

# Mapping Community Assets

Mapping Routes & Locations with the Web and  
Handheld GPS Devices

4-H Roundup  
College Station, TX

June 2011



Improving Lives. Improving Texas.



# Mapping Assets

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“Asset mapping is a process of learning what resources are available in your community”<sup>3</sup>

- **Welcome/ Introductions**
- **Participant Background**
- **What is GPS**
- **Why GPS & Asset Mapping**
- **Generating Ideas to Take Home**
- **Group Discussion**

# Welcome

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Asset mapping is based on understanding and inventorying community capital.

Theory and Technology Can Build on each other in fun and innovative ways...





# Background

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- Name
- Home Town/ County
- What you know about GPS
- Why you wanted to attend this session
- Did you get any ideas in the opening session?



# What is GPS

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Geographic Information

Location + Attribute

*Where* on Earth + *What* is occurring



# What is GPS

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## Geographic Data: Three Basic Elements

Point: House, Business, Park

Line: Trail, River, Roads

Area: Service Area, Community Boundary

Geographic Data: Can be georeferenced  
(geographically located)

Attribute Data: Can be linked to geographic data  
(speed limit, population)



# What is GPS

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## Coordinate System

- A way to reference locations on Earth
- Most Common: Longitude and Latitude

Latitude is North/South –uses equator

Longitude is East/West –Prime Meridian

North + (Maximum value 90 degrees North –North Pole)

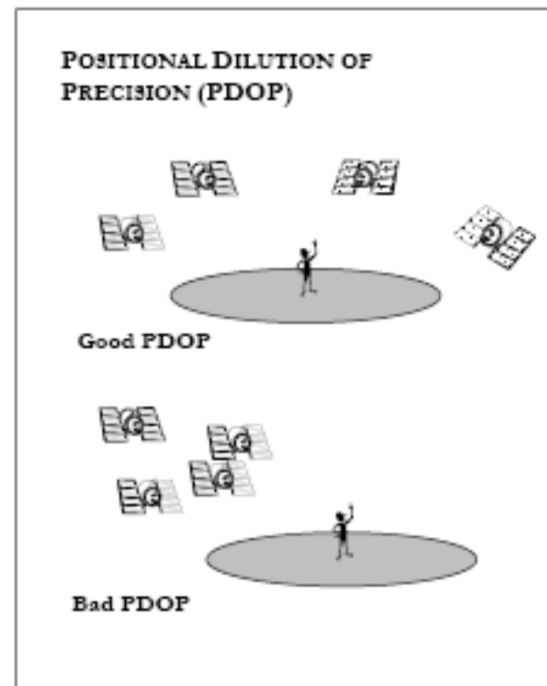
South - (Maximum value ??)

East + of Prime Meridian

West – of Prime Meridian Opposite Prime Meridian is the  
International Date Line~ maximum longitude~ 180 degrees

# What is GPS?

- Made capturing data easier
- “The Global Positioning System (GPS) is a satellite-based navigation system developed by the United States Department of Defense to provide a consistent and accurate method of determining location”
- Errors can still occur when collecting data

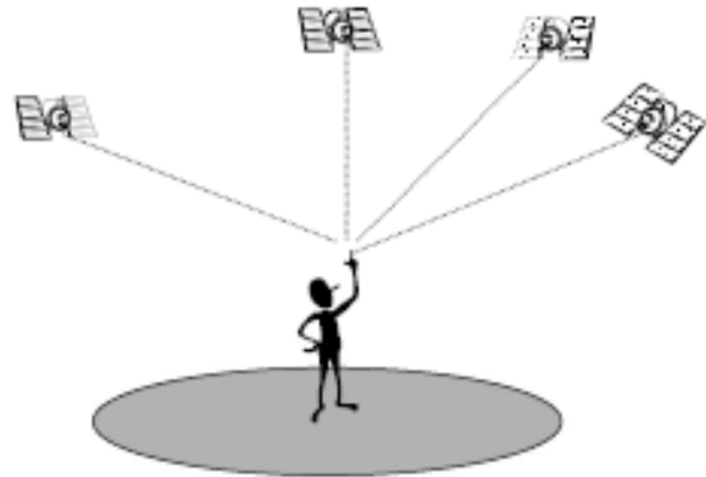




# How GPS Works

## HOW GPS WORKS

Once a GPS unit receives a signal from 4 satellites, it can use that signal to calculate a location in X (longitude), Y (latitude), and Z (elevation). The satellites' signals include time information, which the GPS unit uses to calculate distances. The GPS unit then finds its location using principles of geometry.





# Why GPS & Mapping Assets

Geographic Locations are often an important component of locating assets and potential synergies.

GPS activities can provide the spatial data needed.

