

Student Handout – Nav 3.5 2020

Seattle Wilderness Navigation Field Trip at Heybrook Ridge, Index WA

Dear Wilderness Navigation Student,

Most backcountry trips are safer and more enjoyable with thorough pre-trip work, including navigation. Your instructors expect you to complete any required pre-trip tasks before the Wilderness Navigation Fieldtrip (FT). And they expect you to read this handout with attention to detail.

Student learning targets are:

1. Maintain a high level of situational awareness--determine point location with terrain recognition, map, altimeter, compass & GPS.
2. Plot & follow a path to your destination and return to the TH using the complete navigation toolset.
3. Navigate safely off trail, cross-country with reasonable confidence, accuracy and time.
4. Provide navigation support to bewildered or distressed hikers encountered on and off trail including use of emergency communication devices.

This FT may be your first exposure to the outdoors under less than ideal conditions. Instructors are determined to make this a first class learning experience for all. They will review your gear selections and offer suggestions and coaching as needed. And they'll provide a best estimation of your physical conditioning and any needed accommodations for physical or other limitations.

The Schedule—Target arrival no later than 6:30 am. And it takes >20 minutes to gear up, sign in, find the Sani Can (Porta Pottie) and get to your group.

6:15 - 6:30 a.m. Arrive, prepare to go

6:45 a.m. Student Check-In, Find assigned small group

6:45 – 7:15 a.m. Prep to hike to TH (trailhead) -- Scenario 1[SCN 1]

7:15 – 9:00 a.m. Hike TH >Tower SCN 2

9:15 – 11:00 a.m. > Stumps, bearings, short landfall problem SCN 3, 4, 5 & 6

11:00 – 12:00 p.m. Lunch SCN 7 & 8

12:00 - 12:45 Lunch > Ridge SCN 8

12:45 – 1:30 Ridge > Launch Station SCN 9

1:30 – 2:45 Final problem SCN 10 & 11

2:45 – 3:45 Catchline >TH >CkOut SCN 12

This document contains driving directions, a detailed schedule, and trip description for your reference. Please sign up online to carpool, as parking space is limited. You can specify whether you would rather drive or ride and you can see other students' contact information to arrange a meetup. Do not expect to be done before 5pm. Students who expect to leave early are always disappointed. No one leaves until all are accounted for in the parking area.

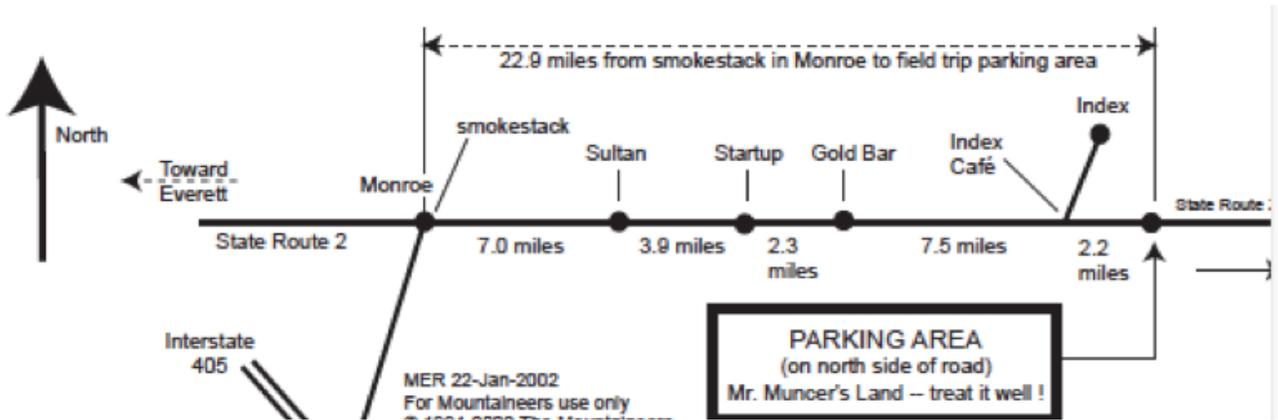
Leave No Trace at Heybrook Ridge

- 1) Carry out all garbage, and everything else you brought in
- 2) Use the provided blue-bags to carry out solid human waste & toilet paper
- 3) If you see trash, please pick it up. Leave things nicer than they were when you arrived.

