

# Navigation Northwest

A Quarterly Publication of the Seattle Navigation Committee  
**Volume 4, Number 4** **December 2016**

## --Navigation Northwest December Features--

Online Wilderness Navigation Course Update	Doug Canfield
Galileo Launches 4 More Satellites: Implications for Navigation	Brian Starlin
Use Lat/Long Decimal Coordinates to Drive to Trailhead	John Godino
Bewildered in the Buckhorn Wilderness	Heidi Walker
Navigating by Map, Compass & Priest – A Dartmoor Tale	Peter Hendrickson
Off to Taiwan: Overall Trip Planning...Pretty Minimal	Lynn Graf

### Courses, Classes, Apps, Gear & Links

Wilderness Navigation Course 2017 Classes	
Smart Phone and Dedicated GPS 2017 Classes	
Introduction to Map, Compass & Altimeter 2017 Classes	
Other Branch and Club Navigation News and Classes	
Navigation Gear, Apps & Links of Interest	Pat Podenski
Seattle & Foothills Compass Recommendations for 2017	Brian Starlin
Seattle Program Center Compass Calibration Station	Bob Boyd

## Editor's Note

These are exciting times to be a Mountaineer with deep interests in navigation and communication. The elearning option for Wilderness Navigation continues to grow around the club. Clubwide minimum standards for navigation are closer to completion. A second draft is expected in January.

Freedom 9 navigation chapter 5 has moved from editors Bob Burns, Mike Burns, John Bell and Steve McClure to the Mountaineers Books editorial team.

And two Seattle chairs (Heidi and Peter) have fessed up about getting off trail in Washington and England. We're hoping others with "off trail" adventures will share them in these pages.



# Online Wilderness Navigation Workshop Update

By Doug Canfield

There is considerable enthusiasm for the online learning format among Mountaineers instructional committees following a successful year piloting the Wilderness Navigation workshop by the Seattle/ Foothills branches last March, and then the Seattle and Kitsap branches this Fall (Fig 1). As a result of the navigation committees' experiences, a Board member created a "Board of Directors Orientation" (BOD) course online for incoming BOD members, and the Progressive Climbing Education initiative is also eyeing elearning in its updated curriculum.

For navigation committees, the Wilderness Navigation workshop will be taught again in 2017, and is currently scheduled by both Seattle and Kitsap branches. Instructors at these branches learned a lot this year about teacher/student ratios and a how to streamline the instructor process for volunteers. (The Seattle branch will assign the online "How to Teach the Workshop" and "How to Teach the Fieldtrip" courses to new volunteers for the first time in 2017.) There are also a handful of tweaks being made to the online student course for next year.

**Figure 1.** Wilderness Navigation elearning workshop screen shot.

An exercise slide from the elearning workshop. The slide has a green header with a mountain icon and the word 'EXERCISE'. Below the header is a topographic map. To the right of the map is a list of map features to be identified, each with an unchecked checkbox and a question mark icon. The list includes: Map title, Adjacent maps, Map scale, Distance scales, Datum and zone, Declination, Contour interval, and Publication date.

Find this information on your Baring map.

- Map title ?
- Adjacent maps ?
- Map scale ?
- Distance scales ?
- Datum and zone ?
- Declination ?
- Contour interval ?
- Publication date ?

The online workshop is available to any branch navigation committee that would like to offer it. The experience so far is that students all over Western Washington have signed up for it, and in some cases students have taken a field trip with a branch other than the one offering the online workshop – so, there are students in your area who want to take the training in this format. There are also navigation instructors and Mountaineers staff who now have experience with this course and who can share their results with you and help you initiate a workshop for your committee.

*--Doug Canfield is Mountaineers Books Director of Sales and Marketing. He is a keen bicycle commuter and long ride cyclist. He was project lead for the elearning development and continues to support those efforts. Contact him at [dougc@mountaineersbooks.org](mailto:dougc@mountaineersbooks.org).*

\*\*\*\*\*

## Galileo GPS Launches Four More Satellites –Implications for Wilderness Navigation

By Brian Starlin

Europe launched four more Galileo satellites in November (Fig 1). Galileo is Europe's alternative to the U.S. Global Positioning System (GPS). This brings them to 18 satellites, and closer to declaring the start of initial services near year's end. Satellites 13 & 14 began transmitting December 8. The full system by 2020 will have 30 satellites -- 24 primaries and 6 spares (Fig 2).

This was the first time the European Space Agency (ESA) packed four satellites into the same launch vehicle, and the first time that ESA was used for launching Galileo satellites instead of a Russian Soyuz rocket.

**Figure 1.** Four satellites headed for orbit November 17 via Ariane 5 rocket.



The Galileo system will be a great addition to the Global Navigation Satellite System (GNSS). Receivers are already being offered that can use all four systems -- GPS (US), GLONASS (Russia), BeiDou (China) and the current Galileo satellites, of which nine are already transmitting. On December 15 in Brussels, Elzbieta Bienkowska, a commissioner at the European Commission, will announce the availability of Galileo initial services. Here's a link to the European Space Agency: [http://www.esa.int/Our\\_Activities/Navigation](http://www.esa.int/Our_Activities/Navigation).

Do you want to mark the location of "that specific rock" where you turn into that specific gully on that one specific climb? When all four systems are up and running, accurate receivers using multiple satellites and signals will be able to have centimeter-accurate positioning, even millimeter. Such receivers are used in geodesy, agriculture, and surveying. Will they come to your smartphone? Maybe  
Navigation Northwest -- Vol4/Issue 4 December 2016

they won't just yet. But they will have more satellites to choose from, which can only help.

**Figure 2.** Illustration of Galileo satellites in orbit.



Smartphone antennas are subject to many kinds of interference, and the phone itself is limited in processing power. But, researchers at the University of Texas at Austin did manage to achieve about 2 centimeters of accuracy using a location stabilized smartphone antenna and external receiver software. Obtaining accuracy at a fixed location is easier than doing so in motion, though. Those researchers plan to continue working on improving accuracy while in motion, and they aren't alone.

