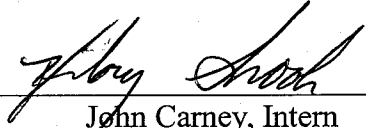
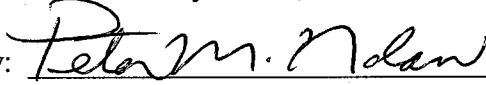
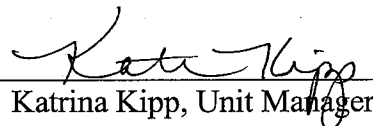


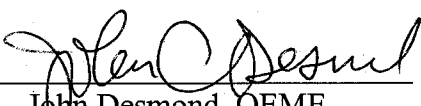
**STANDARD OPERATING PROCEDURE
FOR TRANSPORTING AND OPERATING BOATS**

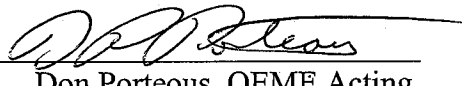
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1.0 Scope & Application:

This Standard Operating Procedure is applicable to the transport and operation of water craft for use in sampling and monitoring. This SOP is intended to standardize procedures for transporting and operating boats and references U.S. Coast Guard (U.S.C.G) publications about these procedures. However, this SOP is not intended as a substitute for information on federal and state regulations concerning water craft operation and transport or as a substitute for a safe boating course. Individuals who operate USEPA water craft are required to complete a safe boating course or have demonstrated their skill and knowledge through a priori experience.

2.0 Summary of Method:

The methods discussed herein cover the operation and transport of water craft for use in USEPA sampling and monitoring activities.

3.0 Definitions:

- 3.1 ABEAM - At right angles to the keel of the boat, but not on the boat.
- 3.2 ADRIFT - Loose, not on moorings or towline.
- 3.3 AFT - Toward the stern of the boat.
- 3.4 AGROUND - Touching or fast to the bottom.
- 3.5 AIDS TO NAVIGATION - Artificial objects to supplement natural landmarks indicating safe and unsafe waters.
- 3.6 ASTERN - In back of the boat, opposite of ahead.
- 3.7 BEARING - The direction of an object expressed either as a true bearing as shown on the chart,
or as a bearing relative to the heading of the boat.
- 3.8 BOOT TOP - A painted line that indicates the designed waterline.
- 3.9 BOW - The forward part of a boat.
- 3.10 BOW LINE - A docking line leading from the bow.

- 3.11 BUOY - An anchored float used for marking a position on the water or a hazard or a shoal and for mooring.
- 3.12 BURDENED VESSEL - That vessel which, according to the applicable Navigation Rules, must give way to the privileged vessel. The term has been superseded by the term "give-way".
- 3.13 CAPSIZE - To turn over.
- 3.14 CAST OFF - To let go.
- 3.15 CHART - A map for use by navigators.
- 3.16 CHOCK - A fitting through which anchor or mooring lines are led. Usually U-shaped to reduce chafe.
- 3.17 CLEAT - A fitting to which lines are made fast. The classic cleat to which lines are belayed is approximately anvil-shaped.
- 3.18 DEAD AHEAD - Directly ahead.
- 3.19 DEAD ASTERN - Directly aft.
- 3.20 DRAFT - The depth of water a boat draws.
- 3.21 EBB - A receding current.
- 3.22 FATHOM - Six feet.
- 3.23 FENDER - A cushion, placed between boats, or between a boat and a pier, to prevent damage.
- 3.24 FLOOD - A incoming current.
- 3.25 FOLLOWING SEA - An overtaking sea that comes from astern.
- 3.26 FREEBOARD - The minimum vertical distance from the surface of the water to the gunwale.
- 3.27 GIVE-WAY VESSEL - A term used to describe the vessel which must yield in

meeting, crossing, or overtaking situations.