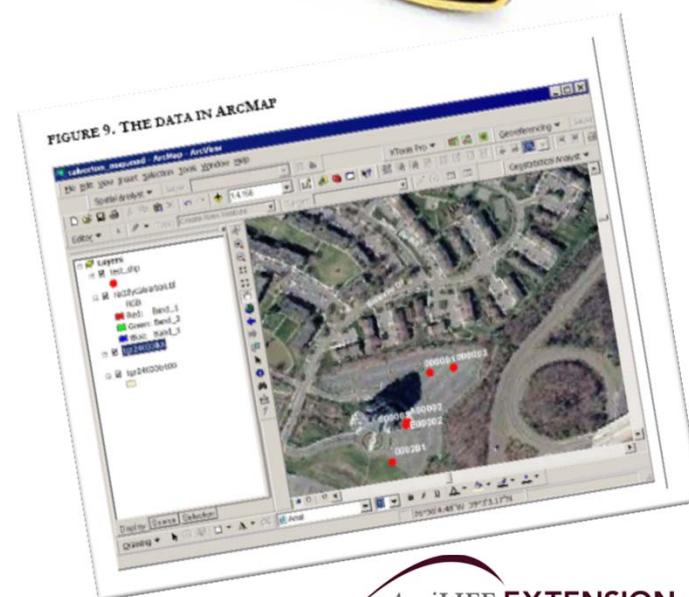
GPS Data can be linked to Attribute Data.

GPS activities can provide a fun and innovative way to educate community members and identify synergies.



# GPS Activities: Collecting Points With Handheld Devices

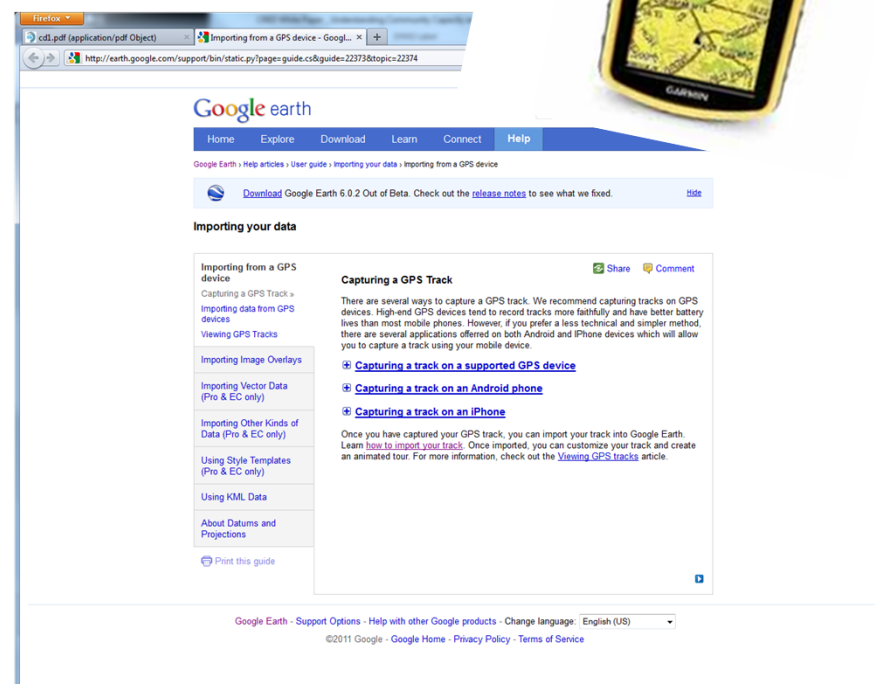
- Why Collect Points/ What Points to Collect?
  - Households
  - Trees
  - Landmarks
- Steps to Take/Consider
  - Equipment
  - Project Coordinator
  - Volunteers/ Training
  - Naming Protocol
  - Forms
  - Processing/ Mapping Data





# GPS Activities: Collecting Points With Handheld Devices

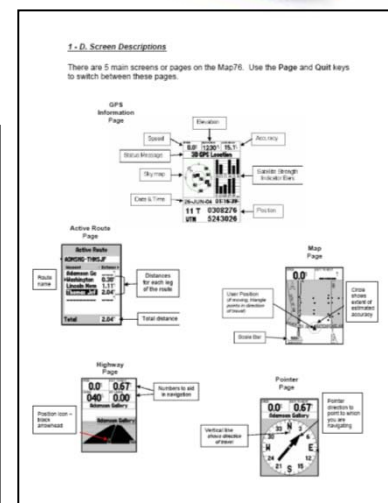
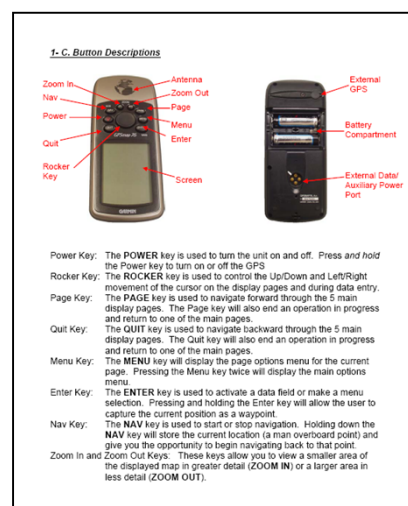
- Steps to Take/Consider
  - Equipment
    - Handheld
    - Or Phone





