Southeast Coast Network

National Park Service
Inventory & Monitoring Program

Standard Operating Procedure (SOP) 3.1.2

Safe Operation of Southeast Coast Network Watercraft

Please cite this as:

Asper, J. R., and A. C. Curtis. 2012. Safe operation of Southeast Coast Network Watercraft. Southeast Coast Network Standard Operating Procedure NPS/SECN/SOP-3.1.2. National Park Service, Athens, Georgia.

Summary

Operating a boat has inherent dangers and therefore certain precautions must be taken in order to maintain the safety of the boat operator and boat passengers. The safety requirements include, but are not limited to, sufficient operator skill level, proper safety equipment, and safe weather and sea conditions. Certain guidelines also must be followed during the operation of the watercraft.

This SOP applies to the operation of both motorized and non-motorized watercraft, and must be read in its entirety prior to commencing fieldwork.

Revision History

Previous Version #	Revision Date	Author	Changes Made	Reason for Change	New Version #

Vessel Types in use by the SECN

The SECN maintains several boats for use in Vital Signs monitoring, including both motorized and non-motorized watercraft.

- One 18-foot aluminum-hull, flat bottom boat with Honda 150 hp motor with a jet drive used for installation and data collection for marsh monitoring, and for collection of water and sediment water quality samples as a part of the Network's coastal assessment protocol.

- One 16-foot aluminum SeaArk Jon boat with Honda 50 hp motor with a jet drive, used for collection of salt marsh elevation/vegetation data as well as stream habitat monitoring.

- One inflatable pontoon skiff with Honda 15 hp motor, for use in salt marsh data collection.

- One sit-on-top kayak equipped with videography, water quality, GPS, and sonar equipment for use when conducting river reach documentation as a part of stream habitat monitoring.

- Two Perception-12 sit-on-top kayaks for use by field support staff when conducting stream habitat monitoring.

This boat safety SOP does not apply to use of the coastal shoreline monitoring amphibious ATV in water.

Equipment Checklist

The following safety equipment must always be on board when embarking on a field mission.

Equipment	Motorized Boat	Non-Motorized Boat
Lifejackets (as described in the requirements section below)	X	X
Fire Extinguisher	X	
Throwable Floatation Device	X	
Flares and daylight markers	X	
Sound producing device (air horn, whistle, bell, etc.)	X	X
VHF Radio	X	X
GPS unit	X	X
Hardcopy maps for navigation	X	X
First Aid Kit	X	X
Push Pole (for manual movement of boat in extremely shallow conditions)	X	
Paddle	X	X
Boat hook	X	
Anchor and rope	X	X
Manual bilge pump	X	
Extra fuel	X	
Tool kit	X	X
Rescue rope		X
Cell phone	X	X
Phone list for local Coast Guard stations (Appendix B)	X	

Requirements

Motorized Boat Operator

The boat operator must meet the following specifications:

- DOI Motorboat Operator Certification Course (MOSS SAF4102) required.
- Responsible for the safety of personnel on board regardless of position and grade.
- Responsible for operating the watercraft in compliance with existing policies, guidelines, and training.
- Must be able to swim.
- Able to navigate in coastal and inland waters.

Crew

At least one crew member (in addition to the boat operator) must meet the following minimum specifications:

- Have completed Red Cross or equivalent First Aid training.
- Able to swim.
- Has basic understanding of boat operation and basic coastal navigation.
- Must obey instructions of watercraft operator.
- Must adhere to all safety regulations.
- Must conduct themselves in a reasonable and prudent manner at all times.

Operation of Boats Alone

- Operation of any watercraft alone IS NOT APPROVED without approval from the employee's branch chief and the network coordinator. Both the operator and the trip must be approved prior to solo boat use.
- To operate watercraft alone, other than for maintenance purposes, the operator must receive written clearance from his or her branch chief or the network coordinator to do so, with explicit conditions under which it is appropriate to operate watercraft alone. At a minimum, clearance letters should indicate which boat(s), Vital Signs monitoring protocols, parks, and any other criteria warranted. The determination to allow solo operation of boats can be based on one or a combination of the following:
    - Number of hours of documented operator experience (one day is equal to 6 hours) while conducting SECN monitoring work.
    - Equivalent experience serving as a boat operator from past employers.
    - Field evaluation of competence by the employee's branch chief or the network coordinator.
- Solo operation of the aluminum flat-bottom boat is not permitted.

Operating Conditions

The weather and sea conditions must be as listed below:

- No operations shall occur if **Small Craft Warnings** or **Lake Effect Warnings** are issued or predicted in the area of proposed operation.

- Boat operations shall not occur below 45 degrees air temp, or when water temperature is below 55 degrees unless all participants are wearing dry suits.

- Boat operations shall not commence if winds exceed 16 knots sustained or when wave conditions exceed 18 inches in the proposed operation area. In the event winds increase above 16 knots during operations, the operator will use sound judgment on seeking safe harborage.

- Boat operators will use sound judgment when operating in the vicinity of air to ground lightning.

- When confronted with rapidly changing conditions, the Boat Operator shall seek safe harborage until conditions improve.

- Boats shall only be operated between 30 minutes prior to sunrise and 30 minutes past sunset, unless delayed by conditions beyond normal control of the operator, such as groundings or squalls.

Flotation Devices

Flotation devices are required for each person on board and must be worn as follows:

- Type III personal flotation devices (PFD) shall be worn at all times when on the boat unless otherwise stated below.

- Type I PFD shall be worn when operating alone and when conditions exceed winds of 10 knots sustained and/or wave heights above 12 inches. The Type I PFD shall always be carried aboard the boat when operating alone regardless of conditions.

- When water temperatures are below 80 degrees or in winds greater than 10 knots and seas greater than one foot, a non-inflating Type I, II or III shall be worn.

- An approved automatic/manual inflating Type V PFD may be worn when approved in accordance to DOI Regulations and in conditions other than those stated above.

Use of Kayaks

Who Can Use the Kayaks

The two Perception-12 SECN-owned kayaks are available for use by NPS staff (permanent and part time) and volunteers, and their guests. At least one staff member, volunteer or partner trained in kayak safety and first-aid must accompany every trip. Trips with more than five paddlers are required to have trained participants in a 1:5 ratio, one properly trained participant per every five paddlers.

