Chapter 1:
Concepts and Philosophy of Rescue [1]

This section is a potpourri of principles and concepts. The first section focuses on the principles of rescue with a list of key points to consider. The second focus is on the rescue curve. It frames rescue in philosophical terms for both the participant and the swiftwater rescuer. The third section focuses on the experience. The adventure sports programmer needs to consider the experience they are creating for their participants. Although this is really true for creating paddling experiences, it is also true for creating swiftwater rescue experiences for participants. The last section focuses on search techniques. Usually, the location of the victim(s) is known. However, this is not always the case and on occasion the victim needs to be found before they can be rescued.

Principles of Rescue

The following are sixteen principles of rescue. They are good thumb rules for practice. The original reference is unsure. The author believes the principles came from Charlie Walbridge's instructor materials. This author has added a couple of principles to the original list.

1) **A sign of a novice is that they begin their rescue efforts with rescue by others (i.e. the rescue squad)**. In contrast, experienced boaters emphasize safety and self-rescue as their first line of defense. This is an application of the Rescue Curve discussed later in this section (see 911 Syndrome). If your first line of defense in rescue is rescue by the rescue squad, you next option is a major injury or body recovery. In a sense, you have squandered away most of your options. Experienced paddlers increase their options of survival and enjoyment by focusing on safety, prevention and self-rescue as their first lines of defense.

2) **Eliminate the accident/incident before it happens**. Think good trip planning. Recognize fatigue, hazards, insufficient skills, lack of experience, etc. before it leads to a life threatening situation. Choose a trip that is commensurate with the skills and abilities of the participants. Remember, no accident; no rescue. Isn't this what everyone wants? All, this is under the rubric of good trip planning.

3) **Always wear a life jacket (PFD)**. Anyone within 10 feet of the water should be appropriately dressed for being in the water, including wearing a life acket.

4) "**Caution" is always the sign of a good rescue**. There are several themes here. The first is the affect of adrenalin. It narrows a person's focus. It reduces cognitive thought in the frontal lobes. This is why training is important. It counter acts the loss of cognitive thought. It can lead to a rescuer entering the scene without adequately surveying the scene for the mechanism of injury (MOI). It can lead to a second victim. Most manuals recommend that the first step is to "***survey the scene***." Practice **STOP.** When you first come upon scene, **stop, think, observe/options, and plan** (Figure 1.2).

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[1] This chapter was written by Robert B. Kauffman who is solely responsible for its content.

5) **Never make the situation worse**. If a rescuer becomes a victim while performing a rescue, you have made the situation worse. You now have two victims. If you dislodge the victim without someone to pull the victim out downstream, you have made the situation worse.

6) **Never tie a rope around the rescuer**. If you are tied in, then you are no longer in control of yourself. Also, don't confuse this point with a self-release system on a rescue harness. With a rescue harness, you have control and can release the belt.

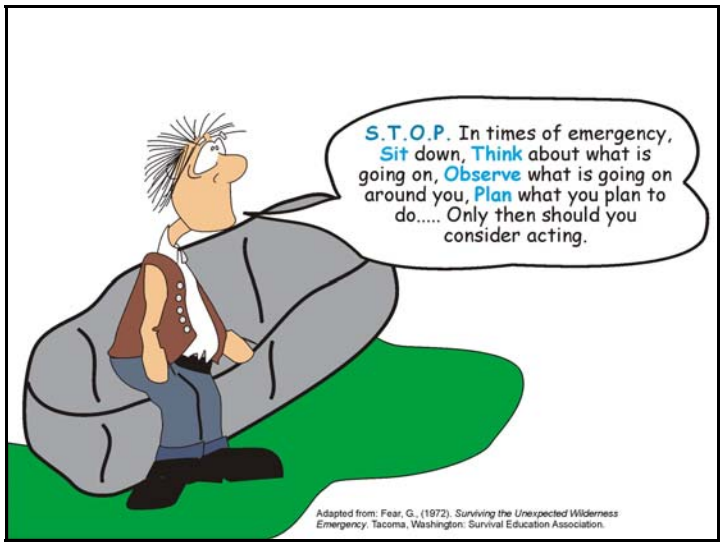

Figure 1.1: STOP - Survey the scene and stop, think, observe and plan.
Source: Author – [file: \FA-STOP2.cdr]

7) **KISS**. Keep it simple and safe. Utilize the lowest risk methods first. Set up the next higher risk method as the next alternative. To a degree, this principle reflects the underlying changes in swiftwater rescue philosophy. It reflects a change in the 1970s when swiftwater rescue morphed many of the more complex climbing rescues (e.g. Tefler lower). Also, it reflects the amount of equipment swiftwater rescuers have to effect a rescue. Usually, this is a throw rope and two to three carabiners.

8) **Think multiple systems**. If one rescue system fails, you should have an alternative approach in the works. Always use the lowest risk method first. If you have the personnel, use them. Also, think more than one way of rescue. Note: Examine the cover of this manual. The diagram has both a snagline and four person rescue performing rescues simultaneously.

9) **Deploy upstream spotters**. You don't need recreational paddlers or rafters interfering with your rescue. In addition, you want to spot debris before it interferes with the rescue. Normally, this would read always deploy upstream spotters. A typical group of four or five paddlers may not have the luxury of having a designated spotter. If not, designate someone to assume this role. Note: Most of the diagrams this manual depict an upstream and downstream spotter.

10) **Deploy downstream backup rescuers**. If the victim becomes dislodged from the original site, you need someone to pull the victim into shore. This may require one or more rescuers. Also, if there is a lack of manpower to disperse a downstream backup rescuer, this makes a case for using some of the cinches.

11) **Rescuers first, victims second**. This is axiomatic. When a rescuer becomes a victim, you have two victims and one less rescuer. You have made the situation worse in two ways.

12) **What you bring with you is what you have for the rescue**. This point dovetails with one of the continuing themes regarding the difference between "rescue by others in your group," and "rescue by others outside your group (i.e. rescue squad)." The equipment which you bring with you may be all the equipment you have for the rescue. Typically, boaters will usually have

several throw bags, prusicks, and carabiners available to effect a rescue. In contrast, a rescue squad can bring all the equipment they like.

13) **When you are focusing on what you are doing, you are not focusing on what the group is doing**. Actually, this is a really good thumb rule for leaders. If you are tying a knot in a system, you are not focusing on what everyone else is doing. However, if you are supervising the setup of a rescue system and tying a knot, you are supervising the overall system. Everyone focuses on what they are doing. However, if this becomes continuous, this may be a sign that the rescue is out-of-control. If as the trip leader, you are focusing on how cold you are, you are not focusing on what the group is doing. You may no longer be in control of your group. It may be time to STOP (see Item #4 and Figure 1.1).

14) **Rescues are dynamic, not static**. Things are always changing during a rescue. The victim may come loose. A raft may paddle into the incident scene. The rescue scene is dynamic and it is always changing. The rescuer must prepare for the change, anticipate it and plan for it.

15) **Play the "what if" game**. You need to plan ahead and anticipate what might happen both before and during a rescue. What if I turn over. Can I roll? What if someone gets hypothermia? Can we extricate them without completing the trip? What if it begins to rain, or the weather gets colder? Did I bring extra equipment? What if the victim comes loose? Is there a downstream rescuer positioned to rescue the victim.

