anyone on the boat has the ability to operate the radios or phones.

Each boat driver and crew member will bring a fully charged cell phone at the beginning of each boat trip and make sure the boat driver has the correct cell phone number of each crew member. It is the responsibility of each boat driver to immediately notify their land contact of when they depart and return from each boat trip. All staff will have every other staff member, student, researcher and crew member's phone number saved in their contact list of their cell phones so they can contact anyone at any time. These are used for weather check-ins, safety, etc. Boat drivers and crew members are responsible for bringing a **Field Safety and Emergency Contact Card** supplied by the LTER and have those contacts saved in their phone.

Captains should make sure passengers have the field safety and emergency contact card on their person.

### 2.2.1 Motor Boat Operating and Crew Training

All Persons that operate vessels owned by CRC must have successfully completed the standard boating safety course established by the Virginia DWR or a NASBLA approved boating safety course, hold current certification in CPR, and hold current certification in First Aid. Additional safety guidelines are outlined in this manual.

### 2.2.2 Personal protective Equipment

Some hazards can be mitigated by the use of PPE. The PPE must meet and be labeled “approved by the United States Coast Guard”. Some PPE is mandatory when under way, yet some PPE is considered optional or highly recommended, depending upon the circumstances involved. The decision to wear the PPE will be based on the decision “to make the safest possible environment” while at work.

<b>PPE</b>	<b>Mandatory/Recommended</b>	<b>Description</b>
Personal Floatation Device (PFD)	Mandatory	Can be type I, II or III PFD.
Skin Protection	Recommended	Sunscreen, clothing
Hydration	Mandatory	Water or fluid containing electrolytes, i.e. Gatorade

### 2.2.3 Boat Safety Equipment

In addition to the PPE, each vessel must be equipped with:

- Anchor with a minimum length of line appropriate to the boat's length and depth of water where it typically operates. It should be a 3/8 inch line and should have a minimum of 4 feet of anchor chain.
- First Aid Kit containing at a minimum:
  1. Anti-sting antiseptic
  2. (6) 4x4 dressings
  3. (4) roller gauze bandages
  4. Trauma dressing
  5. (1) ice pack
  6. Iodine
  7. (1) Triangular bandage
  8. Hydrogen peroxide
  9. Aspirin
  10. Gloves
  11. Pocket mask
  12. Antibiotic ointment
- Visual distress signal devices (at least 3 day and night flares)
- A kill switch and lanyard to immediately shut off the engine
- An electric or air horn
- An effective method of communication when emergencies arise
- Throwable floatation

- Mounted fire extinguisher according to USCG standards
- Means to navigate, i.e. GPS, Charts
- Blanket
- Minimum 1 gallon of water per person per day in a cooler with ice
- Float plan
- Emergency contact numbers
- EPIRB
- VHF

## 2.2.4 Operational Safety Procedures

The Boat Driver is responsible for the safety of all passengers on board their vessel, as well as for their compliance with safety requirements.

The Boat Driver must:

- Conduct a pre-underway safety briefing familiarizing the crew and visitors with the vessel. All passengers should be able to locate and use the following safety equipment.
  1. Fire extinguisher
  2. Visual distress signal
  3. Radio/cell phone
  4. Sound producing device
  5. PFD's
  6. Tools
  7. First Aid kit
  8. EPIRB
  9. Emergency contacts card
- Ensure that all required safety gear is on board, in good condition and stowed properly.
- Ensure that all persons on board are wearing a PFD and appropriate PPE.
- Be attached by a lanyard to the kill switch whenever the boat is underway on plane.
- Operate the boat at all times at a speed which is prudent under the prevailing conditions, taking into consideration such things as weather, sea state, tides, currents, visibility, presence of hazards to navigation, presence of other boats, presence of people in the water, the handling characteristics of the boat and the boat driver's skill.
- DO NOT leave the controls when the motor is in gear.
- Ensure that no one swims when the engine is running.
- Alterations of any wiring or mechanical features of the boat are prohibited.
- Do not use the battery for any purpose other than operating the boat.
- It is absolutely forbidden to have CRC boats used for personal or Recreational purposes. Except when usage is specifically authorized by the CRC staff office and the activity is beneficial to the CRC.
- Boat drivers must stay on the boat in windy conditions, deep water, and strong tidal currents.

**PFD's**

Life jackets will be worn at all times while transiting back and forth by all passengers, crew members, and boat driver while underway. If the boat is on a plane, PFDs need to be on. They are not required while moving at slow speeds in shallow water. Once on site, the boat driver can allow the removal of life jackets while students or researchers are working or transiting to other local sites in a shallow bay. During the winter and or periods when the water temperature and air temperature add up to less than 100 degrees F, Float Coats shall be worn in place of life jackets.

## **Clothing**

All passengers need to wear appropriate clothing given the conditions. **No sandals or bare feet.** Boots or shoes shall always be worn on boat trips, including passengers.

## **Cell Phone**

Each Boat Driver will carry a charged cell phone with them while underway. The Boat Driver should be accessible to answer texts from their land contact and be able to check any weather apps while in the field. Have emergency contacts stored in your phone. See recommended weather apps list below.

