

Global Positioning Systems (GPS)

An Introduction



Goals and Objectives

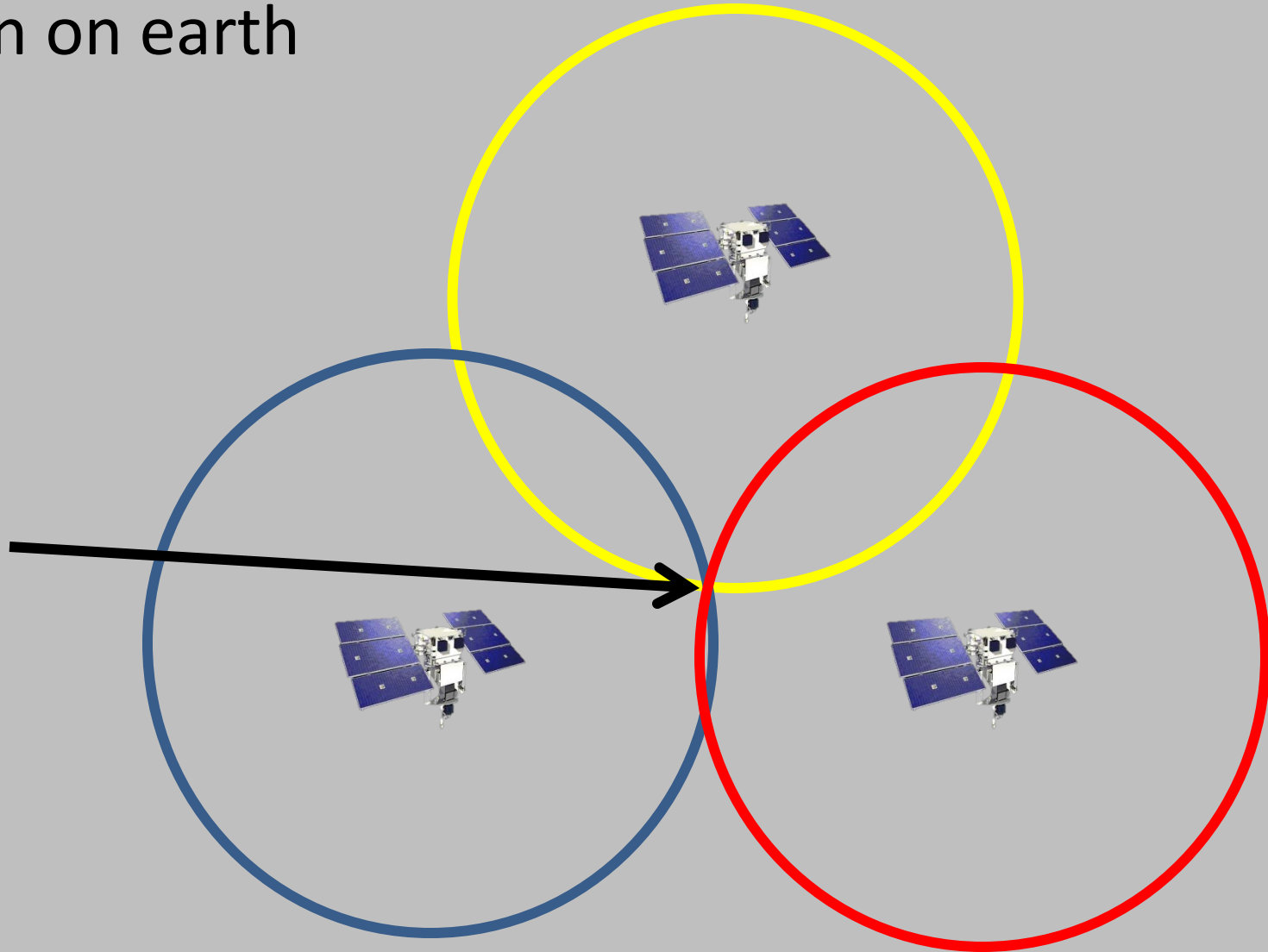
- Goal: Learn about ecology by studying ecosystems and habitats
- Objective: Use GPS to study ecosystems and habitats
- Today's objective: Learn to use GPS units

Outline

- Introduction to GPS
- GPS mapping examples
- Using Garmin Etrex H GPS unit
- Mapping points, lines, and polygons
- Geographic Information Systems (GIS)
- Schoolyard activities using GPS

What is GPS?

