The Mountaineers
EXPLORE • LEARN • CONSERVE

Navigation Northwest

A Quarterly Publication of the Seattle Navigation Committee
Volume 6, Number 3 **October 2018**

-- Navigation Northwest Fall Features --

Courses, Classes, Apps, Gear & Links

Editor Notes

- We continue our search for outings where navigation and/or communications issues provide "Lessons Learned."

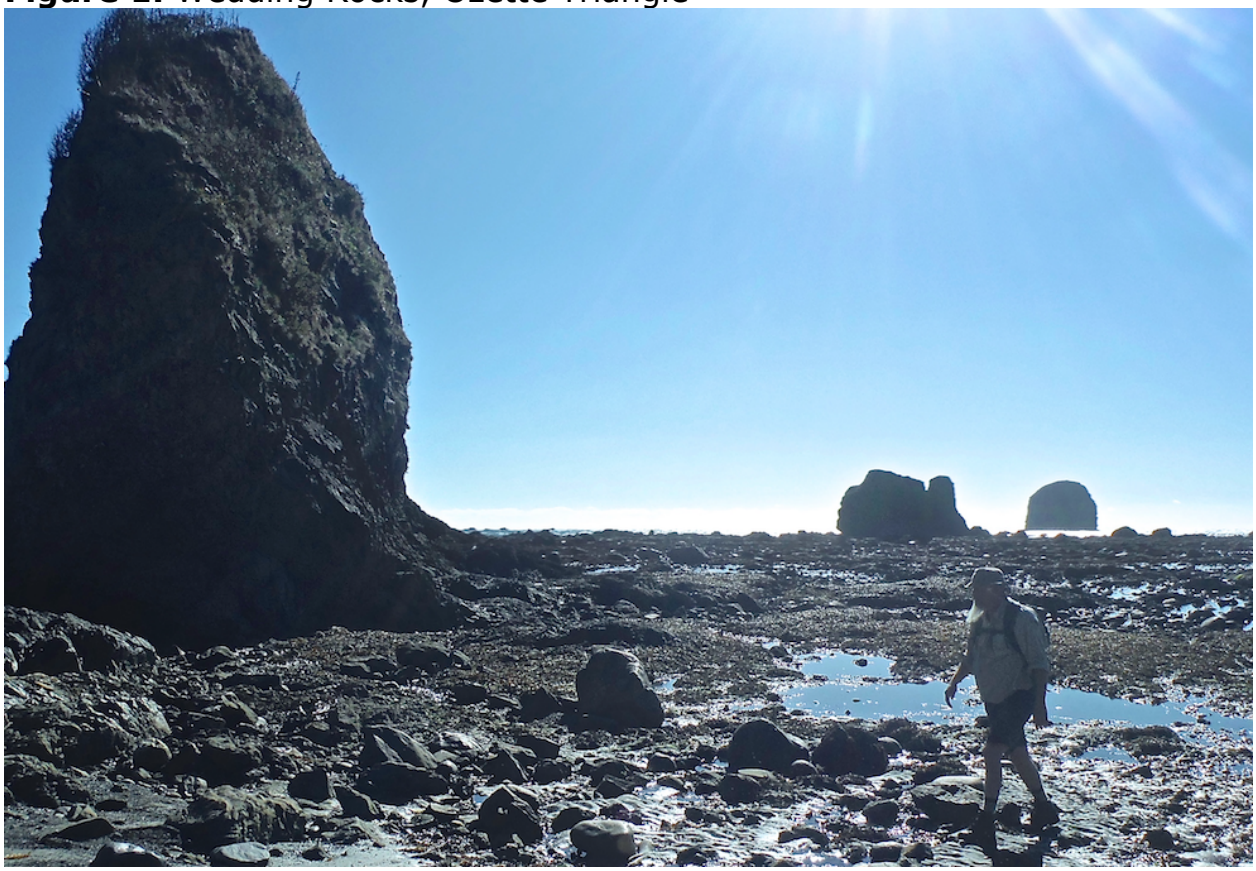
Personal Agendas Breakdown Effective Communication,

An Argument for Radios

By Kathy Fox

I led a recent hike around the Ozette Triangle intent on applying lessons learned from a hike I led there 3 years before. During the 2015 hike, I left my 2-way radios behind. My rationale was: there were six of us; I thought this hike was pretty straightforward, how could you get lost on this hike; and I knew all except one of the participants. And I frequently just didn't want to bother carrying the weight.

Figure 1. Wedding Rocks, Ozette Triangle



Once we reached the Wedding Rocks beach section, we dispersed to explore and discover the petroglyphs. This is an area where you do not always have visual contact with everyone, as there are many sea stacks and rocks. When everyone had seen enough, we found we were missing one hiker. As we looked south, our direction of travel, we saw that the missing member had gone ahead, so we continued toward Sand Point where a junction takes you into the coastal forest leading back to the trailhead.

This missing member continued to be far enough ahead of us that we did not catch up until we reached Sand Point. At this point we realized that the person of interest was <u>not</u> our missing member.

We looked north up the beach to discover that our missing member was approximately the same distance behind us as we thought he was in front of us. It was our hiker and he said that he wanted to find a specific petroglyph and was not leaving Wedding Rocks until he found it. Ouch.

