Swiftwater Rescue Instructor and Instructor Candidate Manual
(last revision 10/16/05)

Objectives
1) Describe key content for individual swiftwater rescue learning modules.
2) Describe common problems for each module.
3) Describe drills and teaching approaches for each learning module.
4) Provide an outline for a formal written instructor manual.

OVERALL THEMES – big picture ideas participants should take from the class.
- protect yourself
- keep the big picture and remember what is truly important
- prevention is far better than reaction
- understand vector pulls
- understand ferry angles
- learn to use throw ropes accurately
- speed, safety and complexity as a touchpoint for each module
- practice all your skills – training pays off

RESCUE PHILOSOPHY
River sense – some paddlers stay “heads up” and aware of what is going on around them. Think “what if…” and try to anticipate when something bad will happen. Consider “what if something bad happens”, and you need to rescue someone, hike out, camp overnight, provide medical care, or do anything else. Remember that proper prior planning prevents poor performance.

Accident timeline (prevention is better than reaction): long before (develop knowledge, skills and abilities), before (obtain site specific knowledge), just before (hazard recognition and avoidance), just after (self rescue), after (rescue by your group), long after (rescue by professionals or off-site groups). Survival likelihood decreases with time after the accident

Rescue priorities (people/equipment and simple-complex) – me, you, everyone else, victim; people, big gear, little gear; simple and fast to complex and slow

Expanded RETHROG – speak, reach, throw, row, tow, go, helo. Use the simplest and safest approach possible, but don’t hesitate to use an appropriate higher risk option. Higher risk boat based rescues are common among recreational boaters and often are appropriate because they can be done “right now”. Think before you act, and consider what happens if you don’t act

In the long run, your goal is to go home at the end of the day, and be able to sleep well as you dream about your actions during the day

drills – practical application throughout the course, emphasizing priorities and prevention.

pitfalls and problems – Instructors need to help students focus on the basics of safe and effective rescue throughout the course. Students often develop tunnel vision, and overlook dangers to themselves or ignore potential ways to simplify the rescue. ICS and scenarios are practical applications of rescue philosophy.

RIVER HAZARDS AND HYDROLOGY
- cold air and water, high water, undercuts, strainers, low head dams, waterfalls, holes, waves, eddy lines, foot entrapments, slick rocks, other craft, other people, critters, driving and vehicular hazards, gear failure, lightning, bad luck
- Understand up- and downstream Vs, “fingers” indicating water flow from drops, eddy lines, pillows, …
- Develop paddling skills and good judgement so that hazards can be avoided.
- Scouting can save your life.

drills – allow students to seek out every potential hazard in a scene; create “traps” for students who ignore downstream hazards; practice swimming over strainers and through holes and waves; include hazards in debriefings
pitfalls and problems – tunnel vision allows rescuers to ignore hazards to themselves and others. Instructors need to stay on top of this issue and constantly drive home its importance.

INTERACTIONS WITH PROFESSIONAL RESCUERS

Other training programs (any local programs, Rescue 3) legal authority of professional organizations – once on scene, professional teams generally have legal responsibility for the scene, and will need to meet a variety of technical standards for gear, training, safety, … Recreational paddlers don’t always fit well into this system. Arguing with professional rescuers is, in some states, illegal and, in all states, can lead to your removal from the scene, which won’t help anyone.

drills – try to arrange a presentation from a professional rescuer, or joint training with rescue teams

pitfalls and problems – egos are a big problem, and have no place in a true rescue. Unfortunately, not everyone recognizes this. Be polite and professional at all times – especially when the other person isn’t! Once professional rescuers are on scene, individuals may face ethical concerns, and may potentially be faced with a decision to choose legally hazardous but ethically correct actions.

COMMAND AND CONTROL

scene assessment (numbers, mechanism, dangers)
communication (AW paddle and hand signals)
ICS system and brief history (fire service; large scene management). Now, widely accepted and practiced for a variety of incidents. e.g., mandated by JCAHO for use in hospital disasters
span of control (3 to 7 people, 3 to 5 ideal; more people should be broken down into multiple teams)
flexible, team-based approach to scene management
essential roles – IC, downstream safety, upstream safety, rescuer
additional – rigger, medic, gopher, evacuation, PIO, security, comfort team, back-up/alternate team, scout, runner, … Be creative in role assignment. Particularly with large parties, make sure everyone has something to do (e.g., gathering wood for a fire, building hasty shelters, scouting for additional victims, rotating out safety personnel). Staying busy won’t be a problem for small groups.
roles terminate when task completed; people can be reassigned.

what we teach vs. what we do – paddlers need to understand the roles in ICS, but also must be able to implement those roles without a formal command structure. In many cases, the rescue is over or the victim is dead before a formal command structure can be established. In reality, successful rescues occur when the rescuers can identify the problem, see what needs to be done, and then do it without waiting for a hierarchical command structure. There is a lot to be said for getting a rescuer hands-on performing the rescue, without going in to decision lock.

drills – sell by having students run an on-land evolution without ICS, practice points on-land and then for on-water evolutions, use ICS for all instructor evolutions and student scenarios

pitfalls and problems – failure to implement some form of command and control; allowing ego and stress to interfere with the rescue; spending too much time establishing ICS when a rapid and simple solution would work.

