



AMERICAN CANOE ASSOCIATION SWIFTWATER RESCUE

Course Overview:

This workshop teaches recognition and avoidance of common river hazards, execution of self-rescue techniques, and rescue techniques for paddlers in distress. Emphasis is placed both on personal safety and on simple, commonly used skills. Techniques for dealing with hazards that carry greater risks for both victim and rescuer, such as strainers, rescue vest applications, entrapments, and pins, also are practiced. Scenarios will provide an opportunity for participants to practice their skills both individually and within a team/group context.

Course Objectives:

- Promote proactive prevention of river accidents and injuries.
- Develop and practice key self-rescue skills.
- Identify and avoid river hazards by understanding hydrology, hazards, and river features.
- Focus on fast, low-risk strategies for early management of river accidents
- Develop and practice methods for recovering swimmers, and loose boats and equipment
- Develop and practice more advanced rope-based and in-water skills
- Gain experience using the rescue PFD, and understand it's strengths and weaknesses
- Utilize rescue scene management principles needed within a paddling group

Participant Qualifications:

- All paddle craft are welcome. Ideally, students should be able to competently maneuver their craft in at least class II whitewater. However, all boaters, and non-boaters with an interest in swiftwater rescue (e.g., professional rescuers), will benefit from the class. Participants should be in good health and overall fitness, possess solid swimming ability, and be comfortable swimming in moving current during river drills.
- Participants should dress appropriately for weather and temperature, and should expect to be in the water for extended periods of time.

Minimum personal equipment for class: PFD designed for whitewater use, whitewater helmet, protective clothing suitable for extended swimming in cold water, protective footwear, boat, paddle, whistle, throw rope, 15+ feet of one inch tubular nylon webbing, 2 locking carabiners, and 2 prusick loops.

Course Duration: Two days (16 – 18 hours)

Course Location: A chute of water with deep, clean wave action, well-defined eddy lines and no immediate hazards or risks below. Ideally, the site should contain class II rapids, although it may be taught on less difficult rapids. Protected space is needed for on-land work, with adequate shelter for inclement weather.

Successive Courses: Advanced Swiftwater Rescue

Course Outline:

Welcome & Introduction (15 minutes)

- Introductions and expectations
- Class overview
- Waivers and medical forms
- Safety plan, “challenge by choice” approach
- Site logistics (bathrooms, food and drink policies, no controlled substances...)
- ACA overview

Rescue Philosophy (40 minutes)

- Accident avoidance and proactive rescue
 - Accident timeline
 - Prevention and “what if...?” strategy
 - Prior planning for accident management
- Priorities
 - Me, my group, bystanders, the victim
 - Simple and fast to complex and slow
- Liability and Ethical issues
 - Negligence, duty to act, breach of duty, harm, standard of care, abandonment
 - Moral vs. legal obligation to act
 - Trip leader vs. common adventurer
- Trip Organization
 - Lead and sweep
 - Know the group, the river and the weather
 - Plan the trip and communicate the plan

Scene Management (25 minutes)

- Locate, access and assess, stabilize and transport
- Prioritizing the rescue

- Most rescues performed quickly, without a formal structure
- Larger groups and longer rescues often need structure
- Incident Command structure
 - Leader
 - Safety
 - Rescuer
 - Additional roles – medic, rigger, runner
- Complete the rescue without compounding the situation
- Communication (AW signals)
 - Hand and whistle signals
 - Cell phone or radio if appropriate

Medical Issues (5 minutes)

- NOT a first aid class; perform medical care to your level of training
- Don’t make the situation worse
- Obtain more training; calling 911 is rarely an effective option
- Rescuers should be familiar with common medical problems including hypothermia, drowning, cuts and scrapes, and dislocations/broken bones.
- CPR and wilderness first aid skills are essential for rescuers

Equipment (30 minutes)