Where Kayaks May be Used

Trips must be within the boundaries of the SECN parks, unless specific permission is given by the Network Coordinator or designee.

When Kayaks May be Used

Kayaking is only permitted during daylight hours; night trips are strictly forbidden. Kayaking is not permitted when there is an imminent chance of dangerous weather. Such a situation exists when a small craft advisory has been issued or a weather system, accompanied by threat of thunderstorms is forecast to occur within two hours from the scheduled start time or end time of the proposed trip.

Priority

Official trips take first priority for use of the park kayaks. Otherwise, they are available on a first come-first served basis. Many official kayak programs are given between June and August.

Personal Behavior

While using the kayaks, either on or off duty, you represent the National Park Service and as such, you may not consume alcohol or behave in any manner that reflects poorly on the Service, or the Park in which the kayaks are being used.

Permissions for Kayak Use

On Duty Use

With your direct supervisor's permission, you may use the kayaks for official use. This means you are on duty, during your scheduled normal working hours. While in official work status, you may use a government vehicle to pull the kayak trailer to a launch/retrieve site. This use is for conducting government business.

Off Duty Use

Personal, off-duty use may be granted with approval of the Network Coordinator or Water Branch Chief. This use is considered non-work status. Any injury sustained by any member of the party may not be claimed against OWCP. During off-duty use the government vehicles and kayak trailers may not be used to transport the kayaks to the launch/retrieval site. Any negligent damage to the kayaks or personal property (e.g. vehicle scratches and dents) resulting from this use is the responsibility of the employee to repair/replace.

Kayak Fishing

Fishing from the kayak is allowed for off-duty use only with a current, appropriate, State Fishing License. Kayakers must use a "paddle leash" (available locally) to ensure the park paddle you are using does not get lost in the excitement of catching a fish. Any damage to your fishing gear is your responsibility and not the Network's.

Operational Procedures

Trailer Operations/Towing

When towing a trailer, the following guidelines must be followed:

- Complete an examination of the trailer before towing.
- Check the trailer hitch and electrical connections.
- Check boat tie downs.
- Ensure loose objects are removed from or fastened to the boat.
- Driver must be comfortable pulling and backing the trailer.
- Adjust vehicle mirrors to account for the trailer.
- Verify tires are inflated properly and bearings are greased.
- Adhere to state DOT trailer speed limits.

Boat Operation

- Prior to boat operation, the boat operator or crew lead (in the case of kayak use) must review safety procedures with any crew/ passengers present.
- Maintain a safe distance from other boats (100 ft minimum unless overtaking or passing).
- No wake within 100 ft of a person, man-made structure or inhabited area.
- Operators must slow to idle speed when entering, leaving, or passing within 50 yards of a state-owned or state-controlled boating or fishing access area. (NC)
- Adhere to state and federal boating regulations.
- Operating date, time, operators name, area of operation, and engine hours will be recorded in the proper log prior to and post operations.

A boat operations checklist is provided in Appendix 3.

Float Plans

Each individual boat operator will designate a person to notify of his or her actions. This person will usually be the Branch Chief in charge of the vital sign being monitored during the operation. Float plans must be filed when using any SECN watercraft.

- Float Plans shall be completed and filed with the pre-designated person, Network Coordinator, and Park Technical Committee Representative no later than 48 hours prior to launching. See Appendix A for an example float plan form.
    - Float plan must include:
        - Description of watercraft
        - List of occupants
        - Emergency equipment on board
        - Point of departure
        - Planned route
        - Estimated time of departure
        - Estimated time of return
        - Means of contact (e.g. VHF radio, mobile phone), and contact schedule
        - Purpose of trip
        - Description of vehicle(s) left at launch site(s)
        - Recommended plan of action if overdue
    - In the event that the operator is requesting approval for solo operation of a boat, the operator must explicitly request and receive clearance.
- Prior to launching, a notice shall be placed on the driver's side dash of the vehicle indicating ownership, operator, and points of contact in case of emergency. A sample of this notice is in Appendix A.
- Upon launching and retrieval, a text message or phone call will be made to the designated persons noting the start and completion of that day's boating operations.

Cleaning and Care of Watercraft and Equipment

Proper care of equipment is required to ensure that boats, engines, and associated gear are in working condition.

Boats

- Refuel tanks and check oil on engines
- Grease Jet Drive (Low pressure)
- Connect fresh water wash and crank engine (run for 15 minutes)

- Pull hull plugs
- Clean bilge, and boat and trailer
- Rinse PFDs with fresh water and hang to dry. Store PFDs when dry.
- Clean and dry, then place radios in re-charge receptacles.

Kayaks

- Rinse kayaks with fresh water; dry cockpits with bilge pumps and sponges. Replace the kayaks on trailer in an upside-down position.
- Rinse paddles with fresh water and place in the storage room, located in the maintenance pole barn.
- Rinse PFDs with fresh water and hang to dry. Place the PFDs back into the dock box when dry. Clean and dry, then place radios in re-charge receptacles. Failure to properly clean or stow kayaking equipment may result in loss of kayaking privileges for the staff members, volunteers or organizations that were responsible for the care of the equipment.

Emergency Situations

The following procedures and recommendations are adapted from Chapter 8 of the Department of the Interior, Motorboat Operator Certification Course Student Reference Manual.

Major Types of Boating Accidents

Major types of boating accidents include:

- Collisions between vessels
- Collisions with objects
- Falls overboard
- Capsizing

Most collisions could be avoided by use of proper lookout, knowledge of "rules of the road", boat lighting requirements, and aids to navigation. Falls overboard are related to sea conditions, movement about the craft, and tripping/slipping hazards on board. Capsizing accidents usually occur in small boats due to sea conditions and/or improper weight distribution.

Common Fatal Boating Accidents

- Capsizing
- Falls overboard

The major determining factor in most fatalities is non-use of PFDs. People who end up in the water were not planning on being there and usually weren't wearing a PFD. Most deaths are due to drowning, with hypothermia being a major contributing factor. Most drowning occurs within 10 feet of safety. Therefore, chances are most rescues will be a simple reach or throw. Vessels less than 16 feet account for most fatalities. Ironically, small vessels have less stringent equipment requirements.

