Habitat Monitoring Along the Lower Colorado River – 2010 Progress

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Outline

- 3 levels of post-development monitoring
- New Sampling Design
- Data Summaries
- Microclimate Monitoring
- Upcoming Projects
- New Sites for 2011

Post-development Habitat Monitoring

1. Compliance monitoring
2. Implementation monitoring
3. Response (Effectiveness) monitoring

Implementation Monitoring

1. Status Monitoring – current conditions of each site.

2. Trend Monitoring and Causal Analysis – change over time and potential causes of change.

Management Priorities

1. Create and maintain habitat for MSCP covered species
   - Specifically, riparian, mesquite, and marsh habitat
2. Use monitoring data to improve decision making (Habitat Credit and AM)

Monitoring Objectives

A. Current density of target tree species (*Populus, Salix, Prosopis*)

B. Changes in density, community composition and structure

C. Abiotic factors –
   - temperature
   - relative humidity
   - Rainfall
   - soil moisture

…Plus Soil Quality (abiotic and biotic)

Vegetation Monitoring

Two plot types

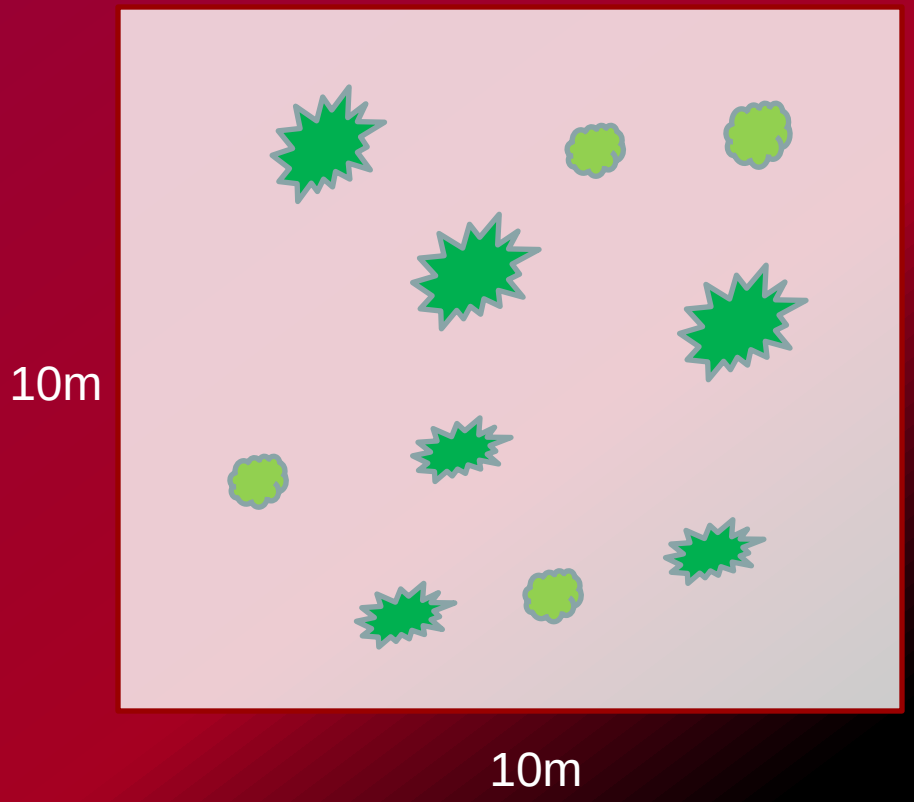
1. Rapid plots (10x10m)
2. Intensive plots (10x40m)

