Recording and Sharing GPS Waypoints
By David Petersen, Mr. BestRest

I don't pretend to know everything there is to know about a GPS, or claim to be an expert when it comes to navigation, but somehow I manage to get from Point A to Point B without getting "lost". I've used a GPS for many years and I've learned a few things along the way, but the more I learn, the more I realize my GPS skills need work. I'm sure some experts will find errors in this article – that's OK. I'm know on the right track and what I'm trying to explain will help the reader get on his own track, too.

A GPS is a wonderful device but it can also be your worst enemy. It can lead you by the nose you to some pre-programmed point on the planet (if you do everything right) or it can lead you astray and you'll find yourself wandering in the wilderness, surviving on berries and pine cones. Don't blame the GPS when that happens. It's a tool that does exactly what you tell it to do. The key to successful GPS navigation is this thing called "YOU". YOU tell it what YOU want it to do, HOW to do it, and then YOU must understand the data it displays in response to YOUR directions.

This article covers the process of collecting waypoint data, recording that data, and sharing that data with others so they can use it (successfully) at a later time.

The actual scenario was a work party that gathered in Republic, WA to lay out a scavenger hunt for the WA BMW Cascade Country Rendezvous. WA BMW Riders and the 47th Cascade Country Rendezvous and Adventure Rally

Six riders, all armed to the teeth with GPS's were tasked with riding pre-determined tracks, then stopping along the way and creating checkpoints (waypoints) that could later be discovered by others. I was in charge of this Expedition; I'd laid the tracks last year so I supposedly knew where the riders were going. "Follow the little colored track line on your GPS and you can't go wrong", I told them.

Whenever they came to a likely spot they would hang a tag with a checkpoint number (D24, D77, etc). Then they would poke their GPS screen and view the lat/lon coordinates, record that info on a sheet of paper, and turn in their worksheets at the end of the day so I could create a checkpoint spreadsheet. When I got home, I would put those checkpoints on maps, and provide a waypoint chart and GPS files to other riders when they showed up at the Rally. That was my plan.

It seemed like a simple task… ride and have some fun, stop here and there, hang a tag, check the coordinates, write them down, turn them in. I carefully briefed each rider, telling them exactly what I needed. Five heads nodded in understanding. What I failed to do was to tell them was the exact format

I needed them to use when they recorded those coordinates. Off they went, intent on doing their jobs, oblivious to the carnage they'd create.

A coordinate is just a set of numbers, right? Right. But the way those numbers are created makes a huge difference. Maps use all sorts of formats, and GPS's use all sorts of formats. If you're savvy you can understand all those variations; it's sorta like being able to speak French and German and Spanish and Tagalog and Hindi and English, all at the same time. I don't, I can't, I never will.

A GPS coordinate is nothing more than a latitude and longitude number.   Without going into too much detail, the world is split at the equator, with northern regions being North latitudes, southern regions being South latitudes. For longitudes the world is split vertically at Greenwich England. Anything west of that line is a Western longitude, to the east is an Eastern longitude. Am I boring you? Probably, but you need this info to work a GPS.

At the Rally we're in a region of the world that has a northern latitudes and a western longitudes. So every coordinate would look something like this: N48.33452 W118.67243. Note that these coordinates were generated using a DIGITAL format instead of the degrees-minutes-seconds format. Digital coordinates are easy to understand because we live in a digital world. A series of numbers and one simple decimal point. Easy peasy. To make it even simpler, most folks drop the N and the W entirely, and only use the numbers. It's widely understood that the first set of numbers is gonna be a Northern latitude, and the second set is gonna be a Western longitude. (for other parts of the globe the N an W would be important, but it wasn't to us).

Back in the days of sailing vessels they recorded coordinates using minutes and seconds. They used a turkey quill as a pen and an ink jar to write those numbers down, They would painstakingly write their coordinates like this: N48° 20.466' W119° 19.554'. The symbol ° indicates degrees, the number before the period indicates minutes, and the last 3 numbers indicates seconds.

Why minutes and seconds? They were using clocks to determine their location and they registered their position only when the sun reached its mid-day zenith. The sextant was developed for just that purpose. Take a sextant reading at exactly noon, refer to a clock, and you could calculate your exact position, or at least get close enough for a sailing vessel. My explanation is greatly simplified but you get the picture. The practice of using degrees-minutes-seconds continues to this day, but it's falling out of favor, except for certain applications.

Today we have satellites to do the work. They communicate with your GPS and through some marvel of electronic time-keeping and radio signals. Your GPS listens to them and tells you exactly where you are. It's all very mysterious, very scientific, and very accurate.

Back to the work party in Republic who were tasked with recording their checkpoints… Due to my lack of leadership and GPS knowledge, I failed to specify the exact format I wanted them to use when they

established checkpoints. Some were using the preferred digital waypoint system, some were using the degrees-minutes-and-seconds system. Fortunately nobody used a sextant. When I pulled their data off the checkpoint spreadsheet and put those waypoint numbers into Basecamp, the checkpoints were not where I knew they should be – they showed up somewhere else on the map. A few were in Canada, a few were in Europe, a few were in the middle of the ocean. What was going on? Was all our work for naught? I kept trying to make sense of it, but no matter what I did those waypoints didn't correspond to where I knew they were.

