Wetland Classification and Basin Characterization Study

Preliminary Results

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Acknowledgements

District Staff

Marty Kelly, Director Ecologic Evaluation, PRJ
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Jones Edmunds, Inc.

Joe Sullivan, Project Scientist
BJ Bukata, GIS Analyst
Mark Nelson, Engineer

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Project Supports: Evaluation of Minimum Flows and Levels Methodologies for Wetlands

- Rules of Chapter 40D-8, Florida Administrative Code
  - Establishment of new methodologies and programs
  - Assist to characterize water regimes
  - Provide measures for prevention of significant harm
  - May reflect seasonal variations
  - Can assist in withdrawal management - OROP

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Project Goals:

- Functional Classification of Wetlands

  TYPES OF WETLANDS?

  - Connected or Isolated – Degree?
  - Clay Beds – Create Locally Confined Conditions
  - Shallow or Deep
  - Landscape Position
  - Species Composition

- Determine **ANNUAL** "Hydropattern"
  - Frequency, Depth and Duration
  - **WHAT % OF THE WETLAND AREA IS FLOODED**

Project Components

- LIght Detection And Ranging (LIDAR)
  Wetland Bathymetry
- Hydric Soils Interface
- Soils Characterization
- Wetland Classification & Characterization

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LIDAR Overview

Uses Light to measure distances

Airborne laser-scanning technology
- Accurate
- 3-D Measurements of Objects

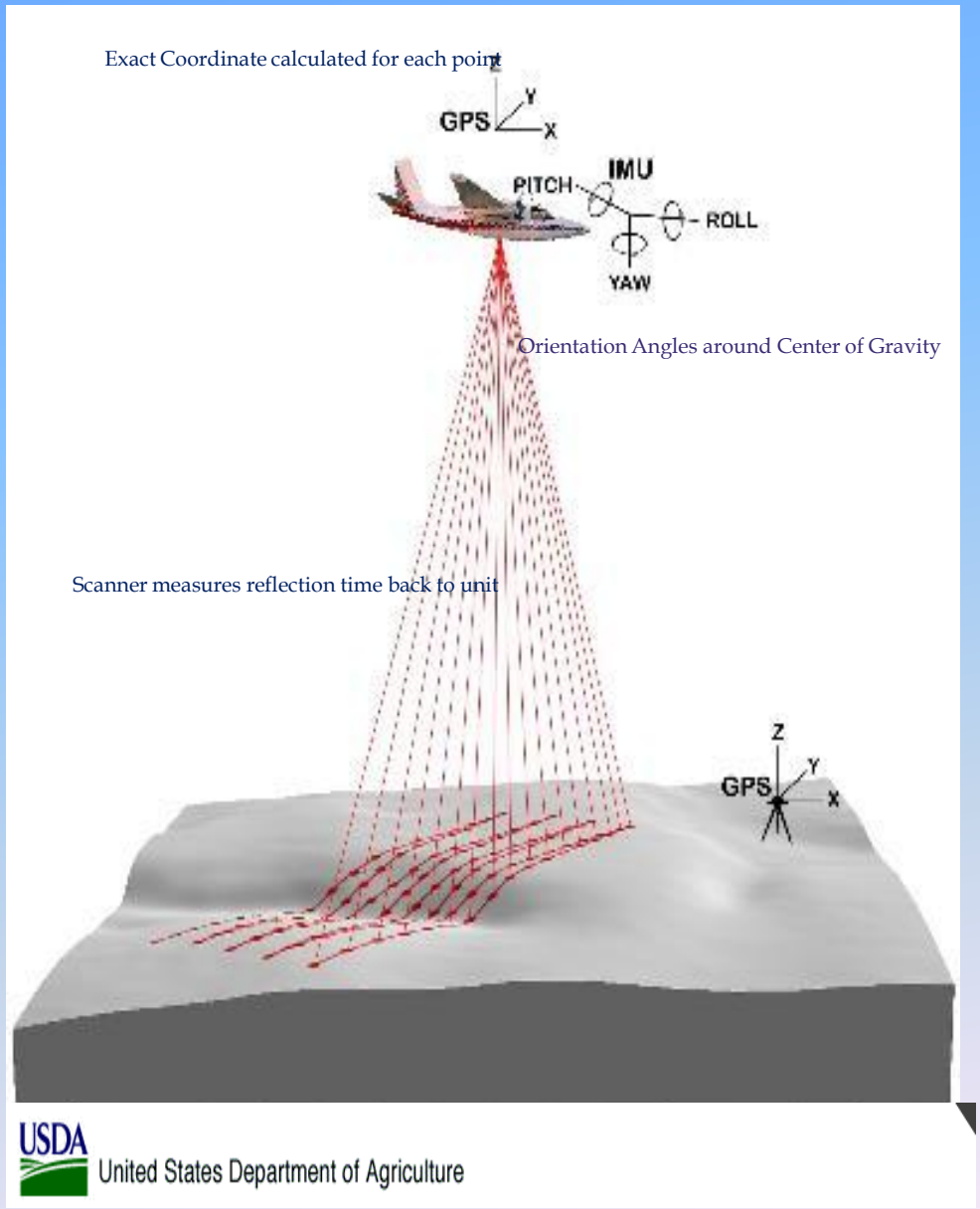
Attachments to scanner
- Inertial Measurement Unit
- GPS

Millions of data points recorded

Up to 100,000 pulses of light/sec

Applications including FEMA Maps

Airborne Laser Scanning Technology

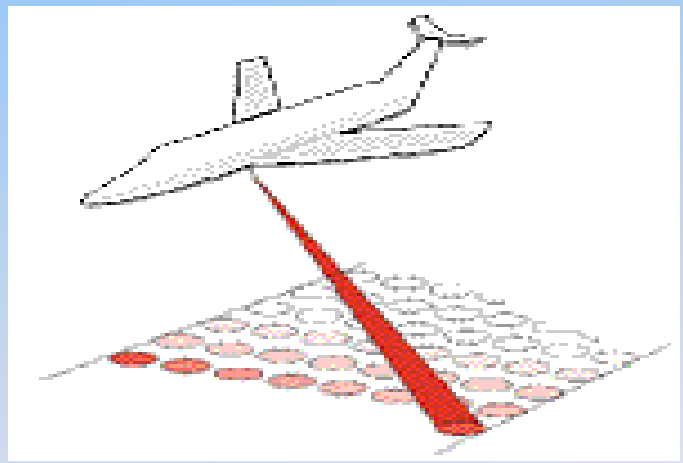


LIDAR and the Canopy

Many beams find a way through the foliage to the ground

Source: Airsurvey.com/lidar

How does it work?



From:**Thomas Hohl**

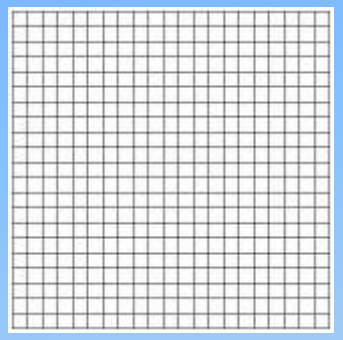
Airborne Laser-Scanning

Method of analyzing

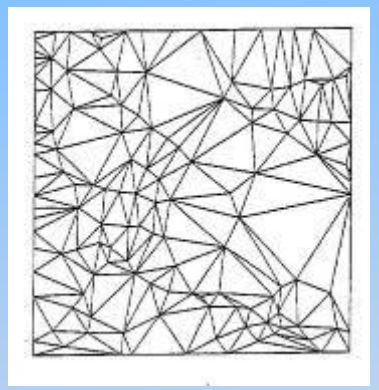
Laser raw data

551001.630	168916.990	520.900
551007.280	168921.990	522.940
551047.900	168946.030	521.690
551002.070	168975.660	525.700
551038.280	168922.590	520.100
551037.470	168923.490	520.170
551035.490	168924.130	520.300
551034.420	168925.330	520.250
551074.600	168912.830	518.160
551093.410	168943.010	520.420
551094.720	168943.490	520.500
551091.810	168947.240	520.550
551092.780	168945.960	520.420
551052.440	168900.370	518.300
551055.890	168942.290	520.760
551054.910	168943.710	521.440
551058.210	168967.050	521.910
551080.930	168916.260	518.290
551039.580	168906.470	519.050
551036.320	168908.590	519.130
551050.930	168903.580	519.190
551050.130	168901.360	518.490
551049.530	168903.360	518.910
551034.950	168921.310	519.480
551035.380	168922.850	519.610
551036.350	168921.550	519.480
551087.450	168944.330	520.530
551074.270	168911.130	518.360
551075.590	168911.590	518.320
551052.210	168961.030	521.950