- 3.28 GROUND TACKLE - A collective term for the anchor and its associated gear.
- 3.29 GUNWALE - The upper edge of a boat's sides.
- 3.30 HEADING - The direction in which a vessel's bow points at any given time.
- 3.31 HEADWAY - The forward motion of a boat. Opposite of sternway.
- 3.32 JETTY - A structure, usually masonry, projecting out from the shore; a jetty may protect a harbor entrance.
- 3.33 KEEL - The centerline of a boat running fore and aft; the backbone of a vessel.
- 3.34 KNOT - A measure of speed equal to one nautical mile (6076 feet) per hour.
- 3.35 LATITUDE - The distance north or south of the equator measured and expressed in degrees.
- 3.36 LEE - The side sheltered from the wind.
- 3.37 LONGITUDE - The distance in degrees east or west of the meridian at Greenwich, England.
- 3.38 MOORING - An arrangement for securing a boat to a mooring buoy or a pier.
- 3.39 NAUTICAL MILE - One minute of latitude; approximately 6076 feet - about 1/8 longer than the statute mile of 5280 feet.
- 3.40 NAVIGATION RULES - The regulations governing the movement of vessels in relation to each other, generally called steering and sailing rules.
- 3.41 OVERBOARD - Over the side or out of the boat.
- 3.42 PILING - Support, protection for wharves, piers etc.; constructed of piles (see PILE)
- 3.43 PILOTING - Navigation by use of visible references, the depth of the water, etc.

- 3.44 PORT - The left side of a boat looking forward. A harbor.
- 3.45 PRIVILEGED VESSEL - A vessel which, according to the applicable Navigation Rule, has right-of-way (this term has been superseded by the term "stand-on").
- 3.46 RUDDER - A vertical plate or board for steering a boat.
- 3.47 RUNNING LIGHTS - Lights required to be shown on boats underway between sundown and sunup.
- 3.48 SCOPE - Technically, the ratio of length of anchor rode in use to the vertical distance from the bow of the vessel to the bottom of the water. Usually six to seven to one for calm weather and more scope in storm conditions.
- 3.49 SPRING LINE - A pivot line used in docking, undocking, or to prevent the boat from moving forward or astern while made fast to a dock.
- 3.50 STAND-ON VESSEL - That vessel which has right-of-way during a meeting, crossing, or overtaking situation.
- 3.51 STARBOARD - The right side of a boat when looking forward.
- 3.52 STEM - The forward most part of the bow.
- 3.53 STERN - The after part of the boat.
- 3.54 STERN LINE - A docking line leading from the stern.
- 3.55 TIDE - The periodic rise and fall of water level in the oceans.
- 3.56 TOPSIDES - The sides of a vessel between the waterline and the deck; sometimes referring to onto or above the deck.
- 3.57 TRANSOM - The stern cross-section of a square stern boat.
- 3.58 UNDERWAY - Vessel in motion, i.e., when not moored, at anchor, or aground.
- 3.59 WAKE - Moving waves, track or path that a boat leaves behind it, when moving across the waters.

- 3.60 WATERLINE - A line painted on a hull which shows the point to which a boat sinks when it is properly trimmed.
- 3.61 WAY - Movement of a vessel through the water such as headway, sternway or leeway.
- 3.62 WINDWARD - Toward the direction from which the wind is coming.

4.0 Health and Safety Considerations:

- 4.1 When working with potentially hazardous materials or situations, follow EPA, OSHA, and specific health or safety procedures.
- 4.2 All proper personal protection clothing and equipment is to be worn.
- 4.3 When sampling lagoons or surface impoundments containing known or suspected hazardous substances, take adequate precautions.
- 4.4 Some samples may contain biological and chemical hazards. These samples should be handled with suitable protection to skin, eyes, as deemed appropriate or described.
- 4.5 At a minimum, all individuals on board a water craft will wear Type III U.S.C.G. approved personal floatation devices at all times. If conditions require further protection, Type I or II will be used.
- 4.6 A minimum of two individuals are required to be on board at all times during vessel operation.
- 4.7 A float plan should be filed prior to departure (See Appendix A) and left in the file holder next to the key locker in the boat room.