We briefly discussed the possibilities of lessons learned from this decision that included the impact on the rest of the party, and a deeper discussion later that evening over the campfire.

We wondered if radio use could have prevented this and talked about the importance of everyone communicating, especially if you have a personal agenda. We also emphasized staying with a buddy, and the impacts that such a decision have on the leader and the rest of the party.

Fast forward to the August trip I led. There were ten of us and four radios. What could go wrong? The following communication discussions took place at the trailhead:

- Stop at junctions to wait until the entire party catches up to discuss which way we'll go;
- Stay within range of someone who has a radio;
- There will be four radios, one always at the front of the party (lead), one always at the end (sweep), and two in between;
- One leader will always have a radio (there were two leaders);
- Use of the radio included: what channel; hold the Press To Talk (PTT) button momentarily before and after speaking to avoid having your transmission cut off;
- If you find that you will be overtaking the lead or the sweep position, take the radio from the person whose position you've taken, and report this over the radio; and
- Be as clear and concise as possible while minimizing talk over the radio.

Some points were brought up and repeated through out the hike as necessary. Once we arrived at Wedding Rocks, we had a group discussion on everyone having until 2:00 p.m. to have lunch and explore. This gave everyone approximately one hour, twenty minutes to explore.

We would meet around the other side of the petroglyph area where the rock formations end and the beach turns south. I reviewed this with everyone on a map, and with some members individually who expressed uncertainty.

At 2:05 there were three experienced members who were not at the designated meeting area, nowhere in sight. I radioed and located 2 of them who were together and asked about the third person. The third person was not with them and was nowhere in their sight. I instructed the two members to continue without stopping to join the rest of the party.

I then backtracked to the original dispersal site to look for the third member But did not see her. I radioed the group that I did not locate her and was returning to their location. As I was returning, one of the members in the group radioed me that they saw the third member through binoculars south beyond the meeting area. I returned to the group and we soon reached the third member.

Figure 2. Seen on later Mountaineers hike but not a Seattle Branch member

What more can I learn from these incidents?
When we know there will be a group dispersal, discussions at the trailhead, and the point of dispersal should cover the points from previous hikes, AND MORE. Emphasize individual responsibility and consideration by and for all members of the party. This includes making sure that members are visible by other members except during a "party separation."

In the both hikes, the complacency of experienced members created situations for the leaders who needed to react to a potentially critical crisis.

In the future, I will keep in more regular radio contact with the group during dispersals to frequently account for everyone and to alert members as regroup time approaches.

The challenge for a leader is to find that sweet spot within each group that allows everyone to enjoy themselves to the highest level possible while not needing to micro manage anyone. Complacency resulting from personal agendas was the culprit with every missing member in the above situations. Followers are responsible for considering the safety of the entire party.

My use of radios has evolved over the five years I've been leading activities. I used to bring them to the trailhead but leave them in the car. Today I always carry

them. Yes, it's another piece of equipment to carry; they should be fully charged; they add another routine to learn and follow (at the trailhead, ongoing discussions, one for each end of the party, etc.). And making sure you get your radios back in one piece. But I will always carry them for the sake of improving communications, and even bring them along when I'm not leading the activity.

[Ed Note: Not long after the hike above, Kathy used her radio to alert members of her party to bears on the beach. See Figure 2.]

Kathy Fox leads Stewardship, Hike and Backpack activities, and is Co-Chair of the Conservation Committee, for the Olympia Branch.
Contact her at kw1960@me.com
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Heybrook Field Trip Pilots Nav 3.0 Revised Curriculum

Scenarios drive instruction

By Peter Hendrickson

A party of seven Seattle and Foothills navigation instructors gave the Wilderness Navigation 3.0 Field Trip a test run on Heybrook Ridge September 23. At the heart of the revised activity is 11 scenarios designed to simulate an actual backcountry outing with particular emphasis on navigation and communication. We will use the same terrain but update the activities. Those who complete the revised course will receive both Wilderness Navigation and GPS Navigation badges.

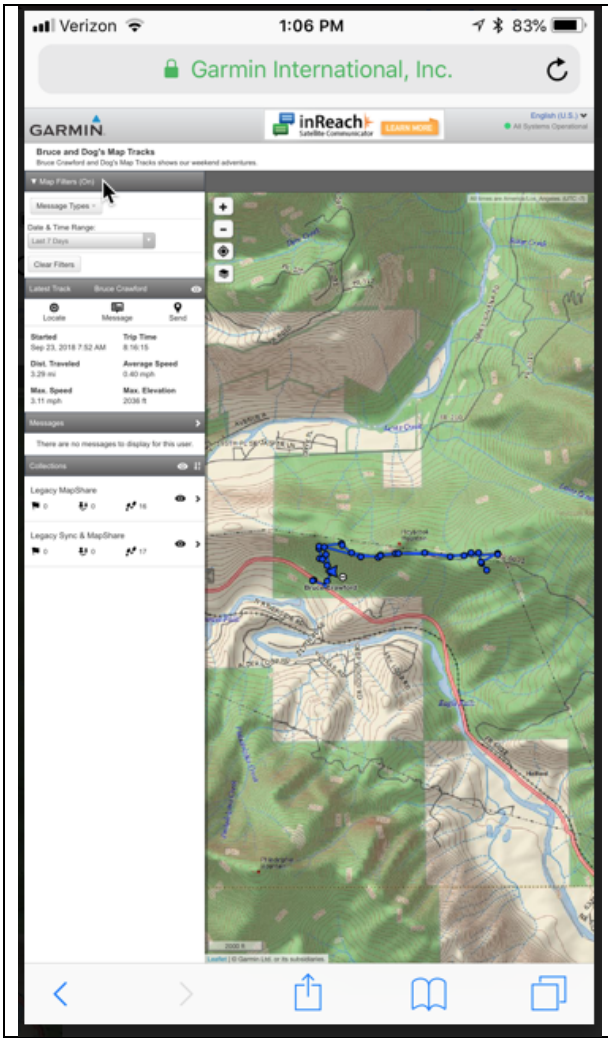
Some two dozen enrolled students will have completed the current Wilderness Navigation eLearning module, a new online GPS module, and a revised, GPS-rich, in-person workshop prior to the November 3 field trip. Other enrolled students will follow the legacy curriculum. Navigation 3.0 calls for students to be competent using all five tools in their navigation tool kits:

>>Hard copy (and e-version) topographical maps
>>Altimeter (dedicated or on smart phone)
>>Hand bearing compass
>>GPS (dedicated or on smart phone)
>>Emergency communication devices (whistle, at minimum, plus PLB & Satellite communicators)

Figure 1. Navigation expert Bruce Crawford and friends – note devices on dogs.

Students will be expected to come prepared with:

- USGS quad maps in hand. CalTopo or Gaia HC map printed as both back-up and, if needed, to provide to other party hiker needing navigation support. Instructors should carry printed backups.
- Compass checked for correct declination (now 15.5 degrees east) at FT site.
- Altimeter calibrated. Morning weather checked to see if HI or LOW barometric pressure change anticipated to heighten the need for constant re-calibration.
- Wristwatch checked for adequate charge (if battery powered) and functional state.
- GPS device loaded with:
    - Route or track (as route)...created or loaded
    - Waypoints...created or loaded
    - Area map loaded
- GPS device health checked (batteries, charge, screen display, weather proofing, metrics...)
- Emergency communication device (whistle, minimum, packed and secured)



Samoyan Heybrook Track Output

Regarding the white-coated Samoyans (Russian herding/hunting dogs), Crawford said, "Cheetah wears a SPOT, Tiger wears a Garmin/InReach Explorer+, and I carry a PLB. So we've got all three satellite constellations covered.

"Cheetah and Tiger have their devices set to tracking mode. The amount of battery use in a day's travel is low and recharge is pretty fast, especially for the SPOT. "

He noted, "Both satellite messengers sent 32 points, the Garmin seems a bit more consistent with a bit less position scatter."

←←← Garmin/InReach Explorer + track in blue at center leading to Heybrook Ridge from US HWY2

Trip planning is tailored to the particular FT site but the elements would be common across sites and branches, if accepted at the next all-branch Navigation Summit. Student pre-trip planning will take 1 to 2 hours, preferably close to the date of the FT.

Students are expected to maintain a high level of situational awareness including:

- Point position
- Travel time estimates (to FT, through scenarios)
- Turnaround time (for overall FT)
- Handrails & catchlines identification
- Bearings of significant lines of travel
- Junctions
- Terrain features

In the interest of time, we skipped Scenario 1 that takes students from the muster area (Mr. Muncer's property) to the actual Heybrook Tower Trailhead (TH). Most attention was given Scenarios 2 (TH to Tower), 3 (Tower to W Stump Field) and 4 (W to E Stump Field). Below is a snapshot of Scenario 2 including some comments from the instructors who took turns acting instructor and student roles.

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. TH Orientation includes following route to tower on the HC map with a finger, checking TH elevation, looking back to road and determining it is due south, then checking the route on GPS device. All tools should easily come to hand. Time is noted in a *Rite in Rain* pocket notebook that may be provided to all students. Instructors read aloud the scenario statements.

Statement: *You've planned a short hike with your brother visiting from Kansas. He's reasonably fit, for a flat lander, but a bit anxious about hiking on a mountain in what looks like dark forest near the wilderness. You'll set him at ease with your facile use of a mix of navigation tools and a casual pace. You've promised him great views from the summit.* [There are six stops on the way to the tower. Below are the first three.]

- First stop @ 15 minutes: Without compass or altimeter or GPS, where are you? Face north. Which way does Hwy 2 run? How many switchbacks ahead? What is a switchback? Can you believe all the switchbacks that appear on a map? How differ from a curve in the trail? What is direction of travel to 3rd switchback? Set a bearing. *[Note: Those who studied the map prior to the FT are rewarded. There is an emphasis on attending to your surroundings, staying in touch with the terrain. Clothing adjustment would happen here, too.]*

Figure 2. Instructors practice fall line slope measurement (about 38 degrees).