16) **There is a difference between the ACA Swiftwater Rescue and Rescue 3's Swiftwater Technician programs**. This used to be more of a concern when there was a lot of overlap between the two programs and which groups they addressed. In essence, it acknowledges the differences between "rescue by others in your group" and "rescue by the rescue squad" (see Rescue Curve and Figure 1.2). Some of the differences between the two programs may be explained in terms of time, personnel, and equipment. **Time** since the boaters in your group are generally the first rescuers on the scene (i.e. the rescue curve). Rescue squads arrive later to the scene. A rescue squad has lots of **personnel** to help in the rescue; a boating trip has those member on the trip less the victim. Rescue squads have loads of **equipment** or "toys." Generally, boaters have less equipment to effect a rescue. The ACA's program focuses on prevention, self-rescue and rescue by others in your group. The Swiftwater Technician program focuses on rescue by other outside your group (i.e. rescue squads).

Rescue Curve[2]

The rescue curve describes rescue in terms of who does what when and what will happen if those attempts fail. The rescue curve states that once an incident occurs, "***without intervention, the probability of survival or avoiding injury, damage, or loss increase with time***." The rescue curve has been refined several times since it was first developed by Kauffman and Carlson (1992) (Figure 1.2). Although the model was originally developed in the context of outdoor activities, it has been generalized to non-outdoor activities (Kauffman, 2003).

[2] This section on the rescue cure is excerpted from the textbook: Kauffman, R., and Moiseichik, Merry., (2013). *Integrated Risk Management for Leisure Services.* Champaign, ILL: Human Kinetics. p. 200-202.

Safety and Prevention – According to the rescue curve, the first line of defense is safety and prevention. These include the active and passive measures that the participant should take to avoid a rescue situation or, if a rescue situation occurs, to better help survive the situation**.** *Active measures* are measures a participant takes to help prevent an incident from occurring. The participant uses their knowledge, skills, and abilities to avoid a situation in which a rescue is necessary. A climber's climbing ability, a paddler's paddling ability, or a driver's driving ability are examples of active safety measures. *Passive measures* are measures that normally do not help prevent the initial incident from occurring but that do help during the rescue phase. For example, a climber uses climbing ropes and protective gear as protection against a fall, but ropes and protection do not aid in the actual climb. A paddler's life jacket aids the paddler only if she comes out of her boat. A spare tire has little value to a driver unless the car has a flat tire. On a playground, surfacing, fall zones, and equipment design are examples of passive measures.

Once an incident occurs, injury, damage, or loss normally occurs unless there is intervention. Intervention is defined as self-rescue, rescue by others in your group, and rescue by others outside your group. Occasionally, intervention will occur naturally. A person falls from the rock face, lands in a tree, the branches cushion the fall, and the person lands relatively unharmed on the ground. A child falls off a climbing apparatus on the playground, and hits the pea gravel surfacing underneath the apparatus. The pea gravel breaks the fall (intervenes) and the child continues to play, uninjured.

Self-rescue – The first level of defense after an incident occurs is self-rescue, or what the victim can do to rescue himself. For example, a climber who falls several feet as a rope suspends his weight

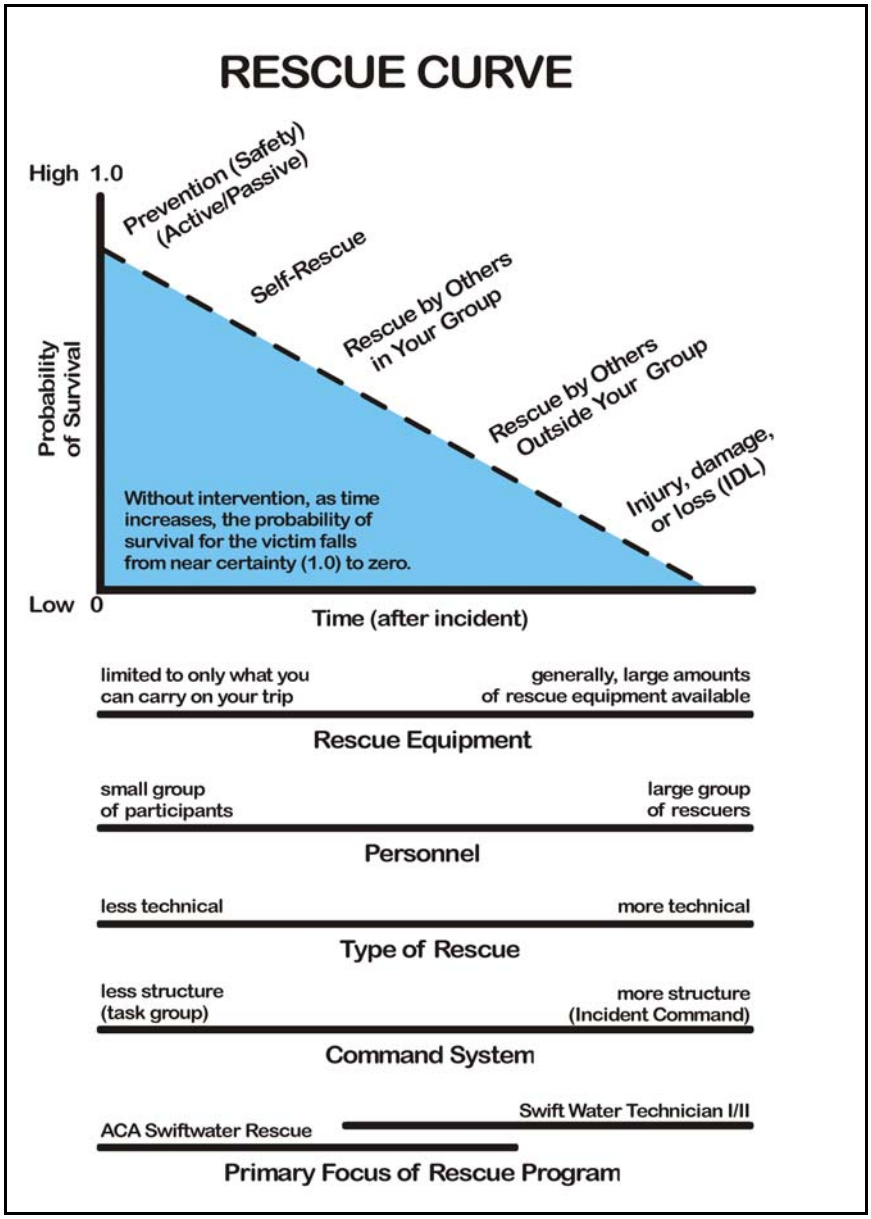

Figure 1.2: The Rescue Curve – The rescue curve suggests that once an incident occurs, without intervention the probability of survival decreases as time increases. The four stages of the rescue curve are prevention and safety, self-rescue, rescue by others in the group, and rescue by others outside the group. The differences in rescue equipment, personnel, type of rescue, and command structure are addressed with the curve. Source: Kauffman and Carlson, 1992, Kauffman 2003.

can grab hold of the rock face and continue climbing. The paddler can Eskimo roll or swim with her boat to the shore. The driver can remove the flat tire and put on the spare tire. On a playground, a child slips on a climbing apparatus, catches herself, and continues climbing. The child self-rescued.

Rescue by Others in Your Group – The third line of defense is rescue by others in the victim's group is the next line of defense. If the climber is belayed, the belayer may lower the climber to a safe area. If the paddler comes out of her boat, a member of her group may paddle over, extend the stern and grab loop to her, and paddle her to shore. The passenger in the car may help change the tire or assist by directing traffic. On the playground, the child climbs to the top of the climbing apparatus, looks around, gets scared, freezes, and starts crying. Her mother rushes over and with outstretched arms lifts her daughter off the climbing apparatus. The daughter is rescued by others in her group. Anyone participating in the activity alone bypasses this phase and directly enters the next.

