The DECOMP Physical Model (DPM)

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What is Adaptive Management?

- Alternative approach to traditional planning procedures for the design and implementation of programs and projects that seek to manage and/or restore natural systems

- Deals with the challenges inherent in predicting and restoring large-scale complex ecosystems in the face of large uncertainties and major trade-off issues

- AM replaces the current dependencies on numerical models and traditional planning guidelines by applying a focused “learning-by-doing” approach to decision-making

What is the A.M. Physical Model?

The adaptive management physical model is…

- an ecological version of an engineering pilot study.

- an on-site, large-scale controlled manipulation of the environment to evaluate system response.

- designed to provide information for uncertain parameters needed to evaluate the DECOMP project.

- designed using an Adaptive Management approach.

Why a DECOMP Physical Model?

Uncertainty 1: **Canal backfilling .**

Do canals need to be completely backfilled in order to achieve hydrologic restoration?

APPROACH: **The DPM will be used to evaluate the hydrological and ecological responses of 3 or 4 backfilling options in the central portion of the L-67C canal.**

Backfill Options: **Complete Backfill, Partial Backfill, No Backfill, and/or Complete Backfill with Boat Channel.**

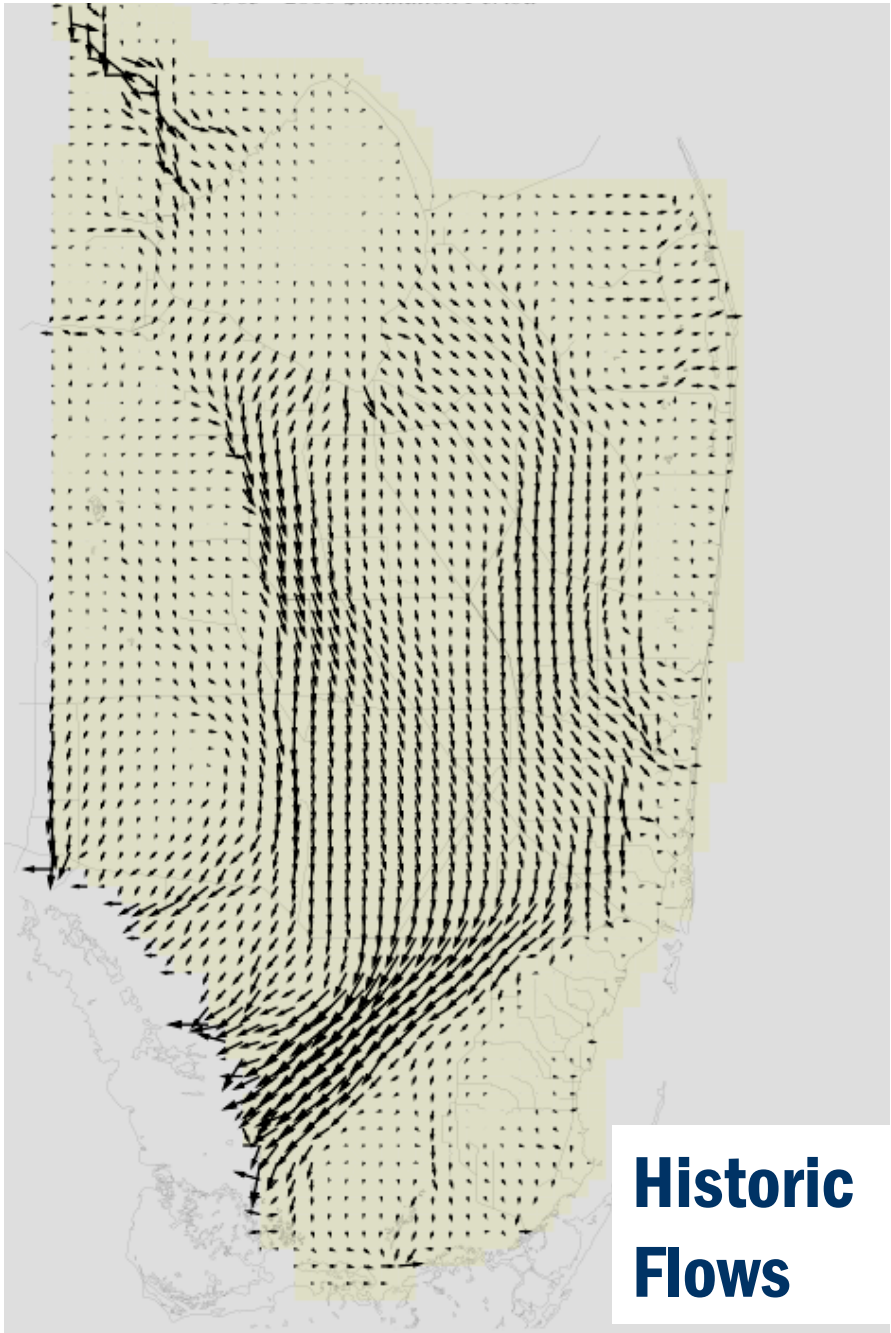
Why a DECOMP Physical Model?

