

Navigation Northwest

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--Some rainy days are best spent navigating walled cities (La Alhambra, Granada)

Hiking and Navigating (or trying to) in Northern Thailand

By Lynn Graf

For three Novembers in a row my husband and I have traveled to Asia, hoping to avoid the worst of the Seattle weather and a certain amount of election news hysteria, always with the goal of exploring by hiking rather than just hitting the classic tourist spots. We travel on our own, no tour group, just three nights booked ahead in a hotel and figure it out from there. We spent four weeks in Taiwan in 2016; three weeks in Hong Kong (no, it's not just skyscrapers) in 2017; and this year three weeks in northern Thailand, starting in Chiang Mai.

Figure 1. Towers of Wat Pan Suang in the town of Phrae, viewed from Vongburi House (an old mansion from the teak logging days)



Finding hiking trails was considerably more difficult in Thailand than on our previous trips, in several senses: identifying places to hike, finding the trailheads, getting to the trailheads, and following the trails once we got there. I don't think Thailand has the hiking culture that exists in Taiwan and Hong Kong (or Korea, from what I've heard), which means there are far fewer trails and some seemed abandoned. The abundant national parks often had only a couple of short trails.

Figure 2. Temples in the distance in Doi Inthanon National Park



We couldn't find any good area maps. I would add that a comparison of the Lonely Planet and Rough Guide to Thailand had us leave the Lonely Planet at home. In our experience, the Rough Guides are much more useful for info on outdoor activities and less traveled areas.

Navigating, both on trails and in towns, was very different. We had gotten spoiled by the accurate USGS topo maps available on Gaia on our smart phones, which made it easy to work with a combination of GoogleMaps and Gaia in our earlier travels. That didn't work well in Thailand because the few old trip reports we could find often described trails which no longer existed or had been blocked off by new development; and the Gaia maps were not very accurate and lacked contour lines.

What proved most valuable in the end was the AllTrails app, something I had never used before. I did need to ante up for a year's subscription for the Pro version, to be able to download maps for offline use, but it was well worth it. Not many officially named and GPS-recorded trails were on it but maps were very accurate, easily zoomed to see contour lines, great for just walking around towns and biking as well as hiking. We still had to juggle back and forth between AllTrails and GoogleMaps because only the latter also had location names in Thai script, necessary for communication with bus and taxi drivers and local people. Printed maps were basically nonexistent.

Figure 3. Rhododendrons along the trail near Doi Inthanon



Was it worth it? Of course! Except for that one trail with the abundant leech population.

--Lynn Graf (text and photos) is a past chair and long term member of the Seattle Navigation Committee, still out there hiking, scrambling and snowshoeing, mostly with The Mountaineers, when not traveling to locations outside of Washington. Contact her at lynn.graf@gmail.com.

Costa Brava Trail Slides into Mediterranean – Gaia To Rescue

By Peter Hendrickson

After some daybreak showers the weather settled to an ever so familiar overcast sky. Our pace was brisk on the GR 92 Costa Brava Spanish national trail, carved into sea cliffs above the Mediterranean north from Barcelona. We'd just finished yet another 100m stair climb to street level (Figure 1) when a German couple stopped to chat. They advised us that a kilometer or so ahead the path had slid into the sea. We needed a work-around, and quickly, to get to our hotel at Tossa de Mar before dark.

Figure 1. Costa Brava trek north of Lloret de Mar, Spain



Trip Planning

Weeks earlier I'd exercised my Gaia GPS pro version to search Other Maps for European layers. The Spain IGN Topo was perfect – hats off to the Instituto Geografico Nacional, a feast of topographic and cultural detail for the determined trekker. While we had a very good guidebook, *Camins de Ronda, The Costa Brava Way*, in 12 stages (Lara & Puig, 2014), the route was not quite the turn-by-turn we enjoyed with Cicerone guides on other European treks.

First efforts with the IGN layer didn't go so well. The Gaia Topo layer was still on and it fuzzed the clarity of the Spanish map. It also took some time to adjust to the shifts in detail with zooming. Some place names and other features were only available at higher magnification. Without easily readable text labels, it was not clear if the UTM grid was kilometers (most helpful in Europe) or some other scale. I remembered the tiny upper left hand corner scale inset. See Figure 2.

Figure 2. UTM grid activated, 10km squares with uploaded waypoints & track.



Our three stages were 20 to 30 kilometers each but elevation gains were modest, under 1000m each day. And much of the GR 92 runs along single-track forest roads. I found GPX tracks covering the entirety of GR 92 from Banyuls-Sur-Mer (Spanish/French border) to Blanes, an hour by train or bus from Barcelona. Numbered north to south, our guidebook took us south to north, no big deal with a good track. The navigation difficulty was kicked up a notch with highly variable signage (often in Catalan, not Spanish), and several scenic departures from the GR 92 route to maximize hugging the coastline at the surf line and by cliffs above. I found the Suunto wrist altimeter more useful than the hard to see contour labels and quicker than Gaia displays for several, quick position checks.