Rescue by Others Outside the Victim's Group – The next line of defense, rescue by others outside the victim's group, includes the rescue efforts of people passing by or the rescue squad. If the climber is injured in a fall or the rescue escalates beyond the capabilities of the other climbers, a rescue squad with specialized training is summoned. The same is true for the paddler. On the playground, the child is crying atop the climbing apparatus, and the mother is standing there not knowing what to do. A passerby rushes over and lifts the child off the apparatus. The passerby performs a rescue by someone outside of the group. Or, in the same situation, the passerby calls 911, and the park sends the fire department and the fireman lifts the child off the apparatus. Again, it is a rescue by someone outside of the group, in this case the rescue squad.

Injury, Damage, or Loss – If no one rescues the victim, additional injury, damage, or loss usually occurs. Even if the climber is not injured by the initial fall, he will experience additional injury or even death without intervention. The paddler who is not rescued may eventually flush through the rapids and naturally wash up on the shore. If no one rescues the driver, he may be stranded in a desolate area. On the playground, it is difficult to envision someone not eventually coming to the rescue. Most likely the child will eventually stop crying and attempt to climb down the apparatus (self-rescue). The child will most likely successfully climb down and go home. Or the child will fall and injure herself and need treatment. Or, the mother will come to her senses, and help the child off the apparatus (rescue by others in the group). This example illustrates the principle that the previous stages can be re-entered again.

Available Resources and the Rescue Curve (see Figure 1.2) – The rescue curve is useful in helping to explain the resources available to or influencing the rescuers. The rescue squad is in the business of performing rescues. As a general rule, the rescue squad has lots of personnel and equipment at their disposal to perform a rescue. In addition, they have trained extensively in rescue procedures. In contrast, people participating in the recreational activity are interested in performing the activity. Rescue is what happens when something goes wrong performing the activity. It is not that they are interested in rescue. They are. However, they are more interested in performing the activity. Often they think in terms of how they can adapt the equipment used in performing the activity to a rescue situation, or they will bring along with them simple devices as long as these items don't interfere with the performance of doing their activity. In terms of personnel, they are limited by who is in their group unless, of course, they are doing the activity alone. In that case, they bypass this phase for the next phase. The following examples illustrate the difference in resources between participants in the activity interested in rescue, and the rescue squad who is prepared to rescue others. In terms of personnel, a group of climbers might consist of 2 instructors and 10 youths. Although the group comprises 12 people, only 2 are well trained (1 if the victim is an instructor). In a paddling group of 5 people, 4 people must conduct the rescue assuming that 1 person in the group is the victim; this is a small group for a whitewater rescue. In contrast, a rescue squad

could have 20 to 30 trained rescurers available to them for a rescue (see Scenes #3 and #4 in Figure 1.4).

Regarding equipment, climbers usually do not bring rescue pulleys and a Stokes litter with them; the rescue squad does. The paddler group might have two carabiners per person and several rescue bags. This makes any rescue involving a lot of carabiners or several hundred feet of rope difficult. In contrast, the rescue squad usually arrives with large amounts of specialized rescue equipment.-

The difference between equipment and personnel in terms of the rescue curve is illustrated by the child stuck atop of the climbing apparatus. If the children become stuck on a bouldering rock (climbing apparatus), it is not expected that the mother supervising the children will have brought a ladder along with her in case she needed to rescue the children. However, if the fire department is called, they would bring a ladder. In this case, the rescue squad (rescue by others outside your group) would have the equipment and personnel necessary to perform the rescue in contrast to the children (self-rescue) or the mother (rescue by others in your group) who wouldn't.

911 Syndrome (Figure 1.3) – The 911 syndrome focuses on the difference between inexperienced and experienced participants. More experienced, specialized participants tend to begin their rescue efforts with safety and prevention. They focus on their equipment and on developing their skills and rescue techniques. They know that if a potential incident occurs, their first line of defense is self-rescue. If self-rescue does not occur, they can move very quickly through the stages of the rescue curve and run out of options. Experienced participants tend to front-load their activity with safety and prevention because they know their survival depends on it.

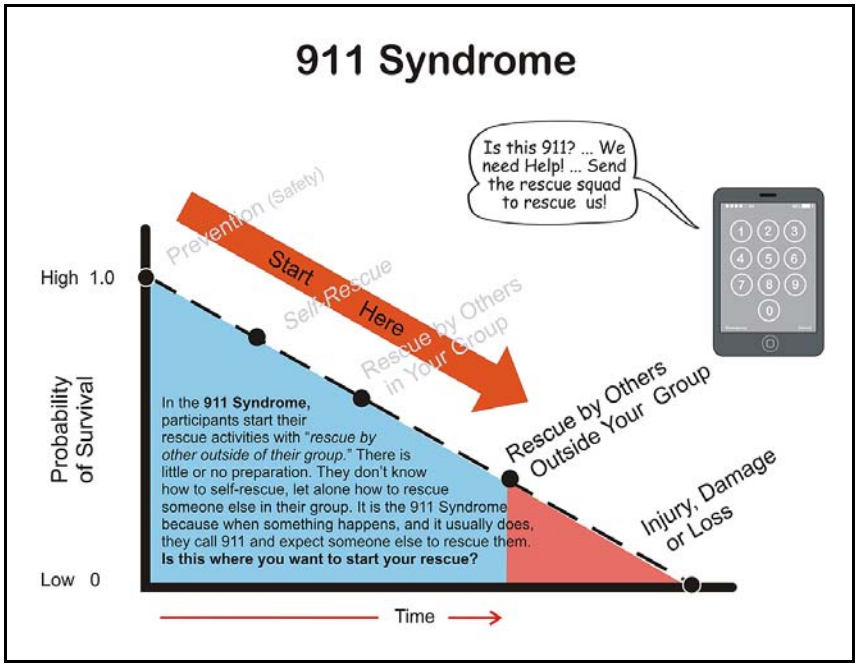

Figure 1.3: 911 Syndrome – In the 911 syndrome, participants begin their rescue efforts by calling the rescue squad (i.e. rescue by others outside your group). Source: Author – [file: \RK-911Syndrome.cdr].

In contrast, inexperienced or "activity for a day" participants usually do not have the necessary skill, knowledge, or training to perform a rescue, and they most likely do not possess or know how to use rescue equipment. They tend to quickly skip over the first three phases of rescue (i.e., safety and prevention, self-rescue, and rescue by others in the group) and immediately go to the fourth phase—rescue by others outside the group. They call 911 and hope that someone comes to rescue them. Usually, they believe that it is the responsibility of someone else to rescue them (Kauffman, 1992; Kauffman et al., 1991, and rely almost completely on the resource manager or the rescue squad for their survival.

Rescue Curve and Swiftwater Rescue (Figure 1.4 and Figure 1.5) – The availability of resources section discusses the differences in resources available between the ACA swiftwater rescue type courses and Rescue 3 courses (see Figure 1.2). It is the difference between rescue by others in your group and the rescue squad. The focus of the ACA swiftwater rescue courses is on a group of paddlers on a trip. They will have less equipment resources with them. They will have with them what they bring with them. This does not preclude using many of their techniques by the rescue squad or in response to a formal rescue. Typically in terms of the rescue curve, a paddling group represents rescue by others in your group (see Scenes #3 and #4 in Figure 1.4).

In contrast, the rescue squad is generally called to the scene after an incident occurs. Unless, they are camping out at known sites, there is often substantial time between when incident occurs and when they arrive. Usually, they bring lots of equipment and personnel with them. Typically, the rescue squad represents rescue by others outside your group.