Major Factors in Boating Fatalities

- Hypothermia (and Cold Water Immersion)
- Drowning

Hypothermia can cause death given enough exposure time relative to the water/air/wind conditions. It can also hasten the onset of drowning in even the best swimmers due to its effects on the extremities. Many "good" swimmers drown attempting to reach shore or their boat due to cold water immersion.

A well-prepared boater must understand the basics of hypothermia and cold water immersion drowning in order to prevent them from occurring, or mitigate their effects in an accident.

Fatal vs. Non-Fatal Accidents

Most fatal accidents are caused by persons falling overboard or the boat capsizing and the victims drowning because they are not wearing PFDs. Even if you are a good swimmer, the urgency of going into the water unexpectedly along with fatigue caused by stressors could render you helpless.

Most non-fatal accidents are caused by collisions with other boats or objects in the water. Remember that the rules of the road suggest that a lookout be posted at all times. Make sure your lookout is doing his or her job.

Small open boats are somewhat unstable and tip easily. Be sure that the boat is tied securely to the dock when boarding and step into the centerline of the boat running fore and aft. With a hand on the pier and one on the boat, lower yourself down into the center. All other passengers should follow suit and keep low when moving around in the boat.

You should not attempt to carry items aboard the boat. You should board first and load them one at a time and, again, place them along the centerline of the boat. Remember to not overload the boat.

Read and take heed of the capacity plate information. Make sure all passengers and carry-on items are secure and the weight evenly distributed.

Once underway, avoid standing up, riding on the bow or gunwale (side) of the boat, trim the boat so it rides level and avoid making sudden sharp turns.

CAPSIZING - The majority of small pleasure boats, and all built after 1978, have flotation to keep them from sinking even if they capsize. If you should capsize it may be safer to stay with the floating boat than try to swim to shore.

A small unstable boat may capsize from the following causes:

- **Overloading** slows a boat down and reduces the amount of freeboard (area above the waterline). A low freeboard increases the possibility of swamping the boat or taking on water that will slow the boat even more. Don't overload your boat with passengers or equipment.

- **Improper weight distribution** can make the boat even more unstable. You must distribute persons and equipment in order to balance the boat and keep water out.

- **Waves** can be a major factor in capsizing especially if they are unexpected. Anticipate all waves and aim the bow into them.

What to do if you capsize

- Take a head count to make sure all crew and passengers are there and provide assistance if needed.

- Put on your PFD (if not already wearing it).

- Stay with the boat – try to get as much of your body out of the water as possible.

- If you have nothing to hold on to and cannot find any floatation material to keep you afloat, improvise by using your clothing. Your pants can serve this purpose – simply remove them, tie the leg ends together, pull the zipper closed and trap air in the legs by blowing or waving in the air, then submerge the pants waist first. As air escapes, blow more air into the waist opening.

- If signaling devices are available, use them to attract attention. Save at least one until you actually see a potential rescuer. A shiny object can also be used to attract attention.

- Attempt to maneuver to the nearest shore or shallow water.

- Use the H.E.L.P. position (see below).

- Remain calm – do not panic.

Crew Overboard

Standing or riding on the gunwales or bow of a boat causes most crew overboard situations. If you must move around in a boat which is underway, stay low, hold on to both sides and have at least three points of contact with the boat at all times.

Crew Overboard Procedure

1. Whoever first sees or hears someone go overboard should shout, "crew overboard (port or starboard)". This person should become the spotter and continually point to the person in the water until the boat is safely alongside. Try not to lose sight of the crew overboard; it is extremely difficult to locate a person in the water.

2. Slowly turn the boat and make a gentle turn keeping the person in view.

3. Approach the person slowly into the wind or current.

4. When the person is alongside put the engine in neutral – keep engine running in case you need to maneuver quickly to adjust position.

5. Once alongside the person, use the **"Reach, Throw, Row, Go"** method. Extend a boat hook or oar toward the person. If they cannot be reached, toss a line with a Type IV floatation device. Your type IV throwable flotation device should always be immediately accessible and within reach of the helm.

6. Adjust the weight to keep the boat trimmed and help the person aboard. Usually over the stern.

Remember **"Reach, Throw, Row, Go"**. Do not go into the water to assist the person unless absolutely necessary. If the victim is unable to board or needs further assistance and someone must go into the water, make sure they have on a PFD and that they are attached to the boat with a line.

Self-Rescue

Boat operators and their crew should be able to rescue themselves in the event they end up in the water. This includes being able to get back onto the boat, or mitigate the effects of having to stay in the water. It is ESSENTIAL that operators utilize their engine kill switch if available. This small device can make the difference between life and death should you fall overboard. Many boaters have fallen over, only to watch their boat motor on out of sight, or worse yet, circle over them ("circle of death").

- **Self-Rescue -** boat can be reached

- **Chin up bounce**- Difficult for most people, especially on high- sided boats. Grab stern or gunwale at lowest point and bounce up as if doing a chin up. On second bounce, try to get upper half of body over the gunwale and into boat, roll into boat.

- **Stirrup**- Try and find loose line hanging off the boat and tie in a loop. Step into loop; use line to climb back into boat.

- **Cavitation Plate**- If engine is out of gear, use cavitation plate on outboard engine or outdrive as a step. Climb onto transom using engine for support.

- **Self-Rescue** - boat unavailable, cold water

- **Heat Escape Lessening Posture (H.E.L.P.)-** Defensive posture used by solitary victim to lessen heat loss. Cross legs, fold arms, bring knees up, and hunch shoulders to neck. Can increase survival time as much as four times.

- **HUDDLE**- Defensive posture used by two or more victims to lessen heat loss. Place arms around each other, and intertwine legs. Can increase survival time as much as four times.

NOTE: H.E.L.P. and HUDDLE are not to be used in moving water due to the risk of entrapment or collision.

In-water survival

Should you find yourself in the water there are survival techniques you can use while waiting to be picked up. Hopefully, you have been a safe boater and you have on your PFD. If not, you will have to float or tread water until rescued.

One method of **floating** is the horizontal back float. This comfortable position keeps your face out of the water and allows you to conserve energy. You simply lie back motionless with your arms outstretched, arching your back slightly; allow your legs to rise straight out.

Another method of floating is the vertical back float. This position does not float your entire body on the water's surface. Your body is still underwater except for your face and upper chest with your arms extended out to each side.