Landslide

The challenge started off Punta Roja. The red track, well way-pointed, was a no-go. See Figure 3. But the detail available on the iPhone 7+ was fine grained enough to work our way street-by-street.

Figure 3. Waypoint below "r" in Costa Marcona shows us nearly back on track.



Meta data for the waypoint below the letter "r" in Costa Marcona showed it was from my photo October 16 Lat: 41.70543, Lon: 2.86791, not one of the waypoints uploaded in the track. I've begun taking photos at some turnings to practice saving visuals for return trip navigation. The gifted waypoints (those tucked into the track) often indicated "Derecha" or "Izquierda" (right or left turn working north to south). Notice the slope shading along the sea cliffs. The grid at this zoom level is 1km. You may be able to pick up the latitude label at far left. No single tool got us back on track but the Gaia Pro IGN layer was a key navigation aid.

--Peter Hendrickson lived (and climbed) 1971-73 in Quito, Ecuador where the only available topo maps required visits to the Instituto Geografico Militar. Fears of revolution were fully realized in a military coup.

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Navigation Summit & Nav 3.0 Seattle Status Report -- A Question and Answer Approach

By Brian Starlin



- How did the November Navigation Summit address alignment of wilderness navigation with the Freedom 9 emphasis on 5 tools, workflow, situational awareness, and the ethic of self-reliance? Did the Seattle/Foothills pilot of a renewed Wilderness Navigation course capture those aims?
 - The pilot course that Seattle ran in September-November 2018 covered all those aims. The plan from our earlier summit was for Seattle to create and pilot this new curriculum, and then share the details and feedback with other branches. We did share our feedback at the November summit, and the other branches are now evaluating their own desire and ability to incorporate similar changes in their own programs.
 - The concerns and challenges that were mentioned include the needs and capabilities within each branch, particularly their available time and instructor expertise to implement such changes.



- Revised climbing standards, soon to be approved, mention only map, compass and altimeter skills. What is the status of GPS instruction from the summit? And in Seattle's new Nav 3.0 course?

- GPS will be included in Seattle's new navigation course. The time is right. Members want and need the knowledge and skills to use GPS together with map, compass, and altimeter.
 - Other branches are considering the incorporation of GPS into the main course but haven't done so yet.
- Has the eLearning course been re-written to reflect new learning targets?
- The eLearning course has the same content that it had at inception in 2016. It is primarily focused on map and compass knowledge and skills, so it provides the core foundation of a Mountaineers' navigation toolkit. A slight update will be published in 2019, but it's mostly cosmetic with some functional changes.
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- It looks like Gaia is the go-to app in several branches. What's the role of Garmins or other smartphone apps such as All Trails or Backcountry Navigator?



- Seattle chose Gaia GPS for several reasons. We needed to focus on one app, to standardize our course material and train our instructors effectively. Its main advantage was its cross-platform availability (Apple and Android), and our committee's familiarity with it. The price is free because the first year of a Premium subscription is available as a Mountaineers Member Benefit. It's a full-featured application, easy enough to learn, and has many help pages and tutorials. It just seems to be a great tool for introducing our members to GPS features such as on-screen mapping, waypoints, tracks, routes, statistics, sharing of data... We also believe that its "shareable folders" feature will help our members to have a common platform where they can share data and trip plans with fellow members.
- Olympia has had students download Gaia and use some Gaia, but not in detail. And they have not formally incorporated it into their course. They have also tried Topo Maps App.
- Foothills believes the GPS skills are an essential part of the course and that students should know how to use it in their trips. The tools are being integrated into the Winter Mountaineering Navigation section, along with other winter concepts such as slopes, the slope card, avalanche run-out calculations on the smartphone, using a theodolite app, and calculating elevation change on the GPS screen.
- In Everett, students are asking about GPS tools. Instructors have demonstrated them on occasion. They are using CalTopo in their presentation.
- Kitsap is already using CalTopo, but is not ready to put the GPS device into their course. They introduce the concepts of the track, route, and waypoint along with CalTopo.
- We didn't hear what is happening in the Tacoma or Bellingham branches. Tacoma has a standalone course but hasn't incorporated

- GPS. Bellingham includes navigation skills and exercises within their climbing and scrambling courses rather than holding a separate course, and we don't know if they teach GPS skills.
- The January Wilderness Navigation posting lists 4 components. This looks like more work. What are the modules and what's the payoff for students? We believe we've added about 4 to 5 hours to a course that previously ranged from 15 to 20 hours worth of instruction and practice.
 1. eLearning Workshop - This conveys foundational knowledge for the map and compass topics. It introduces the altimeter, GPS, and trip planning.
 2. GPS Online Module - This conveys information about the GPS system and awareness of some important pitfalls. Then it helps students set up and begin to use their Caltopo.com account, and their Gaia GPS app.
 3. In-Person Workshop - This is where students put their knowledge into practice with the assistance of instructors. They practice map and compass skills, GPS, trip planning, and prepare for the field trip.
 4. Field Trip - This full day in the field, still at Heybrook Ridge, puts it all together, and also expands reinforces the student's understanding of situational awareness and self-reliance.