5.0 Personnel Qualifications:

- 5.1 Individuals who operate USEPA water craft are required to complete a safe boating course or have demonstrated their skill and knowledge through a priori experience with the boat safety officer.

6.0 Equipment and Supplies:

The following list outlines the minimum equipment necessary for transport and operation of water craft.

6.1 Water craft Transport Equipment:

- Belly straps
- Suitable rack for car top transporting
- Correct size ball hitch

6.2 Water craft Equipment:

- Bow & stern line
- Anchor & tackle
- Paddles
- U.S.C.G. Approved Personal Floatation Devices for each individual on board with one additional
- Radio
- Engine
- Gasoline tanks
- Fuel line
- Drain plug
- Fully Charged Batteries
- Bilge pump
- Water craft engine key

7.0 Preparing Water Craft for Transport and Use

7.1 Water craft sign-out sheet

Keys to each water craft are kept in a key locker located in the boat shed at the OEME laboratory, along with a sign-out sheet/floatplan and checklist. Individuals wishing to use the water craft must complete the sign out sheet and use the checklists.

7.2 Checklist for Preparing trailered Water craft with engines

The following is a generic checklist with the minimum items that should be reviewed before transporting and operating a water craft with an engine:

7.2.1 Trailer Checklist

- Check trailer hitch assembly on vehicle, make sure that ball is properly attached. Check to make sure that correct ball size is used.
- Attach trailer to vehicle, check to make sure trailer is secure on ball hitch (key for lock), make sure tongue is locked on ball by pulling up on trailer.
- Attach trailer safety cables, check cables for wear and tear.
- Connect trailer electrical connection to vehicle electrical plug, check for wear and tear on wires and plugs.
- If the trailer has brakes, check the brake fluid reservoir level, also check brake lines for wear and tear.
- Inspect tires (including spare) to make sure they are properly inflated.
- Check Padlock on spare tire, make sure that key works.
- Check to see that bearing buddies are lubed
- Make sure lug wrench & jack for trailer are in boat carboy
- Check the turn signals, brake lights, and running lights on trailer to make sure they are working properly.

7.2.2 Boat Checklist

- Safety chain & cable attached and snugged to bow roller
- Belly strap attached and snugged, visually inspected
- Bow & stern line on board
- Anchor & tackle on board and visually inspected
- Batteries fully charged & water level checked
- Electronics working (radio, depth finder, accessories)
- Navigation lights working (bow, stern)
- Instrument & compass lights working
- Bilge pump working
- Steering functional & gear visually checked
- Drain plug inserted
- Oil reservoir in main engine full
- Main engine starts & runs (locked in upright position for travel)
- Kicker motor starts, runs (fuel tank full), & is secure to transom
- Paddle on board
- U.S.C.G. Approved Personal Floatation Devices for each individual on board plus one additional
- Gasoline tanks filled (please note that both two stroke and four stroke engines are used, and that they have different requirements

for fuel mixtures. Two stroke engines require an oil/fuel mixture, four stroke engines have separate fuel and oil containers. Determine which engine will be used and consult the manufacture's instructions for proper fuel requirements).

7.3 Checklist for Preparing Vehicle for Top Transported Water Craft

In addition to transporting water craft by trailer, certain water craft such as canoes can be transported on top of vehicles using a rack. The following is a checklist procedure for vehicle top transport of water craft.

7.3.1 Attach transporting racks to top of vehicle following rack manufacture's instructions. Check to make sure the racks are securely attached to vehicle.

7.3.2 Place water craft on top of rack. At a minimum use four lines or straps to attach water craft to vehicle. Securely attach lines to bow and stern of water craft, and attach other end of lines to the bumpers of the vehicle. Securely attach lines to each of the vehicle racks, run line over top of water craft to other side of vehicle rack and securely tie off.

