

# Navigation Northwest

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## Editor Notes

- A Navigation Summit, February 25, 11 to 3:45 pm at the Seattle Program Center, produced several calls to action. See lead article this issue. Next summit: Nov 10.
- We continue our search for outings where navigation and/or communications issues provide "Lessons Learned."

# Summit Leans Toward Modernization Harmonized With Freedom 9

By Peter Hendrickson

Navigation and other committee leaders from Foothills, Kitsap, Olympia, Seattle and Tacoma discussed development of new Wilderness (Basic) Navigation course content. The 14 navigators, climbers, scramblers, hiker/backpackers, authors, map maker guests, and back country ski and snowshoe instructor/leaders met February 25 at the Seattle Program Center to chart a course for late 2018 and beyond.

Hosted by Sara Ramsay, program content manager, they heard a Sunday morning briefing from Brian Starlin, on Seattle’s plan to better align with key elements of Chapter 5 in Freedom of the Hills (2017). The slightly revised eLearning workshop component, now prominent in Foothills, Kitsap and Seattle course design, supports modernization. See principal elements in Slide 2 below.

## Navigation and Freedom 9

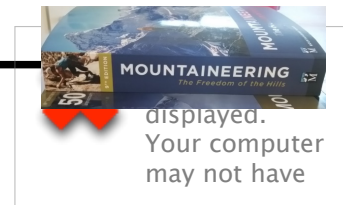
### 1. Five Tools in the Ten Essentials

- Map (including digital options)
- Altimeter (cheap is OK) ←
- Compass
- GPS Navigation (Apps or Dedicated) ←
- Satellite Communications: Sat Phones and Personal Locator Beacons (PLBs) ←

### 2. Workflow (Digital and Manual)

### 3. Situational Awareness to Avoid GPS Pitfalls

### 4. Ethic of “SELF RELIANCE”



Seattle is planning to pilot the renewed course in October/November 2018 as they did in 2015 after the influential June 2015 multi-branch summit. A matrix of navigation learning targets was circulated to begin a conversation about the assignment to extant and future courses. Anticipated elements include:

- >>Replacement of the in-person evening lecture and homework with eLearning instruction for most students. Provide guided practice, not lecture, in the workshop. Some editing of the current modules is anticipated for this blended delivery model. The field experience will continue, likely with revision, to place greater emphasis on frequent orienting (point position), attention to work flow with the five tools in the navigation toolkit, heightened situational awareness and an emphasis on small group work.
- >>Continued emphasis on the topographic map, paper and digital, as the foremost navigation tool.
- >>Elevation of altimeter use from strongly recommended (2015 Summit) to required, acknowledging that elevation is consulted more often than compass in the mountains.
- >>Baseplate compasses remain a central and critical tool in the navigation toolset, particularly as paired with GPS devices.
- >>GPS devices also move from acknowledged as commonplace (2015 Summit) to required a competency in the revised curriculum.
- >>Emergency communication devices (including cell phones) have won the fifth spot in the essential navigation toolkit. Current discussion places them at the party level, rather than in each participant's kit.

## **How Much Workflow/Trip Planning?:**

Basic Concepts -- Not Enough Time for Full Digital Trip Planning

### **Home→Trailhead→En route→Home**

1. Home: Download and print maps, waypoints, routes. Pick toolset. Traditional research.
2. Trailhead: Confirm location, set waypoint, set altimeters.
3. Enroute: Continuous or periodic; Use all tools together.
4. Home: Organize for others and the next trip.

Elearning manager Dilek Bulut is currently working with Seattle and Foothills curriculum developers on new and revised courses that could be used across branches. Foothills Chair Ryan Dubberly is offering/developing both winter navigation and digital trip planning sessions. Bulut invited those seeking eLearning

support to complete a course request form

<https://www.mountaineers.org/courses/elearning/elearning-course-request-form>.

Hendrickson proposed requirements for earning a Navigation Leader Badge first introduced in 2016. A revised proposal was circulated to branches for March review.

Participants also discussed criteria for selecting navigation field trip locations. Central considerations were available parking, isolation from the public, free/low cost, and drive time from branch centers. Dubberly is working with DNR to secure a locale just east of Issaquah. Seattle continues to seek alternatives to Heybrook Ridge while other branches are settled.

All branches reported increasing demand with both "hard" (actual list) and "soft" (those who do not register as positions are already overfilled) waitlists. Dual obstacles are locations for workshops/field trips and instructor supply. No action.

Equivalency protocols differ by branch. The Program Center is better able to support equivalency inquiries when protocols are common across branches. Discussed option for using a hike, backpack, scramble or climb activity to count for a navigation field trip. No action.

Discussed changing the every three years badge refresh requirement. Will explore skills renewal via elearning and other opportunities. There was support for requiring continuing education to maintain the badge. Ramsay forwarded a roster of Mountaineers nearing badge expiration as a source of instructors. No action.

Branches are discussion a Wilderness Navigation Leader Badge proposal discussed at the meeting.

Seattle recently canceled afternoon field trip activities mid-session due to severe weather – high winds on Heybrook Ridge. Discussed protocols for determining Go/No Go. Participants were invited to review the eLearning leadership modules now in production. No action.

Green Trails CEO Alan Colburn and chief cartographer Mark Rothmeyer talked with navigation leaders about the company's digital initiatives. See article elsewhere.

The next Navigation Summit will be November 10. Tweaks to the current Clubwide Minimum Standards will be among the agenda items.

Participants invited or in attendance were:

<b>First</b>	<b>Last</b>	<b>Role(s)* and Branch</b>
Bob	Boyd	Navigation Committee, Seattle, SAR Navigation Lead
Dilek	Bulut	Elearning Program Staff

Alan	Coburn	Guest -- Green Trails President, Seattle
Bruce	Crawford	Navigation Committee, Seattle, Musher
Ryan	Dubberly	Navigation Chair Foothills, SAR
Rick	Finkle	Navigation Chair Tacoma, Snowshoe
Christine	Grenier	Navigation Committee, Kitsap
Joel	Heidal	Navigation Chair, Everett -- Could not attend
Peter	Hendrickson	Navigation NW Editor, Navigation Past Chair, Seattle
Mike	Kretzler	Navigation Chair, Olympia
Jerry	Logan	Navigation Chair, Kitsap -- Could not attend
Ed	Lucas	Navigation Committee, Kitsap
Steve	McClure	Navigation, Climb & Scramble, Seattle, Fr9 Author
Phil	Owens	Navigation Committee, Tacoma
Sara	Ramsay	Content Manager Navigation, Program Center,
Marc	Rothmeyer	Guest -- Green Trails Chief Cartographer, Seattle

*\*Note: Most participants had/have other leadership roles, too.*

*--Peter Hendrickson chaired Navigation Summit 2015 and continues to instruct. Contact him at [p.hendrickson43@gmail.com](mailto:p.hendrickson43@gmail.com)*

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## **No Need to Iron this Compass...Will Drip Dry**

By Steve Russell

The Mountaineers Club teaches map and compass navigation to Seattle students. Some want to improve their navigation skills as general outdoors people – hikers and backpackers –while others take our course as part of the requirements for more adventurous recreation in the backcountry: leaving the trail to “scramble” to non-technical summits or learning the introductory skills of technical rock or glacier climbing.

