

Existing Everglades Monitoring for Compliance with the Settlement Agreement

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Scope of Presentation

- Key language in the Settlement Agreement (SA) is summarized
- Reviews stations in the Everglades Protection Area (EvPA) and associated areas used to meet the requirements
- EvPA Structure and Marsh Stations are summarized
- Relevant new and eliminated structures are listed
- Other Projects discussed
- Detailed parameter lists are available in an associated spreadsheet

SA Structure Monitoring Requirements

Verbatim

- All water control structures for the Refuge, the Park, and the WCAs will be monitored, as is done by the present SFWMD CAMB, ENP, and LEC programs. Monitoring will be extended to any new water control structure added to the delivery system (*Appendix D, Page 4*)
- In order to adequately assess Refuge and WCA nutrient inputs and outputs and Park nutrient inputs, the monitoring program shall include water quality monitoring of discharges at all relevant structures . . . (*Appendix D, Page 5*)

Projects Referenced in the SA Text

- The Settlement Agreement final document is dated February 1992. Active stations were those in use for the period from February 1991 to January 1992
 - LEC
 - Lower East Coast
 - Project suspended in 1986, no sampling in reference period
 - ENP
 - Everglades National Park
 - 7 stations around Park
 - CAMB
 - Conservation Area Materials Budget
 - 51 stations south of Lake Okeechobee

WCA-1

Original

2013



WCA-2

Original

2013

G339

G336A-F

STA-2
Construction

G335
G436

S7

NSID1
rectification

NSIDUS
S38B

S11C

S11B

S144

S145

S146

S38

S11A/S143

S34-G123
(S141)

2009 Broward Co
2004-05 SFV
2009 Palm Beach

©2009 Google

L3
L3BRN

● STA5/6
Construction

L3BRS

S8

S150

Structures not
included in
Settlement
Agreement
G64

S190

S339

S140

C123SR84

S142

L28I

S340

WCA-3
Original
2013

S9

S9A

Construction

S151

S31-S337

● S344

Construction

● S152

2004-05 SFWMD Aerial Photography
2012 Collier County Aerial Photography
2012 Miami-Dade County Aerial Photography
2012 Broward County Aerial Photography

©2009 Google

Imagery Dates: Jan 17, 2005 - Jan 6, 2012

26°10'04.96" N 80°41'48.78" W elev 0 ft

Eye alt 39.42 mi

Tambr105

Structure not
included in
Settlement
Agreement

S343A&B

US41-25

S333

G69

S355A&B

S334

S12A

S12B

S12C

S12D

10

Tambr
Culverts

S356

Construction

ENP North
Original
2013

ENP East Original 2013

C111D
Construction

C111D
Changes

Levee
degrade

DS4/S328

S332

S175

S177

S199

Aerojet
Construction

DS2

S332B

S332C

S174

S176

Berm B3

Structure not
included in
Settlement
Agreement

S178

S18C

SFWMD Enterprise GIS Layers
2012 Miami-Dade County Aerial Photography

©2009 Google

Changes to Structures

- 17 Additions
 - STAs to WCAs
 - G300, G301, G310, G251, S362, G338, G339, G335, G436
 - WCAs (To and Withins)
 - S9A, S334-S356, S355A, S355B, S152 (coming on line)
 - ENP/C111
 - S332D, DS4/S328, S199(?)
- 6 Subtractions
 - S332, S175, S10E, L3, L3BRN, L7/G210
- Original SA programs were 58 structures; now, they have increased to 69 structures

Marsh Monitoring Requirements

Verbatim

- The monitoring program shall include water quality and biological monitoring at interior marsh stations and downstream of all structures discharging into the Refuge, WCAs, and Park, including the Holeyland, Northeast Shark River Slough, Taylor Slough and C-111 basin. The objective . . . is to measure effectiveness of the total phosphorus limits and concentration levels and document further disturbances, or recovery processes, in the Refuge, Water Conservation Areas, and Park. (*Appendix D, Pages 3 & 4*)