A GPS Guru is someone who knows more than you do about the intricacies of navigation. Find one, make friends with them, shower them with gifts, and they'll help you when you're GPS-challenged. My personal GPS Guru is Steve Irby and he's also been a riding buddy for many years. Steve knows enough to teach GPS classes (which he's done). He's very patient with me when I get frustrated working with my own GPS and Basecamp. How did he learn the GPS and Basecamp? From years of practical experience as well some mentoring from his own GPS Guru, Dan Townsley. (Dan will be teaching GPS classes at the WA BMW Rally in July)

"It's all about the waypoints and the way they were created" Steve said, "They were using a different format. All you have to do is convert them to digital numbers and you'll be fine." He hung up the phone and left me on my own (Give a man a fish and feed him for a day… make a man learn how to fish on his own and he'll go hungry for a while, but eventually he'll have food for a lifetime). His advice was easier said than done, but supposedly do-able once I came to understand French and German and Taglog and…. and once I learned a few things about Basecamp. I called Steve several times before I finally figured things out. Apparently, he's sending me an invoice for something called "online support".

Basecamp takes the waypoint data you give it and plunks it on the map. **It does that process based on the data it gets from you**. If you're inputting <u>digital</u> coordinates, it puts that waypoint exactly where you told it, but if you try to use <u>degrees and minutes and seconds</u> coordinates, it puts the waypoint somewhere else. Very confusing.

Basecamp can handle all the GPS formats and place them exactly where they should be, but you have to change some settings so Basecamp can processes the data provided by the person who created the waypoint. If they used a different format than the one you're working with, then the waypoint will show up on the Basecamp map in the wrong place. If you're not careful, you'll miss your mistake, create bad data, and those who later try to find that waypoint will get hopelessly lost.

Simply stated, if your buddy is recording waypoints using a digital format, Basecamp must be set up to process digital data. If your buddy is recording waypoints using a degrees-minutes-and-seconds format, Basecamp must be set up to process degrees-minutes-and-seconds data. **The two formats are NOT compatible.**

You've got to do **TWO** things to make this system work the way you want:

1. Get every rider on the same page. Set everybody's GPS so it creates waypoints using the same format; if they record the data on paper, have them record it in a consistent way.

2. Set Basecamp so it processes waypoint data using the same format as the data collected by the various GPS's.

I strongly recommend that everyone use the **DIGITAL** waypoint format hddd.ddddd°, i.e. W48.63435° N118.35643°. For practical purposes when you record data you can drop the W and the N, as well as the degree symbols (°). It's assumed they'll always be there and there's no reason to write them down.
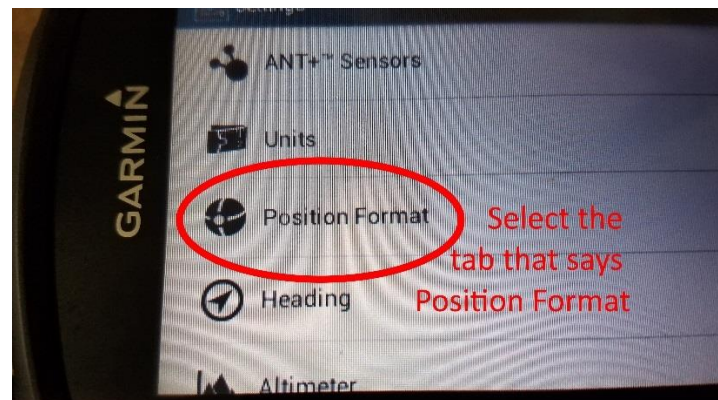
Setting the GPS

How do you set every GPS so it records in the same format? GPS's are different based on model, but they all have a SETUP screen that allows you to choose your waypoint display options. In these photos we'll be using my Garmin Monterra as the guinea pig… your unit is probably different. Poke around until you find what you need.

Click that button and a new screen appears, it might say **MORE** as shown here.