Our Wilderness Navigation field trip, accordingly, includes both trail and off-trail instruction delivered in ruggedly realistic environs atop Heybrook Ridge on National Forest land just outside the Wild Sky Wilderness. The day’s instructional agenda includes two lengthy runs with elevation gain and loss across a forested landscape where the ending points cannot be seen from the beginning points. The students must follow an assigned bearing from one natural feature (tree, boulder, stump...) to another until they finally emerge at or near their intended destination.

These field trips are scheduled during the fall, winter, and spring (to leave the summer climbing season available for those enrolled in the scrambling or climbing courses) and the weather can vary from sunny with spectacular mountain views to rainy, snowy, cold, and windy conditions. The students know in advance that they could face stressful weather conditions and they dress accordingly; indeed, Heybrook Ridge is a well-known “test” of the students’ boots, clothing, and mental fortitude!

The field trip I describe fell in mid-February 2018 in the middle of a winter storm, with snow, rain, and wild wind in the wet and slippery woods. These conditions added to our students’ challenges as they learned to use their magnetic compasses. Our final bearing problems take the students off-trail through forests and clear-cuts. The students have to maneuver through old stumps, mature standing timber, new growth, and tangled bushes, and are at times required to pick their way around extensive stretches of blown-down logs.

Despite these blow-downs, we do not ordinarily encounter conditions in which the trees are in the actual process of falling down around us, but during this trip we were treated to the jet-engine howl of the winds as each storm cell approached, heard the crash of trees falling in the distance, and watched as the trees right around us swayed and slammed their trunks into one another! We quickly made the decision to cut short field trip (one of the few times we have ever had to do this) and got all students safely back to the parking area.

As always, I was accompanied on this field trip by my Suunto mirrored compass, which I purchased at REI in early 1990, the year I took the scramble course. I’m not certain of the model number, though my compass does bear “812” on one

outside edge of the mirror cover. Not only has my Sunnto performed admirably and accurately for 28 years since its purchase, it has proven to be extraordinarily sturdy, having survived all those years of steady use on scrambles, climbs, and backpacks and something in excess of 60 of our navigation field trips!

After I returned from this wet, cold, windy, and snowy Wilderness Navigation field trip, I did my usual weekly wash, adding in the wet muddy clothing I had worn in the field. My only excuse for what happened next is that an extra dose of distraction must have still been lingering from hearing trees crashing to the ground and watching the trunks dance and cavort in the wind.

When the wash was done an hour or so later, and I went to transfer the load of washing to the dryer, I reached into the well of the washing machine and plucked out ... my venerable and beloved Suunto!

Fortunately, this story has a happy ending: the 1990 Suunto seemed none the worse for wear, a further testament to its inherent sturdiness...!

Though I'm glad I found it before it got further tumbled around in the hot dryer!

Digital navigational aids have many advantages: unlike my Sunnto, however, I doubt most phones or other devices would have survived sloshing around in the warm soapy water of my weekly wash!

[Ed note: Colleague Henrik Palin, Suunto Business Manager (aka "the compass dude at Sunnto) in Helsinki commented, "Thank you for the story. Should be a decently clean compass now...! The water and heat of the washing machine should be no problem but the constant hitting from clothes falling around could increase the needle friction. Not recommended though."]

*--Steve Russell is a veteran Wilderness Navigation instructor and scramble leader, a co-founder of the Seattle Navigation Committee. Contact him at [drawndreams@comcast.net](mailto:drawndreams@comcast.net).*

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## Grids, Shapes and KLM files for Decimal Lat/Long Layers