In 2010…

- Beal Lake
- Cibola NWR
- Cibola Valley CA
- Palo Verde Ecological Reserve

Two Plot Types

1. Rapid Plot (10x10m)
   - Systematically placed every 40 meters
   - Density of target trees

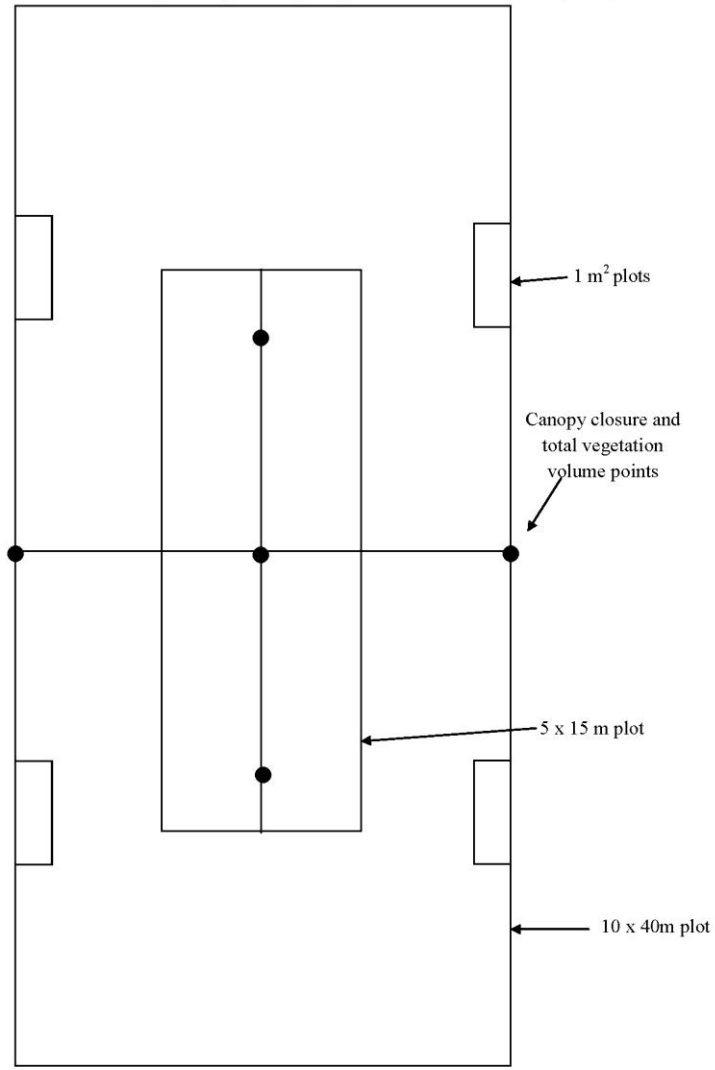


2. Intensive plots (10x40m)

- Nested plots

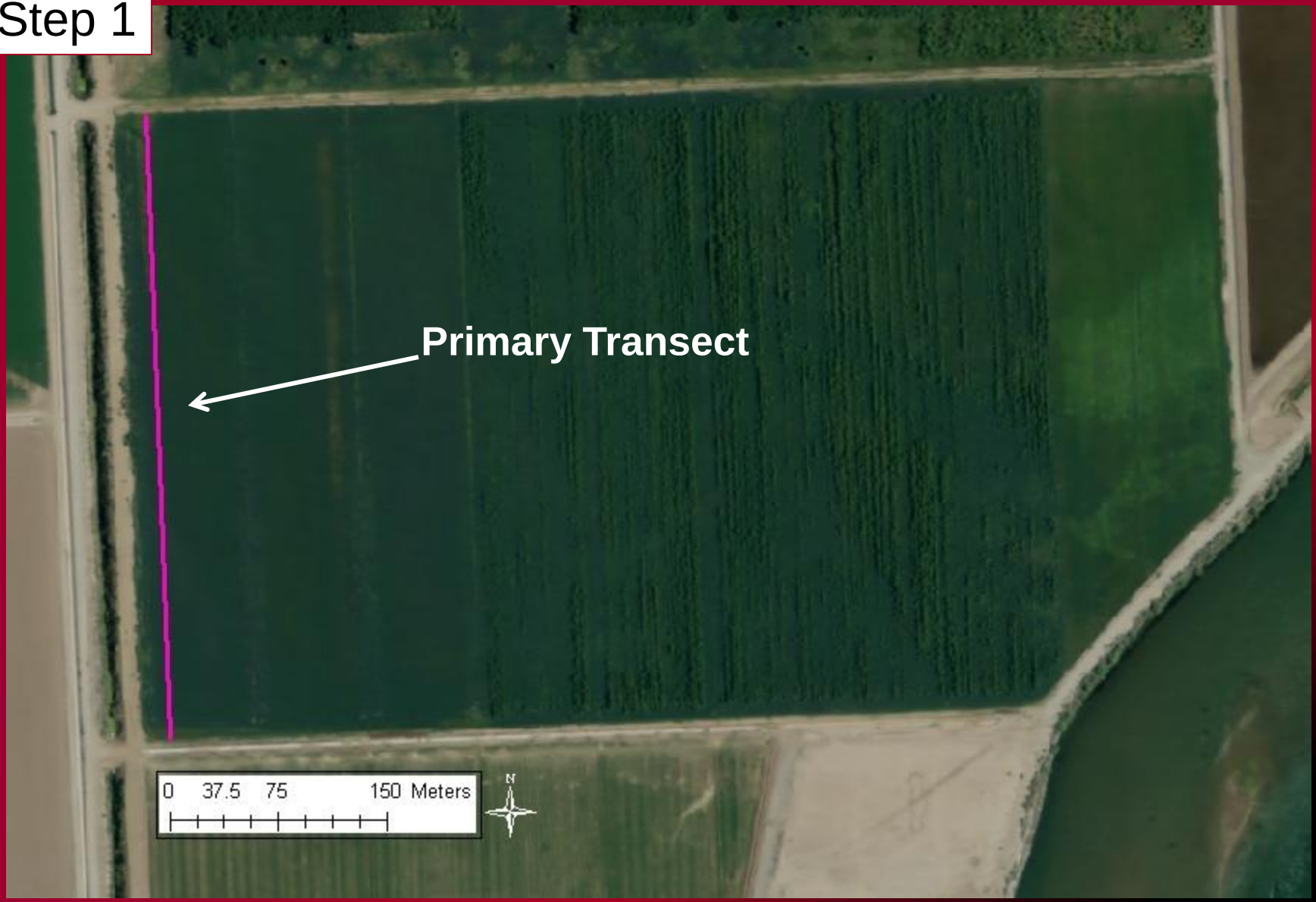
- Overstory trees (Density, Ht., DBH)
- Intermediate trees and shrubs (Density, Ht., DBH)
- Crown Closure
- Total Vegetation Volume (per meter layer)
- Ground and Foliar cover
- Distance to surface water (excl. irrigation)

Figure 2. Intensive monitoring showing nested plots (10x40m, 5x15m, 0.5x2m, 5points)



