

Recreational vs. Mapping grade GPS devices

Hold a recreational grade GPS (ie. Garmin, Magellan) in one hand, a mapping or resource grade unit (ie. Trimble) in the other hand and you may see a GPS reading within 3 meters of each other. So what's the difference? If all you need is to record or navigate to a 3 meter point on the ground, maybe a recreational unit is all you need. If the project goals require data recorded with increased accuracy, multiple distinct features, corresponding attributes and must meet agency standard for solid, defensible datasets on which to base management decisions a mapping grade unit is required.

1. Distinct Features (Points, Lines, Areas)

A feature is an individual point, line or area.

Recreational units are designed primarily to collect only points. It is possible to record a track that may or may not close on itself. This is simply a breadcrumb trail that follows you wherever you go. This single track is not distinct lines or polygons that can be assigned a name or any other information. Software such as DNR Garmin can be used to manipulate this track into line segments or polygons, but it is a very time consuming task for little return. It is questionable that such recreational data would meet many data collection project goals efficiently.

Mapping units collect distinct, individual point, line or area features. A Log-between-feature option does exist to collect a positions recording where you have traveled all day.

2. Attributes

Information about point, line and area features is as critical as the location itself. In fact, it is this information and analysis that provides GIS with so much power.

Recreational units allow you to record simply a 6-8 character name for each point. Any additional information has to be logged somewhere outside of the GPS software and reentered into a GIS system later.

Mapping grade GPS units allow the your the record as many attributes as desired. Customized, data dictionaries can be used to prompt you in the field as to which features and attributes should be collected. Data dictionaries ensure the same project features and attributes are collected consistently and to the same standards. This is critical especially when multiple sites visits, inspections or users are involved. For example, the Bureau of Land Management implemented a nationwide data dictionary was to enforce the consistent standard for Abandoned Mine Lands Inventory System with over 11,000 records.

3. Integrating GPS data with GIS

ESRI ArcGIS products (such as ArcMap, ArcCatalog etc) are the most widely used application and corresponding file formats for GIS data in North America. For Trimble GPS units, Trimble Pathfinder Office software to a number of spatial data formats including ESRI GIS file shapefiles and other formats is very easy.

Each different brand of recreational grade GPS has its own brand-specific hardware accessories and software packages for transferring GPS data to and from a computer. Limited applications exist to convert recreational grade GPS data to ESRI or Trimble file formats. DNR Garmin, an ESRI ArcGIS from the Department of Natural Resources at the University of Minnesota is by far your best choice for recreational units.

4. Viewing and collecting GIS data on the GPS

ESRI's ArcPad software enables you to load their own ArcGIS-created maps (including GPS data already collected) onto a Trimble GPS unit. In the field, you can see your GIS map and current GPS position on the mobile device display, and can collect new data or update existing data directly on the GPS unit using live, collected positions.

Once back in the office, ESRI's GPS Analyst Extension or Trimble Pathfinder Office for differential correction and GPS file management.

5. Accuracy

While recreational grade units are generally accurate to approximately 5 meters, mapping grade units can range anywhere from 5 meters to 10 centimeters depending on chosen hardware. In addition to hardware, it is the ability to collect, process and document various types of GPS signals and conditions that set the two types of units apart.

Recreational units can display an estimated range of accuracy as the unit is collecting data but this figure is not recorded anywhere nor are you able to manipulate the acceptable quality of satellite data in the field. Once data collection is completed, there are limited opportunities to assess or correct calculated positions derived from recreational unit data.

Mapping grade units is designed to decrease various effects from the atmospheric and signal noise. During data collection, the user can modify these setting to specify the acceptable quality of satellite signal for obtaining GPS positions. Real-time correction can be performed while in the field with additional equipment. In the office, data quality can be reviewed. Accuracy can be further improved using differential correction against hourly base station files which calculate and remove known amount of error.