- GPS units use satellites to triangulate your position on earth



Example Research Questions

- Where do animals travel?
 - Where does my dog run?
- How do habitats change over time?
 - How do fish habitat patches change with spring floods?

Where does my dog run?



Juniper

© 2012 Google
Image USDA Farm Service Agency

Google earth

Where does my dog run?



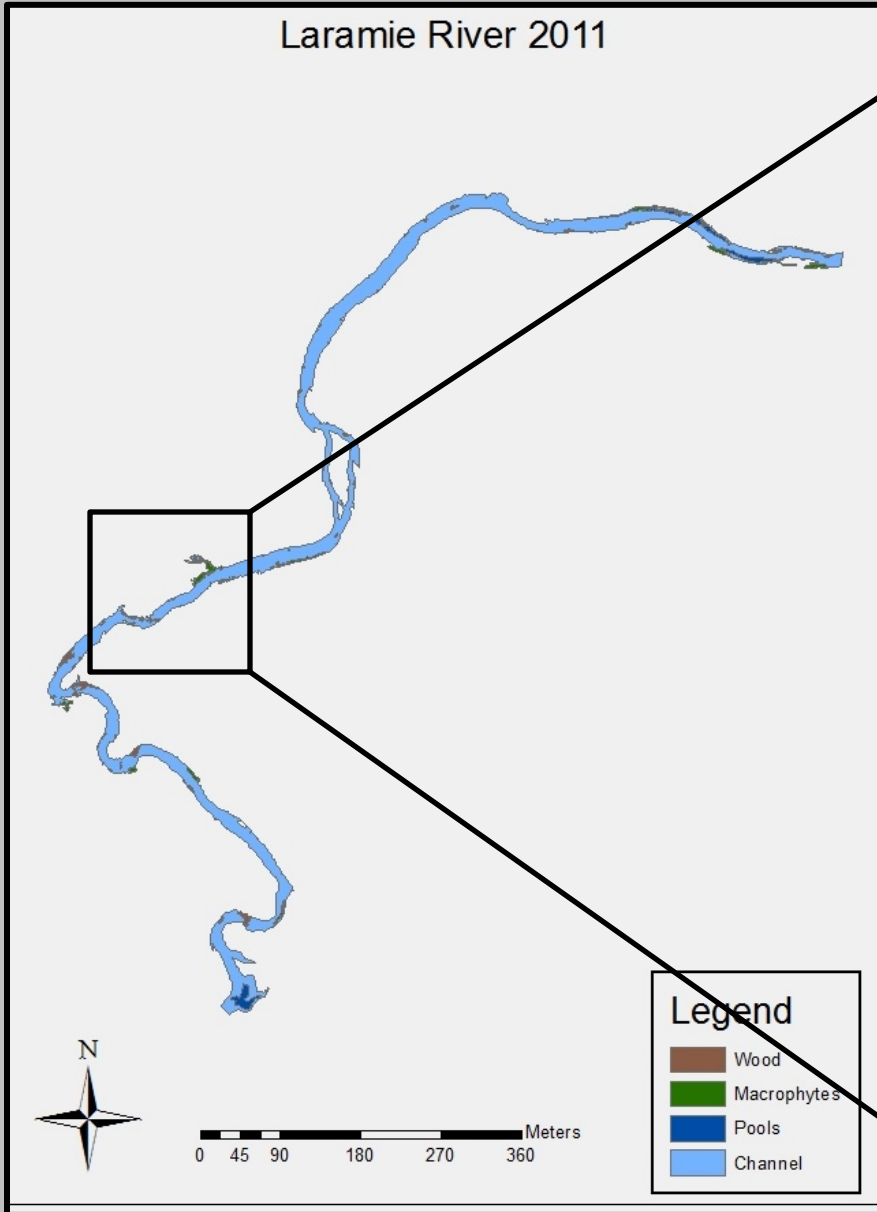
Juniper

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Image USDA Farm Service Agency

