Water Rescue
Lesson One
Watercraft Operations

DOMAIN: COGNITIVE / PSYCHOMOTOR

LEVEL OF LEARNING: COMPREHENSION / APPLICATION

MATERIALS

Swift Water Rescue by Slim Ray; Water Rescue Levels I and II by Delmar; NFPA 1006 Technical Rescuer Professional Qualification; NFPA 1670 Operations and Training for Technical Rescue Incidents; NCOSFM Emergency Vehicle Drivers course; WATER RESCUE, Basic Skills for Emergency Responders, USCG Watercraft Guide; NC Wildlife Commission Boating Guide, BOAT NORTH CAROLINA; North Carolina Motor Vehicle Laws Chap. 20; Water Rescue Video, SWEPT AWAY, by Allen Madison Productions; LCD projector and computer, screen, overhead projector, white board, dry-erase pens, VCR and monitor, throw bags, 1 life ring or buoy, type III or type V PFD for each candidate and instructor, 1 each of the following for each candidate and instructor if necessary, wet suit or dry suit, whistle, water proof light, sheathed knife (or equivalent) and water rescue helmet, sufficient rigging equipment for static and tag-line operations. The instructor should provide additional props that you may have access to that are specific to the Surface Water environment your students will be exposed to.

NFPA 1006, 2008 edition JPRs

11.1.8 Use watercraft for rescue operations, given watercraft, policies, and procedures used by the AHJ

11.1.10 Negotiate a designated watercourse in a watercraft

11.1.11 As a member of a team, use techniques appropriate for the water environment to extricate an incapacitated waterbound victim from the water

Junior Member Statement:

Junior Member training activities should be supervised by qualified instructors to assure that the cognitive and psychomotor skills are completed in a safe and non-evasive manner. While it is critical that instructors be constantly aware of the capabilities of all students both mentally and physically to complete certain tasks safely and successfully, the instructor should take every opportunity to discuss with departmental leaders and students the maturity and job awareness each participant has for the hazards associated with fire and rescue training.

TERMINAL OBJECTIVE

The Water Technical Rescuer candidate, acting as a coxswain, shall properly demonstrate the ability to deploy, launch, operate, anchor and recover the watercraft being used as well as demonstrate watercraft-based rescue and recovery techniques.

ENABLING OBJECTIVES

1. The Water Technical Rescuer candidate, acting as a coxswain and given the appropriate equipment, shall correctly demonstrate the process for inspecting proper hook-up of trailer and towing vehicle when towing a watercraft, and correctly demonstrate proper driving techniques.

2. The Water Technical Rescuer candidate, acting as a coxswain and given the appropriate equipment, shall correctly demonstrate the proper pre-deployment inspection procedures of trailer and watercraft.

3. The Water Technical Rescuer candidate, acting as a coxswain and given the appropriate equipment, shall

correctly launch and recover watercraft used by the Authority Having Jurisdiction (AHJ).

4. The Water Technical Rescuer candidate, acting as a coxswain and given the appropriate equipment, shall correctly demonstrate the ability to handle watercraft in challenging conditions and during different rescue situations.

5. The Water Technical Rescuer candidate, acting as a coxswain and given the appropriate equipment, shall correctly demonstrate the techniques used during a watercraft-based search / rescue on open water.

6. The Water Technical Rescuer candidate, acting as a coxswain and given the appropriate equipment, shall correctly demonstrate the techniques used during a watercraft-based search / rescue on rivers.

7. The Water Technical Rescuer candidate, acting as a coxswain and given the appropriate equipment, shall correctly demonstrate the techniques for extricating a victim from the water when using a watercraft.

NOTE: Watercraft-based rescues are potentially dangerous for rescuers and require direct contact with the victim, thus subjecting the rescuer to the same hazards.

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MOVITATION

Because many of the rescues and recoveries that are related to a Surface Water environment will be performed from some type of watercraft, it is imperative that the Surface Water Technical Rescuer candidate be well versed in the safe operation of any watercraft that they may use. By being familiar with the proper use and handling of their watercraft, they will be better equipped to handle the same watercraft when something out of the normal happens.