Engineers around the world are working to achieve such accuracy for self-driving cars and drones, among other purposes. In the meantime, the price of a good survey-grade GNSS/GPS receiver that used to be \$10K may drop below the thousand dollar level and be within reach of more mainstream applications -- like way-pointing those rocks on your favorite scramble route, eh?

*--Brian Starlin is Seattle Branch Navigation Chair, a climb leader, and a Seattle Mountain Rescue volunteer. He works in the telecommunications industry. Contact him at [brian.starlin@comcast.net](mailto:brian.starlin@comcast.net).*

\*\*\*\*\*

## Use lat/long decimal coordinates to drive to locations without a street address

By John Godino

We all know that Google Maps gives wonderful turn-by-turn driving directions to anywhere with a street address. But what about using Google maps to find a remote trailhead, clearing or campground that does not have a street address? Latitude longitude coordinates (specifically in a decimal degree format) are your new best friend.

If you type latitude longitude coordinates (preferably in decimal degree format) into a Google search or a smartphone mapping app, it places a marker directly on the spot. You can then get driving directions to that location. This can be helpful when giving driving directions to a distant trailhead or remote campsite, so everyone in your group knows exactly where they need to go. (Note that Google's "turn by turn" directions occasionally get a little wonky when you are on remote roads, so carry an alternative map source and use your brain.)

Google Maps has recently been updated to offer driving directions when off-line or in airplane mode. I have not experimented with this to the point of driving to a trailhead outside of cell phone coverage, but it could be a new development with Google maps that would make it even more useful when in the boonies.

### Entering Lat/Long

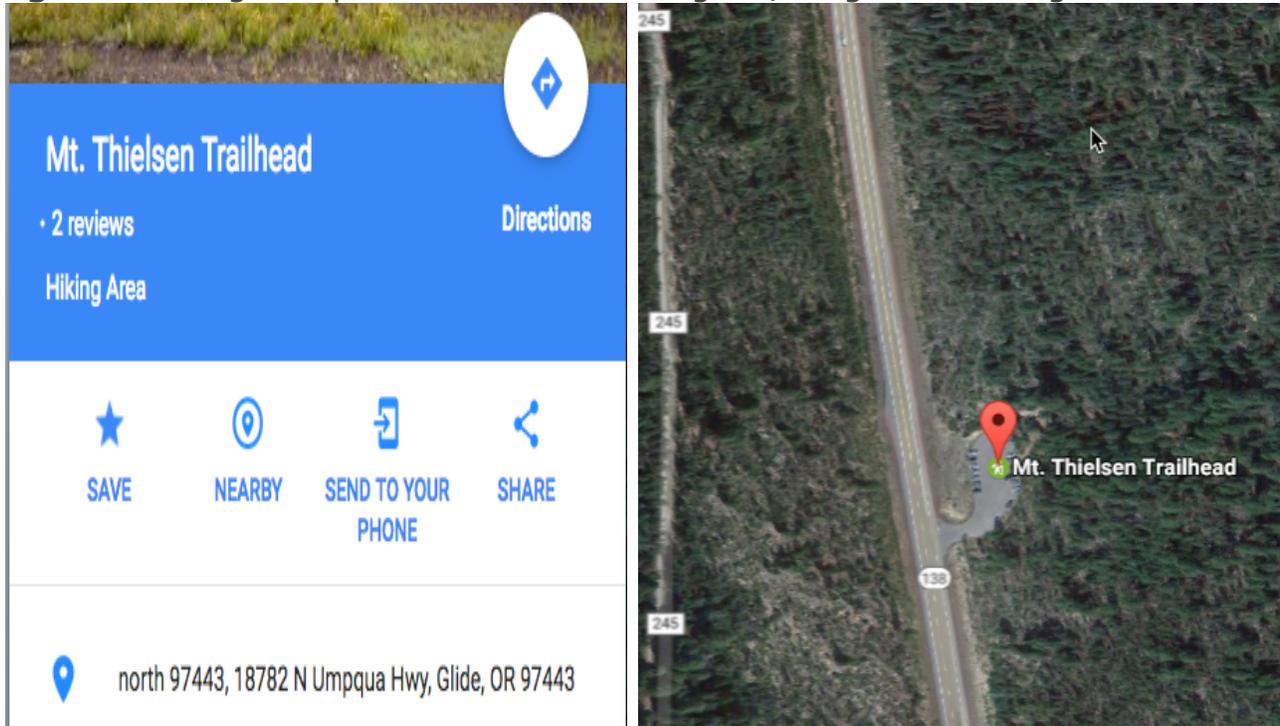
- Use a comma between the latitude and the longitude.
- Be sure to include the "minus" sign before the longitude, indicating west longitude rather than east. If your map draws up in China, then you've probably skipped the minus sign. =^)
- Four decimal places give a positional accuracy to about 10 meters. This is certainly more than enough to find the trailhead. You need at least 4 decimal places for Google to recognize your numbers as lat/long coordinates. Type three decimal places, and Google thinks it's a math problem. No need to use more than four decimal places, we are not surveying a property line here.

Try it! Here are decimal degree coordinates for the Mt. Thielsen trailhead in southern Oregon.

**43.1459, -122.1279**

See Fig 1 for the search results. A Google text search for an obvious trailhead like "Mt Thielsen trailhead" seems to work in Google maps, but not in a regular Google search. Using lat long coordinates decimal degrees works more widely. A plain text search might not serve you well looking for a remote campground TH, morel mushroom picking spot, abandoned mine, cave entrance... You get the idea.

**Figure 1.** Google Maps result when entering Lat/Long decimal degree coordinates.



The Mazamas web has trailhead coordinates for more than 50 of the most popular climbs in the Pacific Northwest. You can see them here: [Mazamas.org](http://Mazamas.org) >> Resources > Maps for hiking and climbing.

### Finding Coordinates

You can get decimal degree coordinates in several ways.

1) Probably the easiest is to go to Google Maps and zoom in on your area of interest.