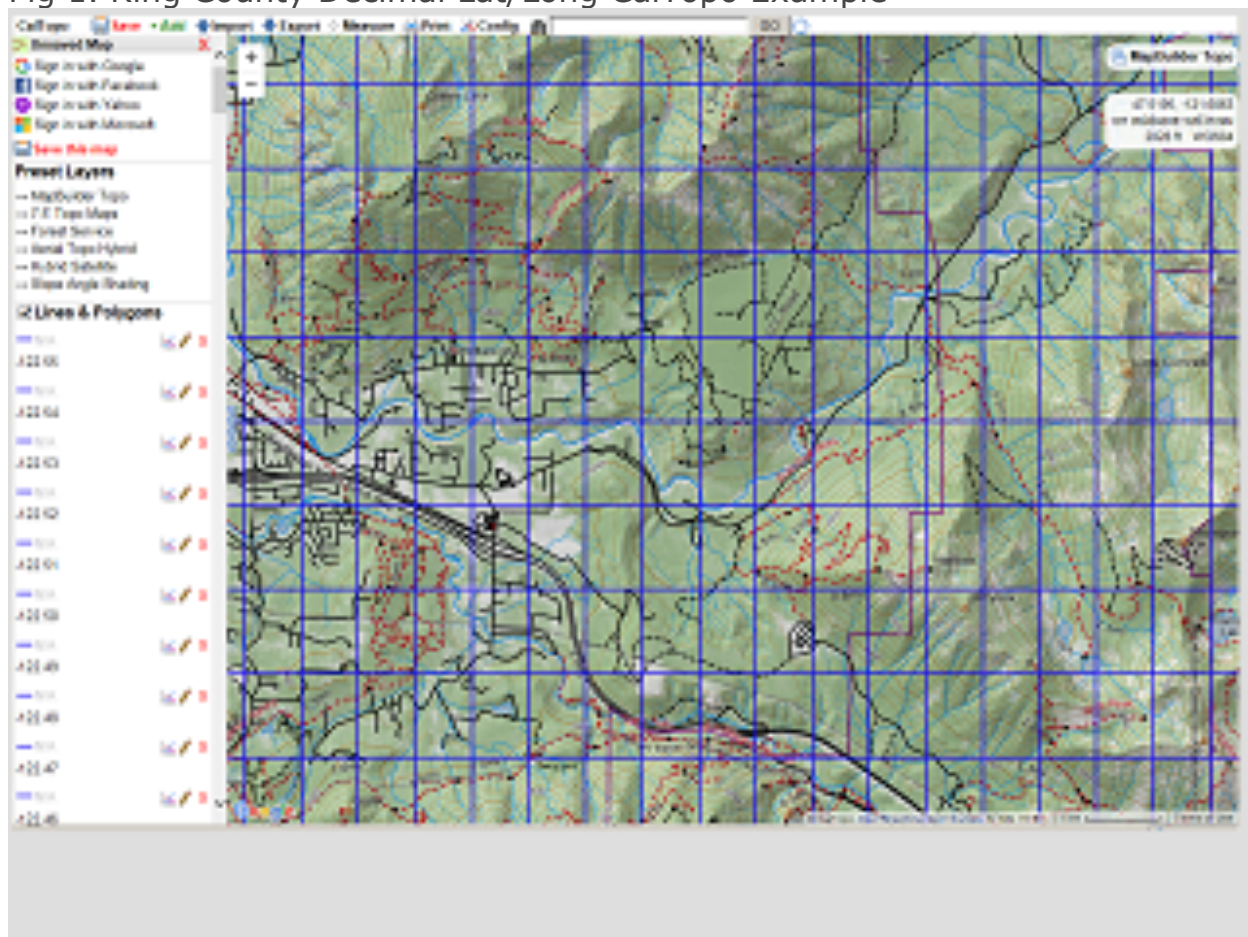
By Bruce Crawford

*[Ed Note: Last issue Bob Boyd called for more attention to Decimal Lat/Long coordinates to better serve the SAR community. He decried the lack of Dec Lat/Long layers for Gaia and other mapping systems. Bruce answered the call.]*

So, you want a grid on your map that the software doesn't directly support? Or maybe you want to draw geometric shapes and you are looking for a way.

You could use a GPX file, but that is focused on tracks, waypoints and routes. A more generic alternative is a KML file. KML stands for Keyhole Markup Language. It is a text language developed by Google for drawing shapes on its maps. A KML file is a plain text file structured with a header, drawing instructions and data, then a footer. Both CalTopo and Gaia GPS allow you to import KML files, though there are items in the KML language the software may not be able to interpret. See Figures 1 and 2.

Fig 1. King County Decimal Lat/Long CalTopo Example





You can find KML language tutorials online (Google has some :-). The default units for specifying the location of a point are decimal degrees latitude and longitude, WGS84.

### **An example:**

The location of 911 call is reported in decimal degrees latitude and longitude, so a map with a decimal degree grid might be convenient for checking a location, but that grid is not always an option in software. Well, you can make your own grid.

The essential elements of a file are shown below. If it looks like gibberish to you, you may want to ignore this article. If it looks readable, you may want to consider crafting KML files to meet any needs you have.

The file header

```
<?xml version="1.0" encoding="UTF-8"?>
<kml xmlns="http://www.opengis.net/kml/2.2">
```

Drawing a grid line for King County at longitude -122.55. For a full grid, there are a lot of these commands to draw lines.

```
<Placemark>
<description>-122.55</description>
<LineString>
<coordinates>
-122.55,47.08,0.0
-122.55,47.80,0.0
</coordinates>
</LineString>
<Style>
<LineStyle>
<color>#ff0000ff# </color>
</LineStyle>
</Style>
</Placemark>
```

The file footer

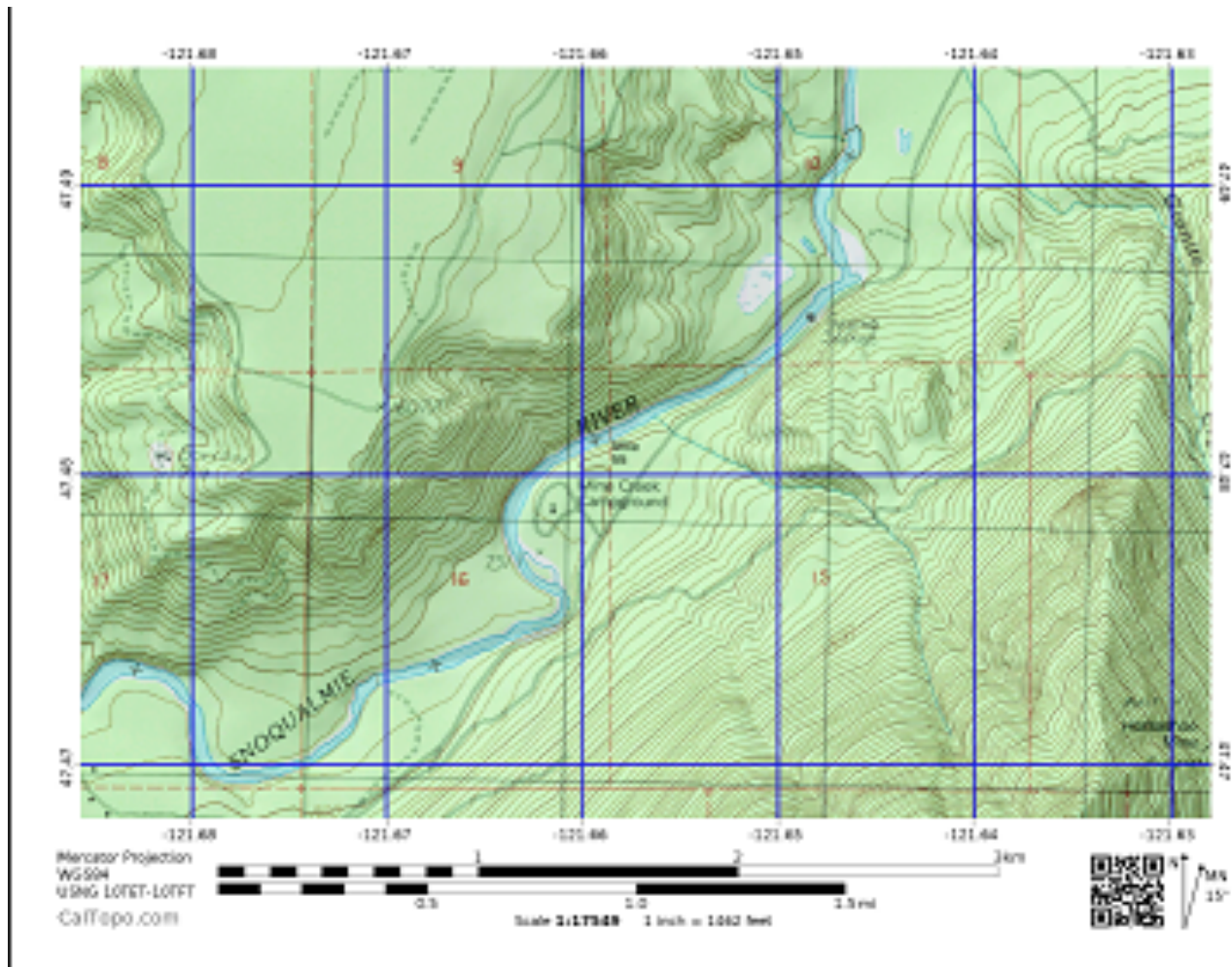
```
</kml>
```

End of the file

Other things to consider

If you draw a line that is long enough, it in many cases should appear on your map as a curve. So, particularly for lines with an east/west component that stretch a long way, you may want to draw a series of shorter line segments to get the curve that your map projection may create.

Fig 2. King County Decimal Lat/Long CalTopo example.



