Thoughts on buying a GPS

- Basic features
  - Coordinate display with UTM as an option
    - Rules out most car nav models
  - Fast start up, good receiver technology
  - Easy to use user interface
    - Hard to quantify
  - USB interface
    - Almost all have this now
  - Mass Storage Mode

Thoughts on buying a GPS

- Optional but useful…
  - GNSS Support GLONASS, etc.
  - Digital Compass
  - External Antenna Input
  - Uploadable maps [why?]

Thoughts on buying a GPS

- Doubtful usefulness… [IMHO]
  - Unit to Unit data transfer
  - Altimeter
  - Camera
  - MP3 player
  - 2 Way radio

Physical & Performance

- Unit dimensions & Weight

- Display size
- Display resolution
- Display type

- Battery & Battery life
- Waterproof & Floats

Maps & Memory

- Basemap
- Preloaded maps
- Ability to add maps
- Built-in memory
- Accepts data cards

- Waypoints/favorites/locations
- Routes
- Track log

More Features

- Automatic routing (turn by turn routing on roads)
- Electronic compass: (tilt-compensated, 3-axis)
- Touchscreen
- Barometric altimeter
- Camera
- Geocaching-friendly
- Custom maps compatible
- Photo navigation (navigate to geotagged photos)
- Outdoor GPS games, Hunt/fish calendar, Sun and moon information, Tide tables
- Area calculation
- Custom POIs (ability to add additional points of interest):
- Unit-to-unit transfer (shares data wirelessly with similar units):
- Picture viewer
- Garmin Connect™ compatible
  (online community where you analyze, categorize and share data)

eTrex 10 $93

- Good basic GPS + GNSS
  - 2011 Technology
- Smallish monochrome screen
- USB interface
- Basemap only

eTrex 20 $159 [+$66]

- Higher resolution color screen
- Ability to add maps
- Map memory + Data card slot

eTrex 30 $241 [+$82]

- Electronic compass
- Barometric altimeter
- Wireless unit-to-unit transfer

GPSMAP 64 $257

- Basic High Sensitivity GPS+GNSS
  - 2013 technology
  - bigger screen than the eTrex
  - shorter battery life
- GPSMAP 64s $308 [+$51]
  - Compass + Altimeter
  - Wireless Unit to Unit data transfer
- GPSMAP 64st $358 [+$50]
  - pre loaded topo maps - not 1:24,000 detail

eTrex Touch 25 $215

- Slightly bigger display than eTrex
- Electronic Compass
- Shorter battery life
  - 16 hrs vs 25 hrs
- eTrex Touch 35 $240 (+$25)
  - Barometric Altimeter
- eTrex Touch 35t $310 (+$70)
  - Topo US 100k maps

Montana Series

- Montana 610 $400
  - Bit bigger color touchscreen
  - 2 AA batts. 22 hrs
  - Compass + Altimeter
  - Wireless transfer?
  - 610t +$40 USA Topo 100k
- Montana 680 $460 [+$60]
  - 8 Mp Camera
  - 680t +$40 USA Topo 100k

Oregon Series

- Oregon 700 $400
  - Bit bigger color touchscreen
  - 3 AA batts. 16 hrs
  - Compass + Altimeter
  - Wireless transfer?
- Oregon 750 $500 [+$100]
  - 8 Mp Camera, WiFi
  - 750t +$50 US Too 100k