LEGAL ISSUES

criminal vs. civil law
torts (civil harms)
negligence and liability
harm, duty, breach, standard of care, abandonment
waivers and assumption of risk forms
do the right thing, take responsibility for actions and try to minimize consequences sometimes the ethically correct action doesn’t match the legally acceptable behavior. Make sure you can live with what you choose to do.

Suits are rare among recreational paddlers. (I’m not personally familiar with any)
drills – actual and theoretical case studies.

problems and pitfalls – this can be a scary topic, and students can literally be scared off. Treat this as a way to manage risks, and not as something that will interfere with doing the right thing.

VICTIM AND RESCUE PSYCHOLOGY
- TUNNEL VISION – avoid focusing solely on the victim; maintain the big picture
- PROTECT YOURSELF
- VICTIM TYPES AND BEHAVIOR
  - PANICKY VICTIM – uncontrolled fear, unlikely to assist in the rescue, surprisingly strong, extremely dangerous to the rescuer. Avoid direct contact unless absolutely needed, try to talk down, encouraging them to “attack” you may allow you to lead them to safety.
  - CALM VICTIM – how you want your victim to behave, able to respond and assist with rescue, may be able to hold onto a rope and follow directions
  - COUNTER PANICKED VICTIM – appears dazed or unresponsive although still heads up, unable to assist in their own rescue while in this state. Proper coaxing may bring them to a calm state, but these victims are always at high risk of panicking and subsequently attacking rescuers.
  - ACTIVELY DROWNING VICTIM – unlikely in a PFD, classic victim is looking towards safety, arms out at side in a cross-like posture, nose and mouth out of water, bobbing up and down. This posture is sometimes mistaken for “joking”. Victims in this posture are seconds from going under, and require an aggressive “go” rescue, with the understanding that they may become panicked once rescued.
- UNCONSCIOUS – often face down and not moving. Assume C-spine injuries and take appropriate precautions.
- Assume all victims in the water are dangerous to you and your group.
- Remember that victims need 2 things – reassurance and information.

drills – simulate victims yourself, choose specific types during simulations and evolutions.

problems and pitfalls – hard to simulate victims well. Participants can get silly during these. Participants may not fully mimic the strength and aggression of a panicked victim. Keep a tight rein on any evolution that has swimmers in the water – overly aggressive victims can easily hurt a rescuer.

MEDICAL CONSIDERATIONS
- GET MORE TRAINING (ARC, SOLO, WMA, WMI, WEMSI, WMS, …)
- PROTECT YOURSELF WITH LATEX/NITRILE GLOVES, BARRIER DEVICES AND VACCINATIONS (E.G., TETANUS, HEPATITIS)
- WILDERNESS VS. STREET ENVIRONMENT (TIME AND TRANSPORT)
- HYPOOTHERMIA – RECOGNITION, PREVENTION AND TREATMENT; MECHANISMS OF HEAT LOSS
- NEAR DROWNING/DROWNING (SUBLIMATION INCIDENTS) – STRONGLY CONSIDER EVACUATION IF THERE IS ANY SUSPICION OF AIRWAY COMPROMISE. IF YOU CHOOSE NOT TO evacuate IN THIS CASE, YOU BETTER HAVE A GOOD REASON!
- SOFT TISSUE INJURIES (TREATMENT, TETANUS PROPHYLAXIS)
- ORTHOPEDIC INJURIES (AT LEAST MAKE NOTE OF SHOULDER DISLOCATIONS AND GENERAL CARE)
- PROACTIVE CARE, PARTICULARLY FOR HYPOOTHERMIA
- ANIMAL BITES ARE A CONCERN – CONSIDER RABIES PROPHYLAXIS

drills – put together first aid kits for specific ailments, review case studies, incorporate medical care into scenarios throughout the course.

problems and pitfalls – how much time do you spend here? A complete WFR class wouldn’t be inappropriate, but it would be hard to shove into a weekend long class! Make sure that you, as the instructor, know how to take care of your injured students and don’t stop pursuing your medical knowledge. Really encourage participants to obtain more training. SWR courses aren’t medical classes, so don’t get bogged down on this topic.

EQUIPMENT
- Allows us to be safer, more productive/effective, separates us from the animals
The best equipment in the world is useless if you don’t know how to use it, or if it’s sitting at home.