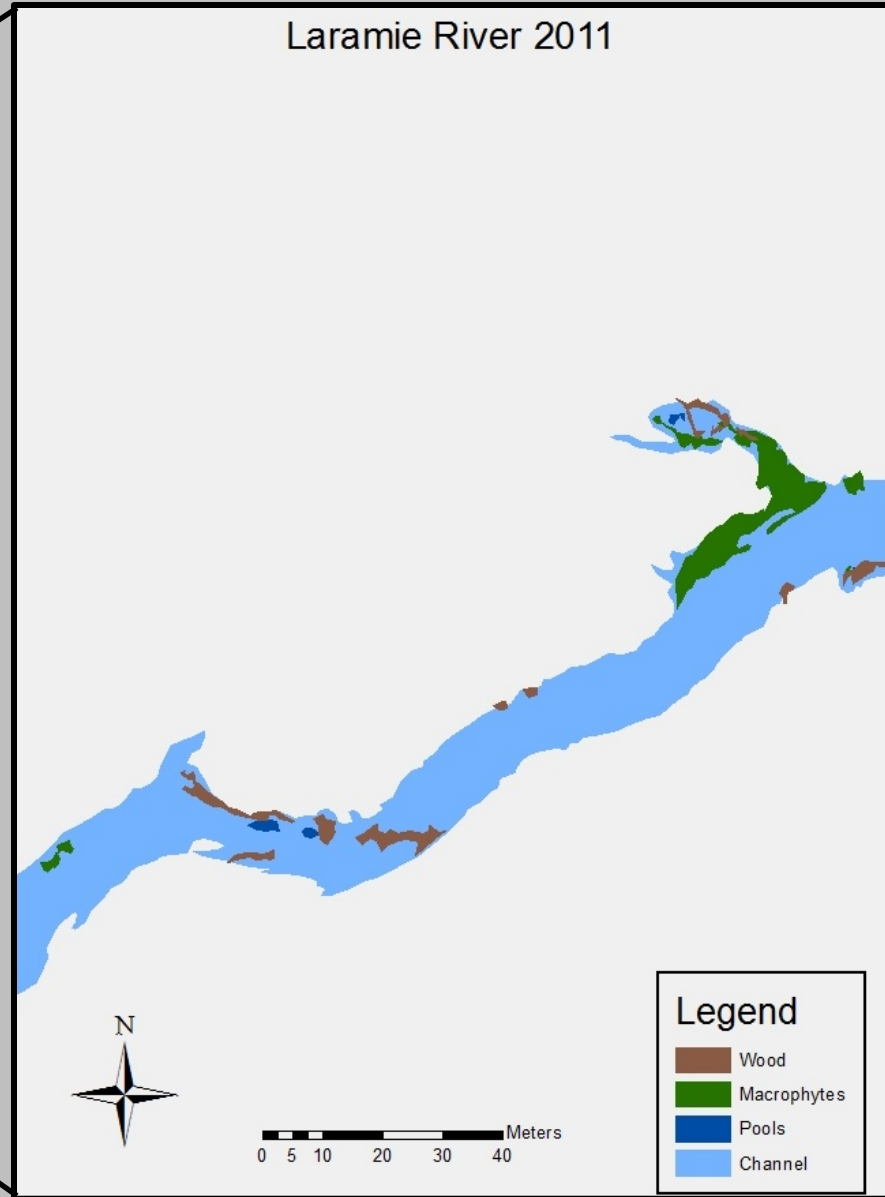
Google earth

How do Fish Habitat Patches Change?

