Avalanche Safety Course
(3 Instructors)

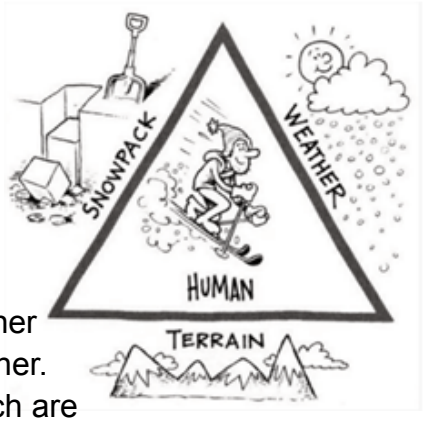
Before the Clinic
First Time - Complete 4 hr "Know Before You Go" course
Repeater - Watch 50 min "Know Before You Go Presentation"

Clinic
Supplies: beacons, probes, shovels, snow kit, saw

The clinic is taught in 3 sections: Trip Planning, Snow Science, and Beacon Rescue

Trip Planning - Avalanche Risk & How to Apply it to an Actual Trail:

Where & Why Avalanches Occur

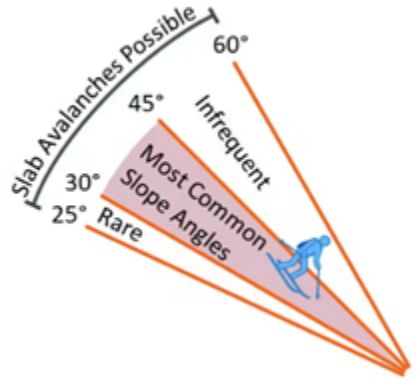


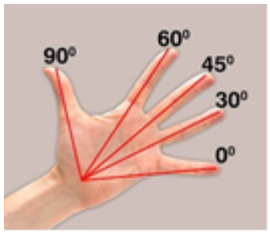
- For an avalanche to occur, you need:
    1- a weak layer in the snowpack
    2- a slope of 30-45°
    3- a trigger

- It is more important to understand recent weather conditions than it is to study day-of-event weather.
- High & dry conditions create surface hoar, which are then covered up by new snowfall and become the weak layer.
- Weak layers also form as snow melts & compacts over time.

Avalanche Terrain

- Steepness of slope – 30-45 degrees
    - Note the slope angle of slopes you are cros
    - Story of Tibble Fork victim.