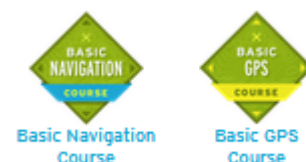
 - Our Portland Mazamas colleagues have left USGS quads behind. Why do we still use them in our courses? What new map skills are in the new course?
 - Seattle still emphasizes the use of a paper-based map for navigation and hasn't yet found a good, high-resolution alternative for learning how to use a map. Even some of the weaknesses with USGS maps make for valuable teaching points about topo maps in general.
 - We've introduced digital mapping, but many digital sources use USGS as their foundational map layer.
 - We mention other map sources. Familiarity with USGS translates to other sources.

 - Will all instructors need new training to teach in Seattle or the other branches using a revised curriculum? How can we retrain hundreds of veteran instructors?
 - Instructors will definitely need the GPS portion of the training, also known as the "GPS Online Module." Even if they already know how to use Gaia GPS, they will need to follow our "GPS Setup Instructions" to prepare their app for our exercises. Our challenge is to have enough experienced instructors on the first few activities, and gradually be able to build up instructor expertise across a wider base of instructors.

 - Is Heybrook Ridge still used by Seattle? Do instructors need to learn new routes? With all the emphasis on scenarios isn't the field trip longer?



- Heybrook Ridge is still the Field Trip location for Seattle. We follow the same route in the same amount of time, but do it differently. The location, the route, and the compass exercises will be familiar to veteran instructors. A small group leader who takes their team through a set of scenarios, however, now drives the format. The scenarios include the core compass exercises, but also introduce GPS skills gradually through the day. The final exercise is split into two components - one based on the compass, and another using the GPS to navigate. Students get first-hand experience on the strengths and weaknesses of each method and I think they will find it very enlightening.
- What's with the claim that wilderness navigators should "Provide navigation support to bewildered or distressed hikers encountered on and off trail including use of emergency communication devices?"
 - This is a goal of the course for several reasons. Mountaineers should be prepared to help and share what they know. It's a core value of the organization. By helping others, we are strengthening not only our own skills, but also the skills of those we may encounter. We also set an example, good or bad, and we prefer that it be a good example. And, it may bring additional people to our member rolls.
- Did the Summit authorize a Wilderness Navigation Leader Badge?
 - We didn't have time to discuss a navigation leader badge. We saved it for later discussion.
- Are navigation equivalency requirements now common across branches?
 - Equivalency procedures are not yet the same, but we started the ball rolling.
 - Lynn Graf in Seattle created an equivalency application, which was shared with summit members. We all agreed to review this application and determine if it could serve as a club-wide standard for equivalency applications. We'll have that feedback by March 2019.
- Did a common Trip Plan Template emerge from the Summit?
 - After the Summit, Seattle decided to continue to use the template contained in the eLearning Course, but with revised directions to emphasize that students must bring a hard copy to the field trip.
- And are there new alternatives for refreshing navigation badges that currently expire after 3 years?
 - We agreed that the 3-year expiration is useful and appropriate. It serves as a recruiting tool to bring in instructors who are "re-badging" every few years. Not everyone re-badges, but it helps. Some



members let their badge expire and never need the badge again, while others need to refresh their badge to take some new course, or just wish to refresh their own knowledge and skills.

- Upon completion of the Seattle course, participants will gain two badges, Navigation and GPS. The GPS badge does not expire.

- What other topics were on the Summit Agenda this year?
 - We reviewed a need for new Field Trip locations. Seattle will remain at Heybrook Ridge for now. Foothills might be close to finding a place along the I-90 corridor. The DNR land used by Everett is going to be logged, so they'll need an alternative. Olympia is on Taylor Shellfish Land, a private area, but it doesn't have much elevation change. Kitsap's area is getting overgrown with brush.
 - We also discussed permitting issues for different kinds of land; whether we should create a field trip working group between branches; how to share lessons and findings; and what constitutes a good field trip location.

- Who attended the December Summit?
 - Foothills - Travis Prescott, Jim Heber and Alan Davey
 - Olympia - Mike Kretzler
 - Seattle - Brian Starlin and Paul Thomsen
 - Kitsap - Marilyn Wright and Troy Hubbs
 - Everett - Joel Heidal
 - Program Center - Nick Block

- When is the next summit? There will be a mid-year check in by phone on Wednesday, May 8th, 6:30 to 8:30 PM. The annual summit is planned for Saturday November 16th, 2019, 9:30 AM to 3:30 PM at the Seattle Program Center. Contact Nick Block at The Mountaineers to get involved.

--Brian Starlin is Seattle Branch Navigation Chair. He co-facilitated the Navigation Summit. Contact him at brian.starlin@comcast.net. Nick Block can be reached at nickb@mountaineers.org.

Navigation with Dogs -- A Primer

By Bruce Crawford

Here's what I've learned mushing and hiking with a few generations of dogs.