Online Mapping Resources

http://www.nearby.org.uk/google/Gridlines_utm.kml.pl

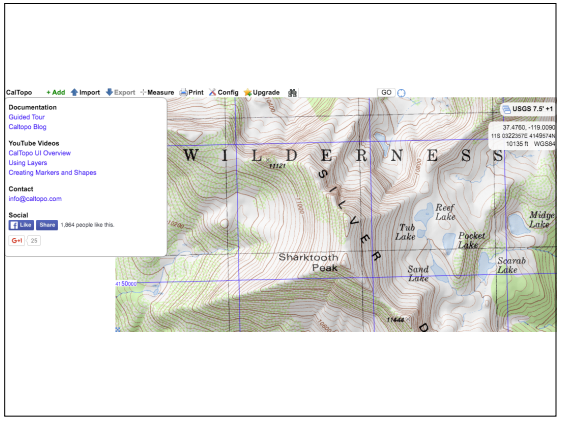
Google Earth UTM Grid Lines KML file

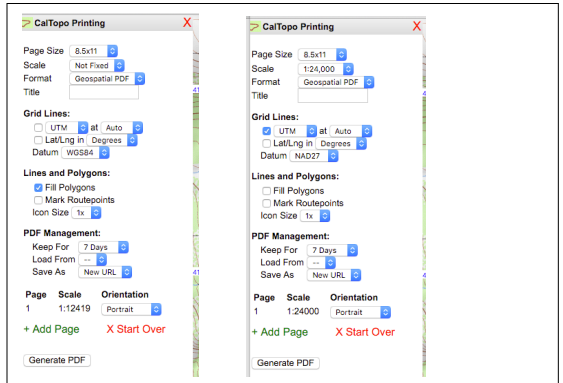
CalTopo.com

- Matt Jacobs
  - BAMRU

Membership Types

	Free	Basic	Pro
Cost	--	**$20/yr**	**$50/yr**
Private Maps (unlimited public maps)	5	20	200
Largest PDF Size	8.5x11	13x19	36x48
PDF Page Limit (8.5x11 and 11x17 only)	5	15	40
Keep PDFs For	7 days	30 days	1 year
KMZ Images 1920x1024 px	16	50	200
MBTiles Images 256x256 px	256	800	3200
KML Super-Overlays	No	Yes	Yes
WMS/WMTS Access	No	No	Yes
Custom MapBuilder Layers	No	No	Yes





PDF Maps

Get the App. Get the Map.®

Winner of multiple awards including

- Best Map Product Worldwide in 2011
- Best Maps for Multimedia Application
- New Technology & New Media Award
- Technology Innovation Award for Mobile Mapping

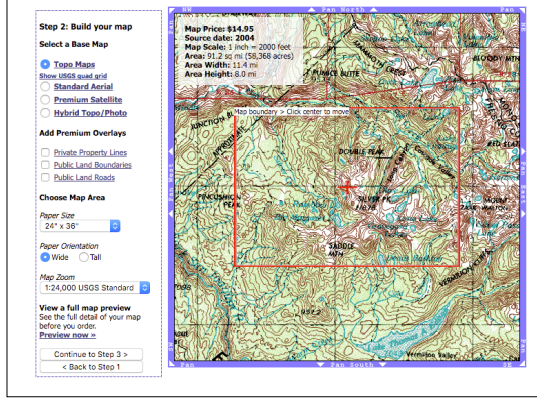
http://www.avenza.com/pdf-maps

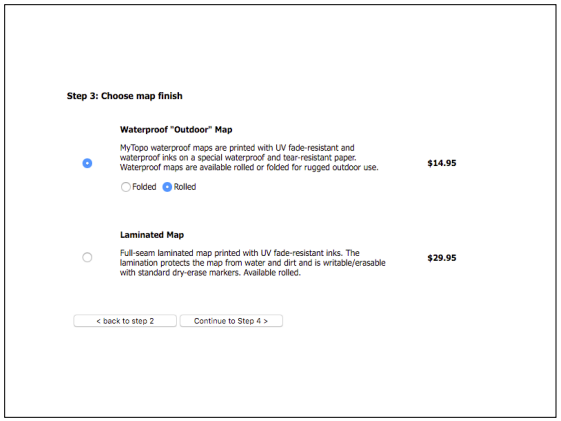
Free

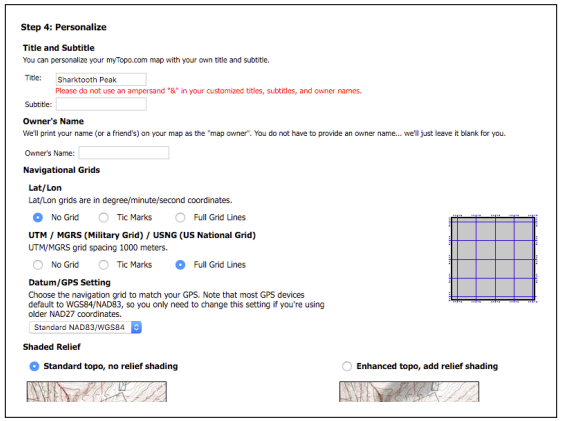
mytopo
A TRIMBLE COMPANY

mytopo.com

Printed & Online Topo Maps,
Aerial Photos, TopoPhotos, and Hunting Maps



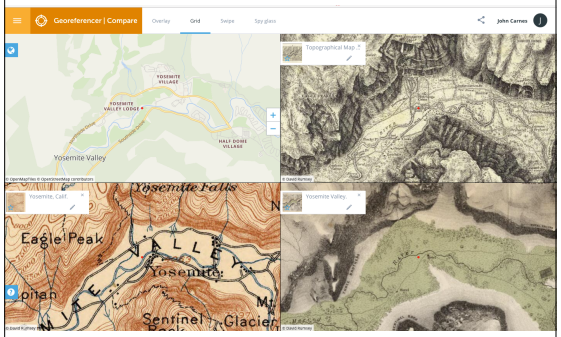




USGS National Map Demo

http://viewer.nationalmap.gov/basic

David Rumsey Georeferencer



PosterBrain

1. Upload Your Poster

Click the "upload your poster" button to the left.

