



## Level 4: Swiftwater Rescue

(Sample Skills Course)

**Course Overview:** The **Swiftwater Rescue** 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. Fundamental and more advanced 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 its strengths and weaknesses
- Utilize rescue scene management principles needed within a paddling group

### Essential Eligibility Criteria (EEC):

ACA courses are open to all individuals who acknowledge the ability to perform the following essential eligibility criteria.

1. Breathe independently (i.e., not require medical devices to sustain breathing)
2. Independently maintain sealed airway passages while under water
3. Independently hold head upright without neck / head support
4. Manage personal care independently or with assistance of a companion
5. Manage personal mobility independently or with a reasonable amount of assistance
6. Follow instructions and effectively communicate independently or with assistance of a companion
7. Independently turn from face-down to face-up and remain floating face up while wearing a properly fitted life jacket\*
8. Get on / off or in / out of a paddlecraft independently or with a reasonable amount of assistance\*
9. Independently get out and from under a capsized paddlecraft\*
10. Remount or reenter the paddlecraft following deep water capsize independently or with a reasonable amount of assistance\*
11. Maintain a safe body position while attempting skills, activities and rescues listed in the appropriate Course Outline, and have the ability to recognize and identify to others when such efforts would be unsafe given your personal situation\*

*\* To participate in adaptive programs, participants must acknowledge only the first six EEC listed above. Entry-level adaptive programs will involve teaching and practicing EEC #7-11.*



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**Course Prerequisites:** 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 / Venue:** 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.

### Succeeding courses:

Level 5: Advanced Swiftwater Rescue

**Class Ratio:** 12 Students : 1 Instructor; with an additional instructor the ratio can be 24 : 2

The following is a general summary of course content for the Level 4: **Swiftwater Rescue** course. Safety and Rescue Instructors should use this document as a general guide for conducting programs. Depending on the program, specific content points might be studied and practiced in depth, briefly reviewed, or skipped entirely. Specific program content should be adjusted as necessary to accommodate student skills, goals and experience, as well as weather and water conditions during the program.

### Introduction, Expectations, & Logistics:

- Welcome, introductions, paperwork
- Student & instructor course expectations and limitations
- Course itinerary & site logistics
- Review waiver, assumption of risk, challenge by choice, medical disclosure
- About the ACA
- PFD policy (always wear on water)
- Appropriate personal behavior
- No alcohol / substance abuse
- Proper etiquette on & off the water
- Respect private property
- Practice Leave No Trace ethics
- Waves
- Weather
- Water

### Personal Preparation:

- Personal ability
- Swimming ability
- Water comfort & confidence
- Fitness, conditioning, and warm up
- Safe paddle and boat handling
- Safety and rescue considerations
- Personal equipment (reviewed by Instructor)

### Rescue Philosophy

- Accident avoidance and proactive rescue

### The Paddling Environment:

- Wind



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## (Sample Skills Course)

- o Accident timeline
- o Prevention and “what if...?” strategy
- o Prior planning for accident management
- Priorities
  - o Me, my group, bystanders, the victim, equipment
  - o Simple and fast to complex and slow
  - o Most effective rescues may have an increased level of risk
- Liability and Ethical issues
  - o Negligence, duty to act, breach of duty, harm, standard of care, abandonment
  - o Moral vs. legal obligation to act
  - o Trip leader vs. common adventurer
- Trip Organization
- Trip planning principles
- Emergency action plan
  - o Lead and sweep
  - o Know the group, the river and the weather
  - o Plan the trip and communicate the plan
- o Debriefing to reinforce rescue priorities
- o Complete the rescue without compounding the situation
- Communication (AW signals)
  - o Hand and whistle signals
  - o Cell phone, radio, satellite communication as appropriate
- Interaction with outside rescuers and First Responders

### Medical Issues

- 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

- Protection from rocks and water
  - o Shoes, helmet, PFD
- Thermal protection
  - o Wet suit vs. dry suit, wool vs. synthetics, avoid cotton in cold/wet conditions
- Personal rescue gear
  - o Boat, paddle, whistle, throw rope, knife, saw, first aid kit, rescue PFD
- Group rescue gear
  - o Survival kit, haul rope, communications, rope.
  - o Specific needs depend on the river paddled and local weather
- Survival equipment

### Scene Management

- Locate, access and assess, stabilize and transport
- Prioritizing the rescue
- Most rescues performed quickly, without a formal structure “Self-directed rescue”
- Larger groups and longer rescues often need more structure
- Incident Command structure
  - o Leader
  - o Safety
  - o Rescuer
  - o Additional roles – medic, rigger, runner, ...