## **VHF Radios**

Each Boat Driver will carry a charged VHF handheld radio with them while underway. The Boat Driver should be aware of how to operate the VHF radio in the case of an emergency and be able to conduct a radio call to USCG Channel 16 in the case of an emergency. See VHF operational guideline below.

## **EPIRB's**

Each Boat Driver will carry an EPIRB with them while underway. Extra EPIRB should be given to students/researchers who are being dropped off on islands or remote areas; demonstrate its use. Alert your passengers that you have an EPIRB. Be sure to have researchers return EPIRBs when they complete their trip.

EPIRB's should only be activated in dire situations such as a boating accident, serious injury or distress situation. Once an EPIRB is activated, if contact cannot be made, the Coast Guard will send a rescue helicopter to the location of the beacon. Each EPIRB (Emergency Positioning Indicating Radio Beacon) has a unique identifying number that is registered to the CRC. When the EPIRB is activated, the Coast Guard will receive an alert with a position (lat and long) of the EPIRB. The Coast Guard will first contact the CRC and notify us that an EPIRB has been activated and we will try to make contact with boat driver or crew members. Once an EPIRB is activated, if contact cannot be made with the boat driver, the Coast Guard will dispatch a rescue helicopter to the position of the EPIRB.

To activate the EPIRB:

- 1) Undo the antennae wrapped around the EPIRB and make sure the antennae has an unobstructed signal to the sky.
- 2) Press and hold the power button for three seconds, listen for a beep and look for a green light, this means the EPIRB is activated and transmitting a signal. Leave the EPIRB activated while awaiting rescue. The EPIRB is waterproof and will float.

- 3) The EPIRB has a Velcro strap that can be attached to your wrist or something else while transmitting. The directions for use are also printed on the EPIRB.

### **Medical and First Aid**

Each boat is equipped with a first aid kit inside a pelican case. It is the responsibility of each boat driver to familiarize themselves with the first aid kits and contents and be ready and able to administer first aid if needed. Each first aid kit contains smaller items such as band aids and alcohol swabs to larger emergency items such as bandages, a CPR mask, a splint, and tourniquet to stop excessive bleeding.

If any injuries occur or medical conditions are suspected, such as hypo- or hyperthermia, the boat driver, site director or other staff member should be contacted immediately. This may include signs of irritability, disorientation/mind fog, loss of balance, lightheadedness, fatigue, etc. Watch out for each other.

If in doubt, call. All students and researchers are responsible for looking out for each other regardless of seniority or professional levels. Anyone can contact their boat driver or a staff member anytime for any reason or concern.

*Any field work injury or medical concern should be reported to staff and the site director the same day the injury occurred.*

## **4.0 Boat Driver Operational Checklists**

Boat drivers should adhere to operational checklists for every boat trip. Operational checklists have been broken down to various stages of a boat trip.

### **4.1 Boat Essential Items Checklist**

Boat Drivers have these essentials before starting a trip.

- Cell phone
- EPIRB personal emergency locator beacon - tested
- VHF
- Emergency contacts card
- Life jacket
- Water – Half your body weight in ounces recommended per day
- Sun protection
- Hat
- Sunscreen (SPF)
- Long sleeved clothing
- Sunglasses
- Full coverage shoes for water work (including boarding and exiting boats)
- Lab contact information, especially for your boat driver
- Weather forecast (checked)
- Extra accommodations for extreme temperatures (warm clothes, cold drinks)
- Insect repellent

- Warm layers or rain gear (remember that boating creates a wind chill and can be wet)
- Food, including emergency snacks

## 4.2 Boat Pre-underway Operational Checklist

Boat Drivers are to complete the following before trip departure.

- File a float plan as appropriate.
- Check the marine weather forecast.
- Confirm you have saved contact number of the terrestrial group you may be dropping
- Confirm contact of the terrestrial group you may be dropping off has an EPIRB personal emergency locator beacon.
- Notify designated land contact that you are leaving.
- Check the boat safety equipment. Confirm and know the location of first aid case, boat repair case, emergency case, anchor, compass, push pole, fire extinguisher, paddle, throwable floatation, emergency water, personal location beacon, and charged cell phone
- Life jackets on before passengers board
- Insert plug(s) before passengers board
- Check the boat hull and prop for damage and steering.
- Make sure throttle in neutral position
- Insert kill switch key
- Turn battery selector switch to 'all'
- Switch on power and ensure all electrical systems are functioning. Radio, GPS, Depth Finder etc.
- Alert staff if any electrical systems, controls, or chiming is not working or abnormal
- Check that gas level is full
- Gas 'primer bulb' is firm
- Trim outboard down so the prop and water intake is fully submerged in water.
- Start the motor.
- Check the motor tell-tale for adequate water circulation.
- Check all gauges for proper operation and indication of proper systems operation. Beware of unusual lights
- Turn Garmin on - determine and or select destination and route
- Provide safety briefing for passengers that includes them knowing where essential safety items are located on the boat.
- Secure all cargo
- Attach kill switch safety lanyard to your body or PFD
- Verbally confirm that everyone on board is ready to get underway
- Untie boat and make sure all lines are inside boat and secured