2. Select Size & Quantity

16" x 24" Small Poster	$12
24" x 36" Medium Poster	$19
36" x 54" Large Poster	$43
Custom Size	UPLOAD FOR PRICING

Oversize Poster Printing: 42" x 150" Max

SELECT ADDITIONAL OPTIONS

Add Lamination $12 — Add Giclee $24

Add Mounting $35 — Add Int'l Shipping $26

$6 Flat-Rate Priority Shipping
Any Quantity - Any Place in the US

OLD MAPS ONLINE

GeoSpatial Technology Solutions
West Valley College

Courses

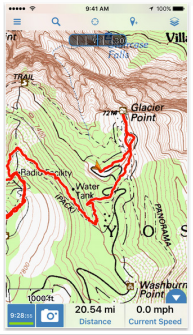
Certificate Course Requirements

Earning the West Valley College GIS Certificate requires completing ten three unit courses for a letter grade or credit/no credit option. All courses are Acceptable for credit at California State Universities

PKMGT 016A Introduction to GIS and GPS
PKMGT 016B Intermediate Desktop Geographic Information Systems (GIS)
PKMGT 016C Spatial Analysis for GIS
PKMGT 016D Cartographic Design for GIS
PKMGT 016E Database Design and Management for GIS
PKMGT 016F GIS Internship
PKMGT 016G Introduction to Remote Sensing
PKMGT 016 H Computer Aided Design
GEO 01 Intro Physical Geography
GEO 02 Intro Cultural Geography

Smart Phone GPS

GAIA GPS



https://www.gaiagps.com

iPhone & Android

$20

GPS MotionX

http://gps.motionx.com/

iPhone

$2

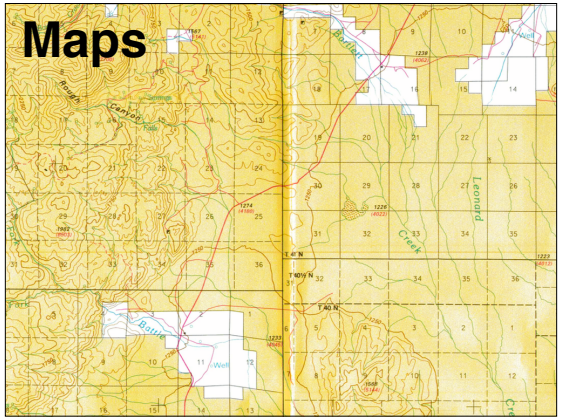
Avenza Maps

https://www.avenzamaps.com/

iPhone & Android

Free
$30/year for unlimited maps

Maps



Maps

- It takes 3-6 BLM 30’ x 1° 1:100,000 maps to cover the area I planned to visit.
- There are 32 7.5’ 1:24,000 scale maps for each BLM sheet.
- I decided to just preload the BLM maps.
- But all I could get were folded paper copies.
- Kinko’s Office to scan
- Georeferenced by hand
- Loaded onto my iPad as GeoPDFs

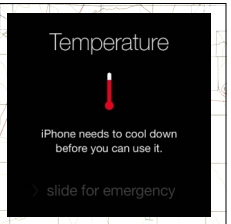
Apps

- Avenza PDF Maps
  - Moving map, with track recording
  - One map at a time (when I did this)
    - They now have map collections feature
  - Free version no limits you to 3 of your own maps.
- Gaia GPS
  - Able to pre-load some 1:24,000 map data.
  - Little support for smaller scale maps
  - I seldom had enough map data

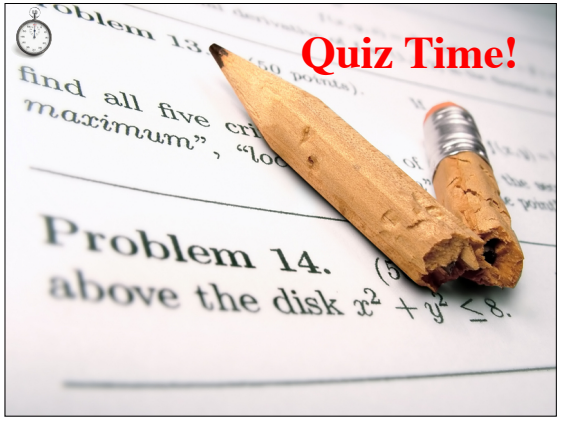
Power and Battery

- I was mostly driving on back roads. Still I had trouble keeping the iPad charged.
- Know your charging system
  - Ignition switched?
  - USB Adapter Current rating?
  - The “right” cable
- Know your phone and GPS settings
  - Airplane mode.
  - Dim the screen
  - No GPS until activated
  - Disable location service for other apps