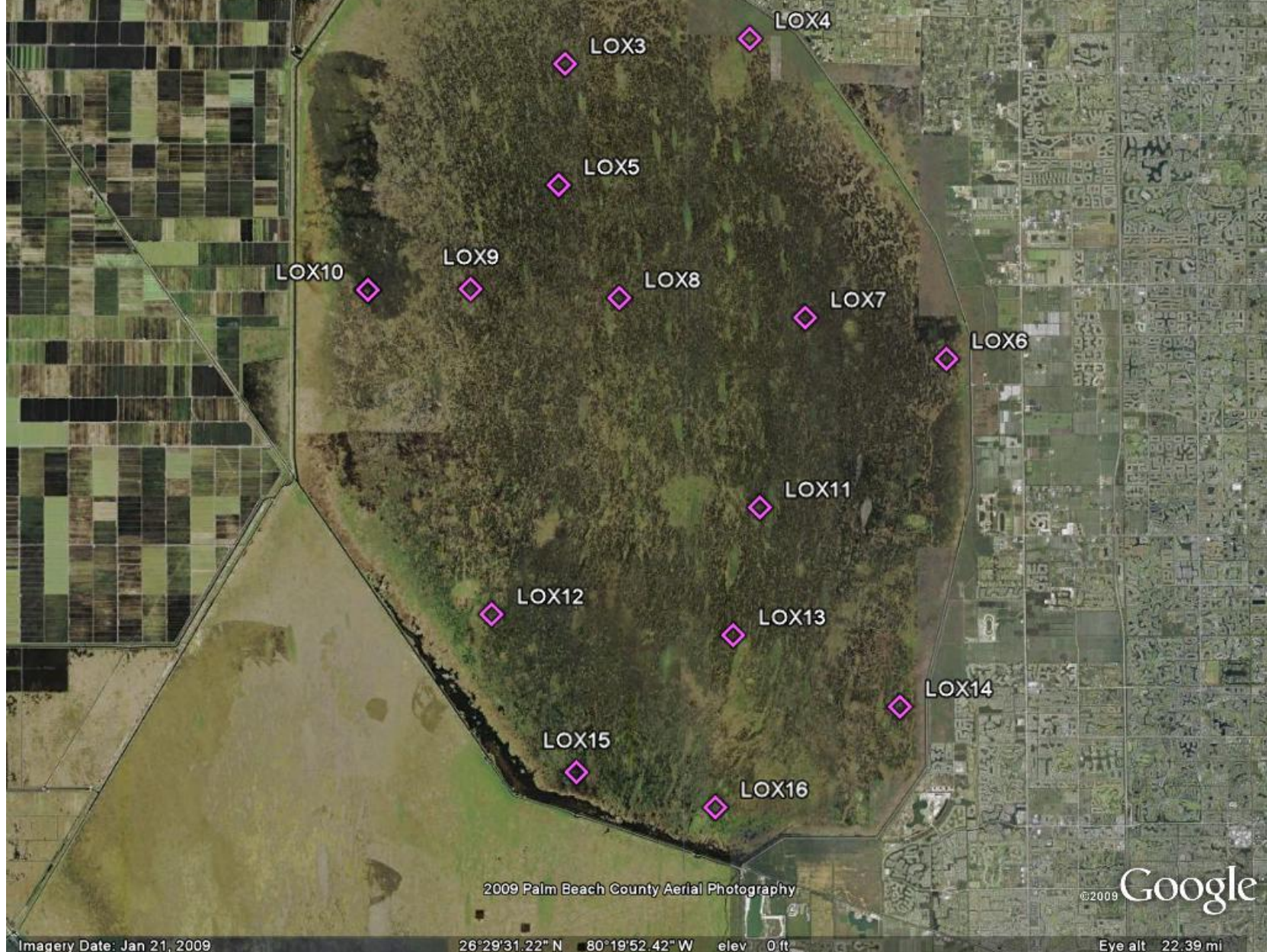
Marsh Monitoring Requirements

Verbatim (cont.)