People seriously underestimate the ability of dogs to memorize trails and routes. If you train your dog to take you back the way you came (my command is "go car") they will typically follow your exact route back, and even remember the route years from now. Next time they'll also remember the drive to the trailhead, and whether the hike was fun.

Experienced dogs will indicate when they think we should turn around. This works well on "in and out" day hikes, but it can take convincing for us to keep going on an extended loop.

Make sure to select a hike appropriate to your dog's current capability and conditioning. Distance and speed should be limited in dogs two years and younger to allow proper bone development. Older dogs may have significantly reduced capability even when it seems only yesterday they could go for miles (be ready to head home when they are half tired).

If you need to stop to use your navigation tools, giving your dogs a treat and water break may give you enough calm time before your team demands to be on the move. A carabiner can allow you to quickly tie the leash or gangline to your pack or around a tree if you need more time in one spot.

...and a bonus tip from Bruce, Figure 1.

Figure 1. A photo of my current compass modifications.



First thing I learned on a survey crew was if you drop something in underbrush, it is lost forever unless it is bright colored. Hence the flagging on the lanyards. Reflective tape on the back of the mirror as two vertical stripes to make back sighting on the center of my compass more precise. Helpful when leap-frogging across open ground with another hiker.

--Bruce Crawford is a veteran wilderness navigator who brings surveyor practice and an engineering career to bear on wilderness way finding. He is a stalwart of the Seattle Navigation Committee. Contact him at bikejor@me.com.

Why Radios For Climbers (and others)?

By Doug Sanders

I have had PLBs since they became legal in CONUS (2003). When the batteries 'expire' I've purchased newer and smaller models. Currently, I'm using the Ocean Signal 'RescueME' PLB1 at 4oz. and 7yr. battery life, which can be found for under \$300. I've seen \$50 rebates. (See NavNW, Vol 6, Issue 3 review.)

As NOAA registration (free) is required, I usually indicate what VHF or UHF General Mobile Radio Service (GMRS) frequency I will use as I always carry a radio (<8oz., the Baofeng UV-F8HP). See Figure 1. Radios are useful between climbing teams for glacier travel or remote lengthy rock climbs where some separation can naturally occur. (Did they stop to change headlight batteries or is someone in that lagging team in a crevasse?) Everett rope leads are issued the Midland GXTs.

Occasionally, the route is unclear and the party can simultaneously check out multiple options while staying in touch. Sometimes an ill climber is left at camp and it takes a load off the leader to be able to check on them. Or, if everything else is straightforward, send them out alone. And, of course if a group spreads apart during the hike out, the front and back can check with each other.

Being able to listen to the entire NWS continuous forecast helps paint a complete weather picture. And, in the event of needing SAR, true 2-way dialogue is best. For, example, I responded to a lost, unprepared team on the summit of Baker who had used a puny FRS (Family Radio Service) radio and reached some kids in Lynden. Because we had 2-way we could provide TLC, encouragement and kick their butts to move during a short weather window as only 3 mountain rescuers had responded to a statewide call-out.

Inbound rescuers can usually establish coms long before they arrive. Best GMRS frequency is probably Channel 1 with no tone. There is no FCC designated frequency. Channel 9-tone 11 is not a good choice as all FRS and GMRS radios are limited to 0.5W between channels 8 and 14 rather than 2W (FRS after 2017) and 5W (GMRS) on other channels.

Rescuers experienced with PLBs can tell a lot from these '1-way' devices that send but do not receive replies. The weather, coordinates, changes in location and PLB tracks can suggest whether a party is off route, lost or has injuries.

A certain degree of desperation is communicated when the device is repeatedly turned off and back on. It's too bad no one (Mountain Rescue Assn?) has established some Morse Code-like guidelines to improve on this. However, I've not known SAR teams to throttle back their response based on a low-severity injury.

Location is the most important attribute of rescue communication and PLB's have the best specs, strongest signals, most extensive satellite systems, and the greatest worldwide, treaty guaranteed, SAR infrastructure and response.

SENDs have their wonderful advantages.

Figure 1. Baofeng dual VHF & UHF and Midland VHF radios.



--Doug Sanders is an Everett Branch Mountaineer, climb leader, climbing instructor and volunteers with the Skagit Mountain Rescue Unit. He is a member of the Mountaineers Safety Committee. Contact: dougsappley@gmail.com

What is the protocol for emergency signaling by whistle?

By Peter Hendrickson

Freedom of the Hills (9th ed, 2017) addresses the use of "local communication devices" for communications within the climbing party. Persistent queries with navigation instructors, including climbers, have not identified any club activity-wide signal protocols. Seattle and Foothills Navigation Committees have developed a revised Wilderness Navigation course. Whistles are a proposed, required emergency communication tool in the personal navigation and communication tool set.

