

This Field Operations Guide contains specific information on technical rescue procedures.

THIS GUIDE IS NOT ALL INCLUSIVE!

It is intended to be used as a tool for training and for quick field reference. Refer to current training manuals and your department policies for detailed explanations. There is no substitute for regular, quality, hands-on training by a qualified instructor.



The techniques and procedures illustrated in this guide follow NFPA standards and OSHA regulations as much as possible. This guide can be used by rescuers at all skill levels but was specifically developed for fully qualified technical rescue technicians. Special operations are inherently dangerous and serious injury or fatality may result from improper performance of these techniques. The author accepts no responsibility for damage, loss, injury or death resulting from information contained in or omitted from this guide.

Thanks to the Phoenix Fire Department and everyone who helped make this guide possible. Special thanks to my friend Ron Jamison for helping to write this guide, Kathy Darrow for editing and to George Drees, Ken Phillips and Jim Frank for great ideas and input.

This guide is dedicated to all those people who go the extra inch every day to make themselves better rescuers.

This handbook is based on the Phoenix Fire Department and Arizona State Fire Marshall's Office technical rescue programs.

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Swiftwater Rescue Command Checklist

Phase I: Size up

- Primary Assessment
 - Secure witness
 - Determine location, number & condition of victims
 - Identify immediate hazards
 - Water level rising or falling (mark waterline)
 - Surface loads (debris), hydraulics, hypothermia
- Secondary Assessment
 - Assess need for additional personnel and equipment
 - Assess need for additional equipment (boat)
- Rescue mode or recovery mode

Phase II: Pre-rescue operations

- Make general area safe (i.e., traffic and crowd control)
- Make rescue area safe
 - Assign safety officer
 - Assure team response to opposite bank
 - Personal protective equipment within 10 ft. (3m) of water
 - Assign downstream bag throwers
 - Assign upstream spotters
- Form incident action plan
 - Reach, throw, **wade, row, go, helicopter**
- Backup plans (i.e., paddle team with boat)
- Subject PFD and helmet
- Pre-rescue briefing

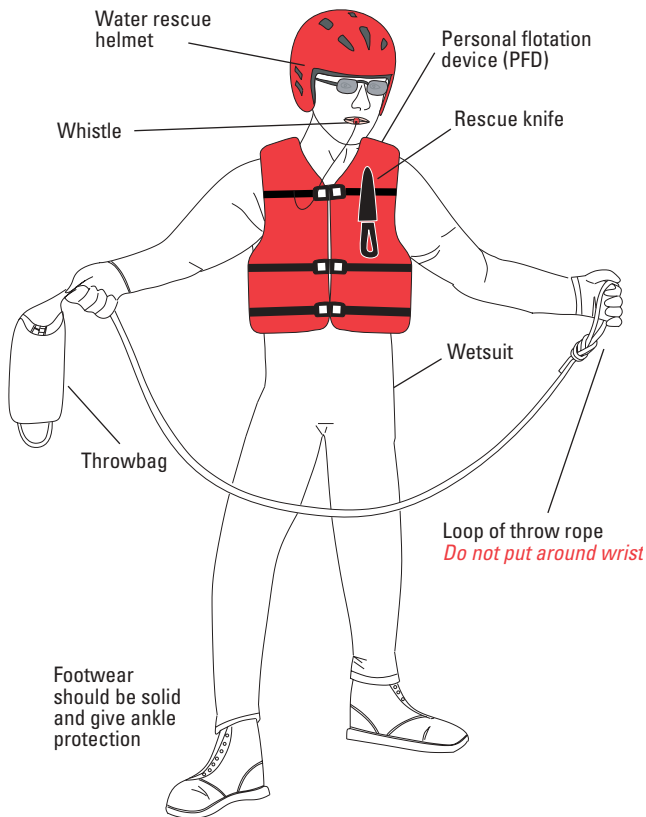
Phase III: Rescue operations

- Implement primary action plan
 - Make contact with subject
 - Apply protective equipment
 - Remove subject to safe area
- Transfer to ALS, consider hypothermia (p.153)

Phase IV: Termination

- Personnel Accountability Report (PAR)
- Collect water samples to assess contamination
- Consider decontaminating rescuers