Google maps, and most everyone else on the web, use spherical calculations for their maps. That makes the math easier (why the coordinates can shift in real time as you move your cursor). But it also means there is another source for distortion. The earth is wider at the equator due to its spin, so an ellipsoid more accurately describes it than a sphere. Most traditional paper maps are projected from an ellipsoid. So, don't expect a perfect match as you move between sources and remain aware the map is an approximation.

--Bruce Crawford is a veteran member of the Seattle Navigation Committee. A keen scrambler and musher, he models METRO wastewater flow by day. Contact: [brucec@bikejor.com](mailto:brucec@bikejor.com)

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## Snow Depth Interactive Map on the NOAA Website

By John Godino

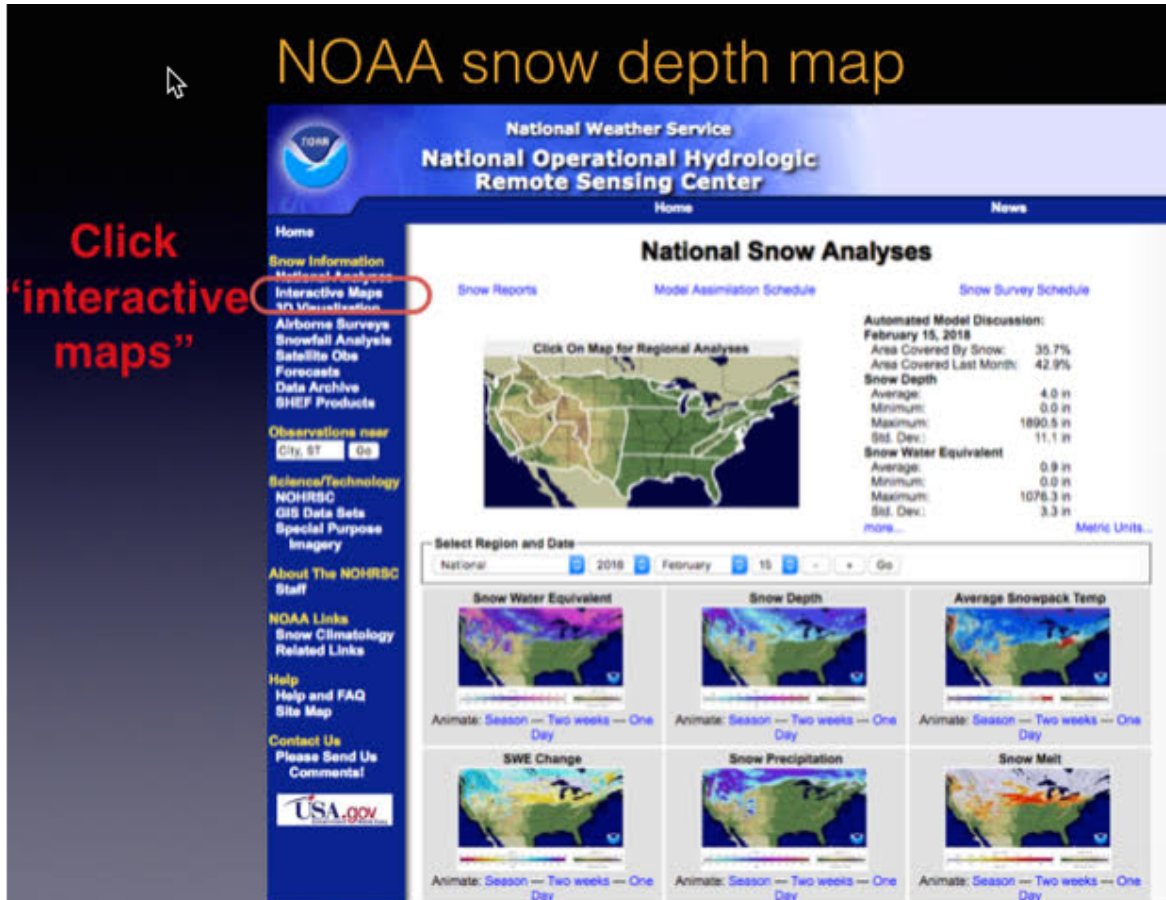
Backcountry travelers in the Northwest often want to know about the snow, or lack thereof, on a hike or climb.

- Is the trail I'm going to hike or mountain bike covered in snow?
- Should I bring my crampons?
- Should I bring a heavy winter pad for camping on snow?
- For ski mountaineering trip, where should we go in late season to be sure of snow?

If you're not familiar with the local area, determining this can be difficult. However, with a little spelunking, NOAA has a pretty cool feature buried on their website that can help give you an answer. NOAA does computer modeling of snow depth over the entire United States.

It's mostly for hydrologic monitoring, estimating reservoir capacity, whether we'll have a drought, etc. But, it also shows, with some nice color-coded maps, the snow depth. Here's how to drill down and find it.

**Figure 1.** NOAA snow depth map.



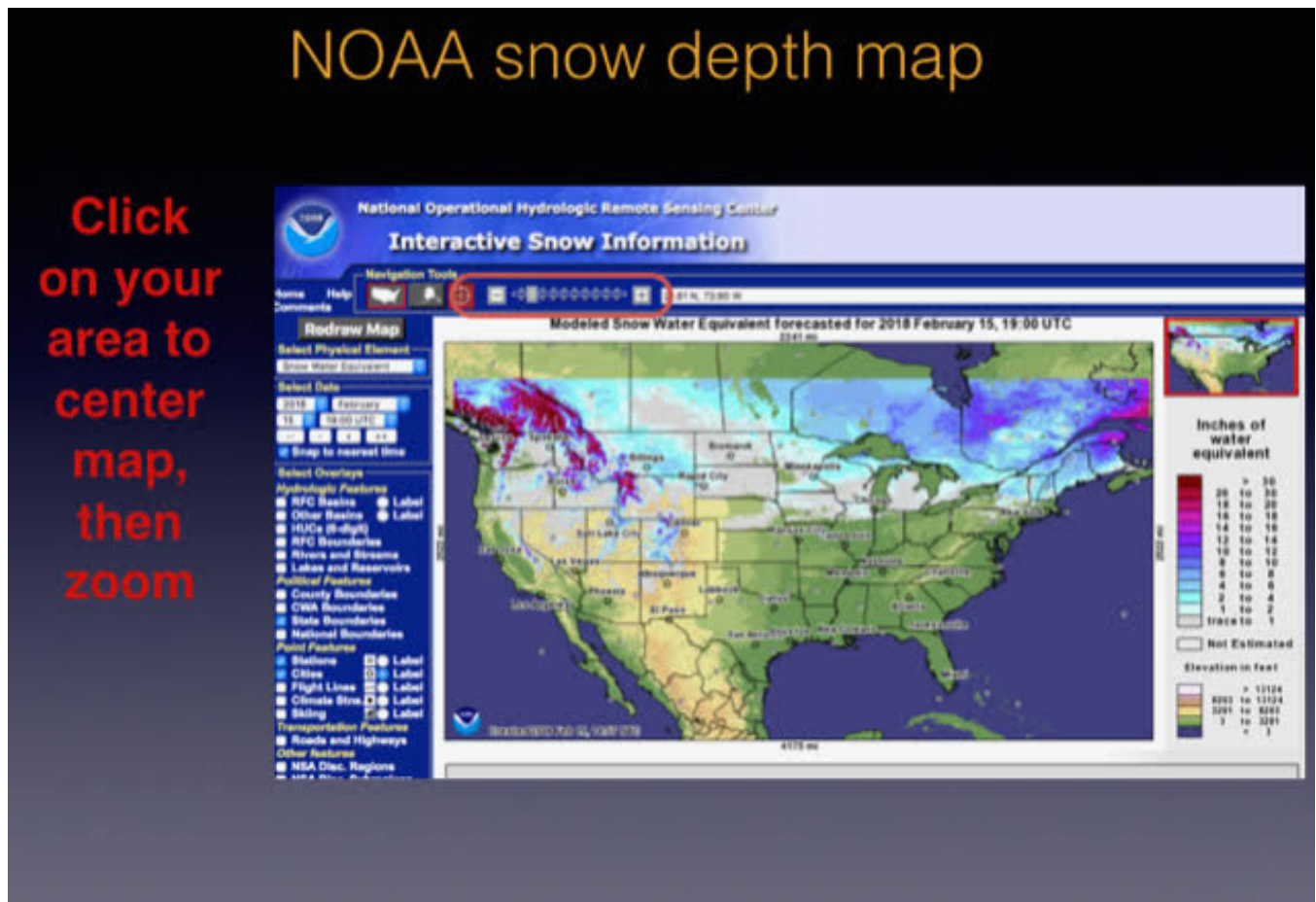
(The website is a little clunky, so you need to play around with it and get used to how it works.)