The Freedom 9 whistle communications paragraph states, "A whistle's shrill, penetrating blast greatly exceeds the range of the human voice and can serve as a crude means of communication in situations in which shouts for help cannot be heard—such as being trapped in a crevasse or becoming separated from the party in fog, darkness or thick forest. Whistles prove much more useful if a climbing party designates specific signals before the trip for "Where are you?", "I'm here and OK," and "Help!" Three signals from any signaling device, repeated several times in sequence, is universal for "SOS." (p 44)

Many sources

A hasty web search surfaced several protocols from around the world.

- 1 blast = How are you?, 2 blasts – I'm fine, 3 blasts = Help! (www.outdoors.stackexchange.com)
- 1 blast = I'm OK or drop clear, 2 = Wait/Be alert. There is an issue but not major, 3 = Dire emergency. Move to the scene of the rescue immediately (Source: Whitewater semi-standard private boats, above item)
- 1 blast = Where are you? Or Call Back signal if you hear anything that sounds like a code, 2 = Call back signal which means, Come Here, 3 = Help Me. All blasts, 3 seconds. (www.outdoorlife.com)
- 3 blasts = Distress signal. Each blast about 3 seconds (www.gotimegear.com)
- 1 blast = Where are you? Also used to respond to other whistle signals. 2 = Signals halt during a sound and light search. 3 = I need Help! (distress, emergency). 4 = Come to me (recall). Each blast should last about three seconds repeated at regular intervals. Whistles should produce at least 100db blast. (Bush Search & Rescue, Victoria, Australia www.gsar.org/manual/whistles)
- Six blasts or flashes at one minute intervals Mountain Rescue Britain http://www.rpmrt.org.uk/safety-advice/?doing_wp_cron=1538180762.7329668998718261718750
- Whistle. Not one of the wimpy tin things, but one of the orange plastic ones that can be heard for 1/2 mile or more. The "Storm" brand is very good. Its sound carries much farther than a human voice, and it doesn't get hoarse after a few blasts. Three blasts is a universal emergency signal, use one

blast for an attention getter. The whistle is also a very useful communication tool for the searchers. It ends up being used on lots of trips, and one of the most frequent uses is to recall hikers who have headed down the wrong trail, so have it where you can get to it quickly.

<https://www.sierraclub.org/washington/ten-essentials-and-staying-found>

The National Park Service references "SUDOT" to guide whistle communication during a rope rescue, Table 1. See p.19, Technical Rescue Handbook, 11th Edition, 2014 (<http://mra.org/wp-content/uploads/2016/05/nps-technical-rescue-handbook-2014.pdf>). A search of this comprehensive handbook did not turn up field search standards for whistle use or specifications for adequate whistles.

Table 1. National Park Service rope rescue whistle protocol.

WHISTLE SIGNALS

COMMAND	WHISTLE BLASTS	MEANING
Stop	One long blast	Stop all movement until further instructions provided
Up	Two short blasts	Movement of the load upward
Down	Three short blasts	Movement of the load downward
Off Rope/ Rope Free	Four short blasts	Rescuer clear of the rope and it is available
Trouble/ HELP!	Continuous blast	General emergency call

Reference: ASTM Standard F1768- Standard Guide for Using Whistles During Rope Rescue Operations.

Which whistles?

There is no shortage of whistle types and manufacturers. Common choices are listed alphabetically below.

- Acme Thunderer
- Acme Tornado 635 Pealess Whistle
- Fox 40 Sonik Blast
- Markwort Storm Safety Whistle
- Rothko Storm Safety Whistle
- Storm All-Weather Whistle
- Survive Outdoors Longer Slim Rescue Howler Whistle
- Universal Survival Technologies JetScream Whistle
- Vargo Titanium Emergency Whistle and Cord
- Windstorm Whistle

Here are two sources for reviews of various whistles. A quick toot-around at our recent Navigation 3.0 field trip did not surface a winner for whistle choice.

<https://campsandtrails.com/best-survival-and-emergency-whistles/>
<https://wiki.ezvid.com/best-survival-whistles>

An invitation

Mountaineers are invited to propose (or identify) a standard protocol for whistle use beyond Rope Rescue operations. Clearly a return toot –toot alerts a searcher that someone is nearby. However veteran Mountaineers and SAR members of the Seattle Navigation Committee note that whistle blasts are unlikely to provide a vector to the source. Unless you have a dog along and follow the dog's lead.

--Peter Hendrickson edits Navigation Northwest and cherishes the Acme Thunderer his Dad give him 60 years ago during his Boy Scout days. That whistle got a thorough workout in the 20 years he refereed soccer. Contact: 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	1° Lt & Good	2° Rt & 1° Rt	Both <1°	
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 0-6400 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 <i>Ranger 2.0</i>	Slope card, <i>New, more features</i>	Still available?	Cabela's, Online	~\$55 ~\$50
Suunto of Finland	MC-2 <i>M3-D Leader</i> MC-2G Navigator	Northern Hemisphere <i>Mirrorless</i> 20 degree tilt margin	<i>Lacks clinometer</i>	REI, Online	~\$40-64 ~\$44 ~\$95
Brunton of Colorado	TRUARC 15* <i>TRUARC 5</i>	*Global needle, mirror <i>Global needle, 51 Grams</i> <i>Luminous</i>	Bezel may pop out <i>Bubbles? Mirrorless</i>	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 2019*

The revised Wilderness Navigation 3.0 is 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). Essential tools are maps, altimeters compass, GPS and emergency communicators . The four components are (1) eLearning Workshop, (2) GPS online module, (3) In-Person Workshop and (4) Field Trip. Completers will receive both Wilderness Navigation and GPS Navigation badges, reflecting the emphasis on using the expanded navigation tool set. Fee.

