Avalanche Awareness and Leading a Companion Rescue
Introduction:

Traveling in the backcountry is a great way to enjoy the outdoors and friends. It’s important that when we travel in the backcountry we acknowledge the risk and understand how to manage those risks. The most dangerous risk is that of avalanches.
Outline:

- Statistics
- Red flags
- Identifying avalanche terrain
- Safe travel protocols
- Tools needed for a rescue
- Phases of a beacon search
- Probing and shoveling protocols
US Avalanche Fatalities by Age

1997-2006

- >60: 3
- 56-60: 4
- 51-55: 8
- 46-50: 10
- 41-45: 27
- 36-40: 34
- 31-35: 31
- 26-30: 43
- 21-25: 45
- 16-20: 30
- 11-15: 3
- <10: 0
Avalanche Fatalities by State

1999-2010

Who’s At Risk?

- Skiers
- Snowboarders
- Snowmobilers
- Snowshoers
- Climbers
- Anyone that recreates in the winter backcountry
Avalanche Fatalities by Incident

1950-2010
Most of the time it’s safe to travel in the backcountry. Learning to recognize when it’s not is critical.
What gets people in trouble in the backcountry?

1. They are unaware of the danger
2. They are aware but willing to take the risk
3. They select poor terrain
4. They miss obvious clues
5. They communicate poorly
6. They travel poorly
Three Basic Questions:

1. Is the snow unstable?
2. Am I in avalanche terrain?
3. Could I trigger an avalanche?

If you answer yes to any of these questions, then you need to reconsider what you are planning or doing and possibly choose a different option.
Before entering the backcountry

• Check the current report from your local avalanche center
  – www.backcountryaccess.com/education

• Check the weather report for your region
  – www.noaa.gov
Red Flags
Clues or warning signs that indicate snow is unstable

Recent Avalanches:
If there are new avalanches, more are possible
Red Flags
Clues or warning signs that indicate snow is unstable

Signs of unstable snow:
• Cracking or collapsing snowpack
• “Whumphing” sounds
• Hollow, drum-like sounds on hard snow
Red Flags
Clues or warning signs that indicate snow is unstable

Heavy snowfall or rain in the past 24 hours
• Avalanches are often triggered the first clear day after a storm
• Just because it’s sunny, doesn’t mean that it’s safe
Red Flags
Clues or warning signs that indicate snow is unstable.

Wind-blown snow
Leeward slopes can become heavily loaded even if it’s not snowing.
**Red Flags**
Clues or warning signs that indicate snow is unstable.

**Warming or Rapidly Increasing Temperatures**
Warm temperatures and gravity can cause the snow to creep downhill and become less stable.
Four Components to Identifying Avalanche Terrain:

- slope angle
- aspect
- common trigger points
- terrain traps
Slope Angle

- Any slope greater than 30 degrees has the potential to avalanche
- Most occur on slopes of 35-50 degrees
- Evaluate the entire slope
  - Steep slopes that sit above more mellow slopes have the possibility of coming down from above and burying you
- Use a slope meter to verify if a slope is steep enough to slide
Terrain Traps

Features on a given slope that have the potential to amplify the consequences of being caught in a slide

- Trees
- Cliffs and rocks
- Gulleys and chutes
- Bodies of water/ice
**Trigger Points**
Be aware when traveling below possible avalanche slopes. Avalanches can be triggered from below and remotely.

- leeward slopes below a cornice
- convex rollovers
Aspect

• The aspect of a given slope can directly affect the slope’s stability.
• Wind will load snow on the opposing slope to its direction.
• Carry a compass so you are able to determine which direction a slope faces.

Southern aspects receive the most sun, and tend to stabilize quickly during winter, but will be more prone to wet slides in the spring.

Northern aspects receive the least sun, and tend to preserve weak layers making them less stable.
**Safe Travel Protocols:**
Never expose more than one person at a time to avalanche danger.

| One person on a slope at a time (stay spread out if you must expose others). | Never descend directly above a companion or another group. |
| Avoid stopping in or beneath avalanche paths. | Watch each other closely from safe locations. |
Safe Travel Protocols:

- Stay alert to changing snow stability due to changes in aspect, elevation, or weather factors (heavy precipitation, wind or warming).
- Communicate within your group, have options.
- Be prepared to do a rescue.
- Always choose the safest route possible on the ascent. Stick to low angle ridges and dense trees.
- On the descent, ski or board one at time, from one safe point to the next.
- Think about an escape route.
- Never travel alone.
Choose terrain that is appropriate for the conditions.
When in doubt, increase your margin of safety.
Essential Backcountry Travel Tips

• Plan for the best, but be prepared for the worst
• If an avalanche happens, do not go for help. You are the victim's best chance of survival
• Never go into the backcountry without a properly functioning avalanche beacon, probe, shovel and airbag pack
Asphyxiation is the cause of most avalanche fatalities, but if you get the victim fast enough you can save them

• If the victim is recovered within 15 minutes chances of survival are almost 92%
• After 15 minutes the survival rate plummets. At 35 minutes the survival rate drops to 37%
• After 35 minutes the survival is extremely low
• Search and rescue can be called, but usually cannot get to the scene of an avalanche quickly. When they arrive it’s usually a body recovery mission
What do you need for a rescue?

Avalanche Airbag Pack

Floats the victim to the surface of the debris and allows for the greatest chance of survival.

Avalanche Beacon

Follows an electronic signal to the buried victim.

Always make sure the beacon is functioning properly before heading out for the day.
What do you need for a rescue?

**Avalanche Probe**
Verifies the depth and location of a buried victim.

**Avalanche Shovel**
Used to dig out the victim.
Inverse segregation shuffles the biggest particles to the top.
Airbag Statistics: 98% Survival Rate

180 deployments as of September 2008
If an avalanche happens to you

- Yell so other people can hear and see you.
- If possible, ski or ride to the side of the moving snow.
- Fight with all of your effort to stay on the surface.
- Discard skis and snowboard, they can act as an anchor.
- As the snow slows, try to thrust a hand upward above the snow surface.
- Before the snow stops, try to clear an airspace in front of your face.
- If buried, do not panic! Stay calm and try to relax.
If an avalanche happens to your partner

• Watch the victim(s) as they are carried down the slope. Look for the last seen point.
• Make sure it is safe to begin a search.
• Delegate tasks: visual search, beacon search, probing, shoveling.
• Mark the area where the victim was last seen and begin search here. Look for any surface clues.
• When victim is located, confirm depth and location with probe.
• Shovel strategically: begin downhill of victim.
Three Phases of a Beacon Search

1. Signal Search
2. Coarse Search
3. Fine Search

• Multiple searchers can decrease recovery time
• Begin probing where you have confirmed your lowest distance reading
Multiple Searchers

1. Signal Search

2. Coarse Search

3. Fine Search
Last seen point

Eliminates this area for searching

Last seen point - begin Signal Search here >

Fine Search
Proper Probing

- Begin probing at the lowest distance reading.
- Probe in concentric circles until you strike the victim.
- Make each probe hole about 10 inches (25cm) apart.
- Your probe should enter the snow perpendicular to the slope.
- Once you have confirmed the victim’s location, leave the probe in the snow.
Strategic Shoveling

- Shoveling consumes the majority of time and effort in an avalanche rescue.
- Do not take shoveling skills for granted.
- In burials deeper than 1 meter begin digging downhill of the probe about 1.5 times the burial depth.
- If one rescuer, make the hole one wingspan wide.
- If more than one rescuer, work side by side and make the hole two wingspans wide.
Additional Resources:
avalanche.org
avalanche.ca
backcountryaccess.com/education