Try a Google for < NOAA snow depth map > See Figure 1.

Or go directly here: <http://www.nohrsc.noaa.gov/>

(Which, in government-speak, is “National Operational Hydrologic Remote Sensing Center”.)

**Figure 2.** Centering the map for the area of interest.

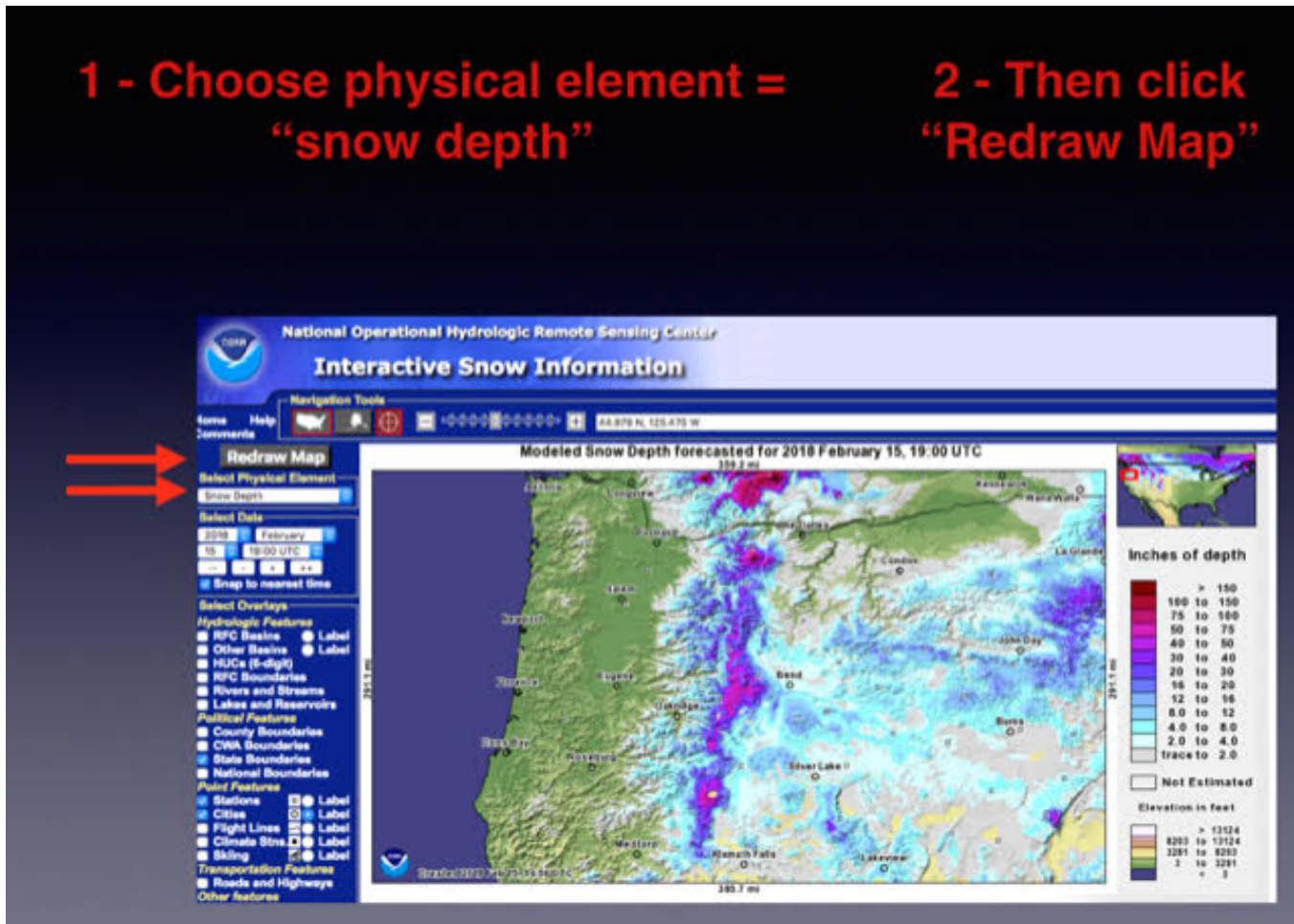


1. From this page, click “Interactive Maps” in the upper left corner.
2. Click anywhere on the map to center the map on that location, for example central Washington Cascades.
3. Then, zoom in by clicking the plus / minus slider bar at the top of the map, that looks like it was designed by an eight-year-old. See Figure 2.



- Then, look in the upper left corner of the screen. You should see a drop-down menu for "Select Physical Element." This is the info that is actually displayed on the map. The default appears to be "Snow Water Equivalent."
- Click the drop-down menu, and change it to "Snow Depth", which is what we are more interested in. See Figure 3.

**Figure 3.** Selecting the "snow depth" element



- Then, click the big gray "Redraw Map" button in the upper left corner.