Lead course administrator is Brian Starlin.

Dates 2019	1 - eLearning 2 - GPS Module	Date & Day	3 - Workshop 4 - Fieldtrip
Jan 8 to 22 Jan 9 to 22	Online Online	Thursday, Jan 24	Program Center
Jan 29 to Feb 12 Jan 30 to Feb 12	Online Online	Wednesday, Feb 13 Saturday, Feb 23	Program Center Heybrook Ridge
Feb 12 to 26 Feb 13 to 26	Online Online Online Online	Wednesday, Feb 20 Saturday, Mar 16 Thursday, Feb 28 Sunday, Mar 17	Program Center Heybrook Ridge Program Center Heybrook Ridge
Feb 26 to Mar 12 Feb 27 to Mar 12	Online Online	Thursday, Mar 14 Saturday, Apr 13	Program Center Heybrook Ridge
Mar 12 to 25 Mar 13 to 25	Online Online	Tuesday, Mar 26 Saturday, Apr 28	Program Center Heybrook Ridge

Introduction to GPS & Trip Planning Course—Seattle*

Interested in learning to use your smart phone as a wilderness GPS? Maybe you've had a Garmin for years or the Gaia app on your smart phone and want to get the most out of them. This one evening course is revised. Prior completion of the Wilderness Navigation course is strongly encouraged. Fee and Badge.

Course lead administrator is Michael Hutchens.

Dates 2019	Location
Wednesday, January 30	Seattle Program Center
Thursday, April 18	Seattle Program Center
Wednesday, May 22	Seattle Program Center
Friday, September 27 – GPS only	Online Classroom Details TBD

Introduction to Map & Compass 2019– Seattle*

The Seattle Navigation Committee scheduled five 2019 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.

This Getting Started introductory class does not satisfy the navigation requirement for Alpine Scramble, Basic Climbing, Snowshoe or Backcountry Ski. Baseplate declination adjustable compass loaners are available for the class. Fee, no badge.

Lead course administrator is Nina Crampton.

Intro to Map, Compass (& Altimeter)	Location
Monday, January 14	Seattle Program Center
Wednesday, April 24	Seattle Program Center
Monday, June 10	Seattle Program Center
Monday, August 12	Seattle Program Center
Monday, September 9	Seattle Program Center

Other Seattle 2019 Navigation Seminars/Clinics*

Seminars/Clinics	Dates
Instructor Training Elearning – No fee Program Center Lead seminar administrator is Paul Thomsen.	Jan 22 & Feb 27 Seattle Program Center
Mentor Sessions Wilderness Navigation – No fee	Dates To Be Posted
Wilderness Navigation Equivalency – No fee Lead equivalency administrator is Lynn Graf	Rolling enrollment

Other Branches 2019 Navigation Courses*

Branch	Course	Dates
Everett	Basic Navigation Workshop & FT Camp Edward	Saturdays Feb 23, Mar 02, Mar 30
	Wilderness Navigation eLearning Option	Under Consideration
Foothills	Staying Found	April 28, May18
	Wilderness Navigation	
	Digital Trip Planning & Navigation	TBD
	Navigating in Winter Terrain	Date 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 Lacey Community Center	Tues Apr 16 & Thurs Apr 18
	Navigation Field Trips Kennedy Creek, Black Hills	Sat Apr 20 or Sun Apr 21
Tacoma	Wilderness Navigation Lectures 1 & 2; Field Trip	Mar 14 & 21; Mar 23
	Wilderness Navigation Lectures 1 & 2; Field Trip	Apr 16 & 23; Apr 27
	Wilderness Navigation Lectures 1 & 2; Field Trip	Sep 11 & 18; Sep 21

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

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.

Contact Information Other Northwest Mountaineering Clubs

Organization	Web address	Notes
The American Alpine Club – Northwest Region	https://americanalpineclub.org/cascade-section	Cascade Section has a Washington & Oregon focus Facebook presence
BOEALPS, The Boeing Employees Alpine Society	http://boealps.org/about-us/	Primarily climbing; spring Basic Mountaineering Course
Bushwhacker Climbing Club	https://bwcc.clubexpress.com/content.aspx?page_id=22&club_id=172409&module_id=151320	Founded 2003. Hike, climb, ski, socialize
Mazamas	https://mazamas.org/	Founded 1894 in Portland. Mainly a climbing club for those who have already summited a glaciated peak
OSAT, One Step At A Time	http://www.osat.org/	Melds outdoor activities with recovery; 6 month glacier climbing course
WAC, Washington Alpine Club	https://washingtonalpineclub.org/	Founded 1916. Many Guye Cabin activities, Snoqualmie Pass

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...