Second, passage from one phase to the next can occur innocuously and with seemingly simple decisions. One such example is illustrated in Scene #2 in Figure 1.4 and in Figure 1.5. A swimmer is thrown a throw rope from the shore. Prior to the throw rope, the swimmer is *self-rescuing*. By accepting the rope, the swimmer has seamlessly passed to the next phase of *rescue by someone in your group*. This is not a bad thing. It is done all the time. However, the swimmer is still responsible for himself. He must pay attention to the situation. If the rescuer is going to swing the swimmer into a hazard, the swimmer needs to take responsibility and let go of the throw rope and assume *self-rescue* again. In technical terms, the swimmer passes from the self-rescue phase to rescue by others in your group phase and then back to the self-rescue phase.

Third, many of the wading and swimming exercises including the strainer drill familiarize swiftwater rescue students with moving water. These exercises aid in self-rescue.

Fourth, and moving to the safety and prevention phase, it goes without saying that the knowledge, skills, and abilities learned by the swiftwater rescuer aids the rescuer in their preparation. It is the reverse of the 911 Syndrome. Knowing what can happen leads to better preparation. In terms of knowledge, knowing how to negotiate a stainer can save one's life. Knowing the parts of an eddy aids in identifying them on the river. Knowing the parts of hydraulics aids in identifying them on the river.

Knowledge complements skills. Skill is the ability to do or perform. Having performed the strainer drill takes an intellectual exercise and transforms it into a skill. Eddies are like people. Physiologically everyone is pretty much the same, but their personalities are quite different. The ability to recognize the differences in eddies and what they can do to you comes with experience. The same is true for hydraulics. Frowning and smiling holes are a simple example of being able to differentiate between a hydraulic which can be played and one which will play with the paddler. Having the tactile feel of the attitude of the boat underneath the paddler can determine whether the paddler remains a rescuer or becomes a victim also when approaching the victim in the backwash or downstream portion of a hydraulic.

Ability is the actual ability to perform the previously mentioned skills. Prior knowledge, skills and ability make river users safer. They know what to avoid and can more easily avoid what needs to be avoided.

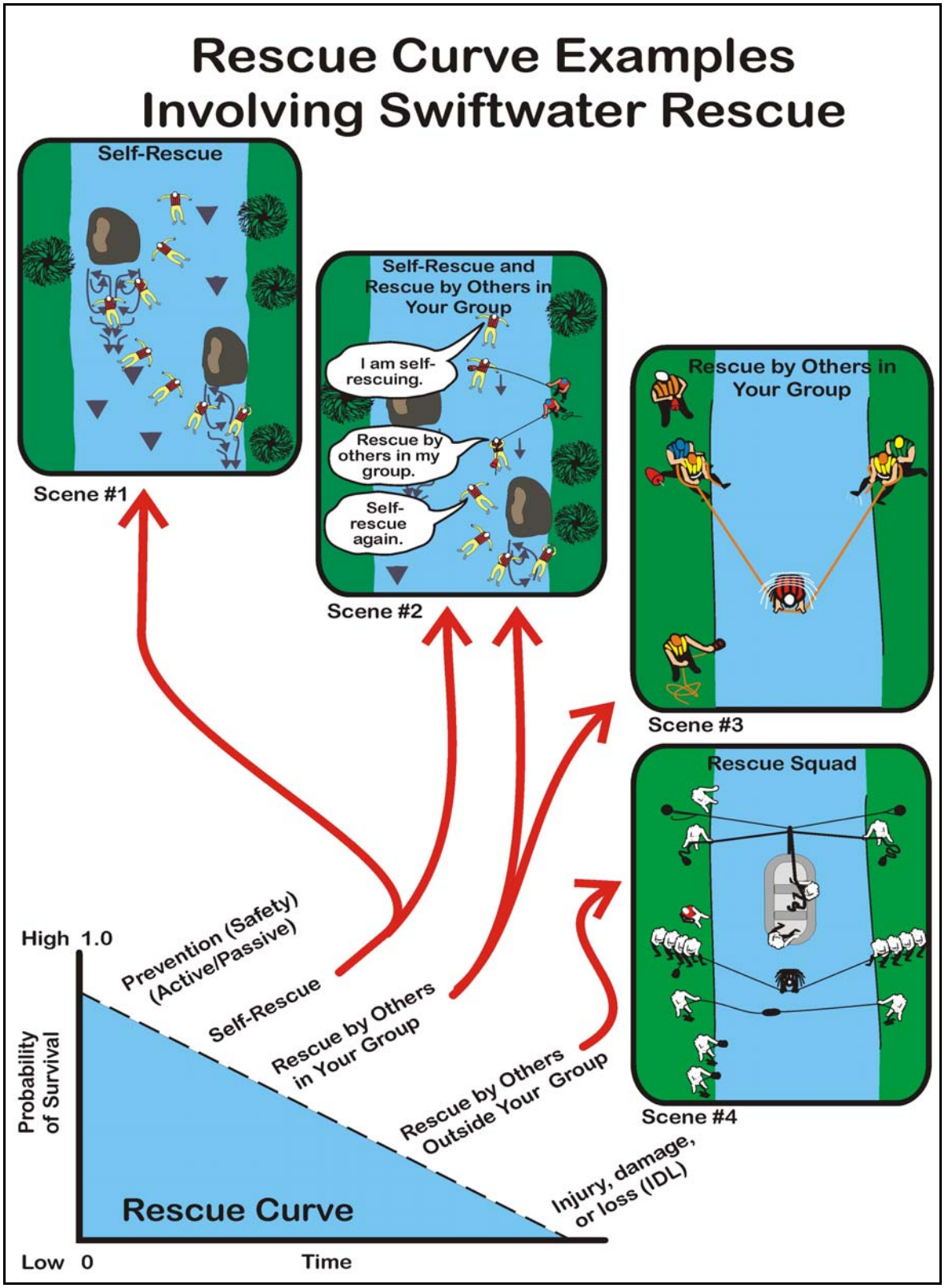

Figure 1.4: Rescue Curve Examples Involving Swiftwater Rescue – Four different scenes depicting swiftwater rescue examples are presented for three of the rescue curve phases. Source: author – [file:\PHIL-RescueCurve_v4.cdr]