# GPS Activities: Collecting Points With Handheld Devices

- Steps to Take/Consider
  - Equipment
    - Handheld
      - » GPS Units- preferably all the same
      - » Plan for what data you want to capture
      - » GPS/PC Connector Cables
      - » Plan/Knowledge of what to map
      - » Manual
      - » Batteries
      - » Software
      - » Survey Form



# Capturing Points

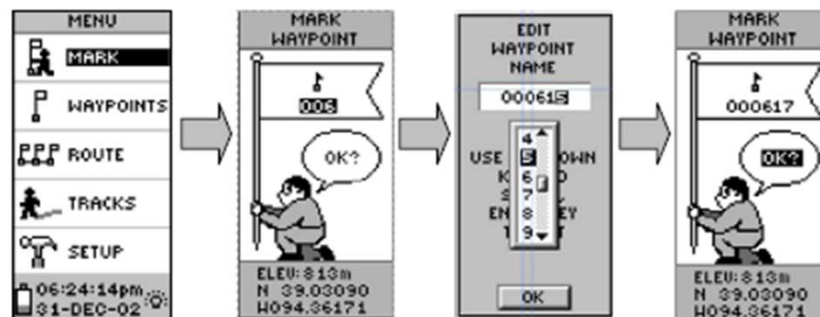
FIGURE 2. THE GARMIN ETREX



FIGURE 3.  
UNITS SETTING

UNITS	
POSITION FRMT	1000.00000°
MAP DATUM	WGS 84
UNITS	METRIC
NORTH REF	MAGNETIC
VARIANCE	004°E
DEFAULTS	

FIGURE 4. MARKING AND NAMING A CLUSTER POINT



# Survey Form

Survey Form			
Place Name			
Date:	Day:	Month:	Year:
Volunteer:		Code:	
Position Information			
Waypoint ID (from GPS Unit			
Altitude		Meters	
Latitude		Longitude	
Mapping Assets Data			
(You enter here)			



## A vertical collage of 20 rectangular panels. The panels alternate between solid colors (olive green, maroon, grey, and brown) and a central photograph of a person in a white shirt and blue shorts watering plants in a garden. The photograph is split vertically, showing the person on the left and the plants on the right. The colors are arranged in a repeating pattern: olive green, maroon, grey, brown, olive green, maroon, grey, brown, olive green, maroon, grey, brown, olive green, maroon, grey, brown, olive green, maroon, grey, brown.

**FIGURE 9. THE DATA IN ARCMAP**



FIGURE 9. THE DATA IN ARCMAP

The screenshot displays the ArcMap application window. The title bar reads 'c:\arcwork\mapshed\ ArcMap - ArcView'. The menu bar includes File, Edit, View, Window, and Help. The toolbar contains icons for opening files, saving, printing, and other standard GIS functions. The 'Layers' panel on the left lists the following layers: 'test.shp', 'rectifycalkerton.tif', 'RGB', 'Red: Band\_1', 'Green: Band\_2', 'Blue: Band\_3', '072401084', and 'lyr240201000'. The main map area shows an aerial photograph of a residential neighborhood with several red circular markers overlaid, each labeled with a number: 000084, 000063, 000003, 000002, and 000201. The status bar at the bottom indicates the drawing mode and shows the coordinates 1077914.45 and 377251.17N.

**FIGURE 7: DATA IN GPS UTILITY**

The screenshot displays the 'GPS UTILITY (4.15.3) - [Untitled.txt - Waypoints (\*.\*)]' window. The menu bar includes File, GPS, Record, View, Tools, Options, Window, and Help. The toolbar contains various icons for file operations and GPS functions. The status bar at the top right shows 'WGS 84'. The main data table lists waypoints with the following columns: ID, Coordinate, Symbol, T, O, Alt(m), and Comment.

ID	Coordinate	Symbol	T	O	Alt(m)	Comment
001	+39.051304 -076.934904	Flag	I	E	34.5	
002	+39.051304 -076.934904	Flag	I	E	34.5	
003	+39.051965 -076.934450	Flag	I	E	61.6	
004	+39.051983 -076.934111	Flag	I	E	61.2	
M01	+39.050820 -076.935171	Fish	I	E	78.7	
M02	+39.051345 -076.934871	Flag	I	E	69.1	

At the bottom of the image, a status bar indicates 'CONNECTED TO eTrex Software Version 2.14'.