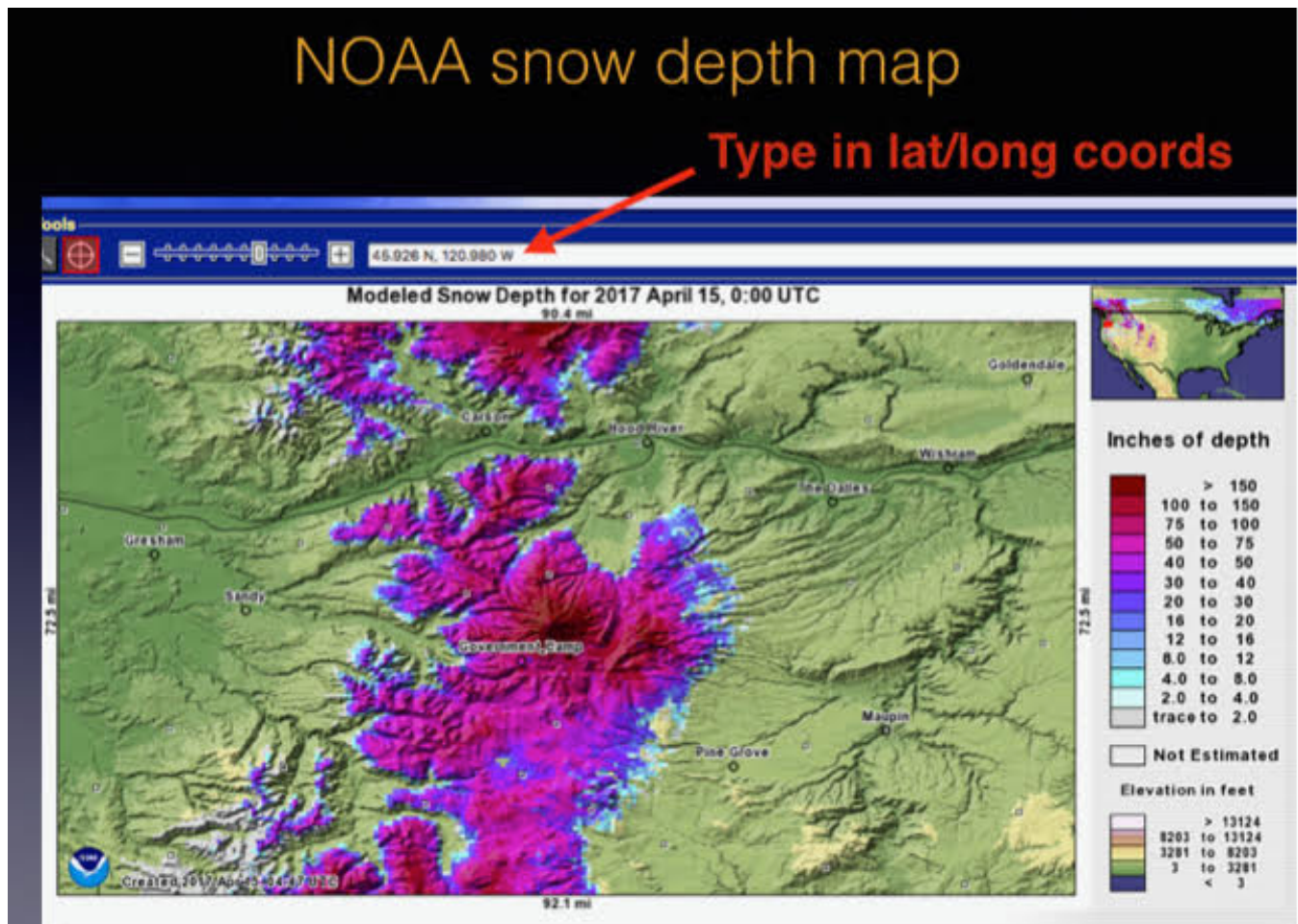
Now we're talking!

You should have a map zoomed in on the Washington Cascades, with snow depth selected, showing "inches of depth" on a nice color coded legend on the right.

Today's date should be at the top of the map.

Or, you can type in latitude longitude coordinates in the search bar and it should draw a map centered on that point. See Figure 4.

**Figure 4.** Generate lat/long centered snow depth map



You can also use the "select date" to see any date in the past and check the snow data.

I honestly have not found a great use for this yet, but it is kind of cool to scroll back a few years for the same date, say today, and redraw the map, and see a multi-year period of snow pack data for the same day.

I tried this for California for the last few years, and you can definitely see why they had several years of drought.

Give it a whirl!

--John Godino is the self-declared Mazamas Club "NaviGeek-in-Residence." A former forest ranger, he is their lead navigation instructor. Contact him at [johngo.pdx@gmail.com](mailto:johngo.pdx@gmail.com).



## Anxious About Avalanche? Slope Measurement Options

By Bruce Crawford

This has been a terrific snow year for mushing in the Cascades. Earlier this month on the Stampede Pass road I saw the top of an avalanche track that I knew crossed the road ahead. This was the navigation question: Do we continue, or take a left on the gentler Tacoma Pass road? It depends not only on the [nwac.us](http://nwac.us) forecast, but also on the slope.

Three inclinometers are shown below.

The pole clinometer (attaches to your ski pole, using the pole like a plumb bob) shows the slope in the red. Nothing to pull out of your pocket. No batteries to charge. Works at all temperatures. And in fading or flat light. The red zone is the maximum danger zone for slope. See Figure 1.

**Figure 1.** Pole clinometer slope scale is wrapped on pole. Red shows danger.



I've loaded the Theodolite App to my iPhone. Note that it displays UTM coordinates, date, time, elevation, and heading. The photo option preserves the data for later analysis. It shows 37 degrees. Horizon angle is displayed in the right panel—not our measure of interest for this exercise. See Figure 2.

**Figure 2.** Theodolite app slope reading 37 degrees in left panel.



My declination adjustable, baseplate compass also works in all weather and never needs a charge. I've centered West at the direction of travel mark by the hinge and tilted the compass to match the slope in the distance. I read the angle using the free-swinging black arrow. Degrees are scribed in small numbers inside the bezel housing. Compass says about 36 degrees. See Figure 3.

**Figure 3.** Hand bearing compass inclinometer reads 36 degrees.



So, the three independent readings agree. We take the Tacoma Pass road, and continue to evaluate terrain.

*--Bruce Crawford is a veteran member of the Seattle Navigation Committee. A keen scrambler and musher, he tests many navigation tools. The Samoyed is Cheetah, one of many raised/trained by Bruce's family. Contac Bruce or Cheetah: [brucec@bikejor.com](mailto:brucec@bikejor.com)*

## Navigation 2018 Across the Branches

### Everett

#### Chair Joel Heidal

Joel is new to the chair position in Everett. The Basic (Wilderness) Navigation Course continues at Camp Edwards.

### Foothills

#### Contact Person: Paul Thomsen

Foothills continues to offer their Staying Found and winter navigation courses. A new Digital Navigation course will be presented May 15<sup>th</sup>. Foothills is looking to offer a Wilderness Navigation course Spring 2019 based on the Seattle course. To that end Foothills is working with DNR to find a fieldtrip location.