Regards,

The [Seattle Navigation Committee](#)

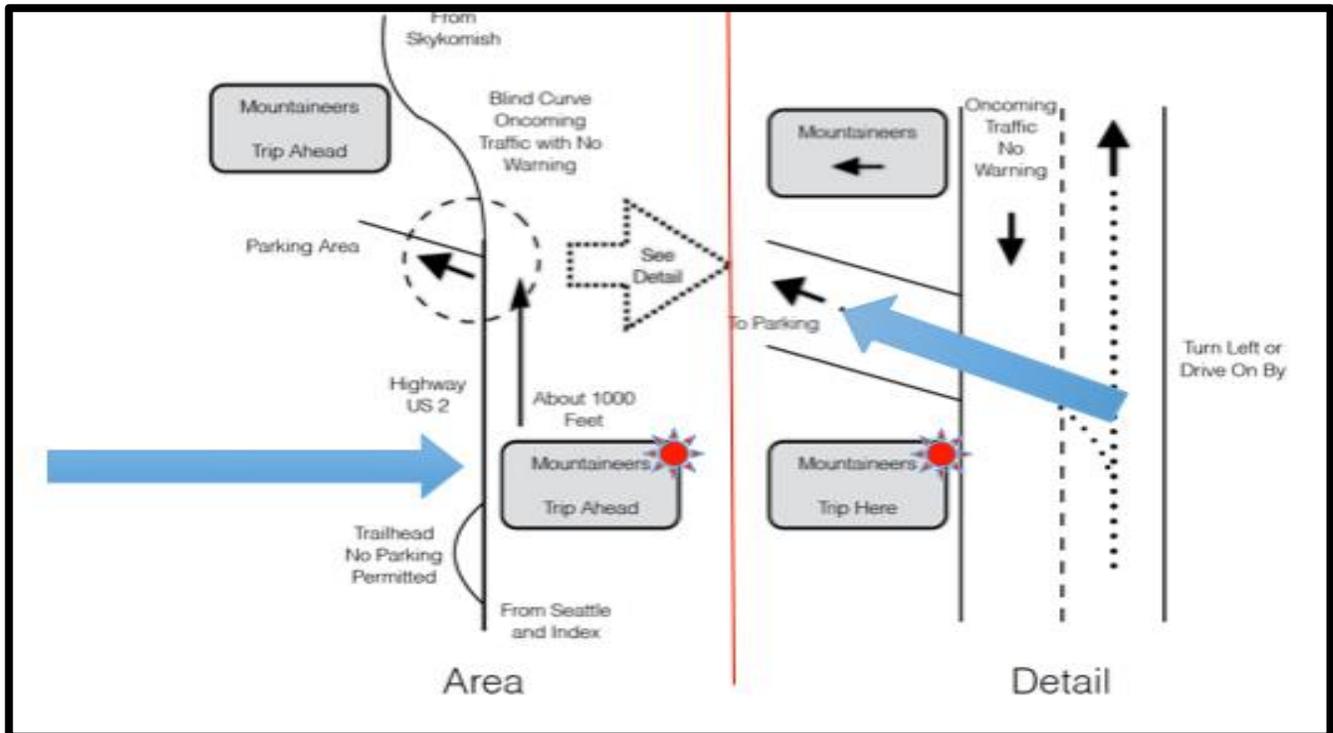
Driving Directions to Heybrook Ridge – map is not to scale.



Allow ~65 minutes driving time from Bellevue, ~80 minutes from downtown Seattle or the 65th St Park and Ride. If you plan to stop for bathroom, snacks or breakfast, add 15 to 40 minutes. Please carpool. There is not enough room for multiple, single passenger vehicles on our host, Mr. Muncer's land.

There is a blind curve immediately following the turn (heading east) into the parking area. Only turn if the volunteers wave you in. Do not stop on the highway. If you cannot turn in, proceed until you find a safe location a short distance after the blind curve.

Promptly follow directions for parking. Light wand assisted parkers will show you where to park. Student check-in and portable toilets are up the gravel road.



For students, "ready to go" means dressed, pack on back, checked in, portable toilet visited, and at their assigned small group. It takes a while...