# GPS Activities



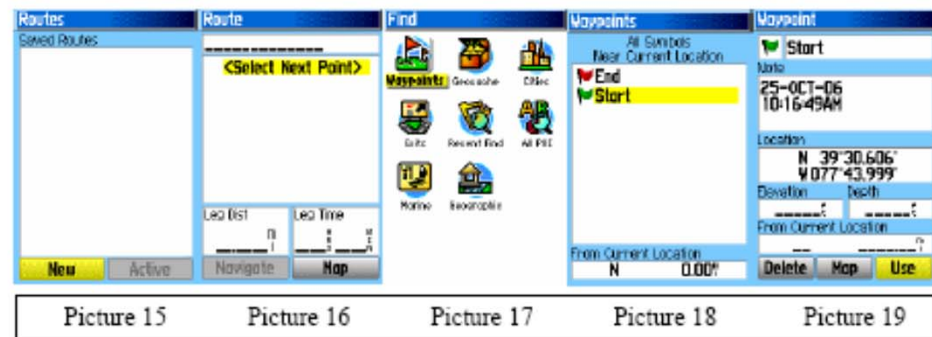
Google<sup>™</sup> Earth  
Obtaining coordinates

# Routes

## PROJECT B: Routes

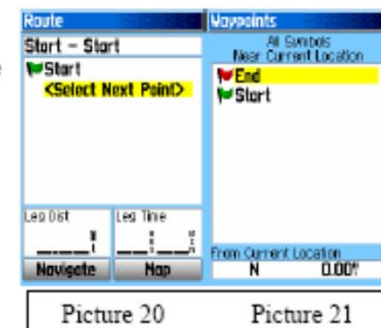
Use the Routes feature to obtain directions between waypoints you created.

- Press MENU twice to return to the main menu page. Use the rocker button to highlight **Routes** and press ENTER. Highlight **NEW** on the bottom of the screen and press ENTER (picture 15). Press ENTER to "Select Next Point" (picture 16).
- On the next screen, highlight the **Waypoints** icon and press ENTER (picture 17). Using the rocker, highlight the waypoint marking your starting position (Start waypoint) and press ENTER (picture 18). On the Waypoint page that popped up, highlight **Use** and press ENTER (picture 19).



Now your starting waypoint should be listed on the Route screen.

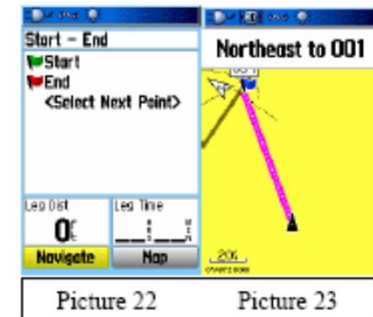
- Again, highlight **Select Next Point** and press ENTER (picture 20). Highlight the **Waypoints** icon and press ENTER.
- Now highlight the End waypoint, and press ENTER (picture 21). Highlight **Use** in the lower right hand corner of the screen and press ENTER.



Now your two waypoints should be listed in the Routes page.

# Routes

- Highlight **Navigate** and press ENTER (picture 22). The map screen will appear, showing your current location marked by a black arrow (picture 23). The top of the screen will instruct you which direction to travel. Refer to the North cardinal arrow to help orient yourself.



Picture 22      Picture 23

- Follow the on-screen instructions, moving toward your destination. When you get within about 30 feet of the End waypoint, the unit will beep and read "Arriving at End."

When you are finished navigating, be sure to *turn off navigation*. If navigation is left on, you may have trouble using other functions of the GPS unit. Turning navigation off can be done several ways.

- From the compass screen, press MENU. Select **Stop Navigation** and press ENTER (picture 24).
- From the map screen, press MENU. Select **Stop Navigation** and press ENTER (picture 25).
- From the routes screen, highlight **Stop** and press ENTER (picture 26).

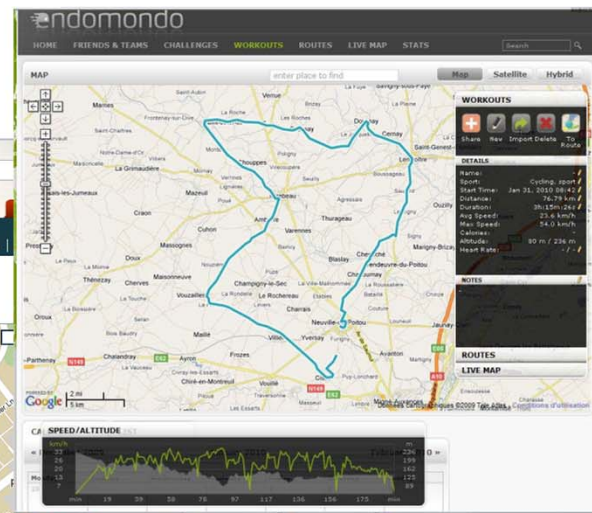
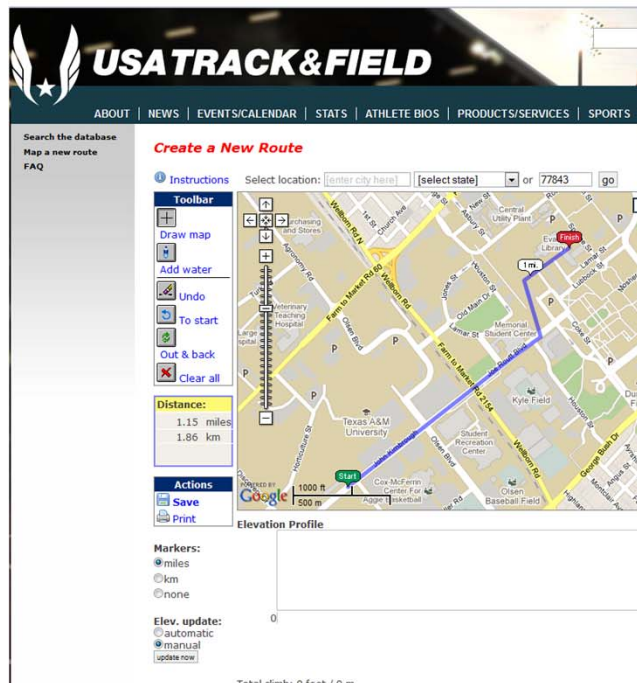