The checklist procedure for the water craft used in vehicle top transporting is the same as that outlined in section 7.2.2.

8.0 Transport of Water Craft

All water craft will be transported in accordance with federal, state, and local regulations.

9.0 Unloading Water craft

9.1 Prior to moving vehicle to boat ramp:

9.1.1 Attach bow and stern lines to boat. Make sure length of lines is such that the lines reach the dock or shore where the boat will be placed.

9.1.2 Remove the belly strap from the boat and trailer.

9.1.3 Disconnect trailer lights from vehicle.

9.1.4 Determine one individual who will assist driver in backing boat down ramp. Work out audio and visual signals to assist driver in unloading process.

9.1.5 Check to make sure drain plug is inserted in the boat.

9.2 At the boat ramp

9.2.1 Before backing vehicle and trailer down boat ramp, make sure the trailer and vehicle are in a straight line.

9.2.2 Check to make sure that boat ramp is clear of personnel, vehicles, or boats before proceeding. Individual assisting driver in backing up should stand to the driver's side of vehicle and well clear of trailer.

9.2.3 Back trailer down boat ramp to edge of water and stop. The driver's assistant should disconnect safety chain & cable from boat, and roll up excess cable on trailer winch (**Disconnect safety chain and cable ONLY if located on a LEVEL surface, otherwise leave cable and safety chain attached until the boat is floated off the trailer**). The driver's assistant should take bow and stern lines in hand, and then move clear of trailer and vehicle.

9.2.4 Once all personnel are clear of vehicle, back trailer into water until wheels are covered or boat begins to float on its own. The backing momentum will push boat away from trailer. Once boat is clear of trailer, the trailer can be pulled out of the water. The boat should be pulled to the dock or shore and secured using bow and stern lines.

10.0 Operation of Water craft

10.1 Starting the Engine

10.1.1 The transport lock for the engine should be lifted or adjusted, and the engine lowered into the water. If starting in a shallow area, make sure that the engine is at least lowered to the point where the cooling water intake is below the waterline.

10.1.2 Attach engine electronics to battery leads.

10.1.3 Check to make sure the fuel line is properly attached, prime the fuel line by squeezing the fuel "bulb" until it becomes firm and open the air vent on the top of the gas can cap.

10.1.4 Make sure throttle position is in neutral and if necessary turn choke on.

10.1.5 Turn key to start engine. Inspect engine to make sure that coolant system is working (i.e. a stream of water is flowing from engine compartment). If coolant system is not working, stop engine immediately and check to make sure water intake and exit ports are clear.

10.1.6 Allow engine to warm up at idle speed before leaving dock or shore.

10.2 Leaving dock or shore

10.2.1 Untie bow and stern lines, keeping one line in hand for the individual shoving off the boat.

10.2.2 Make sure all personnel on board have PFDs on.

10.2.3 If leaving from a dock, walk boat to end of dock

10.2.4 Prior to leaving shore or dock, driver will look around to determine if there are any oncoming boats or other hazards.

10.2.5 Once clear, the driver should indicate when the line tender should board.

10.2.6 Once all personnel are on board and in position, the driver may put the engine in gear and make way.

10.3 Operating Water craft (Rules of the Road)

All water craft will be operated in accordance with federal, state, and local regulations. The following highlights critical procedures for operating water craft.

10.3.1 Obey all posted signs and signals such as but not limited to, "No Wake Zone", Posted Speed Limits, Draw Bridge Signs etc....