- Right-click, and choose "What's here?" This opens a pop up box. The lat/long coordinates in decimal degrees, of the exact point you clicked, appear at the bottom of the box.
- Copy / paste the coordinates into a new Google search to test. If it draws your spot correctly, your coordinates are correct and you can use them in your smartphone for driving directions. Text or email them to friends who want to find your trailhead or camp spot.
- Google gives you decimal degree coordinates out to six decimal places. I usually just delete the final two.

2) Go to [caltopo.com](http://caltopo.com), the best online mapping software (IMHO). Using the different map layers from the upper right corner, choose one that lets you zoom in to your area of interest.

- The coordinates of the cursor are shown in the upper right corner. Change the coordinate type under the "Config" menu at the top of the page.
- Mouse over the location for which you want to coordinate, look at the upper right corner of the screen, and copy them down carefully.

**And also...**

- UTM coordinates, the preferred coordinate system for backcountry navigation, are NOT recognized by a Google search.
- Latitude longitude coordinates in the traditional degrees minutes and seconds and the more specialized format called degree minutes ARE recognized with a Google search, but these are harder to obtain and it's really easy to screw them up when you enter the coordinates. (The "degree minutes" system is typically used by electronic navigation systems in ships and airplanes, and not much by civilians.)
- It's usually best to stick with decimal degrees as shown above.

Coordinate examples in Table 1, all of the same location, the Mt. Thielsen trailhead.

**Table 1.** Coordinate system examples.

<b>Coordinate System</b>	<b>First Coordinate Latitude or Easting</b>	<b>Second Coordinate Longitude or Northing</b>
Universal Transverse Mercator -- UTM (with Datum & Zone)	(NAD 83, 10T) 570913E	4777387N
Latitude longitude, decimal degree	43.1459,	-122.1279
Latitude longitude, degrees minutes and seconds	43°08'46",	-122°07'41"
Latitude longitude, degree minutes	43°08.76',	-122°07.68'

--John Godino self describes as, "Mazamas Resident Navigeek." He was a National Forest Service wilderness ranger and is a frequent Navigation Northwest contributor. Contact him at [johngo.pdx@gmail.com](mailto:johngo.pdx@gmail.com).

\*\*\*\*\*

## Bewildered in the Buckhorn Wilderness

By Heidi Walker

It was day 3 of a 5-day backpack and I had lost the trail. The “trail” we had been following petered out to nothing more than an animal track in the alpine tundra. The rest of our party was coming up behind me and my mind raced as to what to do. This was supposed to be a nice easy trip.

After my dog ate a hole in the drywall large enough for a herd of wildebeest to migrate through, my sister and I started backpacking during the doggy-terrifying 4th of July holiday. This year we had decided on a 5-day excursion in the Buckhorn Wilderness of Olympic National Forest and invited a couple of friends and another dog to join us.

We planned on 5 days for a 30-mile, leisurely paced, loop that our friends who weren't accustomed to backpacking would find enjoyable. It had been 20 years since Holly had backpacked and this would be Evie's 1st time. Our route took us up Copper Creek to Buckhorn Lake then over to Marmot Pass and out the Upper Dungeness. This route had the added bonus of being far enough away from fireworks to protect the drywall from the dog.

We gathered mid-morning on day one and my sister, Kristi, handed each of us a map printed from AllTrails with our route highlighted. We made it easily to our 1<sup>st</sup> night's camp near Tubal Cain Mine (Fig 1) and explored the area. Day 2 found us at Buckhorn Lake, relaxing in view of Buckhorn Mountain.

**Figure 1.** All Trails (free not Pro) Tubal Cain Trail [not entire route of party].



Everything on Day 3 started out perfectly (Fig 2). Wispy clouds drifted in and around Buckhorn Mountain, but the weather was warm and sunny while we broke  
Navigation Northwest -- Vol4/Issue 4 December 2016

down camp. I had become the defacto group leader since my dog, Zillah, and I were in front and I had traveled most of the route before. Day 3 would be on the section of trail I had never hiked. I folded my map to the section we were hiking and stuffed it in an easily accessible pocket. Really, I didn't think we'd need the map as most trails in the area are well marked.

**Figure 2.** Beginning day 3 hiking out of Buckhorn Lake basin, Buckhorn Mtn in background. All photos by H Walker.



We hiked from the lake to the main trail and continued our climb to Marmot Pass, our expected camp for the night. Zillah and I led the way and soon Kristi, Evie and Holly were several switchbacks behind. By late morning, I had climbed beyond most of the trees and sat to wait for the others. I watched other hikers and backpackers pass me on their way up or down keeping an eye out on their route so I could point it out to my friends and feel more confident as we continued. I also watched the clouds as they had been building throughout the morning often obscuring Buckhorn Mountain and the ridges on its flanks. It was still sunny where we were but the wind was picking up and I wondered if we might need to push on to Boulder Camp further along on our route.

Just before the rest of the party met up with me, a small group of day-hikers came upon me -- they told me they were camping at Camp Mystery just below Marmot Pass and were heading down to Buckhorn Lake. We exchanged information and they continued on. Once we all gathered together, we found a secluded area out of the wind for lunch. I mentioned the hikers and pointed out the route that we'd be taking -- just a few more switchbacks and over a little knoll, then it would be relatively flat.

At some point after topping out over the knoll, I spotted a trail that I believed to be our trail -- the trail we would never reach. But we had reached the alpine tundra and were enjoying a stroll at higher altitude. The clouds covered most of the sky above us, occasionally drifting down to shroud the landscape in a misty fog. And it was here I lost the trail.

My first error was following the group of day-hikers I had talked to earlier. They passed us on their return and I thought that they must know where they were going. I was paying more attention to where they were going than where the trail was going. They ended up going cross country and climbing up on a ridge along Buckhorn Mountain. I began to realize that they weren't going the direction we wanted to go.

**Figure 3.** Our little group crosses tundra after losing trail.



Our second error was to think we still had to go forward instead of turning back to the last place we knew our point position. I suggested we skirt around the snow patch that blocked our way and continue on, while Holly found what looked like a trail off to one side. And instead of turning back, we too climbed up to the ridge along Buckhorn Mountain and again lost the trail.