Find System Settings
Poke that button

Scroll down to the button that says "More" and poke it.
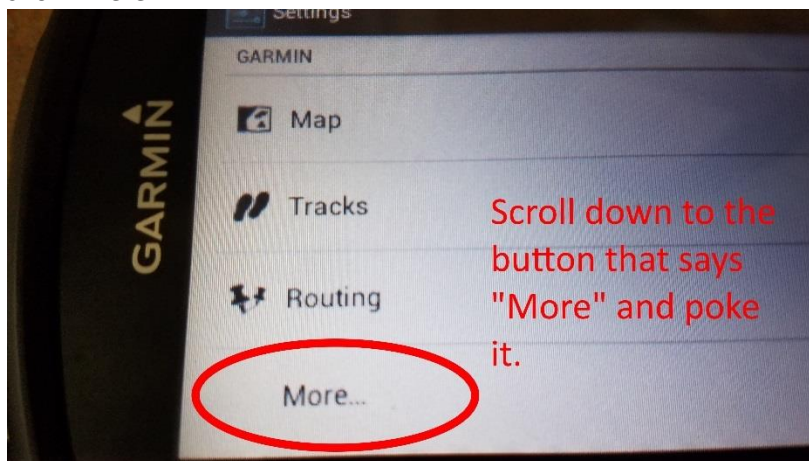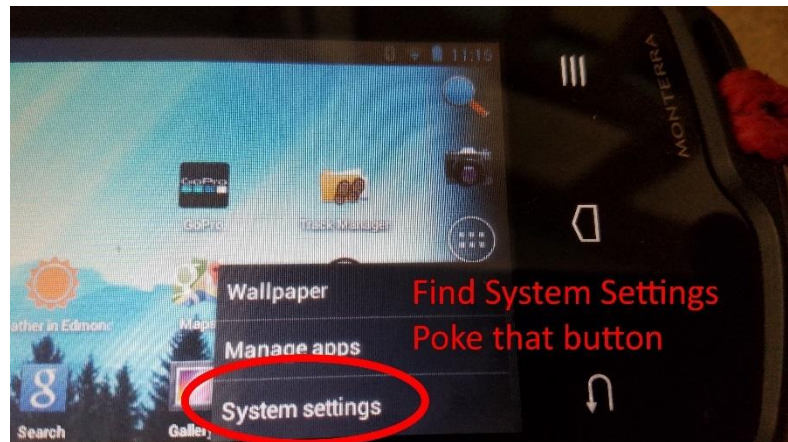
Next, click on the **POSITION FORMAT**.

Select the tab that says Position Format

Once you click that button, you'll see a number of options for recording and displaying coordinates. Scroll and select the one that says **hddd.ddddd**. Or, you can be stubborn and use another system, but don't say I didn't warn you.
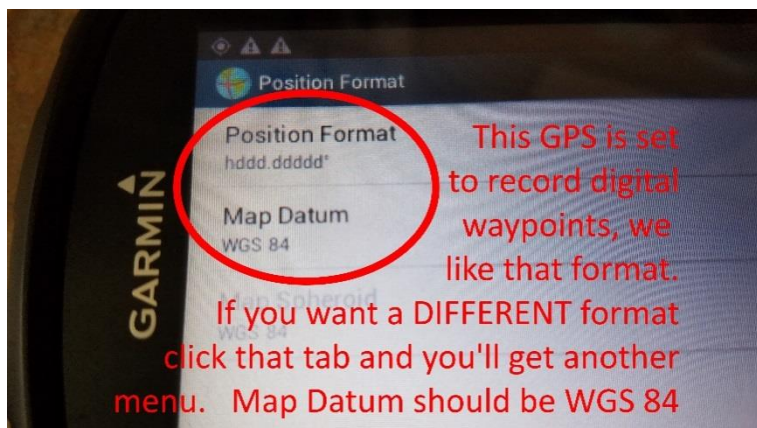

Once everyone's GPS is speaking the same language they can go out and mark checkpoints (waypoints), record the data, and share it in a way that's easy for everyone to understand.

Basecamp File Setup

I won't go into much detail here, but I'd be remiss if I didn't tell you how to save the waypoints you're recording. Start at the Basecamp main menu. Click **FILE**, CLICK **NEW**, CLICK **LIST FOLDER**.
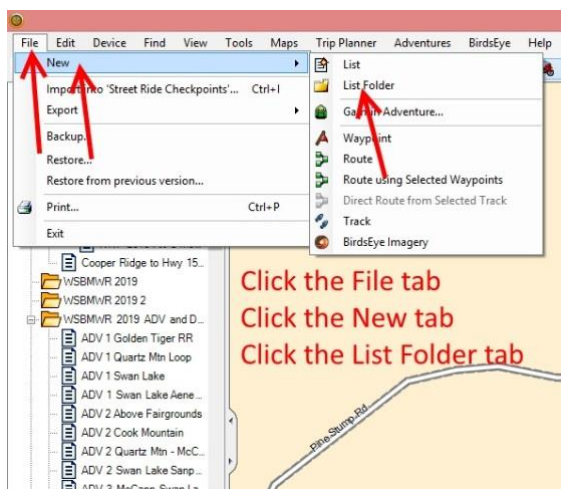
By doing all that I created a New Folder within another file named "WSBMWR 2019 ADV…" as shown below.
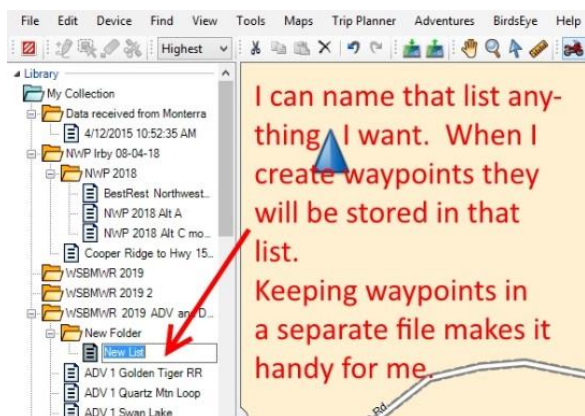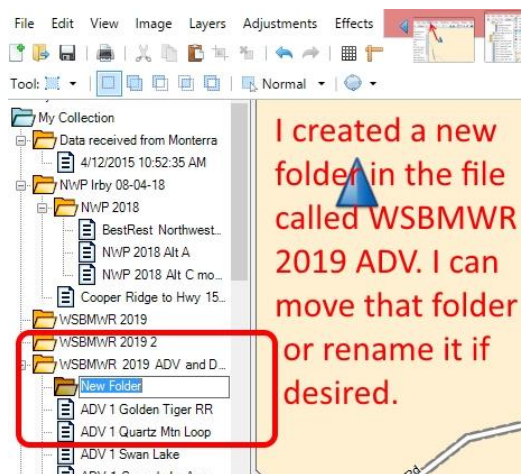
I can name that New Folder anything I want. Or I can move that Folder and New List anywhere on the list of files that are in the blue folder called "My Collection". These steps are nothing more than sorting files and placing them where you find them most convenient.