If you cannot float in this manner, you can practice **survival floating**. Very simply put, tilt your head back, slowly press down with your arms and legs to bring your mouth above the water, inhale, hold your breath and go limp for a few seconds. Your face will go underwater while you angle your arms and legs. Exhale as you are tilting your head back and preparing to break the water's surface so that a minimum amount of energy and movement is required to keep your head out of the water long enough to inhale.

Treading water requires more energy than floating but keeps your head above water. Treading water is accomplished by doing a slow series of scissor kicks with your legs while slowly waving your outstretched arms back and forth on the water's surface.

When you find yourself in the water keep your clothes on to help prevent heat loss. Because they also trap air they can assist you in floating.

Victim Rescue

Characteristics of a person in distress

- Can wave and yell for help.

- Has not yet reached the panic stage.

Characteristics of a person drowning

- Cannot speak, consciously wave for help, or consciously grab rescue device.
- Has reached the stage of panic. This is usually accompanied by inability to breathe.
- Victim is under the surface most of the time.
- May have as little as 20 to 60 seconds before they go under; or may disappear immediately.
- Appear to be doing a breaststroke with arms raised above head, head is tilted way back, and mouth is wide open. May have appearance of playing/splashing.
- Victim will probably attempt to climb onto you if you get too close to them.

Priorities in rescue situations

- Self: most important.
- Partner(s): second most important.
- Victim: third important.

Rescue Sequence (listed in order of increasing risk to rescuer)

- Talk into self-rescue
- Reach
- Throw
- Boat ("Row")
- In-Water (Go)

Note: Maintain visual and verbal contact while using any rescue technique

Assistance from Shore

Every year people drown within a short distance of the shore. When some trauma happens, such as stepping off an underwater shelf, the surprise itself can cause a drowning response. The victim, even if they can swim, suddenly cannot shout for help and just splashes around in the water. Exhaustion can occur in a minute or less and the person then quits splashing and sinks. Should you find someone needing assistance from shore, remember the following:

Talk into self-rescue- Since most people end up in the water within 10 feet of safety; many rescues are simply a matter of getting the victims attention and directing them into one of the self-rescue techniques to regain entry into the boat.

Reach rescue - In this rescue, some type of device is used to extend the rescuers reach to the victim. The proximity needed is determined by the device used, sea conditions, wind speed/direction, and ability of the rescuer. They are quick to deploy and leave the rescuer on a safe platform. Use boat hook, paddle, fishing pole, etc.

- Brace yourself - if possible get someone to hold you.
- Extend device to victim. Remember that a drowning victim cannot think rationally, tell him/her what you want them to do.
- Be careful that victim does not pull rescuer into the water, rescuer should be prepared to let go of reach device if the situation deteriorates.
- Pull victim to boat.
- Talk into self-rescue or assist into boat.

Throw Rescue- Use when victim is too far away to use a reaching device, or distance may increase quickly. Throwing devices have the same limitations as reaching devices, are quick to deploy and give a greater reach. Use the same techniques as described in the reach rescue. Typical devices include:

- Type IV ring buoy with 70' polypropylene line attached- Offers flotation to victim, but requires skill and accuracy to land near victim.
- Throw bag or heaving line- Offers no flotation to victim, requires skill and accuracy to land near victim.
- Alternatives- Any type PFD (be sure to "handle" the device to make it easier to throw over distance). Anything that floats (cooler, tire, etc.), attach line if possible. Throw upstream or upwind so device will float to victim. Remember, when there is current, surface water generally moves faster than the victim.

Boat rescue ("row")- Use when victim is too far away for a reach or throw. The boat serves as an extension of shore, placing the rescuer in the vicinity of the victim so that a less risky reach or throw can be executed.

- Approach victim from downwind or current for better control.
- As boat nears victim, shut engine off, in gear, unless other hazards dictate otherwise (i.e., obstacles, dams, currents, etc.).
- Use reach and throw techniques.

In - water Rescue ("go")- Most dangerous form of rescue, should only be attempted by individuals who have been trained, have practiced, and who are in adequate physical condition. Used when condition of victim is such that he/she cannot help themselves, and it's not possible to

maneuver the boat close enough for a reach rescue. Coldwater rescue (less than 70 degrees) requires use of cold-water survival suit.

Extrication from Water

Getting victim into the boat- Position victim alongside boat where freeboard is at a minimum. Usually this is the stern or as far astern as possible. The choice of technique is dependent on both the boat and the victim's condition/cooperation.

Conscious victim - no major injury: If possible, provide victim with PFD.

- Ladder- Easiest and most effective of all retrievals.
- Stirrup- Fasten line with loops to cleat use as a rope ladder.
- Retrieval strap- Commercially available, padded loop with hand holds, or large loop tied into end of line. Put loop around victim under armpits. May need two rescuers. Use bounce technique to assist victim to sitting position on rail, and then into boat.
- Bounce- Grab victim's PFD, shirt, wrists, or as high as possible on second bounce onto gunwale, and then into boat.

Unconscious or weak/injured victim: Support victim with a PFD during retrieval.

- Roll aboard- Secure end of blanket or net by tying to rail or standing on it. Put rest of net in the water and place under the victim. Rescuers grab the outside of the net and pull up in unison.
- Retrieval strap - Commercially available, padded loop with hand holds, or large loop tied into end of line. Put loop around victim under armpits. May need two rescuers. Use bounce technique to assist victim to sitting position on rail, and then into boat.

Note: Do not use for victim with suspected head/cervical/spinal injuries.

Suspected head/cervical/spinal injuries: Requires highly specialized training and equipment, most likely provided by local emergency medical services (EMS). Symptoms include: Pain, loss of movement and feeling, tingling, deformity of back or neck, breathing stopped. If hypothermia or other life threatening conditions are not a factor, keep victim in water until EMS arrives. Try to eliminate any movement caused by waves, etc.

NOTE: Possible spinal injury treatment and management requires specialized training and practice. For this reason, information on spinal treatment is not included in this document. Obtain training and utilize local protocols.

Drowning

Drowning is usually defined as suffocation in a liquid. It is a leading cause of death among boaters and would be rescuers. Many people who fall in the water cannot swim well. For those

who can swim well it usually results from underestimating the power of moving water, and/or the effects of hypothermia on swimming ability. In a rescue situation, failure to follow the rescue sequence puts the rescuer at additional risk.