By now a cold wind had picked up and the clouds around us were alternating between a thick and thin fog. There was no way for me to get our bearing by compass. Holly again scouted and found what this time looked like a real trail but which way should we go? Without a line of sight, I couldn't take a bearing or figure out our map position or which way we would need to go to reach Marmot Pass. I was figuring we should go right on the trail but after my previous misdirections, my friends were hesitant to believe me. And I really couldn't blame them for my confidence was shaken.

Our relief came as a pair of hikers approached us from the left. They had also made the mistake of climbing the ridge as we had and were hesitant to go the same route back to Buckhorn Lake. I explained our dilemma and asked if they knew which way Marmot Pass was but they weren't positive. We pulled out our maps and he pulled out his altimeter. We were 600 feet above the pass.

We turned right to head down the trail not up. Soon we were out of the clouds and heading to Marmot Pass (Fig 4). We took one look at the angry clouds over the pass with the frigid wind coming through and we opted to continue to Boulder Camp for the night. The rest of our trip was quiet and uneventful.

**Figure 4.** Kristi, Holly & Evie (from L) take a breather after finding our trail.



We celebrated a happy occurrence as we descended off Buckhorn Mountain -- we met a nanny goat, her kid and a juvenile. It was a thrilling moment for Evie and Holly who hadn't been that close to goats before.

### **Lessons learned:**

1. Don't blindly follow people on the trail. They may not be going the same direction you are or they might not know where they're going themselves. If I had stopped to evaluate the other group, I would have taken better note that only one of them seemed well prepared to be out hiking.
2. Do drop your pack if necessary and scout behind you. We may have lost the trail only a few hundred yards back. If any one of us had been willing to do that, we may have found the point where we went off trail.
3. Altimeters aren't only for climbers. If I had one I might have noticed earlier that we should have been dropping in elevation instead of climbing. We would have had more information to make decisions earlier.

I'm still curious as to where we lost the trail. I'd like to make a reverse trip soon so I can find it.

*--Heidi Walker is Seattle Branch Hiking Chair and a regular Wilderness Navigation and Outdoor Leadership instructor. She also serves as Seattle Branch Vice Chair and Seattle Photography Secretary. A photographer, she's working on a Washington State Parks picture book. Contact her at [fotogirl.heidi@gmail.com](mailto:fotogirl.heidi@gmail.com).*

\*\*\*\*\*

## **Navigating by Map, Compass and Priest—A Dartmoor Tale**

By Peter Hendrickson

The guidebook was excellent but the trails were not. A single stone marker signaled the start of the Two Moors coast-to-coast trail across Dartmoor NP in Devon, England. Tin mining decades ago spawned one long rail bed to guide two hours walking but that clarity was rare the rest of the day and most of the following days. A second stone marker later brought us onto the norm: braided tracks left by sheep, cattle, ponies, other hikers, even the military—most were damp or muddy. And we got sloppy...

### **Our toolset**

We had used other Cicerone guides across Europe for long distance treks and scrambles. Sue Viccars' turn-by-turn Two Moors (2015) looked as useful in scope and detail. And we had the excellent 1:25000 UK Ordnance Survey OL 28 map covering the entire park in one, large double-sided sheet. The British Geological Survey service provided a current compass variation/declination of ~ 00 degrees, 22 min east of grid north that I preset on the old Silva Ranger before arrival. A new Suunto Traverse ABC/GPS watch was fully charged on my wrist and the iPhone had Gaia pro (without any downloaded UK maps) in airplane mode to conserve battery.

We scrambled up a cut bank on an easterly heading with a short ascent towards one of the many granite block stone structures left from mining and military operations. And we stayed left as the narrative directed. The elevation seemed close enough under increasingly gray skies where it was hard to tell if pressure was dropping. I had not enabled the Suunto fuse function to match GPS and barometer for altitude. Visibility was very good, many kilometers. Our navigating, not so good.

### **Pretrip planning**

Literature from the National Park, from blogs, from our Devon friend Robyn, and from our Skype call with a NP information centre cautioned that map and compass navigation skills were critical in Dartmoor as rainfall, winds, mist and fog were among the nastiest in the UK. The park lady said, "You'll not want to be out there when the weather is on—you can't see a thing and you'll be looking for a rock to take shelter." We both teach Wilderness Navigation in the Seattle Branch and I'd spent much of the prior day reading the guidebook and rehearsing the route on the map. Nancy did the same after work that evening on the 5-hour bus ride Heathrow to an Ivy Bridge B & B.

**Figure 1.** Peter snacking before getting both feet and boots off trail.



Photo/NR Temkin

After about a half hour after our turning a couple approached on a fairly muddy section. We chatted and learned they were doing circular walks from several TH car parks. We didn't recognize "Shipley" but they were quasi locals (we thought) and assured us we were on the right path. But the altimeter had us at 460m and a 100 degree bearing down the path. Not quite right, a bit high and too much east in our bearing.