3 fundamental types of equipment – protection from the environment, protection from rocks and water, and rescue gear
- Environmental protection
  - wetsuits, drysuits, fleece, polypro, helmet liners, gloves
- Protection from rocks/water
  - PFD (rescue vs. not), helmet (shell, padding, harness), foot wear (closed toe?), pads
- Rescue gear (personal and group)
  - throw bag, carabiners, prusicks, webbing, knives, saws, whistles, first aid kits, survival kits, haul lines, …
  - boats (see boat-based module)
  - paddles – useful wading tool, elevate lines, form tripods, …
  - simple gear works best
  - take care of your gear (replace when worn, protect from UV light)
  - survival gear – bivy sacks; extra food, water and clothing; fire making supplies

**drills** – review each participant’s equipment during evolution, create boater for specific situations (winter, summer, park and play, remote, …), case studies for gear failure (e.g., footwear, helmet, PFD)

**problems and pitfalls** – remember that most students have some understanding of personal gear and are most interested in actual rescue tools. It is easy to end up with a 30 minute discussion of what you choose to wear, without providing any underlying understanding of how you made your choices. On the other hand, participants may arrive with inadequate gear, so a gear check early in the class helps correct any problems that may exist. Give participants the information they need by understanding your group. Help them understand why and how to make their own choices about their gear. Help students recognize the strengths and limitations of gear.

**KNOTS**

particularly with outdoor professionals, expect a generally high level of skill (but with tremendous variation). All of the knots listed below need not be taught – figure 8 family, barrel, prusick, water and tensionless hitch are most important.

- rope terminology (running and standing ends, bights, loops)
- knot characteristics (strong, simple, easy to untie, minimal weakening, easy to recognize)
- rope characteristics (braid vs. kernmantle, material, stretch, applications, UV degradation)
- overhand
- figure 8 family (*8, *8 follow thru (loop and bend), *8 on a bight, double eye 8, in line 8)
- bowline
- butterfly
- munter hitch
- sheet bend
- zeppelin knot/hunter’s reef
- clove hitch and half hitches
- *double grapevine/double fisherman’s
- *prusick
- *water knot
- *tensionless hitch / Lighterman’s hitch
- mariner’s hitch (several modifications)
  - Bachman
  - Kleimheist
  - sailing coil
  - climbing coil

**drills** – let students teach each other, use “real” situations to demonstrate need for knots, knot relay, challenges, speed drills, upside down/underwater/behind your back…
**problems and pitfalls** – how much time do you spend here? Participants need lots of hands-on practice to master knots, and the class doesn’t allow for this. Use people with knot tying assistance to coach those less experienced. Emphasize figure 8 family because it is simple, commonly used and effective. Good homework activity. Tensionless hitch is valuable, as is the bowline.

**THROW ROPES**
lower risk, simple, fast
rope properties (floats, strong, relatively low stretch*, easily seen, coils well – good “hand”)  
  *stretch may help for people rescues, while hindering boat recovery
rope types (woven, braid on braid, 3-strand, kernmantle, polypro, spectra)  
length and diameter (50-75’, _” to _”; 5/16” to 3/8” by 60 to 75 feet seems most useful)
three (four) types of throws (under, over, side-arc, over-arc)  
second throw/coil throws – coil with _ twist and/or double drape techniques
aiming points – across victim’s shoulder or helmet; aim beyond the victim
receiving the rope – hold the rope, across opposite shoulder, point head where you are going, rope is held on chest and not overhead
belay – body, seated, buddy, dynamic, tree. Expect an impressive load when you catch a victim.
Belay so the load line is downstream of you.
safety rules – no body parts through loops, don’t stand on or over a line, don’t stand in bights, aim beyond the victim (not at them), rope held on the chest and not overhead when received, expect a load from the victim and don’t allow yourself to be pulled off your feet, never abandon a line
vector pulls – both by hand and with an attached mobile tag line; key for the “dangling” victim
landing zones – pendulum the victim to shore, consider where they will land. Hauling in to shore is feasible, but much harder.
stuffing the bag

**drills** – throw stuffed bag in opposing lines
throw to a moving target
throw followed by coil throw
throw to two victims
rapid throws to small targets
in-water practice with every swimming drill
compare pendulum to a direct haul

**problems and pitfalls** – don’t step on my rope! Practice is essential. Student performance often drops remarkably on the water, when they are cold and the ropes are wet. Make sure you (the instructor) practice, so you don’t embarrass yourself. Inaccuracy is the leading problem, followed by poor belay stances and failure to consider landing zones.

**WADING**
risk spectrum (higher risk, fast, easy; risk may reduce with multiple person wades)
advantages – fast, low tech, easy access, groups can move victims well, great access tool
disadvantages – higher risk
bottom characteristics (sand vs. rock, regular vs. irregular), water depth, water speed
defensive swimming position – when you lose footing, let go and swim instead of fighting for a foot entrapment
safe eddy rule (stand up when stable, not before)
serves as a means for an individual to cross a stream, to assist or carry a victim across current, and as a means to access victims mid-current
one person with paddle
two person
3+ person wheel
pyramid (sets a large eddy)
line astern
when more than one person is moving, careful coordination is required.
**drills** – practice each technique, move victims from one side to another, use multi person techniques to create an eddy for extrication. Downstream safety is key to this evolution – assume students will lose their footing.