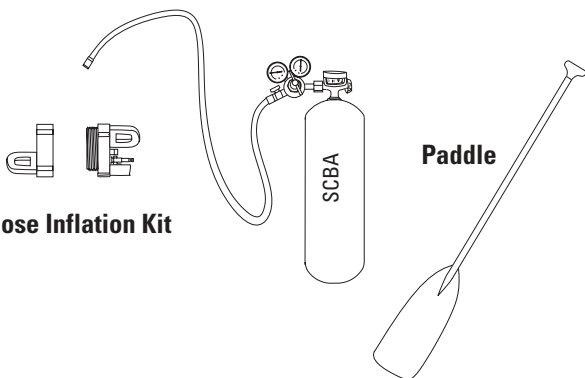
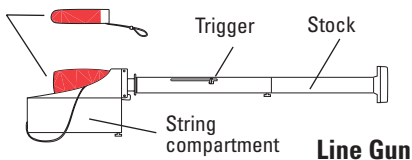
Personal Protective Equipment



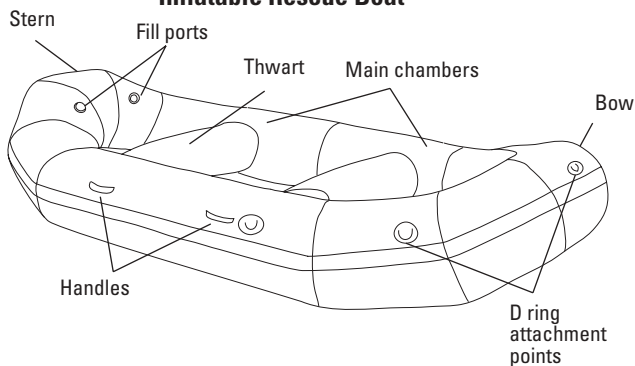
- ✓ Water conducts heat away from the body 25 times faster than air of the same temperature.

Team Equipment

Floating and non-floating projectiles



Inflatable Rescue Boat



Swiftwater Rescue Communications



Whistle blasts

- One blast = stop, look at me
- Two blasts = begin action agreed upon or indicated by whistle blower
- Three blasts repetitive = distress, need help

Hand signals

- One arm in the air = I need help
- One hand on top of head = I am ok

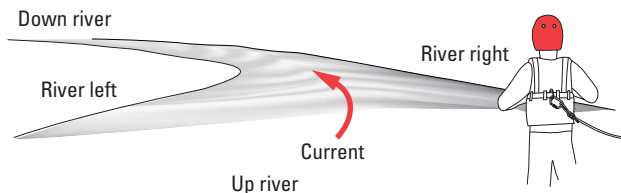


Swiftwater Hazards

- Low head dam/hydraulics
- Strainers
- Hypothermia
- Floating debris
- Foot entrapment
- Stationary objects
- Panicked swimmers

River orientation

Rescuer facing down stream



Methods of effecting a rescue in order of use/risk:

- Reach
- Throw
- Wade
- Row
- Go
- Helo

Low risk

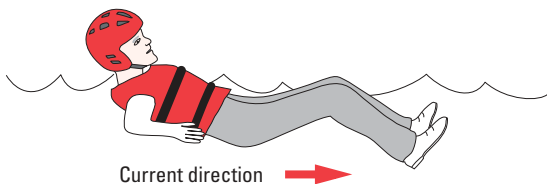


High risk

✓ Do not go within 10 ft. (3m) of the water without a PFD on!

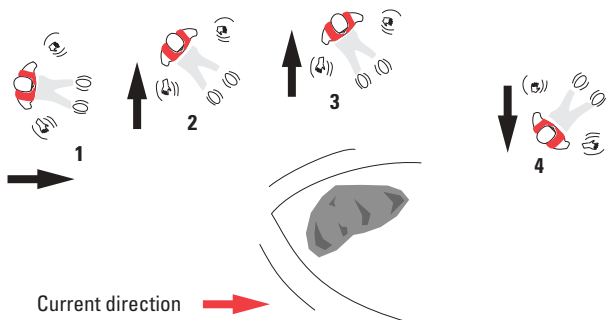
Safe Swimming Position

If you get swept away, assume safe swimming position and navigate with ferry angle.