## 4.3 Boat Underway Operation Checklist



**Underway boat handling**

- Aware of how tide and wind will impact your ability to maneuver
- Choose routes based on accessibility given your tides.
- Avoid stranding, especially if weather is of concern.
- Work with researchers to set efficient routes for sampling multiple sites
- Avoid research gear and people in water
- Keep passengers aware of changes in speed, sharp turns, or docking
- Slow and trim in shallows
- Avoid reverse in shallow water and eelgrass, reverse propeller direction causes grass to wind and increases chances of prop damage
- Slow when passing others (for passenger comfort and gear safety)
- Keep a watch on the weather and on weather app forecasts
- Look for messages from other staff; share warnings with crew
- Monitor passengers health and do check ins

**Offboarding people in shallow water**

- Anchor securely; engine trimmed up
- Warn when anchoring, make sure anchor line is free and not wrapped on any objects or parts of your body, watch swing, wind and tide change, and warn people in the water about the presence of anchor and lines
- Check depth and share with passengers before anyone enter the water from boat
- Mention stingrays (Stingray Shuffle™) and other dangers and precautions before divers enter the water
- Give passengers permission to enter or exit the boat
- Boat must be fully stopped to enter or exit the boat
- Use a dive flag when people are out of boat and snorkeling
- Know where every person in the water is located
- Watch for hazards – sharks, tide shifts, passing boats (instruct researchers to stand up for visibility)
- Keep divers away from the prop
- Have divers board the boat using platform ladder

**Beaching/Dropping people off on an island or shore**

- Before making your approach to the island, have passengers prepare their gear so they're ready to quickly get their gear and themselves quickly off the boat.
- Go over disembarking procedures with passengers so they understand when and how to get off the boat
- Assess your beaching area and make sure there aren't any hazards where you want to beach. If there are hazards consider finding another beaching point
- Trim up the engine and slowly begin heading to your designated beaching area
- Keep an eye on the depth as you're approaching the island
- As you get shallower, continue to trim the engine up as you get closer, using your forward momentum to take you up on the beach

- Tell passengers to “hold on” while the boat makes contact with the island. Depending on the wind and tides, sometimes you may bump the island harder than other times, be ready.
- Once the boat is firmly planted on the island, have the students begin to disembark the boat with their gear always straight off the bow. There are sometimes very steep drop-offs with strong currents, don’t let passengers walk down the side of the boat during this time.
- Continue to maneuver the boat so it is as perpendicular to the shore as possible, you want to try to avoid having the boat pushed sideways along the beach.
- Once everyone is clear of the boat, begin to slowly back down away from the island. Do not lower the engine until you know the water is at least 2 or more feet deep.

## 4.4 Boat Post-Operation Checklist

Boat Drivers are to complete the following after the trip is completed.

- Notify designated land contact that you have safely returned.
- Shut down the engine and turn off electrical equipment.
- Turn off the power switch.
- Fill up gas and oil tanks. DO NOT leave the gas nozzle unattended.
- Moor vessel with weather forecast in mind and use a cleat hitch knot if at dock.
- Trim the engine’s lower unit out of the water.
- Flush engine if appropriate.
- Remove all personal items.
- Secure electronics, stow gear, and lock any compartments as necessary.
- Check the boat hull and prop for damage.
- Check all switch positions and turn the battery selector switch to off position.
- Ensure that bilge is off (not auto or on).
- Record any entry in the boat logbook for any fuel pumped.
- Wash the boat with fresh water as appropriate.
- Cancel your float plan as appropriate.
- Notify CRC staff of any boat problems that need to be solved before the boat is used on another mission. Vehicle and Vessel reporting slips can be found next to the float plan board and should be submitted to the staff mailbox at room 101.
- Notify CRC staff of any first aid or boat repair equipment that was used and needs to be replenished before the boat is used on another mission.

## 4.5 Truck Pre-Operation Checklist

Truck operators are to complete the following before trip departure.

- Walkaround and inspect for damage.
- Lights functioning properly.
- Brakes functioning normally.
- Tires and proper inflation.

- Oil and fuel level are okay.
- Truck log mileage noted.**
- Mirrors properly positioned.
- Any problems noted and given to CRC staff.

## 4.6 Truck Post-Operation Checklist

Truck operators are to complete the following after the trip is completed.

- Fueled # of gallons recorded in the logbook.
- Truck log mileage noted.
- Any problems noted and given to CRC staff.

## 4.7 Boat Trailer Operation Checklist

Trailer operators are to complete the following before trip departure.

- Integrity of trailer.
- Strap secure.
- Condition of lug nuts.
- Winch secure.
- Lights functioning properly.
- Tires at proper inflation.
- Hitch secure.
- Chains properly placed.
- Any problems noted and given to CRC staff. Vehicle and Vessel reporting slips can be found next to the float plan board and should be submitted to the staff mailbox at room 101.

## 4.8 Boat Trailer Post-Operation Checklist

Trailer operators are to complete the following after the trip is completed.

- Trailer rinsed with fresh water.
- Park in the CRC boat designated area.
- Chock the jack wheel.
- Condition of lug nuts.
- Lights functioning properly.
- Tires at proper inflation.
- Any problems noted and given to CRC staff. Vehicle and Vessel reporting slips can be found next to the float plan board and should be submitted to the staff mailbox at room 101.