**problems and pitfalls** – participants often fight for footing in marginal settings, when they should let go and swim. Can be a tremendous time sink if logistics aren’t well thought out. Be very careful when moving with toes pointed downstream as this increases foot entrapment risk.

**SWIMMING**

- **risk spectrum** (high risk, fast, simple)
- **advantages** – speed, low tech, great access tool, fun, personal safety/rescue
- **disadvantages** – high risk, poor visibility, cold
- **defensive, aggressive, drops, eddy turns, ferries and peel outs**
- **body can do everything a boat can, but the body requires more planning and anticipation**
- **focus on a destination, look where you are going**
- rolling from defensive to aggressive – keep feet up; always stay parallel with the surface and near the surface to reduce entrapment risk. Defensive swims in shallow water are more comfortable if the back is arched to protect the buttocks.

- **swiftwater entries** – head and feet elevated; impact on chest; 45 degree upstream angle (sets ferry angle); arms crossed in front of the face to protect it and to keep swimmer on the surface
- breath and look at back side of wave crests, turn head aside for breakers as you come up waves
- shape change or crawl for the bottom to escape holes

- **safe eddy rule** – stand up when you are stable, not before. Essentially, if you can swim, you should. Water more than calf deep places a swimmer at risk for foot entrapment.

- **drills** – entries, eddy turns and peel outs, swim through the biggest rapids available. Consider starting drills with a simple defensive swim to assess student skills and comfort. Make swimming integral to every portion of the course.

- **problems and pitfalls** – wide range of swimming skills. This has the potential to produce high anxiety levels in some participants. Make sure participants remember “challenge by choice”. Don’t hesitate to swim with your students if needed. Instructors must swim the area several times before allowing students to swim. If possible, swim the area well before students arrive and then again just before students swim.

**STRAINER DRILLS**

- Dangerous – probably highest injury risk of any evolution
- If possible, avoid strainers.
- 3 options – feet first (fatal, head down and face upstream body wrap), slow head first (leads to body wrap), aggressive (climb up and over the strainer)
- Strainer needs to be manned on both sides with quick release ability. Be sure of downstream safety – good opportunity for more throw rope work.

- **drills** – swim over the strainer in all 3 positions. Allow participants to set up the strainer to practice anchors.

- **problems and pitfalls** – make sure you go over first to find out if the strainer is set properly and that the bottom under the strainer is clear. Strongly consider going over multiple times, with different instructors. Remove all gear from the PFD, and consider removing eyeglasses. Hit the strainer with outstretched arms, and keep it away from your face to avoid facial fractures. This evolution may be the most dangerous one done in the SWR class. I have personally seen participants dislocate shoulders and break noses. Expect high anxiety levels and provide lots of hands on support for the participants. Emphasize challenge by choice. Instructors can reduce anxiety by standing right at the strainer bar, although in deep water this may not be possible. Instructors must be able to release the strainer bar in case a student becomes entangled.

**BOAT BASED RESCUE**

- **boat types** (canoe, raft, kayak)
higher risk (but safer than swimming), simple, fast – note that this doesn’t really fit into lifeguarding’s RETHROG concept; a kayak is more of a “tow” rescue than a “row” rescue. Rafts fit the row concept better. Canoes fall somewhere in between, depending both upon solo vs. tandem and upon hull design. Boat based rescue is often the fastest and easiest technique for paddlers.

- safety – make sure any deck lines are tight and gear is properly stowed
- self rescue – keep boat downstream of swimmer, set a ferry angle, try to hold boat and paddle in one hand so as to allow a free swimming hand, don’t hesitate to drop gear and swim for safety. Learn to roll your boat and be able to climb back into canoes and rafts.
- assisted self rescue – support partners boat while they climb in; rig rescue sling for canoes and sit on tops; assist by pulling victim in; empty boat for swimmer (drag over deck, bail, Capistrano flip); Hand of God rescue; Eskimo rescue

- boat rescue – tow system, shove, bulldoze, allow to flush downstream to a pool. Towing a boat through a rapid is difficult and dangerous. Tow using a painter or rescue vest.
- paddle rescue – tow system, two paddle paddling, throw to an eddy or shore, put in your canoe or raft, tow with painter or rescue vest
- swimmer rescues:
  - back deck (reasonable victim protection but tendency to stern squirt; victim needs to put their head on the deck and in the small of the rescuer’s back.)
  - tow from stern (less victim protection but boat stays flat)
  - side load (pull into canoe or raft; be sure to lift with legs and keep good balance, or hold to side)
  - front tow (victim straddles bottom of boat, cheek alongside bow – minimal victim protection, potential to pinch victim but easier to paddle and keep kayaks flat, allows eye to eye contact).

Drills - pick up swimmers and tow boats using all methods; for decked boats, particularly try using both “high-headed” and “low-headed” back deck victims.

drills work well in groups of three – one person bails out of boat, one person rescues boat and paddle, one person rescues victim.