- Protection from rocks and water
 - Shoes, helmet, PFD
- Thermal protection
 - Wet suit vs. dry suit, wool vs. synthetics, avoid cotton in cold/wet conditions
- Personal rescue gear
 - Boat, paddle, whistle, throw rope, knife, saw, first aid kit, rescue PFD
- Group rescue gear

- Survival kit, haul rope, communications, ...
- Specific needs depend on the river paddled and local weather
- Survival equipment
 - Food, water, extra clothing, shelter, fire making supplies, ...
 - Specific needs depend on the river paddled and local weather

Rescue Vest (20 minutes)

- Multi-use rescue tool
- Components of the vest
 - Sewn in harness
 - Quick release buckle
 - Belt
- Hazards of the vest
 - Buckle jam (avoid by correct release, smooth belt end and appropriate belt length)
 - Cross lock harness and belt (avoid by using only locked carabiners)
 - In-water risk exposure (avoid by practicing and recognizing limits)
- Communications
 - One hand in air means “help me”
 - Use two hands for directional changes
- Applications
 - Anchor and belay
 - Towing boats or gear (with tether)
 - Personal extrication
 - V-lower and direct lower
 - Live bait (preset and “on the fly”)
 - Uses limited only by your imagination

Throw Ropes (50 minutes)

- Selection based on rope material, diameter, and length

- Advantages and disadvantages of traditional bags, waist bags, coiled lines
- Care of the rescue rope
 - Avoid sun exposure, keep clean, avoid stepping on the line, avoid sharp or rough edges
 - When in doubt, replace the line
- Rope safety
 - Avoid standing over lines
 - Avoid tensioning lines perpendicular to current,
 - Keep your body out of loops in the line
 - Consider clean line techniques
 - Keep entire rope in bag to avoid accidental deployments
- Throwing and recovery zones
 - Consider where the victim will land, don't make their situation worse
- Types of throws
 - Over-arm (football and arc), underarm, side-arm
 - Deploying less than full length for close targets
- Factors impacting an accurate throw
 - Rope length and diameter, brush and trees, footing, distance to target, cold hands, practice
- Receiving the rope
 - Hold over your shoulder, with hands on your chest and elbows tucked into stomach
 - Rope should sit on the shoulder opposite the target shore (to set ferry angle)
- Belay techniques
 - Hip belay, sitting, buddy, dynamic, tree
 - Line on downstream side
- Coiling and rethrowing
- Vector pull to assist landing
- Stuffing techniques

- Multiple swimmers

Line Ferries and Line Crossings (15 minutes, practice in other modules)

- How do you get a line across the river?
- Essential skill for many rope-based rescues
- General principles
 - Look for narrow areas
 - Look for clear throwing zones
 - Establish a line catcher
 - Keep the line as high as possible out of the water, to avoid drag
 - Upstream safety and downstream safety vital
- Throwing techniques
 - Direct throw
 - Buddy throw
 - Messenger line
- Boating, swimming, and wading techniques
 - Use a reverse pendulum and, whenever possible, keep the line out of the water
 - Downstream loop
 - Rescue vest
- Simple line crossings
 - Pendulum (can be done with multiple people, vector pull speeds the pendulum)
 - Hand over hand tag line (hard in fast water, excellent wading assist)

Knots (60 minutes)

- Components of a good knot
 - Recognizable form, strong, easy to tie and untie, minimal rope use, minimal loss of rope strength, common use
- Terminology
 - Standing and running ends, bights, loops
- Key actions
 - Set, dressed, backed up

- Figure eight family
 - Strong, easily tied and recognized, fundamental rescue knots
 - Figure 8, figure 8 on a bight, figure 8 follow-through (as both a loop and a bend), double eye figure 8, in line figure 8
- Additional important knots
 - “no-knot” (friction hitch), butterfly knot, bowline, water knot (for webbing), double fisherman’s bend, prusick
- Many other knots available; these form the foundation of river rescue
- Knot mastery comes from practice; plan on tying knots with cold hands, under water

Anchors (30 minutes)