PRESENTATION

ENABLING OBJECTIVE #1

The Water Technical Rescuer candidate, given the appropriate equipment, shall correctly demonstrate the process for inspecting proper hook-up of trailer and towing vehicle when towing a watercraft, and correctly demonstrate proper driving techniques.

1. Demonstrate the process for inspecting proper hook-up of trailer and towing vehicle when towing a watercraft.
   a) Hitch and ball assemblies of towing vehicle secure.
   b) Electrical connections secure and usable.
   c) Trailer hitch secure and locked on ball.
   d) Safety chains criss-crossed and securely attached.
   e) All trailer lights functioning.

2. Demonstrate the process for inspecting the towing vehicle and discuss proper driving techniques.
   a) Ensure that mirrors are adjusted to allow full view of trailer and watercraft.
   b) Driver should be experienced in towing operations.

c) AHJ should establish criteria for same.
d) Driver should ensure proper placement of hands on steering wheel.
e) Allow more time for braking.
f) Maintain farther following distances.

Reference: Motor Vehicle Laws of North Carolina, Chapter 20.
BOAT NORTH CAROLINA, Chapter 2.
USCG Watercraft Guide.

PRESENTATION

ENABLING OBJECTIVE #2

The Water Technical Rescuer candidate, given the appropriate equipment, shall correctly demonstrate the proper pre-deployment inspection procedures of trailer and watercraft.

1. Demonstrate the proper pre-deployment procedures for inspecting watercraft.
   a) Ensure that watercraft is properly secured to trailer. If double-bunking, both units should be secured individually and together.
   b) All equipment in watercraft should be stowed properly.
   c) Motor is the correct size for that craft, and should be secured in “UP” position and locked.
   d) Transom support (if used) should be locked in place.

2. Demonstrate the proper pre-deployment procedures for inspecting trailers.
   a) Trailer wheels are properly lubricated.
   b) Tires are properly inflated, lug nuts are secured, and spare tire is secured.
   c) All loose straps are secured.
   d) All trailer lights are operable.
   e) Correct tongue weight for the trailer.

Reference: BOAT NORTH CAROLINA.
North Carolina Motor Vehicle Laws, Chapter 20.
NCOSFM Emergency Vehicle Drivers course.
USCG Watercraft Guide.

PRESENTATION

ENABLING OBJECTIVE #3

The Water Technical Rescuer candidate, given the appropriate equipment, shall correctly launch and recover watercraft used by the Authority Having Jurisdiction (AHJ).

1. Demonstrate the proper techniques for checking watercraft and equipment prior to the launching of watercraft.
   a) Allows wheel bearings to cool.
   b) Easier to load equipment.
   c) Be sure drain plug is in.
   d) Disconnect trailer lights.
   e) Slowly back trailer down ramp until watercraft is in water.
   f) Set parking brake and block wheels.
   g) Launch watercraft, maintain secure hold on bow line.

2. Demonstrate the proper techniques for the recovery of watercraft.
   a) Recovery of the watercraft is essentially the reverse of the launching sequence.
   b) All equipment stowed out of the way for recovery of the watercraft.
   c) Slow approach to the retrieval site.
   d) Hand-operated or powered retrieval to trailer.
   e) Decontamination and rehab of the watercraft may need to be done at the retrieval site.

3. Demonstrate the proper techniques for boarding watercraft.
   a) Maintaining stability is a safety issue. Ensure that all personnel are equipped with PFDs prior to boarding.
   b) Keep body low and weight centered.
   c) If loading any items onto the craft, do so one item at a time.

4. Demonstrate proper docking procedures.
   a) Docking procedures will vary depending on wind and water conditions.
   b) Docking will prove to be a difficult procedure for inexperienced operators.

c) Head into the wind or current if possible.
d) Plan on how you intend to dock.
e) Have fenders, boat hook and/or a heaving line ready.
f) When docking in current, slip sideways bit by bit towards the dock, pier or slip.
g) Secure bow and stern lines.

5. Emphasize that when approaching a partially submerged vehicle or building, it is recommended that if possible, the approach is made from the side, going upstream into the current flow. This is to prevent the watercraft and rescuers from getting caught by either if the current should suddenly move them.