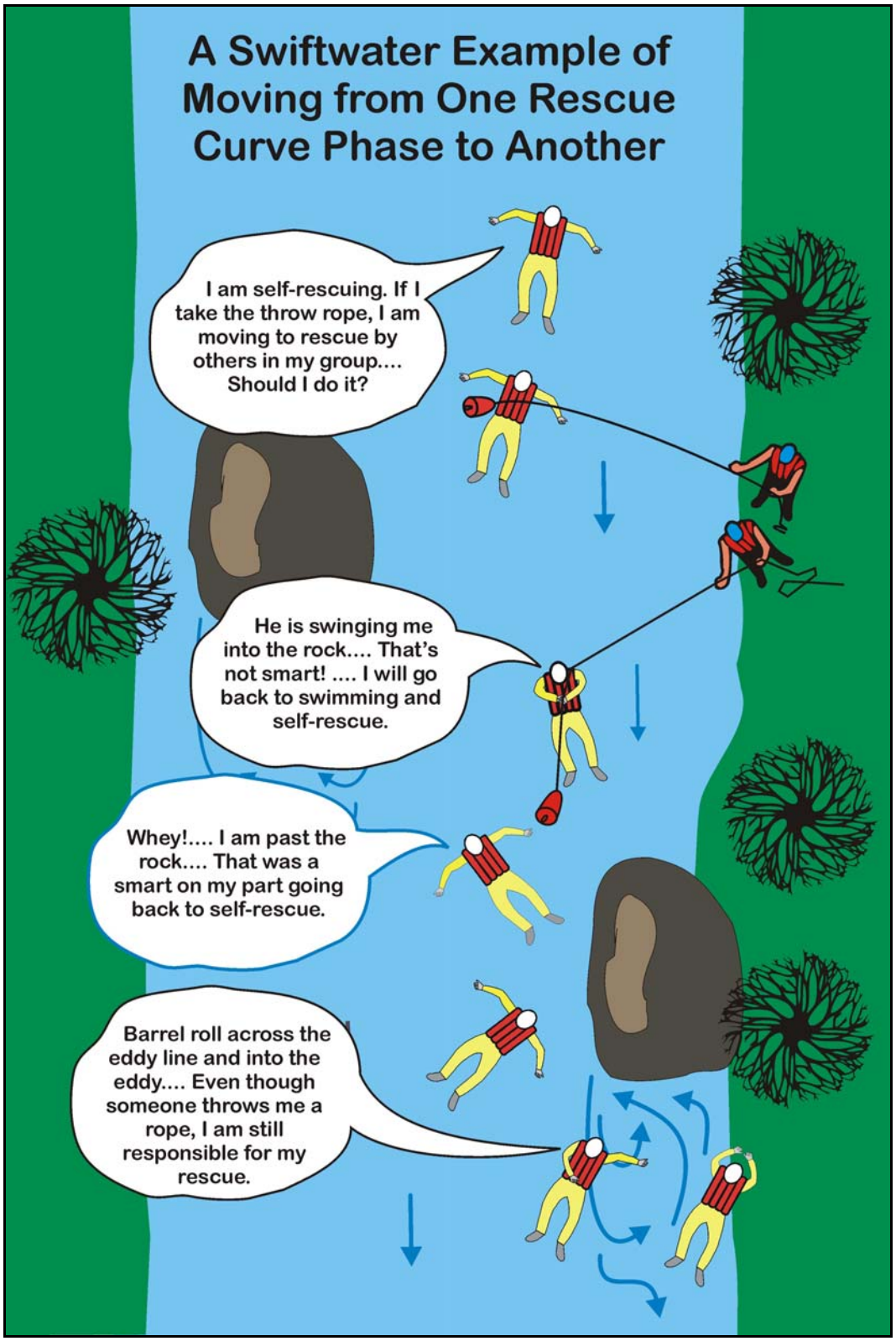

Figure 1.5: Moving from One Phase to Another – This scene shows how easily a swimmer can move from self-rescue to rescue by other in your group and then back to self-rescue. Source: author – [file:\PHIL-RescueCurve_v3.cdr]

The Experience

There are two distinctly different approaches toward creating the experience for participants. Interestingly, both approaches have their roots in the same research. The discussion begins with the flow model and "*seeking mastery*." With the introduction of perceived risks and a leader or guide who provides considerable knowledge, skills and experience to the activity, the second "*roller coaster experience*" approach emerges.

Seeking Mastery – A boater or for that matter anyone seeking mastery, attempts to bring all of their knowledge, skills and experiences to match the challenges present (Figure 1.6). Conceptually, the flow model suggests the relationship between the challenges present and the skill of the individual. Although Csikszentmihyi didn't focus on perceived risks in discussing the flow experience, a person seeking mastery seeks to minimize perceived risks because perceive risks diminish the matching process of the skills to the challenges. This should become apparent in the next section on the Adventure Experience Paradigm.

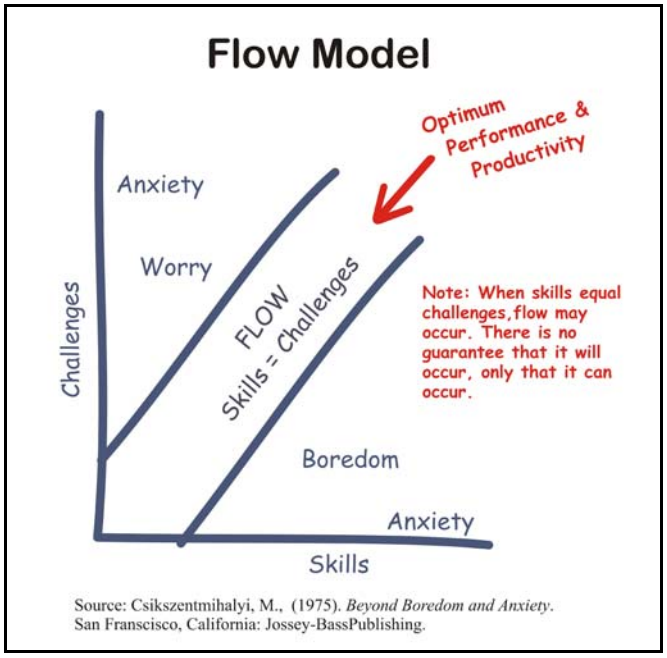

Figure 1.6: Flow Model – In the flow model, the participant seeks to match their skills with the challenges present. Their knowledge, skills and experience help them to create this match. Source: Csikszentmihalyi – [file:\RK-Flow.cdr]

Typically, surfing a wave, making a precise eddy turn, or making another maneuver is an art form where the boater matches the challenge of the maneuver with their ability to perform the maneuver. Mastery is the ability to find the find line between challenges and skills. In terms of the flow model, flow can occur when this happens. Flow may not occur, only that it can occur. The boater knows when this occurs because according to flow methodology, typical symptoms of a flow experience include a merging of the activity and experience, a loss of external reality, and a oneness with the experience. A classic symptom of not being in the flow experience is consciously thinking about and analyzing what he or she is doing. In this situation, the boater is viewing the activity externally and the flow experience is not occurring.

Athletes and boaters seeking mastery require, knowledge, skill and experience. Practice and experience provides the boater with the ability and skill to be able to find the edge and to place the boat and boater in a kinesthetic dance with the moving water. Over time, the athlete or boater increases their skills and the ratchets up the challenges to correspond with the new skills developed. It is a process of skill development and seeking mastery of the activity.

It is worth noting the other position in the flow model. If the challenges greatly exceed the skills, anxiety occurs and if they mildly exceed the skills, worry occurs. On the bottom of the graph, if skills greatly exceed the challenges, anxiety will occur and if they mildly exceed the challenges, boredom occurs.

Adventure Experience Paradigm (AEP) – Developed by Priest and Gass (1997), the Adventure Experience Paradigm incorporates a generic flow model embedded in the paradigm (Figure 1.7). From a programming perspective, the paradigm is foundational. There are two significant differences from the flow model. The flow model focuses on the individual. The AEP introduces a leader or programmer who facilitates the experience. Second is the introduction of perceived risks and perceived competencies.

As in the flow model, the programmer seeks to match the challenges and risks present in the activity with the skills and competencies of the participants. A peak adventure occurs when the two are matched or are in equilibrium. A misadventure and devastation and disaster occur when the risks and challenges greatly exceed the competencies and expectations of the participants. Providing activities in this range can easily lead to participant dissatisfaction and can eventually in being sued. If the competencies and skills exceed the challenges an adventure and exploration and experimentation can occur.

Since the leader or programmer brings considerable knowledge, skills and experience to the activity, their ability can easily compensate for the lack thereof on the part of the participant. Or with the introduction of perceived risks and challenges, the leader or programmer can create a peak adventure while at the same time reduce actual risks (Figure 1.8). This makes the activity safer. Hence, the roller coaster experience discussed in the next section.