Ferry angle

1. Feet first, facing downstream.
2. Knees bent with feet slightly lower than butt.
3. Set proper ferry angle.
4. Angle body with head pointed 45 degrees toward the desired bank.
5. Stroke backward to help navigate.
6. Look for eddy and get set up well in advance.
7. Avoid strainers. If not possible to avoid, swim hard head first and attack up and over obstacle.



Shore-Based Rescue: Reach

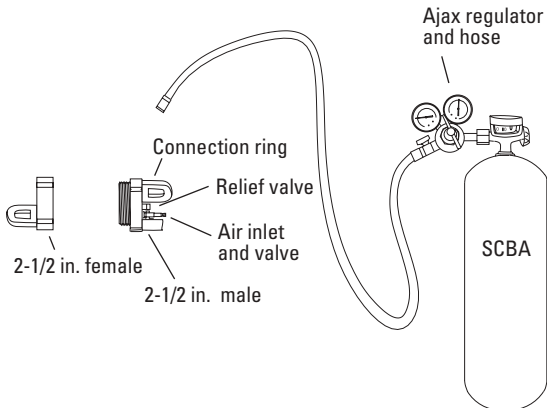
Reach with an object such as a pikepole or paddle

1. Lay flat on the ground so as not to get pulled in.
2. Reach as far out as possible.
3. Yell to get the subject's attention.

Reach with an inflated fire hose in low head dam situations and bridge rescues

1. Connect as many sections of 2.5 in. diameter hose together as needed.
2. Cap one end.
3. Install the inflation manifold to the other end.
4. Tighten all couplings.
5. Assemble air bottle and regulator.
6. Inflate hose to 50 to 60 psi.
7. Form bight in end of hose and tie off.
8. Consider attaching PFD to end of hose.
9. Push hose out to victim.

Inflation manifold



Shore-Based Rescue: Reach

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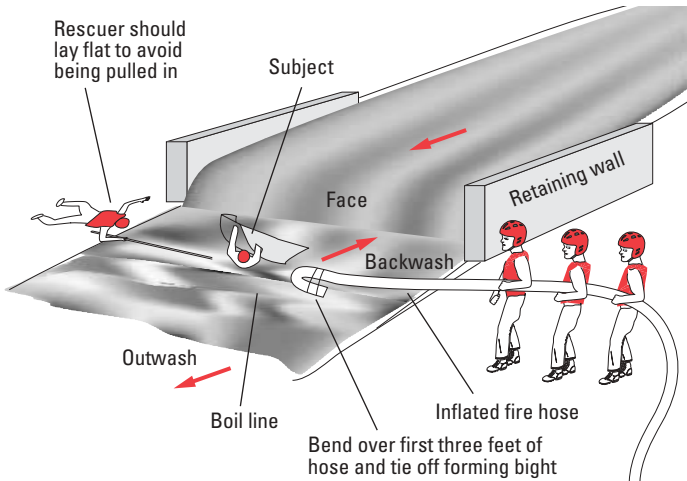
Reach subject with object

- Pike pole
- Paddle
- Tree branch
- Inflated fire hose

Other rescue options

- Flotation device tied to rope held by rescuers between river left and river right
- Boat on highline: track line must be up river from hydraulic and boat must be kept straight and away from face of hydraulic with downstream control lines
- Two boat access with downstream brake boat
- Remember aerated water reduces prop efficiency
- **Lead boat must never contact face of hydraulic!**

River wide hydraulic (low head dam)



- ✓ Swimmers and boaters can identify this hazard from upriver by seeing a horizon line down river.