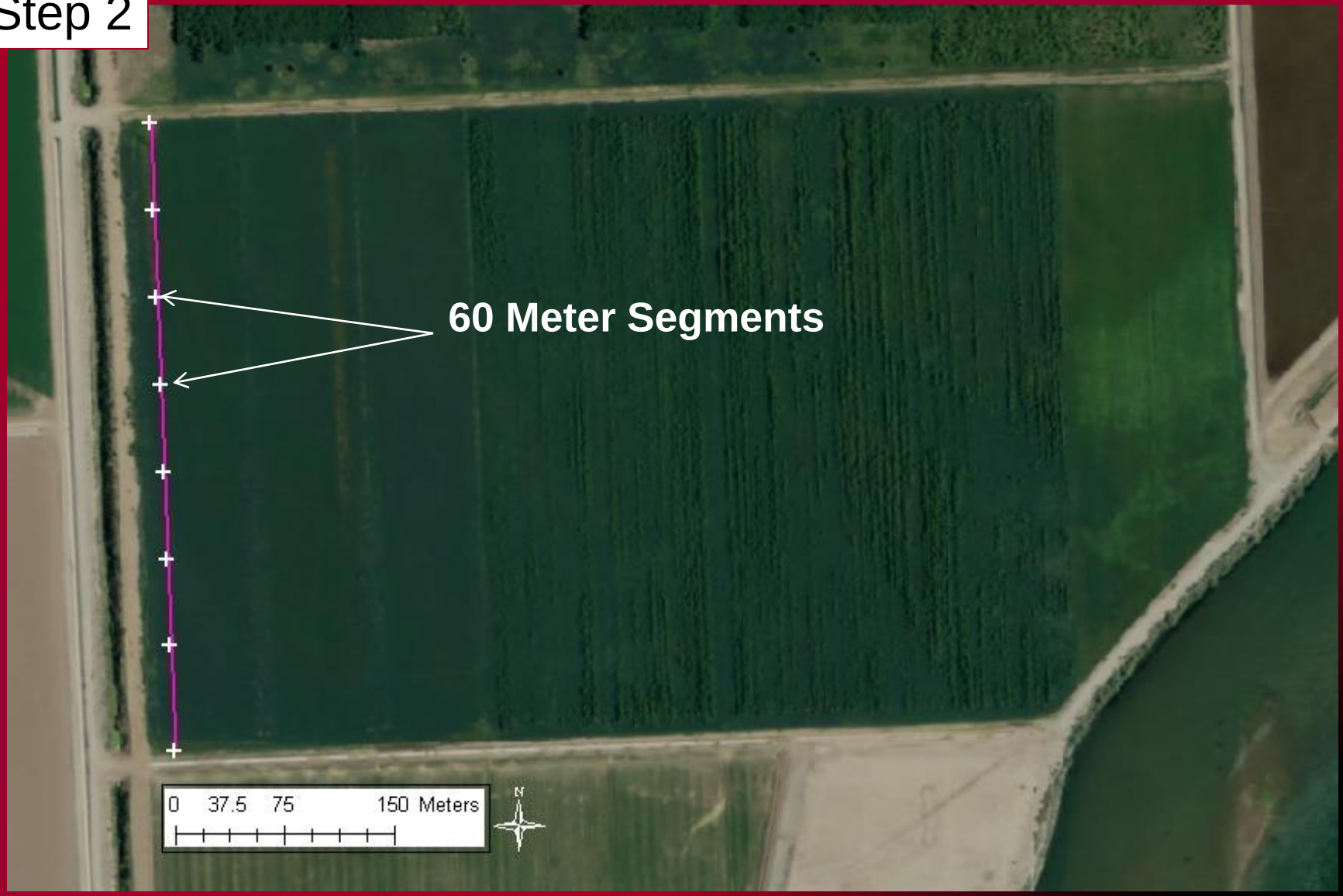
Sampling Design

Step 1



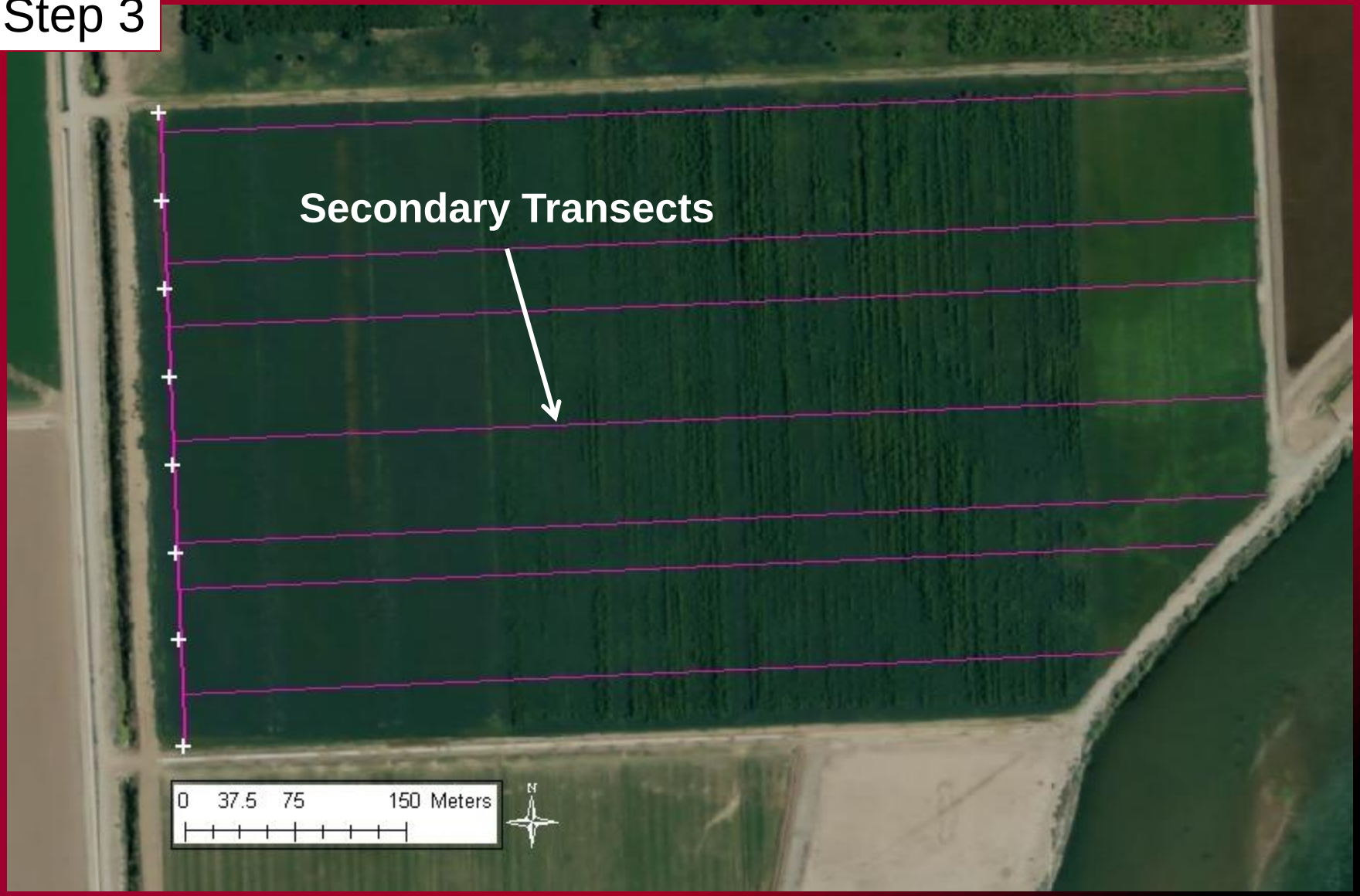
PVER Phase 3 Example

Step 2



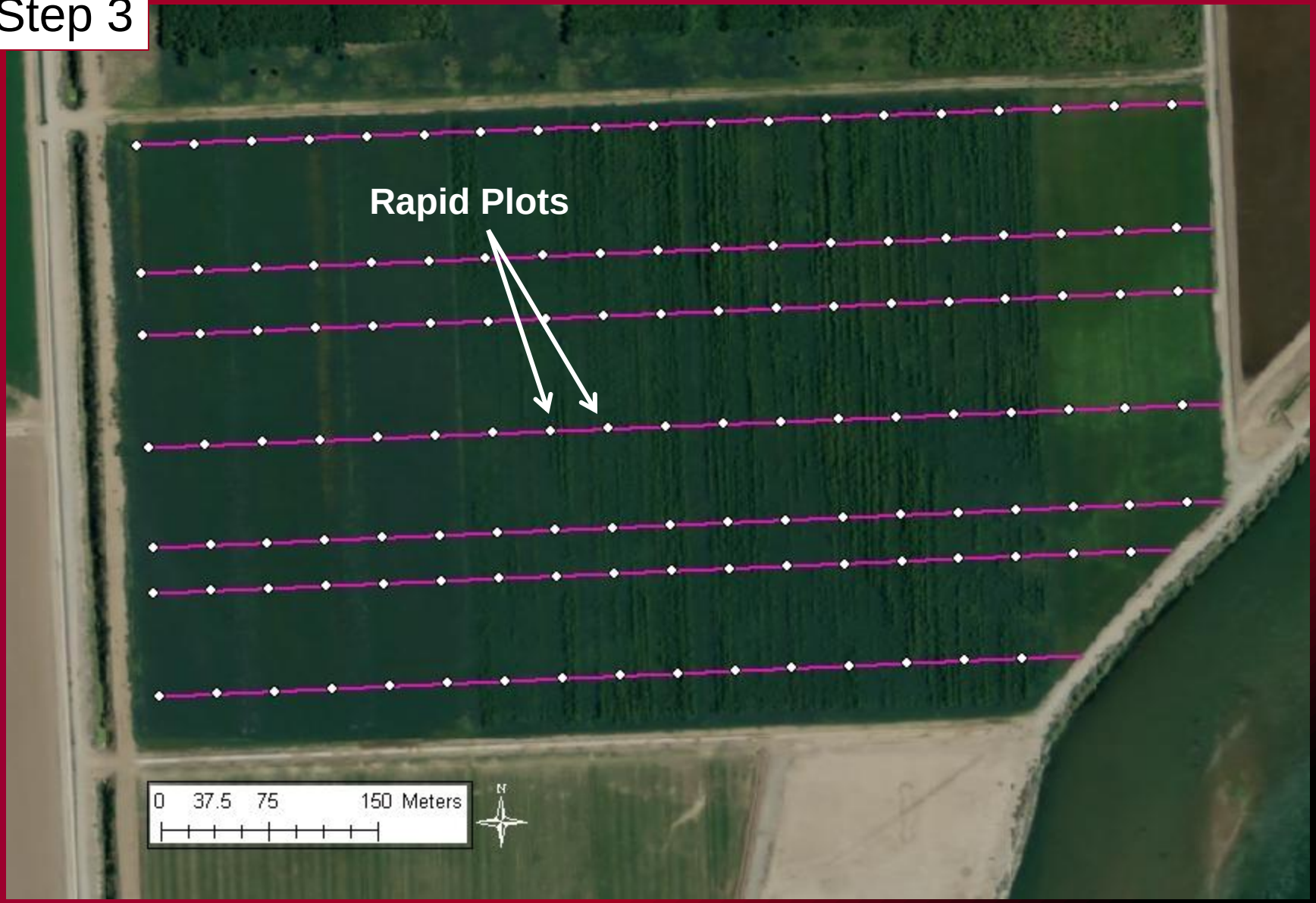
Sampling Protocol

Step 3