GRID



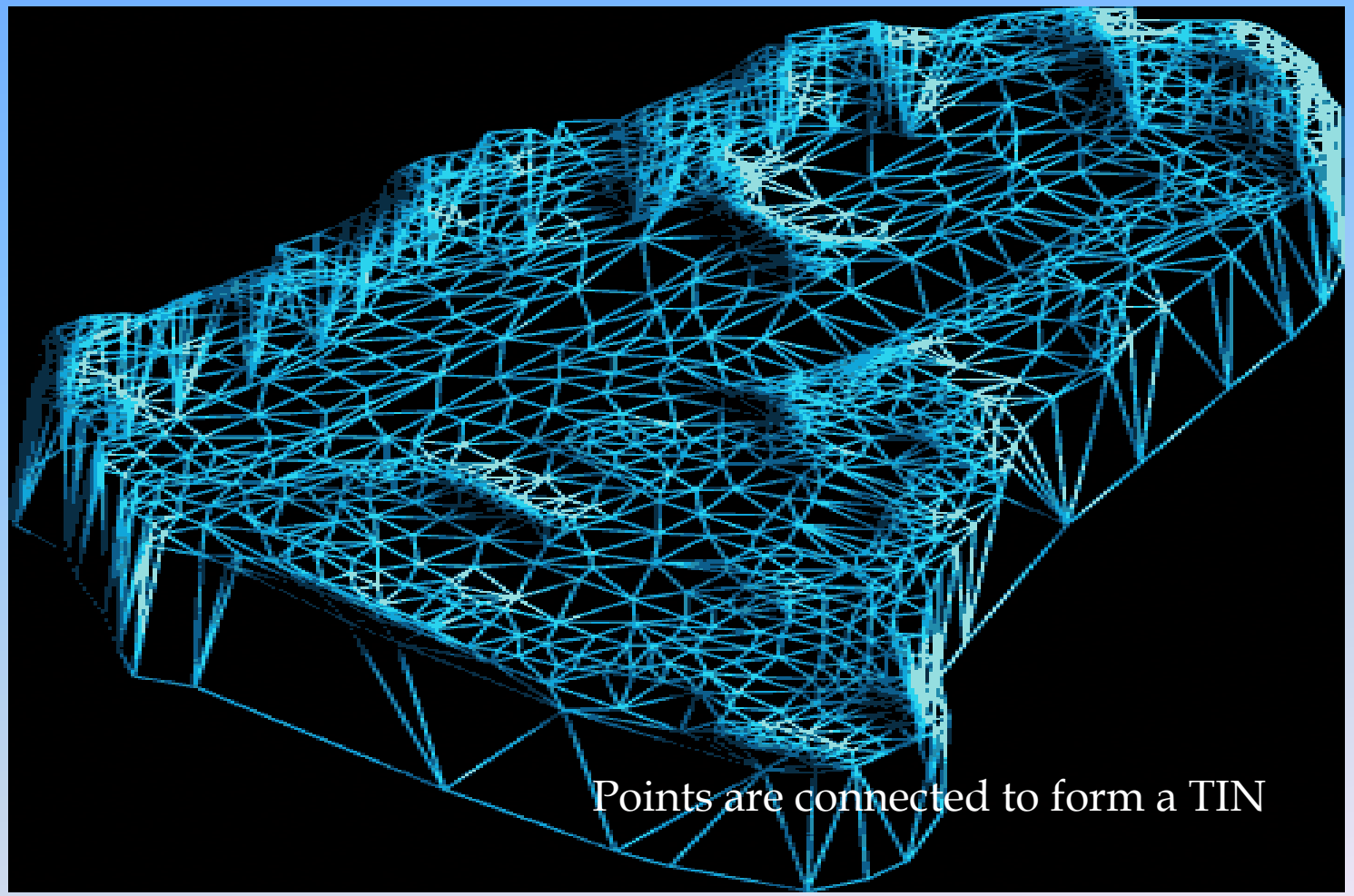
TIN



Contour lines

From:Thomas Hohl

Triangular Irregular Network (TIN)



Source: Airsurvey.com/lidar

BARE EARTH FILTERING

- Software filtering leaves Bare Earth points
- Technique removes shrub and tree points

Field Verify Points

- Layer LIDAR ground points over shapefiles
- Four Feature Classes of Data Established

Suitable
Marginal
Sparse
Unsuitable

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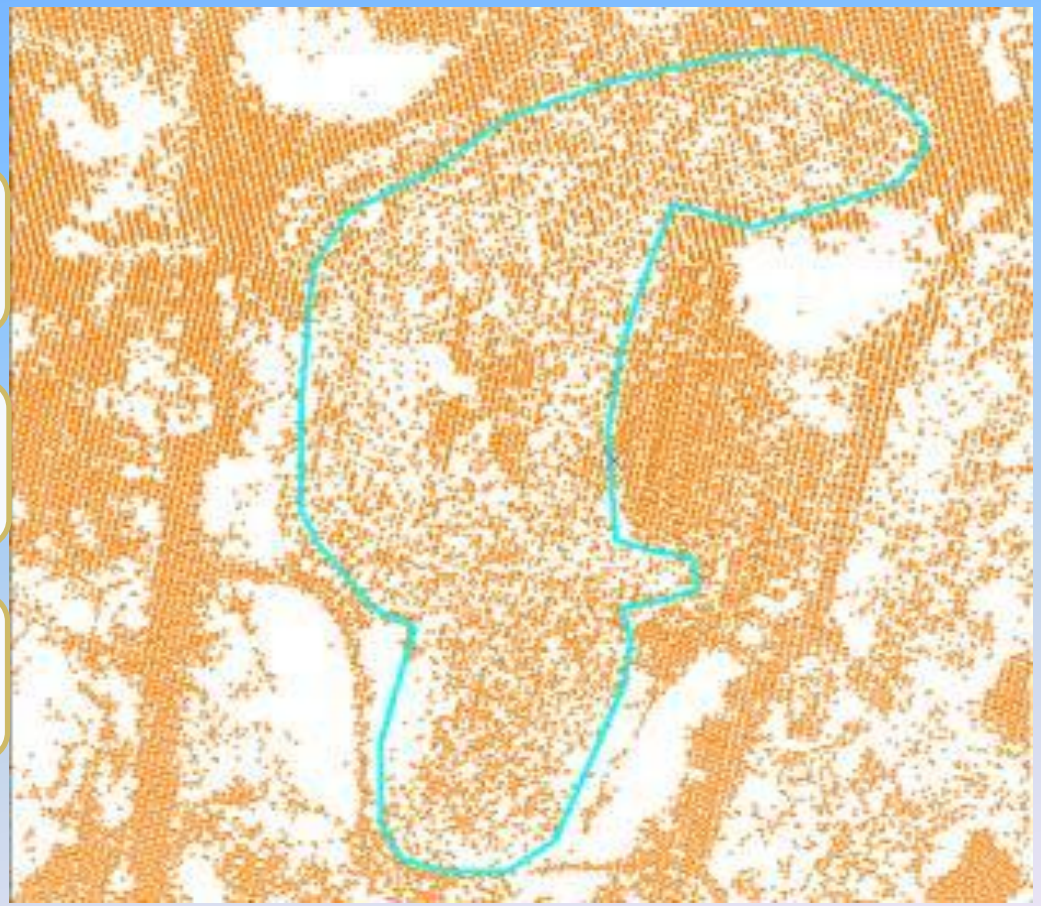
Suitable Coverage

- Well Distributed Ground Points
- Adequate Number of Points
- Successful Modeling Expected