## 5.0 Land Contact Procedures

The land contact must be notified and agree to being the land contact person before each boat trip. Don't assume someone knows they're a land contact until they verbally agree to be a land contact. Before the boat trip, the land contact and boat driver will establish how frequently they want to do check-ins and overall expectations. The land contact must be a staff member.

**Land contact overdue boat response:** If a boat driver fails to return or communicate by the return time stated on the float plan, the land contact will initiate the overdue boat protocol outlined below.

- 15 minutes after scheduled return time: The land contact will text boat driver
- 25 minutes after scheduled return time: The land contact will call the boat driver
- 35 minutes after scheduled return time: The land contact will call the boat driver and then text all passengers on the boat.
- 45 minutes after scheduled return time: The land contact will call all passengers on boat
- 60 minutes after scheduled return time: The land contact will alert CRC site director, notify CRC staff, call Coast Guard, call 911 Marine Police, and depending on conditions launch a support boat to begin searching for the overdue boat.

## 6.0 Support Boat Procedures

A staff member may determine that a support boat is needed to assist a CRC vessel, in this case all safety guidelines still adhere to a support boat trip. A land contact and float plan must be made. Boat driver should take into consideration the estimated time the trip will take and the weather and tidal conditions before launching.

- For Hog: 4-5 hours before sunset (from CRC → out → back to dock)
  - For emergencies on Hog and at the Flux tower, call Marcus Killmon (TNC) to see about a faster response
- For South Bay: 2 hours before sunset (double to 4 hours for outlying bays reached from Oyster)

## 7.0 Boat Mechanical Troubleshooting Guide

### Boat won't start

- In deep or moving water, anchor or tie off boat
- Throttle in neutral position
- Kill switch key is inserted
- Battery selector switch (red switch) is on 'all'
- Prop and lower unit fully submerged in water
- Gas tank has gas
- Gas 'primer bulb' is firm

- Check the battery for charge and check battery terminal wire connections. Make sure they are tight and remove any corrosion.
- Start motor and proceed**

#### **Outboard motor sounds alarm and red light : Motor is overheating**

- Immediately bring the throttle to idle position and then turn the motor off.
- In deep or moving water, anchor boat
- Leave prop in water
- Let motor cool
- Bring prop out of water and check prop for damage or entanglements
- Make sure water intakes on the motor bottom unit are clear of debris
- Lower outboard so it is level. Check motor oil level. A 1 qt bottle of oil is on the boat. If needed, fill with oil.
- Trim prop back in the water and start the motor. Make sure water is coming out of the tell-tale.
- If no water is coming out of the tell-tale, use the wire tell-tale tool to clear any debris clogging the tell-tale.
- Proceed** once water is flowing out of the tell-tale.
- If the alarm continues to resound once underway, stop and turn the motor off. Anchor the boat and contact your land contact for assistance. The motor should not be run if it is overheating unless it is an emergency situation as the motor will be damaged. If you must proceed when the motor is overheating, do so slowly.

#### **Motor is vibrating**

- Slightly trim the prop up to make sure it was not resting on transom
- If vibrating continues, bring the throttle to idle position and then turn the motor off
- Anchor boat
- Bring prop out of water and check prop for damage or entanglements
- If a problem can not be resolved contact your land contact and determine if it is safe to drive the boat back.

## **8.0 VHF Operational Guide**

CRC Boat Drivers carry a VHF for boat trips. Boat Drivers are not required to be listening to the VHF while operating the boat. The primary communication instrument to be used with a Land Contact is a cell phone, second to that is the VHF radio. The VHF radio can also be used to call a CRC terrestrial crew in the area, call a CRC boat in the area, call other boats in the area for help, and to call the Coast Guard in emergency or non-emergency situations. CRC Boat Drivers are to use Channel 9 as their primary calling channel to make initial contact with a Land Contact and then can move to a designated working Channel (Channels 68, 69, 71, 72, 78A) to further talk.

## 8.1 How to operate a ICOM IC-M25 handheld VHF

1. Turn on
2. Select the correct channel.
3. Adjust "Squelch" control as low as possible without hearing static or "white noise".
4. Push the PTT button on the VHF microphone to speak.
5. Speak in a normal voice.
6. Take your finger OFF the PPT button to hear the other person.

## 8.2 VHF channels

- **Channel 9:** The primary calling channel. (Establish contact on this channel and move to a "working channel" as soon as possible.)
- **Channel 16:** USCG Emergency and Distress calls only.
- **Channel 22A:** Restricted to USCG use only. If you establish contact with the USCG on Channel 9 or 16, they may ask you to switch to Channel 22A. You may also hear an announcement on Channel 16 to switch to Channel 22A for important information.
- **Channels 68, 69, 71, 72, 78A:** "Working Channels." The only channels available to non-commercial vessels for ship-to-ship and ship-to-shore communications. (Although you may have many other channels on your radio, each of them is restricted to specific uses.)