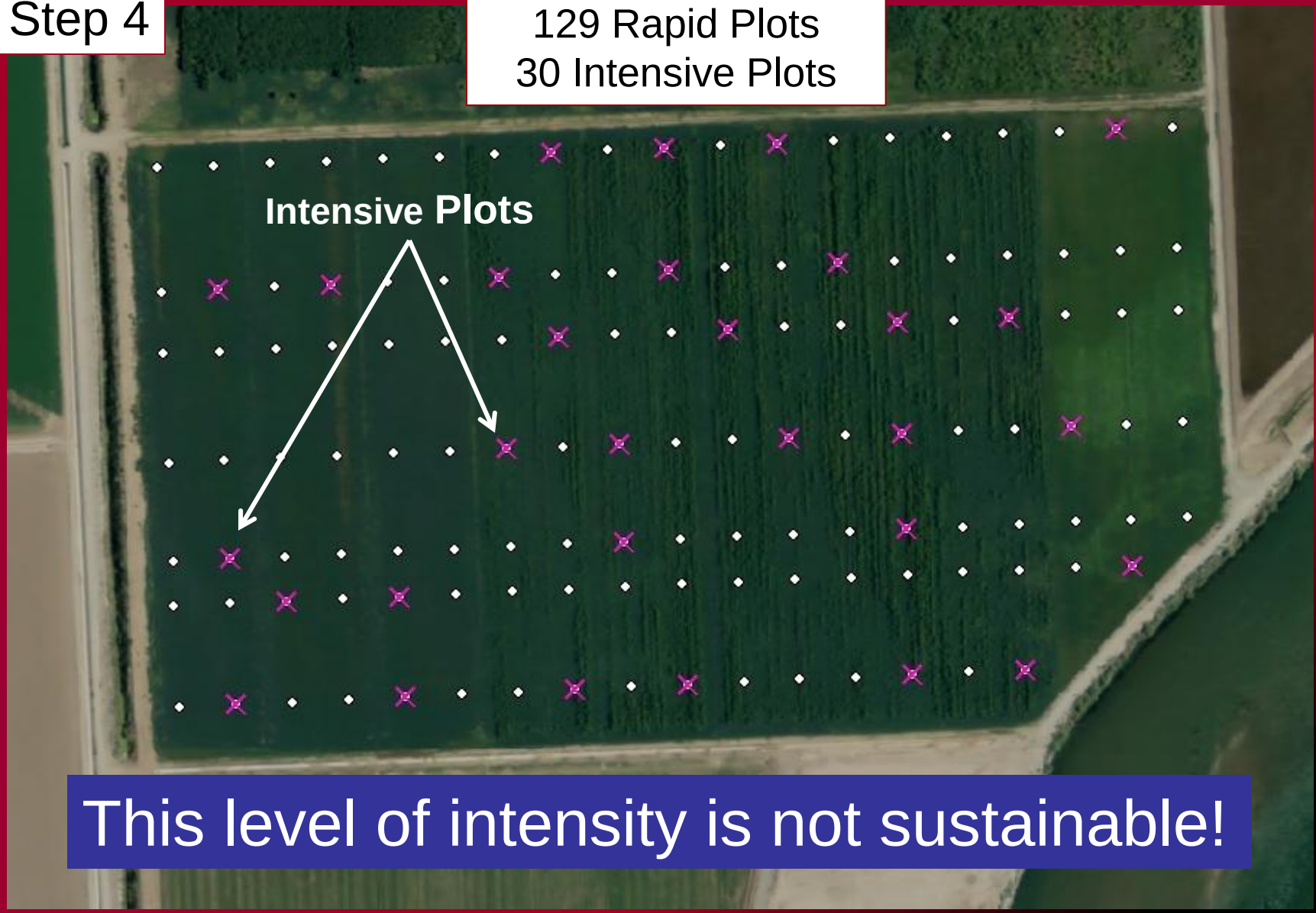
PVER Phase 3 Example

Step 3



Step 4

At PVER Phase 3
80 Acres
129 Rapid Plots
30 Intensive Plots

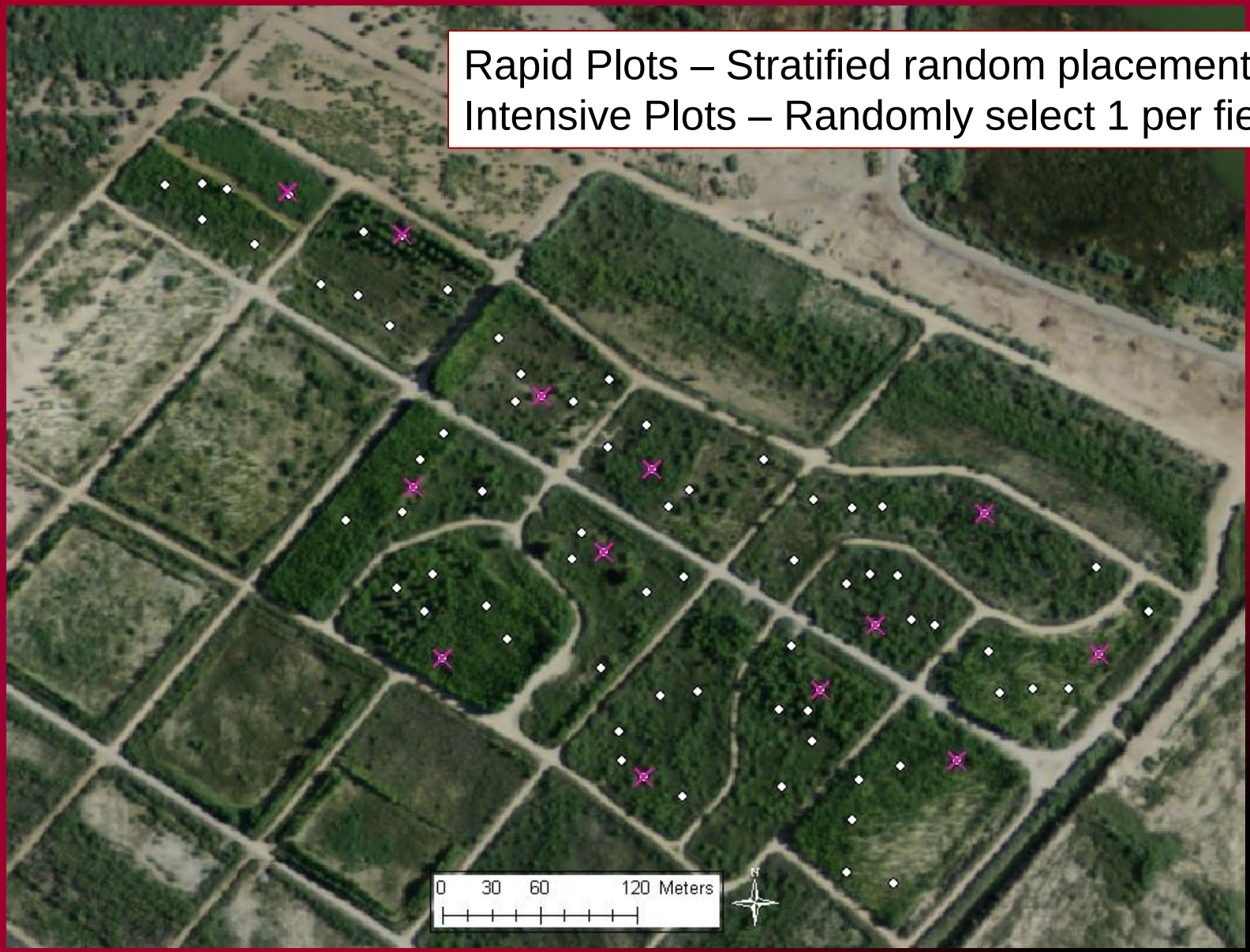


This level of intensity is not sustainable!