6. Demonstrate proper anchoring procedures.
   a) Ensure that the proper anchor type is being used for the water environment (bottom structure is determining factor).
   b) Watercraft should carry two different anchor styles.
   c) The depth of the water determines the Anchor Scope.
   d) Anchor Scope determines the amount of Rode (anchor line and chain) that should be used.
   e) Head your craft into the wind or current.
   f) Lower anchor over the bow of the craft.
   g) Reverse travel and set anchor.
   h) Allow approximately 1/3 of the rode to deploy, cut the engine, tie off the anchor line to a forward cleat and let out the remainder of the line.
   i) Never anchor a small watercraft from the stern.

Reference: BOAT NORTH CAROLINA.
North Carolina Motor Vehicle Laws, Chapter 20.
NCOSFM Emergency Vehicle Drivers course.
USCG Watercraft Guide.

PRESENTATION

ENABLING OBJECTIVE #4

The Water Technical Rescuer candidate, given the appropriate equipment, shall correctly demonstrate the ability to handle watercraft in challenging conditions.

1. Discuss the watercraft's Trim (the way it floats).
   a) Watercraft must be stable to operate properly.
   b) All equipment and personnel must be evenly distributed in the craft. Keep the bow light.
   c) Never exceed the craft's capacity.
   d) The general rule of thumb for fuel usage is 1/3 out, 1/3 in, and 1/3 in reserve.

2. Discuss the proper handling of the watercraft used by the AHJ when operating under power, and without power.
   a) All watercraft will handle differently.
   b) Hands-on practice is the only way to ensure proficiency and comfort with the craft.
   c) Motorized watercraft handles best when heading into the wind.
   d) When running with the wind, the operator must travel faster than the wind to maintain control of the craft.
   e) Speed may be reduced quickly by shifting into reverse and applying power.
   f) The sudden loss of power on swift moving water will necessitate bringing the bow of the craft around to the downstream position and gaining control of the watercraft until it is either safely docked or power is restored.
   g) An exception to this rule is when rescuers are on the ocean, or a large lake with wave action. In this case, the rescuers need to maintain the bow of the craft into the waves to prevent possible swamping.
   h) During the operation of any type of watercraft, you find yourself out of the craft in any type of moving water, river of surf, personnel need to position themselves upstream or seaward of the craft to prevent being caught between the craft and any obstructions.
   i) An understanding of the flotation capabilities of the watercraft used by the authority having jurisdiction (AHJ) when overturned and the recovery techniques for the same are important points for the students to know.

3. Demonstrate the correct procedures for entering an Eddy (Eddy Turn).
   a) Approach from the upstream side.

b) Begin turning into the eddy as the bow of the craft breaks the differential line where the currents meet.
c) Rescuers in the craft lean towards the downstream side to allow the current to help with the turn.
d) Allow the stern of the craft to swing downstream.
e) Power upstream into the eddy.

4. Demonstrate the correct procedures for exiting an Eddy (Eddy Peel-Out) when approaching from the downstream side.
a) Navigate the bow of the craft to the upper end of the eddy.
b) Begin to turn the bow of the craft slightly towards the port side.
c) As the bow of the craft crosses the differential line, increase power and point the craft downstream.
d) Rescuers should lean towards the downstream side of the craft.

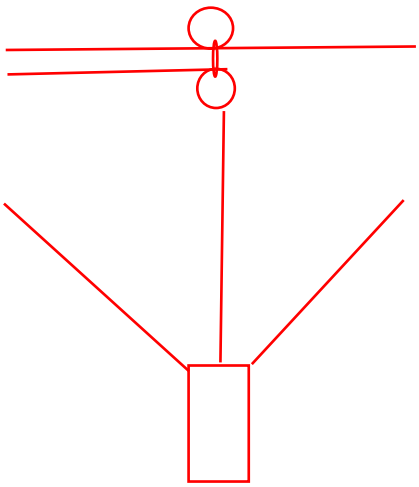
5. Demonstrate the correct procedures for exiting an Eddy (Eddy Peel-Out) when approaching from the upstream side.
a) Navigate the bow of the craft to the lower end of the eddy.
b) Begin to turn the bow of the craft slightly to the starboard side.
c) As the bow of the craft crosses the differential line, increase power and point the craft upstream.
d) Rescuers should lean to the downstream side of the craft.