- Foundation for many advanced skills
- Places team at higher risk; consider what happens if the anchor fails
- Good anchors
 - Can hold the load
 - Are close to the load, and in line with it (anchor-belay-climber concept)
 - Can be attached to a haul line
- General concepts
 - Stay low to the ground
 - Pad or, better yet, avoid friction points
 - Consider what happens if the anchor fails
 - Internal angles ideally less than 90 degrees
 - Hard on soft, soft on hard
- One point anchors
 - “no-knot”
 - Simple loop
 - 3 bight (internal angles must be much less than 90 degrees to reduce risk of triloading carabiner)
- Two point anchors

- Use with marginal anchors, when a live load is attached, and just on general principles
- Load distribution and self-equalizing loop
- Expect the load to move
- Avoidance, high side to avoid inverting, wiggle off the rock, bail out
- If all participants are safe, waiting for low water may be a viable option
- Advanced techniques
 - Hull wraps/Steve Thomas rope trick
 - Raft tacos

Mechanical Advantage (45 minutes)

- Key for advanced unpinning techniques and rope rescues
- Places team at higher risk, takes time, and is complex
- Safety rules
 - Use dampers when possible
 - Use brakes when possible
 - Stay out of the line of fire
 - Pull with your back towards likely failure point, wearing PFD and helmet
 - Consider directional changes
- 10 boy scouts
- Vector pull
 - Good for MA, bad for anchors
- 3:1 (Z-drag)

Pins (20 minutes)

- Avoid getting pinned or entrapped by recognizing hazards
- Pin mechanics
 - Balance between gravity, friction, and force of water
- Types of pins
 - Vertical, center broach, end to end, pinch pin
- Release by unbalancing forces
- Tag line on boat for recovery after release
 - Consider what happens when the boat releases
- Stabilization line to support trapped victim
- Cinch line techniques may be helpful for pinned gear
- Self rescue

Entrapment (10 minutes)

- High risk; hands-on rescue places rescuers near the entrapping object
- Most commonly foot entrapments, strainers, or trapped in a boat
 - Avoid by hazard recognition, appropriate swimming techniques, and appropriate outfitting
 - Extrication often requires hands on contact by a rescuer
- Keep victim heads up with stabilization line
- Snag line to release foot entrapments
- Cinch line as a last resort

Stabilization, snag, and cinch lines (60 minutes)

- Upstream and downstream safety is essential
- Consider what happens when the victim is freed; consider pre-set live bait
- Fundamental tool for entrapment and pin rescues
- Stabilization line
 - Supports trapped victim
 - Set a sharp downstream pointing V in the line for optimal support
 - Line ideally should be under armpits and support victim in heads up position
 - Very effective, with documented saves
 - Essentially impossible for unresponsive victims –

- requires some victim cooperation
- Snag line
 - Line designed to release a foot entrapment
 - Tensioned and deep
 - May need to be weighted
- Cinch lines
 - Designed to wrap about victim and maintain control
 - Takes more time and practice
 - Victim is at much higher risk – last resort technique
 - Very useful for pinned gear
 - Simple cinch
 - Kiwi stabilization line/cinch
- Modified belly flop; head and feet up, impact on the PFD
- Set ferry angle
- Protect face with crossed arms
- Managing holes and drops
 - Ball up over drops
 - Escape holes by aggressive swimming towards ends, changing shape or
 - Crawling to river bottom
- Swimming with gear
 - Keep boats downstream
 - Boat and paddle in one hand

Hazards and Hydrology (20 minutes)

- Rivers are powerful, predictable and persistent
- Subjective vs. objective hazards
 - Poor judgment can be fatal
 - River hazards don't care if you don't recognize them
 - Flooding dramatically increases risk
- Water reading (upstream and downstream Vs)
- Eddies and eddy lines
- Waves
- Hydraulics
- Strainers
- Horizon lines
- Undercut rocks, broaching rocks
- Foot entrapment risks

Swimming (60 minutes)

- Essential self-rescue and access tool
- Safe eddy rule, don't try to stand in swift current
- Defensive and aggressive swimming
 - Breathing techniques
- Defensive to aggressive transitions
- Crossing eddy lines
- Ferry techniques
- Swiftwater entries