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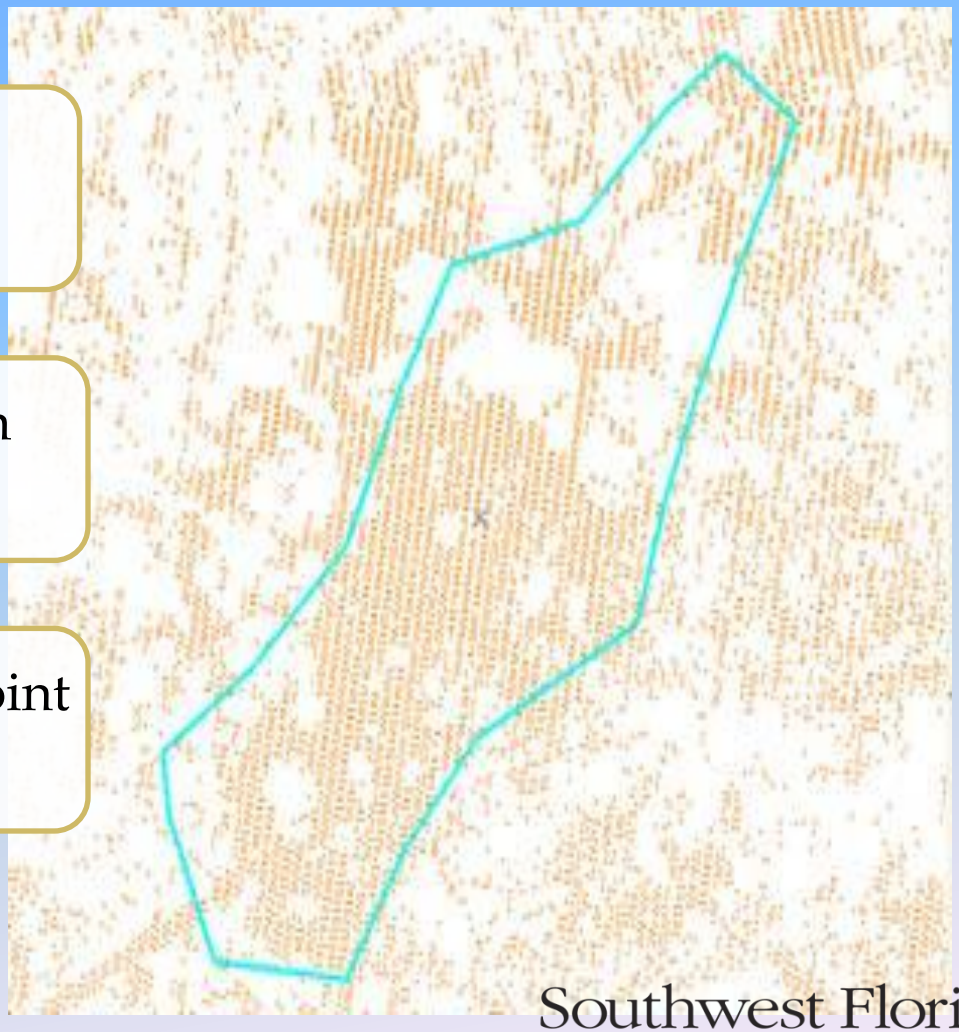
Marginal Class

- Well Distributed
- Evidence of Inundation
- May not find lowest point
- May be no alternative



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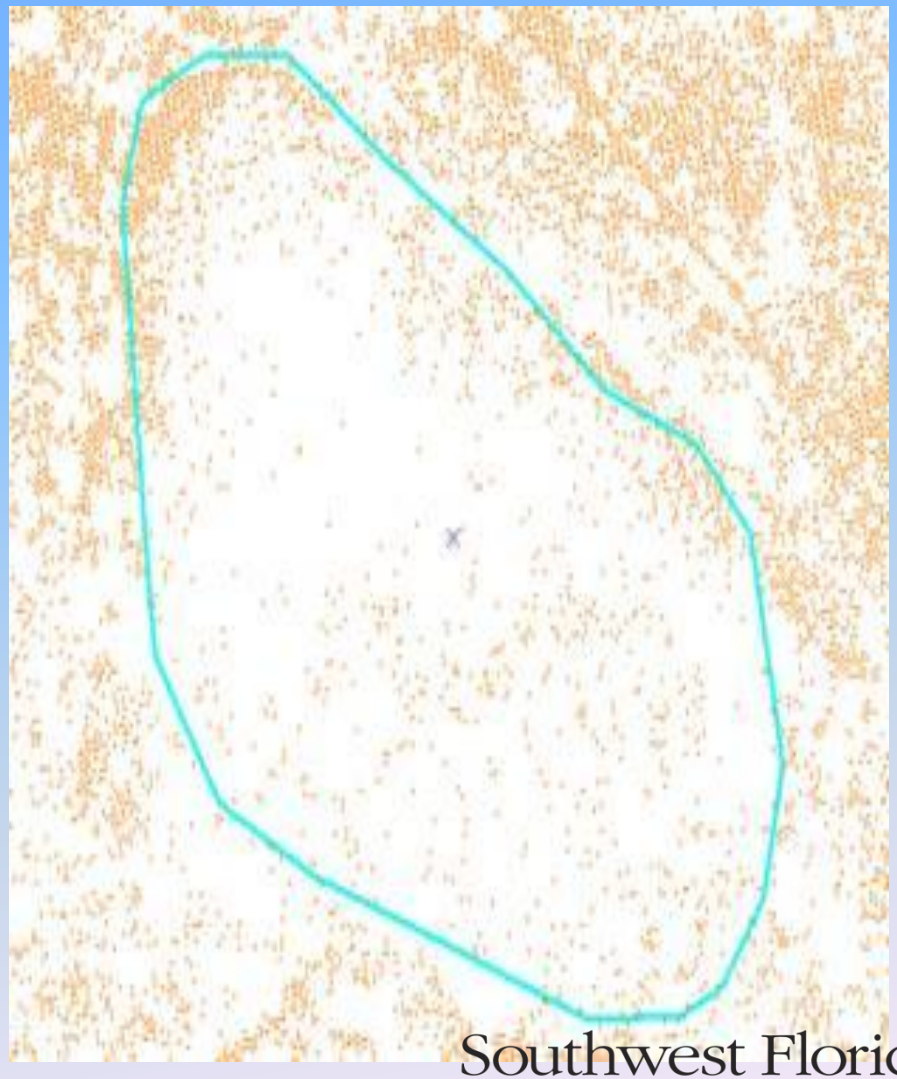
Sparse

- Low number of points
- Poorly distributed

- Wetland Contours not represented adequately

- Large gaps indicating inundation
- Lowest points not likely



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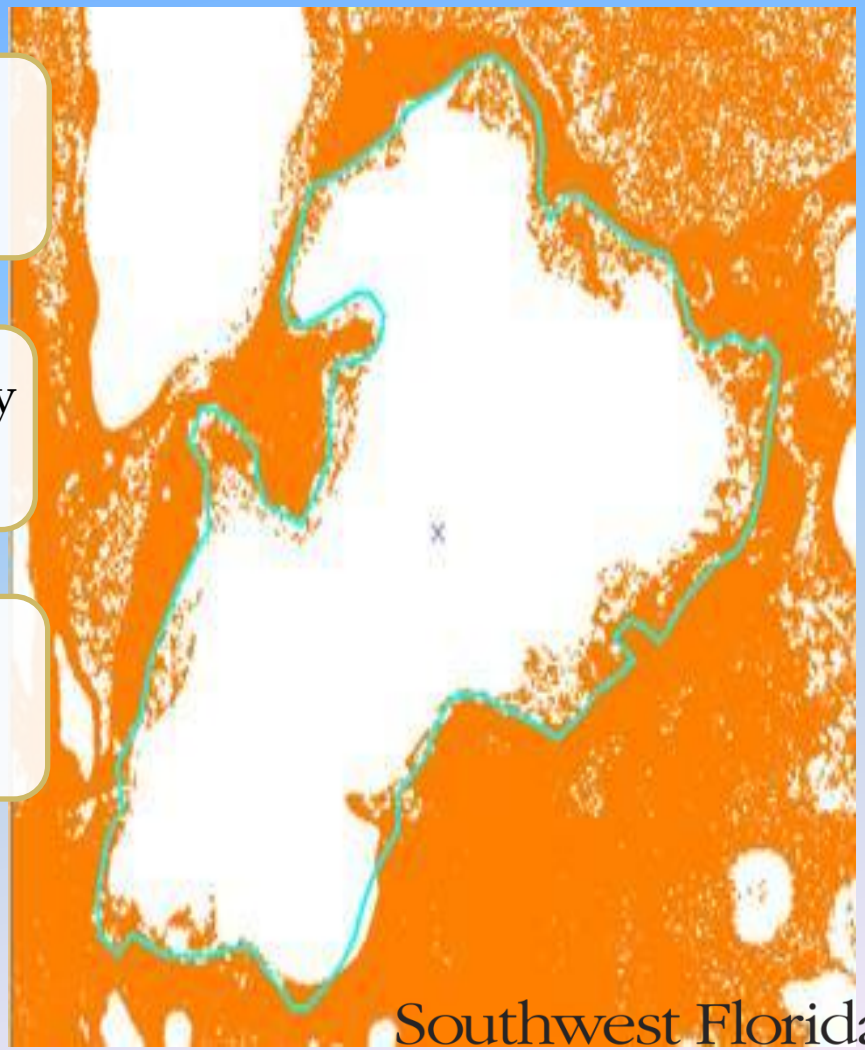
Unsuitable