- line ferries using rescue vests, rope loop over downstream shoulder and rope in hand. Be sure to have a line receiver (or let students figure this out on their own!). Remember to teach reverse pendulums before allowing participants to do line ferries (or again allow them to figure it out for themselves).

problems and pitfalls – stay very heads up on safety issues as there is a potential to have lots of things going on at once, with lots of people in the water. Choose an area with a large downstream pool to avoid flushing equipment to the open sea. Make sure all gear is well-stowed before deliberately swimming out of a boat (stowed on shore is probably safest, but doesn’t allow participants to see the effects of a swim on their gear). Low volume boats are poor rescue platforms, but can serve with practice. Consider practice in a lake, if available.

CONTACT RESCUES AND C-SPINE CONTROL

- fast, simple, dangerous and exhausting
- successful performance requires excellent swimming skills and solid pre-planning
- consider victim psychology
- downstream safety is essential - accurate rope throws after contact make the evolution much easier
- talking to the victim makes things much easier and safer – calms victim and lets them know what is going on.
  - “quick reverse” before contact
  - turn victim, hold onto both PFD straps if possible (your right arm under victim’s right strap and holding to left strap; tight PFDs may not permit this), then swim for shore; catch a rope if at all possible for aggressive victims, splash water, block and turn with lunges, or simply swim backwards; consider using yourself as a “target” for the victim to pursue all the way to shore.
encourage cooperative but exhausted victims to relax; generally victims rescued in this fashion are not able to assist in self-rescue.

unconscious victims are assumed to have C-spine injury
C-spine control by minimizing motion – wrist turn in rapid moving water, dual overhead wrist lock for shallow water, victim sandwich for deeper and slower water. Do the best you can, but remember that you still have to get the victim to shore and protect yourself. Survivable cervical fractures can generally tolerate a little movement – so when given the choice between keeping the victim face down (guaranteed fatal) or rolling them (maybe fatal), choose to roll them.
C-spine principles – maintain in-line orientation, minimize movement, move the body as a unit, maintain an airway.

drills – rescue differing victim types – encourage talking to victims. At a minimum, deal with active and C-spine compromised victims. Remember to incorporate strong downstream safety. For stronger groups, consider including “unexpected” victims during the course, to allow for spontaneous rescues.

problems and pitfalls – very demanding both physically and emotionally. Make sure participants don’t flush beyond downstream safety personnel, and be prepared to go in the water after both participants. Fins help a lot. Contact rescues are a key instructor skill – instructors, as a last resort, must be prepared to swim after their students.

RESCUE VESTS
Valuable rescue tool, but with specific manageable risks
Three major components – vest, attached reinforced harness, strong swimmer belt integral to safety harness
Risks – increased risk of snagging, carabiners accidentally clipping into harness, chest pressure during V-lower/live bait, “expert” appearance
Components – harness increases PFD strength, quick release belt allows release of tether under load while still allowing shore-based line attachment.
Participants must recognize the potentially fatal risks associated with rescue vests
Uses – anchor attachment, belay, secure equipment, tow point, wading self-assist, pin extraction, direct lower, live bait, direct lower, v-lower, line ferry, … Limited only by the user’s creativity.
Release from the belt by pulling straight out. Angled pulls increase the risk for snagged webbing.
Tow systems (e.g., sea kayaking systems) are NOT rescue vests; know the difference.
Recognize that each vest is slightly different. If possible, have multiple examples.
Differentiate between threading techniques – direct feed to buckle is weak, but releases easily (good for line ferries); weaving through the tri-glide is very strong (tri-glide takes all the force), but takes more pressure to release (better for live bait and V-lowers)

drills – live bait and v-lower below. Encourage creative use during scenarios and evolutions.

problems and pitfalls – Standard of care requires instructors to check participant harness each time they use a rescue vest in a drill. Never use non-locking carabiners, and be sure to demonstrate what can happen when a non-locking carabiner is used with the harness. Try to have extra vests to improve flow during the evolutions.

LIVE BAIT
fast, simple, dangerous (but less so than contact swims)
belayer attaches line to swimmer’s harness, using a knot or a locking biner. Swimmer swims after victim, catches them and is recovered to shore by the belayer. Recovery is MUCH easier with a vector puller. Rescuer entry to water is crucial; too early and you flush downstream, too late and you chase the victim. Try to enter on a ferry angle so that you can reach the victim quickly.
Still need downstream safety. If victim is out of reach, belayer can move downstream or attach a second line.

drills – Go after victims; practice setting up from scratch in an impromptu setting.
problems and pitfalls – Make sure locking carabiners are used, make sure the participants release buckle is set correctly. Teach belaying. Remember that a single belayer is unlikely to be able to pull a rescuer upstream. Vector pulls are key, and often overlooked.