Picture 24      Picture 25      Picture 26

Application – You can enter waypoints in a GPS unit and give it to coworkers, buyers, etc. to find their way to an access point or a corner of a timber sale. The waypoints for property corners or timber sale boundaries can be entered into a route so people can navigate around the perimeter.

# Routes On-Line

- Great for measuring and sharing within App
- Difficult to export and use with other programs





# Geocaching

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- A Technology Based Treasure Hunt
  - Find geocaches (hidden containers) using GPS units and coordinates.
  - Create your own Treasure Hunts...



# Geocaching Example

Firefox

Geocaching in Minnesota: Minneso... x Importing from a GPS device - Goo... x TechGuide\_GPS\_jul07.pdf (applicati... x GPS Training x Beginner\_Activity3.pdf (application/... x

http://www.dnr.state.mn.us/geocaching/index.html

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## Geocaching

- Are you ready for a new adventure?  
Grab your hiking boots and charge the GPS unit - the Minnesota State Parks Geocaching Wildlife Safari has begun.  
[Start your adventure...](#)
- Wait! What is Geocaching?!  
[Help!](#)
- Congratulations to the Geocaching Wildlife Safari finalists.



Find a cache

- [Rules to remember](#)
- [State parks with private geocaches](#)
- [State parks with Wildlife Safari geocaches](#)

Place a cache

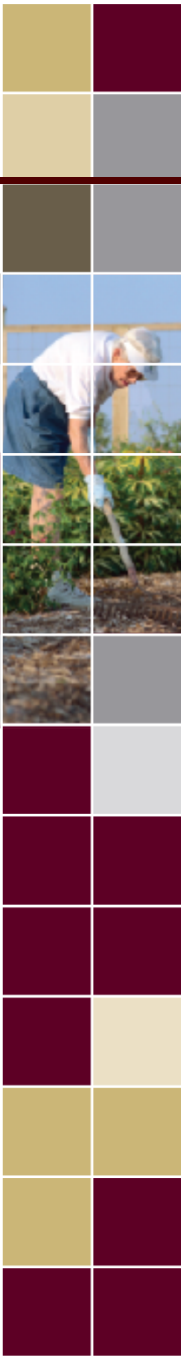
- [Geocaching permit form](#) (PDF)
- [State forests geocaching guidelines](#) (PDF)
- [State parks geocaching guidelines](#) (PDF)

Geo-info

- [Geocaching.com](#) (EXT)
- [What is geocaching?](#)
- [Geocaching - Tried it..Liked it...do it! \(video\)](#)
- [2008 Geocaching History Challenge](#)
- [Geocaching Wildlife Safari](#)
- [Couple is FTF in Geocaching Wildlife Safari \(video\)](#)

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# Geocaching Example



Firefox

Minnesota State Parks Geocaching ... x Importing from a GPS device - Goo... x TechGuide\_GPS\_jul07.pdf (applicati... x GPS Training x Beginner\_Activity3.pdf (application/...


http://www.dnr.state.mn.us/state\_parks/geocaching/safari/index.html

Home > Recreation > Geocaching > State Parks >

## Minnesota State Parks Geocaching Wildlife Safari

The safari adventure has begun! This three-year program will take you across Minnesota—discovering the hidden gems of the state and revealing exciting facts about Minnesota's favorite critters.

Whether you are looking for coordinates to Wildlife Safari caches, visiting a Demo Park, or new to the geocaching craze and want to find out what it is—we have you covered!



**Wildlife Safari geocaches**

- [Main page](#)
- [Challenges](#)
- [Demo parks](#)
- [Handouts](#)
- [Rules to remember](#)
- [State parks with geocaches](#)
- [Slideshow](#)
- [Wildlife Safari finalists](#)

**Place a cache**

- [Geocaching permit form](#) [\(PDF\)](#)
- [State forests geocaching guidelines](#) [\(PDF\)](#)
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**WHAT** – The Minnesota State Parks Geocaching Wildlife Safari