Plots distributed by acreage

Phase	Acres	# Intensive Plots	# Rapid Plots
Beal	34	13	78
PVER2	72	27	133
PVER3	80	30	129
PVER4	97	37	150
PVER5	210	80	332
CVCA1	91	35	153
CVCA2	71	27	95
CVCA3	103	39	168
CVCA4 East	91	35	297
CVCA4 West	58	22	92
CVCA5	71	27	100
CibolaNT	36	14	58
CibolaCrane	147	56	200
CibolaMP	20	8	35
Totals	1180	450	2020
		427	1,864

Beal Lake - Modified design



How often will monitoring occur?

- New phases monitored annually for three years then…

Either…

- Move to a rotational basis monitoring phases every other year.

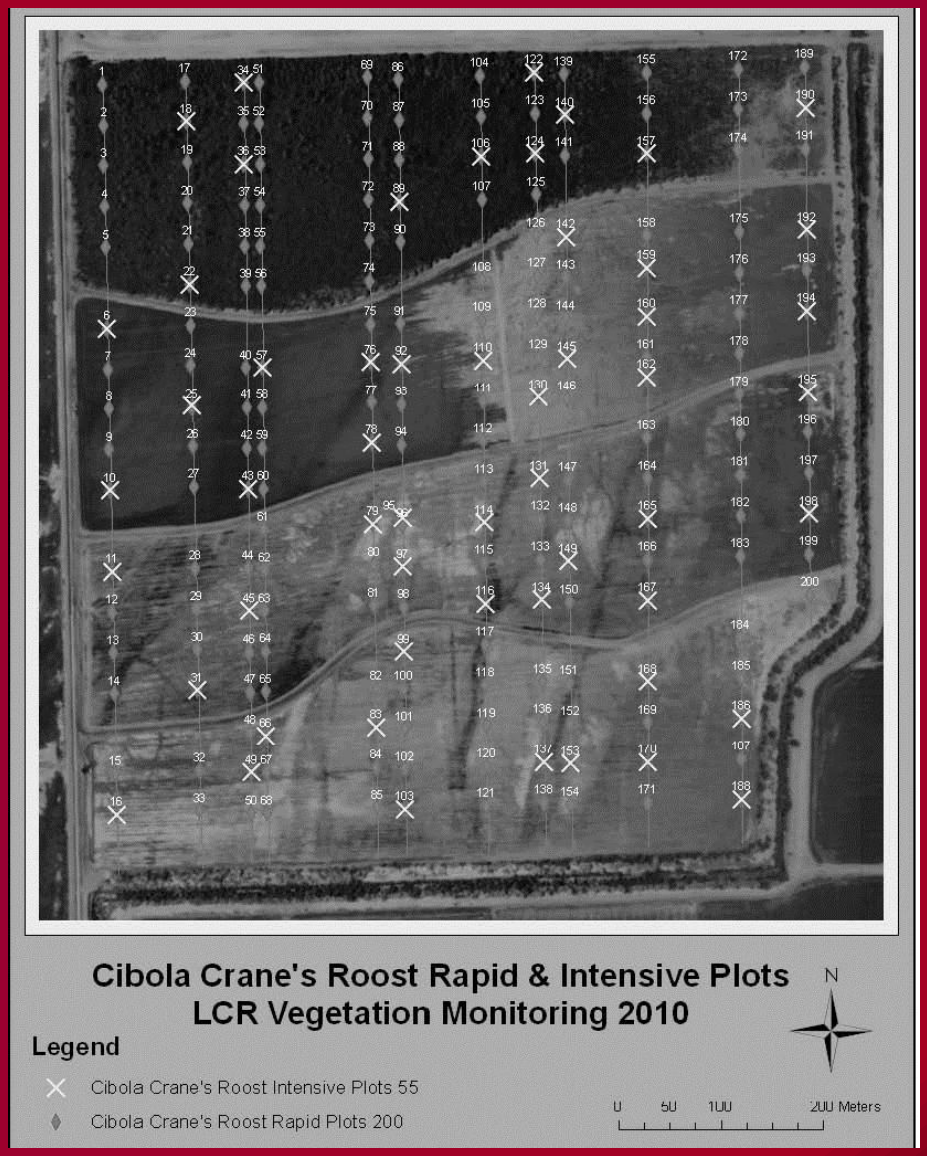
Or…

- Sampling intensity will be reduced enough after the 1st year to make monitoring all phases every year cost effective.

Results – 2010

- Vegetation sampling September – November
- Collect intensive and rapid plot data
- Information on herbaceous, shrub, and tree species
- Currently working on data analysis
- Field Observations and General Trends