V-LOWER
- slower, more complex, relatively dangerous
- requires some practice and solid communication/preplanning
- 2 line control on the rescue swimmer. Need to designate emergency release signal and plan, and be sure of hand signals. All hand signals need to be clear and easy to understand.
  - hand signals: Two hands straight up – hold; two hands to the right – swing right; two hands to the left – swing left; two hands upstream – pull upstream (extremely difficult); two hands downstream – let out slack slowly; one hand overhead waving – help me
- If rescue swimmer is on tether and needs help, they should be pendulummed to shore – communicate this plan in advance.
  - Technique works best in class I – III water where the rescuer can stand up and work on something once they are in place, or as an access tool. Big waves make breathing and visibility difficult whereas fast current places a high load on the rescuers chest.

drills – play with the system; All participants should be swimmers, belayers and back up/buddy belayers. If possible, run the technique in both hard and easy water, to emphasize its strengths and limitations.

problems and pitfalls – time consuming evolution. Keeping track of rings can be a problem, as can swapping out vests and belayers. Consider using instructors on one side of the river and keeping students on one bank. Have a plan for jammed buckles. Use only locking carabiners. Tow tethers should be removed – they tend to make swimmers spin on the end of the V-lower. Students commonly try to set a wide angle in the V, which makes it very hard on the belayers. Try to keep the inside angle in the V less than 90 degrees.

UNPINNING AND EXTRICATION
- speed, safety and complexity vary, but generally slower, more complex and more dangerous.
- unpin boats and gear, extricate people
- extrication – stabilize, make heads up, use what you know to safely remove the victim
- unpin – things held in place by balance of forces: gravity, force of water and friction; to unpin, look for most easily unbalanced force and unbalance it. Extrication may require unpinning. In the process of unpinning, boats almost always flip, so be prepared to either prevent or deal with this outcome.
  - safety – boats function as strainers, one hand for boat, one hand to do the work. Try to work downstream of the boat/strainer/whatever at all times (upstream it’s a strainer, downstream it’s an eddy).

drills - practice with trees, boats,… pinned in safe spots. On-land drills are key, because they allow practice in a safe environment.

problems and pitfalls – do you practice in the water and, if so, whose boat do you use? Watch out for students working around the boat; rescuers on upstream face are dealing with a strainer. Be very careful with vertical pin drills, to prevent participants from falling on their face.

ANCHORS
- speed, safety and complexity vary depending on the techniques used and the specific scene
- consider what happens if the anchor fails
- hard on soft, soft on hard; internal angle
- foundation of technical rescue system, fun to play with gear, multiple uses
- Hold the load, anchor/belayer/climber concept, correct position, means to attach the line generally, attach low to reduce leverage (may attach high, but need to have good reason)
- Single point – simple and fast, but depends on infinitely strong point
- use BFR, BFT, vehicles, bridge pilings, …
- simple wrap, 3 bight, wrap 2 pull 1, wrap 3 pull 2, 3 bight with a wrap, tensionless hitch, chock (either on webbing knot or hardware), deadfall, pickets, … Personally, I prefer 3 bights, tensionless hitches
and simple loops because they are fast and effective. Given time, a wrap-pull combo has some technical advantages, but isn’t likely to add anything to the rescue. Pickets and deadfalls require practice and solid judgement, and other techniques should be considered first. Successful pickets and deadfalls require practice beyond the scope of this course.

Two point – increased complexity, good for live loads, dicey anchors, general principles

Unlike climbers, swiftwater rescuers expect the direction of pull to change (e.g., as the boat is freed and moves downstream). In addition, swiftwater rescuers rarely dangle live loads. Therefore, multidirectional self equalizing anchors are appropriate for swiftwater rescues.

Load distributing, multi-directional. Twist to make anchor self-protecting; minimize length of equalizing loop to reduce shock load, consider tying off loop (depends on likely change of direction).

Three point – more gear, more complex

3 point cordellette, in line 8, figure 8, … as alternate systems

Lots of potential methods for multiple systems, but teaching them all might take all day… Develop multipoint anchors by combining 2 and 3 point anchor systems.

**drills** – practice each type, races, seek out sites besides trees, seek out most innovative anchor, incorporate anchors into scenarios and practice sessions…

**problems and pitfalls** – huge time sink if all forms are practiced. This module is good for homework and handouts. If students work in groups, there is a potential that one person will do all the work (typically the climber in the class). Multipoint anchors are relatively complex and often are a new skill. As such, they require lots of practice to develop mastery.

**MECHANICAL ADVANTAGE**

Risk spectrum – higher risk, more complex, slower

Advantage – more power

Disadvantage – takes time and equipment

Self protection – PFD and helmet, pull with back toward load, direction change, look for footing, consider direction of failure, incorporate snubbers as close as possible to likely failure points (on load line), consider whether or not it is even needed.

Remember not to run lines over friction points.

Rules - number of lines from load = multiplication of power; load anchor = odd; load as a pulley point = even; friction sucks, pulleys might be your friend

1:1 – get a line on load and pull in the direction needed. Then, add more people. Consider direction change (for protection) and vector pull (to increase MA).