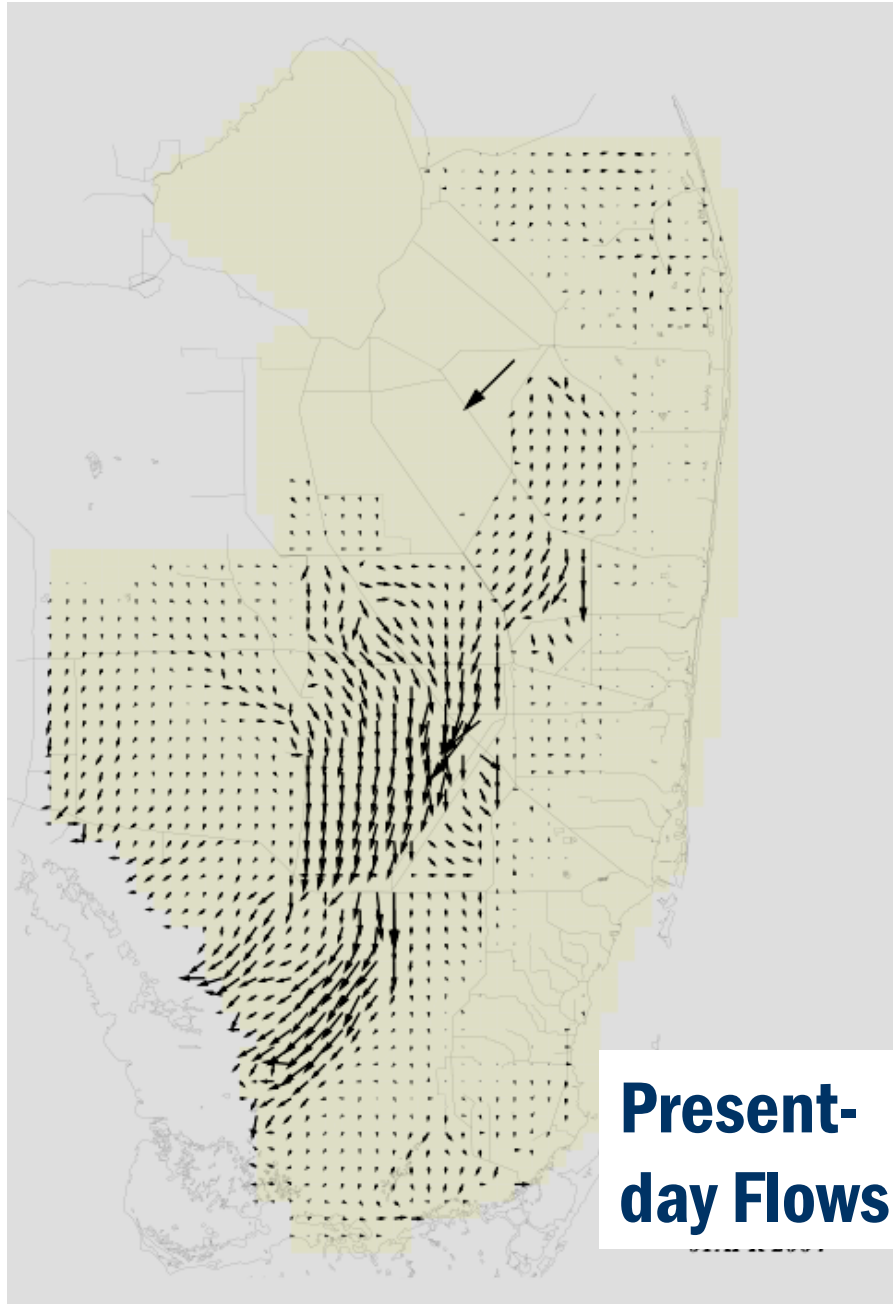
<u>Uncertainty 2:</u> Sheetflow (how water flows across the landscape, how much, and how fast)

- **How do canals, levees, and levee modifications affect sheetflow (hydrology)?**
- **How do these sheetflow modifications affect the ridge & slough landscape structure and function (ecology)**?