Setting Basecamp Coordinate Formats

Now let's move on to the next step… setting up Basecamp so it'll record all those digital waypoints correctly.

Note that I'm gonna be talking here about manually entering waypoints, using my keyboard. If you're using a cable to transfer waypoint data this process isn't the same. The computer and the Basecamp program will automatically read the data coming from the GPS and plunk the waypoints in the proper spot. When that file is shared, other GPS's will read the waypoints correctly.

On the Basecamp top menu, select the **EDIT** icon. A menu will appear. Click on **OPTIONS**.
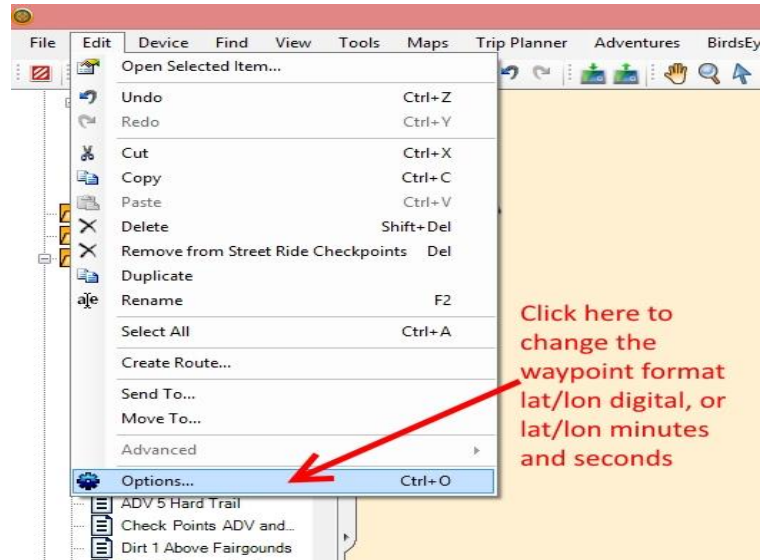
The next window on your computer screen will show the **OPTIONS** menu. Scroll down to **GRID** (lower left of that menu) and click that button.
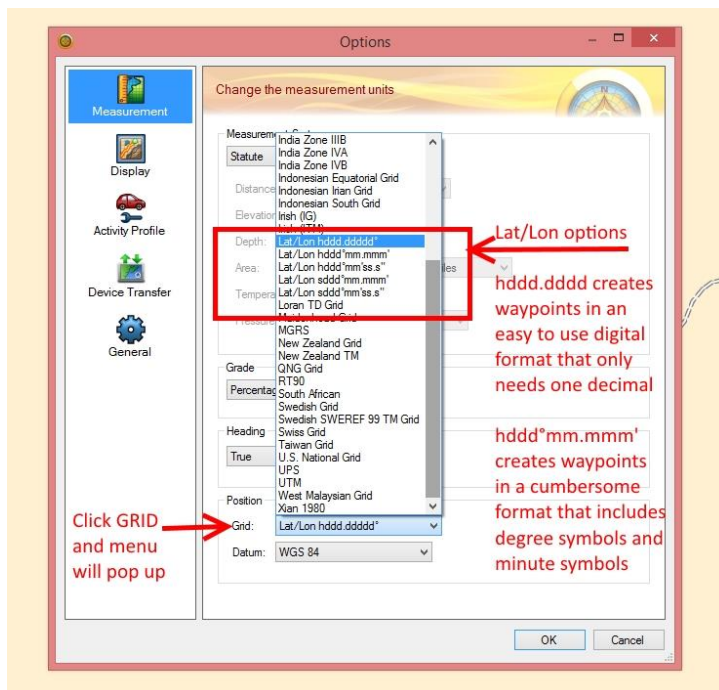
Up pops the various options you can select. I strongly recommend you select the Lat/Lon hddd.ddddd° button shown in blue. That's the easy-to-use digital format I prefer.