Types of Drowning

- Dry – little or no water enters the lungs (10-15% of all drowning)
- Wet – aspiration of water into the lungs (85-90% of all drowning)
- Secondary – a person successfully revived, but dies later due to complications.
- Cold Water Drowning – a person who drowns in cold water, and can still be successfully revived.

NOTE: Any revived, near drowning victim must seek medical attention to avoid the risks of secondary drowning.

Cold Water Drowning Survival Factors

- Age- younger the better.
- Length of submersion- shorter the better (individuals have been successfully revived after being under water for over one hour).
- Water Temperature- colder the better (cold produces beneficial physiological changes).
- Water Quality- cleaner the better.
- CPR Quality- 2-person preferred; steady, high quality compressions/ventilations, confirmed circulation.
- Victim Struggle- less is better.
- Physical condition of the victim- other injuries can complicate survival.

Care for Drowning

- Remove from water.
- Ensure ABCs (see below) and initiate CPR as appropriate.
- Prevent further heat loss.
- Handle gently.
- Administer 100% oxygen.

- Transport to nearest medical facility that can handle emergencies. A drowning victim is not dead until they are warm and dead.

Hypothermia

Even when the weather is warm, do not forget that in many areas the water can be very, very cold. A sudden unexpected wake or other "unbalancing event" can land you in the frigid water. Although the possibility of drowning from falling into the water is a real threat, so too is hypothermia.

Hypothermia is a condition that exists when the body's temperature drops below ninety-five degrees. This can be caused by exposure to water or air. The loss of body heat results in loss of dexterity, loss of consciousness, and, eventually, loss of life. A few minutes in cold water makes it very difficult to swim, even just to keep afloat. In addition, a sudden, unexpected entry into cold water may cause a reflexive "gasp" allowing water to enter the lungs. Drowning can be almost instantaneous.

Your body can cool down 25 times faster in cold water than in air. If you examine the chart below you will see that survival time can be as short as 15 minutes. Water temperature, body size, amount of body fat, and movement in the water all play a part in cold-water survival. Small people cool faster than large people and children cool faster than adults.

PFDs can help you stay alive longer in cold water. You can float without using energy and they cover part of your body thereby providing some protection from the cold water. When boating in cold water you should consider using a flotation coat or deck-suit style PFD. They cover more of your body and provide even more protection.

Hypothermia does not only occur in extremely cold water. It occurs even in the warmer waters of Florida and the Bahamas.

Types of Hypothermia

- **Chroni**c - occurs from prolonged exposure to the water/air environment.

- **Acute**- occurs from sudden immersion in cold water ("Cold Water Immersion").

Note: Water conducts heat 25 to 35 times faster than air at the same temperature.

Methods of Body Heat Loss

- **Conduction**- direct transfer of heat from body by direct contact with water, or some solid surface (rock, ground, boat deck).

- **Convection**- loss of heat by air or water moving across the body and carrying it away.

- **Radiation-** loss of heat energy to the environment from unprotected parts. Over 50% of heat loss is from the head, followed by the neck, armpits, chest and groin.

- **Evaporation**- conversion of perspiration into water vapor, cooling the body at the surface.

- **Respiration**- exhalation of water vapor carrying with it heat from the body.

Heat Loss Factors

- **Age**- children lose heat faster than adults.

- **Body Build**- thin people lose heat faster than heavier people.

- **Movement in Water**- a person swimming or aggressively moving in the water will lose heat faster than someone passively floating.

- **Alcohol/Caffeine** - dilates the blood vessels, causing victim to lose heat faster.

Hypothermia is a progressive problem in which the body passes through several stages before the individual lapses into an unconscious state. The extent of a person's hypothermia can be determined from the following:

- **Mild Hypothermia** - the person feels cold, has violent shivering and slurred speech.

- **Medium Hypothermia** - the person has a certain loss of muscle control, drowsiness, incoherence, stupor and exhaustion.

- **Severe Hypothermia** - the person collapses and is unconscious and shows signs of respiratory distress and/or cardiac arrest probably leading to death.

Hypothermia Chart		
If the Water Temp. (F) is:	Exhaustion or Unconsciousness	Expected Time of Survival is:
32.5	Under 15 min.	Under 15 - 45 min.
32.5 - 40	15 - 30 min.	30 - 90 min
40 - 50	30 - 60 min.	1 - 3 hours
50 - 60	1 - 2 hours	1 - 6 hours
60 - 70	2 - 7 hours	2 - 40 hours
70 - 80	3 - 12 hours	3 - Indefinitely
Over 80	Indefinitely	

Note: Temperatures listed are approximate due to individual differences in normal body temperature and response to change.

Conservation of heat is the foremost objective for a person in the water. To accomplish this, limit body movement. Any action generates heat that is absorbed by the water. Don't swim unless you can reach a nearby boat or floating object. Swimming lowers your body temperature and even good swimmers can drown in cold water.

If you can pull yourself partially out of the water - do so. The more of your body that is out of the water (on top of an over-turned boat or anything that floats), the less heat you will lose. Especially keep your head out of the water if at all possible - this will lessen heat loss and increase survival time.

Wearing a PFD in the water is a key to helping the person survive. A PFD allows the person to float with a minimum of energy expended and allows them to assume the **h**eat **e**scape **l**essening **p**osition – **H. E. L. P**.

This position, commonly referred to as the fetal position, permits the victim to float effortlessly and protect those areas most susceptible to heat loss including the armpits, sides of the chest, groin, and the back of the knees. If you find yourself in the water with others, you should huddle as a group to help lessen heat loss.

Care for Hypothermia

- Ensure ABCD (airway, breathing, circulation, degrees-prevent further heat loss).
- Protect victim from cold environment.
- Remove wet clothing, wrap in dry clothing and/or blankets.
- Insulate from ground.
- Handle gently.
- Transport to medical facility as soon as possible.
- Beware of after-drop, as body re-warms, cold blood trapped in extremities moves into the core. The heart may be affected, causing arrhythmia.

Do not massage the victim's arms and legs. Massage will cause the circulatory system to take cold blood from the surface into the body's core, resulting in further temperature drop. Do not give alcohol, which causes loss of body heat, or coffee and tea that are stimulants and may have the same effect as massage.

