**Planning a Safe River Trip**

**River Safety**

**1. Preplanning**

* + Know the river
  + Know your group
  + Know your own skills and resources
  + Have the right equipment

**2. On the River**

* + Travel safely
  + Keep the group together in some fashion
  + Be prepared for a rescue
  + Have the proper paddling and rescue skills

**Dynamics of Accidents Formula**



These two factors can overlap to a greater or lesser extent. The greater the overlap the higher the Accident Potential. The effect of combining Environmental Hazards and Human Factor Hazards multiplies the Accident Potential rather than simply being additive. The greater the number of hazards, the more quickly the Accident Potential can rise. For example:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Accident Potential Increase** | | | | |
| 2 Environmental Hazards | + | 2 Human Factor Hazards | = | 4 times higher Accident Potential |
| 3 Environmental Hazards | + | 3 Human Factor Hazards | = | 9 times higher Accident Potential |

[Test your knowledge about the Dynamics of Accidents Model.](http://www.princeton.edu/~oa/accidscen.html)

**2) Examples of Hazards**

**Environmental Hazards**

When assessing the potential environmental hazards you need to look at three factors.

**1. ACTIVITY**

* Static - activities in which the environment is relatively unchanging (e.g. hiking)
* Dynamic - activities in which the environment change change very quickly in unpredictable ways (e.g. whitewater paddling, biking)

**2. LOCATION**  
In remote locations you need to exercise additional precautions. One common method of accomplishing this is to increase the rating of the rapid by one class if you are in a remote setting. For example, a Class III becomes a Class IV. This helps take into account the increase in Accident Potential (see below).

**3. SEASON/CLIMATE**  
Weather and the possibility of weather changes also have a significant impact on Accident Potential.

|  |  |
| --- | --- |
| Examples of Hazards | |
| **i. Environmental Hazards** | **ii. Human Factor Hazards** |
| **A. Environment**   * Pinning/entrapment * Undercut rocks/ledges * Foot entrapment * Strainers * Holes * Cold temperatures (water/air) equipment * Overexposure to sun * Bees * Poor physical strength, stamina | **A. Participants**   * No awareness of hazards * Fear * No skills to avoid hazards * Resistance to instructions * Irresponsible/careless attitude towards self, others, equipment * Other inexperienced paddlers on the river * Need to "prove" self - macho * Exhaustion |
| **B. Equipment**   * Lack of proper equipment (PFD, helmet etc.) * Improper clothing for temperature * Boat in poor repair | **B. Leaders**   * Lack of knowledge of environmental hazards * Inadequate skills to extricate self and group from hazards * Poor safety judgment * Poor teacher of necessary skills * Instructions unclear * Poor supervisor, does not correct problems * Ineffectual under stress |
| **C. Driving**   * Bad road conditions * Overloaded vehicle * Ddarkness * Other erratic drivers * Rushing to meet schedule * Overly tired from long drive * Not driving defensively * Poor driving skills * Alcohol | **C. Group**   * Group not yet formed, lacks cooperative structure * Interpersonal frictions unresolved * Poor communication patterns * Excessive competition * Scapegoating or lack of concern for slow or different * Individuals excessive pressure or stress to "perform" macho * No practice in working harmoniously under stress * Lack of leadership within group * Splintering into sub-groups |

**3) Sample Accident Scenarios**

Think of an accident situation you have been in whether on an outdoor trip or in some other setting. Analyze the situation and list the Environmental Hazards and the Human Factor Hazards that led to the Accident Potential.

**4) Teaching the Formula = Reducing the Accident Potential**

It is essential to teach the Dynamics of Accidents Formula at the very beginning of any trip (or prior to leaving campus) so that all participants are aware of how their behavior is directly related to reducing the possibility of accidents. Participants then can take some responsibility for their own safety. The formula gives you four basic things:

* A technique for evaluating risk potential in the field
* A tool for analyzing how accident potential can be reduced
* A decision making tool
* A rationale for why OA has particular things we teach, particular rules and policies
* A rationale for why you make particular decisions

**5) Environmental Briefing**

A comprehensive Safety Program allows one to intervene to prevent Human Factor Hazards from overlapping with Environmental Hazards and thereby reducing the Accident Potential. In order to do this it is necessary to rethink from Day 1 of the trip ***what is an environment?*** In planning a trip the leaders must examine the environment and the activities of the trip in order to ascertain what the possible environment hazards of that trip are. This information must be communicated to the group in the form of an Environmental Briefing at the beginning of the trip with subsequent briefings when there is a change in environment or activity (e.g. if a hiking group changes to canoeing the environment and activity have changed and there are different environmental hazards). The first Environmental Briefing should follow the leaders’ presentation of the Dynamics of Accidents formula. On longer trips it may be useful to have the participants do some of the Environmental Briefings once they are familiar with the formula. This can be done with the help of the leaders. The Environmental Briefings set a a tone for safety and help inculcate the idea that the participant is responsible for his/her own behavior.

**6) What If?**

It is important to analyze the possible accident potentials from a what if perspective. Ask yourself what is the worst case scenario. Then ask yourself what you can do to reduce the accident potential.

**Running A River**

**1. Preplanning**

* 1. Introduction - Skills/River
  2. What Skills?
     + What is the highest skill level of the group?
     + What is the lowest skill level of the group?

The river or river section should be chosen based on something that the person(s) with the least skills in the group could run. The person(s) with the highest skills should feel comfortable in performing rescues in the most difficult section of the river.