- Second stop before first switchback. What is your slope estimate? How can you measure with the compass clinometer? Demonstrate. Discuss avalanche range 25 or 30 degrees to about 50 degrees. Three out of four avys occur between 34 and 45 degrees -- red light terrain. Confirm with contour matching to compass slope hash marks (if available). Where are we? Terrain match and confirm with altimeter. *[Note: Understanding fall line is critical. Jim Heber, a snow navigation expert, introduced his credit-card sized terrain-measuring tool. Nina Crampton suggested using the nearby prominent, tilted rock slab to give a physical referent for slope angle.]*
- Third stop between first two switchbacks. Altimeter reads XXXXft. Where are you? Confirm with terrain matching. Take a bearing on the fall line. *[Note: Navigation skills need multiple exercises to move skills past "introduced" to "learned." Throughout the day, altimeters were read many times. Each time there was considerable variance across instructors and tools. We will need to resolve our approach to teaching around those variations.]*

Our 8am to 3pm day wrapped up at the "Y" intersection, short of testing a fresh approach to the Final Problem where students move down Heybrook Ridge through broken and difficult terrain for about 1km. We plan to have students follow a track for the first section to the overgrown forest road to follow a compass bearing for the remainder to the catchline. We also tested Scenario 11 from the catchline to the TH where students will need to respond quickly to short point position queries

that rely both on memory of the trip up and application of skills practiced earlier in the day.

A multi-branch navigation summit earlier in the year authorized Seattle (and any other interested branch) to re-think the Wilderness Navigation curriculum and activities. Seattle and Foothills instructors have been working for several weeks to prepare for the October 25 Workshop and November 3 Field Trip. Several challenges lie ahead including instructor training, document revisions, integration of GPS skills and keeping to the daylight hours available for the field trips. Results of the try out will be a major topic at the upcoming November 17 Navigation Summit.

Weekend participants were Travis Prescott, Wendy Williams and Jim Heber (Foothills) plus Bruce Crawford, Nina Crampton, Nancy Temkin and Peter Hendrickson (Seattle). Brian Starlin and Russ Immel have also participated in the Field Trip planning. Draft instructor documents have been circulated to staff and the other branch navigation leaders.

--Peter Hendrickson is immediate past Seattle navigation chair. He was a public schools teacher and principal then curriculum, instruction and assessment specialist for several decades. Contact him at p.hendrickson43@gmail.com.

Bench tests support update for required compass models

Article first published July 2018

Seattle navigation's compass guy, Bob Boyd, has completed bench tests of three preferred compass models for Wilderness Navigation instruction. The registered land surveyor used his home test station to challenge Silva, Brunton and Suunto performance. Updated Mountaineers-wide compass requirements follow on the next page. *--Editor*

Compass Test	**Silva Ranger** #1 & #2	**Brunton TruArc** #3 & #4	**Suunto MC-2** #5 & #6	**Other Remarks** Both USGS Suuntos are for the US
Packaging	Overdone	Overdone	Easy Open	
Shipped By	Amazon	Back Country	Amazon	
Freezer Test	Good	Good	Good	
Opens	Easy	Easy	Easy	
Hinge	Good	Good	Good	
Lanyard	Short & pulls apart	Short but good	Short but good	Silva has a two piece measuring lanyard that can pop apart, loosing your compass.
Scales	UTM & others	Scales but not UTM	UTM & others	
Magnifying Lens	Yes	Yes	Yes	
Leveling Bubble	No	Yes	No	
Information Cards	Yes	Yes	Yes	These cards have miscellaneous information & scales.
Bezel Turns	Good & Very Hard To Turn	Too Loose	Good	Compass #2 took two hands to turn. The Bruntons will almost turn themselves. Compass #5 glows in dark.
Declination	With a screw driver	Friction	With a screw driver	The Brunton system is hard to master
Bezel Centered	Yes	Yes	OK	Keep Suunto bezel pushed forward.
Mirror	Good	Good	Some warpage	The Silva has an X to look at. Suunto mirror makes a poor signaling device.
Needle Length	1 - 7/16"	1-1/8"	1-5/16"	Longer is better to align.
Global Needle	No	Yes	No	The Brunton global needle has a lot of needle dip, which can be hard to align.
Orienting Lines	Good	Good	Yes, but short	First remove white plastic from bottom of the Brunton bezel.
Set A Bearing	Easy	Too Easy	Good	Compass #2 has a still bezel. Bruntons almost turn themselves.
Pointing Error	1º Lt & Good	2º Rt & 1º Rt	Both <1º	
Clinometer	Yes	Yes	Yes	

Mountaineers Required Compass Features

Wilderness Navigation & Other Courses

Revised July 2018

1. **Adjustable declination**: This feature simplifies map and compass work. Most compasses with adjustable declination have an adjustment screw, usually brass or copper-colored, and a small key attached to the lanyard. Some have a 'tool-less', pinch-to-adjust feature.

- All students MUST have a compass with adjustable declination. The presence of a declination scale does not guarantee that it can be adjusted.
- Even if you already have a compass without adjustable declination, you may not use it in this course. Experience indicates that such compasses detract from the learning experience.

2. A **transparent rectangular base plate** with a direction of travel arrow or a sighting mirror.

- Transparency allows map features to be seen underneath the compass.
- A rectangular shape provides straight edges and square angles to plot on the map.

3. A **0 to 360 bezel** (the rotating housing) marked clockwise from 0 to 360 degrees in increments of two degrees or less. Bezels should be large to allow use with gloves - the larger size also improves accuracy. Do not get one marked in 0-90 degree quadrants OR one marked in O-6400 mils!