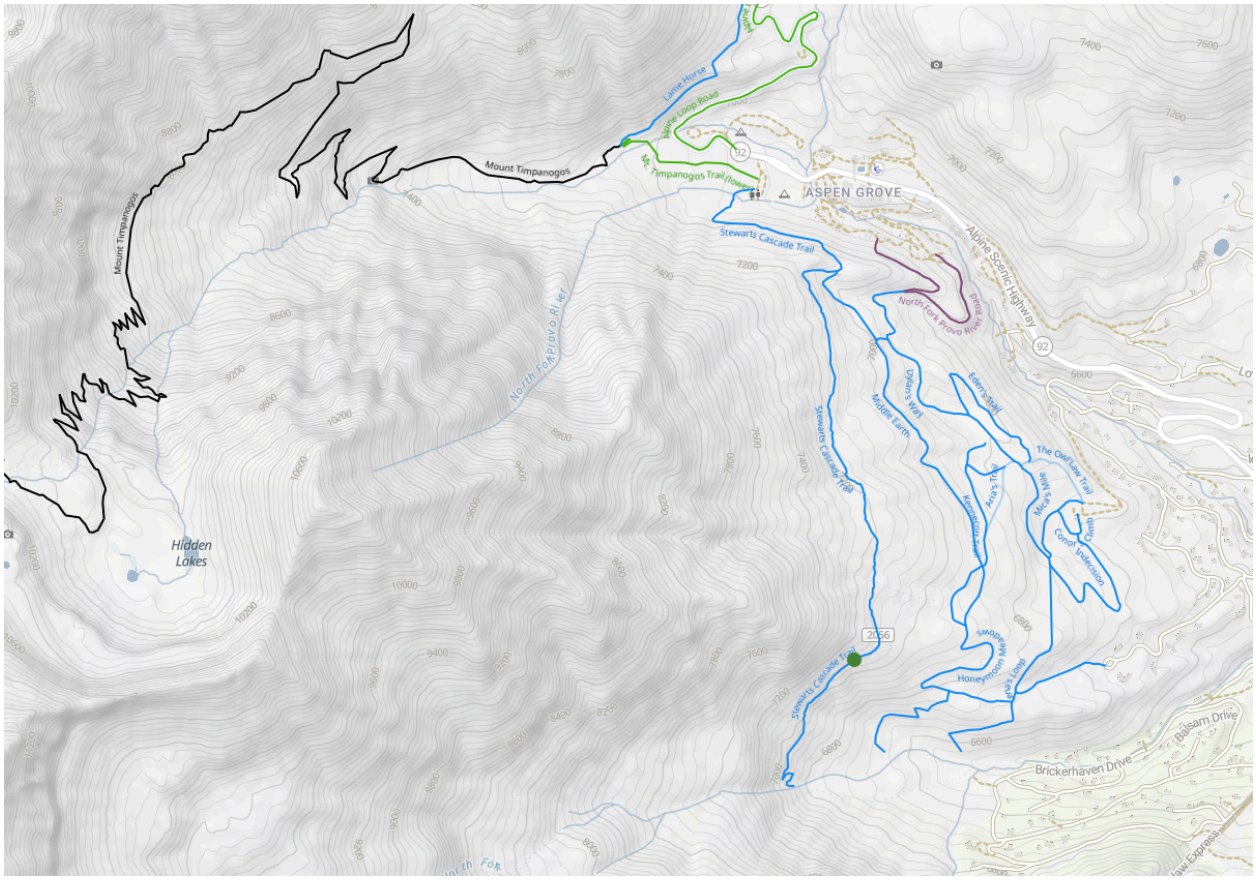


    - Hand method for rough estimate: 

- Connected slopes
- Terrain Traps (gullies, rocks, cliffs, trees, cravasses)
- Triggers
    - Wind, human-induced

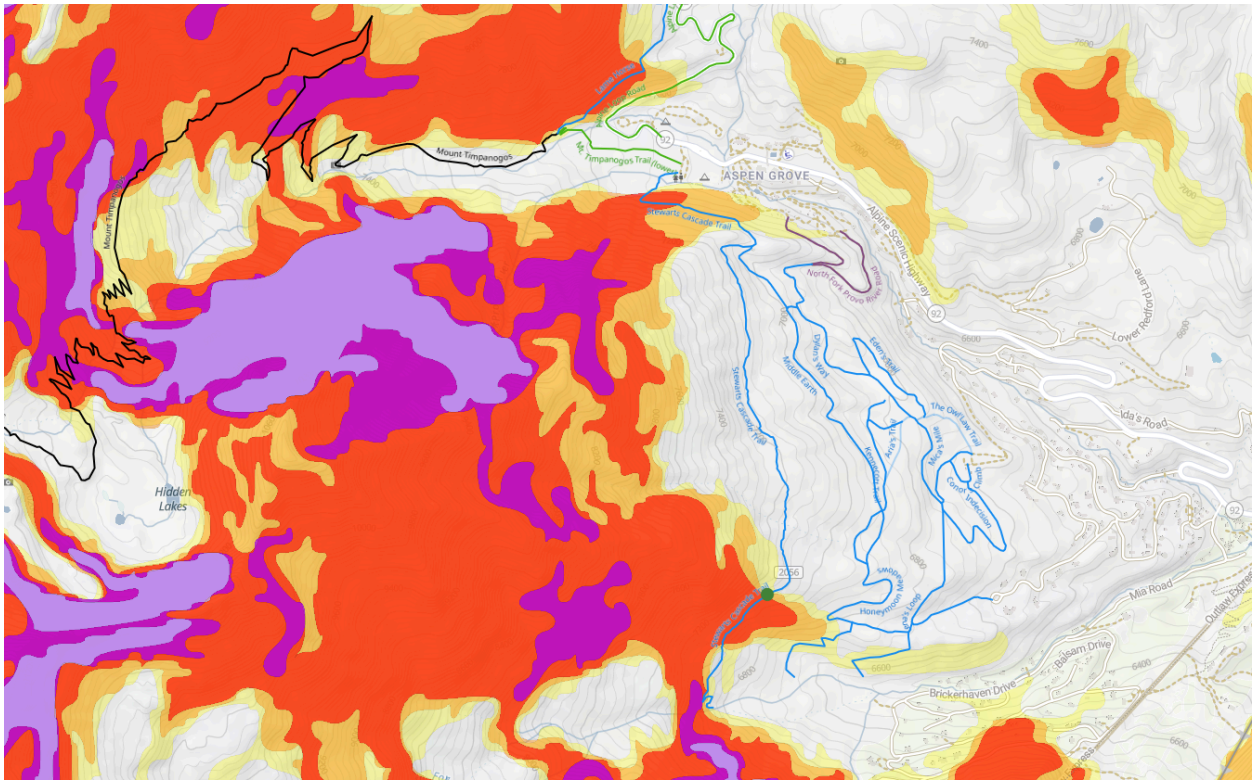
Avalanche Forecasts

- Current avalanche forecast: https://utahavalanchecenter.org/ -can also download the app, follow on social media, links to these are found on their website
- How to read the avalanche forecast/understand the compass rose: https://utahavalanchecenter.org/forecast/tutorial
- Know how to apply the compass rose to your specific trail – look at elevation all along the route, look at slope angles, look at the direction the slopes are facing
- Use the map overlay on your specific trail & note the danger areas, an example follows
    - Map apps with snow info as overlays:
        - Trailforks: https://www.trailforks.com/ (overlays are free on the website, requires paid version for overlays in the app)
        - Gaia GPS: https://www.gaiagps.com/
        - OnX Backcountry – app only
    - Trailforks image of Stewart Falls trail (most left of the blue trails), Aspen Grove



- What do you observe about the area this trail crosses?