Shore-Based Rescue: Throw

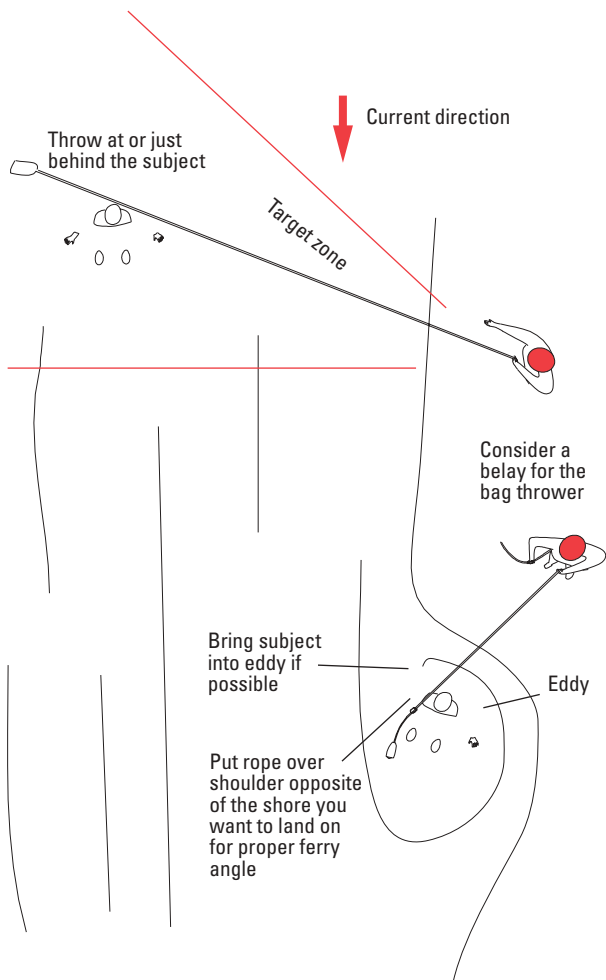
1. Choose a strategic spot to set up to throw bag.
2. Get and keep eye contact with the subject .
3. Aim for the subject's head or slightly up river.
4. Make a strong underhand throw when the subject is in the target zone.
5. Carefully bring the subject to an eddy or the best landing spot you can find.
6. Be ready to make a second throw.

Remember

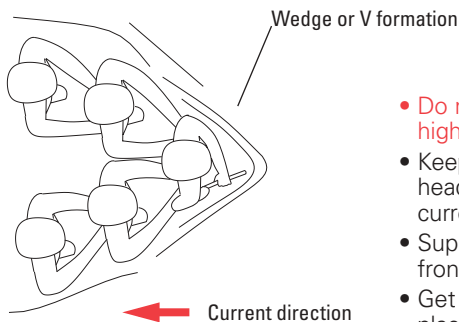
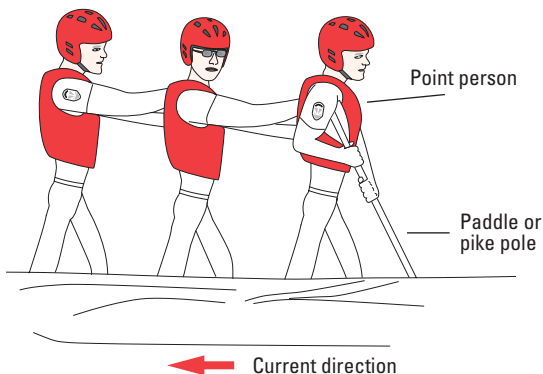
- Do not wade into current over your knees
 - Consider a belay line for the rescuer throwing the bag if the shore is sloping and or if there is risk of the rescuer getting pulled in
 - If the subject does not have a PFD on they will plane under in strong current. Try to give a moving belay and pull them in gradually
- ✓ Never count on the victim to participate in their own rescue.

Shore-Based Rescue: Throw

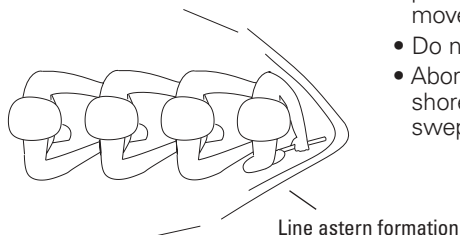
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Shallow Water Crossing: Wade