2:1 – anchor on shore; good for tensioning lines in a piggyback system, relatively little equipment

3:1 – “Z-drug”, well-known, strong, requires more gear, more complex

4:1 – pig rig and its variants; good for line tensioning, very strong, no more gear than a 3:1. Many potential 4:1 systems, depending on available equipment and the situation at hand.

6:1 – begins to max out line strength, even for small groups. Lots of gear

9:1 – complex and gear intensive; potentially useful for flipping loaded rafts

Smart groups might get up to 81:1 (or higher!) with only 2 ropes; MA this high is an academic exercise.

**drills** – set up systems with limited gear, psuedo-scenarios, drills may be limited by time and student’s ability to remember systems; this and anchors are a good “homework” drill. Participants can develop familiarity with the physical skills and then use class time to refine the skills and develop more judgement. Four to one systems can be made in lots of different ways – encourage students to get creative.

**problems and pitfalls** – Another potentially huge time sink that makes a great homework activity. Snubbers, friction over sharp edges and self-protection are often forgotten

**LINE FERRIES**

essential for many rescues – how do you get the rope across the river?

ranges from simple to complex, safe to dangerous, fast to slow

need upstream spotters – you’re responsible for damage caused by the strainer you create
look for ways to make your life easier – minimize obstructions, look for simple approaches, look for narrower channels, look for islands, absolutely have a line receiver, keep line as elevated as possible
simple throw, buddy throw, wade out into water as far as possible
boat and swimmer reverse pendulum (rescue vest or downstream loop)
messenger line
connect two lines
be creative – think how to make your life as easy as possible. Can you wade or walk a line across at some point? Do you really need to get the line across the river?

drills – practice during line crossing techniques, strainers, V-lower and scenarios

problems and pitfalls – participants often have trouble trying to make their life easy. Encourage people to look for ways to simplify getting the line across the river. Accurate long distance rope throwing is essential.

LINE CROSSING TECHNIQUES
slower, more complex, increasing danger. Upstream safety is mandatory.
First, get the rope across the river… Avoid tensioning perpendicular to current
uses – move groups rapidly, move patients, victim access, backup safety while wading
Zip line - ideal site has fast current, easy access, solid accessible anchors. Complex. Uses include moving large numbers and mid stream access. Great evolution to practice anchors and MA. Be careful to hold arm on chest and not overhead. Set a ferry angle.
Hand over hand crossing – ideal site has moderate current and is shallow enough to stand. Relatively simple, may require MA for faster current upstream move. Uses include moving across current (great wading aid), midstream access and support. Teach how to move from downstream to upstream. Fast current is a significant limitation.
pendulum – anchor one side and pendulum people to anchored side. Relatively simple and fast. Speed things by adding a downstream moving vector pull. Moves large numbers of people; be careful of “cracking the whip” too hard – you can lose the downstream people.

drills – set up hand over hand line and zip line, move participants back with a pendulum; all participants try hand over hand upstream move (on land first increases success). Student set up allows anchor and MA practice and requires implementation of ICS.

problems and pitfalls – this is a huge time sink. Skills are rarely used by recreational boaters.

ROPE SYSTEMS – STABILIZATION LINES, SNAG LINES AND CINCHES
slower, more complex, increasing danger. Upstream safety is mandatory
increasingly gear and personnel intensive
see standard reference texts for drawings and additional details; important points are presented below.
stabilization line – fast, very effective; simply crosses victim and acts as a helping hand; may help provide air pocket and emotional support. Useful for foot entrapments and all types of pins. Try to maintain a 90 or so degree bend in the line at the victim to reduce the vector pull effect.
snag line – a deep line designed to snag the victim and release the entrapment. Starts out downstream of the victim and is worked upstream. Keep the line tight and submerged, try to avoid snagging underwater objects. Consider weighting the line by filling throw bags with rocks.
cinch line – multiple types: simple cinch, J-cinch and variations, Kiwi cinch, Carlson cinch and variations. Useful for body recovery and gear recovery; potentially useful for foot entrapment recovery. Complexity ranges from mild to utterly confusing.
simple cinch – clip lines into the stabilization or snag line and encircle victim. Line A clips into the stabilization line on river left and then is thrown to river right. Line A is then moved downstream, encircling the victim. A second line can be similarly attached on the opposite river side. There is a risk of severely constricting the victim.
kiwi – throw a rope upstream of victim (maybe two ropes clipped together), then use a live bait swimmer or a Reach system to recover the rope after it dangles around the victim. Once rope is ashore,
create a loop containing the victim and cinch down. Useful when you can only work from one side of the river.

J-cinch – Tie a butterfly knot into the middle of the cinching line, and work it downstream of the victim. Then work an second line, carabinered into the butterfly knot, around the victim (advantage: control and action from single side, disadvantage: unlikely to work). Alternatively work the knot close to the victim and then throw the second attached line to the other side so that the victims is enclosed (advantage: far more likely to work, disadvantage: lose single side control).