- 10.3.2 Take care when operating water craft around sailboats or human powered craft (e.g. rowing shells, kayaks, canoes). Give these boats a wide berth when overtaking or meeting, and reduce speed of water craft to produce as little wake as possible.
- 10.3.3 When approaching another water craft from any direction, make your intentions known early and clear to the other craft as to how you will pass them. This may be done by signaling and then making course corrections deliberately and in an obvious manner.
- 10.3.4 When operating water craft in heavy boat traffic areas, monitor appropriate marine radio channels.
- 10.3.5 Remember the phrase “Red, Right, Returning.” When traveling in a channel or a shipping lane returning to a harbor or landing, red colored “nuns” mark the right hand side of the channel or shipping lane, green or black colored “cans” mark the left hand side of a channel or shipping lane. Keep the appropriate navigation aid on your right when entering or leaving.
- 10.3.6 When crossing areas of heavy traffic, cross at right angles to the channel lanes. When traveling with heavy traffic, if possible stay to the edge of the marked channel.
- 10.3.7 Prior to and during operation of water craft, monitor both weather forecasts and current weather conditions.

10.4 Anchoring

- 10.4.1 Select an area that offers maximum shelter from wind, current and boat traffic.
- 10.4.2 Determine depth of water and type of bottom (preferably sand or mud). Calculate the amount of anchor line you will need. General rule: 5 to 7 times as much anchor line as the depth of water plus the distance from the water to where the anchor will attach to the bow. For example, if the water depth is 8 feet and it is 2 feet from the top of water to your bow cleat, you would multiply 10 feet by 5 to 7 to get the amount of anchor line to put out. In tidal areas, be aware of scope with tidal changes and boat swing.

- 10.4.3 Secure the anchor line to the bow cleat at the point you want it to stop; make certain you take a couple wraps around the cleat prior to “cleating off.”
- 10.4.4 Bring the bow of the vessel into the wind or current. When you get to the spot you want to anchor, place the engine in neutral. When the boat comes to a stop, slowly lower the anchor. Do not throw the anchor over, as it will tend to entangle the anchor.
- 10.4.5 When all anchor line has been let out, back down on the anchor with engine in idle reverse to help set the anchor. If the holding ground is questionable, “cleat off” and then back down on the anchor to get a good “bite” into the bottom.
- 10.4.6 When anchor is firmly set, use reference points (landmarks) in relation to the boat to make sure you are not drifting. Check these points frequently, especially in areas subject to tidal changes.

10.5 Returning to Dock or Shore

- 10.5.1 Before approaching dock or shore, determine which personnel will be in charge of bow and stern lines. Notify line tenders not to “pull” the boat in by the line while docking causing loss of control by the driver.
- 10.5.2 Approach dock or shore at low speed. Place throttle in neutral position when arriving at dock, if the boat is still moving forward when at the dock apply a quick burst of reverse throttle to stop forward motion of boat.
- 10.5.3 When the boat has stopped its forward motion, have the bow and stern personnel disembark to secure the lines. Shut off engine. If necessary, secure fenders to the side of the boat next to the dock prior to landing.

11.0 Loading Water Craft Onto Trailer

11.1 Prior to loading water craft:

- 11.1.1 Determine job assignments for personnel, one person will have to drive the boat onto the trailer, one shore person will have to attach the safety cable

and reel the winch, and one person will have to drive the vehicle.

11.2 Loading Water craft:

11.2.1 Back the vehicle and trailer down the boat ramp, stopping when the tires of the trailer are submerged, or all but the two rollers nearest the vehicle are submerged. (Apply the emergency or parking brake on the vehicle).

11.2.2 Back the boat away from the dock, and approach the trailer at a very slow speed. The driver of the boat should aim the bow of the boat for the bow roller. Place the throttle of the boat in neutral just before arriving at the trailer.

11.2.3 When the boat comes to a complete stop, the shore person attaches the safety cable to the boat and begins to reel in the cable. As the boat is being reeled in, care should be taken to keep the boat in line with the trailer.

11.2.4 Once the bow of the boat is snug with the bow roller, the boat driver raises the engine and locks it for transport. The driver can then climb out of the boat. Care should be taken when climbing out of the boat.