- The monitoring program shall include water quality sampling every other week at representative internal marsh stations including monthly sampling at the 14 permanent Refuge stations. *(Appendix D, Page 4)*
- Monitoring shall be implemented . . . along transects in the WCAs, Park, and Refuge originating at major surface water inflow points and continuing along flow gradients. *(Appendix D, Page 5)*

Change to monthly monitoring of marsh stations
approved by the TOC

WCA-1 (14 Stations)



WCA-2A (8 Stations)



2009 Broward County Aerial Photography
2009 Palm Beach County Aerial Photography
2004-05 SFWMD Aerial Photography

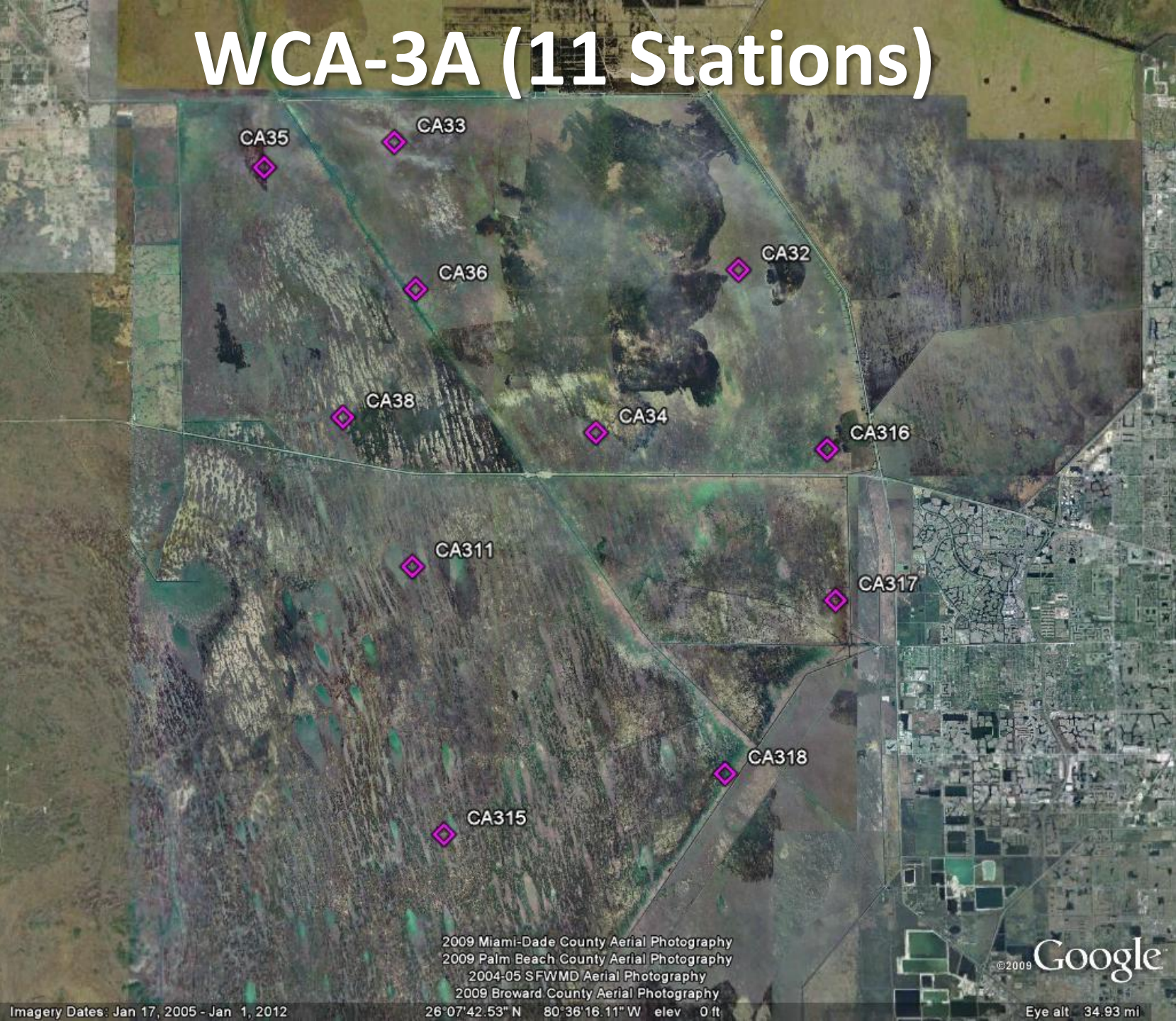
©2009 Google

Imagery Dates: Jan 17, 2005 - Jan 21, 2009

26°19'07.86" N 80°25'19.22" W elev 0 ft

Eye alt 12.80 mi

WCA-3A (11 Stations)