## 8.3 Emergency distress call / MAYDAY procedure for VHF Channel 16

1. Tune to channel 16.
2. Distress signal "MAYDAY", spoken three times.
3. The words "THIS IS", spoken once.
4. Name of vessel in distress (spoken three times) and call sign or boat registration number, spoken once.
5. Repeat "MAYDAY" and name of vessel, spoken once.
6. Give position of vessel by latitude or longitude or by bearing (true or magnetic, state which) and distance to a well-known landmark such as a navigational aid or small island, or in any terms which will assist a responding station in locating the vessel in distress. Include any information on vessel movement such as course, speed and destination.
7. Nature of distress (sinking, fire etc.).
8. Kind of assistance desired.
9. Number of persons onboard.
10. Any other information which might facilitate rescue, such as length or tonnage of vessel, number of persons needing medical attention, color hull, cabin, etc.
11. The word "OVER"
12. Stay by the radio if possible. Even after the message has been received, the Coast Guard can find you more quickly if you can transmit a signal on which a rescue boat or aircraft can come.

### **If you hear a distress call**

If you hear a distress message from a vessel and it is not answered, then you must answer. If you are reasonably sure that the distressed vessel is not in your vicinity, you should wait a short time for others to acknowledge. Contact your land contact before assisting mayday calling vessel.

### **What to do if no one responds to your distress call**

Tune your VHF to an VHF channel guarded by the Coast Guard, and repeat your mayday call. Activate your EPIRB.

## **8.4 Example of an emergency distress call / MAYDAY**

*Calling Vessel:*

“MAYDAY-MAYDAY-MAYDAY

This is Parramore- Parramore- Parramore VA3370BT

MAYDAY this is Parramore position is Seaside South Bay behind Wreck Island

Latitude 37.268418, Longitude -75.806894

Struck submerged object

Need medical assistance and tow

Three adults onboard

One person fracture of neck

Estimate can remain afloat two hours

Parramore is twenty four foot Carolina Skiff- green hull- white deck, blue t-top

OVER”

Repeat at intervals until an answer is received.

## **8.5 Standard call procedure**

The standard procedure for a non-emergency call such as calling another vessel, terrestrial crew, or CRC, is as follows:

1. Call the vessel, marina or restaurant on Channel 9 in the following manner.
2. Name of vessel or station being called, spoken three times.
3. The words "THIS IS", spoken once.
4. Name of your vessel spoken once.
5. The word "OVER".
6. Then you wait for the station being called to answer. Their answer should be in the same manner as your call.
7. Once answered you should suggest a specific working channel to carry on your conversation.
8. The word "OVER".

9. Wait for reply or confirmation from the station being called, switch to the working channel and repeat the process.
10. When done speaking and leaving a specific channel, use the word " OUT" at the end.

## 8.6 Example of a non-emergency call vessel to vessel

*Calling Vessel:* "Pongo, Pongo, Pongo, THIS IS the vessel Parramore. OVER."

*Responding Vessel:* "Parramore, Parramore, Parramore, This is Pongo. OVER."

*Calling Vessel:* "Please switch to Channel 68. OVER." (or some other proper working channel)

*Responding Vessel:* "Roger. Switching to Channel 68, OUT."

You would then switch to Channel 68 and call Pongo using the same procedure and conduct your business. All conversations whether on a hailing channel or a working channel should be kept short and to the point.

You may use channel 16 to call a ship or shore station, but if you do so, you must, must be brief! We recommend this same procedure be used over channel 9, if channel 9 is used as a calling channel.

## 8.7 Example of a non-emergency call vessel to Coastal Research Center/land contact

*Calling Vessel:* " Coastal Research Center, Coastal Research Center, Coastal Research Center THIS IS the vessel Parramore. OVER."

*Responding CRC:* "Parramore, Parramore, Parramore, This is Coastal Research Center. OVER."

*Calling Vessel:* "Please switch to Channel 68. OVER." (or some other proper working channel)

*Responding CRC:* "Roger. Switching to Channel 68, OUT."

You would then switch to Channel 68 and call CRC using the same procedure and conduct your business. All conversations whether on a hailing channel or a working channel should be kept short and to the point.

# 9.0 Non- Staff Boat Driver Guidelines and Training Procedures

## 9.1 Non-Staff Boat Driver Certification Training Itinerary

Prior to training all participants should have completed their boater education and have read the CRC boating manual

### At center:

- Go over the structure of the day
- Review materials that boat driver will need to know
  - Boater education card obtained from the Virginia Department of Game and Inland Fisheries or prior approved boating safety course



- CPR and first aid training certificate
- CRC Boating Safety Manual
- CRC Best Practices for Fieldwork
- CRC Boat Troubleshooting Procedures
- Infield boat training with CRC staff
- Feel confident that training and knowledge has prepared you to safely operate an approved CRC vessel on an established and approved route

- Review boat trip preparation: weather apps and tide apps
- Go over: Identifying anvil clouds and severe weather
- Go over: Identifying water hazards (seine net buoys, ghost pots, deadheads, wrack, standing crab pots, standing birds, short ripples/signs of shallow water)

**At float plan board:**

- Review boat trip preparation: Filing a float plan and how to get and test an EPIRB

**At boat on trailer:**

- Review the specifics and mechanics of the hull and motor
- Review essential items always on the boat and the contents of the boat repair, emergency, and first aid boxes

**At boat on dock:**

- Review starting boat
- Review troubleshooting
- Review getting underway then loop back to dock
- Review docking the boat
- Review hitch knots and how to securely moor the boat
- Review turning off, washing down, and refueling the boat

**At float plan board:**

- Review erasing float plan and returning PLB
- Boat materials reporting
- Accident reporting

**On Water Training: 2 sessions**

**Session 1:**

On Boat: practicing docking- take each person through docking procedure three times or until they are comfortable

- Go through pre-operation checklist
- Go through starting checklist
- Get a feel for boat at low speed
- Practice docking techniques
- Practice hitch knots

**Session 2:**

On Boat: practice routes to South Bay destinations, boat handling, field awareness, emergency scenarios.