6. Demonstrate the correct Static Line Ferrying procedures for non-powered watercraft.
a) Static line is placed perpendicular to the shorelines.
b) Two pulleys are attached to the static line.
c) A short line (body cord) is attached to each pulley.
d) The rescuer at the bow of the craft controls one pulley.
e) The rescuer at the stern of the craft controls one pulley.
f) The rescuer controlling the stern pulley shortens or lengthens the line to allow the current to push

against the side of the watercraft and ferry it across the body of water.

7. Demonstrate the correct ferrying procedures for powered watercraft.
   a) Launch the craft from the shore with the bow pointing upstream.
   b) Maintain an angle of approximately 45 degrees with the bow of the craft to the current flow.
   c) Use only enough propulsion to maintain that angle and neutralize the force of the current.
   d) Do not try to move the craft upstream or downstream, only across the body of water.

8. Demonstrate the correct procedures for a Static-Line Watercraft-assisted rescue.
   a) A watercraft-assisted rescue should be used when a shore-based rescue is not appropriate or fails.
   b) Works well for bodies of water up to 300 feet in width.
   c) Position a fixed static-line across the body of water 15 to 20 feet upstream from the position of the victim and 2 to 4 feet above the surface of the water.
   d) Secure tag lines from each shore to the bow of the watercraft.
   e) Properly position a pulley on the static line and then, by use of a carabiner, attach a second pulley to the carabiner hole of the first pulley.
   f) Secure a line to the bow of the watercraft and thread it through the sheave of the second pulley.
   g) This line acts as a belay line and can be operated by a rescuer in the watercraft or by rescuers on the shoreline to allow the rescue craft to float downstream, rescue a victim and then be pulled back upstream and onto shore.



9. Point out attendants on the shore maneuver the rescue watercraft across the body of water and into a position in-line with the victim using the tag lines attached to the bow of the rescue watercraft. Once the victim is in the craft and it is pulled back to its original position, the tag lines are used to return the rescuers and victim to the shore.

10. Demonstrate the correct procedures for a Two-Craft Tether watercraft-based rescue.
    a) Used for open water or approaching low-head dams.
    b) Requires the use of two watercraft.
    c) On-scene rescue officer should be positioned on the shore, in-line with the boil-line in the water below the dam where he/she can use some type of communication to direct the operation (bull horn, radios, hand signals, etc.).
    d) Lead craft approaches the victim from the downstream side.
    e) On-scene rescue officer observes the lead craft to assure that it does not cross the boil-line below the dam.
    f) Lead craft is tethered to a second craft located 50 to 100 feet downstream.
    g) Using throw bags and flotation devices, rescuers in lead craft will attempt to retrieve the victim.
    h) If the lead craft is in danger of being pulled into the boil line, the second watercraft downstream then proceeds to pull the lead watercraft back downstream away from the boil line and to safer waters.

Reference: WATER RESCUE, Chapter 10, pages 199 - 229.
Swift Water Rescue by Slim Ray, pages 28-31 and 163-166.

PRESENTATION

ENABLING OBJECTIVE #5

The Water Technical Rescuer candidate, given the appropriate equipment, shall correctly demonstrate the techniques used during a watercraft-based search / rescue on open water.

1. Demonstrate procedures for conducting a watercraft-based search in inaccessible areas such as those containing drop-offs, ledges, and heavy debris.
    a) Use several cross-search patterns for drop-offs.

2. Discuss the use of Sonar Graphs and divers to enhance the search effort.

a) Slow movements through a search area allow sonar graphing to be more effective.

3. Explain that watercraft operators should move slowly over established search areas when using grappling hooks and drags so that these devices will stay in position during the search.

4. Demonstrate the correct procedures for conducting a Circular Search Pattern.
   a) Tie a line to an anchored watercraft or to a spot on the shoreline.
   b) The anchored watercraft allows for a full circle search pattern to be used while the shoreline anchor allows for a semi-circle type search pattern.
   c) A predetermined length of line is deployed for each consecutive search sweep.
   d) Overlap on the search sweeps.
   e) Marking the line prior to each sweep is an easy way to keep track of the search area. This can be accomplished with plastic marking tape or by tying a knot in the line

5. Demonstrate how the search legs are run parallel to the long side of the search area in a Parallel Track Line Search Pattern. This type of search pattern should only be used when the victim's Point Last Seen (PLS) is approximate.