- Inundation nearly complete
- Ground Points only on periphery
- No data available



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115 Categorized Wetlands

*	Suitable	55
*	Marginal	21
*	Sparse	11
*	Unsuitable	28

66% Usable

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USGS Ground Elevation Surveys
Basis to measure success criteria

- Bathymetry and Vegetation in Isolated Marsh and Cypress Wetlands in the Northern Tampa Bay Area, 2000-2004
- Kim Haag
- Terrie Lee
- Donald Herndon

Cooperative Study funded by:
SWFWMD, TBW and Pinellas County

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PILOT STUDY COMPARISON ANALYSIS

LIDAR vs. USGS SURVEYED WETLANDS

- District Analysis
- Jones Edmunds Analysis

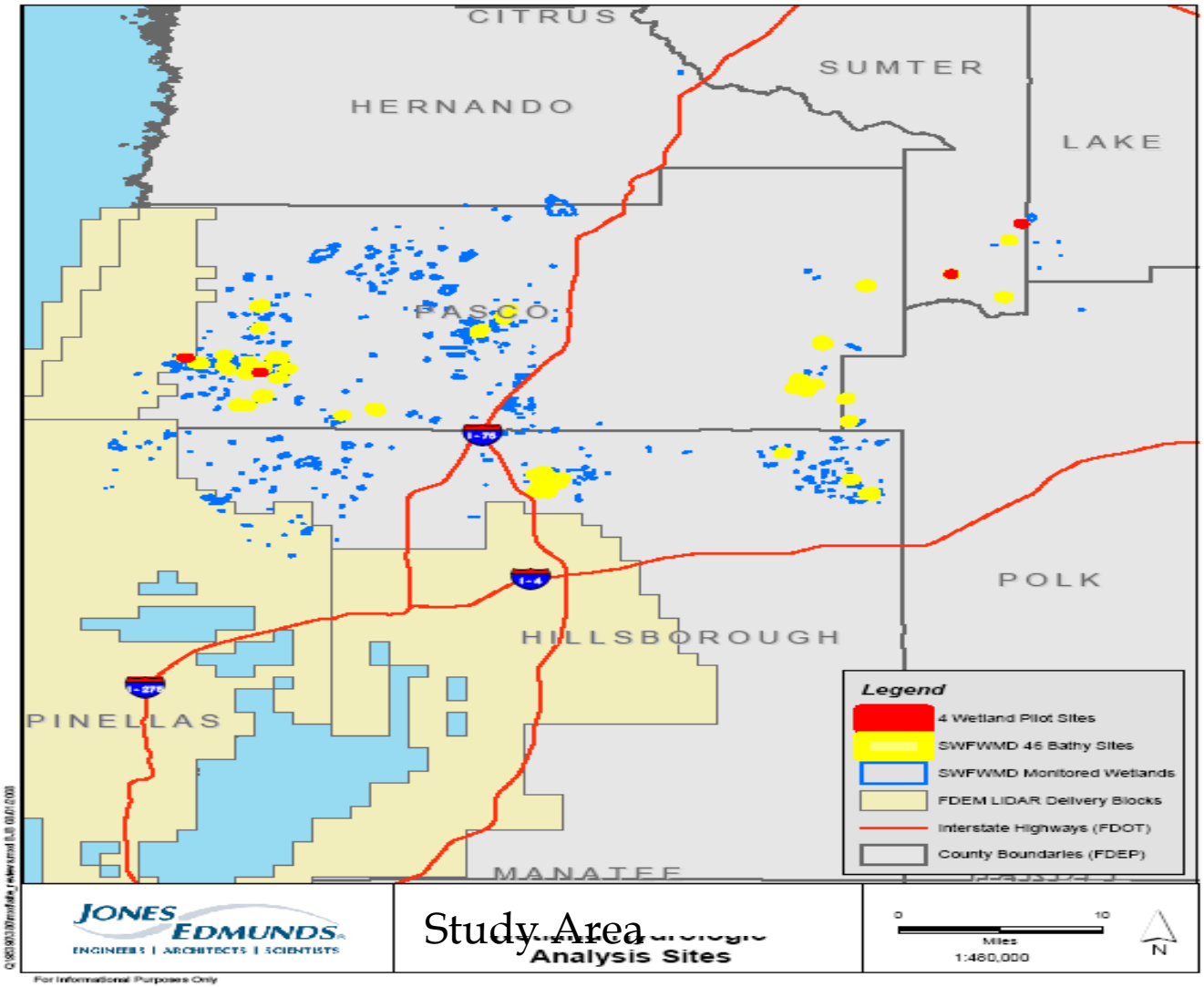
Chosen Sites:

- Three Forested Sites
- One Marsh Site
- Two sites in Starkey Wellfield
- Two sites in Green Swamp

Analyzed:

- Vertical Accuracy
- Stage Area/Volume
- Methodology/Techniques

Study Area



Study Area

District Analysis

Vertical Accuracy

- Surveyed the Four Sites
- Verified benchmark elevations NAVD88
- Compared Actual Survey Points with LiDAR Points
- Verified Accuracy Standards : 6/10 foot
  - Guidelines: American Society for Photogrammetry and Remote Sensing (ASPRS 2004)

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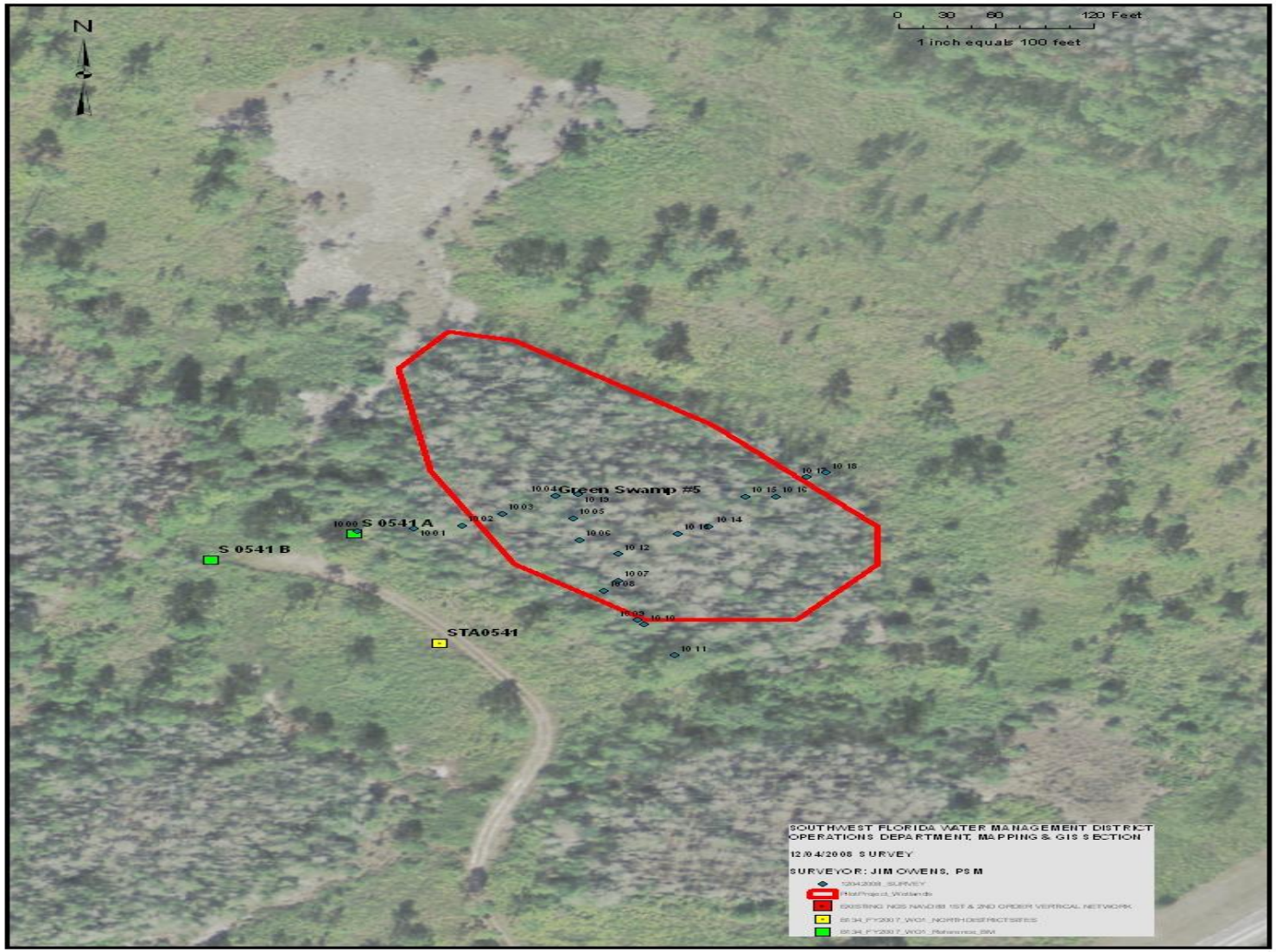
Green Swamp #5 Survey Points