In the case of raft or similar guides, the guide increases perceived risks while reducing or managing actual risks. Choosing the designated or standard route through a rapids is an example of reducing actual risks. Making it an exciting run increases the perceived risks and challenges. It is the application of the roller coaster experience to create the desired experience while making

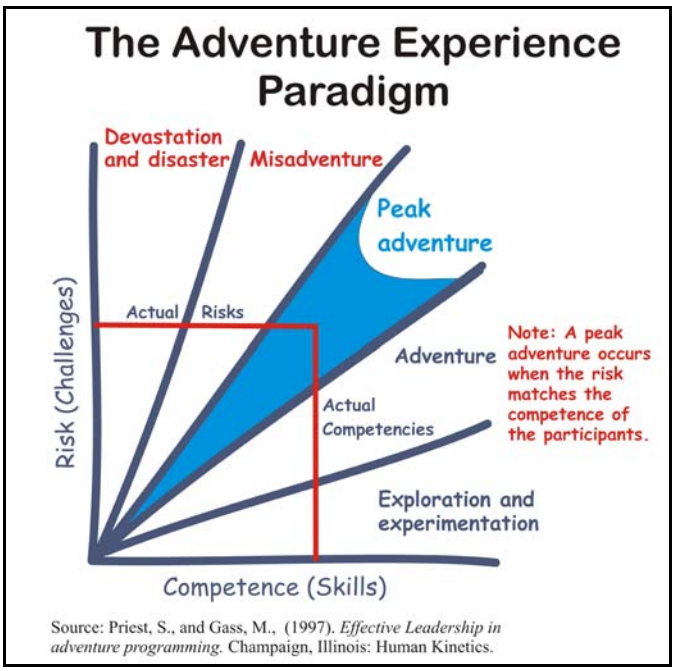

Figure 1.7: Adventure Experience Paradigm(AEP) – Caption: The AEP embeds the flow model into it to create a peak adventure where the risks and challenges match the competencies and skills of the participants. Source: Priest and Gass – [file:\RK-AdvenExperParadigm.cdr].

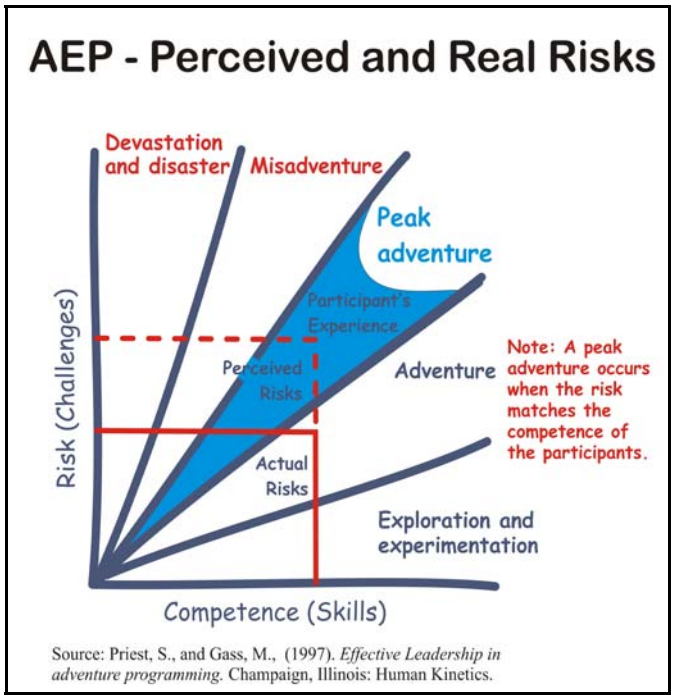

Figure 1.8: AEP - Perceived Risks – Caption: Instead of matching actual risks and challenges to provide a peak experience, perceived risks and challenges are provided to create a peak adventure. It returns to a variation of the roller coaster. Source: Priest and Gass – [file:\RK-AdvenExperParadigm3.cdr].

the activity safer also.

As a sidebar to this discussion, the participant can have perceived competence or perceived skills. Since the participants are relying upon the knowledge, skills and experience of the leader or programmer, they may believe that they have more skill than they actually have. In the rafting example, a participant may believe they have the ability to maneuver the raft (i.e. skill) when they really don't have the ability. For those familiar with Hersey's (1984) *Situational Leadership* model, this situation is called a "*pseudo-4*" (Kauffman, 2011) where the follower believes they have the ability when they don't.

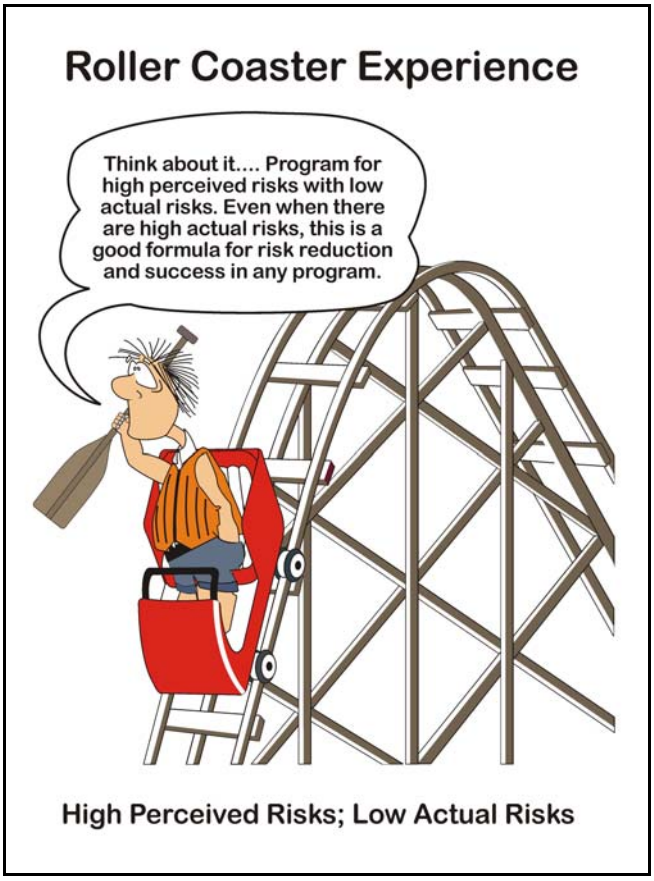

Figure 1.9: The Roller Coaster – When designing an experience, think of a roller coaster. It minimizes actual risks and increases perceived risks. Source: author – [file:\PHIL-RollerCoaster.cdr]

Roller Coaster Experience (Figure 1.9) – Perceived risks and challenges and the reliance upon a leader or programmer for participant skills are the factors behind the roller coaster experience. Quite simply in terms of the AEP, the leader or programmer seeks to enhance the experience by increasing perceived risk while at the same time reducing and managing actual risks. It provides a peak experience that is safer at the same time.

Consider the roller coaster. It is high on perceived risk and low (hopefully low) on actual risk. The roller coaster is inspected daily. The probability of a person getting on a roller coaster having a successful ride is fairly high. The roller coaster rides on a track. There are safety devices to keep people safely within the coaster. The ride is designed to minimize actual risk. When was the last time a roller coaster came off the track? It is designed to create high perceived risks with low actual risks.

As a matter of practice, an adventure sports programmer wants to create a roller coaster type experience by decreasing actual risks and increasing perceived risk. Yes, there are risks in running rivers. Never-the-less, the guide seeks to reduce the actual risks while maximizing perceived risks.