**WHERE** – Found at all 72 Minnesota state parks

**WHY** – Because there is so much to explore outdoors!

**WHEN** – May 2, 2009 through May 2, 2012

**WHO** – Anyone and everyone, young and old, beginners and experts

**HOW** – Grab a GPS unit, get the coordinates, visit a Minnesota State Park, and start searching!

**Wildlife Safari Coordinate List**

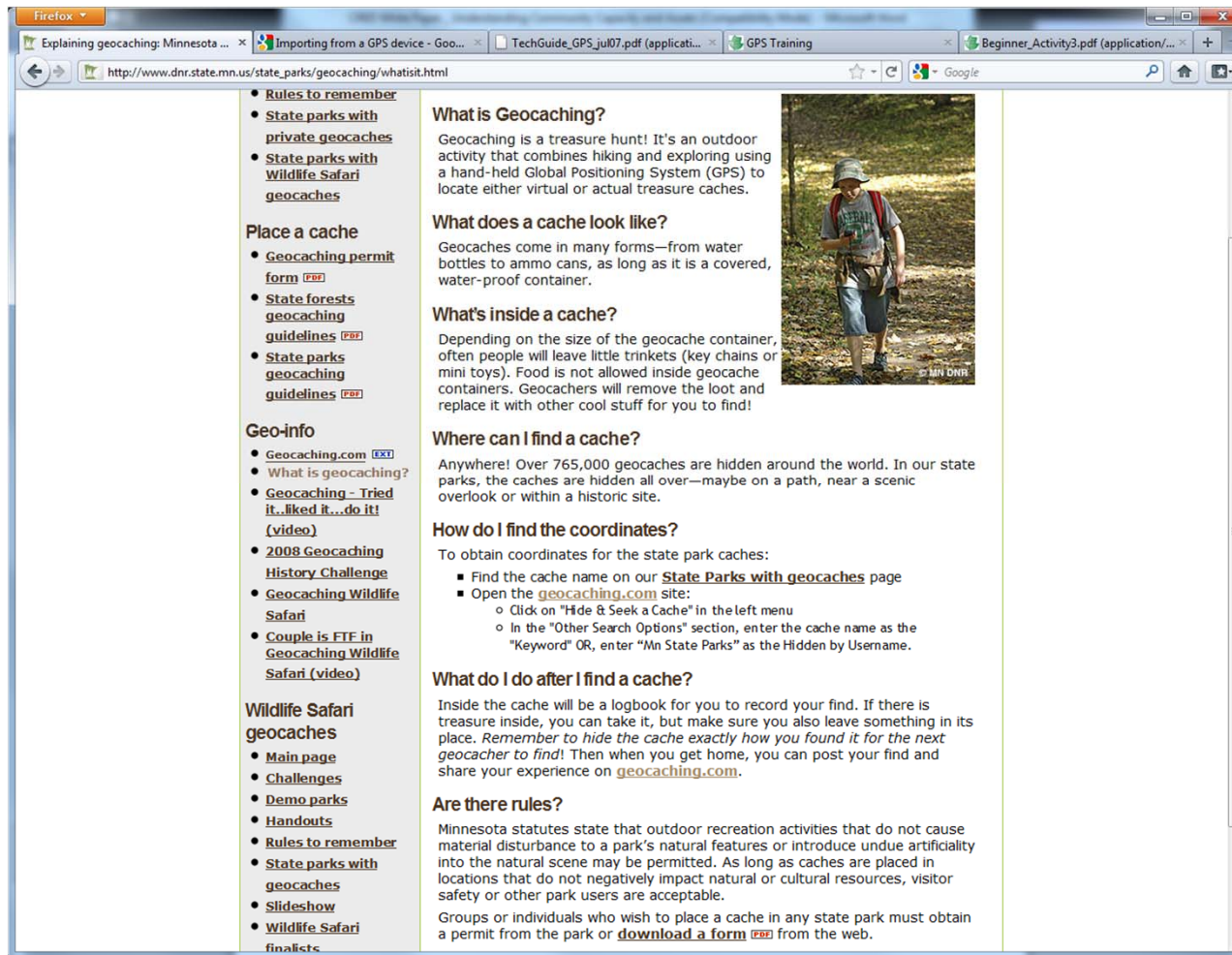
A safari adventure is never complete without its challenges! **Bring it on...**

Don't have a GPS unit but still want to try geocaching? Not a problem, Minnesota state parks have 25 Demo Parks ready to help. **Parks with GPS units to loan...**

Before you head out, be sure to check out these **handy handouts...**

- [Wildlife Safari Coordinates List](#)
- [Program Brochure](#)
- [Garden Island Charter Companies](#)

# Geocaching Example



Explaining geocaching: Minnesota ...

http://www.dnr.state.mn.us/state\_parks/geocaching/whatist.html

- **Rules to remember**
- **State parks with private geocaches**
- **State parks with Wildlife Safari geocaches**

**Place a cache**

- **Geocaching permit form** (PDF)
- **State forests geocaching guidelines** (PDF)
- **State parks geocaching guidelines** (PDF)

**Geo-info**

- **Geocaching.com** (EX)
- **What is geocaching?**
- **Geocaching - Tried it...liked it...do it!** (video)
- **2008 Geocaching History Challenge**
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- **Couple is FTF in Geocaching Wildlife Safari** (video)

**Wildlife Safari geocaches**

- **Main page**
- **Challenges**
- **Demo parks**
- **Handouts**
- **Rules to remember**
- **State parks with geocaches**
- **Slideshow**
- **Wildlife Safari finalists**

**What is Geocaching?**

Geocaching is a treasure hunt! It's an outdoor activity that combines hiking and exploring using a hand-held Global Positioning System (GPS) to locate either virtual or actual treasure caches.