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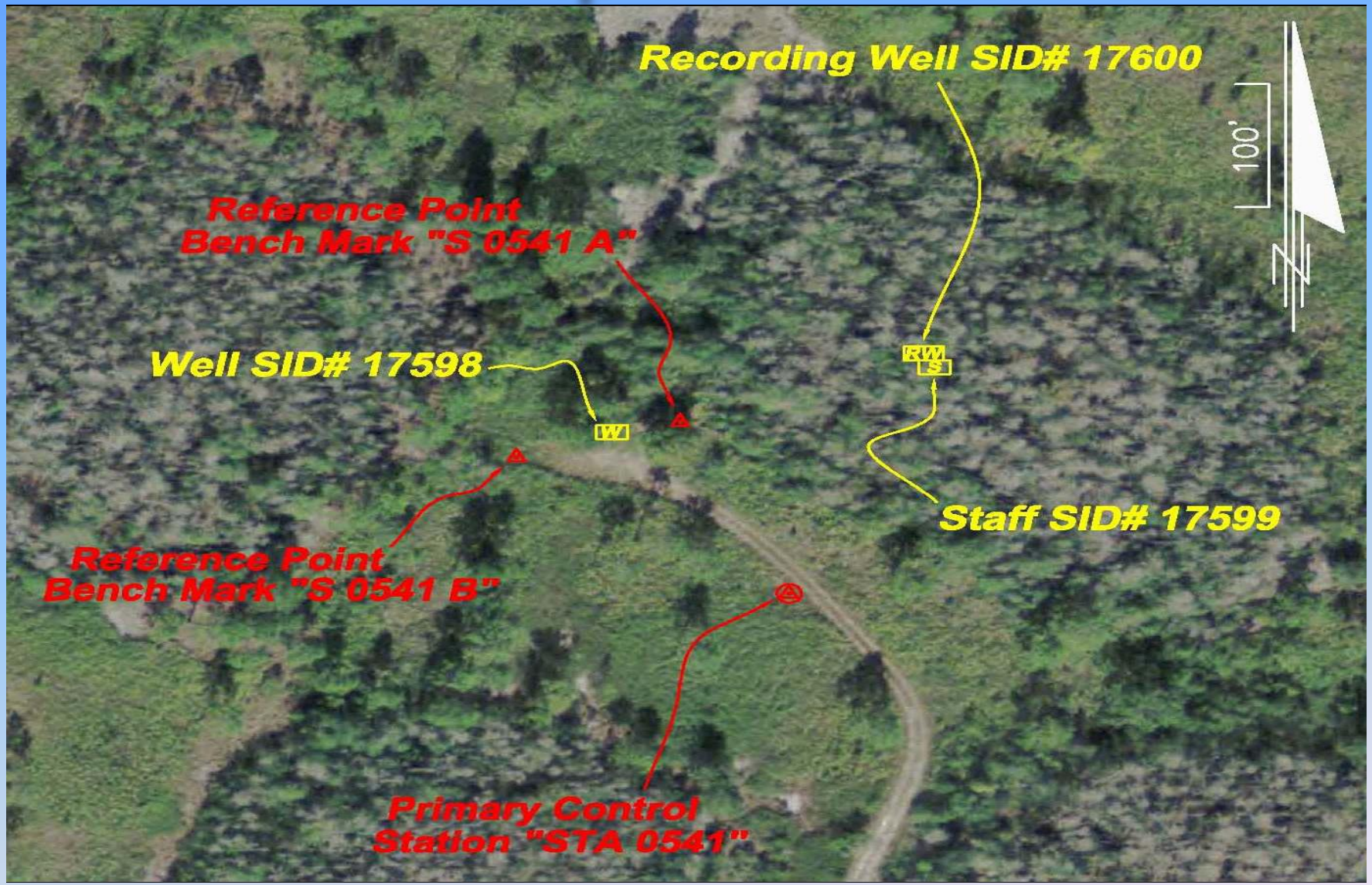
Green Swamp #5 Benchmarks



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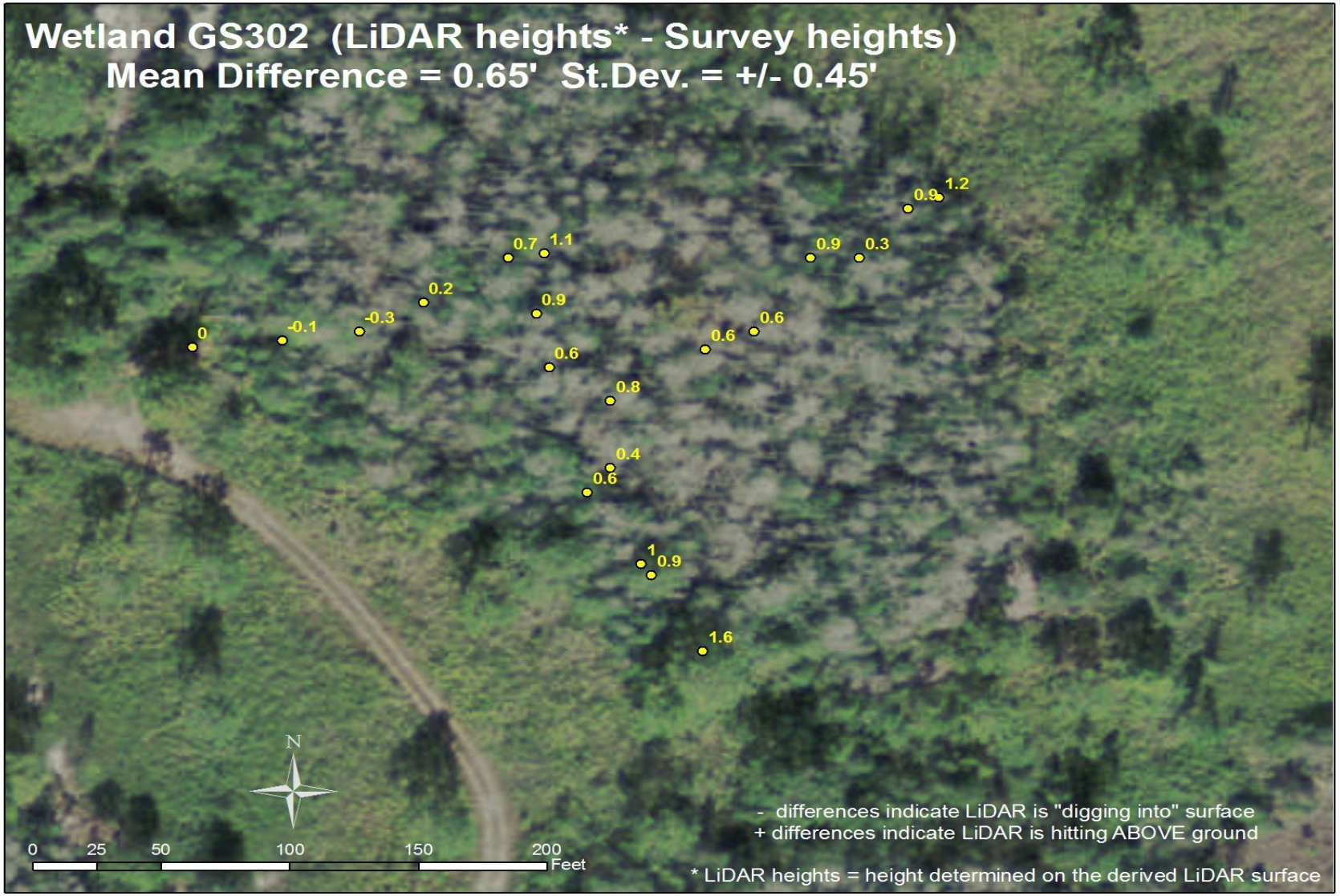
Results