EMERGENCY RESPONSE PLAN - HEYBROOK RIDGE

ACCIDENT RESPONSE RESPONSIBILITIES

Field Trip Day Leader:

- 1) Appoint an Incident Commander to coordinate all response and evacuation needs. This can be one of the Area Leads on the field trip or other personnel.
- 2) Continue with the overall responsibility of the field trip.
- 3) Provide additional manpower to the Incident Commander as required.
- 4) Contact injured person's emergency contacts.
- 5) Report incident to the club and appropriate committee chair(s).

Incident Commander (Area Lead):

- 1) Coordinate all response and evacuation needs (actions depending on the severity of the incident). Initiate 911 or beacon SOS signal if needed.
- 2) Coordinate with the First Aid Leader to ensure immediate first aid is given to the injured person(s).
- 3) Contact ambulance, hospital, and county sheriff as required.
- 4) Deliver accident report to Field Trip Day Leader with evaluation of seriousness of the injury and type of evacuation recommended. Continually provide status updates.
- 5) Plan and carry out evacuation if needed.

First Aid Leader:

- 1) Designated in each small group, or on the spot based on available skills.
- 2) Designate a communications/site leader if possible to relay communication with the Incident Commander (need radio, ideally an instructor).
- 3) Ensure proper assessment, first aid, and stabilization of victim's condition.
- 4) Stay with the victim until situation under control or care is transferred to a higher authority.
- 5) Report status updates to incident commander via the site communications/site leader.

ACCIDENT RESPONSE PROCEDURE:

- 1) Self-evacuation is the rule, except in cases of medical emergencies requiring immediate treatment.
- 2) Radio channel for communication: channel 6 code 17. All instructors will carry radios. NOTE: An alternate frequency may be designated by the incident commander. Incident commander will have sole authority over 911 calls and/or beacon SOS initiations and notify the Day Leader of such an initiation.
- 3) The victim (or First Responders in the case of an unresponsive victim) should make their situation known via whistle (three short whistle bursts for a minute, followed by a minutes break) or radio communication.
- 4) First responders assure incident scene safety.
- 5) First Aid Leader will initiate assessment, treatment, and stabilization of any injured person(s).
NOTE: The Day Leader and 1 Area Leader (stationed on the old road during the final problem) will have expedition first aid kits.
- 6) Communication will be established by the First Aid Leader (or designated communications/site leader) with the Day Lead, and subsequent Incident Commander.
- 7) Develop and execute an Evacuation Plan - First Aid Leader (and others as needed) under the direction of the Incident Commander. 911/SOS initiation is at the discretion of the Incident Commander.
NOTE: There is a gated Forest Service road down the back side (north side) of the site to the highway in Index. The road heads downhill halfway between the stumps and the fire tower. The field trip leader has a key to the gate, which is located at the start of the road, near the state highway in Index. In general, this road can be negotiated by pickup truck or high clearance car, unless covered with snow. The road (FS 6022) that continues east towards Baring to exit onto US HWY 2 is generally not passible and has the same gate key.
- 8) First Aid Leader and the Incident Commander should remain with the victim throughout the evacuation plan until care is transferred to a higher authority.
- 9) The Day Leader will remain responsible for the overall execution and safety of the field trip. Early termination will be the decision of the Day Leader.
- 10) Post evacuation, the Day Leader will contact the injured person's emergency contacts and update them with the current status and plan.
- 11) Following the field trip, the Incident Commander will provide information in order for the Day Leader to submit a report of the incident to the club and appropriate committee chair(s).

LOST HIKER PROCEDURE:

- 1) For lost hikers, they should stop moving and stay in the same place. Attempt to make their situation known via whistle (three short whistle bursts for a minute, followed by a minutes break) or radio communication. Wait until assistance arrives.
- 2) For Leaders and Instructors, insure your small group is supervised, locate lost hikers, notify the Day Leader of the incident.

CONTACTS:

LAW ENFORCEMENT

Snohomish County Sheriff: Dial '911' and ask for the Snohomish County Sheriff.

FT Directions: Heybrook Ridge, Snohomish County, WA. Heybrook Lookout TH (1070) on US HWY 2 to the Fire Tower, then along Forest Road 6022 and beyond up along Heybrook Ridge to elevation ~ elev 2400'.