Strainers (30 minutes)

- Lethal hazard, common cause of river fatalities
- May appear benign (it's just a tree...)
- Potential approaches
 - Avoid (best)
 - Aggressively swim into and over (best if can't be avoided)
 - Defensive and/or passive (fatal)

Wading (50 minutes)

- Safe eddy rule
- Swim instead of fighting for marginal footing
- Water depth, water speed, bottom conditions affect performance
- Maintain balance
- "Look with your toes"
- One person with paddle/prop
- Two person
- Wedge
- Line astern

Boat-based rescue (75 minutes)

- Often fastest and easiest technique for boaters, but potentially high risk
- Many uses for boats
- Ferries for people and equipment
- Tool to sprint for help
- Paddle recovery

- Throw, two paddles in hand, put in your boat
- Boat recovery
 - Bulldozer or shove
 - Set a ferry angle
 - Tow with tether system on rescue PFD
- Self rescue
 - Hold boat and paddle in one hand when swimming with gear
 - Set a ferry angle
 - Boat stays downstream of victim
- Swimmer rescues and assists
 - Hand of God rescue
 - Assisting victims back into boats
 - Strengths, limitations and techniques with canoes, kayaks and rafts
 - Stern and bow tows

“Live Bait” Rescues (45 minutes)

- High risk for rescuer, but fast and simple
- Requires rescue swimmer, rescue vest, locking carabiner, throw rope and belayer; vector pullers, backup belayers and landing zone helpers are useful
- Downstream safety is essential
- Victim psychology
 - Normal: able and willing to assist in their own rescue
 - Panicked / aggressive: extremely dangerous
 - Near (or counter) panic: initially nearly unresponsive, then becomes panicked
 - Unresponsive: assume C-spine injury for unconscious victims
- Timing for water entry is key, and takes practice
 - Hold 10 to 20 feet of rope on entry (toss downstream)
 - Time entry so as to ferry directly to victim

- Avoid hovering
- Speak to victim
 - Splash and back away for self protection
 - Rescuer safety is highest priority
- Turn victim and hold to PFD, or execute cross chest or surf carry
- Rescuer and victim belayed in to shore
 - V-puller on shore helpful

Contact Rescues and C-spine control (30 minutes)

- Fast, simple, extremely risky
- Very difficult to swim victim to shore
 - Redundant downstream safety is essential
 - Requires near-competitive swimming ability
- Recommended only for unconscious victims where no other option exists
- Maintain in-line c-spine control
- Bring victim face up with cradle or rotation methods and get help

V-lowers (60 minutes)

- Slower, higher risk, more complex
- Requires two belay teams, rescue vest, rescue swimmer, downstream safety,
- Locking carabiner and at least two throw ropes
- Allows direct maneuvering to rescue location
- Hand signals and safety plan
 - One hand in air means “help me”
 - Use two hands for directional changes
- Arching back to plane to surface
- Single rope technique for direct lower
- Higher water volumes and deeper water can overwhelm the rescuer

Scenarios (90 minutes)

- Managing common river problems, including multiple swimmers and loose gear
- Debriefing to reinforce rescue priorities

Conclusion & Wrap-up (15 minutes)

- Opportunities for additional training
- Recommend first aid training
- Continue to practice skills – this is just the beginning!
- Avoiding incidents is far better than reacting to them

Notes:

Times shown are estimated total teaching times for each part. Actual times and teaching sequences may vary depending on the site, weather, number of sessions over which a class is spread, number of switches between on-water and off-water in any given session, and the students' interest, abilities and experience.

Resources

- Whitewater Rescue Manual (Walbridge and Sundmacher)
- Swiftwater Rescue (Ray)
- River Rescue (Bechdel and Ray)
- Heads Up! (video)
- Whitewater Self Defense (video - Ford, Walbridge and DeCuir)
- River Safety Reports (Walbridge)

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