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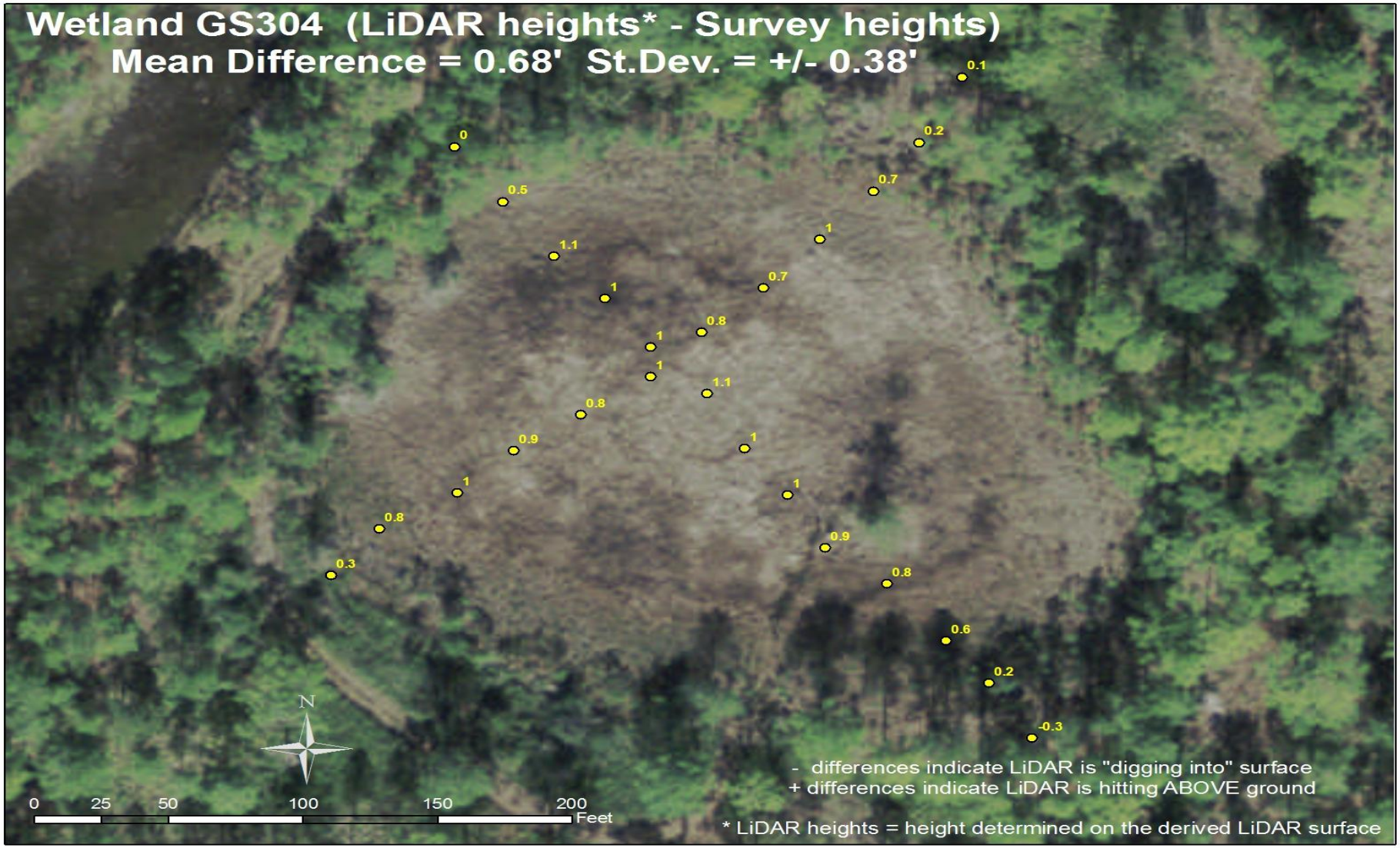
Green Swamp Marsh



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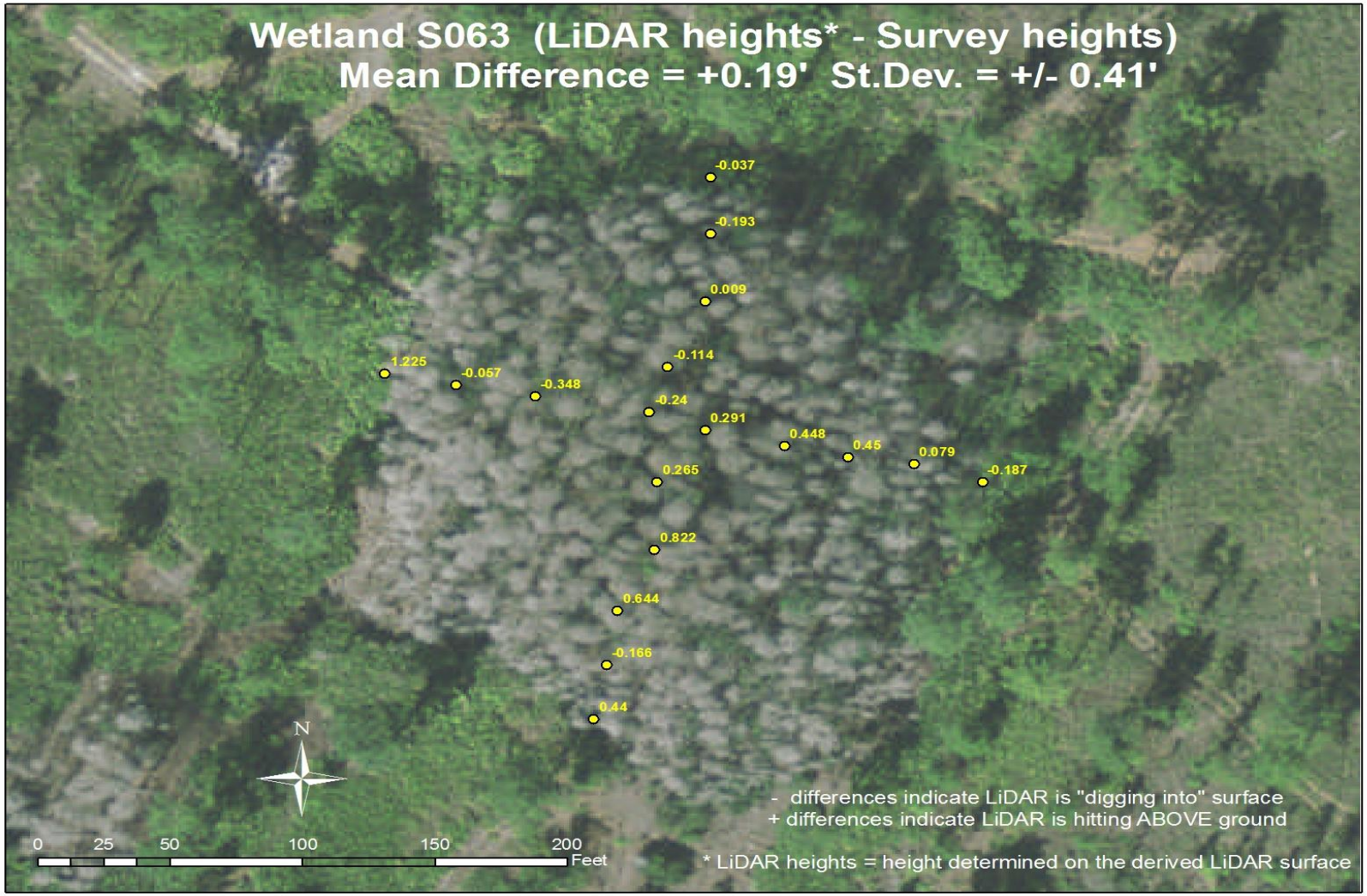
Starkey S63 Augmented Cypress