**2. What River?**

* 1. River Classification System
     + [AWA Standard I - VI River Classification System.](http://www.awa.org/) Currently there are a number of efforts going on to revise the River Classification system so that it becomes more open ended like the rating system used for rock climbing.
     + Be aware of differences in western vs. eastern ratings and the current tendency towards downrating.
     + If you are paddling in a remote area or on a multi-day trip where help is a significant distance away, upgrade the rating of the rapid by one class. So a Class III would be considered a Class IV in terms of the consequences because of your remoteness.
  2. Flow
     + Depth in Feet
     + Cubic Feet per Second (CFS)
  3. Gradient
     + How much?
     + How does it change?
  4. Type of River
     + Pool/Drop - drops tend can be steeper and more difficult
     + Continuous - can present more difficult rescue
  5. Temperature
     + Air
     + Water
     + Weather Change?

**3. What Equipment?**

* 1. How long is the trip? one day, multi-day
  2. How remote is the trip? from help, resupply
  3. What are temperature and weather conditions?
  4. What spare equipment should you have?
  5. If something went wrong, what would you need?
  6. Equipment to bring
     + Boats - in good repair
     + Paddles - are spares needed?
     + Clothing - What type is needed based on water ***and*** air temperatures? If air and water temp add up to less than 100 degrees F you should have a wet or dry suit (this is a not especially conservative).
     + PFD - with knife, whistle, carabiner
     + Helmet
     + Throw Bag
     + First Aid Kit
     + Other Rescue Gear
       - extra carabiners
       - slings (1/2 " tubular nylon webbing)
       - prussik loops (made from perlon)
       - rescue pulleys (optional)
  7. Other Equipment Issues
     + Check it out - Leaders then need to make sure that all participants have the necessary equipment. If people are bringing their own equipment it must be examined to make sure that it is in good shape.
     + How to use it - Participants must be instructed on the safe and appropriate use of all equipment.

**4. Leadership**

This issue of leadership on paddling trips is often overlooked, especially on club trips. Whenever you head to the river there are some fundamental skills that need to exist both with each paddler, and among the group. Individual paddlers obviously need appropriate paddling skills, equipment, and judgment to let them navigate the river safely. There also need to be skills like first aid, CPR, river rescue and equipment like rescue gear and a good first aid kit. If these things aren't there and you need them, you may be in serious danger.

The notion of a "trip leader" may be antithetical to some paddlers, but having someone who is designated to make sure that all these things are taken care of is just good expedition-style planning. It doesn't mean that the "leader" makes all the trip decisions. Rather, this person serves as the "conscience" of the group, that little reminder to make sure that all the bases are covered. In an emergency situation, the people with the most river rescue or first aid experience need to take charge and this might not be the designated trip leader. This is something that also should be determined before a group goes out, who has the skills and judgment to take over in an emergency and who is the back-up person in case the primary is the victim.

**5. On the River**

* 1. How to Run a River
     + Scout - especially anything blind or new
     + Eddy Scout
     + Scout "Down from the Top and Up from the Bottom"
     + Trip Organization
       - Lead and Sweep boats - keeps the group "contained" within a safety net
       - Buddy System - makes sure that someone else is always aware of where you are
     + When Do You Carry?
       - Whenever you feel like it.
       - When there are ***any*** serious concerns/reservations about the safety of running the drop.
       - When you need to "set an example" for other members of the group
       - When you are tired/cold etc. and are not in the proper condition to run the drop safely and in control.
       - ***Tell*** your paddling partners not to run the drop if they are in questionable shape to handle it (either physically, mentally, or technically.)
     + Save Others - size up people on river via technique, equipment attitude and give appropriate feedback - be tactful
     + Hypothermia

**Safety Training**

In order to deal with any emergency situation you need to have the proper skills and training. These skills must be learned ***before*** going out on the river. In the middle of an emergency is not the time to see if you can throw your Throw Bag well.

* 1. CPR
  2. First Aid
     + To treat injuries or medical emergencies
     + What if someone on a raft trip had a heart attack or a diabetic emergency?
     + What if someone in your group was highly allergic to bee stings?
  3. [AWA River Signals](http://www.awa.org/)
     + All members of the party should know them
  4. River Rescue Skills
     + From an experienced River Rescue training group.

**River Rescue Organization**

* 1. Preplanning (Ask yourself these questions before you get to the river)
     + What if there is an emergency situation?
       - How much time do I have to effect a rescue?
       - Where to set up rescue systems?
       - Should someone walk out for help? Who?
     + What do I do about the emergency?
       - What equipment would I need for a rescue?
       - Do I have the skills for the rescue?
       - Do I have the manpower for the rescue? Do I need additional help?
     + Who takes control in an emergency?
       - The person(s) most skilled in that area (river rescue, first aid) must take control and others follow his/her instructions
       - What if the leader(s) are the victim(s)? Who is next in charge? You should have a back-up person both for rescue and first aid.
  2. Rescue Planning (Ask yourself these questions in an actual emergency.)
     + Assess the situation - Establish Priorities
       - How many people are involved?
       - Head up vs head down situation?
       - Is the person stable?
       - How much time do I have?
       - What are my resources - human and equipment?
       - What are the extent of injuries?
       - What is the safest way to effect the rescue?
     + Effecting the rescue
       - The leader must assign tasks to the group
       - The leader should try to keep from being intimately involved in the actual rescue to remain free to continually assess the situation. This assumes that there are others in the group with the skills/abilities to follow through with the rescue. If this is not the case the leader may have to effect the rescue.

**Final Thoughts**

1. **SAFETY = JUDGMENT**
2. Know your limits and groups limits. Be conservative.
3. Be flexible - (e.g. change route if needed)