<u>APPROACH:</u> The DPM will be used to evaluate the hydrological and ecological responses to flow across three partially backfilled regions of the southern L-67C canal and the canal modifications in the central part of L-67C.

How much sheetflow is possible?





Why a DECOMP Physical Model?

Uncertainty 3: Maintain and restore a ridge & slough landscape.

Uncertainty 4: Maintain and restore tree islands.

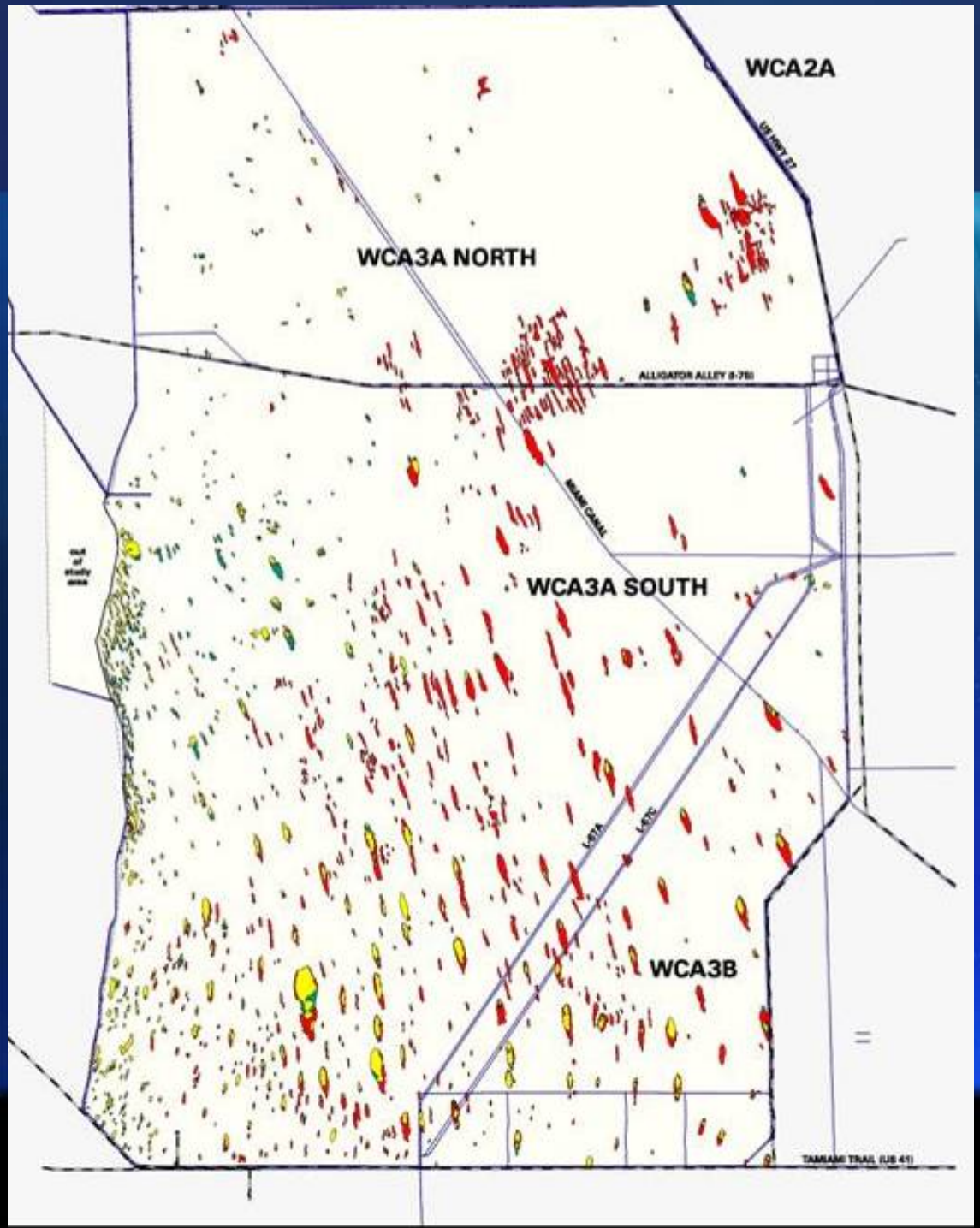
How are the ecology of these habitats coupled to hydrology and how does one balance the hydrologic needs of both?

APPROACH: The DPM will be used to evaluate the hydrological and ecological responses to flow across three partially backfilled regions of the southern L-67C canal.

How can landscape patterns be restored?