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## (Sample Skills Course)

- o Food, water, extra clothing, shelter, fire making supplies, ...
- o Specific needs depend on the river paddled and local weather

### Rescue Vest

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

### Throw Ropes

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



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### (Sample Skills Course)

- o Hip belay, sitting, buddy, dynamic, tree
- o Line on downstream side
- Coiling and rethrowing
- Vector pull to assist landing
- Stuffing techniques
- Multiple swimmers

#### Line Ferries and Line Crossings

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

#### Knots

- Components of a good knot
  - o Recognizable form, strong, easy to tie and untie, minimal rope use, minimal loss of rope strength, common use
- Terminology
  - o Standing and running ends, bights, overhand and underhand loops
- Key actions
  - o Set, dressed, backed up
- Figure eight family
  - o Strong, easily tied and recognized, fundamental rescue knots
  - o Water knot, Figure 8 stopper, figure 8 on a bight, figure 8 follow-through (as both a loop and Flemish bend), double fisherman for prusik application, prusick knot.
- Additional useful knots (optional)
  - o butterfly knot, clove hitch, and two half hitches, munter hitch
- Knot mastery comes from practice; plan on tying knots with cold hands, under water
- [www.animatedknots.com](http://www.animatedknots.com)

#### Anchors

- Foundation for many advanced skills
- Places team at higher risk; consider what happens if the anchor fails
- Good anchors
  - o Can hold the load
  - o Are close to the load, and in line with it (anchor-belay-climber concept)
  - o Can be attached to a haul line
- General concepts
  - o Stay low to the ground



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- o Pad or, better yet, avoid friction points
- o Consider what happens if the anchor fails
- o Internal angles ideally less than 90 degrees
- o Hard on soft, soft on hard
- One point anchors
  - o “no-knot”
  - o Simple loop
  - o 3 bight (internal angles should be less than 90 degrees to reduce risk of tri-loading carabiner)
- Two point anchors
  - o Use with marginal anchors, when a live load is attached, and just on general principles
  - o Load distribution and self-equalizing loop
  - o Expect the load to move

### Pins

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

- If all participants are safe, waiting for low water may be a viable option
- Techniques to attach to open boat hulls
  - o Steve Thomas rope trick with slippery clove hitch
  - o Raft tacos

### Mechanical Advantage

- Key for advanced unpinning techniques and rope rescues
- Places team at higher risk, takes time, and is complex
- Safety rules
  - o Use dampers when possible
  - o Use brakes when possible
  - o Stay out of the line of fire
  - o Pull with your back towards likely failure point, wearing PFD and helmet
  - o Consider directional changes
- 10 boy scouts
- Vector pull standard method and progressive vector
  - o Good for MA, bad for anchors
- 2:1 and 3:1 (Z-drag)

### Entrapment

- High risk; hands-on rescue places rescuers near the entrapping object
- Most commonly foot entrapments, strainers, or trapped in a boat
  - o Avoid by hazard recognition, appropriate swimming techniques, and appropriate outfitting
  - o Extrication often requires hands on contact by a rescuer (e.g., two+ person)
  - o wading techniques, tethered swimmer)
- Keep victim heads up with stabilization line
- Cinch line to secure victim



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### Stabilization, Cinch and Snag Lines

- 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
  - Very difficult for unresponsive victims – often requires some victim cooperation
- Cinch lines
  - Designed to wrap about victim and maintain control
  - Takes more time and practice
  - Victim is at higher risk, but also is more secure
  - Very useful for pinned gear
  - Simple cinch – open and closed
  - Lasso loop cinch
  - Kiwi cinch
- Snag line
  - Line designed to release a foot entrapment
  - Tensioned and deep in the water below the stabilization line
  - May need to be weighted or submerged with a paddle

### Water Hazards and Hydrology

- 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
- Flush drowning

### Swimming

- Essential self-rescue and access tool
- Safe eddy rule, don't try to stand in swift current
- Defensive and aggressive swimming
- Strategies to conserve energy including positioning, short aggressive position sprints and "porpoising" for in-water scouting
  - Breathing techniques – timing in waves and focus on downstream side
- Defensive to aggressive transitions
- Aggressive upstream and downstream orientation (upstream ferry and downstream eddy catching)
- Crossing eddy lines
- Ferry techniques
- Swiftwater entries
  - Modified belly flop; head and feet up, impact on the PFD, sliding across the water
  - Enter water with a good ferry angle
  - Protect face with crossed arms