Results – Field Observations



Results – Field Observations

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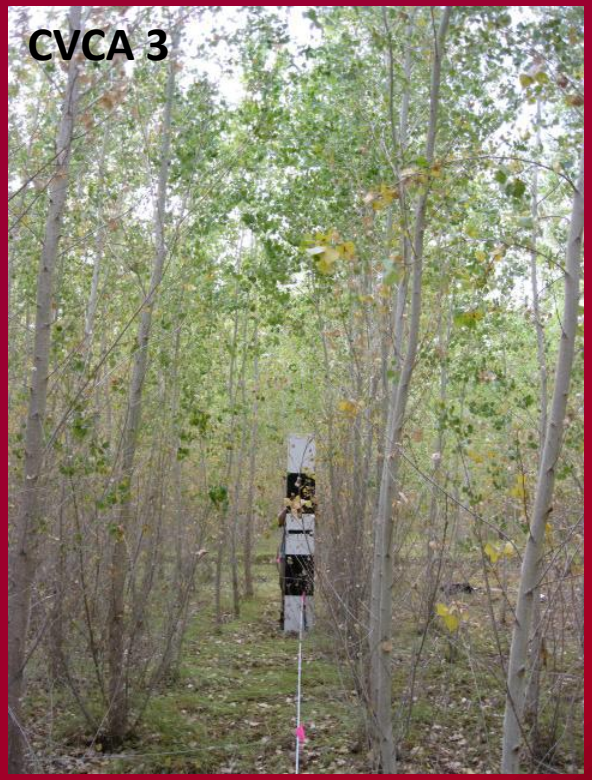
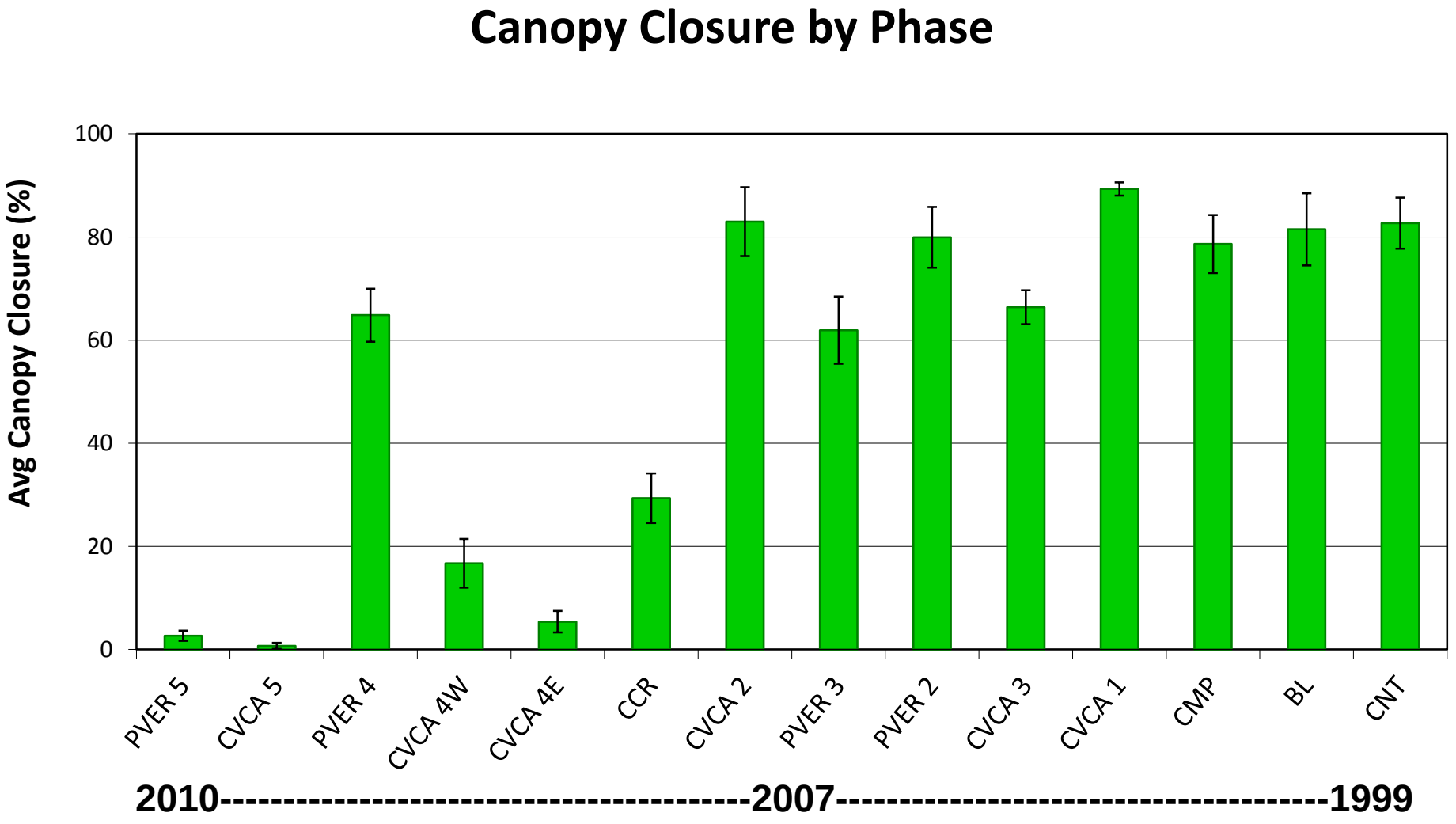
Planted 2010