Pre-drainage ridge & slough landscape

Impacted ridge & slough landscape



EVERGLADES RESTORATION
SHARE PROGRESS with the WORLD

What are the depths and hydroperiods needed to prevent tree island "drowning" while restoring the ridge & slough landscape?

Why a DECOMP Physical Model?

<u>Uncertainty 5:</u> Hydrologic model accuracy.

Can we exceed the computer simulated estimates of seepage and tree island tolerances in WCA-3B without causing ecological or flooding impacts?

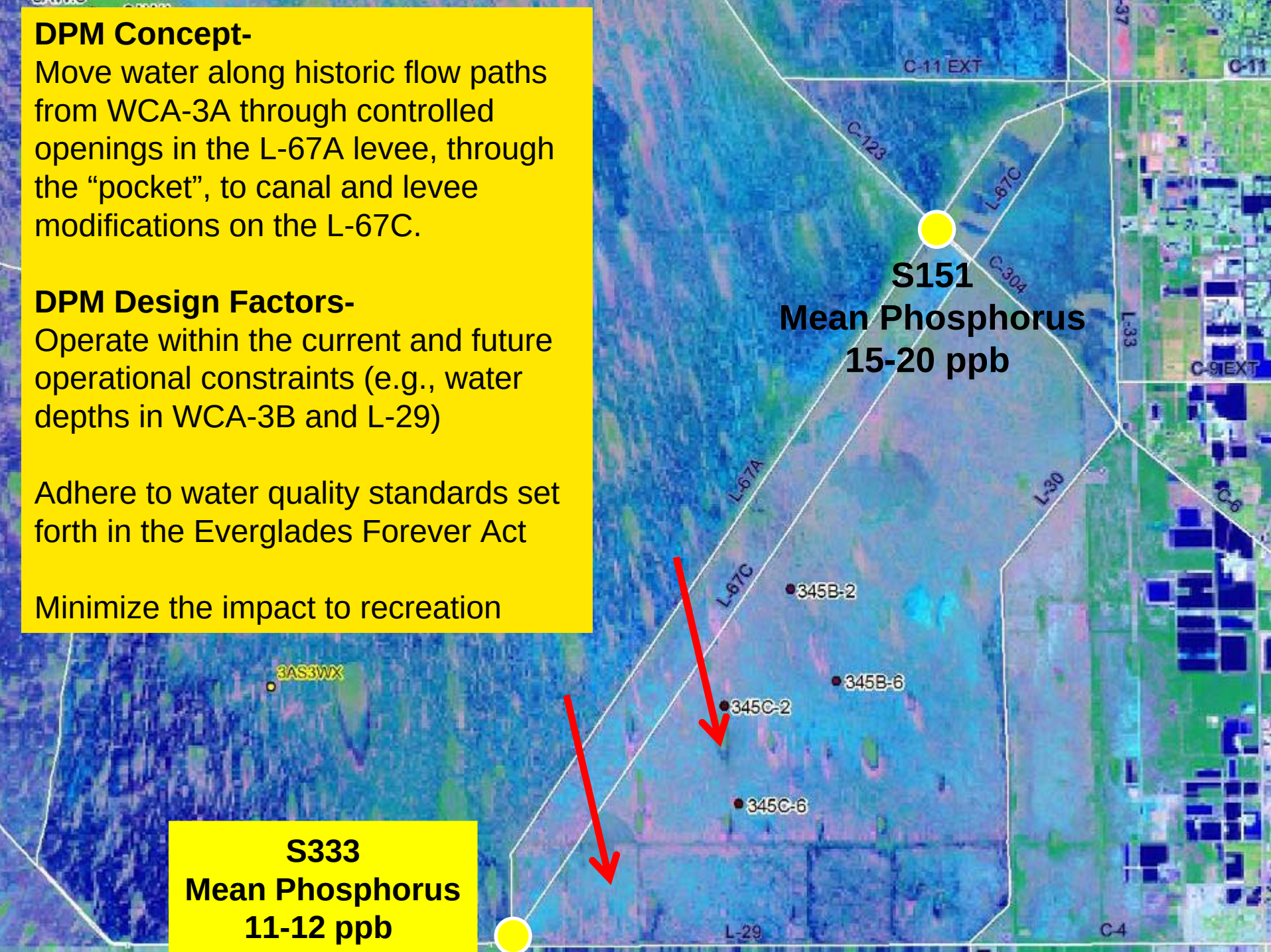
<u>APPROACH:</u> The DPM will be used to raise water levels in WCA-3B to test the hydrological tolerances that are constraining the flows to Northeast Shark River Slough.

DPM Concept-
Move water along historic flow paths from WCA-3A through controlled openings in the L-67A levee, through the “pocket”, to canal and levee modifications on the L-67C.