If you've thoughtfully set your GPS to that same format before you headed out the door, then your waypoints will be compatible in Basecamp. If you didn't, you're gonna be pulling your hair out by the roots.

Reminder: If the GPS format and the Basecamp format aren't IDENTICAL you're gonna have sadness. Your waypoints will show up on the map but they'll be somewhere they don't belong.

Here's what happens when someone records a GPS waypoint using hddd°mm.mmm', but your Basecamp program is set to read hddd.ddddd'. The actual waypoint location is miles away from the waypoint that shows on the map. You can't take a degrees-minutes-and-seconds coordinate and casually enter them as though they were digital coordinates. If you do you're gonna get something like this:
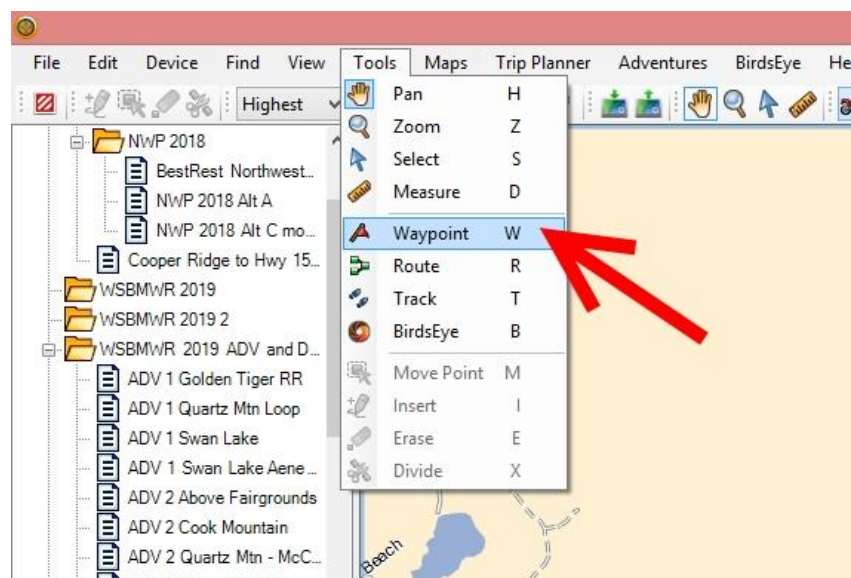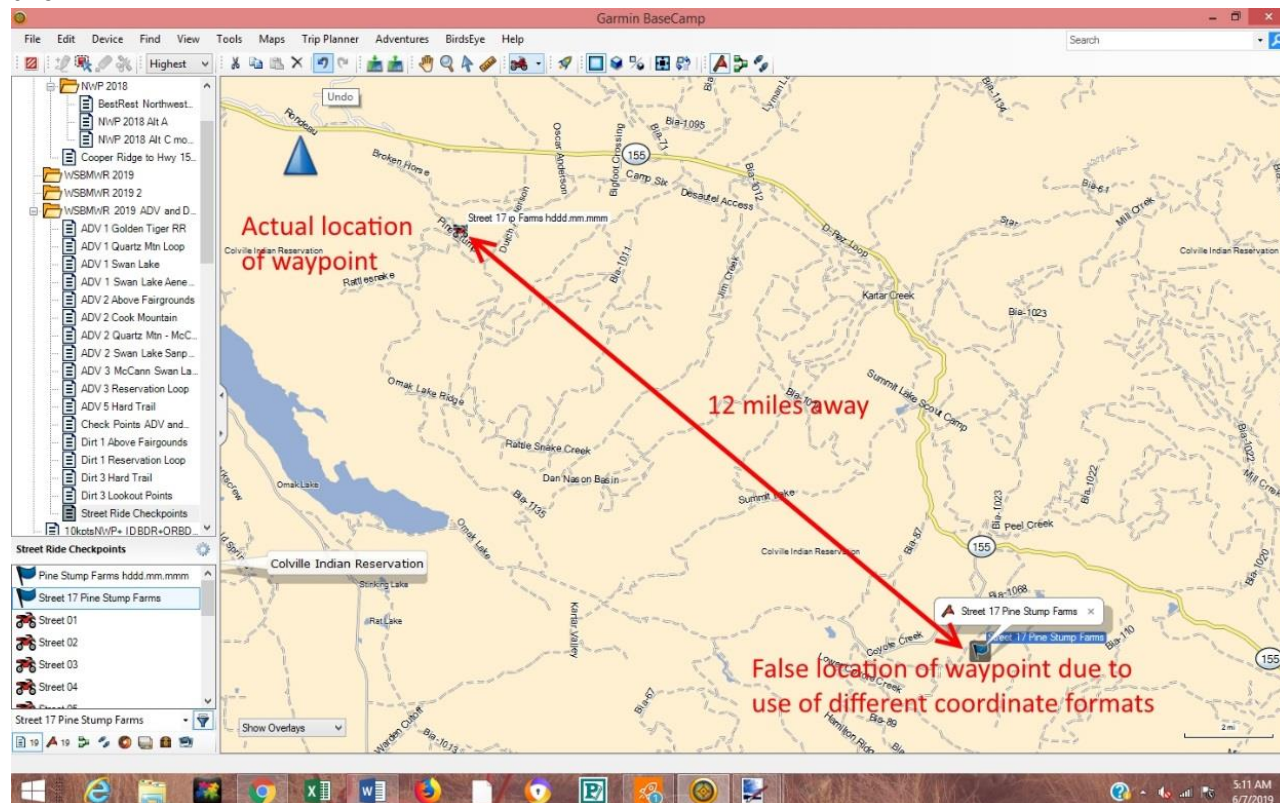