4. **Meridian lines**: Parallel 'meridian lines' on the bottom of the interior of the circular compass housing rotate with the bezel when it is turned. Longer lines are better. Meridian lines run parallel to the north-south axis of the bezel, however turned, for use with a topo map.

5. A **ruler and/or gradient scale** engraved on one of the straight edges, used for measuring distances. In the U.S. 1:24000 scales (rather than 1:25000) are preferred. Both are acceptable.

6. A **3 to 4-inch base plate**. A longer straight edge makes map work easier.

Additional recommendations

- A sighting mirror in the cover: May reduce error introduced when moving compass from eye-level after sighting to waist-level for reading the dial. Protects the bezel.
- A liquid-filled housing: Reduces erratic needle movement (common on better compasses). In some cases, steadying the compass needle can be difficult
- An inclinometer: A gravity driven arrow that allows you to measure slope angle.

Current favorites: Silva, Suunto, and Brunton are favorites. All have adjustable declination. Their quality and usability varies, so **keep any receipt**. We have unfortunately seen many defective compasses in the past.

Maker	Models	Features +	Features -	Vendors	Cost
Silva of Sweden	Ranger CL515 *Ranger 2.0*	Slope card, *New, more features*	Still available?	Cabela's, Online	~$55 *~$50*
Suunto of Finland	MC-2 *M3-D Leader* MC-2G Navigator	Northern Hemisphere *Mirrorless* 20 degree tilt margin	*Lacks clinometer*	REI, Online	~$40-64 *~$44* ~$95
Brunton of Colorado	TRUARC 15* *TRUARC 5*	*Global needle, mirror *Global needle, 51 Grams* *Luminous*	Bezel may pop out *Bubbles? Mirrorless*	REI, Cabela's, Online	~$50-60 *~$20-30*

Manufacturers make continuing improvements and corrections in models. Model variations and designations proliferate – insist on features 1 to 6 above. Manufacturers make continuing improvements and corrections in models.

(Rev 3July2018/ph bb bs jl)

Wilderness Navigation Course Offerings--Seattle

Basic Navigation transitioned to Wilderness Navigation in 2016, clearly focused on wilderness/back country travel including off trail navigation to meet requirements for Alpine Scramble, Basic Climbing, Snowshoe and BC Ski students (and others). Altimeters and GPS units (basic point position) are included.
A revised Wilderness Navigation course will be piloted in October/November. Those completing the revised course will receive both a Wilderness Navigation and GPS Navigation badge, reflecting the emphasis on using the expanded navigation tool set. Fee and badge(s). **The 2019 courses will be posted in early December.**

Date & Day	Workshops*	Date & Day	Fieldtrips
Mon, Sep 24 to Oct 23	Online Classroom	Saturday, Nov 3	Heybrook Ridge
Thursday, Oct 25	Program Center	Saturday, Nov 3	Heybrook Ridge

**Note: Students may enroll in the elearning program, as available, to complete the workshop online prior to their fieldtrip.*

Introduction to GPS & Trip Planning Course—Seattle*

Are you interested in learning to use your smart phone as a wilderness GPS? Maybe you have had a dedicated GPS for years or the Gaia app on your smart phone and want to get the most out of them. This one evening course has been revised for 2019. Stay tuned for details. Prior completion of the Wilderness Navigation course is strongly encouraged. Fee and Badge.

Lead course administrator is Michael Hutchens.

2019 Dates TBD	Seattle Program Center

Introduction to Map & Compass (& Altimeter) – Seattle*

The Seattle Navigation Committee scheduled six 2018 Introduction to Map and Compass dates at the Seattle Program Center from 6:30 to 8:30 p.m. Instructors are drawn from the pool of Wilderness Navigation Course teachers.

Administrative lead is Nina Crampton. This Getting Started introductory class does not satisfy the navigation requirement for Alpine Scramble, Basic Climbing, Snowshoe or Backcountry Ski. Fee, no badge.

Intro to Map, Compass (& Altimeter)	Location
Monday, September 10	Seattle Program Center

Other Seattle 2018 Navigation Seminars/Clinics*

Seminars/Clinics	Dates

Instructor Training Elearning – No fee Program Center	Wed, Oct 10
Mentor Sessions Wilderness Navigation – No fee	Thur Nov 1
Wilderness Navigation Equivalency – No fee	Rolling enrollment
Contact Leader Lynn Graf	

Other Branches 2018 Navigation Courses*

Branch	Course	Dates
Everett	Basic Navigation Workshop & FT Camp Edward	Saturdays TBA
	Wilderness Navigation eLearning Option	Under Consideration
Foothills	Staying Found	TBD
	Wilderness Navigation	Spring 2019
	Digital Trip Planning & Navigation	TBD
	Wilderness Navigation Equivalency	Contact TBD
Kitsap	Both series have Elearning Wkshp Option	Sep 17 thru 28
	Wilderness Navigation Lectures Option	Thursday, Oct 4
	Wilderness Navigation Wkshp/Field Trip	Saturday, Oct 6
Olympia	Navigation Lectures 1 and 2	Tues & Thurs TBD
	Navigation Field Trips	Sat or Sun TBD
Tacoma	Wilderness Navigation Lectures 1 & 2; Field Trip	Aug 7 & 9; Sat 11

* Check mountaineers.org for up-to-date listings.