DPM Design Factors-
Operate within the current and future operational constraints (e.g., water depths in WCA-3B and L-29)

Adhere to water quality standards set forth in the Everglades Forever Act

Minimize the impact to recreation



DECOMP Physical Model History

- The DECOMP Physical Model has been through 15 iterations (Kia v1, v2; Lexus v1, v2, v3; Ferrari v1; and Prius v1, v2 and v3).
- Consideration was given to the goals and concerns of all parties.
- The present design:
  - Maximizes the uncertainties and hypotheses that can be addressed.
  - Incorporates stakeholder concerns (e.g., restricting backfilling of canals to the L-67C).
  - Will comply with all environmental regulations.
  - Works within both current and future operational constraints.

Lexus Model

Ideal thoughts

- Levee gap (partial backfill)
- Levee gap (complete backfill)
- Levee gap (no fill)
- CSOP L-67A weir-culvert cluster re-location
- CSOP L-67A weir-culvert cluster location (⊗= removed)

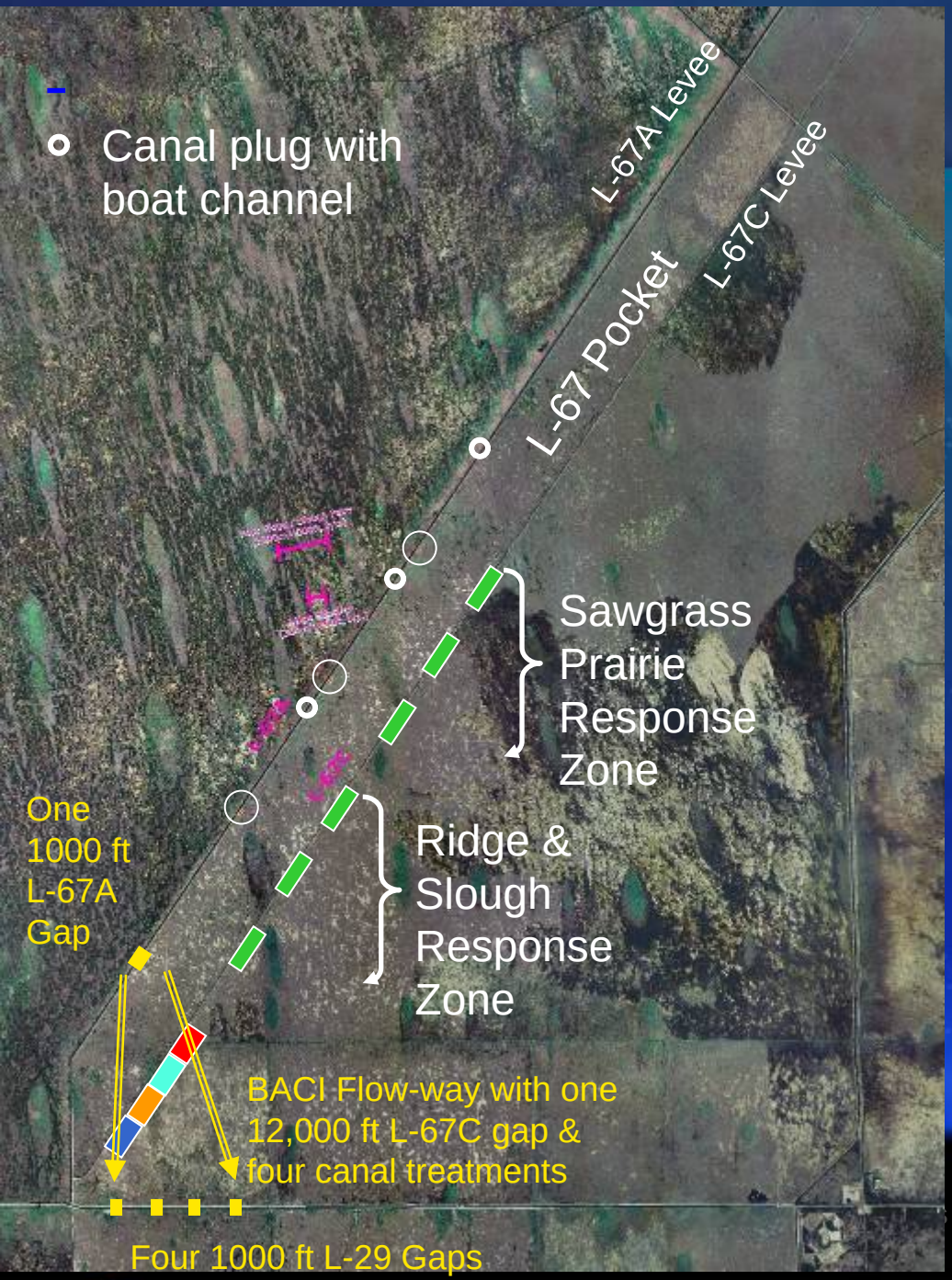
Ferrari Model

Unlikely thoughts

- Levee gap (partial backfill)
- Levee gap (complete backfill)
- Levee gap (no fill)
- CSOP L-67A weir-culvert cluster re-location
- CSOP L-67A weir-culvert cluster location (⊗= removed)
- 2000 cfs pump