**What does a cache look like?**

Geocaches come in many forms—from water bottles to ammo cans, as long as it is a covered, water-proof container.

**What's inside a cache?**

Depending on the size of the geocache container, often people will leave little trinkets (key chains or mini toys). Food is not allowed inside geocache containers. Geocachers will remove the loot and replace it with other cool stuff for you to find!

**Where can I find a cache?**

Anywhere! Over 765,000 geocaches are hidden around the world. In our state parks, the caches are hidden all over—maybe on a path, near a scenic overlook or within a historic site.

**How do I find the coordinates?**

To obtain coordinates for the state park caches:

- Find the cache name on our **State Parks with geocaches** page
- Open the **geocaching.com** site:
  - Click on "Hide & Seek a Cache" in the left menu
  - In the "Other Search Options" section, enter the cache name as the "Keyword" OR, enter "Mn State Parks" as the Hidden by Username.

**What do I do after I find a cache?**

Inside the cache will be a logbook for you to record your find. If there is treasure inside, you can take it, but make sure you also leave something in its place. *Remember to hide the cache exactly how you found it for the next geocacher to find!* Then when you get home, you can post your find and share your experience on **geocaching.com**.

**Are there rules?**

Minnesota statutes state that outdoor recreation activities that do not cause material disturbance to a park's natural features or introduce undue artificiality into the natural scene may be permitted. As long as caches are placed in locations that do not negatively impact natural or cultural resources, visitor safety or other park users are acceptable.

Groups or individuals who wish to place a cache in any state park must obtain a permit from the park or **download a form** (PDF) from the web.



# Geocaching Example

Firefox

State Parks with Geocaches: Minnes... x Importing from a GPS device - Goo... x TechGuide\_GPS\_jul07.pdf (applicati... x GPS Training x Beginner\_Activity3.pdf (application/... x

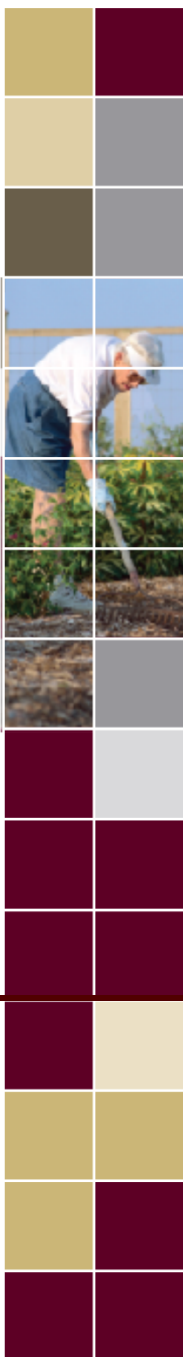
http://www.dnr.state.mn.us/state\_parks/geocaching/parklist.html

## State Parks with Geocaches

The following geocaches have been placed in Minnesota state parks and recreation areas by individuals or groups who have completed a permit application that was approved by the park.

These geocaches in state parks are NOT part of the wildlife safari.

State park name	Cache name	Latitude	Longitude
Afton State Park	T82 Oct07 Afton	N 44° 52.191	W 092° 46.479
Bear Head Lake State Park	East Bay Trail	N 47° 47.300	W 92° 4.733
Camden State Park	Brawner Lake - fishing time	N 44° 19.930	W 95° 55.423
Camden State Park	Brawner Lake - Picnic time	N 44° 20.044	W 95° 55.345
Carley State Park	1st Annual Bluebell Cache - multi-cache	N 44° 07.056	W 92° 10.497
Carley State Park	Wildflower Trail	N 44° 07.155	W 092° 10.506
Charles A. Lindbergh State Park	Zoo Landing	N 45° 57.146	W 094° 23.497
Charles A. Lindbergh State Park	Xtreme 01	N 46° 00.917	W 094° 21.644
Charles A. Lindbergh State Park	The Lone Eagle-multi-cache	N 45° 57.384	W 094° 23.785
Cuyuna Country State Recreation Area	Cuyuna View 2	N 46° 29.032	W 093° 59.862
Father Hennepin State Park	Deerbed	N 46° 09.072	W 093° 30.296
Father Hennepin State Park	3 White Deer	N 46° 08.632	W 093° 29.480
Father Hennepin State Park	Old Timber	N 46° 08.922	W 093° 29.576
Flandrau State Park	Prairie View	N 44° 18.072	W 094° 28.580
Flandrau State Park	Top of the Steps	N 44° 17.439	W 094° 27.910
Flood Bay State Wayside	Wisdom	N 47° 02.356	W 091° 38.493
Frontenac State Park	"Stumped" at Sand Point-multi-cache	N 44° 32.172	W 092° 20.396



