No Weed Left Behind: A GPS method for conducting a complete weed inventory

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Photo by: Ingrid B. Hogle

Like the No Child Left Behind Act

- We believe in early detection of weed occurrences.
- We believe that every individual weed counts.
- And that is why we inventory...

Weed Mapping and Monitoring

Photo By: Joseph M. Di Tomaso

- Why Inventory?
  - The most effective and comprehensive way to obtain:
    - "presence data"- where weeds are
    - "absence data"- where weeds are absent
  - Central to implementing an early detection–rapid response program

The Role of GPS/GIS

- Completeness in surveys
- Maintaining year to year continuity in a management program
- Identifying priorities for control and future management

Inventory Tools

- Low-tech: A good hardcopy map, a sharpie and a filing system!
- High-tech: Mobile Global Positioning System (GPS) technology incorporated with GIS.

Inventory Tools

We use both recreational and survey grade GPS

- Garmin Rino 120 is a recreation grade GPS unit with built in radios (walkie talkies) with variable accuracy (<10m)
- Trimble ProXT (<1m accuracy)

http://www.trimble.com

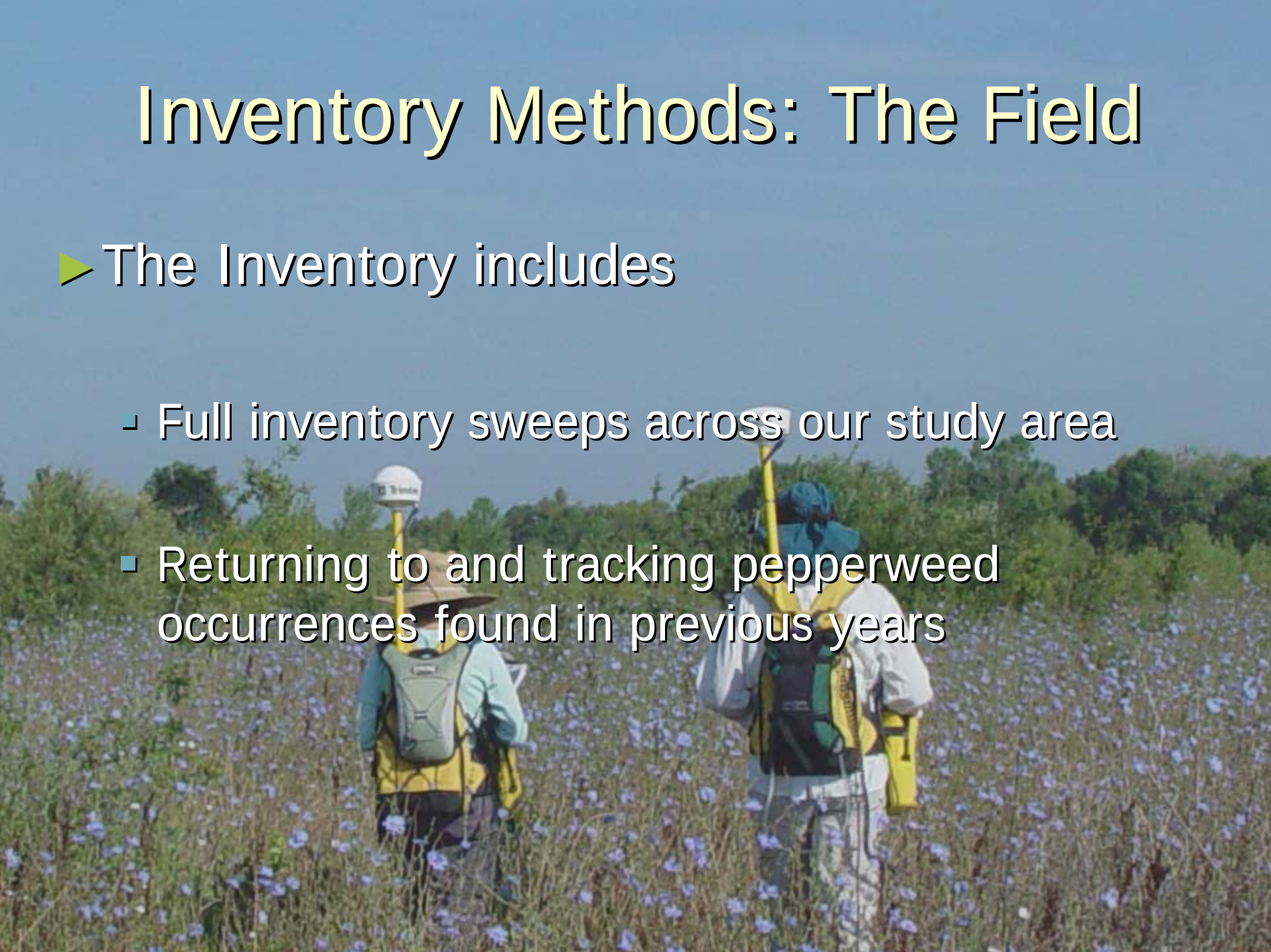
http://www.garmin.com

Cosumnes River Preserve Perennial Pepperweed Control Project

- Four year inventory of *Lepidium latifolium* (Perennial Pepperweed) at the Cosumnes River Preserve.
- Adaptive management experiment to control *Lepidium latifolium*

Inventory Methods: The Field

- The Inventory includes
  - Full inventory sweeps across our study area
  - Returning to and tracking pepperweed occurrences found in previous years



GIS Methods: The Office

- Tracks from Garmin Rinos are uploaded into ArcMap
  - Can track day to day coverage
  - Tracks prioritize future survey activities

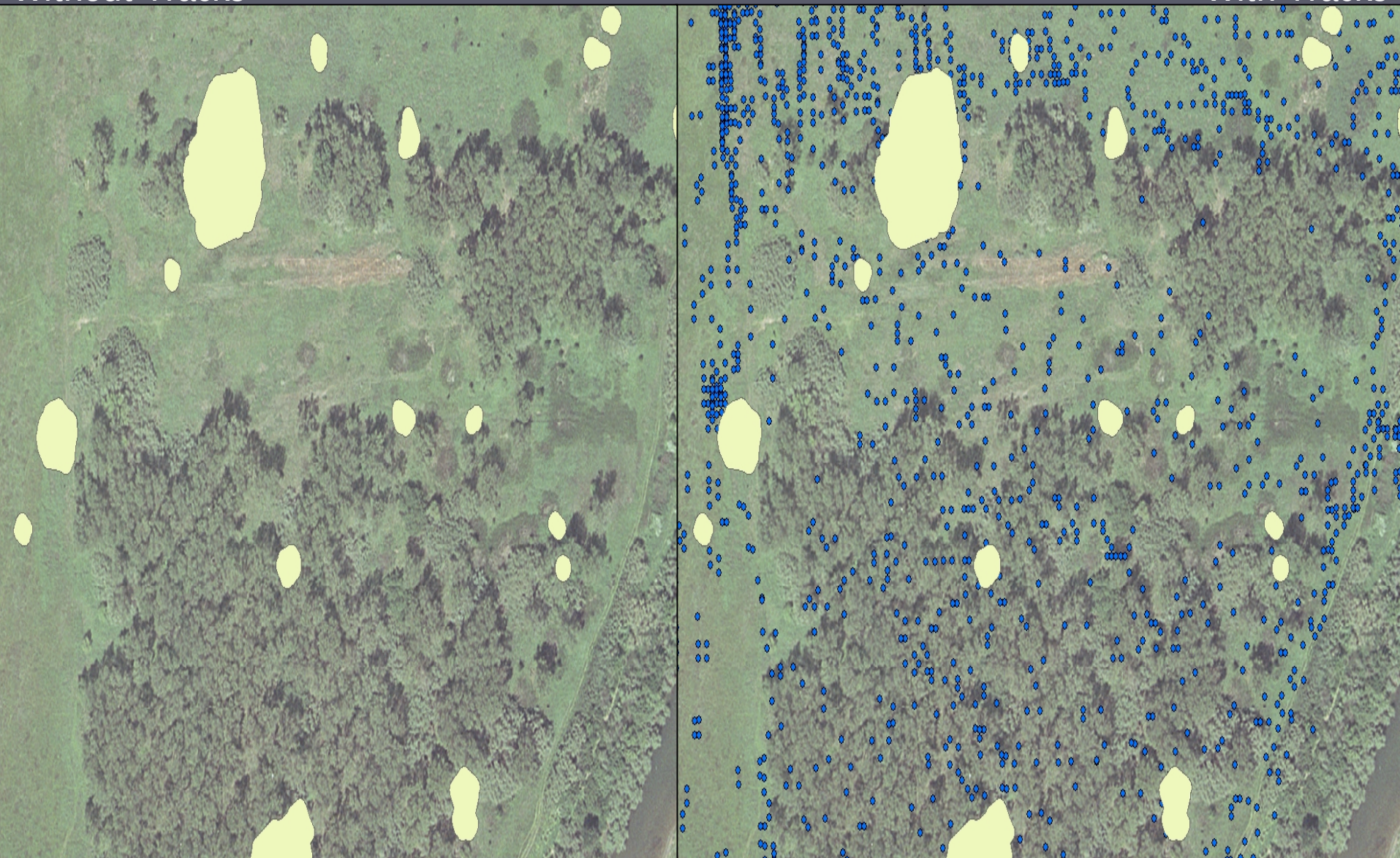
- Hawth's Analysis Tools (Its FREE!)
  - Helps to visualize total areas surveyed.