Prius Model v1

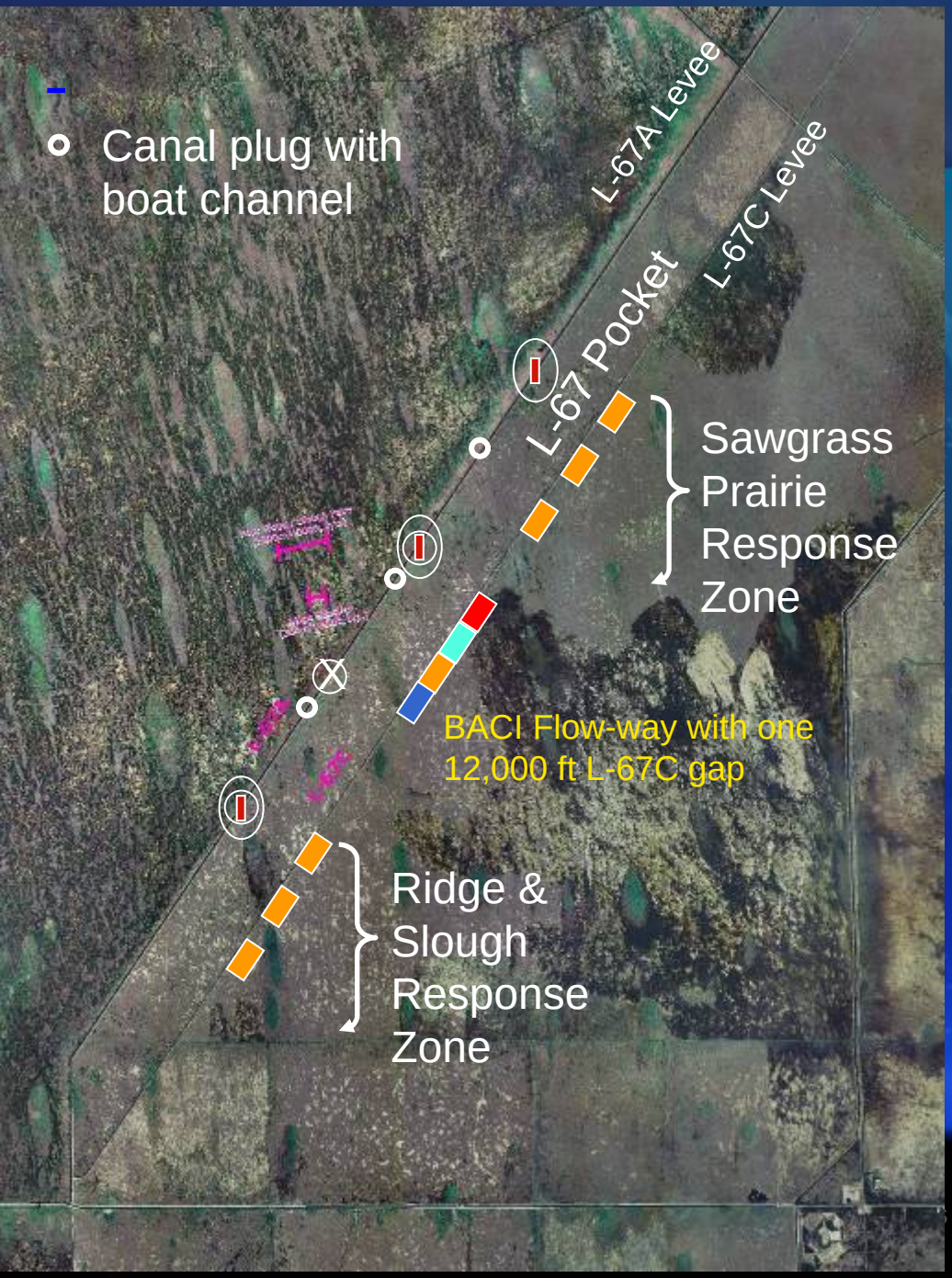
Jan. 24, 2006



This is a hybrid of the basic 3-gap CSOP design to include replicated Response Zones, and a Before and After Control Impact (BACI) flow-way physical model.