Navigating Through the Wild Elearning Course – No Badge

Books -- National	Online Lessons Support Backcountry Off Trail Travel -- Contact Doug Canfield, Books	Completed, No plans to repeat

Mazamas (Portland, OR) 2018 Navigation Instruction*

Portland	Navigation Skill Builder Class – Videos, Wkshp, Field work	TBD
	Wilderness Navigation Smartphone GPS (Gaia)	TBD

*Northwest climbing clubs support similar goals for exploration, learning and conservation. Reciprocity is routinely granted across state lines. Mazamas lead navigation instructor is John Godino, contact johngo.pdx@gmail.com.

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Navigation Gear, Apps & Links of Interest

Your comments and suggestions are ever welcome regarding the Seattle Navigation website and links in Navigation Northwest. –Pat Podenski, Section Ed

The Gear…

Review: Ocean Signal rescueME PLB1

By Pete Matsudaira

Recently I purchased a personal locating beacon. I evaluated different products from Garmin, Spot and Acr Electronics, but settled on the rescueME PLB1 from Ocean Signal. This single use, GPS-enabled rescue beacon is manufactured in the UK.

When activated, it broadcasts a 5W emergency signal with GPS data at 406 MHz to an array of COSPAS SARSAT satellites that is eventually passed on to local search and rescue. It also sends out a 50mW 121.5 MHz homing signal for more precise location for local authorities as well as a LED strobe light to assist in final location fixing.

It does not allow any degree of two-way communication like the Garmin InReach variants or the different Spot Messenger devices. It requires registration with NOAA, but there is no subscription required. A mail-in registration form is provided to send to NOAA. Alternatively, NOAA has registration website that is easy to use. When registering essentially you provide the 15-digit device ID and emergency contact information.

The main three drivers for me were, a "low cost insurance," low annual cost and low weight/size. A device of this type saved the life of an acquaintance, who while on an extended backpacking trip was incapacitated and had to be flown out by helicopter. This is the "insurance" aspect. With careful Internet shopping I was able to procure the rescueME for a total cost of $260 (including tax). With the lithium battery expiring after 7 years, the battery in my unit will need to be replaced by an authorized dealer in 2025. I expect by that time there might be more capable devices to choose from.

The emergency communicator is about 3" tall x 2" wide x 1.25" thick and weighs 4.1 ounces (116 grams) without the provided cradle and floating holder. Its low weight fits in line with lighter backpacking setup I am using. This seems to be the smallest option in this category. Though it is waterproof to 15m. SAR folks prefer devices with two-way communication, but this was sufficient for my current needs. For more information: https://www.acrartex.com/products/rescueme-plb1

--Pete Matsudaira is a Foothills hiker and backpacker with a particular interest in lightweight strategies. An engineer, he builds trucks by day. Contact him at harumimiki@comcast.net

The Apps...

- **Gaia** has released a rain and snow overlay with 48 hour forecasts plus a wildfires overlay. Pro version: GaiaSeptemberNewsletter
- **AllTrails Pro** has added Lifeline for users to share planned route details to assigned safety contacts who can follow progress with live tracking (if in range of signal).
- Past BOD President Dan Lauren drew our attention to new mobile phone apps for **www.Peakbagger.com**. The android and iOS apps provide a mobile interface to the Peakbagger.com database.
- **(Following apps first published in June 2017 issue)**

Free (or nearly) Altimeter Apps For Smart Phones

By Lynn Graf

	App Name	Device	Developer	Cost
	Gareth Altimeter	Android	Gareth Price	free
	Accurate Altimeter	Android	AR Labs	free
	Pro Altimeter	iPhone	Hunter Research and Technology	$0.99

	Altimeter Plus	iPhone	Sichtwerk AG	free

Short guide to a few recommended altimeter apps for cell phones
Don't want to spend the money for a classic wristwatch altimeter, one more gadget? Basically all SmartPhones nowadays have GPS capability. This means that they can pinpoint your spatial position without cell service, which is often spotty or non-existent in the backcountry (and searching for a signal drains the battery, in case you haven't noticed). Many of the newer models (iPhone 6 and later, for example) also have a pressure sensor. This can be used for extra correction or a cross-check of elevation by barometric pressure (which is what wristwatch altimeters use) but that is not really necessary and requires more frequent calibration.

Here are recommendations for two very basic apps for Android and two for iPhones.

Selection Criteria (not in order of importance): low or no cost, easy to use, no cell service required, no ads, low memory and storage usage, reasonable speed at obtaining GPS signals, clear numerical display, recommendation from Mountaineers member(s) who have used it in the field.
There are many more out there, more all the time, and increasingly with features in addition to GPS-based elevation. We invite you to try them, see how they work for you, and let us know if they don't work as advertised. If you want additional information, see the article in Navigation Northwest (https://www.mountaineers.org/blog/how-to-pick-an-altimeter) describing a systematic comparison of several Android apps.
Also, The Mountaineers currently has a deal for free use of GAIA Pro that basically turns your cell phone into an advanced GPS device. Check the website under "Benefits" (https://www.mountaineers.org/membership/benefits/instructions-for-redeeming-member-benefits). It is highly recommended but requires time and practice to set up and use efficiently. The Seattle Navigation GPS class features Gaia as the app of choice. Backcountry Navigator, another full-service GPS app, also has many followers. Both are well worth it, in my opinion, but a paper map, compass and altimeter app will get you a long ways, both on and off-trail.