CA35

CA33

CA36

CA32

CA38

CA34

CA316

CA311

CA317

CA318

CA315

2009 Miami-Dade County Aerial Photography
2009 Palm Beach County Aerial Photography
2004-05 SFWMD Aerial Photography
2009 Broward County Aerial Photography

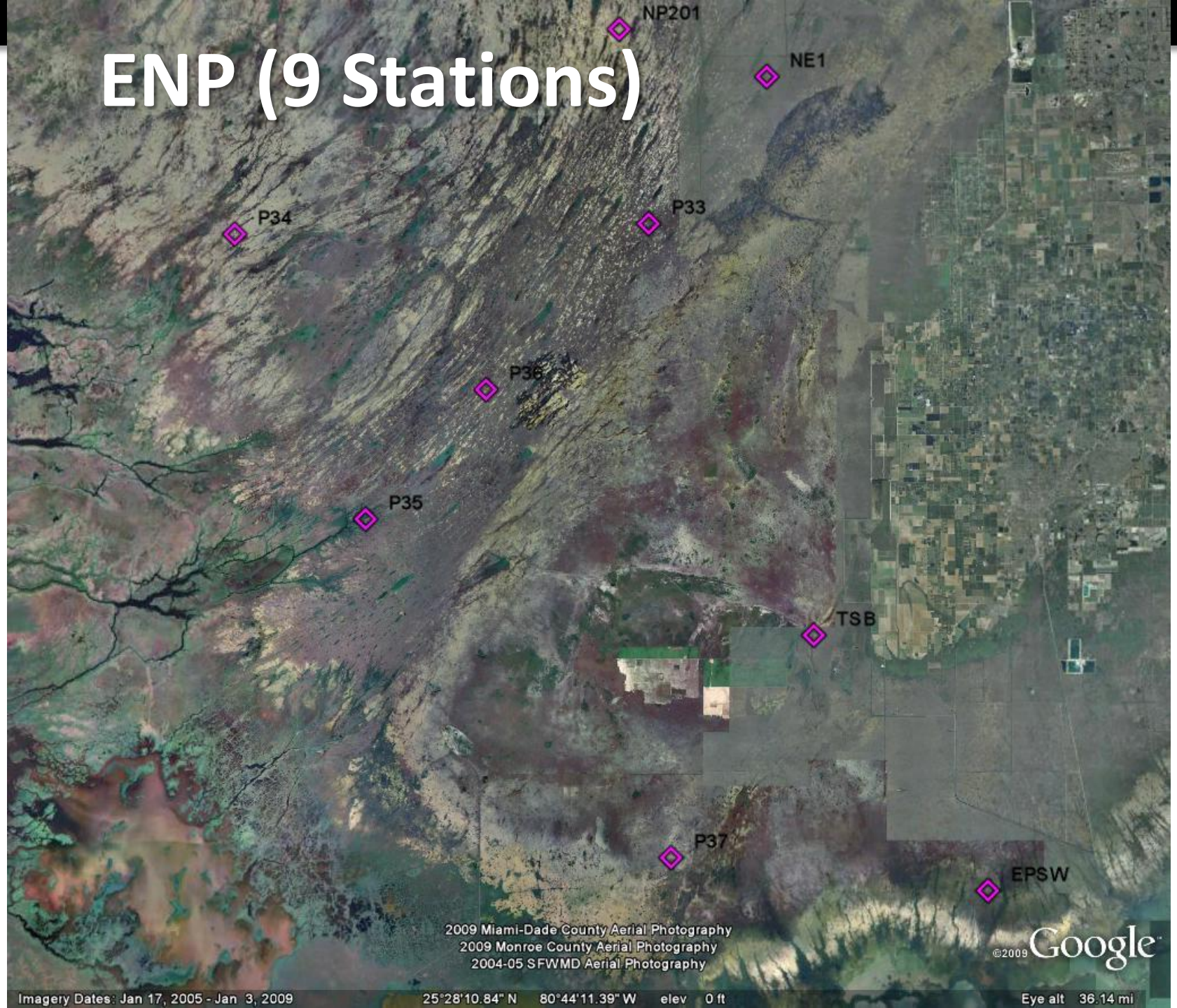
©2009 Google

Imagery Dates: Jan 17, 2005 - Jan 1, 2012