### **Ignoring hard data**

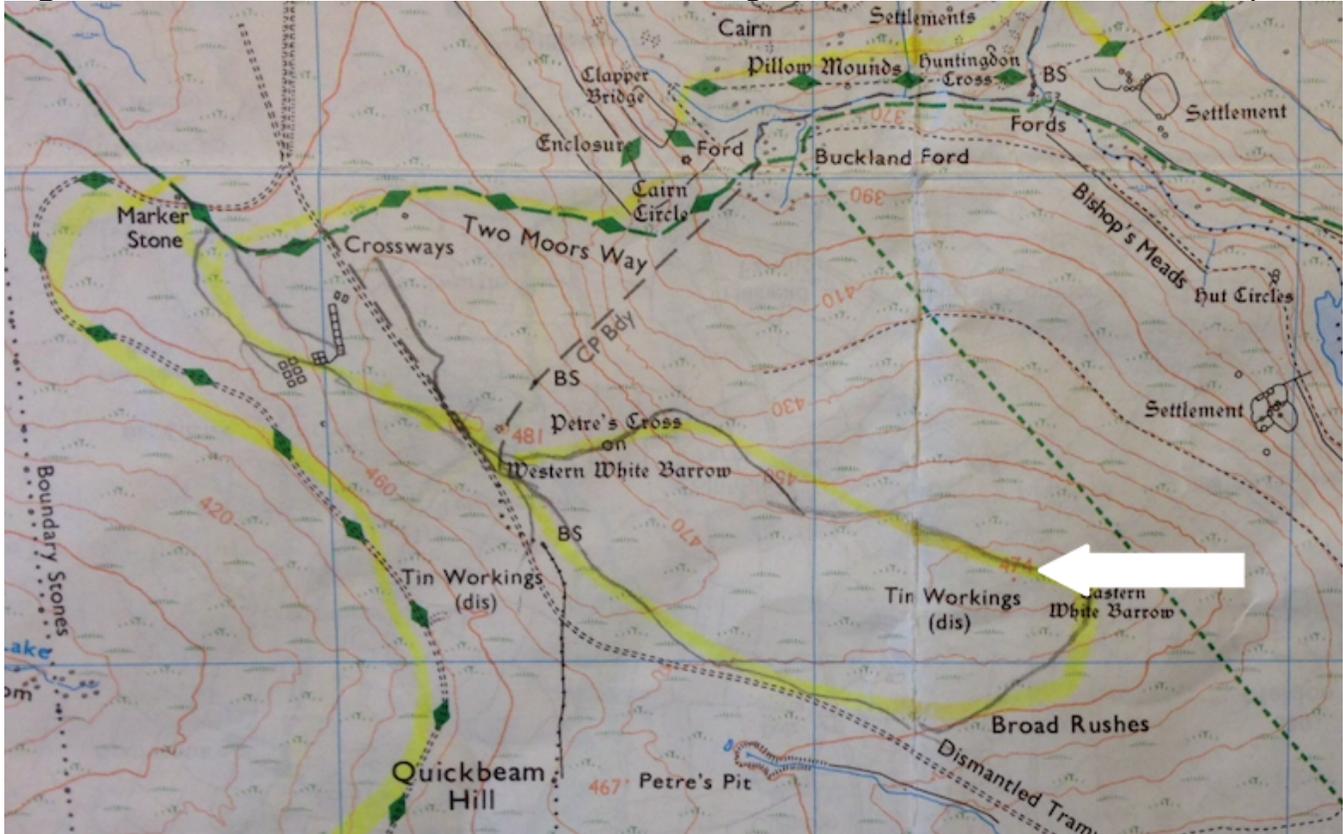
We had passed a Tor on our left 30 minutes earlier, ignoring the path that led to it. Another Tor in the distance was not mentioned and we thought little of it. But our path brought us well below it off our left shoulders and I'd spotted a person poking about. We were trying parallel tracks to find the most dry (least wet) and to avoid large, nasty sections of gorse, Broom's spiny cousin. We'd made the terrain and rare counsel fit our picture of position, discounting two essential data sources:

- Both map and guide called for decreasing elevation. We were ascending.
- And the bearing on my long trusted and reliable compass was off by >100 degrees.

Hungry and concerned, we climbed north to the guy sitting by the second Tor. I pulled out OL 28 and introduced myself to determine our position. John had his own older edition so I asked him the name of the circular tower. He said his hiking mates called it, "The Submarine" because of the profile from a distance. Neither map nor guidebook had any U-boat references but we'd seen a memorial

to downed WWII American airmen in Ivy Bridge. He smiled at our attempt to stay on Two Moors Way and suggested we turn back towards the proper trail. He further offered to lead the way as he said an even trickier section lay ahead before a final stream crossing. We accepted.

**Figure 2.** Arrow marks “The Submarine” and green diamonds Two Moors Way.



### Lesson Learned

We didn't need Gaia. We didn't need the Ordnance Survey monthly fee app (~USD \$5) I'd investigated online where we could download a scratch-and-read OL 28 code. We should've used the location function in the Traverse when position doubts increased. But I hadn't explored that function beyond pulling up default UTM coordinates that seemed about right in WGS 84, Zone 30. And hadn't resolved the slightly different (from USGS) OL 28 two-digit grid markings and shorter collar (edge) UTM markings. Nor had we continued the practice of reaching full agreement on point position every 20 minutes or so. We skipped over the second "OODA Loop" step (Observe, Orient, Decide, Act Web).

**Figures 3 & 4.** Nancy at a clapper bridge and Nancy with John the vicar.



It turned out that John was a retired Anglican priest with a loping stride and deep knowledge of the moors. We intersected Two Moors Way a few meters from our failure to turn north spot and the next hours worked well with constant bearings taken from the map. After crossing a “clapper” bridge and fording a stream, we hit the second footbridge crossing spot-on and made to our B & B an hour before dark—an 11-hour, 20+ km day mostly at 200 to 500m. And the squall held off until the last hour. The priest had recommended Jail Ale—his taste in beer was every bit the match of his kindness and moor savvy. The following three days provided additional, challenging navigation but no further Tor-Class “submarines.”

*--Peter Hendrickson is fond of long walks in the U.S., Europe and South America. He completed the circumnavigation of Brooklyn in November – Manhattan is done and Staten Island is next. Reach him at [p.hendrickson43@gmail.com](mailto:p.hendrickson43@gmail.com).*

\*\*\*\*\*

## Off to Taiwan: Overall Trip Planning...Pretty Minimal

By Lynn Graf

My husband, Richard, and I headed off for a month in Taiwan with very little preparation other than two guidebooks we had barely looked at (Lonely Planet Guide and Rough Guide) and two days of Taipei hotel reservations. The goal was to travel to several different areas, doing as much hiking as possible, explore and stay where we liked, then move on, without an agenda determined by an organized tour. We never managed to acquire the one English hiking guide by Richard Saunders, an expatriate Brit, not available in stores here or there.

### Navigation toolkit

Two iPhones with Gaia GPS, compass set to the local declination and altimeter. Tourist brochures, mainly in Chinese, some with English translations. Trailhead billboards/kiosks.

We found that Taiwanese are enthusiastic hikers, although just like here there seems to be only a small subset who do longer trips and ignore the weather, tramping through even heavy rain in thin plastic rain ponchos, in large, social groups. We were always greeted with friendly smiles and thumbs up gestures, offered snacks (Care for some peanuts with spicy dried fish? Or a piece of sugar cane to suck on?). And tea, always tea.