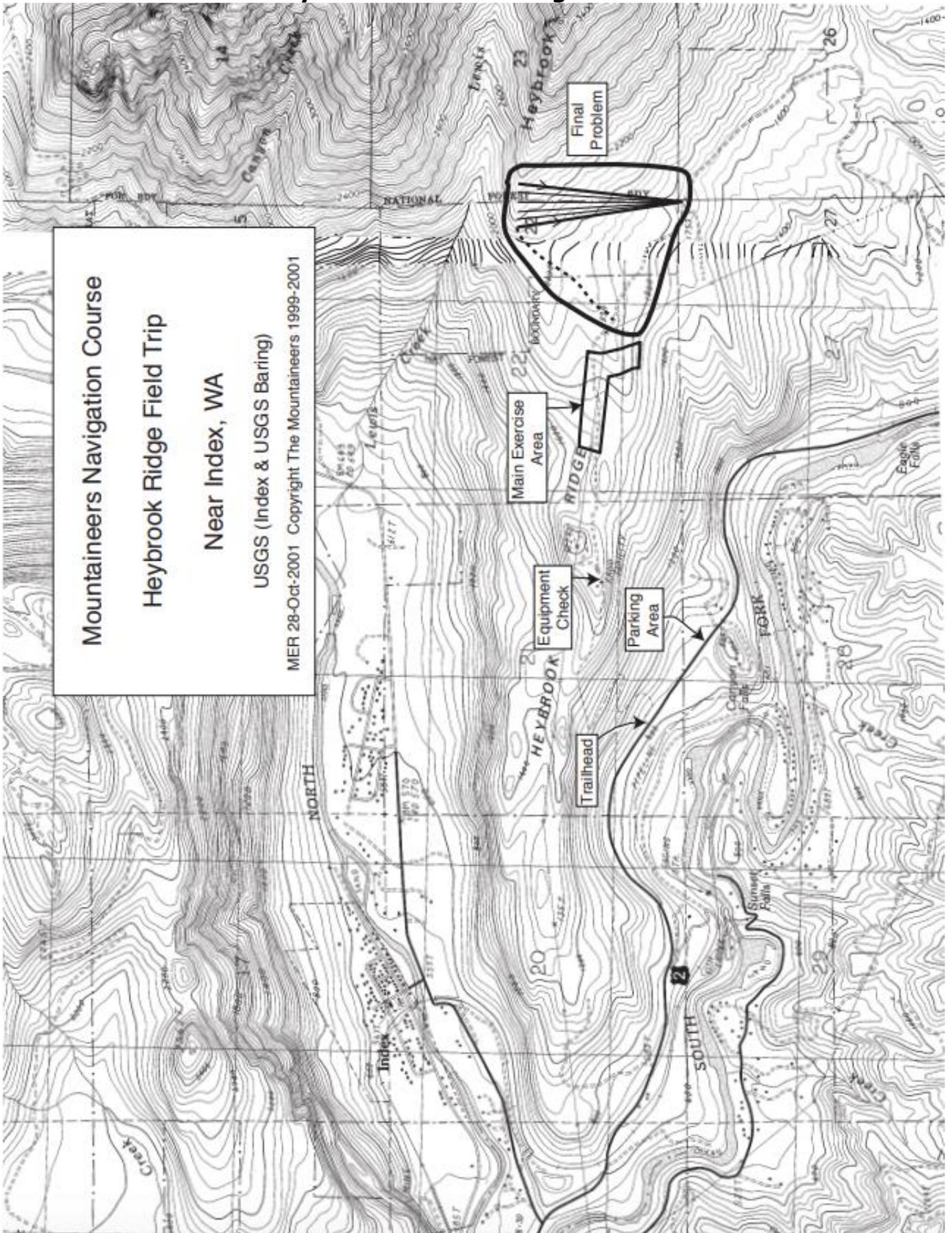
MEDICAL EMERGENCY

EvergreenHealth Monroe (old Valley General Hospital)-

Address: 14701 179th Ave SE, Monroe **Phone:(360) 794-7497**

Directions: From Heybrook Ridge EvergreenHealth Monroe can be reached by driving west on US HWY2. Proceed through Monroe. Just past the SR-522 intersection/overpass you'll come to the intersection at 179th St. SE (Valley View Road). Turn left onto 179th St. SE, heading south across the railroad tracks. EvergreenHealth Monroe is on the immediate left.