26°07'42.53" N 80°36'16.11" W elev 0 ft

Eye alt 34.93 mi

ENP (9 Stations)



2009 Miami-Dade County Aerial Photography
2009 Monroe County Aerial Photography
2004-05 SFWMD Aerial Photography

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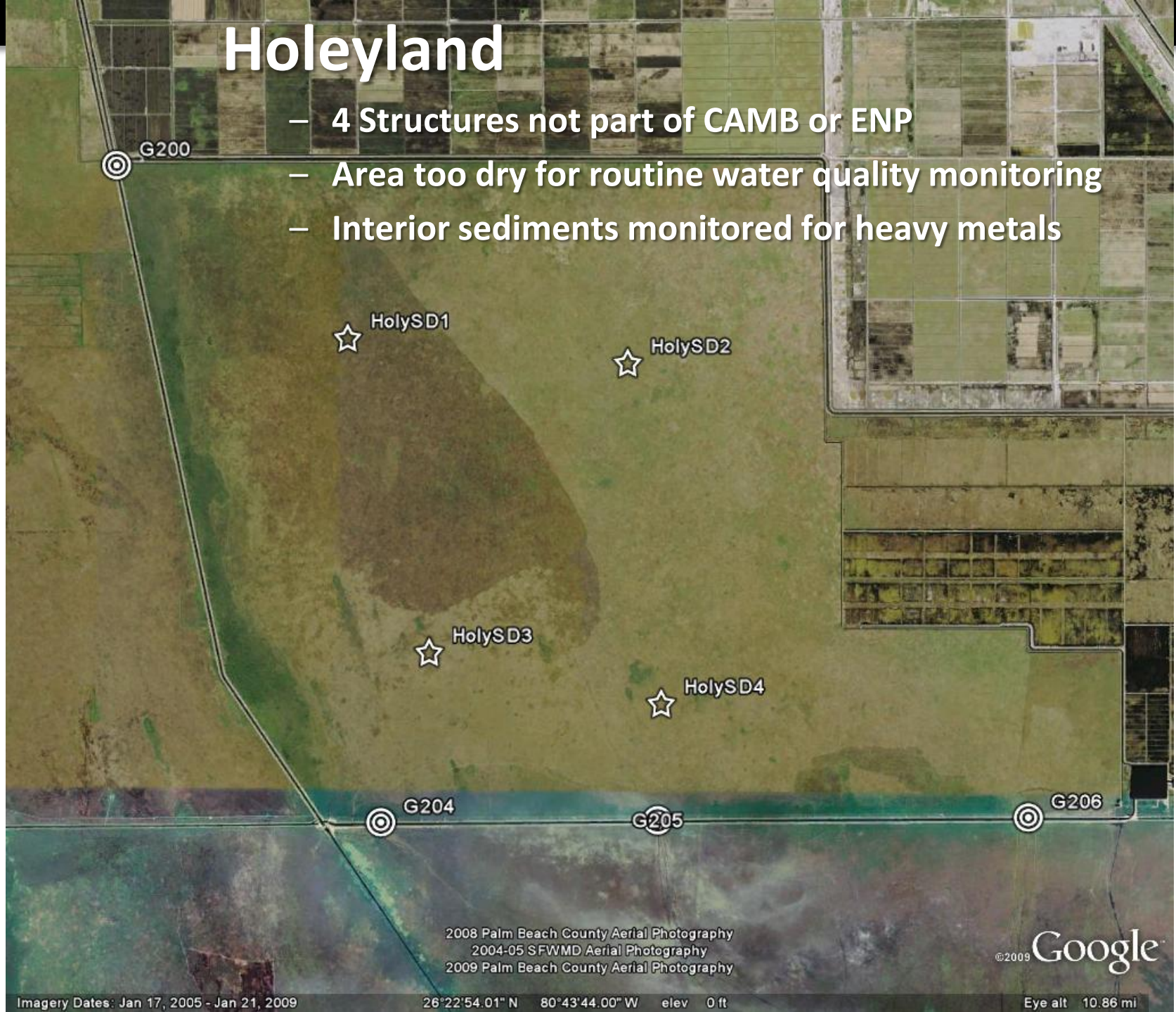
Imagery Dates: Jan 17, 2005 - Jan 3, 2009