Treatment of hypothermia can be accomplished by raising the body temperature back to normal. Re-establishing body temperature can be as simple as sharing a sleeping bag or blanket with another individual, or applying warm moist towels to the individual's head and body. A warm bath could be used for mild to medium hypothermia but never if the victim is unconscious. Do not attempt to raise the temperature too rapidly, gradual warming is recommended.

Prevention of Hypothermia

- Rest and eat high-energy foods prior to exertion.
- Maintain fluid and food intake during workday.

- Dress in layers.
- Protect areas of high heat loss (head, neck, armpits, and groin).
- Recognize signs and symptoms of hypothermia; intervene early.

Cold Water Survival

- If sudden immersion occurs, cover mouth and nose to prevent gasping in water.
- Wear a PFD.
- Keep clothes on.
- In most cases do not try to swim. An exception is in moving water (streams, rivers with fast currents). In that situation, back or sidestroke at an angle, head pointed upstream, toward the shoreline. Do not attempt to fight the current.
- Get out of the water as soon as possible, even part way (i.e., crawl up on top of overturned boat).
- If you cannot get out of the water, use the Heat Escape Lessening Posture (HELP), or the Huddle position (depending on number of people) to conserve body heat.
- Allocate resources for group survival. Rotate people into the "warmest" area regularly.

NOTE: According to the U.S. Coast Guard, water less than 70 degrees F is considered cold water.

First Aid

Every boater should take an American Red Cross or other approved first aid course. It is not only important for your own personal safety but for your passengers and other boaters you may encounter who need first aid assistance. You should also equip your boat with a first aid kit. This kit should be sufficient to deal with common problems such as sunburn, scrapes, bruises, minor burns, seasickness and bug bites.

Supplies

The following is a **minimum** inventory of first aid supplies you should carry.

- First aid manual
- Adhesive bandages in various sizes
- 3-inch sterile pads
- Triangular bandages
- 1-inch and 3-inch rolled bandages
- Tweezers and blunt scissors
- Cotton balls and cotton tipped applicators
- Antiseptic
- Sun screen (minimum SPF 15)
- Calamine lotion
- Motion sickness pills or patches
- Aspirin or substitutes
- Eyewash cup

Shock

Untreated, shock can cause death from a collapse of the cardiovascular system carrying oxygen to the body's vital organs. The signs of shock may include cold, clammy skin; profuse sweating; a pale color; bluish lips; rapid pulse and labored or rapid breathing. To treat shock, lay the victim on their back and cover with blankets or clothing to keep warm. Elevate the feet 8 to 12 inches higher than the head. Do not give the victim anything to eat or drink. Keep the victim comfortable until help arrives.

Bleeding

Control external bleeding by following these guidelines:

- Place direct pressure on the wound with a sterile dressing or clean cloth.
- If you do not suspect a broken bone, elevate the injured part above the level of the heart.
- Apply a pressure bandage to hold the dressing or cloth in place.

- Wrap bandage snugly over the dressing to keep pressure on the wound.
- If blood soaks through the bandage, add more pads.
- Continue to monitor vital signs.
- Help the victim rest in a comfortable position
- Maintain normal body temperature
- Reassure the victim
- Care for other injuries or conditions

Burns

- Burns are classified by depth of injury; the deeper the burn, the more severe it is. Treating burns should be done in such a manner as to relieve pain, prevent infection and prevent or treat for shock.
- First-degree burns redden the skin much like sunburn. Immerse the affected area in cool water or cover it with a cloth soaked in cool water. If necessary apply a dry dressing and cover it with a bandage.
- Second degree burns form blisters. Treat in the same manner as first degree burns.
- Do not break or try to remove any burned tissue. Do not apply any kind of antiseptic sprays or ointments. If possible keep the affected area above the victim's heart.
- Seek medical treatment as soon as possible.
- Third degree burns char and destroy tissue. Call for medical help immediately. Treat for shock if necessary and continue treatment as in second-degree burns.

Broken Bones

A broken bone injury should be immobilized to prevent further injury. Stop bleeding, if there is any, treat for shock and seek medical attention.

Rescue Breathing

If a victim is not breathing they must be attended to immediately. Rescue breathing is used to maintain an airway and cause air to flow in and out of the lungs. Rescue breathing should be continued until the victim can breathe for himself or herself or a doctor or other trained person takes responsibility. Rescue breathing should only be initiated if the victim still has a pulse; otherwise CPR should be administered.

Rendering Assistance From a Boat to Other Individuals Involved in an Accident

Be prepared to help others in trouble if at all possible but do not take unnecessary risks that could put your life in danger. Don't panic, have lifesaving equipment ready and approach the accident carefully. Watch for persons in the water and throw floatation devices to any who do not have any. Talk to the people and assess any injuries they may have.

Administer first aid if necessary and get the people to shore as quickly and safely as possible. Remember; don't overload your own boat with too many people. If necessary take victims requiring the most assistance into the boat and throw a line to the others and tow them slowly as you proceed.

Running Aground

Running aground can happen to even the best boat operator. Knowing how to properly navigate and having knowledge of the local area will greatly reduce the likelihood of running aground. Be sure to review navigation charts and maps as well as use a depth finder when navigating unknown waters. Keeping a lookout posted will also help reduce the chance of running aground.

Definitions

Hard Aground – means you hit so hard that the hull imbeds into the bottom material. The hull may be breached or forward motion immediately stopped by a hard aground.

Soft Aground – means you bumped the bottom or moved into a very soft bottom material such as sand or mud.

Actions to Take if Aground

- Put on PFD; remain calm.
- DO NOT reverse the engine in an attempt to dislodge the boat – this can cause additional damage to either the boat or the environment.
- Assess the damage. Check for signs of water. Listen for signs of rushing air as this suggests that water is rushing in and forcing air out.
- If you have bent the propeller, the rudder or damaged the shaft or its support, you will notice a vibration (sometimes violent) when you engage the engine. If this is the case, stop the boat, set the anchor and call for assistance.
- If there is no structural damage consider: (1) which way is the tide moving? Will it be enough to re-float the boat? (2) If there is no tide, determine if you can safely move the boat out of the area (typically in reverse) without causing damage – go very slowly.
- If you doubt you can free the boat, call for professional assistance such as a marine rescue.