- Trailforks image with Avalanche Slope map overlay of the same area. Can you find areas on the trail that are at a higher risk for avalanches? Remember the color code for risk. Also compare the topography without the overlay. Look at the Mt Timpanogos trail (black) & identify avalanche risk areas.



- Avalanche risk color code:
  Yellow: 25-30°
  Light Orange: 30-35°
  Red: 35-45° (most dangerous)
  Dark Purple: 45-50°
  Light Purple: greater than 50°
- Do you see the green dot on the Stewart Falls trail? The elevation here is approx. 7000ft. The compass rose will tell us that conditions below 8000ft are one color. They may be a different color at the next elevation tier, and we falsely assume that because we're at 7000ft that we are at less risk. However, if we look at the topography of that slope without the overlay, we can see in more detail that the trail crosses an avalanche run-out path. That is why the overlay shows red across the trail, even at the lower elevation. Always look for the chutes.
- Also to note: the Timpanogos trail *in winter & early spring* crosses snow run-off and can cause hidden snow bridges. Be aware of what is under your trail.
- (All the blue trails on the right side of the Stewart Falls trail are XC ski trails at Sundance.)

Avalanche Data Resources - Apps & websites we use to get a bigger picture of snowpack, current conditions, etc:

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UDOT app: check route cameras, see hazard signs or traction requirements, live feed of snowplows, weather conditions give report of road conditions (ice, dry, etc)
-  Avalanche Forecasts app & website: Western states & Canada forecast reporting, updated daily by 6/7am during the season
-  Trailforks app & website: includes Avalanche Forecast, Avalanche Risk, & Slope Angle map overlays, useful mapping for year round activities, website offers free overlays, subscription required for mobile
-  Gaia GPS app & website: includes Avalanche Forecast, Avalanche Risk, & Slope Angle map overlays, useful mapping for year-round activities, my personal favorite for mapping out your own trails, website offers free overlays, subscription required for mobile

- NOAA snowpack website: updated daily, can zoom into area, a little archaic interface, but informative & useful for getting bigger picture of a particular area & elevation
- Buoy 51101 – snow storm predictor, see Significant Wave Height WVHT (plus more data than you could ever dream of)
- Powder Buoy – explanation & charts of Buoy 51101
    - Facebook for Powder Buoy 

- Instagram for Powder Buoy 

Snow Science

- Recognize the five red flags of avalanches
    - Recent avalanches – debri, fracture line
    - Shooting cracks
    - Whumpfing
    - Big changes in weather
    - Persistent slab avalanches (Stewart Falls)
- Unstable snow
    - Different types of snow crystals
    - Different types of avalanches
        - Glide
        - Wind Slab
        - Cornice Fall
        - Wet Slab
        - Persistent Slab
        - Wet Loose
        - Deep Persistent Slab
        - Dry Loose
        - Storm Slab
    - Dig a pit - layers of snow
        - Snow hardness measurement
        - Observe layers

Beacon Training – Rescue (in parking lot)

- Beacon and how to use it
- Search, probe, shovel
- What to do when an avalanche occurs
    - Deploy airbag
    - Fight to exit to the side or self-arrest
    - Fight to get to the surface
    - Create an air pocket by your face
    - Try to dig out
    - Remain Calm
- How to search for a victim

- Organize search
    - Stop and assess further risk
    - Choose a leader
    - Count heads – note last location
    - Call for help
    - Change to search mode on beacon
- Perform search
    - Start search where victim was last seen
    - Search methodically in swaths no more than 40 meters/120 ft wide (long)
    - Yell to others when you get a signal or find a clue (pull out of snow)
    - Follow signal to burial area
    - Keep beacon near the snow on final approach – place a marker at 5 meters/15 ft
    - Locate closest signal by bracketing (slowly approach the point from all four sides)
- Pinpoint victim with probe
    - Probe in a spiral pattern (25 cm from last) – if large group, have only 2 with probes and the rest with shovels
    - Leave probe in when you contact victim
- Dig out victim
    - Start at a position one long downhill step from probe (2-3 steps if deep snow)
    - Dig toward bottom of the probe
    - Toss snow far behind and to the sides
    - Change shovelers often
    - Slow down when you get close to the victim
    - Uncover face first
- First aid
    - Provide first aid
    - Transport to medical care (move to better location even if helicopter is coming – using a litter or sled)

Take a class – Avalanche Awareness, Avalanche Level 1, Avalanche Level 2

Resources:

REI - https://www.rei.com/learn/expert-advice/avalanche-basics.html?series=avalanche-awareness

KBYG.org