### Seattle

#### Chair Brian Starlin

Seattle is offering the full suite of Wilderness Navigation, Introduction to Map & Compass, and GPS classes – six independent sessions per offering. An ad hoc sub committee is looking into further modernization of navigation instruction with a greater emphasis on smart phone and dedicated GPS devices. A November pilot of the revised Wilderness Navigation course is anticipated.

### Kitsap

#### Chair Jerry Logan

Kitsap has embraced the eLearning course for the workshop portion of the Wilderness Navigation Course. We just ran the latest course in February with a March 3rd field trip on a beautiful clear day at Gold Mountain. We included an introduction to Caltopo with this field trip to continue our move into electronic navigation tools exploration. This was very well received by our students.

### Tacoma

#### Chair Rick Finkle

Tacoma continues to offer the Basic (Wilderness) Navigation course.

### Olympia

#### Chair Mike Kretzler

Olympia continues with the Basic (Wilderness) Navigation course in April. We are able to keep our field trip at Kennedy Creek, having sorted out the ownership of the land we use. We're working on integrating electronic resources into our trip and route planning topics.

### Bellingham

Bellingham wraps navigation instruction into scramble instruction.

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## Wilderness Navigation Course Offerings--Seattle

Basic Navigation transitioned to Wilderness Navigation in 2016, clearly focused on wilderness/back country travel including off trail navigation to meet requirements for Alpine Scramble, Basic Climbing, Snowshoe and BC Ski students (and others). Altimeters and GPS units (basic point position) are included.

<b>Date &amp; Day</b>	<b>Workshops*</b>	<b>Date &amp; Day</b>	<b>Fieldtrips</b>
Tuesday, Mar 27	Program Center	Saturday, Apr 7 or 14	Heybrook Ridge
Mon, Sep 24 to Oct 23	Online Classroom	Saturday, Nov 3	Heybrook Ridge
Thursday, Oct 25	Program Center	Saturday, Nov 3	Heybrook Ridge

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

## 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 the Gaia GPS app 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. Prior completion of the Wilderness Navigation course is strongly encouraged. Fee and Badge.

### Topics include:

- Overview of how GPS works
- Common accuracy issues and solutions
- Review of UTM coordinates – Working knowledge is assumed
- 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) and Garmin dedicated units. Other brand GPS units are welcome, but instructors may not be familiar with them. Lead course administrator is Michael Hutchens.

The current URL provides a description and the 2018 dates are on the calendar: [GPS2018Seattle](#)

<b>Smart Phone &amp; Dedicated GPS Course</b>	<b>Location</b>
Wednesday, April 18 (Waitlist)	Seattle Program Center
Wednesday, May 23	Seattle Program Center
Wednesday, June 6	Seattle Program Center



Wednesday, August 22	Seattle Program Center
Wednesday, September 26	Seattle Program Center

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

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

Administrative 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>
Wednesday, April 25	Seattle Program Center
Monday, May 14	Seattle Program Center
Monday, June 11	Seattle Program Center
Monday, August 13	Seattle Program Center
Monday, September 10	Seattle Program Center

### **Other Seattle 2018 Navigation Seminars/Clinics\***

<b>Seminars/Clinics</b>	<b>Dates</b>
Instructor Training Elearning – No fee	Wed, Oct 10
Mentor Sessions Wilderness Navigation – No fee	Thur Apr5, or Nov 1
Wilderness Navigation Equivalency – No fee	Rolling enrollment
Contact Leader Lynn Graf	

### **Other Branches 2018 Navigation Courses\***

<b>Branch</b>	<b>Course</b>	<b>Dates</b>
Everett	Basic Navigation Workshop and Field Trip at Camp Edward	Saturdays Mar 31
	Wilderness Navigation eLearning Option	Under Consideration
Foothills	Staying Found	Saturday, May 5
	Wilderness Navigation	Under Development
	Digital Trip Planning & Navigation	Tuesday, May 15
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	Tuesday & Thursday Apr 17 & 19
	Navigation Field Trips	Saturday or Sunday Apr 21 or 22
Tacoma	Wilderness Navigation Lectures 1 & 2; Field Trip	May 8 & 10; Saturday 12
	Wilderness Navigation Lectures 1 & 2; Field Trip	Aug 7 & 9; Saturday 11



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

### **Navigating Through the Wild Elearning Course – No Badge**

Books -- National	Online Lessons Support Backcountry Off Trail Travel -- Contact Doug Canfield, Books	Completed, No plans to repeat
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### **Mazamas (Portland, OR) 2018 Navigation Instruction\***

Portland	Navigation Skill Builder Class – Videos, Wkshp, Field work	Sunday, April 8
	Wilderness Navigation Smartphone GPS (Gaia)	Sunday, May 27

\*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).

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## Navigation Gear, Apps & Links of Interest

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

### The Gear...

- Navigating city streets on night hikes? Or directing traffic off Hwy 2 to the Seattle Wilderness Navigation Field trip? Newest light wand has also been seen in the hands of SPD officers directing traffic in DT Seattle. The 14.5 inch Red LED Traffic Safety Wand Flashlight has 18 Red LED (two flashing modes - Blinking & Steady-glow) plus 1 White LED on tip (as flashlight), using 3 AA-size batteries. Leaders from the field trip and Seattle night hikes found the 7 oz tool superior to both heavier (old traffic wands) and smaller (Big Larry) lights for commanding driver attention and reducing arm fatigue. Around \$13, [Amazon](#)

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### The Apps...

- *Google maps will work like Google Earth by using the mouse control key to change from 2-D to 3\_D view. Try it on a tall mountain – a John Godino. See: [Full3d](#)*

(Following apps first published in June 2017 issue)

## Free (or nearly) Altimeter Apps For Smart Phones

By Lynn Graf

	App Name	Device	Developer	Cost
	<a href="#">Gareth Altimeter</a>	Android	Gareth Price	free
	<a href="#">Accurate Altimeter</a>	Android	AR Labs	free
	<a href="#">Pro Altimeter</a>	iPhone	Hunter Research and Technology	\$0.99
	<a href="#">Altimeter Plus</a>	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.



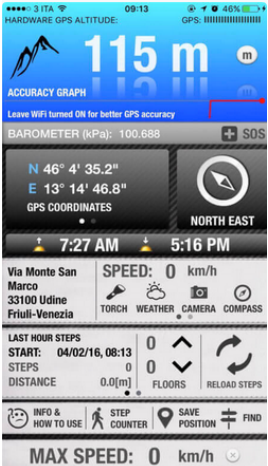
Also, The Mountaineers currently has a deal for free use of GAIA Pro that basically turns your cell phone into an advanced GPS device. Check the website under "Benefits" (<https://www.mountaineers.org/membership/benefits/instructions-for-redeeming-member-benefits>). It is highly recommended but requires 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.