**Figure 1.** Tea and more wherever we went.



People wanted to know where we were from, and USA seemed to elicit a surprised and positive response. Trails were mostly stone and wood steps, hanging bridges, very well constructed, well signed (often in both English and Chinese) and maintained. I'd swear many trails where we were consisted of 80% steps, up and down without much concept of switchbacks.

**Figures 2 & 3.** Bamboo corridors and thousands of stairs.



Rain shelter pavilions (for those tea sessions), benches and toilets were frequent. Off trail travel is virtually impossible with the terrain and vegetation, at least where we were (below 4000 ft).

**Figure 4.** No, not climbing cascaded cliffs.



The island of Taiwan has a backbone of peaks over 10,000 ft, so rugged that there is no east -west highway that can be maintained. Unfortunately two typhoons moved through just 2 weeks before our arrival, and even minor maintenance problems appear to be enough to warrant closing off trail access. We finally ignored 2 closures and found only short awkward stretches.

So what about navigation? We found navigating the trail systems relatively straightforward with a combination of trailhead signs, and those along the trails ... and, most importantly, the Gaia GPS app on our iPhones.

**Figures 5 & 6.** Trailhead kiosks – much Chinese, little English.



We were already accustomed to using the Gaia app (free to Mountaineers volunteers) for navigating in Washington and had downloaded many of the maps for Taiwan... not that that was necessary, given the ubiquitous availability of Wi-Fi. Probably because of the long US relationship with Taiwan, including a major military interest, USGS quality 1:24000 topo maps were available. Open Hiking overlays were available and actually seemed more up to date than those here! Trails were all there as depicted, spot on, even if peaks and all else were designated by Chinese characters and trail names varied wildly on different maps.

Public transportation is easy, cheap, and frequent -- unfortunately not to the central mountains. Even the small busses we took to ~3000 ft a few times were hair raising trips on narrow roads, not for the faint hearts or weak stomachs. Add in fog and rain or another oncoming bus, hairpin turns plus standing room only in some cases, and I wondered what it would be like going even higher. Next time!

--Lynn Graf is a long-term Seattle Navigation Committee member (and past chair), hiker, and scrambler still recovering December 12 from jet lag from the November 7 to December 7, 2016 trip. Contact her at [lynn.graf@gmail.com](mailto:lynn.graf@gmail.com).

\*\*\*\*\*

## Wilderness Navigation Course Offerings 2016-2017--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. We are developing a Seattle version of Foothill's Staying Found, which does not meet back country course requirements. <https://www.mountaineers.org/about/branches-committees/seattle-branch/committees/seattle-navigation-committee/course-templates/basic-navigation-course/wilderness-navigation-course-seattle-2017>  
 Fee and Badge.

<b>Date &amp; Day</b>	<b>Workshops*</b>	<b>Date &amp; Day</b>	<b>Fieldtrips</b>
Thur, Jan 26	Program Center	Saturday, Feb 18	Heybrook Ridge
Tuesday, Feb 7	Program Center	Saturday, Feb 18	Heybrook Ridge
Thur, Feb 23–Mar 6	eLearning	Sat or Sun, Mar 18&19	Heybrook Ridge
Thursday, Mar 9	Program Center	Sat or Sun, Mar 18&19	Heybrook Ridge
Tuesday, Mar 28	Program Center	Saturday, April 01	Heybrook Ridge
		Saturday, April 22	Heybrook Ridge
Wednesday, Oct 25	Program Center	Sat or Sun, Nov 4 (Nov 5, if needed)	Heybrook Ridge

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

## Smart Phone and Dedicated GPS Navigation 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 and want to get the most out of it? The Smart Phone and Dedicated GPS Navigation course is for you! We will cover basic usage of both dedicated GPS units and some select GPS apps for smart phones, as well as common issues that can affect GPS accuracy and ways to avoid them. This course is an evening at the Mountaineers Seattle Program Center, split between a classroom lecture and a hands on outdoor exercise. This course is open to Wilderness Navigation students and graduates. Fee and Badge.

### Topics include:

- Overview of how GPS works
- Common accuracy issues and solutions
- Review of UTM coordinates
- Entering waypoints
- Navigating to a way point
- Back tracking a route
- Overview of emergency communication devices (SPOT & PLB)

Students need to bring a GPS enabled device to the class; loaners are not available. We cover both Gaia for iOS and Android devices (\$20, pro not required/Free to Mountaineers volunteers) and Garmin dedicated units. Other

brand GPS units are welcome, but instructors may not be familiar with them. Lead course administrator is Brian Seater.

The current URL provides a description and the 2017 dates are on the calendar: <https://www.mountaineers.org/about/branches-committees/seattle-branch/committees/seattle-navigation-committee/course-templates/smart-phone-dedicated-gps-seattle/smart-phone-dedicated-gps-seattle-2017>

<b>Smart Phone &amp; Dedicated GPS Course</b>	<b>Location</b>
Tuesday, January 31	Seattle Program Center
Monday, April 17	Seattle Program Center
Wednesday, May 24	Seattle Program Center
Tuesday, June 27	Seattle Program Center
Wednesday, August 16	Seattle Program Center
Tuesday, October 17	Seattle Program Center

### **Introduction to Map & Compass (& Altimeter) -- Seattle**

The Seattle Navigation Committee scheduled six 2017 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. Enroll at URL below or others posted: <https://www.mountaineers.org/about/branches-committees/seattle-branch/committees/seattle-navigation-committee/course-templates/introduction-to-map-compass/activities/introduction-to-map-compass-mountaineers-seattle-program-center-17>. Administrative leads are Nina Crampton & SuJ'n Chon. This Getting Started introductory class does not satisfy the navigation requirement for Alpine Scramble, Basic Climbing, Snowshoe or Backcountry Ski. Fee, no badge.