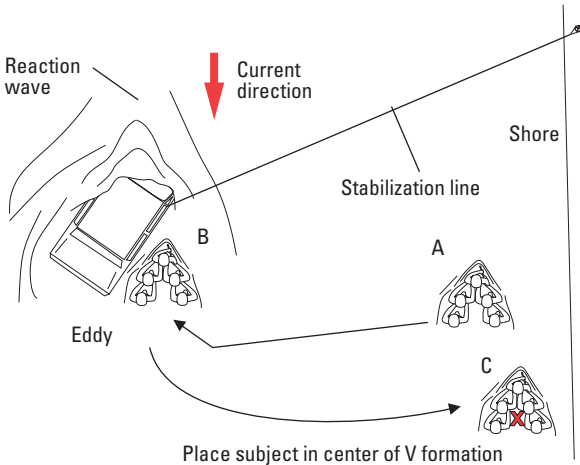
- Do not enter current higher than knee deep
- Keep the formation headed straight into the current
- Support the person in front of you
- Get a solid foot placement each time you move your foot
- Do not rush
- Abort and return to shore before getting swept away



Shallow Water Crossing to a Vehicle



1. Do not enter current deeper than your knees.
2. Have upstream spotters to watch for floating debris.
3. Have downstream bag throwers as backup plan.
4. Secure vehicle with stabilization line if possible.
5. Do not follow the stabilization line, it leads to the reaction wave.
6. Take a PFD and helmet for each subject.
7. Keep the formation headed straight into the current (fig. A).
8. Abort the attempt if formation is not totally stable.
9. Move laterally to the rear of the vehicle, avoid the reaction wave.
10. Watch for instability of the vehicle.
11. If the vehicle appears stable, move up into the eddy (fig. B).
12. Get PFD and helmet correctly on each subject.
13. Assist one subject into the pocket of the V formation.
14. Move laterally to the safe bank (fig. C).
15. Repeat the process for additional subjects.



Boat Operations: Row

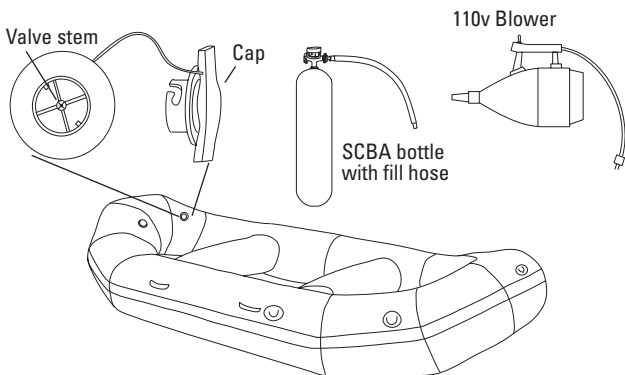
Boat inflation procedure

1. Remove valve cap.
2. If valve stem is not flush with outside of valve, push in and turn 1/4 turn.
3. Insert fill nozzle and flow air.
4. Fill each main chamber to the point that it has shape.
5. Rotate around and gradually top off each chamber to insure equal pressure (floor and thwarts).
6. Final fill should give boat enough pressure to just dent tube with one knee.
7. Cap valves.

To deflate

1. Put one person on each valve, uncap and place finger on valve stem.
2. On mark, simultaneously push in valve stem on each main tube and turn 1/4 turn to keep open.
3. Open all other valves.
4. Fold boat, roll and stow in carry bag.

Halkey Roberts Valve



Boat Operations: Row

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Use a boat with paddle crew to:

- Paddle out to drifting subject
- Access hard to reach locations
- Have a backup plan to recover any rescuers swept away

Paddle crew procedures

1. Inflate boat.
2. Put one paddle for each rescuer plus one backup in boat.
3. Clip two throw bags into boat.
4. Assemble paddle crew.
5. Place boat in eddy or other suitable launch spot.
6. Paddle captain sits in back on raised stern.

Paddle captain is responsible for steering the boat.

Have two designated grabbers, others keep paddling.

Standard paddle commands

"Forward paddle" = All paddlers paddle forward.

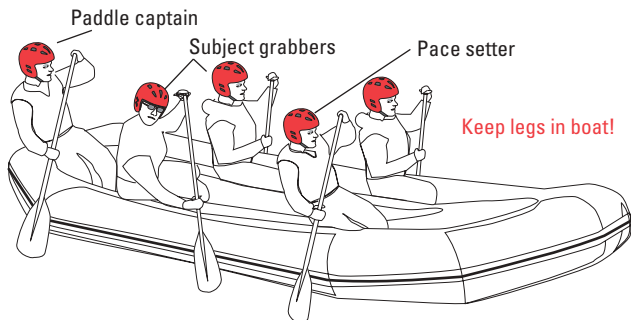
"Back paddle" = All paddlers back paddle.