6. Demonstrate the correct procedures for conducting an Expanding Search Pattern.
   a) Used when the victim's PLS has been well established.
   b) The first leg of the search is done in the direction of the wind drift and/or current flow.
   c) All course changes are made at 90-degree angles and all in the same direction, right or left.

Reference: WATER RESCUE, Chapter 10.

PRESENTATION

ENABLING OBJECTIVE #6

The Water Technical Rescuer candidate, given the appropriate equipment, shall correctly demonstrate the techniques used during a watercraft-based search / rescue on rivers.

1. Demonstrate the correct procedures for conducting a Shoreline Search.
   a) Check strainers, eddies and deep pools with pike poles or long grab hooks.
   b) Maintain a safety boat downstream during all search operations.

2. Demonstrate the correct procedures for conducting a watercraft-based search on a river.
   a) Establish the victim's Point Last Seen, if possible.
   b) Determine the area of the river to be searched at one time. Obstacles in the river or changes in the current flow may dictate area covered.
   c) Establish two static lines. One static line is placed at the start of the search area. The second static line is placed downstream of the starting point. The second static line also serves as a safety line for watercraft that may get into trouble.
   d) A safety watercraft should be positioned a short distance downstream from the second static line to serve as a safety back up.
   e) Place the watercraft abreast at the starting point and sweep the search area.
   f) The number of sweeps in an area will be dependent on how many watercrafts are available in relationship to the width of the river.

Reference: WATER RESCUE, Chapter 10.
Swift Water Rescue by Slim Ray, pages 204-205.
Delmar Water Rescue Levels I and II, page 140.

3. Point out that when rivers have shorelines a great distance apart, techniques such as the circle search, parallel track-line search, and using expanding search patterns may be more appropriate to use.

PRESENTATION

ENABLING OBJECTIVE #7

The Water Technical Rescuer candidate, given the appropriate equipment, shall correctly demonstrate the techniques for extricating a victim from the water when using a watercraft.

1. Demonstrate the correct procedures for using the Stirrup Method of extricating a victim from the water.
   a) Used for conscious victims.
   b) Tie small loops into a web or rope sling.
   c) If possible, attach the sling to the opposite side of the craft from retrieval side.
   d) Rescuers not assisting with victim extrication should be positioned on the opposite side of the craft from the retrieval side for balance purposes.

2. Demonstrate the correct procedures for using the Blanket, Net or Rope (Par buckling Method) of extricating a victim from the water.
   a) May be used for conscious or unconscious victims.
   b) Position and secure one end of a blanket, net or ropes (minimum of three) inside the rescue watercraft.
   c) Position the other end of one of the above appliances so that it cradles the victim.
   d) While holding the outside ends of the above chosen appliance, gently roll the victim up and into the rescue craft.
   e) This method creates a 2:1 mechanical advantage and makes it easier to retrieve the victim.
   f) This method is not recommended for victims with suspected neck or back injuries
   g) Victims with suspected neck or back injuries should be first stabilized in the water with an appropriate stabilization device (e.g., Miller Body Splint, Floatable Backboard, and Scoop Stretcher) before attempting to load the victim into the rescue craft.

3. Demonstrate different methods for extricating a victim from the water into a watercraft.
   a) PFD.
   b) Rope.

NOTE: Parbuckling maneuvers are best performed in watercraft that have a minimal freeboard (distance from

waterline to gunwale). Examples of this type craft would be rafts and John boats.

Reference: WATER RESCUE, Chapter 7.
Delmar Water Rescue Levels I and II, pages 36-37.

SUMMARY

This lesson plan is designed to familiarize the Water Rescue responder with the working applications of watercraft operations in a Surface Water incident. By understanding the versatility of watercraft in a rescue environment and some of the operating principles for the different types of watercraft, the Water Rescue responder will be better able to understand the need for further training. The U.S. Coast Guard, North Carolina Wildlife Commission as well as other organizations has watercraft operator courses.

Remember, as with any rescue tool, a watercraft is only as good as the operator who is trained to use it. The old adage "Practice makes perfect" is truly applicable here.