25°28'10.84" N 80°44'11.39" W elev 0 ft

Eye alt 36.14 mi

Holeyland

- 4 Structures not part of CAMB or ENP
- Area too dry for routine water quality monitoring
- Interior sediments monitored for heavy metals



2008 Palm Beach County Aerial Photography
2004-05 SFWMD Aerial Photography
2009 Palm Beach County Aerial Photography

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Atmospheric Deposition

Verbatim

Atmospheric deposition will be monitored at selected sites in the EAA, WCAs, the Refuge, and the Park. *(Appendix D, Page 5)*

Note: FDEP funded University of Michigan to conduct intensive monitoring of deposition at several sites in South Florida including ENP. TP deposition data are available for review.

Atmospheric Deposition (5 Stations)



2009 Monroe County Aerial Photography

2004-05 SFWMD Aerial Photography

2009 Palm Beach County Aerial Photography

Imagery Dates: Jan 17, 2005 - Jan 2, 2012

26°01'11.31" N 80°31'36.76" W elev 0 ft

©2009 Google

Eye alt 123.99 mi

Pesticides Monitoring

- A plan for limiting pesticide/herbicide and heavy metal analysis to a range of representative compounds and sampling locations can be considered. (*Appendix D, Pages 3 & 4*)
- Structures for Pesticides
 - S5A, S6, S7, S8, S9, S12A, S333, S334-S356, S190, L3BRS, S31, S18C, S177, S178, S332DX
 - DS4/S328 when used
- Marsh for Pesticides
 - Lox8, Lox10, WCA2F1, WCA2U3/CA215, CA315, CA33

Metals Monitoring

- Surface Water

- Fe

- S5A, S5AE, S5AW, S5AS, S6, S7, S8, S10A, S10C, S10D, NSID1, S11A, S11B, S11C, L28I, L3BRS, S150
 - All Marsh stations in WCA1, 2 and 3

- Cu

- S5A

- THg

- S332DX and DS4

- MeHg

- S332DX

- Sediments

- Lox8, Lox10, WCA2F1, WCA2U3/CA215, CA315, CA33
 - Ag, Al, As, Be, Cd, Cr, Cu, Fe, Ni, Pb, Sb, Se, Th, THg, TOC, Zn

Can We Make Changes?

- *Appendix D, Pages 5 & 6*
 - 4) Any proposed changes in field sampling protocol or laboratory procedure must be justified and brought to the attention of the TOC for approval before implementation. The sampling designs, frequency, analytical methodology, and QA/QC protocols employed in the monitoring program shall be subject to mutual acceptance by all parties. The overall objective will be to maximize the accuracy and precision of the monitoring data, while insuring that any new sampling techniques or analytical procedures will not introduce biases relative to the historical monitoring data upon which the limits are based.

Overarching Issues

- Settlement Agreement open to interpretation
- TOC role modified in 1995 Status Report
- Some of the existing monitoring stations have been made obsolete by construction
- In places, monitoring is redundant
- Some of the monitoring parameters are no longer a priority

ENP North In transition

Tambr105

S355s don't operate

US41-25

S333

S355A&B

S334

S12A

S12B

S12C

S12D

Tambr
Culverts

S356

Full CEPP implementation will make
calculation of compliance standard
using Park structures almost
impossible

Bridge construction
removes several culverts

Road improvements
make sampling Tambr
culverts dangerous

Discussion and Next Steps