Once your settings are compatible (based on the format you selected on your GPS), bring up the Basecamp map and click the **TOOLS** button. A menu will appear, scroll down to the **Waypoint** tab and click. Now whenever you put your mouse and on the map and click, you'll create a new waypoint.

NOTE: your mouse pointer doesn't have to be on the actual location of the waypoint. You can edit the waypoint coordinates manually after you've clicked and created the waypoint.

I wanted to put a waypoint at the end of this spur road called Rattlesnake Road, so I clicked in the approximate location I wanted it to go, using my mouse.
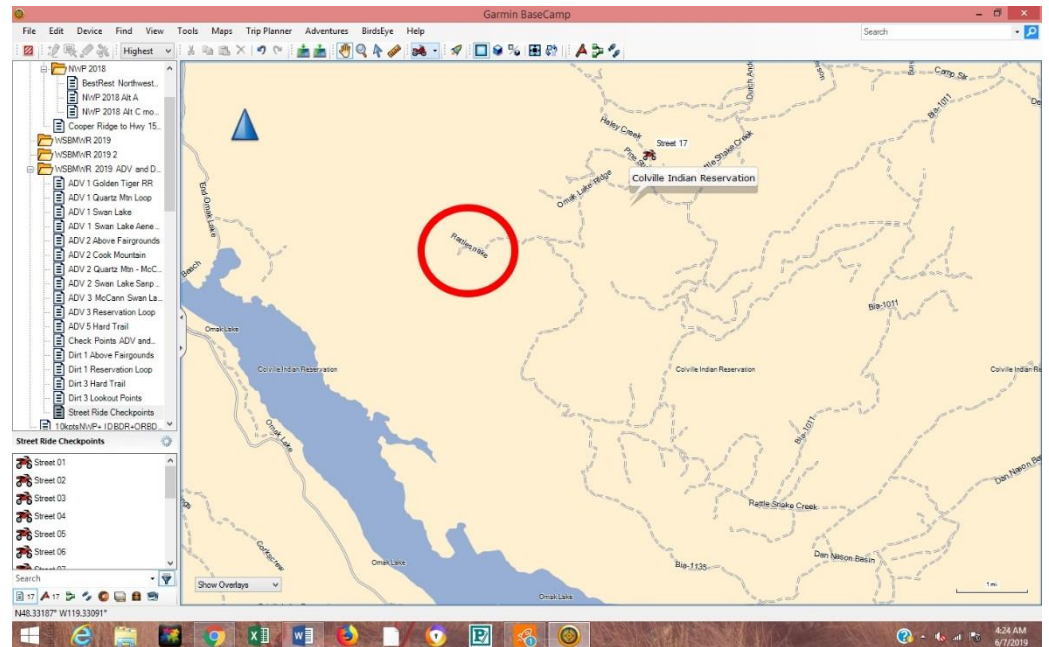

When I did the above, I saw this appear on the screen (red arrow for emphasis):

Bingo! A waypoint named Rattlesnake Road appeared on the map AND it also showed up in the lower left menu of Basecamp.
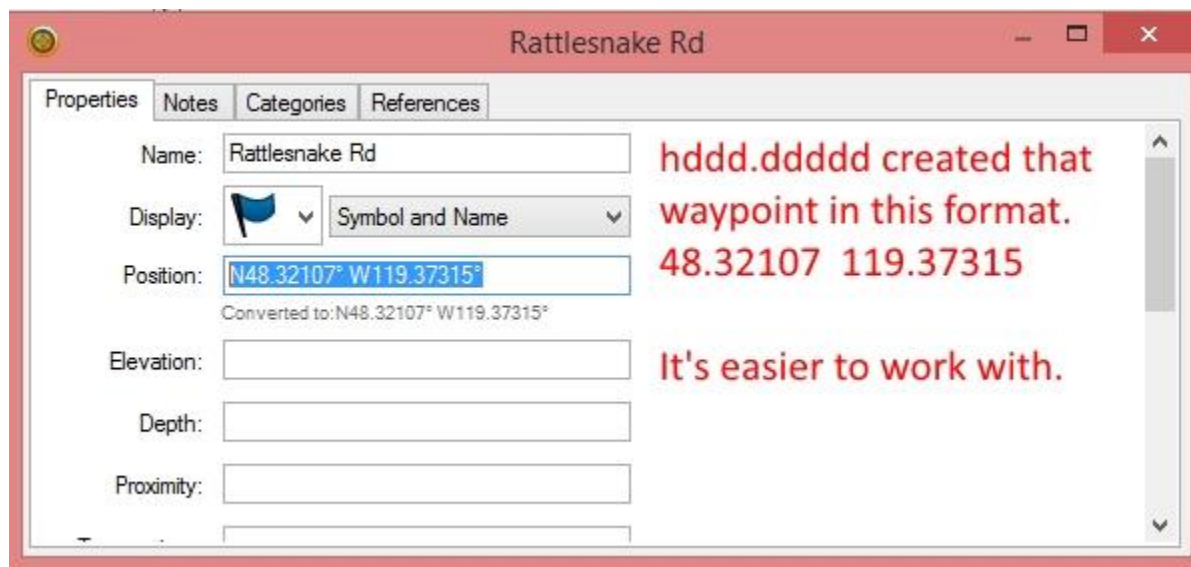
I still need to do some work on that waypoint so I'm not quite finished yet.