A Full Day of Wilderness Navigation Scenarios



Trip Planning

The organizing field trip concept is to simulate an actual backcountry outing with particular emphasis on navigation and communication.

Student tasks performed before Field Trip:

- Hard Copy (HC) Student Field Trip Handout in 1 gallon ZipLoc bag.
- Packed 10 Essentials, food for lunch, 2 liters of water or other beverage
- Full outdoor gear (not snowshoes or ice axe) – i.e. polypro insulating layers, rain gear, heavy hiking or mountaineering boots, etc. (No Cotton!)
- Commercial 1:24,000 USGS Index & Baring HC maps (and each protected in separate, 1-gallon ZipLoc bags. Field trip site (smaller area) CalTopo HC maps of exercise area printed as both back-up and, if needed, to provide to other party hiker needing navigation support.
- Compass checked for correct declination (15E for Index as of February 2020).
- Morning of weather checked to see if HI or LOW barometric pressure change anticipated to heighten need for constant re-calibration.
- Gathered intelligence re weather, NWAC avalanche concerns, fire danger, highway, TH, trail(s).
- Wristwatch has correct time & full charge (if battery powered).
- GPS device loaded with:
 - Waypoints and Tracks loaded from provided GPX file
 - Area map at usable scale (as student-generated before Workshop)
- GPS app/Smartphone checked--batteries, charge, screen display, weather proofing, metrics...)
- Emergency communication device (whistle, minimum, packed and secured).

Muster Area Work

Students spend the first half hour with instructors preparing for the scenarios and rehearsing the essential workflow before the first step down the trail.

Navigation tools/outdoor gear set up & secured

- Index USGS Quad HC map folded to the area of travel and protected from the elements in ZipLoc bag. Map comes to hand easily without fumbling. CalTopo HC map bagged with Index Quad.
- Index USGS Quad oriented using terrain matching and point position determined. Identify distant peaks with cardinal bearing direction from TH -- N, NE, E, SE, S...
- Baring USGS Quad HC map folded to area of travel, stowed in ZipLoc bag and tucked in backpack for later use.
- Altimeter altitude checked against known TH altitude (proximal contour line). Calibrate the altimeter (if pressure based) at this known elevation.
- Compass adjusted to 15degrees East and secured to wrist, pack or clothing and comes to hand easily.
- GPS device with Gaia Topo, student GPX files, in airplane and low battery modes, weatherproofed, and in secure place but comes easily to hand. Full battery power assured. GPS device acquires n=4 or more satellites. Note: iOS does not display satellites, only accuracy. Waypoints displayed on pre-loaded map. Point position on HC map confirmed.
- Battery back up, if carried by anyone, protected and in known pack(s) location.

- Wristwatch* or app charged (if necessary), correct time set, visible and secure.
- Emergency Communication* device checked in secure pack placement – minimum is whistle.
- Smartphone parking *area photo* taken looking back from direction of travel to TH.
- Rite in Rain* pocket notebook placed in accessible spot with small, #2 pencil. Salient weather data recorded – time, temperature, sky, wind, precipitation.
- Students stow all navigation gear for ready retrieval (with instructor help).

Instructors will be reminding you to use: 5 Steps to remember at every stop

- 1. Where are you?**
- 2. Where do you want to go to?**
- 3. What route will you take to get there?**
- 4. How long will it take?**
- 5. What do you expect to see along the way?**

Scenario 1 (Muster area to actual TH)

Students will use fundamental navigation techniques to reach the TH emphasizing primacy of a hard copy (HC) topo map.

- Find current location on a map & GPS. Bearings to the TH and the Lookout Tower.

Scenario 2 (Forest Service TH to Tower)

This scenario makes repeated point position determinations (on the HC map) with the full suite of navigation tools used in different combinations.

Scenario 3 (Tower to W Stump Field)

After arriving at Fire Tower (do not climb) snack, take a breather to perform these tasks.