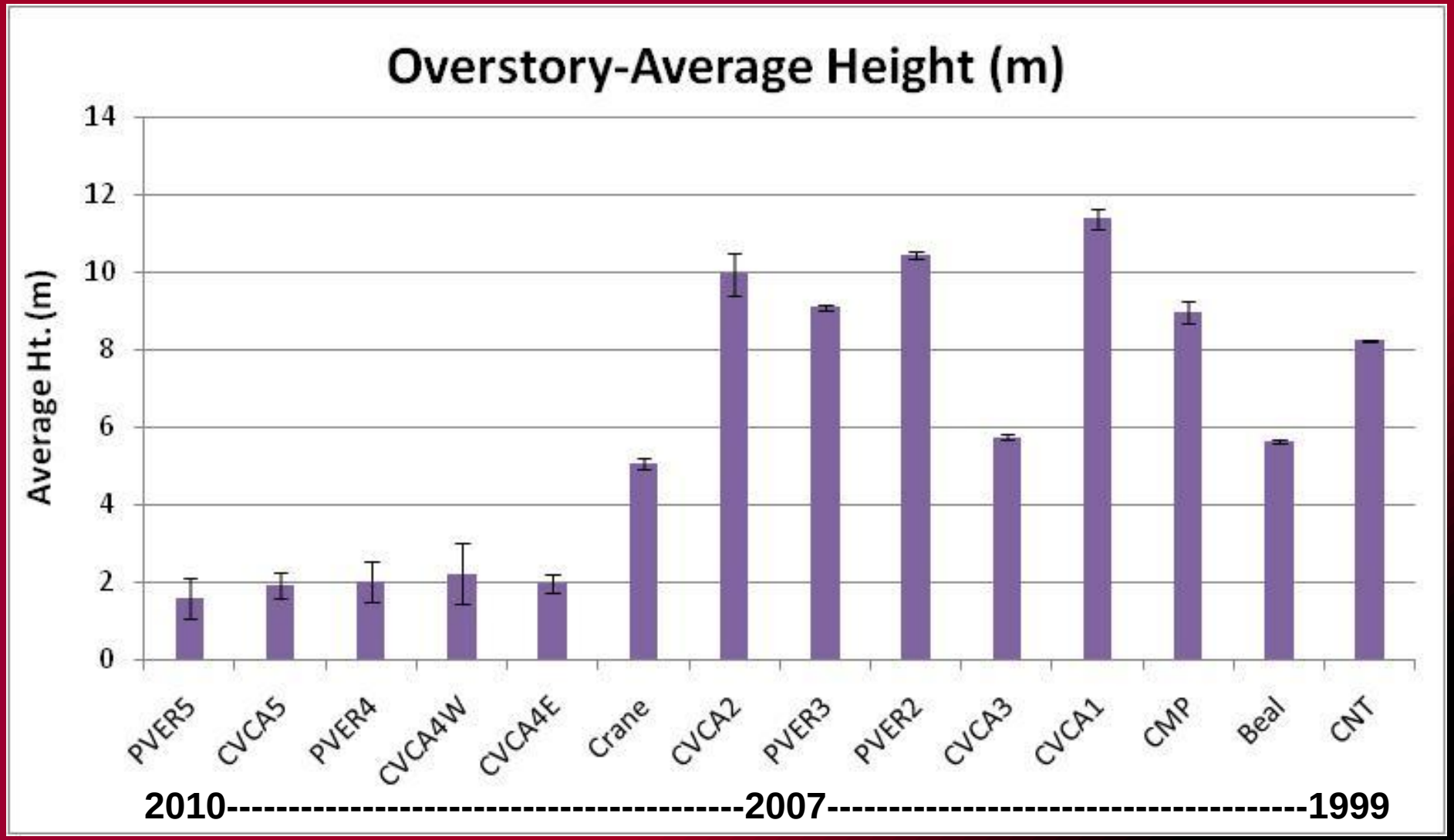
Planted 2007

Planted 1999

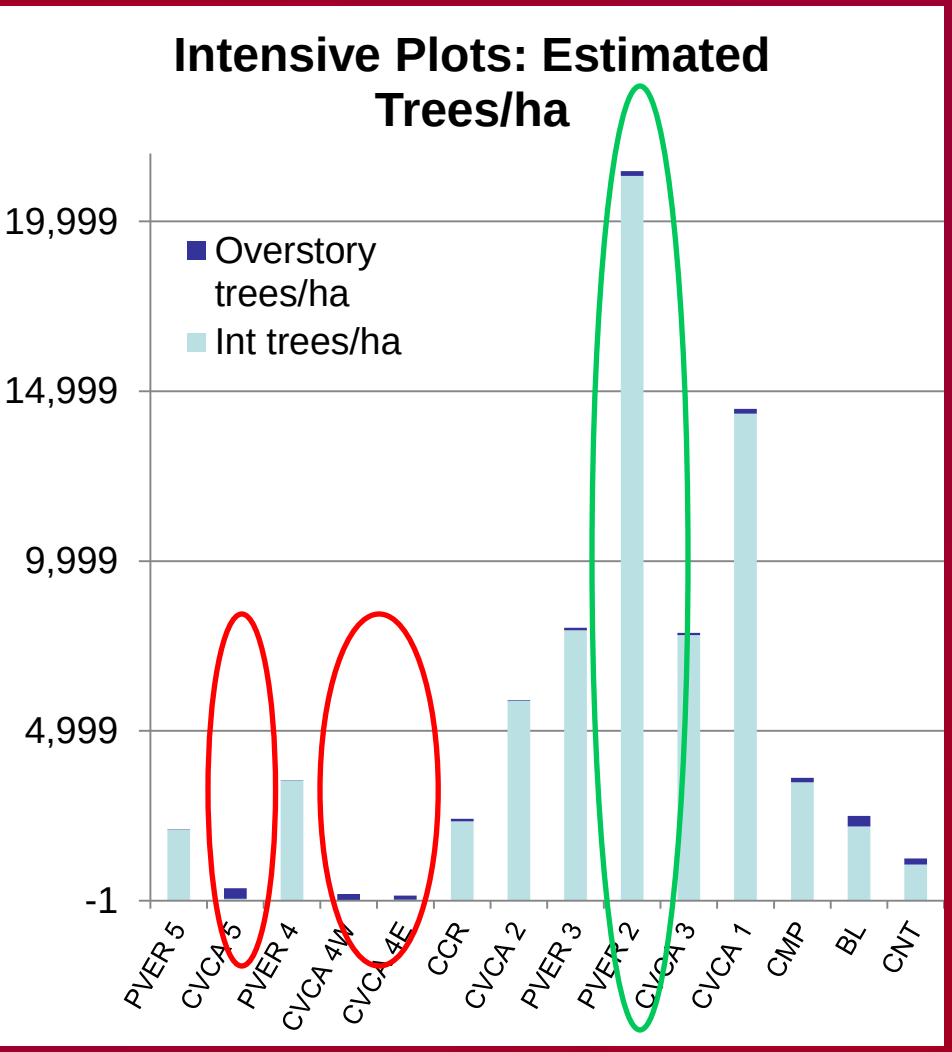
Results – Canopy Cover

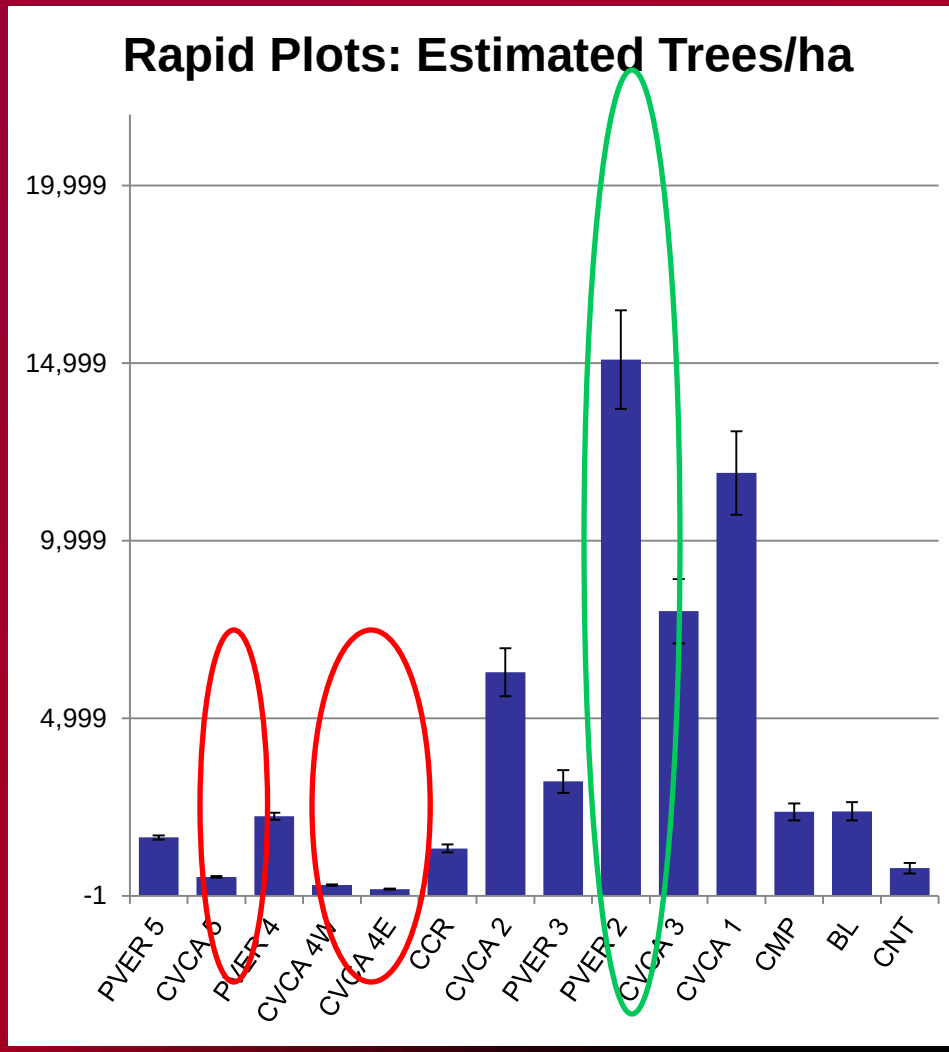


Results – Canopy Cover



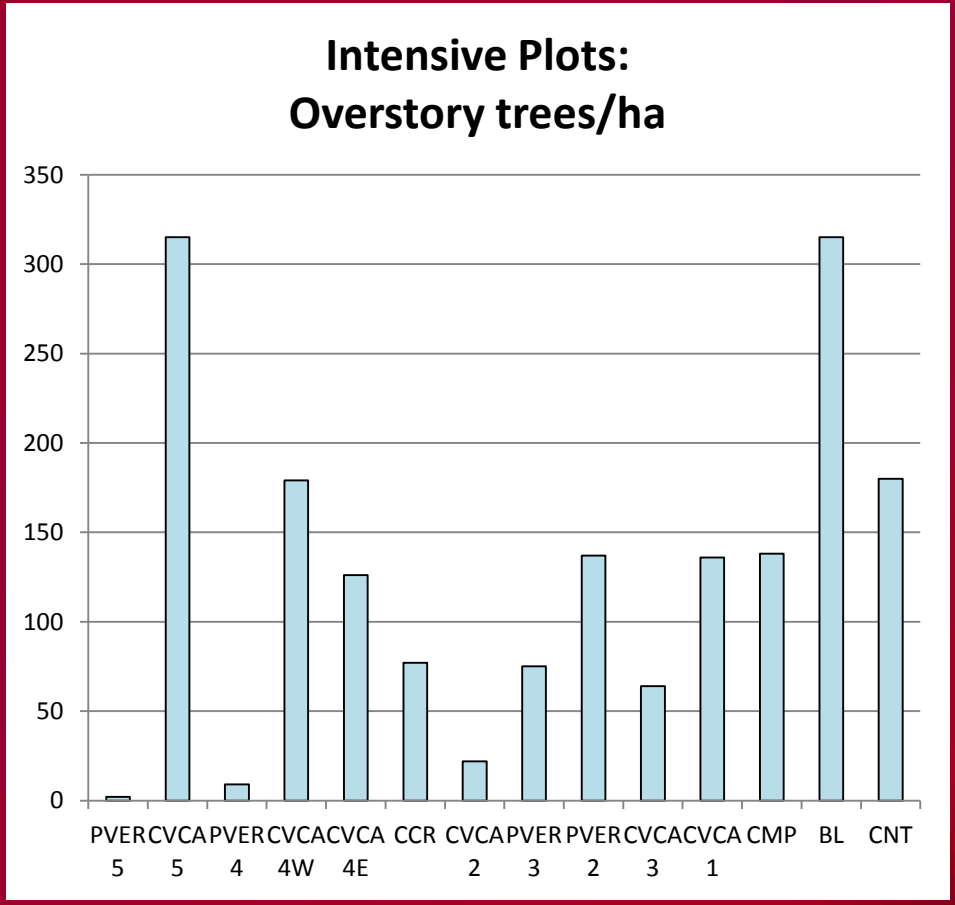
Results – Tree Density Estimates

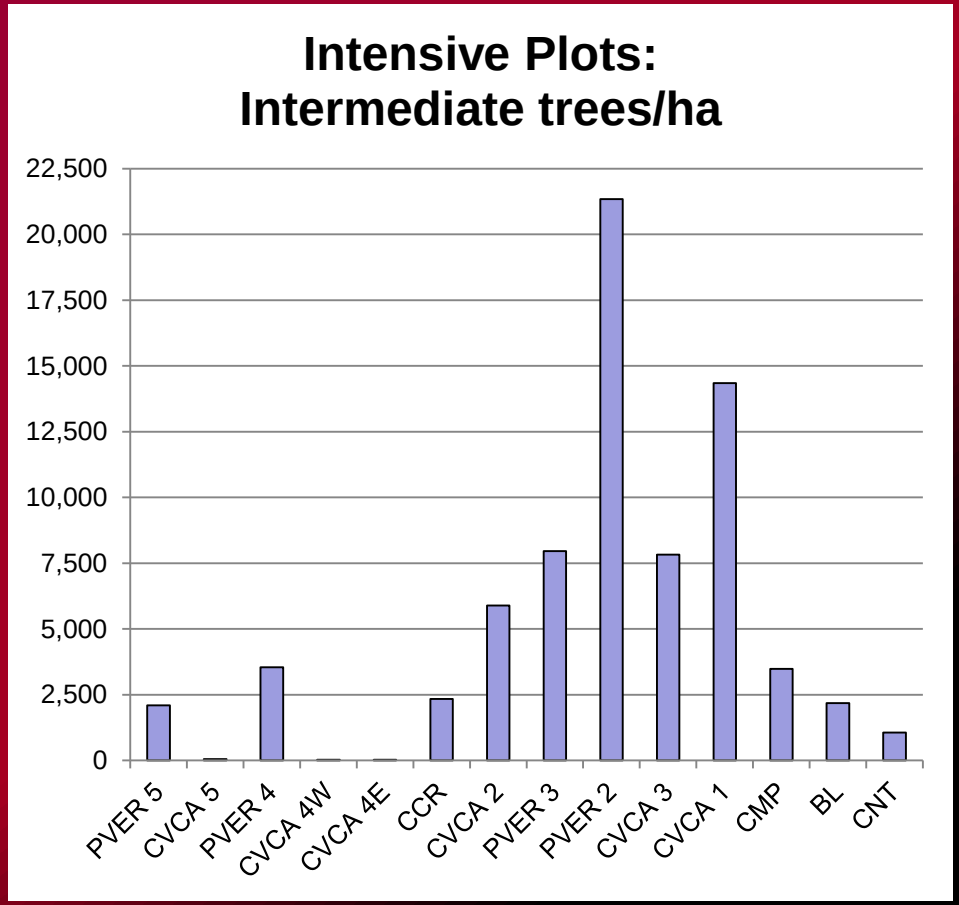




Results – Tree Density Estimates

- Intensive plots allow us to break out Overstory and Intermediate tree information
- Differences from what species were planted, and age





Microclimate Monitoring

- HOBO gauges – Installed January 2011
  - Temp and Relative Humidity
  - Photosynthetically Active Radiation

- Soil Moisture – Planned for 2011
  - Plant available water across gradient