Carlson cinch – see many other written references for description. Complex system, but provides very secure wrap on the victim or gear. Requires lots of practice to work. Complexity borders on that of a Tyrolean, although the Carlson cinch is truly do-able and useable by recreational boaters willing to take the time to practice it.

Remember to consider what you’ll do once the victim is free. Redundant downstream safety is essential. Expect victims freed with these techniques to be hypothermic, injured, and unable to provide effective self rescue.

drills – practice on land and in water. Participants need lots of practice to have any hope of remembering the more complex cinches. On land practice with each rope a different color helps a lot. In water, try simulated foot entrapments and actual paddle (or stick) entrapments. Drills should first be done in very easy water (even still water) to allow gradual development of the skills.

problems and pitfalls – although stabilization lines and snag lines are fairly straightforward, the more complex cinches are very complex and require lots of practice. They can be somewhat frustrating for both participants and instructors. Make sure they are sold as solid tools not only for body recovery but also for gear recovery. Emphasize the stabilization line as an essential rescue tool for pins and entrapments – the chances of surviving a heads down pin requiring a complex cinch are very small, but stabilization lines may give victims the time and assistance they need to self rescue. Participants often appear hesitant to use the techniques unless they are required to do so.

SCENARIOS

Scenarios are an essential wrap up for the course. For participants, this provides a comprehensive opportunity to practice the skills they’ve learned, and to see what works for them. For instructor candidates, this is an opportunity to demonstrate their knowledge, and learn how to run a simulation. For instructors and trainers, scenarios help identify exactly what participants learned and areas that need more emphasis in later classes. Scenarios need to challenge the participants, while being run safely. Scenarios require supervisors, who can insure that appropriate upstream and downstream safety are provided, that victims are not unduly placed in danger, and that participants can obtain a useful learning experience. Scenarios are, by definition, less controlled than drills and therefore instructors must maintain a high level of vigilance during scenarios.

Drill vs. scenario

Throughout the class, participants will practice their skills in a series of drills. During drills, instructors should give clear directions about what to expect and how to react. Drills allow practice of specific skills. On the other hand, scenarios allow practice for judgement. Participants have to size up the scene, develop a plan of action, and execute the plan. Both drills and scenarios should be appropriately difficult. For less skilled or experienced participants, scenarios may be only slightly more complex than a drill. However, more skilled participants deserved more challenging scenarios.

Key roles in scenarios

1) evaluators – responsible for insuring overall safety of the evolution and evaluating individual performances. If possible, designating a single safety officer is helpful. Keeping a detailed time record and written notes regarding individual performance will help in debriefing.
2) victims – Can come from the pool of instructors or from outside the class. Try to avoid using participants for primary victims. Finding victims who aren’t directly involved in the class makes the evolution more real and more challenging – just how many outsiders did you bring in???
3) rescuers – the participants in your course.
**Key components to a successful scenario**

1) Clear objectives – the instructor should have a clear learning objective for the scenario, and should design the scenario appropriately. This objective need not be immediately apparent to the participants.

2) Safe scene – make sure the scenario stays a scenario and has little chance to degrade into a truly dangerous situation. At the same time, make sure the scene is challenging enough to provide some learning value. Balancing this may be difficult. When in doubt, err on the side of caution.

3) Ready students – the scenario should challenge, but not overwhelm, the participants. It is easy to design a scenario where participants simply cannot succeed, but this doesn’t benefit the participant.

4) Clear expectations – let the participants know what you expect from them, in terms of safety, timing, … Establish clear ground rules and make sure that there is a clear “exit” strategy that anyone can use if the scenario starts to become truly dangerous. For example, any participant should be able to yell “stop” and all action would immediately stop until their concerns are addressed. When possible, avoid artificial boundaries (e.g., it’s really 34 F outside, even though we’re all sweating in the 90 F weather). However, when appropriate, don’t hesitate to include them – just make sure there is an appropriate underlying reason.

5) Clear debriefing afterwards – It can be tempting to point out all the failures during the scenario, but that will dramatically reduce the learning quality of the evolution. Instead, lead the participants through a discussion of what they planned to do, what worked well, what didn’t work, and what they could do differently in the future. Emphasize that this is the place to make mistakes, so they don’t happen later. Remember that scenarios can be very stressful for the participants (in fact, if you design them well, they should be stressful), so after the fact try to de-stress the group and emphasize the take home learning points.

**FINAL WRAP UP**

Participants will benefit from some type of closing statement. Thank them for their work, re-emphasize the key points, suggest future training opportunities, and make sure they are safely on their way home at the end of the class. Do a thorough gear sweep at the end of the day so no one leaves valuable gear behind. It is the instructor’s responsibility to insure that everyone leaves the scene safely at the end of the class, so the instructor should always be the last person to leave the scene.