- Record arrival time in notebook.
- Check the Waypoint.
- "Party separation" protocol (toilet break) invoked followed by 10 Essentials check.
- Accuracy checks on all navigation tools. Reset, if needed.
- Practice compass bearing field measures on 3 distant peaks (if visible), else 3 natural or cultural features at least 75' (25m) away

This scenario addresses overall readiness, relationship of anticipated trail conditions to gear/clothing selection, and a calibration check of all tools.

Scenario 4 (W Stump Field Entrance to E Stump Field)

Students improve accuracy with hand-bearing compass. This scenario provides yet more practice with combinations of navigation tools and an assist to bewildered hikers.

Scenario 5 (W or E Stump Field -- Take 9 bearings [6 OK] within $\pm 3^\circ$, $\pm 4^\circ$)

The stumps were resurveyed with laser equipment (August 2004). Most errors come from compass user technique, some from compass error (manufacturing variance).

Western stumps: Bearings

1	2	3	4	5	6	7	8	9
A	A	B	A	C	B	C	U	#2
E	B	D	D	E	C	D	T	#3
F	G	G	F	G	E	E	J	

Eastern stumps: Bearings (NOTE: **at stump G**, students take bearings from N side)

1	2	3	4	5	6	7	G	K
A	B	B	A	A	E	A	H	#4
B	D	C	C	D	F	D	#5	D
E	Y	K	G	F	G	G	F	G
							W	O

Taking a Bearing Compass Tips

A) The fundamental technique

Square up your body facing the bearing target. With arms at your side, hold the compass towards your direction of travel. Bury "Red Fred in the Shed." Raise the compass with hands outstretched and confirm Fred is still in the shed. [See Burns & Burns, *Wilderness Navigation, 3rd Edition, 2015, pp. 42-54*]

B) Determine dominant eye, if not known

- Check for Dominant Eye – Extend both hands forward of your body and place the hands together making a small triangle (approximately 1 inch per side) between your thumbs and the first knuckle.
- With both eyes open, look through the triangle and center something in the triangle.
- Close your left eye. If the object remains in view, you are right eye dominant. If closing your right eye keeps the object in view, you are left eye dominant.
- You can also point to something with an index finger and close each eye in turn to see which eye keeps the finger and the object in alignment.

C) Problem solving, if inaccurate bearings continue

- Ask the instructor to try your compass.
- Leveling? The compass must be level so the needle floats and doesn't stick.
- Centering? On a mirrored compass, center the line on the mirror with the center of the bezel.
- Metal? Such as rings, watches, eyeglasses or bracelets, pencils and pens.
- If the compass is consistently low: increase the declination setting (i.e. change from 15 to 17).
- If the compass is consistently high: decrease the declination setting (i.e. from 15 to 13).

Scenario 6 (E Stump Field to Lunch Area)

This scenario provides instruction and practice with two bearing following techniques, person-to-person leapfrog and tree/rock to tree/rock intermediate objectives. Tools include map, compass and GPS. Instructors demonstrate both techniques. On reaching catch line, 23 feet from target = 2°. Good result is an error within ±2° (± 23'). ±4°

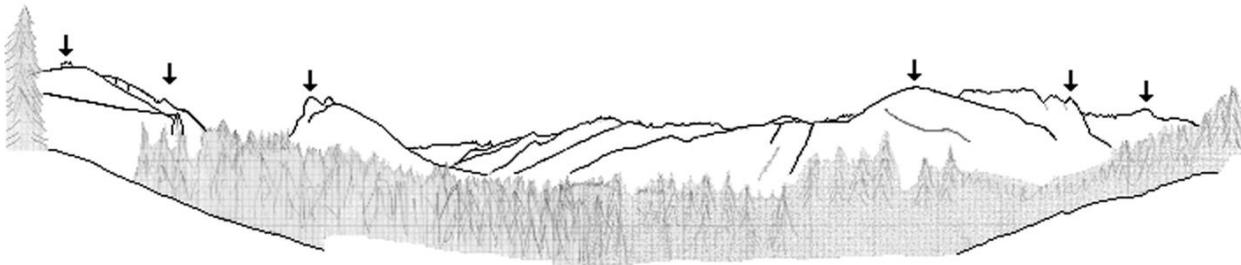
Scenario 7 (Where Are You? / Mountain Vista Exercise – working lunch)

Timeframe: Time is limited. You will need to do this problem and eat lunch at the same time.