- 4000 ft gap (complete backfill)
- 3000 ft gap (complete backfill)
- 3000 ft gap (canal plug with boat channel)
- 3000 ft gap (partial backfill)
- 3000 ft gap (no fill)
- CSOP L-67A weir-culvert cluster location

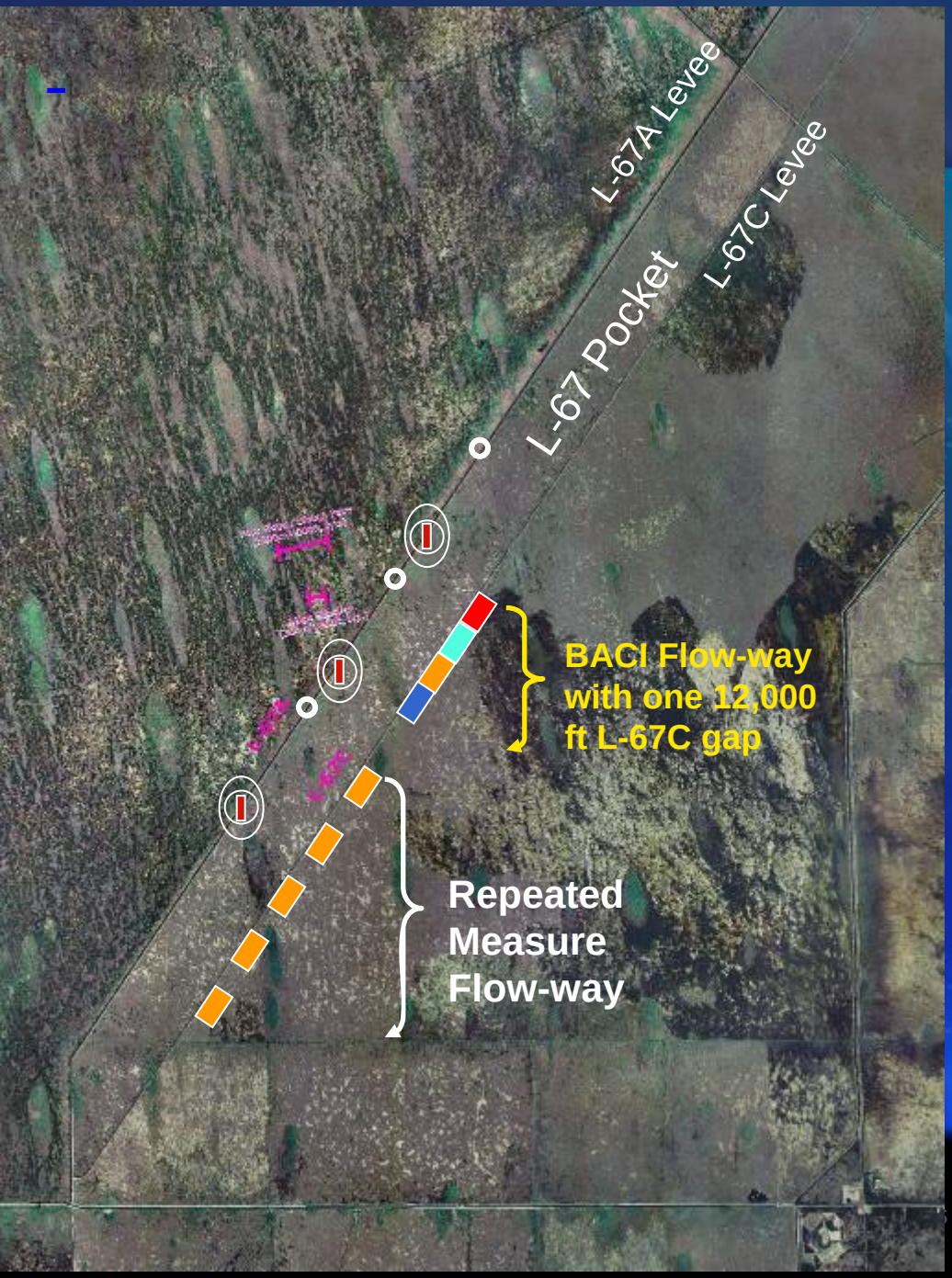
Prius Model v2



This is a hybrid of the basic 3-gap CSOP design to include replicated Response Zones, and a Before and After Control Impact (BACI) flow-way physical model.