"Right turn" = Paddlers on right give one stroke back then continue forward. Left continues forward.

"Left turn" = Paddlers on left give one stroke back then continue forward. Right continues forward.

"Stop" = All paddlers stop paddling.

"High side" = Everyone move to the rising tube.



Boat on Highline: Row

Boat on highline with movable control point is used to

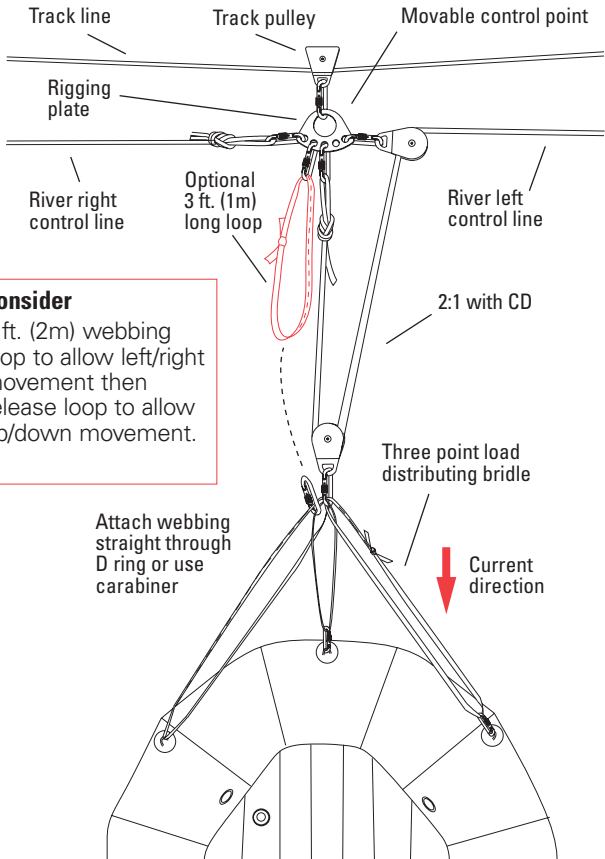
- Precisely position boat in fast current
- Provide safe rescue platform
- Access low head dams
- Create a movable platform to catch drifting swimmers

Procedure

1. TSO assigns boat team, river right group and river left group.
2. Boat team inflates boat and rigs webbing bridle on front three D rings.
3. Remote side gets into position and locates suitable anchor.
4. Rescue side sends messenger line to remote side.
5. Remote side receives messenger line and pulls main rope across.
6. Anchor first line across and designate as track line.
7. Pull two additional lines across using track line.
8. Anchor second line and designate as remote control line.
9. Pull back using track line and anchor with ratchet prusik and PMP.
10. Pre-tension track line with 3:1 using **no more than 1 puller**.
11. Tie off track line with 3 ft. (1m) of slack between prusik and anchor.
12. Attach track pulley to track line and rig movable control point.
13. Attach rescue side control line to movable control point.
14. Boat can be rigged with no capability to lower, with 1:1 lower line, with 2:1 lower line or with pulley system controlled from within the boat.
15. 2:1 controlled from rescue side is recommended.
16. Post-tension track line with 3 pullers if needed.