--Lynn Graf is a past Seattle Navigation chair and an active hikes and scrambles trip leader. She is a frequent contributor to Navigation Northwest. Contact her at: lynn.graf@gmail.com.

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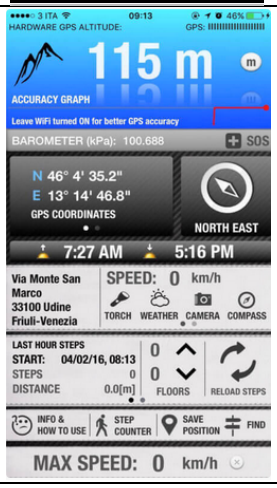
Free (or nearly) GPS Apps for Smart Phones

By Brian Starlin and Emma Agosta

Screen Shot	App Name	Device	Developer	Cost
	MyTrails	Android	FrogSparks	Free Pro €2
	GPS Essentials	Android	Schollmeyer Software Engineering	Free
	Handy GPS	iPhone	Anthony Dunk [*Note: Also authored Coordinate Master to convert Lat/Long to UTM*]	Free
	Altimeter GPS	iPhone	Andrea Piani	Free

Criteria for Android and iOS GPS:

1) Backcountry oriented (Topo Maps rather than street maps)
2) Works offline, in airplane mode, with only the GPS on

3) Can display UTM and Lat/Long
4) Has at least NAD83/WGS84, but gets extra points if it has NAD27
5) Extra points if it's available for Android and iOS
6) Able to save data and send in GPX format
7) Able to import GPX format
8) Accurate (although I believe it's based on underlying GPS hardware)
9) Extra credit if tracks can be shared on a cloud service
10) Free

We used a 10-point scale with higher numbers meaning more of the above features were found. Also, there is a main point we need to make. Gaia is a serious app for backcountry use and has all the features we want. And Gaia Pro is currently free for one year to Mountaineers members .

Android Reviews (Brian)
>>GPS ESSENTIALS (mictale.com) -- 5 points
Only available on Android.
It only uses cached maps, which limits its offline usefulness.
Very robust dashboard, highly configurable.
Limited selection of map sources
The UI is clunky. It uses a thing called "streams" to store data. The Import/Export functions were hidden in the "streams." The track recording was also buried in the stream screens. The Dashboard is great, but the other functions are clunky.

>>HANDY GPS (BinaryEarth) -- 2 points
Great for just displaying your coordinates in various formats. It has very limited maps -- a blank screen, and the Google Maps. The map does not work offline and cannot be downloaded.

>>MYTRAILS (FrogSparks) -- 6 points.
Great selection of maps. I think it has only NAD83/WGS84 because I don't see a Datum setting. Tracks and waypoints can be saved as GPX. The free version can only save the current track, plus one. And can only store 100 tiles at a time in the offline storage. UTM displays on the screen. It's on Android.

>>RAMBLR (Bientus) -- 2 points
This is more of a journaling and trip sharing app than a GPS app. It's very focused on tracking and sharing details of a trip. It has Google Terrain and OpenCycle maps. It can use an offline map. It does not display coordinates, but it can show you your location on the map background. As I said, it's a journaling app.

iOS Reviews (Emma)
Additional features I noticed are under "other features and comments."

>>ALL TRAILS -- 3 points, free

Hiking oriented but by trail (not backcountry). More like WTA app. Works offline. WGS 83/84. Available for IOS and Android. Map overlays (such as USGS topo) are in the Pro version ($29.99/year). No UTM or Lat/Long. Other features/Comments: ability to track a route, keep history etc. Many other apps do this for hiking, biking, running and other sports. I do not believe these are the kind of apps our readers are looking for.

>>ALTIMETER GPS -- 4 points, free.
Not backcountry oriented. Lat and Long: yes. No UTM. Elevation (ft/meters). Accuracy: unknown. Available on both? Some features only work with internet (i.e. choice of map format). Other features/comments: Weather, barometric pressure. Compass heading, Step Counter. Speedometer. Save position. Ads (non intrusive at the bottom, yet one can accidentally click). Find feature to search for location.

>>DECLINATION -- 1 point, free
Not backcountry oriented (map: satellite view). Lat and Long and UTM. Works offline: yes. Accuracy: unknown; Datum: ? Other features/Comments: Declination; Ability to search by Lat and Long. Ads.

>>HANDY GPS -- 6 points, free
Not backcountry oriented. Works offline: yes. UTM and Lat/Long, (plus elevation); Datum: ? Available for both IOS and Android. Able to save data and email : yes. GPX file: no; Accuracy level (+-10m). Other features/comments: nice display: uncluttered; intuitive, user-friendly; key features: Map. Digital Compass. Can save waypoints and email position from within the app. No ads. My favorite among free but cannot compete with Gaia.

>>MAP TOOLS -- 3 points, $0.99
Street oriented; Works offline; Lat and Long and UTM; Datum: ?; GPX format: no; accuracy: unknown. Other features/comments: Not intuitive. Confusing zoom in and out feature. Declination provided.