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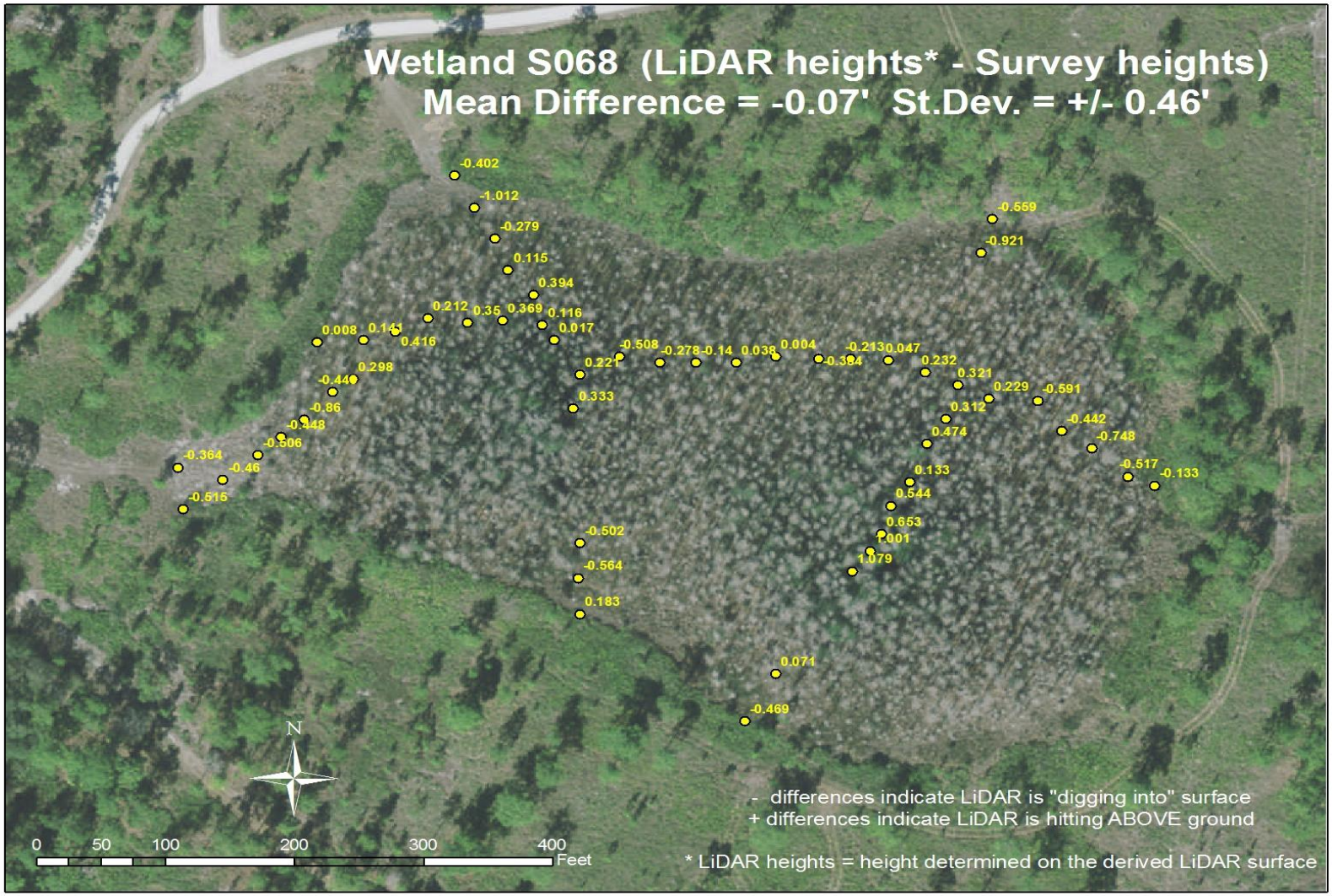
Starkey DD Cypress Dome



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Wetland Classification & Characterization

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What Goes into the Mix?

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Classification Scheme for District Wetlands

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Classification Provides:

Hydrologic Characteristics for Each Wetland Type

ANNUAL WATER LEVELS

Supports Wildlife Life Cycles
Supports all Trophic Levels of Wildlife
Greater Resolution of Wetland Health

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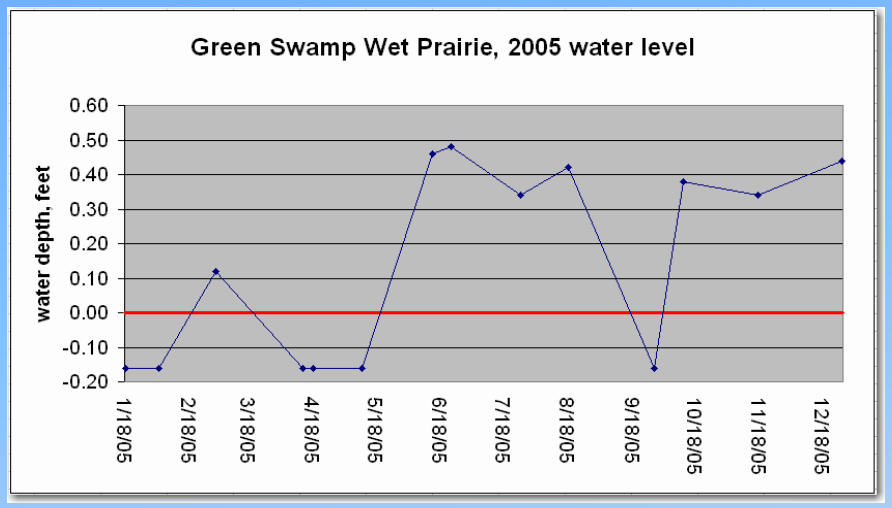
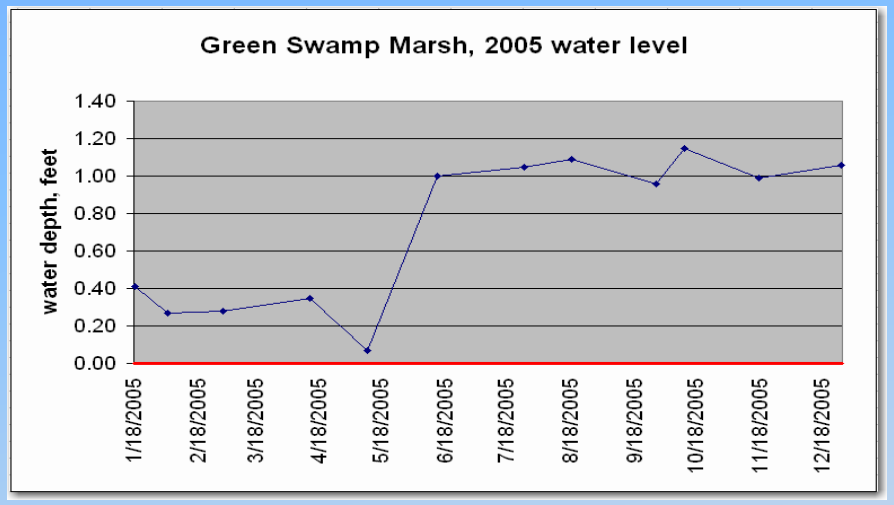
Qualitative descriptions:

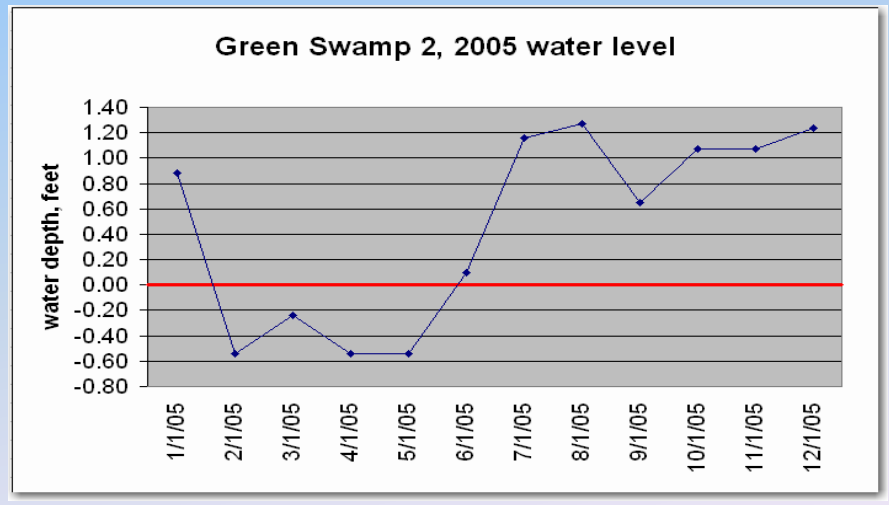
Karen Gruenhagen
From 2008 DEP SLERP Conference