<b>Intro to Map, Compass &amp; Altimeter</b>	<b>Location</b>
Monday, January 23	Seattle Program Center
Tuesday, April 11	Seattle Program Center
Wednesday, May 17	Seattle Program Center
Thursday, June 15	Seattle Program Center
Monday, August 14	Seattle Program Center
Wednesday, September 13	Seattle Program Center

### **Other Branches 2017 Navigation Courses\***

<b>Branch</b>	<b>Course</b>	<b>Dates</b>
Everett	Basic Navigation	Mar 4, Mar 18
	Wilderness Navigation eLearning Option	Under Consideration
Kitsap	Wilderness Navigation Wkshp/Field Trip	TBD
	Wilderness Navigation eLearning Option	TBD
Olympia	Basic Navigation	Apr 18, 20 Lecture
		Apr 22, 23 Field Trip

Tacoma	Wilderness Navigation Lectures 1 & 2; Field Trip	Mar 13 & 20; Mar 25
Tacoma	Wilderness Navigation Lectures 1 & 2; Field Trip	Apr 13 & 19; Apr 22
Tacoma	Wilderness Navigation Lectures 1 & 2; Field Trip	Aug 10 & 17; Aug 19

\* Be sure to check [mounaineers.org](http://mounaineers.org) for up-to-date listings.

**Mazamas (Portland, OR) 2017 Navigation Instruction\***

Portland	Intermediate Climbing School Lecture & Field Trip	December 6 & 10
Portland	Navigation Skill Builder Class	Feb TBD
Portland	Navigation Skill Builder Class	April 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](mailto:johngo.pdx@gmail.com).

\*\*\*\*\*

**Navigation Project(s)**

>>Our Seattle Volunteer Park effort to create a self-guided navigation map, compass, and SmartPhone (altimeter & UTM coordinates) practice course is online. You may download the PDF (with answers) here:

<https://www.mountaineers.org/about/branches-committees/seattle-branch/committees/seattle-navigation-committee/files/seattle-navigation-self-guided-practice-volunteer-park/> Thanks to Nancy Temkin and Bob Boyd for 2015 beta testing. And to Brian Starlin for 2016 improvements.

>>A second practice course focused on GPS use is under development for Lincoln Park in West Seattle by Mountaineers Safety Chair Dave Shema.

\*\*\*\*\*

## 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...

--No reports this issue.

### The Apps...

#### -- Compass 360 Pro for Android

Students have asked about digital compasses for their smartphones and I never had a good answer for whether they are accurate and which one to get. I tested a few apps and found that accuracy varies. The phone must be level in order to display an accurate bearing. Compass 360 Pro is a free app, with advertisements, but I like two features. It has a set of levels on the screen, and it has adjustable declination. The levels allow me to adjust the tilt and yaw of the smartphone itself. The declination adjustment allows me to work with the same bearing on the map, and in the field, without doing any declination calculations in my head.

**Figure 1.** Compass 360 Pro matched with baseplates compass.



Figure 1 shows the app by itself, and another next to a mechanical compass, showing 235 and 233 degrees respectively, within plus-minus 2 degrees.

--Brian Starlin

--**Gaia Topo**, now the default map source in Gaia GPS, targeted at backpackers

[http://blog.gaiagps.com/unveiling-the-alaia-gps-topo-map/?utm\\_source=GaiaCloud&utm\\_campaign=249cb3de22-&utm\\_medium=email&utm\\_term=0\\_146e7f7888-249cb3de22-113452029](http://blog.gaiagps.com/unveiling-the-alaia-gps-topo-map/?utm_source=GaiaCloud&utm_campaign=249cb3de22-&utm_medium=email&utm_term=0_146e7f7888-249cb3de22-113452029)

## And the links...

- Andrew Skurka reviews the Suunto M3-G Global Compass.  
<http://andrewskurka.com/2016/long-term-review-suunto-m-3g-global-compass-adjustable-ultralight/>  
And in this video demonstrates the M3-G features.  
<https://www.youtube.com/watch?v=rbt8ZOPvDQQ>
- Andrew Skurka weighs in on altimeter watches versus sport watches.  
<http://andrewskurka.com/2016/altimeter-watches-made-obsolete-by-the-gps-sport-watch/>
- A gizmo that is supposed to facilitate Bluetooth/VHF radio communication between smartphones.  
<https://www.wired.com/2014/07/a-brilliant-antennae-that-lets-you-text-even-during-a-catastrophe-like-sandy/>  
  
<https://www.rei.com/product/103081/gotenna-text-and-location-communicator-2-pack>
- Finally, do you really want to disconnect from the wired world, here's one way :-)  
<https://www.outdoorresearch.com/blog/stories/video-what-calls-you>

\*\*\*\*\*

## Navigation Gear--Compasses

### Required Compass Features: Seattle Wilderness (Basic) Navigation Course & Foothills Staying Found Seattle Mountaineers—Revised September 2016

1. **Adjustable declination:** If there is one feature that simplifies map and compass work, this is it. Compasses with adjustable declination can often be identified by the presence of an adjustment screw, usually brass or copper-colored, and a small key attached to the lanyard. It allows you to move the orienting arrow in relation to the azimuth ring.

- All students **MUST** have a compass with adjustable declination. The presence of a declination scale does not guarantee that it can be adjusted. Avoid the 'tool-less' declination feature on the Brunton (see below).
- 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 and triangulate 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. In general, bezels should be large to allow use while wearing 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 plotting and triangulating on the 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.

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

#### Additional recommendations

- A sighting mirror in the cover: Reduces error introduced when moving compass from eye-level after sighting to waist-level for reading the dial.
- 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, Kasper & Richter, and Brunton are the common favorites. Their quality and usability varies, so **keep any receipt**. We have unfortunately seen many defective compasses in the past. Beware the UST ~\$7 knock-off baseplate compass available via Amazon and other outlets. Our gear tests show it to be unreliable.

--From Silva, with a sighting mirror, is the Silva Ranger 515 CL (not the CLQ). Without a mirror is the Silva Explorer Pro (not the 203 or Polar). Silvas are available at Cabela's or online.