Goals: To figure out where you are using situational awareness and all the navigation tools. Discuss your answers with your instructors and group at each step of your work.

Figure out where you are:

- 1. Orient your map** - Orient map so that the top of the map points north (so that it matches the topography), using a relatively flat surface. Use a stump, rock, ground, or your pack. **Do not hold the map in your hands; because once you move the map, it will no longer be oriented.**
2. You are not standing at a **known landmark** (easiest method of knowing where you are).
3. **Dead Reckoning** – Where were you when you started the landfall problem? (Ask your instructor if you don't know.) What direction did you go? For how much time and at what pace (speed) did you travel? Estimate the distance. Plot where you might be now.
4. **Altitude and Slope** – What does your altimeter say the elevation is? Does that additional information confirm and refine your dead reckoning answer? Would the steepness of the slope and the shape of the slope (convex or concave in the vertical or horizontal direction) provide useful information unique to your location in this case? How far is the crest of the ridge above you?
5. **Landmark Identification and Distant Bearings** – Look for mountains and compare their shapes to those you see on your oriented map to identify them. Take bearings to the mountains shown below (or if they are not visible, get bearings from your instructors). You can also use man-made (cultural) landmarks like power line towers and roads to help. Plot a bearing that is most likely to help reduce uncertainty of your position. Does it help?



6. **GPS & UTM** – Your GPS gives your position as NAD27 10T 611701E 5295972N or WGS84 10T 611607E 5296169N. Plot the UTM coordinates for your map's horizontal datum on your map. Does it confirm your location as you determined using other methods?

Scenario 8 (Lunch area to the base of Heybrook Ridge)

This scenario calls for planning and traveling a route from the lunch area to the turnoff (Waypoint 9Start) leading to the final problem launch area, including a party separation pause at a "Y" intersection.

Figure out how to get where you are going next, and how to get home:

1. Figure out and sketch a route on your maps to your next destination, Waypoint 9Start.

Your group needs to stop at the following waypoints along the way:

- Waypoint East Stumps: WGS84 10 T 611451E 5296337N
- Waypoint 9Start: WGS84 10 T 612176E 5296329N

2. Sketch a route that would return you to the fire tower, the trailhead and your car.
3. Estimate your travel times using your hiking speed and the distance to the ridge and back to the cars. Given the current time, what is your latest allowable turn-around-time if you want to get to your car by sunset?

Scenario 9 (Waypoint 9Start to launch point "A" "B" "C" "D" or "E")

This scenario calls for planning and traveling a route to the launch point using situational awareness, compass, map, altimeter, and GPS. **Tips:** Use Heybrook Ridge spine as a handrail and altitude as an instrument catch line.

- Waypoint 10A: WGS84 10 T 612382E 5296796N

Sky Wilderness Boundary	Launch A	Launch B	Launch C	Launch D	Launch E
Elevation 2220'	2300'	2330'	2375'	2415'	2475'

Scenario 10 (Launch from "A" (or assigned point) to an old forest road, then to the active forest road FS 6022)

This scenario splits the Final Problem into two components, navigating first by following a track or waypoints, and second by following a bearing on your compass. [Note: instructors with radios are guardian angels that follow students.]

Scenario 11 (At the Final Problem catch line.)

Good result is arrival within 2 signs of target ($\pm 2^\circ$). $\pm 4^\circ$ is acceptable. This scenario makes good use of the time waiting for others to finish on the active forest road. Some recommendations are: Practice "Lost Behavior." Measure your pace. Practice emergency communication protocol. Talk about emergency shelters. Tell outings "war stories" in your group.

Scenario 12 (Catch line to check out station)

This scenario provides wrap up instruction for the long walk back to the TH and check out. How far is, and how long will it take to reach the trailhead? Instructors will pose questions at 6 spots to quickly check navigation skills on the return.

Back at the TH - After the Hike Considerations

While memories are fresh:

- Record return time, notes on route, weather, Wow! events, and adverse events.
- Record return elevation and percent battery remaining on phone.
- Note navigation, communication or fitness issues needing attention looking ahead.
- Record new friends' contact information.