Green Swamp Wetlands

Each wetland type has a unique hydrologic signature

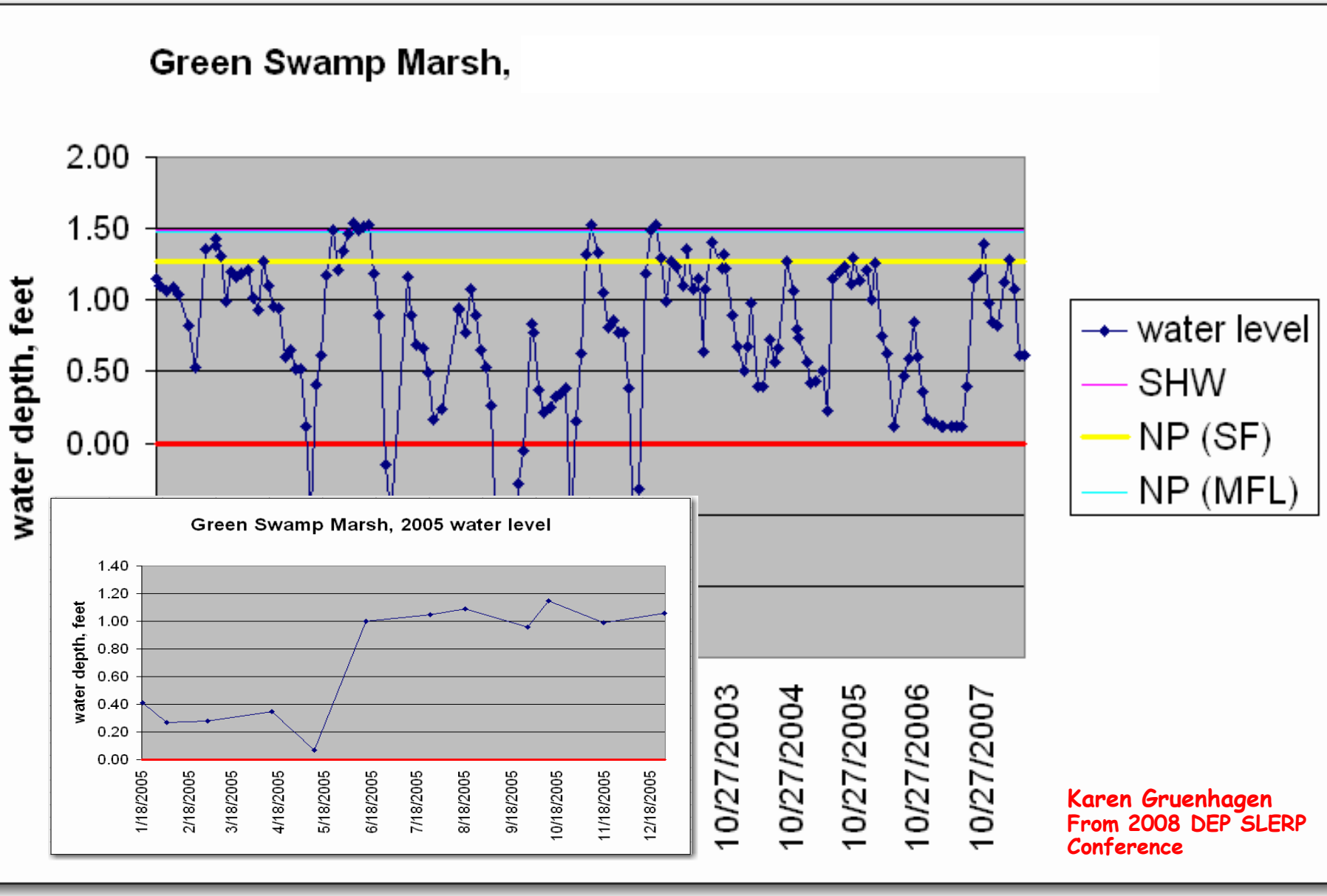






Karen Gruenhagen
From 2008 DEP SLERP Conference

Composite Water Level



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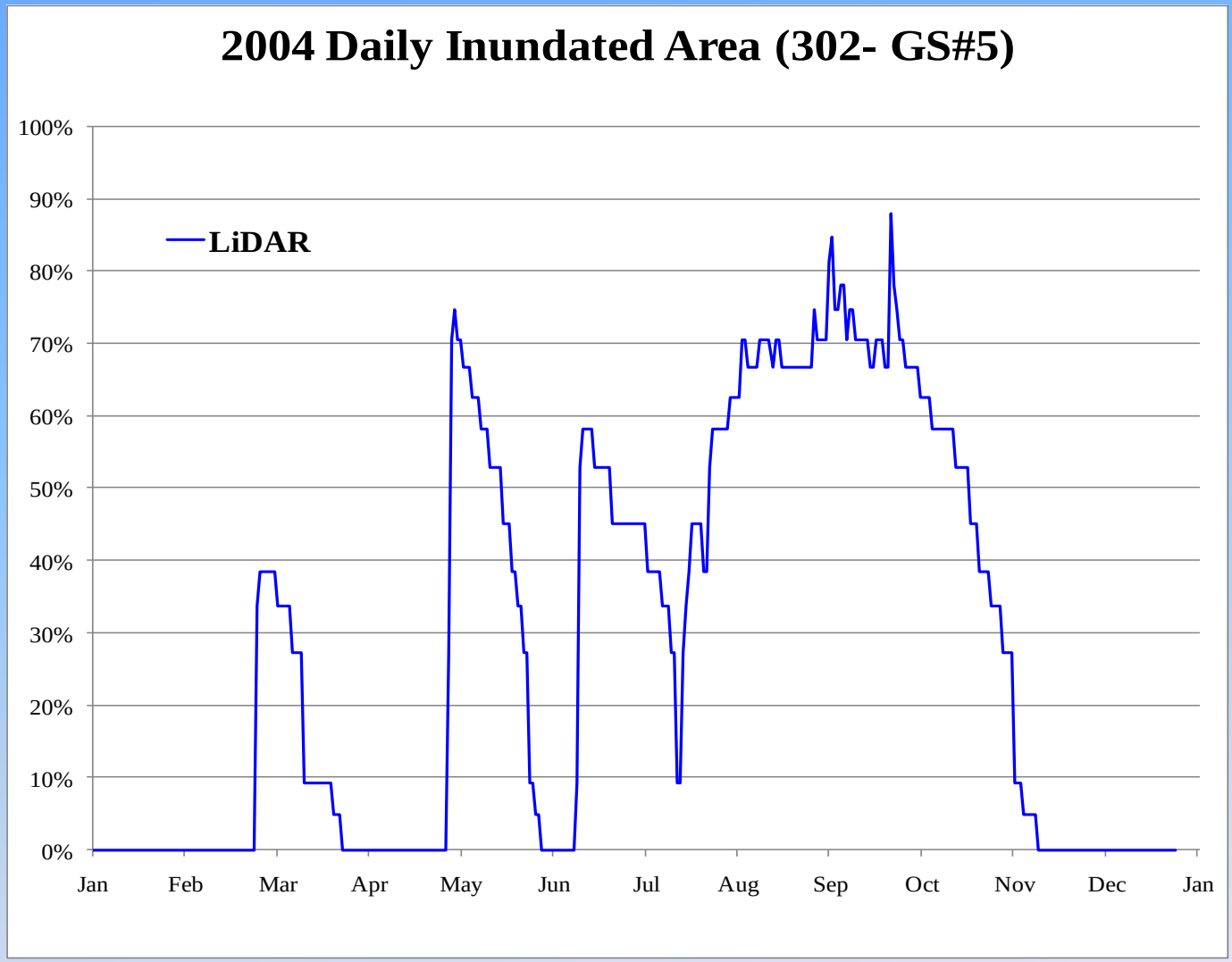

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Preliminary Results

PILOT PROJECT RESULTS
BJ BUKATA
MARK NELSON

Hydric Non-Hydric Soils
Soils Characterization
JOE SULLIVAN

JONES EDMUNDS
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