For the raft guide or adventure sport's programmer, the roller coaster is a good model to utilize. Although the actual risks can't be minimize to the extent of an actual roller coaster, they can be minimized. The guide takes the designated route. It is as if the boat is on a set of rails, much like a roller coaster. Taking a designated or standard route consistently reduces risks. In addition, the trip avoids high water levels. At the same time the guide can increase perceived risks. This can be done verbally or by purposely brushing against rocks to create the perception of greater risks by the participants. It is the roller coaster experience which minimizes actual risks while increasing perceived risks.

SWR Experience – Returning to the SWR course and experience, swiftwater rescue courses utilize primarily the mastery model. The goal is to develop SWR skills among the participants. Rapids and river experiences (i.e. challenges and risks) are chosen to match the skill levels of the participants. Doing so will most likely result in a good experience by participants. In addition, a minimum level of challenges and skills may be prescribed for the course also.

Search Techniques for Swiftwater Rescue

Very often in swiftwater rescue incidents, the location of the victim is apparent and in practice, the rescue quickly enters the rescue phase without the need to search for the victim. However, in some cases, the location of the victim is not readily known and a search must be conduced for the victim. The purpose of this section is to provide a primer on swiftwater search techniques for swiftwater rescuers.

This discussion is delimited in its focus to groups already on the river such as private boaters and commercial rafters and not to rescue squads who usually arrive later. In terms of the rescue curve, its focus is "*rescue by others in your group*." It does not include extended searches by rescue squads. The section draws upon three sources: (Kauffman and Moiseichik, 2013, Ch.10; Setnicka, T., 1980; Stoffel, R., 2001). To a certain extent, the materials used are adapted from land base techniques. The example used is based on an actual incident on the Arkansas River (Durkee. 2018). The incident site is accurate as is the general position of the rafts. The type of raft and their passengers are not accurately depicted.

Search and Rescue Phases (Figure 1.10) – In a normal search and rescue operation there are five phases. They are the search, rescue, first aid (medical), evacuation and management Kauffman and Moiseichik, 2013, Ch.10). Except for the management phase, the phases are generally sequential. This means that before performing the rescue phase, the victim needs to be found. Before performing first aid, the victim needs to be removed from the MOI (Mechanism of Injury). This reduces the likelihood of a second victim. And, before evacuation, the victim needs to be stabilized and prepared for transportation (i.e. first aid).

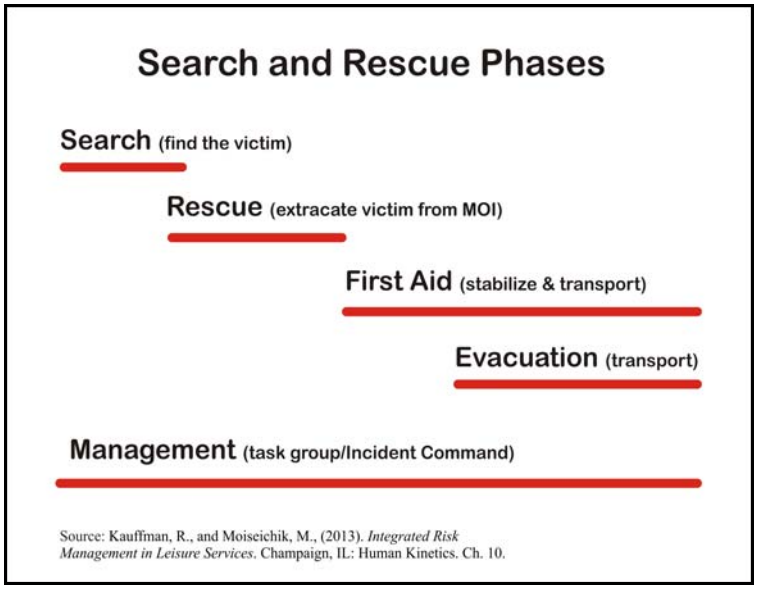

Figure 1.10: Search and Rescue Phases – Caption: In general, the four phases are sequential. Before extrication, the victim must be found (search). Before rendering first aid, the victim needs to be extricated (rescue), Before evacuation, the victim need to be stabilized and prepared to transport (First Aid). Source: Author – [file:\PHIL-S&RPhases.cdr]

Search Phase – The search phase is the first phase. The purpose of the search phase is to locate the victim. Usually, but not always, the search phase is fairly easy because the victim is easily located. However, this is not always the case and it is important to prepare for situations where a search needs to be conducted. The search phase will be addressed in greater depth regarding swiftwater rescue in the next section.

Rescue Phase – The purpose of the rescue phase is to remove the person from the source of harm or MOI (i.e. Mechanism of Injury). This is the primary focus of most swiftwater

rescue skill instruction. It is the focus of this book and subsequent chapters.

First Aid (Medical) Phase – The purpose of the first aid or medical phase is to stabilize the victim and prepare them for evacuation or transport. Conceptually, this phase follows the rescue phase. First aid skills are generally covered in Wilderness First Responder and similar courses. First aid techniques are not included here.

Evacuation Phase – The purpose of the evacuation phase is to transport the victim to a location where they can be transported to the hospital or appropriate facility. Usually, this phase receives passing consideration or everyone assumes the helicopter will simply lift the victim out of the incident site. Unfortunately, not every site is accessible by helicopter nor is a helicopter always available. Anyone who has done a mock evacuation carrying a loaded stokes litter understands the difficulty and energy consumption of the evacuation process. Although more consideration should be given to evacuation, it too receives limited discussion in this section.

Management Phase – The purpose of the management phase is to provide the administrative support to a search and rescue operation. In most search and rescue operations associated with private boaters and commercial rafters, the management structure tends toward a task group in contrast to the incident command structure associated with larger and more formal SAR efforts.

The incident command structure was outgrowth of efforts to fight wildfires in the 1970s. It divides the administrative structure into operations, planning, logistics, and finance and administration. The incident command structure is mentioned because it is usually associated with rescue squads and larger groups. In contrast, swiftwater rescue situations associated with private boaters and commercial rafters tend to involve a smaller group of rescuers, and they are not extended multi-day efforts. For this reason, they tend to use a task group structure where one of the rescuers takes on the leadership role.

Search Phase for SWR – As noted in the beginning of this section, there may be times when it is necessary to search for the victim. For this reason, it is appropriate to integrate some of the search principles into swiftwater rescue training. In a river situation, the objective is to locate the victim as quickly as possible. Usually, time is of the essence. Pre-incident activities are important because the first step is to recognize that someone is missing. This is not always as easy as it may sound. Next, determine the Point Last Seen (PLS) for the victim. This along with the river current and hazards determines the search areas and where the hasty search is conducted.

Pre-Incident – Pre-incident behavior and procedures followed by the group is important. This is the first line of defense because when an incident occurs, everything seems to unravel. This is the nature of incidents. There are two important objectives of any group on the river. First, boaters need to keep track of the people in their boat and when possible other boats also. Know the count. Be sure to keep track of the other boats on the trip. Follow normal river running procedures and protocols. Second, when one or more people fall into the water, it is important to keep track of the swimmers. Doing so minimizes the need for a search. Key to the process is that once an incident occurs, people can easily become dispersed and it is important to account for everyone so that a search can begin if someone is missing.

Point Last Seen (PLS) – The Point Last Seen (PLS) is the location where a witness last saw the victim. Determining the PLS is important because it helps determine the search area. It is one of the first tasks of the rescuers to determine. Be sure to ask other people on the trip including passengers on commercial trips. In Figure 1.11, the PLS was identified at the bend of the river. Area (a) is the logical area to begin the search.