(http://www.spatialecology.com/htools/index.php)

I was there!

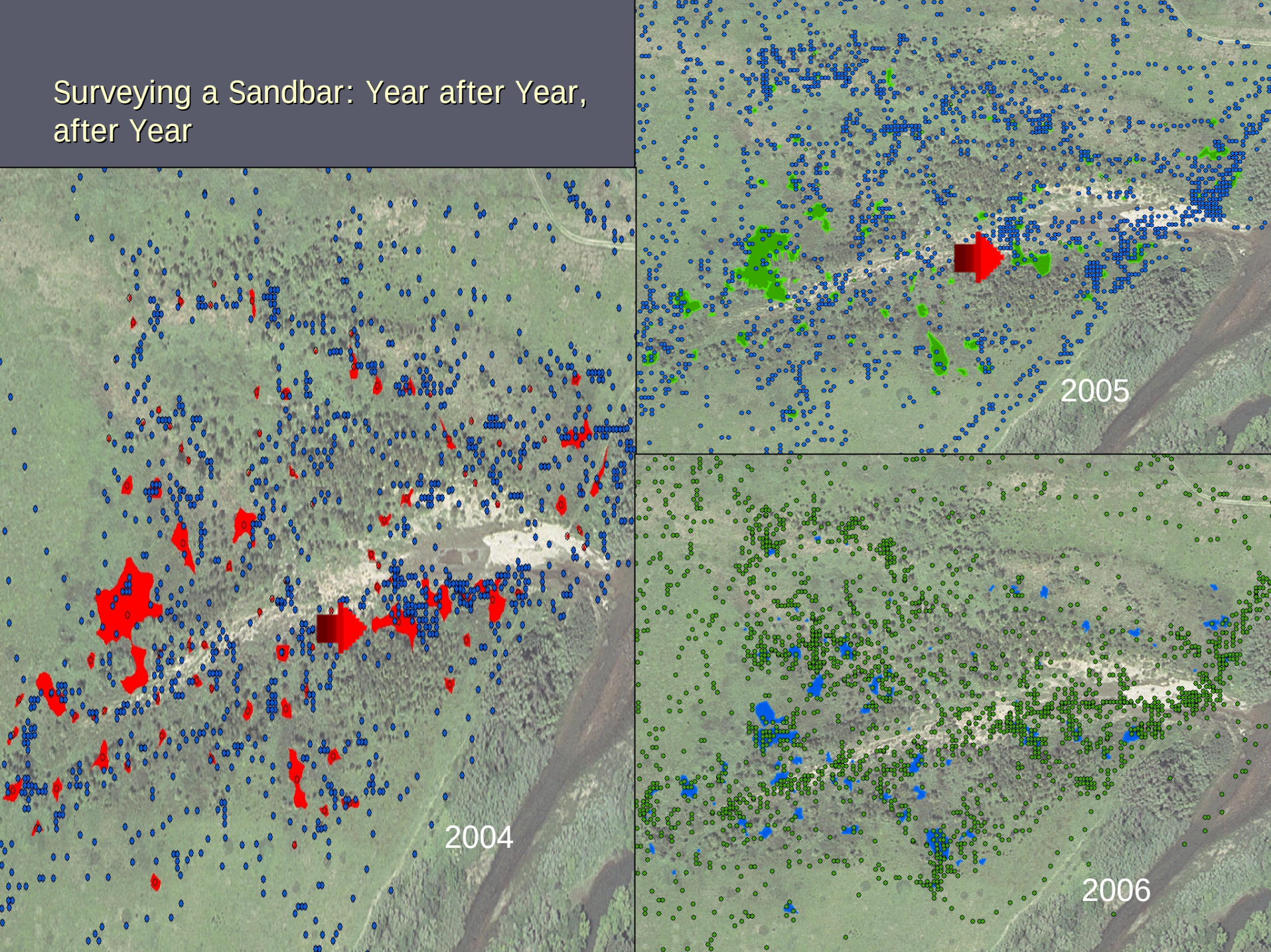
Without Tracks

With Tracks




Sand Bar: Patches found in 2004

Surveying a Sandbar: Year after Year, after Year

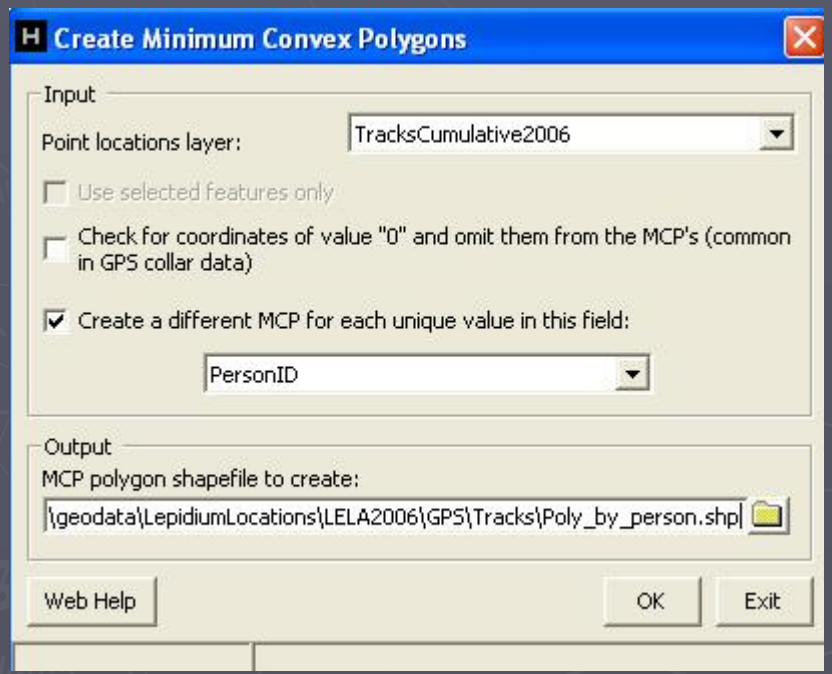


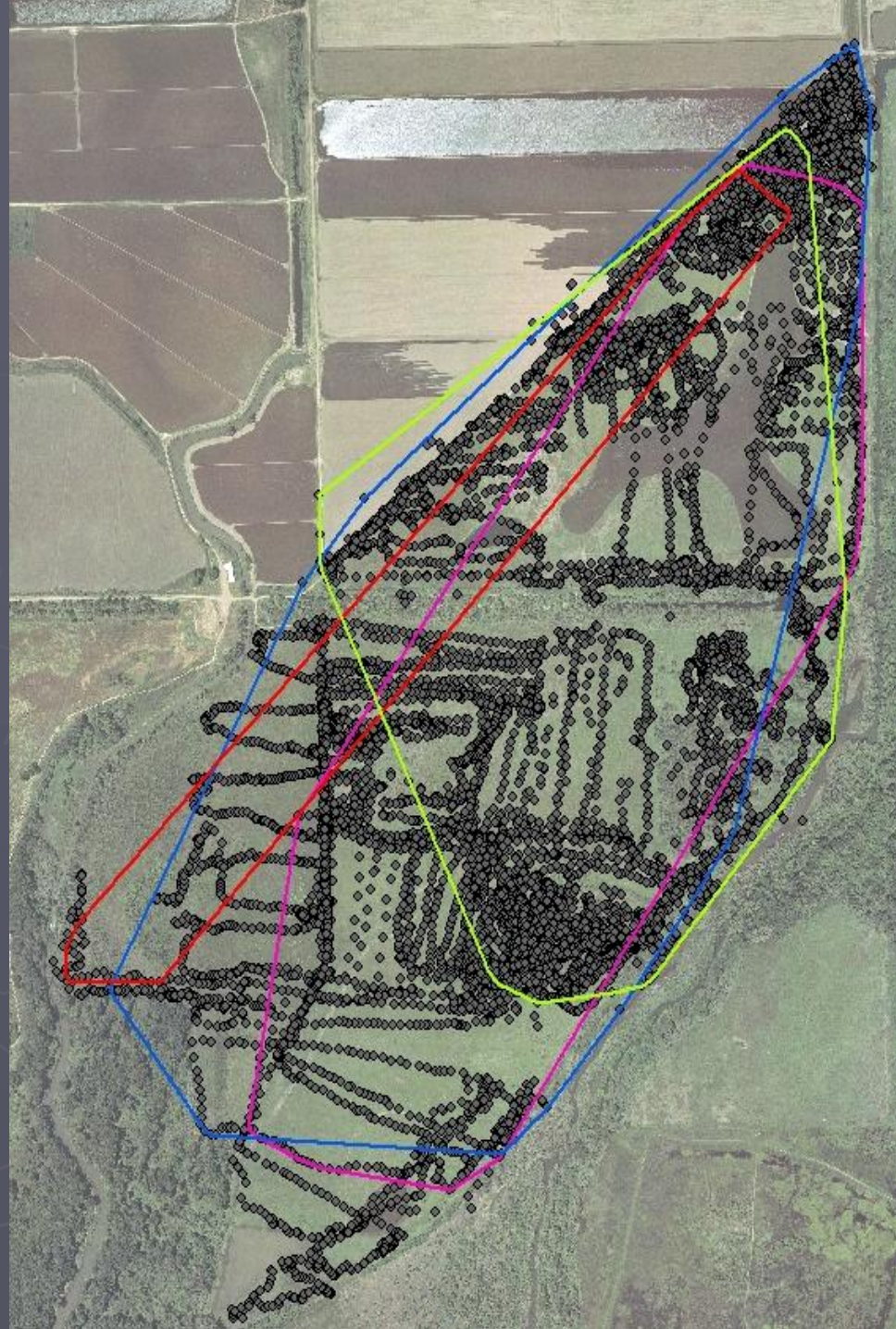
We’re animals too

- Hawth’s Animal Movement Tools
  - Create Minimum Convex Polygons by
    - Person
    - Date
    - Site
    - Species
      - Multiple polygons can be created by unique values from only *one* field

Area surveyed

•These polygons were created by creating a different MCP for each unique value in the field “PersonID” contained in the attribute table of the shapefile “TracksCumulative2006”






1
2
1&2 Combined

Problems with GIS methods

- Tracks can exaggerate area surveyed if surveyor is not careful to turn off tracks when they have stopped surveying.
- Minimum Convex Polygons are useful on a day to day basis
  - Large scale: true area inventoried becomes fuzzy

Sharing your shapefiles

- Using GPS and GIS methods for a survey allows you to easily share information.
  - A complete GPS survey means you can give accurate presence *and* absence data to anyone willing to pull some weeds!

Questions?

- Hawths Analysis Tools: http://www.spatialecology.com/htools/index.php
- California Department of Food and Agriculture. California Weed Mapping Handbook. 2002. http://cain.nbii.org/weedhandbook/CalifWeedMappingHandbook.pdf

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