SmartPhone Failures—Let's Count the Ways

By Peter Hendrickson & Nancy Temkin

We use Google Maps for routine car trips around Western Washington, sometimes to calculate arrival times and other times to escape nasty traffic. Most locations and routes are well known after nearly 40 years in the region. We lead many hikes in the area, instruct frequently and have grandkids scattered from Tacoma to Everett. Mostly we want to learn the strengths and limitations of the app for those time when we really need to reach a trailhead or doorstep on time.

Similarly we use GaiaGPS even when we know the trailhead and can navigate by easily spotted landmarks. Come whiteout, washout, nightfall, or new terrain we want to use Gaia wisely, facile with the features and alerted to the failures.

We've begun collecting failures and share them below, hoping to expand the list with information from other users who have encountered failures in the field. Kindly respond to the SurveyMonkey link to help us better understand both the breadth (different types) and depth (frequency) of Gaia failures. Our experience is primarily with iPhone models 5 through 7+. We use LifeProof cases.

Smart Phone failures (mostly user failure)

- Dropped phone, not in LifeProof case, cracked face (Heybrook Ridge Parking Area)
- Cracked screen, data hard to read (See cracked face above)
- Dropped phone, landed in rocky puddle, case failed (Dolomites, Via Ferrata route)
- Device will not charge (Sometime after Dolomites adventure)
- Dropped phone, didn't notice no longer in pocket (Working on farm)
- Glare from bright sun blurs screen (Everywhere...)
- Phone wet even with case on (Heybrook navigation fieldtrip, user did not snap case shut)
- On charger over night—not charged in morning:
 - Failed to fully insert cable
 - Switched outlet went off with lights
 - Cable compromised by broken wires
- Phone does not charge while driving:
 - Car 12v port not working
 - Plus charger issues above
- SmartPhone volume buttons not responding (Case not well seated)
- Battery not holding charge even with careful use (Battery recalled and replaced)

- Battery drains quickly on snowshoe trip (Failed to keep in warm place)
- Battery drained even when side or top button toggled (Failed to quit Raise to Wake)
- Battery drains quickly out of cell range (Failed to use Airplane Mode)
- Battery drained while phone in pocket (Pocketed phone turned on while in the saddle--Northern Peru 40km horse trek)
- Touch screen non-responsive:
 - Screen freeze in spurts (Force start <https://support.apple.com/en-us/HT201412>)
- Battery drained with device in sleep mode:
 - Google maps still determining location when not using app;
 - Gaia plotting position when not in active use;
 - Other apps working in background;
 - Failed to activate Airplane mode;
 - Screen brightness high.

Telephone Issues

Effective phone volume too low (All the time with case on—must use earbuds)

Here's the SurveyMonkey link to contribute your own examples of SmartPhone failure. Click the link or slip it into your browser. We'll publish results in a later issue.

<https://www.surveymonkey.com/r/XPGLHFL>

--Peter Hendrickson and Nancy Temkin are navigation instructors and hike leaders with Seattle and Foothills Branches. Contact them at p.hendrickson43@gmail.com or nancy.temkin@gmail.com.

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.

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 <i>[Note: Also authored Coordinate Master to convert Lat/Long to UTM]</i>	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.