11.2.5 Once all personnel are clear of the boat and trailer, the vehicle driver places the vehicle in drive and slowly begins to apply the accelerator. As this is being done, the emergency brake is released and the trailer is pulled from the water. Once the trailer is completely out of the water, stop the vehicle on a level surface. Make sure the boat is resting on all of the trailer rollers in an even manner. If this is not the case, then back the trailer into the water, loosen the safety cable and reposition the boat.

11.2.6 Move the trailer from the boat ramp

11.3 After Loading Trailer:

11.3.1 Removal all equipment from boat and secure any compartments anchors, etc.

11.3.2 Re-attach belly strap on the boat to the trailer.

11.3.3 Remove boat drain plug.

11.3.4 Disconnect electronics from boat engine battery.

11.3.5 Connect trailer electrical connection to vehicle electrical plug. Check the turn signals, brake lights, and running lights on trailer to make sure they are working properly.

12.0 Storing Water Craft After Use

12.1 The following is a generic checklist with the minimum items that should be reviewed and completed at the time of storing water craft.

12.1.1 Trailer Checklist

- Wash down trailer and remove any weeds present on the trailer (especially wheel wells, disc brakes, & lights)
- Before disconnecting trailer electronics check to make sure that the trailer lights are working (turn signals, brake lights, running lights)
- Lock trailer hitch.
- If the trailer has brakes, check the brake fluid reservoir, fill if not full.
- Chock the trailer wheels and elevate trailer tongue to a height where any water entering the boat will drain out. Remove the drain plug and leave next to the transom.
- If any problems are encountered during use of trailer or boat, notify personnel in charge of boat operations immediately upon return.

12.1.2 Boat Checklist

- Safety chain & cable attached and snugged to bow roller.
- Belly strap attached and snugged, visually inspected.
- Bow & stern line on board & stowed.
- Anchor & tackle on board and stowed properly.
- Boat & motors freshwater rinsed/weeds removed.

- Motors down for storage.
- If boat was used in saltwater, flush motors.
- Battery switch on off.
- Drain plug pulled and trailer tongue elevated.
- Return equipment to boat room, if equipment is till wet, let dry then store.
- Return boat keys to boat shed key locker, complete sign-out sheet

When not in use all boats must be placed in the boat storage area.

13.0 References

- 13.1 Federal Requirements for Recreational Boats, (2001) United States Coast Guard, http://www.uscgboating.org/reg/reg_fr_contents.asp
- 13.2 Reference Guide to State Boating Laws, 6th Edition, (2000) (Chris Moore and Ron Sarver, Editors), National Association of State Boating Law Administrators, Lexington, KY, 90pp.
- 13.3 Navigational Rules and Regulations (1995), United States Coast Guard, United States Government Printing Office, Pittsburgh, PA, 214pp.

<http://www.USCGBoating.org/>

<http://www.uscg.mil/vtm/pages/rules.htm/>

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APPENDIX A

Vessel Float Plan

Float Plan

Name of vessel's operator:		
Telephone Number:		
Name of Vessel:		
Registration No.:		
Description of Vessel: Type: Make: Color of Hull: Color of Trim: Most distinguishing identifiable feature:		
Rafts/Dinghies: Number: _____ Size: _____ Color: _____		
Radio: Type: _____ Frequencies Monitored: _____		
Number of persons onboard:		
Name:	Age:	Address & Telephone:
Note: List additional passengers on back.		
Engine Type: _____ H.P.: _____ Normal Fuel Supply (days): _____		

Survival equipment on board: (check as appropriate)		
Life Jackets	Flares	Smoke Signals
Medical Kit	EPIRB	Paddles
Anchor	Loran/Gps	_____
Food for _____ days - Water for _____ days		
Trip:		
Date & Time of Departure:		
Departure From:		
Departure To:		
Expected to arrive by: _____ In no case later than: _____		
Additional information:		