Accident Reporting

Federal law states that if you are involved in a boating accident that includes injury requiring medical treatment, death, disappearance of a person, or property damage of at least $500.00, you are required to stop, identify yourself and your boat, and give help as needed. Additionally, you are required to file an accident report with the responsible local law enforcement agency, the appropriate agency accident form, and to your immediate supervisor.

Many states have more stringent laws on reporting accidents - check your state specific information. If in doubt, report the accident. Boating accidents include; capsizing, crew overboard, collisions, fire, sinking & flooding, explosions and disappearance.

See Appendix A for DOI Accident Report Form

Literature Cited

DOI-MOCC. 2008. Department of the Interior, Motorboat Operator Certification Course Student Reference Manual. Chapter 8. http://training.fws.gov/EC/resources/motorboat/pdf/DOI_MOCC_student_manual.pdf.

DOI. 2011. Departmental Manual. Series 27: Safety Management. Part 485: Safety and Occupational Health Program. Chapter 22: Watercraft Safety. http://elips.doi.gov/ELIPS/DocView.aspx?id=1624.

EMPLOYEE ACCOUNTABILITY FORM

I certify that I have read and I am familiar with SECN Standard Operating Procedure 3.1.2 for Safe Operation of Southeast Coast Network Watercraft.

I understand that the lack of compliance with this SOP will result in possible disciplinary action.

_____
Name

_____
Date

Appendix A – Field Forms

FLOAT PLAN

INSTRUCTIONS: Complete this plan before you go boating and leave it with a reliable person who can be depended upon to notify the Coast Guard, or other rescue organization, should you not return or check-in as planned. If you have a change of plans after leaving, be sure to notify the person holding your Float Plan. For additional copies of this plan, visit: **www.floatplancentral.org**

www.cgaux.org

Do NOT file this plan with the U.S. Coast Guard

www.uscgboating.org

VESSEL

IDENTIFICATION:

Name & Hailing Port _____

Document / Registration No. _____ HIN _____

Year & Make _____

Length _____ Type _____ Draft _____ Hull Mat. _____

Color _____

Prominent Features _____

COMMUNICATION:

Radio Call Sign _____

DSC MMSI No. _____

Radio-1: Type _____ Ch./ Freq. Monitored _____

Radio-2: Type _____ Ch./ Freq. Monitored _____

Cell / Satellite No. _____

E-mail _____

PROPULSION:

Primary-- Type _____ No. Eng. ___ Fuel Capacity _____

Auxiliary--Type _____ No. Eng. ___ Fuel Capacity _____

NAVIGATION: **(Check all on board)**

☐ Maps ☐ Charts ☐ Compass ☐ GPS / DGPS

☐ Radar ☐ Sounder ☐ _____

SAFETY & SURVIVAL

VISUAL DISTRESS SIGNALS:

☐ Electric S-O-S Light

☐ Orange Flag

☐ Orange Smoke

☐ Red Flares

AUDIBLE DISTRESS SIGNALS:

☐ Bell

☐ Horn / Siren

☐ Whistle

OTHER GEAR:

☐ Drogue / Sea Anchor

☐ EPIRB _____

☐ Fire Extinguisher

☐ Flashlight / Searchlight

☐ Food & Water for _____ days

☐ Foul Weather Gear

☐ Life raft / Dinghy

☐ Personal Locator Beacon

☐ _____

☐ _____

☐ _____

☐ _____

PFDs: **(Do not count Type IV devices)**

_____ Quantity On Board

GROUND TACKLE:

☐ Anchor: Line Length _____

PERSONS ONBOARD

OPERATOR:

Name _____ Age ___ Gender ___ Notes (Special medical condition, can't swim, etc.) _____

Address _____ Has experience: ☐ with this Vessel ☐ with Area

City _____ State _____ Zip Code _____ Home phone _____

Vehicle (Year, Make & Model) _____ Vehicle License No. _____

Trailer will be parked at: _____ Trailer License No. _____

PASSENGERS / CREW: Name & Address | Age | Gender | Notes (Special medical condition, can't swim, etc.)

1. _____
2. _____
3. _____
4. _____
5. _____

Attach "Supplemental Passenger List" if additional passengers or crew on board.

ITINERARY

	DATE	TIME	LOCATION / WAYPOINT	MODE OF TRAVEL	REASON FOR STOP	CHECK-IN TIME
Depart						
Arrive						
Depart						
Arrive						
Depart						
Arrive						
Depart						
Arrive						
Depart						
Arrive						

Attach "Supplemental Itinerary" if there are additional locations or waypoints.

Contact 1: _____ Phone Number _____

Contact 2: _____ Phone Number _____

If you have a genuine concern for the safety or welfare of any persons on board the Vessel described above, who have not returned or checked-in in a reasonable amount of time, then follow the step-by-step instructions on the *Boating Emergency Guide™* included with this float plan, or on the Internet at:

www.floatplancentral.org/help/BoatingEmergencyGuide.htm

Copyright 2010 Coast Guard Auxiliary Association, Inc. All rights reserved.

In Case of Emergency:

Vehicle Ownership: Southeast Coast Network, National Park Service

Vehicle Operator: Cell Phone:

Date: Float Plan Filed This Date:

Float Plan Point of Contact #1:

Phone Number:

Float Plan Point of Contact #2:

Phone Number #2:

Other Emergency Contact/Phone #:

SMIS

Offline Accident Reporting Worksheet

(Preparation for reporting online via www.smis.doi.gov)

Factual Information about the Accident

Date / /	**Reporter's/Supervisor's Name**	**SSN - Last 4**
Time AM : PM	**Place/Location of Accident**	
Zip Code of Accident	**Narrative**	
Result ☐ **Injury** ☐ **Illness** ☐ **Injury w/Prop Damage** ☐ **Property Damage Only** ☐ **Incident Only**		

Contributing Factors

Unsafe Act	**Unsafe Condition**	**Management Factor**

Personal Data

Name	Last MI								First	
Attributes	**SSN** **Occ Code**		**Grade/Step**			**DOB** / /			**Sex**	
Address	**Street** **State**		**Zip Code**							
Organization	**Bureau Code** **Organization Code**					**Sub-Bureau Code**				
Empl Status	**Perm**	**Temp**	**Emer**	**Contr**	**Concess**	**Public**	**Volunteer**	**Firefighter**	**BIA**	**Other**