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## Free (or nearly) GPS Apps for Smart Phones

By Brian Starlin and Emma Agosta

Screen Shot	App Name	Device	Developer	Cost
	<a href="#">MyTrails</a>	Android	FrogSparks	Free Pro €2
	<a href="#">GPS Essentials</a>	Android	Schollmeyer Software Engineering	Free
	<a href="#">Handy GPS</a>	iPhone	Anthony Dunk <i>[Note: Also authored Coordinate Master to convert Lat/Long to UTM]</i>	Free
	<a href="#">Altimeter GPS</a>	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 to Mountaineers members.

### **Android Reviews (Brian)**

>>GPS ESSENTIALS ([mictale.com](http://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.

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## And the links ...

- Adventure Alan reviews the inReach and SPOT satellite messenger devices. Note that these are really in a different category than Personal Locator Beacons (PLBs) because they support two-way text messaging in addition to the ability to send out an SOS. Two-way text messaging is proving to be very valuable in SAR operations because it facilitates communication/coordination of details well beyond a simple SOS.  
<http://www.adventurealan.com/best-satellite-messenger-inreach-vs-spot/>
- A blog article that describes various ways to utilize your smartphone for trips including weather, avalanche forecast, navigation, tracking, notes and photography.  
<https://blog.gaiagps.com/7-ways-to-use-your-smartphone-to-plan-backcountry-ski-trip>
- Section Hiker details the list of navigation hiking gear that he carries on trips in the backcountry.  
<https://sectionhiker.com/hiking-navigation-gear-list/>
- Section Hiker explains Geospatial PDF (an extension to Adobe's Portable Document Format that lets you encode GPS features with PDF documents) and how you can use CalTopo to self-publish your very own Geospatial PDF maps. Note that you could try it right now by creating a Geospatial PDF of the area you are located at and importing into the free Avenza Maps app on your smartphone - good times!  
<https://sectionhiker.com/gps-navigation-with-pdf-maps-on-smartphones/>

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# Navigation Gear--Compasses

## Required Compass Features: Seattle Wilderness (Basic) Navigation Course & Foothills Staying Found Seattle Mountaineers—Revised March 2017

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 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 Polaris). Silvas are available at Cabela's or online.

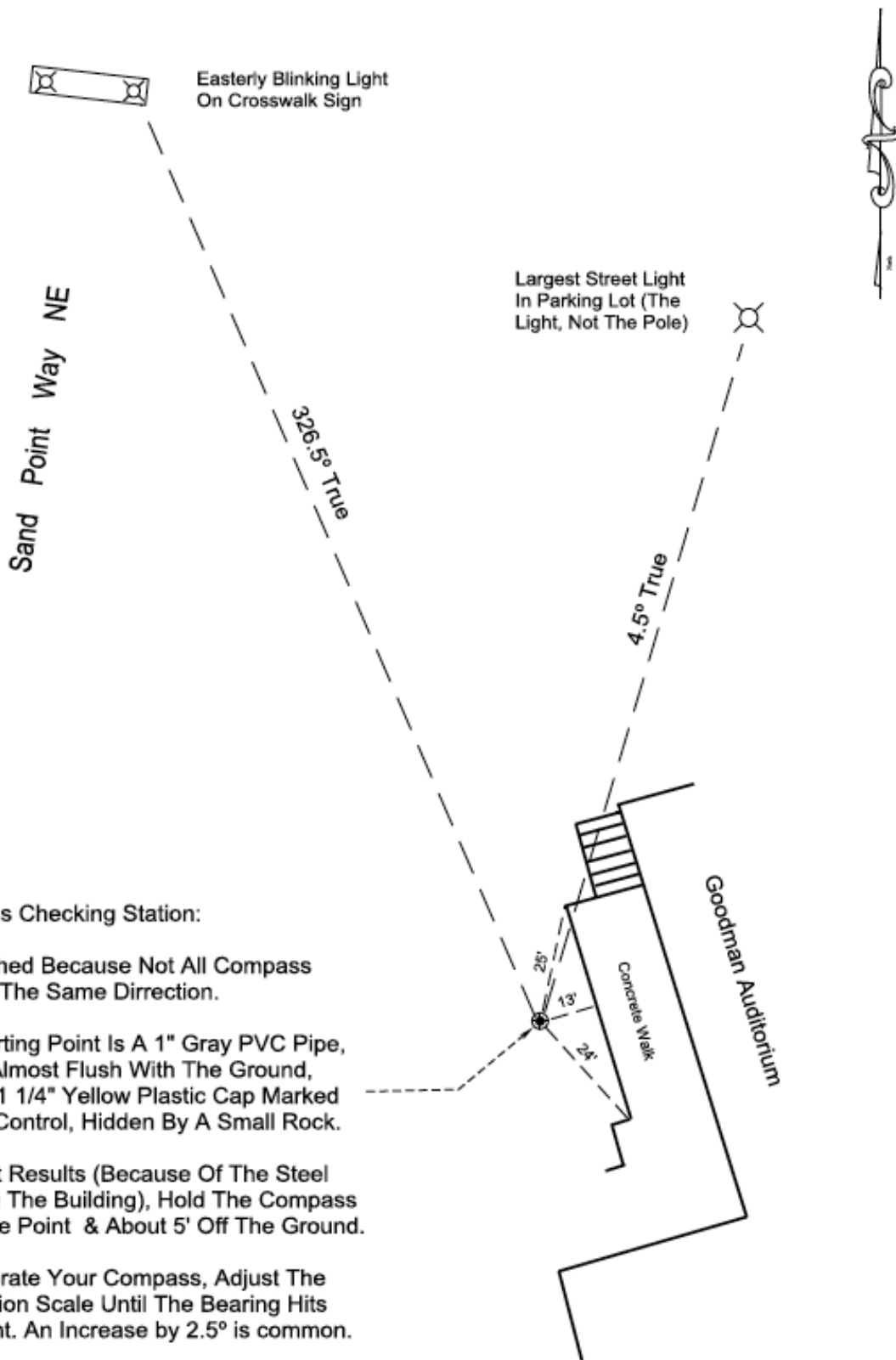
--K & R has the Sherpa and Alpin using 1:25,000 vs. 1:24,000 rulers. They are available online.

--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. Suunto is currently available at REI, Feathered Friends and online.

Manufacturers make continuing improvements and corrections in models.

(Rev Mar2017/bb)



**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 Targets 2018

<b>Calendar 2018</b>	<b>Copy Deadlines</b>	<b>Publish Dates</b>
<b>Volume 6, Issue 1</b>	<b>June 1</b>	<b>Late June 2018</b>
<b>Volume 6, Issue 1</b>	<b>September 1</b>	<b>Late September 2018</b>
<b>Volume 6, Issue 1</b>	<b>December 1</b>	<b>Late December 2018</b>

**Inquiries, Contributions, Letters to the Editor to Peter Hendrickson**  
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### **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**

(Rev08May2018/ph)