- Go to SB152 via Man and Boy Channel

- Guidance on interaction with other vessels and activity in channel (passing boats, wakes, gill net markers, fishing boats, kayakers, crab pot lines)
- Practice shallow water trimming and what to do if you run aground
- Practice anchoring at SB152 ( how to approach a pole with wind and tide considerations)
- Practice marking new site in Garmin and naming site
- Practice breakdown procedures
- Practice emergency communication procedures
- From SB 152 go to resiliency sites via Man and Boy > inlet from resilience go to SB152 and back through Man and boy to Oyster
- Weather spotting
- Lightning
- Getting towed
- When and how to use the Personal Locator Beacon(PLB) and calling in Coast Guard

**Schedule times to review and sign CRC non-staff captain certification forms**

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## 9.2 Non-Staff Boat Driver Certification Form



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of VIRGINIA

Coastal Research Center

### Non-Staff Boat Operator Certification

- I \_\_\_\_\_ acknowledge that I have completed the following
- Presented CRC staff my boater education card obtained from the Virginia Department of Game and Inland Fisheries or prior approved boating safety course
  - Presented CRC staff my CPR and first aid training certificate
  - Have read and understand the CRC Boating Safety Manual
  - Have read and understand CRC Best Practices for Fieldwork
  - Have read and understand CRC Boat Troubleshooting Procedures
  - Have completed infield boat training with CRC staff
  - Feel confident that my training and knowledge has prepared me to safely operate an approved CRC vessel on an established and approved route

This document certifies that \_\_\_\_\_ has been approved to operate a Coastal Research Center vessel on established routes.

Approved route(s):

Approved vessel(s):

By signing this certificate, you acknowledge that you have read and understand the Coastal Research Center Boating Manual. As the boat operator, you are responsible for ensuring safe operation of your vessel and the reasonable safety of your crew. You further acknowledge that non-staff boat operators are required to have a second approved boat operator on board for all trips unless special arrangements have been approved in advance (based on routes and drivers, not established on a trip to trip basis).

Approved special arrangements:

\_\_\_\_\_  
Non-staff operator: Name

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Date

\_\_\_\_\_  
Certifying staff: Name

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Date

## 10.0 Accident Reporting

All personal injuries and damages to CRC property must be reported to the CRC office as soon as possible or within 24 hours. It is the responsibility of the Boat Driver to execute the emergency management plan. Details regarding execution of the emergency management plan should include the following information:

- Date, time and place of the incident.
- Vessel(s) involved.
- Number of people on board.
- Nature and severity of injuries.
- Damage assessment.
- Description of what happened.
- Was the law enforcement agency notified and/or involved?
- How could this have been prevented?
- What First Aid assistance was administered.
- Did the injured parties require emergency evacuation and where were they transported?
- Emergency contact information for administrative follow up.
- If witnesses were at the scene, obtain a statement from each one regarding the incident.
- Notify the emergency contact person and CRC lab manager immediately.
- Provide no information at any time in the presence of media.

## 11.0 Emergency Contact Numbers

### Medical Emergencies

Emergency Medical Services	911
U.S. Coast Guard	757-331-2000
	VHF Channel 16

### Non-Emergency Coastal Research Center Staff

Cora Johnston	757-620-7016
Donna Fauber	757-618-7196
Tom Burkett	757-607-6277
Sophia Hoffman	757-607-6281
Buck Doughty	434-987-5148

## 11.1 CRC Field Safety and Emergency Contact Card

### FIELD SAFETY

*Report any dangerous or uncomfortable encounters to station staff. We are here to help.*

#### Stay safe:

- Have identifying materials (car decals, institutional swag, a business card).
- Carry your permit(s) or research approval letters and a form of ID.
- Identify yourself as a student or scientist with the UVA Lab (LTER) in Oyster.
- Mention a staff member's name.
- **If you feel unsafe, leave or request help from staff.**

Remember that irritability & confusion can be signs of exposure and distress.

**Take care of your field crew and model responsible conduct (hydration, gear).**

Be sure to **exchange contact information with station staff** (often your boat captain). If a concern arises (emergency or not), contact us for help.

**Don't wait** - it may take up to an hour for a staff member to reach you at a remote field site.

If you need medical care:

**Riverside Hospital** in Onley, VA (Rt 13 on left just North of Walmart - ~40 min N of lab)

**Eastville Community Health Center** (Rt 13 about 5 miles North of the lab)

*Let staff know about medical emergencies.*

### EMERGENCY CONTACTS

In case of emergency, call your captain or station staff first (we can help guide emergency response). Service may be poor - share critical information first:

**"This is [name]. It's an emergency. I'm near [location]."**

As needed, also *call* or *text* 911.