# Questions?

# Presentation References

## Slide Images

[http://www.google.com/imgres?imgurl=http://freegeographytools.com/wp-content/uploads/2008/01/51p6748z1z1.-ss500-.jpg&imgrefurl=http://freegeographytools.com/2008/improving-position-measurement-accuracy-in-consumer-grade-gps-receivers-part-i&usg=\\_\\_yjKF7bHKXdZQNc4jpG5I2w7Q24M=&h=500&w=500&sz=43&hl=en&start=0&zoom=1&tbnid=gAd-4ocSnSjl3M:&tbnh=143&tbnw=143&ei=Q5X2TbeRIs-WtwfG7tSYBw&prev=/search%3Fq%3Dgps%2Bunits%26hl%3Den%26sa%3DX%26biw%3D1262%26bih%3D889%26tbn%3Disch%26prmd%3Divns&itbs=1&iact=rc&dur=753&page=1&ndsp=25&ved=1t:429,r:11,s:0&tx=83&ty=57&biw=1262&bih=889](http://www.google.com/imgres?imgurl=http://freegeographytools.com/wp-content/uploads/2008/01/51p6748z1z1.-ss500-.jpg&imgrefurl=http://freegeographytools.com/2008/improving-position-measurement-accuracy-in-consumer-grade-gps-receivers-part-i&usg=__yjKF7bHKXdZQNc4jpG5I2w7Q24M=&h=500&w=500&sz=43&hl=en&start=0&zoom=1&tbnid=gAd-4ocSnSjl3M:&tbnh=143&tbnw=143&ei=Q5X2TbeRIs-WtwfG7tSYBw&prev=/search%3Fq%3Dgps%2Bunits%26hl%3Den%26sa%3DX%26biw%3D1262%26bih%3D889%26tbn%3Disch%26prmd%3Divns&itbs=1&iact=rc&dur=753&page=1&ndsp=25&ved=1t:429,r:11,s:0&tx=83&ty=57&biw=1262&bih=889)

[http://www.google.com/imgres?imgurl=http://hikinglady.com/wp-content/uploads/2009/12/Outdoor-GPS-Unit1.jpg&imgrefurl=http://hikinglady.com/the-gear/gps-units/&usg=\\_\\_1wNRXw2iVBGAFF9GVAUt60YI0=&h=440&w=440&sz=23&hl=en&start=0&zoom=0&tbnid=VPsGBhe68ki2DM:&tbnh=127&tbnw=127&ei=Q5X2TbeRIs-WtwfG7tSYBw&prev=/search%3Fq%3Dgps%2Bunits%26hl%3Den%26sa%3DX%26biw%3D1262%26bih%3D889%26tbn%3Disch%26prmd%3Divns&itbs=1&iact=rc&dur=342&page=1&ndsp=25&ved=1t:429,r:8,s:0&tx=59&ty=48&biw=1262&bih=889](http://www.google.com/imgres?imgurl=http://hikinglady.com/wp-content/uploads/2009/12/Outdoor-GPS-Unit1.jpg&imgrefurl=http://hikinglady.com/the-gear/gps-units/&usg=__1wNRXw2iVBGAFF9GVAUt60YI0=&h=440&w=440&sz=23&hl=en&start=0&zoom=0&tbnid=VPsGBhe68ki2DM:&tbnh=127&tbnw=127&ei=Q5X2TbeRIs-WtwfG7tSYBw&prev=/search%3Fq%3Dgps%2Bunits%26hl%3Den%26sa%3DX%26biw%3D1262%26bih%3D889%26tbn%3Disch%26prmd%3Divns&itbs=1&iact=rc&dur=342&page=1&ndsp=25&ved=1t:429,r:8,s:0&tx=59&ty=48&biw=1262&bih=889)

## A Field Guide to Data Collection

[http://www.rollbackmalaria.org/partnership/wg/wg\\_monitoring/docs/mis2005/cd1.pdf](http://www.rollbackmalaria.org/partnership/wg/wg_monitoring/docs/mis2005/cd1.pdf)

## Importing g Your Data

<http://earth.google.com/support/bin/static.py?page=guide.cs&guide=22373&topic=22374>

## Tech Guide– Collecting and Working With GPS Data

[ftp://ftp-fc.sc.egov.usda.gov/MD/web\\_documents/technical/soils/gps/TechGuide\\_GPS\\_jul07.pdf](ftp://ftp-fc.sc.egov.usda.gov/MD/web_documents/technical/soils/gps/TechGuide_GPS_jul07.pdf)

## Import GPS data from your handheld GPS device

[http://earth.google.com/outreach/tutorial\\_importgps.html#gpsdevice](http://earth.google.com/outreach/tutorial_importgps.html#gpsdevice)

## University of Maryland Extension GPS Training

<http://www.naturalresources.umd.edu/EducationalGPS.html>

## Routes On Line

Usatf.org  
Endomondo.com

## Explaining geocaching

[http://www.dnr.state.mn.us/state\\_parks/geocaching/whatisit.html](http://www.dnr.state.mn.us/state_parks/geocaching/whatisit.html)