If I click on the Rattlesnake Road name in the lower left menu, the details of that waypoint will appear in a new menu.
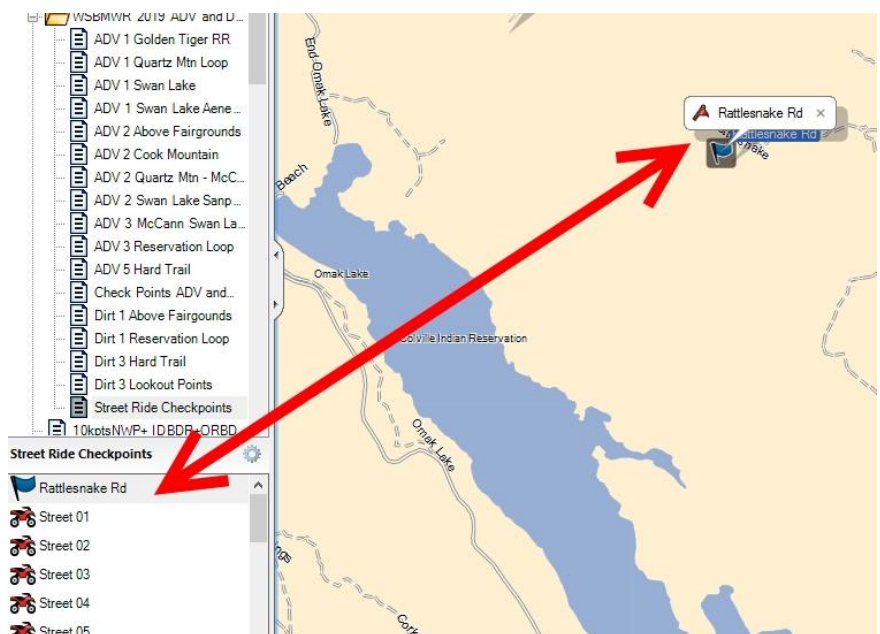
Basecamp tells me that the name is recorded as "Rattlesnake Road". It picked up that name from the Garmin mapping program. If I clicked off the roadway, it might show up as Colville National Forest or some other name. In this case Rattlesnake Road has coordinates of N48.32107° W119.37315°.
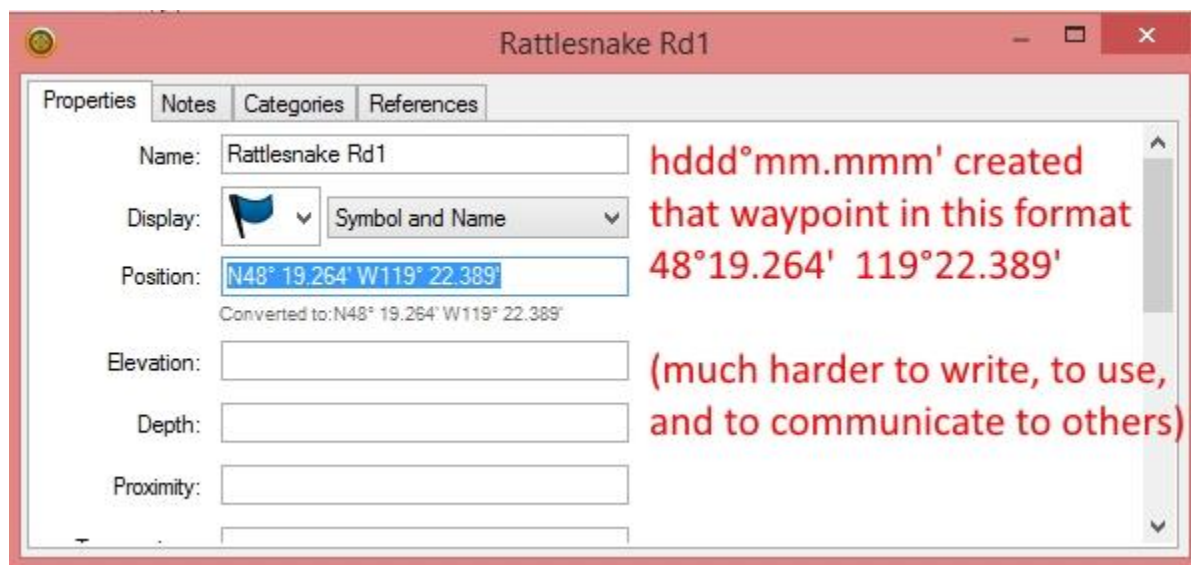
If I was foolishly working in the archaic language of degrees-minutes-seconds, the coordinates would read something else (shown below). All those degree signs, decimal signs, and minute marks are difficult to read and difficult to enter on the computer. The digital format (shown above) is quicker and easier. Think of the digital format as the universal language of the GPS community.