#### For help on the water or with boats:

Tom Burkett (LTER) 757-607-6277

Marcus Killmon (TNC) 757-999-1745

Sean Fate (VIMS) 757-709-4076

Buck Doughty (LTER) 434-987-5148

#### Coast Guard:

Wachapreague 757-787-9526

Cape Charles 757-331-2001

#### For help on the mainland or with safety concerns regarding people:

LTER Office 757-331-1246

Northampton Sheriff 757-678-0458

#### Regarding animals:

Strandings 757-385-7575

Wildlife Violations 800-237-5712

Island birds (Alex, TNC) 757-635-3113

*See safety information on reverse.*

**If you feel unsafe, leave or request help from staff.**



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## 12.0 Additional Terms and Resources

### **EPIRB**

Emergency Position Indicating Radio Beacon (EPIRB) is a small transmitter used to send out an emergency signal to rescue services.

### **VHF**

Very High Frequency. A range of radio frequencies from 30 MHz to 300 MHz. The VHF band is used for television, FM and amateur radio, airplane navigation and traffic control and marine communications. Channel 16 is used only for Coast Guard emergencies.

### **PPE**

Personal Protection Equipment (PPE).

### **PFD**

Personal Floation Device. Coast Guard approved Type III life jackets are to be used.

### **Float Coats**

Warm buoyant PFD coats that are Coast Guard approved Type III life jackets.

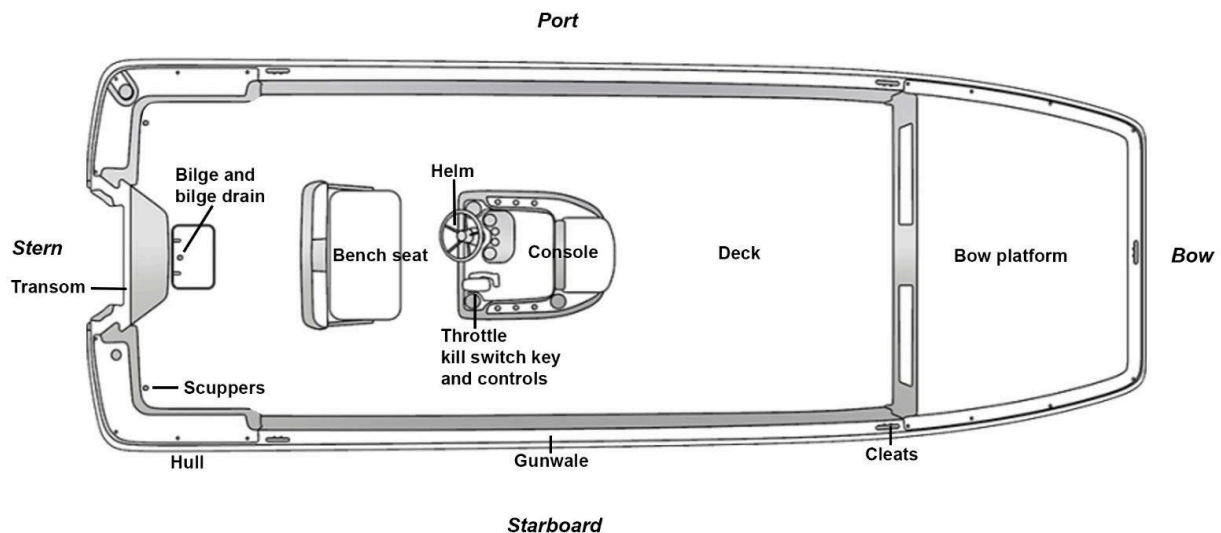
### **VDWR**

Virginia Department of Wildlife Resources (VDWR).

### **Skiff**

A shallow, flat-bottomed open boat with a sharp bow and square stern.

**Main Components of a Skiff**



### **Hull**

The main body of the boat, includes the sides, bottom and deck

**Bow**

Front part of the boat

**Stern**

Rear part of the boat

**Helm/Console**

The steering station of the boat

**Transom**

The vertical stern cross section of the boat that supports the outboard.

**Scuppers 'Scupps'**

The drains in the transom of the boat - can be plugged when drainage is not needed.

**Bilge**

Is the lowest part of the inner boat hull- the bilge plug is located in the bilge drain and should be inserted when the boat is in water.

**Kill switch key**

A safety feature, where a lanyard connects the boat pilot to the ignition key. Should the boat driver become separated from the controls, the motor shuts off. Also known as an engine cutoff switch (ECOS).

**Battery selector switch**

Switches permit battery selection (of two or more batteries) for specific purposes including starting engines, running accessories, and recharging.