--Brian Starlin is the Seattle Navigation Chair and a frequent Navigation Northwest contributor. Contact him at brian.starlin@comcast.net

--Emma Agosta is a Seattle Navigation instructor and committee member. A geologist, she is fluent in land forms (and Italian). Contact her at emagosta@gmail.com

And the links …

- GaiaMapLoad is a new YouTube tutorial from Gaia to select, save and load maps for use beyond cell tower range.

- Navigation, trip planning and weather judgement errors lead to multiple fatatilites on Swiss Haute Route

https://www.outsideonline.com/2329041/chamonix-zermatt-alps-haute-route-disaster

- An excellent, in-depth, comprehensive review of the new Garmin inReach Mini (subscription required to read entire article) https://backpackinglight.com/garmin-inreach-mini-review/

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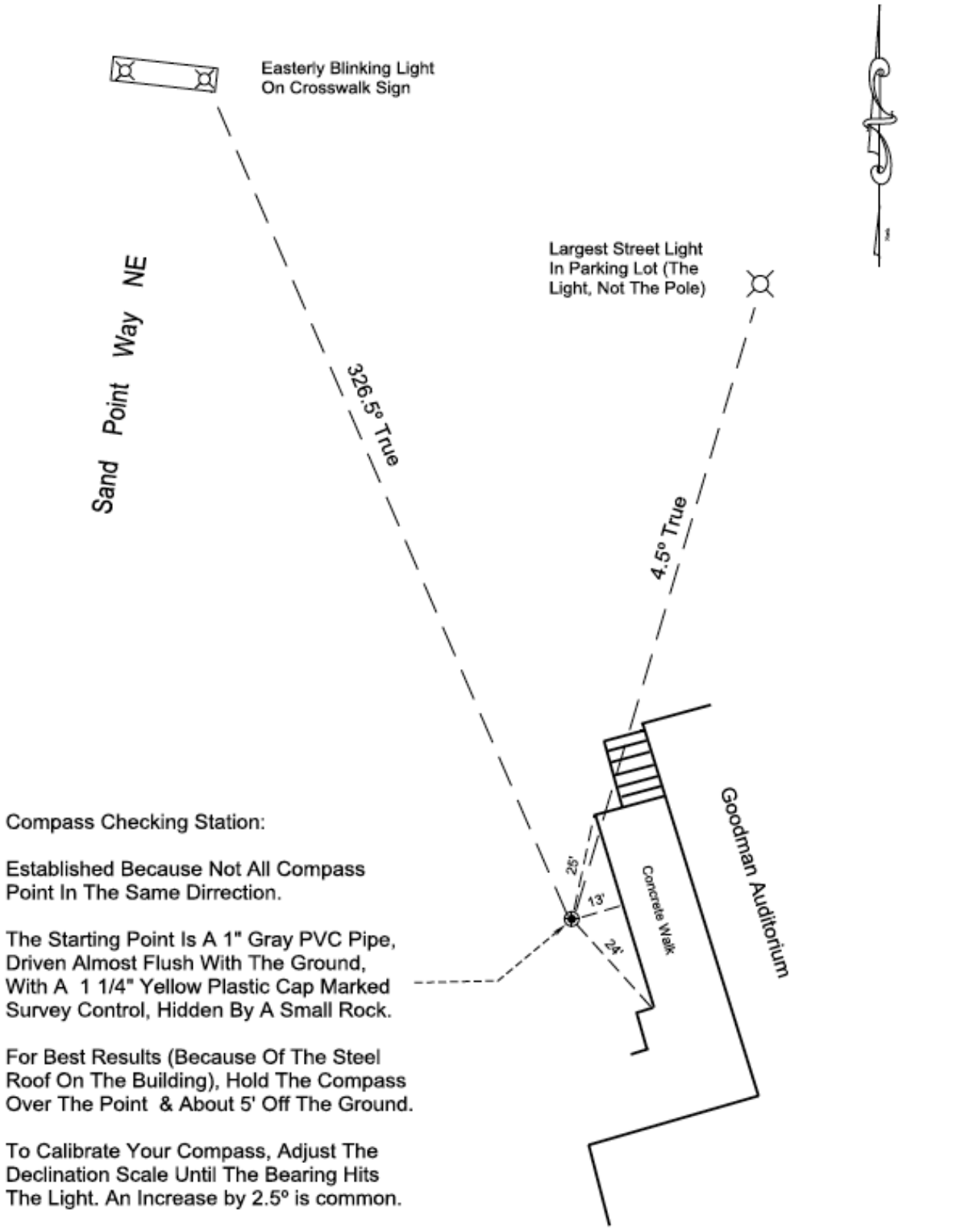

Seattle Program Center Compass Calibration Station

Navigation Northwest Copy and Publish Targets 2018

Calendar 2018	Copy Deadlines	Publish Dates
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Inquiries, Contributions, Letters to the Editor to Peter Hendrickson
p.hendrickson43@gmail.com

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--Refer to figs by number in body of text
--No footnotes, header or footer
--Author blurb with preferred email contact address

Kindly contact editor for further information regarding topics, length, tables, figures, deadlines...

"Do not go where the path may lead, go instead where there is no path and leave a trail." *--Ralph Waldo Emerson, American writer, 1803-1882*

(Rev03Oct2018/ph)