Last Known Position (LKP) – Some of the safety literature mentions the Last Known Position (LKP) also. This is the last place where the victim was known to be based on physical evidence. In a swiftwater rescue situation, it determines the upper limit of the search area. In Figure 1.11, the LKP is where the victim falls out of the raft in the large breaking wave. As a practical matter, the LKP and PLS are often the same location. It is mentioned, but as a matter of practicality, most rescuers will refer to and use the PLS.

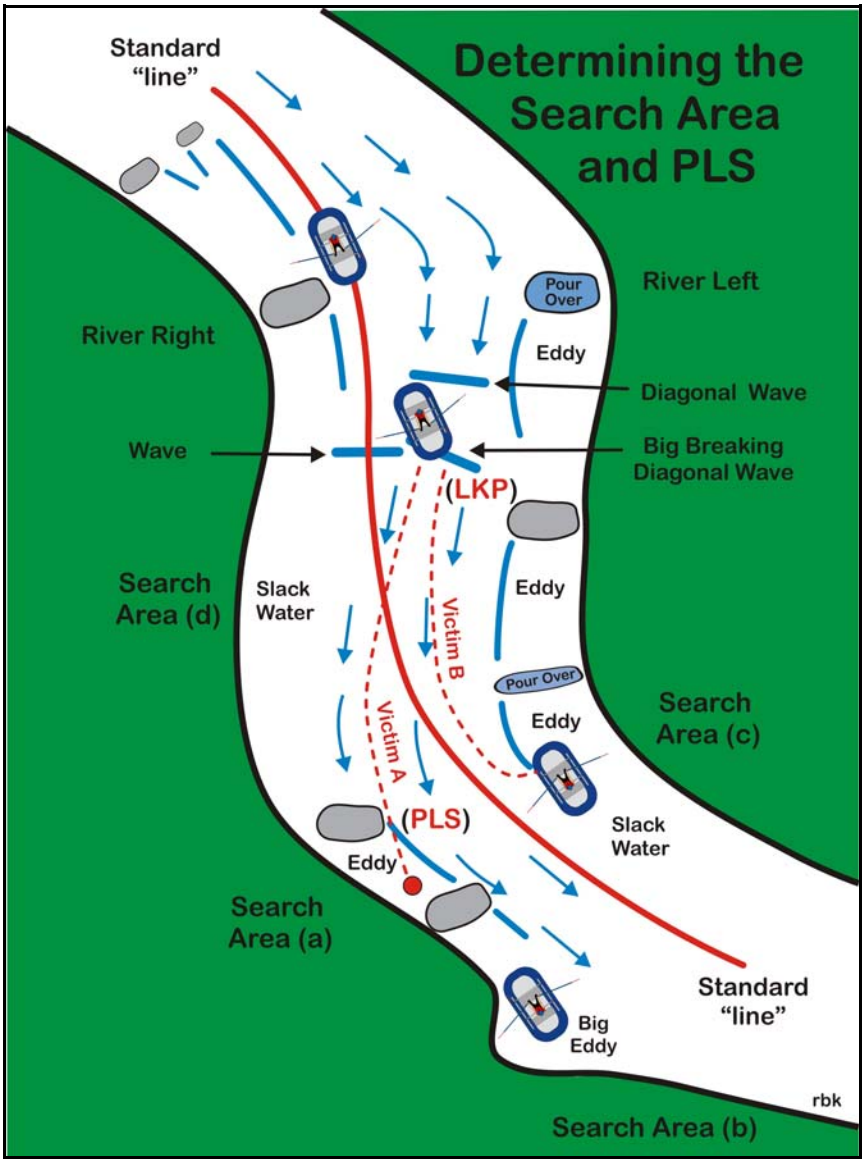

Figure 1.11 – Determining the Search Area and PLS – Big Drop on the Arkansas River. Source: Author – [file:\PHIL-PLS.cdr]

Determining the Search Area – Once the PLS is determined, determine the search area and prepare to conduct a search. A ***hasty search*** is a quick search of likely areas where the victim might be found. In river situations, consider the following in determining the search area. It is unlikely that the victim will be found upstream of the PLS. It is likely that the victim's location will be affected by river dynamics and currents. It is more likely that the victim will be found on the outside of a bend in the river where the current is stronger than on the inside of the bend where it is shallower and the current is less strong. Known hazards such as strainers and undercut rocks are likely collectors of victims and are a likely place to search.

Using Figure 1.11 as an example, a raft dumps two passengers in a large breaking wave at the top of the rapids (LKP). The one passenger drifts downstream toward river left and is picked up by another raft on the inside of the bend at the bottom of the rapids. The other passenger drifts downstream with the current. The PLS was determined by one of the passengers in another raft who thought he saw the victim above the tight bend in the river. The importance of determining the PLS is that it focuses the search on the most likely place to begin the search.

Based on the PLS, the first area to be searched is area (a). Based on the river currents and known hazards present, a hasty search discussed in the next section can be conducted immediately. A second area in which to conduct a search is area (b). This assumes the victim was swept through the rapids and further downstream. Also, remember that the victim would float past the raft situated in the eddy on river right without being noticed. After a search of area (a) and (b), area [c] and (d) may also be included. Area [c] is on the inside of the bend where it is shallower and where the current tends to be moving toward river right than river left. Area (d) is above the PLS site and less likely to have the victim. It depends on the strength of the those who determined the PLS. If it is weak, this area may be included earlier in the search.

Hasty Search – As the name implies, the purpose of a hasty search is to perform a quick search in the most likely area where the victim is most likely to be found. Its emphasis is on speed. If personnel are available, it may be conducted simultaneously with determining the PLS. Searchers should use the buddy system where the buddies are in close visual contact with each other. In a swiftwater rescue situation, the hasty search is influenced by river dynamics, known hazards and if readily determined, by the PLS.

Returning to Figure 1.11, the main current plows into the river bend at the bottom of the rapids before exiting river left. Also, there is a known hazard of undercut rocks on the bend. A drifting passenger is very likely to become entangled in the undercut rocks on the bend. Even without identifying the PLS, area (a) would be a logical location to search for the victim since the river current would normally sweep a person into the eddies and undercut rocks located on the bend of the river. If the water is deep, paddles or sticks could be used to locate an underwater victim.

Take Care of Non-searchers – If there are passengers on a commercial trip or people in a private boating group who are not involved in the search, make sure they are in a safe and secure area. If needed, have someone supervise them. You don't want a second victim.

Search Techniques Summary – This section addresses a niche in swiftwater rescue. Often, but not always the victim is readily found and the rescue can begin. However, there are instances where the victim needs to be found first before the rescue can be performed. This section adapts basic search techniques and protocols to swiftwater rescue situations.

Summary

This section focuses on the concepts and philosophy of rescue. The first section provides sixteen principles of rescue. They are a potpourri of suggestions. Many of these principles filter into the second section on the rescue curve. Philosophically, the rescue curve suggests individual responsibility. Conceptually, it frames rescues in terms of surviving and time after an incident occurs. Like any paradigm, it intuitively makes sense. The first line of defense is safety and prevention. Once an incident occurs, the second line of defense is self-rescue. Then it is rescue by others in your group. The fourth line of defense is rescue by others outside your group, including the rescue squad. If none of these intervene, injury, damage or loss can occur.

Don't forget the search function. On occasion, the victim(s) will need to be found first. This requires search techniques. Adapted from land based search principles, the section on search principles provide a primer on search principles adapted to swiftwater situations. In terms of the rescue curve, these techniques are applicable to *rescue by others in your group*.

The next to last section introduces the concept of programming for risks. It introduces the roller coaster experience and programming for high perceived risks while reducing actual risks. This is a formula for providing safe and enjoyable experiences. This includes swiftwater rescue courses also.

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