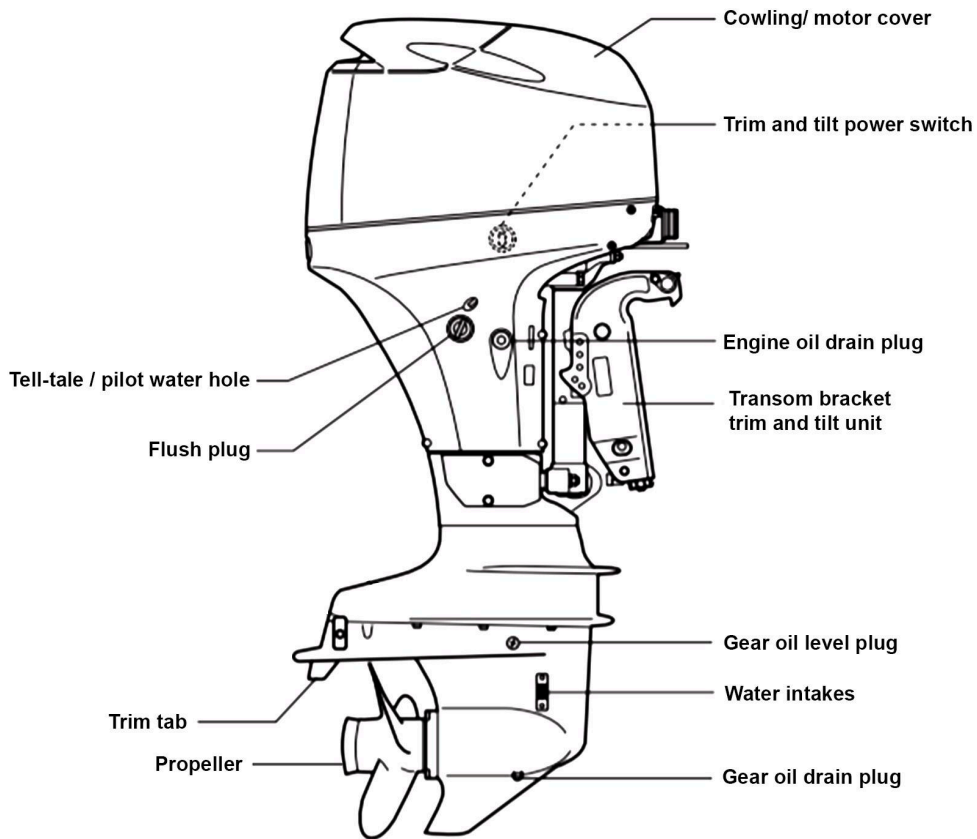
**Throttle**

The controlling component of the outboard that determines the speed of the boat, the throttle also controls the trim unit.

**Outboard Motor**

A portable engine, with its own propeller, that is designed to be attached externally to the stern of a boat.

## Main Components of an Outboard Motor



### ***Trim and Tilt Unit***

A hydraulic unit that adjusts the angle of the motor and determines the depth and pitch of the propeller. Adjusting the unit changes the smoothness of the ride, the grip on the water, and the ability to jump on a plane.

### ***Cowling***

The motor cover on the outboard. The cowling has latch levers that need to be released to remove the cowling and access the power head.

### ***Water intakes***

Water entrance for water to be propelled upward to cool the engine.

### ***Tell-tale***

Water exit for water that has been used to cool the engine.

### ***Flush plug***

Connection for flushing engine with fresh water.

### ***Propeller 'Prop'***

The final piece of the drivetrain that propels the boat.



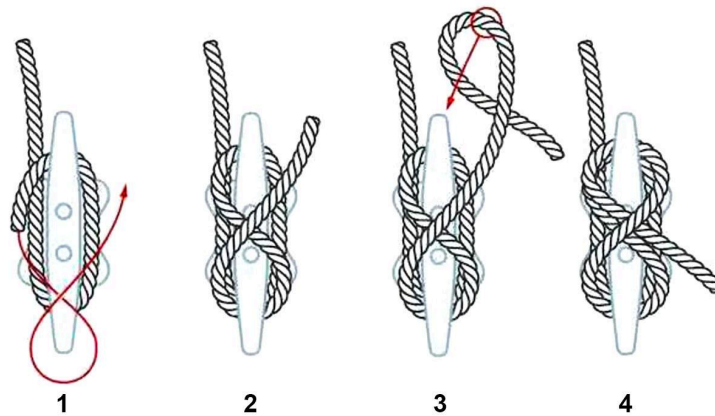
### **RPM**

Revolutions per minute. The number of full turns or rotations of the engine crankshaft at a given throttle setting. It is not advised to go above 5500 RPM.

### **Cleat Hitch Knot**

A cleat hitch is the knot used to tie a boat line to a dock cleat. A cleat hitch is also used to tie an anchor line to a boat cleat.

**Cleat Hitch Knot**



### **Weather Apps**

Preferred apps for

Weather apps:

Weatherbug

Weather Underground

**WeatherChannel**

NOAA Radar

NWS (small craft advisory)

Dark Sky

Lightning:

**Lightning**

Wind apps:

Windfinder

**Windy**

Tide Apps:

Tide Alert

**Tides**

Tides Near Me

Coast Guard app of NOAA buoys

Tempest – UVA CRC station (on our dock)

## 13.0 References

- 46 CFR, Coast Guard, Department of Transportation, Requirements
- 33 CFR, Navigation and Navigable Waters, Subchapter S, Boating Safety.
- 410 DM, Department of Interior, Regulations.