Heat



- It will stop working!
- Charging it warms it up too
- Keep it out of the sun
- I'd have at least 30min of downtime to get it cool enough to run again
- Too cold can also be a problem



The Plan

- Take the quiz
- Eat lunch
- Continue outside exercises
  - Do a more difficult low visibility route
  - Practice the Lot 2 bearing and distance problem
  - Find more "flags"
- Grade the quiz

Just because it's on your map, doesn't mean you can go there!

- Private Property
  - Hiking, hunting, fishing are usually not OK in the United States. Roads may or may not be OK
  - Acceptable behavior varies by region and country.

Just because it's on your map, doesn't mean you can go there!

- Public Lands
  - Not all activities permitted
  - Some areas require permits
  - Some areas closed to public access
- Indian reservations are not public land
  - Each is likely to have it's own unique access restrictions.

Just because it's on your map, doesn't mean you can go there!

- Poking around military and government facilities with your nav gear, will likely draw attention from security forces.
- Your nav gear may get you arrested and jailed in some countries.

My Favorite Nav Books

- Navigation - Finding Your Way on Mountain and Moorland
  - Kevin Walker ~$18
- Navigation in the Mountains
  - Carlo Forte ~$19
- Ultimate Navigation Manual
  - Lyle Brotherton ~$15

What Can Go Wrong…

Change in Visibility

- Darkness
- Fog, snow, rain
- Snow covering roads, trails, and terrain

Passive Transport

- Hiking behind a leader, paying no attention to navigation
- Getting dropped off by vehicle or helicopter

Getting Separated

- One or members of a group, without good navigation skills get separated from the rest of the group.

Equipment Failure
You – Fatigue

- Tired, Cold, Wet, …
- All of these lead to stupid mistakes.

Equipment Failure

- I talk to lots of people that "don't trust" the GPS system…
- I ask them what time it is, and none of them look towards the sun or pull out a sundial.

Equipment Failure
GPS

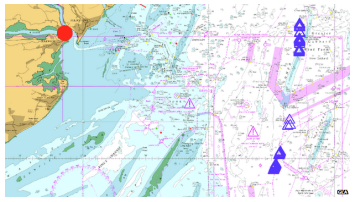
- You forgot how to use it
- Dead batteries
- Device failure or loss

April 2nd 2014

Satellites of the GLONASS network experienced a half-day outage when bad data was uploaded to spacecraft.

The GLA map shows a GLONASS receiver at Harwich giving corrupted position fixes that were off by more than 50km.

The Authorities say the 2 April event is a timely reminder that alternatives to satellite navigation are essential.



A GLONASS receiver (red dot) on England's east coast gave position fixes in the North Sea (blue triangles) BBC 9/14/2014

Equipment Failure
Compass

- You forgot how to use it
- Poor visibility limits usefulness
- Misadjusted for declination
- Device failure or loss

Local Magnetic Anomalies

- May be as much as 90 degrees
  - –3-4 degrees is common
- North of Kingston, Ontario; 90° of anomalous declination.
- Kingston Harbor, Ontario; 16.3° W to 15.5° E of anomalous declination over two kilometers (1.2 miles); magnetite and ilmenite deposits.
- Savoff, Ontario (50.0 N, 85.0 W). Over 60° of anomalous declination.
- Ramapo Mountains, northeastern New Jersey; iron ore; compass rendered useless in some areas.
- Near Grants, New Mexico north of the Gila Wilderness area; Malpais lava flows; compass rendered useless.

Equipment Failure Map

- Traveled beyond the maps carried
- Got wet - beware of water based inks
- Lost it

Emigrant Wilderness Orienteering Rally

Hints and Tips

- Plot the points quickly, before you join your maps together. Have someone else double check the point plotting.
- Consult the alternate maps. Don't write on them.
- Highlight trails, so they stand out visually.
- Mark your route next to the trail, not on top of it.
- Create course legs for off trail travel. Use your new route finding knowledge.
- Use the grid and contours for quick time estimates
- Create some choice points to skip checkpoints if time is short.
- Create a bailout plan.
  - Use the alternate maps to see the surrounding area.