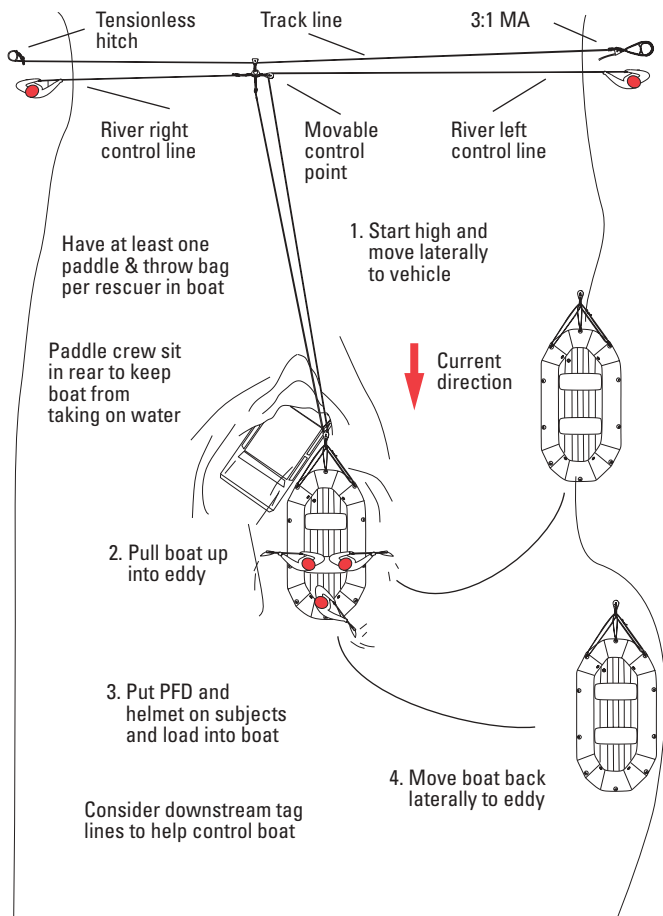


Boat on Highline: Rigging



- ✓ Drag on boat and tension on control lines will be severe in current faster than 10 ft./sec. (3m/sec.).
- ✓ Be prepared to put ratchet prusiks with attendants on control lines.

Boat on Highline: Operation



✓ The paddle captain must be prepared to cut the boat loose if the rope system puts boat in danger or if there is a need to chase a swimmer.



Boat on Highline: Crew Signals to Shore Control



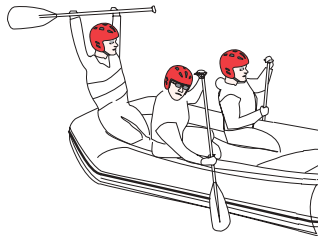
1 whistle blast and paddle
straight up = **STOP**

2 whistle blasts = move boat in direction
indicated by captain's raised paddle

River right



River left



Down river

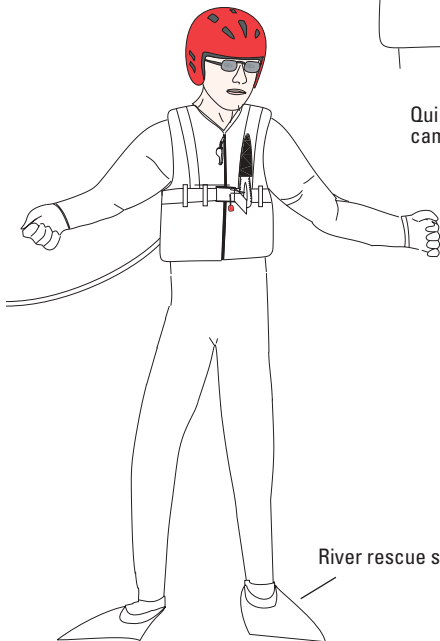
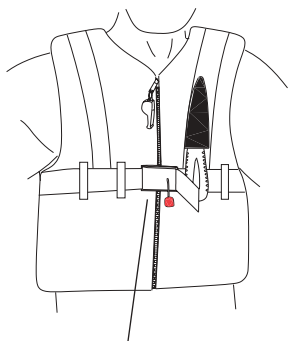
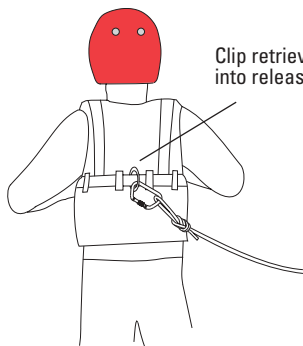


Up river



Strong Swimmer Rescue: Go

Tethered rescuer special use rescue vest



Tethered Strong Swimmer: Go



Indications for use

- As a backup plan
- To rescue a drifting subject who is out of throwbag range or unable to catch and use throwbag
- Useful range of about 150 ft. (45m)