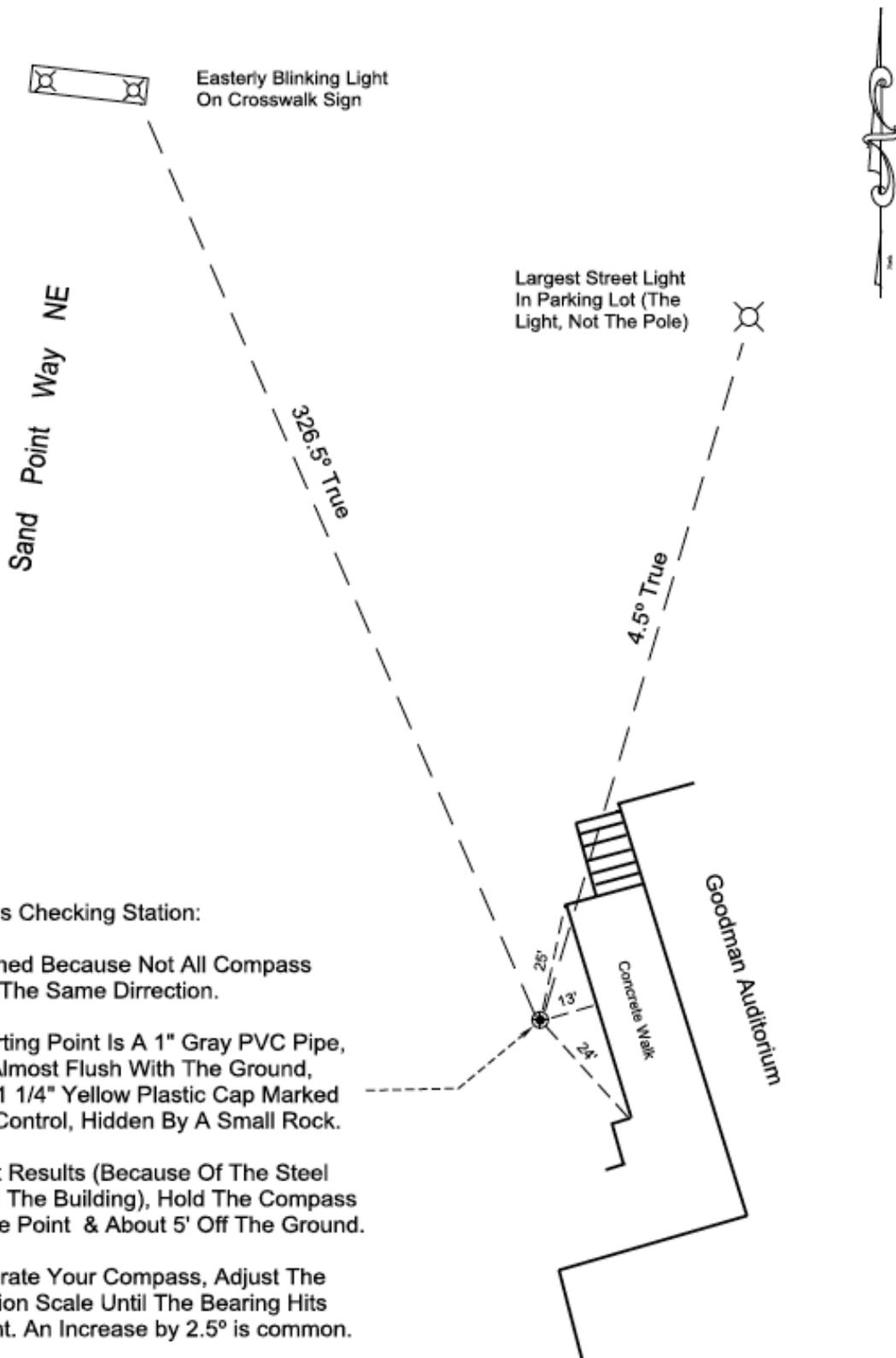
--K & R has the Sherpa and Alpin using 1:25,000 vs. 1:24,000 rulers. They are available online.

--Brunton has several compasses that meet our requirements but present issues with "tool-less declination", lack of clearly visible meridian lines or scales and curvy shapes. Several tool-less declination models have come apart in user hands. Preferred models are TruArc 15 (mirrored), and TruArc 5 (non-mirrored). The TruArc 10 has measurement scales (good) but curvy sides (not good). The TruArc 3 lacks clear meridian lines and is short. Bruntons are available at REI, Cabela's or online.

--Newly available retooled Suunto MC-2 (mirrored) and M-3 (non-mirrored) 2016 models passed all bench tests with flying colors—a batch of eight was locally tested. Older MC-2s frequently needed to be set 2-3 degrees higher (i.e., 165 degrees East became 18-19 degrees East). Suunto is currently available at REI, Feathered Friends and online.

Some older Suunto M-3 and MC-2 lines exhibited a 2-degree magnetic error and are corrected by adding 2-3 degrees East (i.e., 16 degrees East would need to be 18-19 degrees East). Needles in 2016 and later models are not impacted. Meridian line length has also been sacrificed for Suunto branding on both models. If you are comfortable with foreshortened meridian lines, the M-3 and MC-2 lines are OK. Manufacturers make continuing improvements and corrections in models.

*(Rev Sept2016/bs.ph)*



**Compass Checking Station:**

Established Because Not All Compass Point In The Same Dirrection.

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 Deadlines 2017

<b>Calendar 2017</b>	<b>Copy Deadlines</b>	<b>Publish Dates</b>
<b>Volume 5, Issue 1</b>	<b>March 1</b>	<b>Late March 2017</b>
<b>Volume 5, Issue 2</b>	<b>June 1</b>	<b>Late June 2017</b>
<b>Volume 5, Issue 3</b>	<b>September 1</b>	<b>Late September 2017</b>
<b>Volume 5, Issue 4</b>	<b>December 1</b>	<b>Late December 2017</b>

**Inquiries, Contributions, Letters to the Editor to Peter Hendrickson**  
[p.hendrickson43@gmail.com](mailto:p.hendrickson43@gmail.com)

**OK to forward**

**OK to use with attribution**

**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 figs/tables etc. to go
- Send figures, tables, photos as attachments or by separate email
- 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**

(Rev.15 Dec 2016/ph)