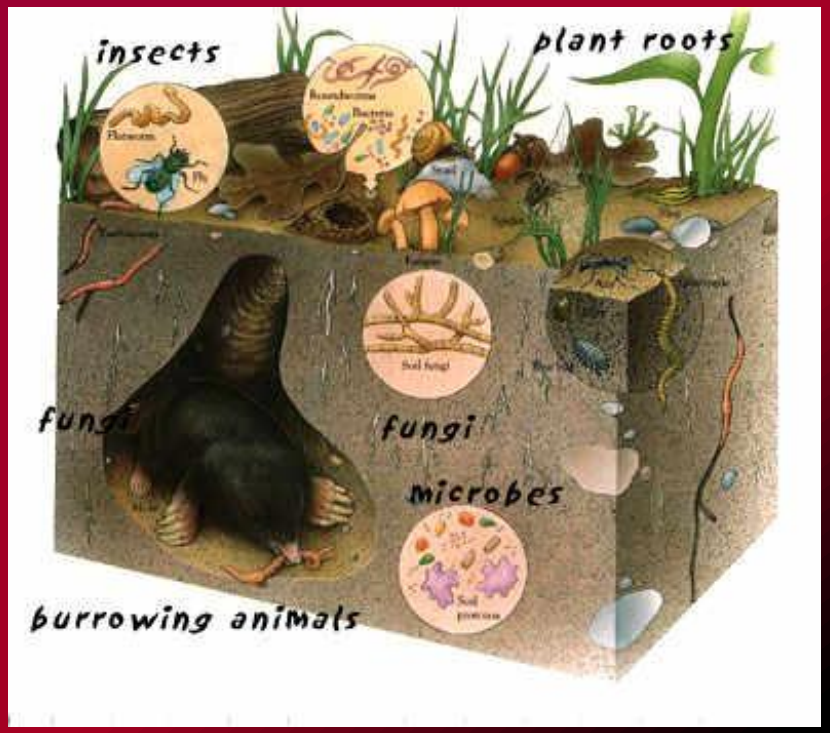
Marsh Habitat Monitoring…

…will begin in 2011

- Protocols will be modeled off of existing Marsh Habitat Monitoring Programs in our region

Soil Quality Monitoring – 2012?

- Soil Organic Matter
- Bulk Density
- Aggregate Stability
- pH
- Electrical Conductivity
- Extractable N, P, K
- Soil Respiration



Additional sites

In 2011…

- Hartmine Marsh
- Bill Williams River NWR

In 2012…

- Imperial NWR - Marsh
- Laguna Conservation Area

Acknowledgements

Land Owners

- Havasu NWR
- Cibola NWR
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- Arizona Fish and Game

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Thank you!

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