I can change details about my newly created digital waypoint by clicking on the small tabs at the top of that new red window. See next page.

- **Properties** tab already gives you general info about the waypoint. You can change them. This one is currently named Rattlesnake Rd.

- **Notes** tab allows you to enter comments, i.e. "there be bears up here", "steep drop-off", "6-pack stashed behind the oak tree", etc.

- **Display** tab allows you to select an icon that is easy to identify on the Basecamp map and on the GPS when you upload that data. I like to use an icon showing a motorcycle (scroll up to find it)

- **Other tabs have different functions, but I seldom use them**
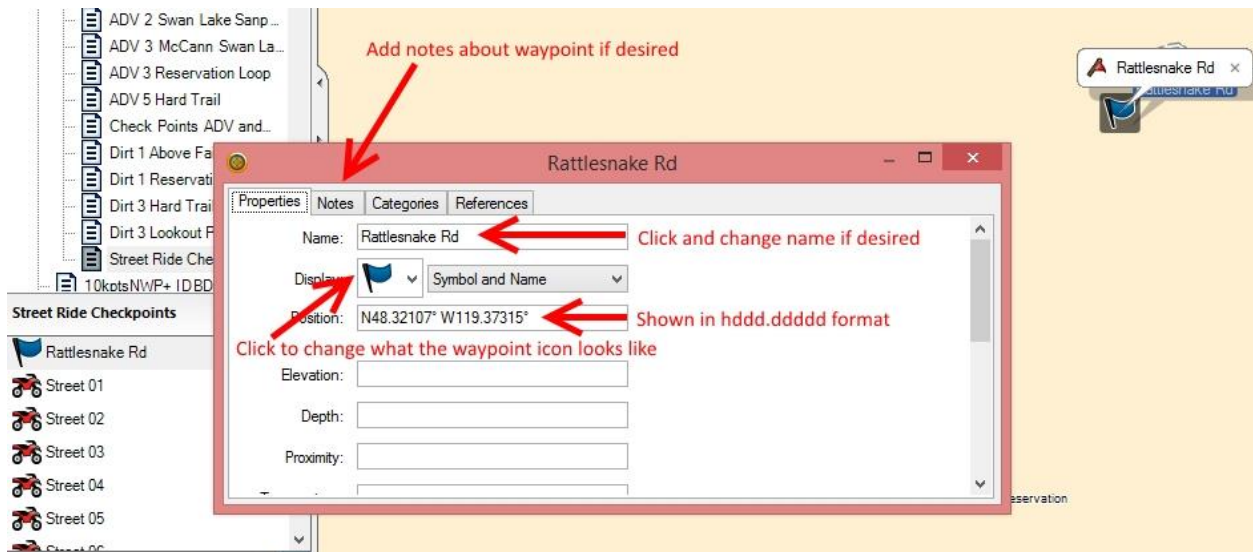
Once you've made the necessary changes, there's **NO** button that tells you how to save that file. Don't worry, they'll automatically save themselves once you **click the small red X box** at the top right of that red window. Your waypoint is saved with all the coordinates, all the notes, icons, etc. that you added. It'll show on the map, and it'll also show up on the menu at the lower left of the Basecamp screen.

Note the motorcycle icons in the lower left and their unique names (Street 1, Street 2, etc.). Each one of those waypoints will take a rider to a specific checkpoint. If you also look at the list of folders to the left of the red box (photo above), you'll see bold type that says **Street Ride Checkpoints.** That's where I'm storing them, all in the same folder. The top one says **Rattlesnake Road** and it has a flag icon. That's because I haven't changed the data within that red box. Before I'm done I'll take care of those details.

Whew, that was a mouthful… your eyes probably rolled back in your head and you fell out of your chair due to boredom. Sorry, this stuff can be technical, but if you're sitting in front of your computer scratching your head as you fight the battle between the GPS formats and Basecamp, then this tutorial might save you a lot of headaches.

We'll see you on the trail
David Petersen (Mr. BestRest)
BestRest Products
Makers of the CyclePump Tire Inflator, EZAir Tire Gauge, and other adventure gear for motorcycles.