Injury Information

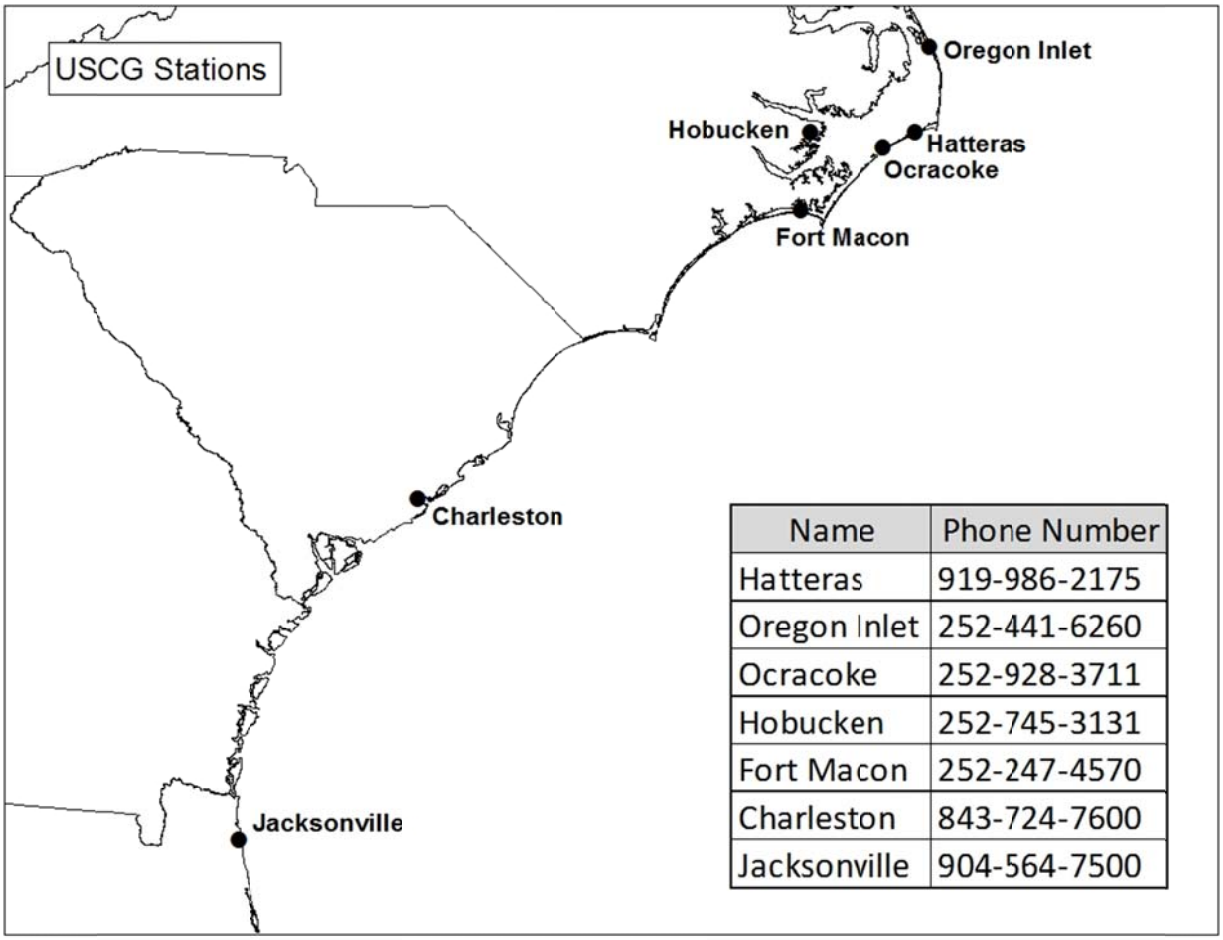
Body Part	**Date Work Stopped** / /
Severity	**Date Pay Stopped** / /
Nature	**Date Terminated** / /
Type	**Date Returned** / /
Activity	**45 Days COP Began** / /
Cause	**Days Restricted Duty**
Source	**Days Lost Time**

Property Damage Information

Property Type	
Description	
Property Owner	
Cause of Damage	
Source of Damage	
Cost/Loss	
Responsible for Property	**SSN** **Name** **(use personal data block above or another form)**

Additional Notes and Bureau Specific Data

Appendix B – Coast Guard Contact List



Name	Phone Number
Hatteras	919-986-2175
Oregon Inlet	252-441-6260
Ocracoke	252-928-3711
Hobucken	252-745-3131
Fort Macon	252-247-4570
Charleston	843-724-7600
Jacksonville	904-564-7500

Appendix C – Boat Operations Checklist

Boat Pre-Start

- ☐ File Float Plan
- ☐ Install Hull plugs
- ☐ Check Fuel Level
- ☐ Check Mooring Lines
- ☐ Check Engine Oil
- ☐ Check Fuel Line
- ☐ Check battery and cable connection
- ☐ Check anode
- ☐ Verify Safety Equipment
  - Flares (check expiration)
  - PFDs (for everyone in boat)
  - Fire extinguisher
  - Throwable
  - Emergency kit
- ☐ Turn on power switch
- ☐ Choke (as necessary)
- ☐ Pump Fuel Bulb (as necessary)
- ☐ Crank
- ☐ Verify coolant discharge

While Running

- ☐ Check Coolant periodically
- ☐ Check Jet drive Intake (for vegetation that has been sucked in)

Trailering

- ☐ Check Zerk fittings
- ☐ Check Straps
- ☐ Check Tires
- ☐ Check Hitch (hitch, locks, chains)
- ☐ Check Lights
- ☐ Empty boat of loose gear

Boat Post-Use

- ☐ Check oil
- ☐ Pull hull plugs
- ☐ Connect fresh water wash and crank engine (run for 15 minutes)
- ☐ Clean boat and trailer
- ☐ Clean bilge
- ☐ Grease Jet Drive (Low pressure)
- ☐ Dry and stow gear
- ☐ See trailering
- ☐ Refuel Tanks
- ☐ Clean life jackets