Laramie River 2011



Laramie River 2011



Garmin Etrex H GPS Unit



Mark, Routes, Tracks



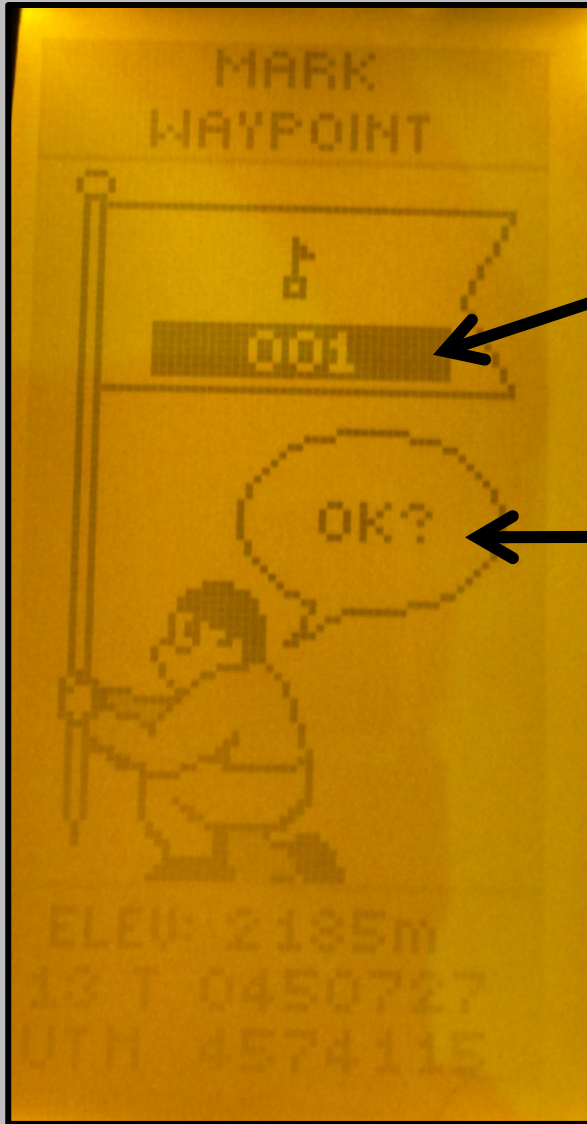
Creates a point

List of points

Tool to combine points into a route

Automatically creates route along the path you walk

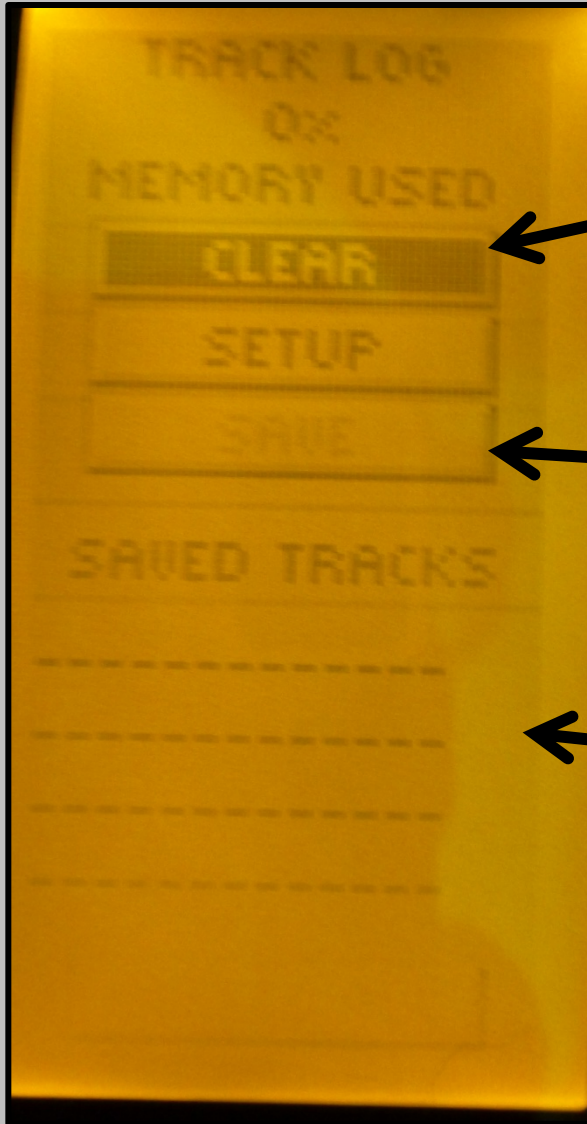
Mark a Waypoint



Highlight to name the
waypoint

Highlight and press enter
to save the waypoint

Create a Track



Clear the track log before starting a new track

Save your track when finished mapping a feature

This is a list of your saved tracks

Points, Lines, and Polygons



● Points (Mark)

— Lines (Waypoints)

□ Polygon
(Waypoints)


~ Polyline (Tracks)


□ Polygon (Tracks)

Points, Lines, and Polygons



 Points (Mark)

 Lines (Waypoints)

 Polygon
(Waypoints)

 Polyline (Tracks)

 Polygon (Tracks)

Points, Lines, and Polygons



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Points, Lines, and Polygons



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Geographic Information Systems (GIS)

- Computer programs that can be used to analyze data
 - Spatial
 - Temporal
- Free GIS tools
 - Google Earth
 - ArcExplorer Online
 - Wisdom

Schoolyard Activities

- Decide how to best map features in the schoolyard
 - Mark waypoints
 - Create polylines and polygons using Tracks
- Additional activities
 - Write your name using Tracks
 - Hide and seek using Mark