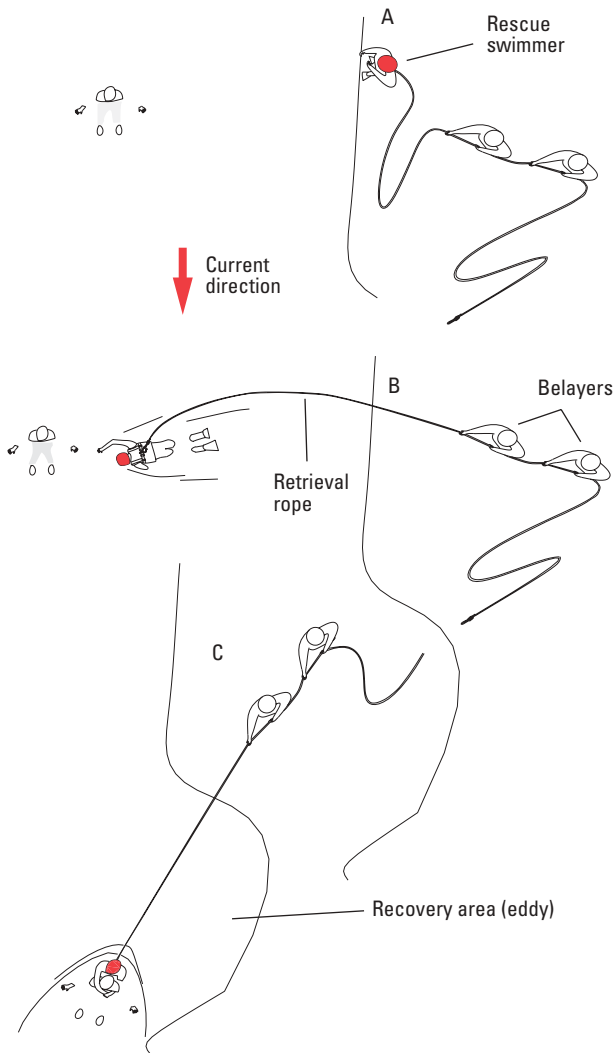
Minimum requirements

- **Recovery area clear of obstructions**
- 1 Special purpose rescue vest
- 1 Pair river rescue fins
- 1 Strong swimmer with appropriate protective equipment
- 1 200 ft. (60m) rescue rope
- 4 Technical rescue technicians for support
- 2 Throw bags
- A good backup plan

Procedure

1. Set up at a downstream location with best advantage.
 2. Strong swimmer dons river rescue fins and special purpose rescue vest.
 3. 200 ft. (60m) rescue rope is connected by carabiner to releasable ring on back of rescue vest.
 4. Stack approx. 20 ft. (6m) of rope down river from rescuer.
 5. Position belay crew down river from rescue entry point.
 6. Wait until subject is even with rescuer (fig. A).
 7. Rescuer maintains eye contact with subject and performs shallow water dive entry (fig. B).
 8. Rescuer swims aggressively to subject.
 9. Belayers feed rope to prevent drag on rescuer and stand by for ready signal.
 10. Rescuer holds subject with appropriate technique and indicates ready.
 11. Belay team moves rescuer and subject to shore (fig. C).
 12. If belayers are unable to bring rescuer in, rescuer can release from tether line and initiate backup plan (last resort).
- ✓ **Never tie a rope around a rescuer. Only attach rope to a quick release system.**

Tethered Strong Swimmer: Go



Helicopters and Swiftwater: Helo



Helicopters are considered to have a high risk factor for swiftwater rescue operations. Prior to the use of a helicopter, all other options should have been ruled out due to the higher risk to rescuers or because they are incompatible with the situation. Rescuers should be the highest trained, strongest and best equipped available. A safety briefing must be conducted prior to starting operations. The pilot, as always, has the final word on go or no go.

Support role, less risk

- Transport rescuers across river
- Transport equipment across river
- Provide reconnaissance

Rescue role, highest risk

- Access vehicles and midstream objects
- Extract subjects via one-skid
- Insert rescuers onto objects via one-skid
- Insert rescue swimmers into water near subject
- Extract rescuers and subjects via short haul



Follow local protocol for these high risk procedures!