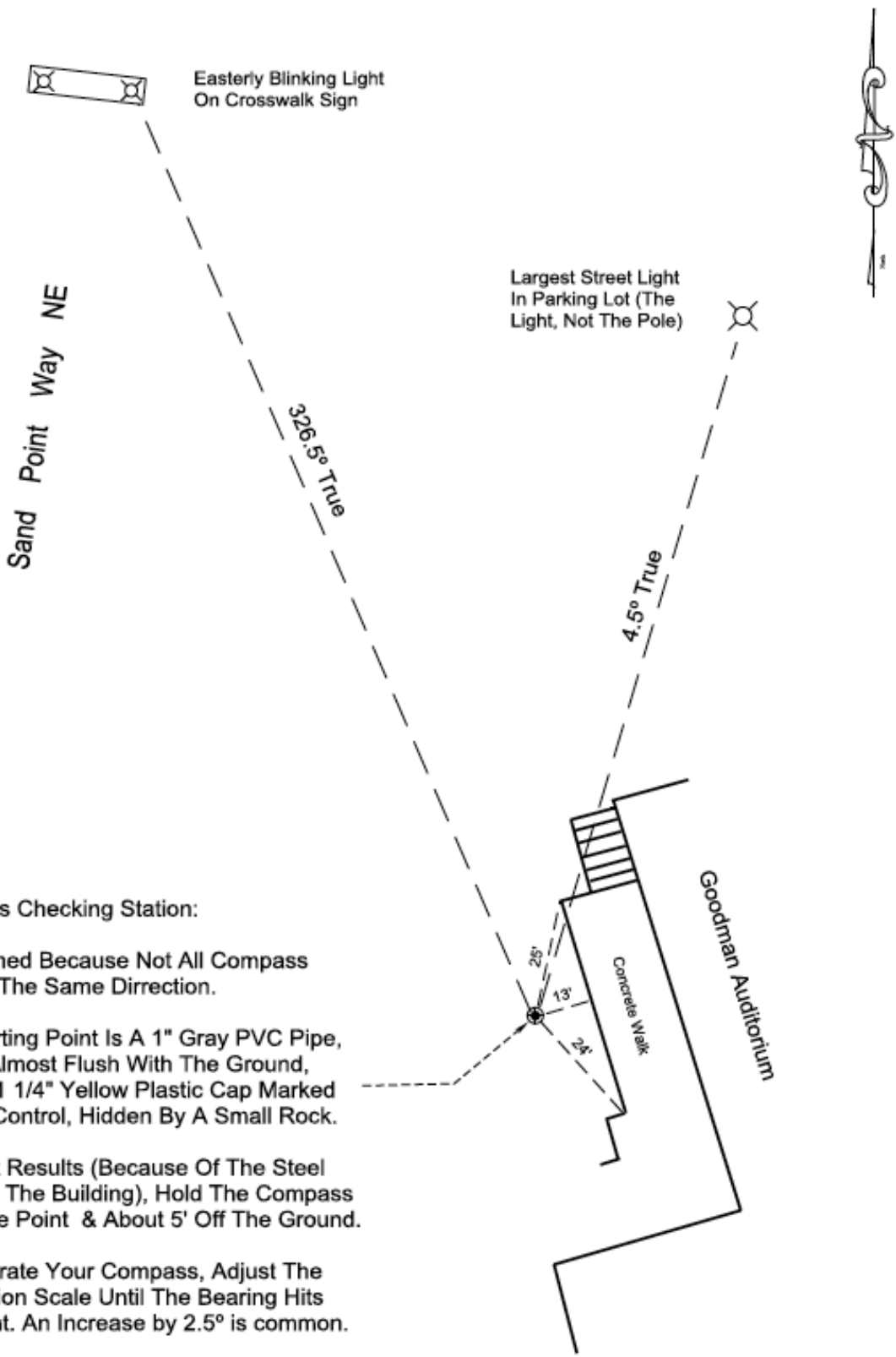
--Brian Starlin is the Seattle Navigation Chair and a frequent Navigation Northwest contributor. Contact him at brian.starlin@comcast.net

--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 ...

- Introducing alpinesavvy.com – from our Mazamas colleague and frequent Navigation Northwest contributor -- climbing tips and navigation resources for the savvy alpinist.
 - Get skilled: Over 150 tips, hacks and tricks covering all aspects of climbing and mountaineering

- Stay found: More than 70 GPX track files and KMZ files (Google Earth) for the most popular mountaineering routes in the Pacific NW, available as a single downloadable file
- Maps: Google maps of the most popular NW climbing routes, "Highest 100" peaks in a few western states, and climbing areas around Portland
- Gallery: inspiring mountain images from expert NW photographers
- Videos: AlpineSavvy approved YouTube collection of quality videos covering beginner and intermediate climbing skills. *Ed: We use two of the videos in Wilderness Navigation 3.0.*
- Wilderness navigation challenge: A series of question and answer/explanations covering every element of backcountry navigation. Test your knowledge and learn new skills at your own pace.



Compass Checking Station:

Established Because Not All Compass Point In The Same Direction.

The Starting Point Is A 1" Gray PVC Pipe, Driven Almost Flush With The Ground, With A 1 1/4" Yellow Plastic Cap Marked Survey Control, Hidden By A Small Rock.

For Best Results (Because Of The Steel Roof On The Building), Hold The Compass Over The Point & About 5' Off The Ground.

To Calibrate Your Compass, Adjust The Declination Scale Until The Bearing Hits The Light. An Increase by 2.5° is common.

Please Hide With Rock When Finished.

RWB
2/2014

Seattle Program Center Compass Calibration Station

Navigation Northwest Copy and Publish Targets 2019

Calendar 2019	Copy Deadlines	Publish Dates
Volume 7, Issue 1	March 1	Late March 2019
Volume 7, Issue 2	June 1	Late June 2019
Volume 7, Issue 3	September 1	Late September 2019
Volume 7, Issue 4	December 1	Late December 2019

Proof Readers: Stevie Russell & Nancy Temkin

Inquiries, Contributions, Letters to the Editor to Peter Hendrickson
p.hendrickson43@gmail.com

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Email Navigation Northwest to any friends/outdoors partners to distribute

Guidelines for contributor submissions:

- Word doc...Google doc OK but not a PDF
- 12 pt Verdana
- Standard margins
- Indicate in body of text where you would like figures/tables etc. to go
- Send figures, tables, photos as attachments or by separate email
- Refer to figures & tables 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

(Rev 05Jan2019/ph)