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### (Sample Skills Course)

- o Consider crawling or sliding into water, especially if shallow and rocky
- Managing holes and drops
  - o Ball up over drops
  - o Escape holes by aggressive swimming towards ends, changing shape or
  - o Crawling to river bottom
- Swimming with gear
  - o Keep boats downstream
  - o Boat and paddle in one hand
- Essential to critically evaluate personal boating skill
- Many uses for boats
- Ferries for people and equipment
- Tool to sprint for help
- Paddle recovery
  - o Throw, two paddles in hand, put in your boat
- Boat recovery
  - o Bulldozer or shove
  - o Set a ferry angle
  - o Tow with tether system on rescue PFD
  - o Tow with painter or tow line on boat

### Strainers

- Lethal hazard, common cause of river fatalities
- May appear benign (it's just a tree...)
- Possible approaches
  - o Avoid (best by far)
  - o Aggressively swim into and over (best if can't be avoided)
  - o Defensive and/or passive (potentially fatal)
  - o "Canadian Log Roll" technique for large diameter strainers
- Self rescue
  - o Hold boat and paddle in one hand when swimming with gear
  - o Set a ferry angle
  - o Boat stays downstream or to the side of victim
- Swimmer rescues and assists
  - o Hand of God rescue
  - o Assisting victims back into boats
  - o Strengths, limitations and techniques with canoes, kayaks, rafts, SUP, and river boards and other river craft
  - o Stern and bow tows

### Wading

- 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
- Fence wade

### Boat-based rescue

- Often the fastest and easiest technique for boaters, but potentially high risk

### Tethered Swimming Rescues and Non-Tethered Swimming Rescues (optional)

- Higher 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
  - o Normal: able and willing to assist in their own rescue



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## (Sample Skills Course)

- o Panicked / aggressive: extremely dangerous
- o Near (or counter) panic: initially nearly unresponsive, then becomes panicked
- Timing for water entry is key, and takes practice
  - o Hold 10 to 20 feet of rope on entry (toss downstream)
  - o Entry ferry angle is key
  - o Time entry so as to ferry directly to victim
  - o Avoid hovering
- Speak to victim
  - o Splash and back away for self protection
  - o 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
  - o Vector-puller on shore helpful
- Swimming rescues with the use of the rescue vest are fast, simple, extremely risky
- Very difficult to swim victim to shore
  - o Redundant downstream safety is essential
  - o Requires fins or near-competitive swimming ability
- Recommended only for unconscious victims where no other option exists

### V-Lowers (Optional Module)

- Slower, higher risk, more complex
- Requires two belay teams, rescue vest, rescue swimmer, downstream safety, upstream safety, locking carabiner and at least two throw ropes
- Allows direct maneuvering to rescue location
- Hand signals and safety plan

- o One hand waving in air means “help me”
- o Point with one or two hands for directional changes
- Arching back to plane to surface
- Hands behind head to help create an air pocket
- Single rope technique for direct lower
- Higher water volumes and deeper water can overwhelm the rescuer
- Very effective as a wading assist
- Provides strong support for rescuer forced to work upstream of significant hazards

### Scenarios

- Managing common river problems, including multiple swimmers and loose gear
- Debriefing to reinforce rescue priorities
- Emphasis on what worked and what could be done differently next time.
- Goal is to create appropriate confidence in training and techniques

### Conclusion & Wrap Up:

- Group debrief / Individual feedback
- Course limitations
- Importance of First Aid & CPR
- Importance of additional instruction, practice, experience
- Importance of appropriate level of safety & rescue training
- Demo advanced maneuver
- Life sport / Paddling options
- Local paddling groups / Clubs
- Handouts / Reference materials
- ACA Membership forms
- Course evaluation
- Participation cards

### Resources

- Whitewater Rescue Manual (Walbridge and Sundmacher)
- Swiftwater Rescue (Ray)



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(Sample Skills Course)

- • River Rescue (Bechdel and Ray)
- • Heads Up! (video)
- • Whitewater Self Defense (video - Ford, Walbridge and DeCuir)
- • River Safety Reports (Walbridge)
- Whitewater Safety and Rescue (Ferrerero)
- Kayaker's Toolbox (video – Holt and Dickert)
- High Angle Rescue Techniques (Vines and Hudson)
- NOLS River Rescue Guide (Ostis)
- [www.animatedknots.com](http://www.animatedknots.com)
- [www.cmcrescue.com](http://www.cmcrescue.com)
- [www.americancanoe.org/R3](http://www.americancanoe.org/R3)