- 3000 ft gap (complete backfill)
- 3000 ft gap (canal plug with boat channel)
- 3000 ft gap (partial backfill)
- 3000 ft gap (no fill)
- CSOP L-67A weir-culvert cluster location

Prius Model v3

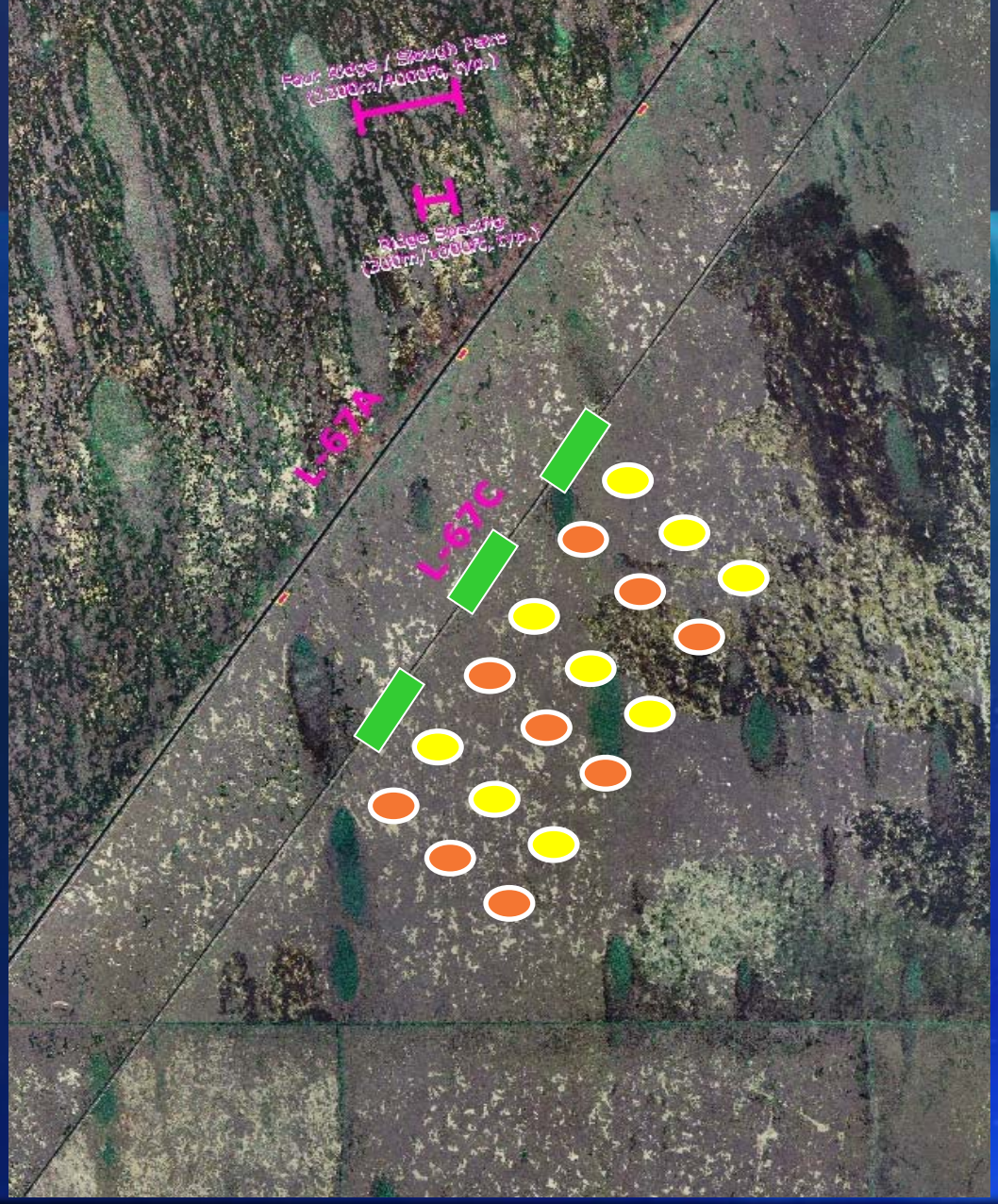


- 3000 ft gap (complete backfill)
- 3000 ft gap (canal plug with boat channel)
- 3000 ft gap (partial backfill)
- 3000 ft gap (no fill)
- CSOP L-67A weir-culvert cluster location
- Canal plug with boat channel

The exact location and size of the gaps, culverts and canal treatments are not final.

WHY Two Designs?

- Each design is optimized for statistically power to obtain the natural variability associated with hydrologic (BACI) and ecological (Repeated Measures) cause and effect.



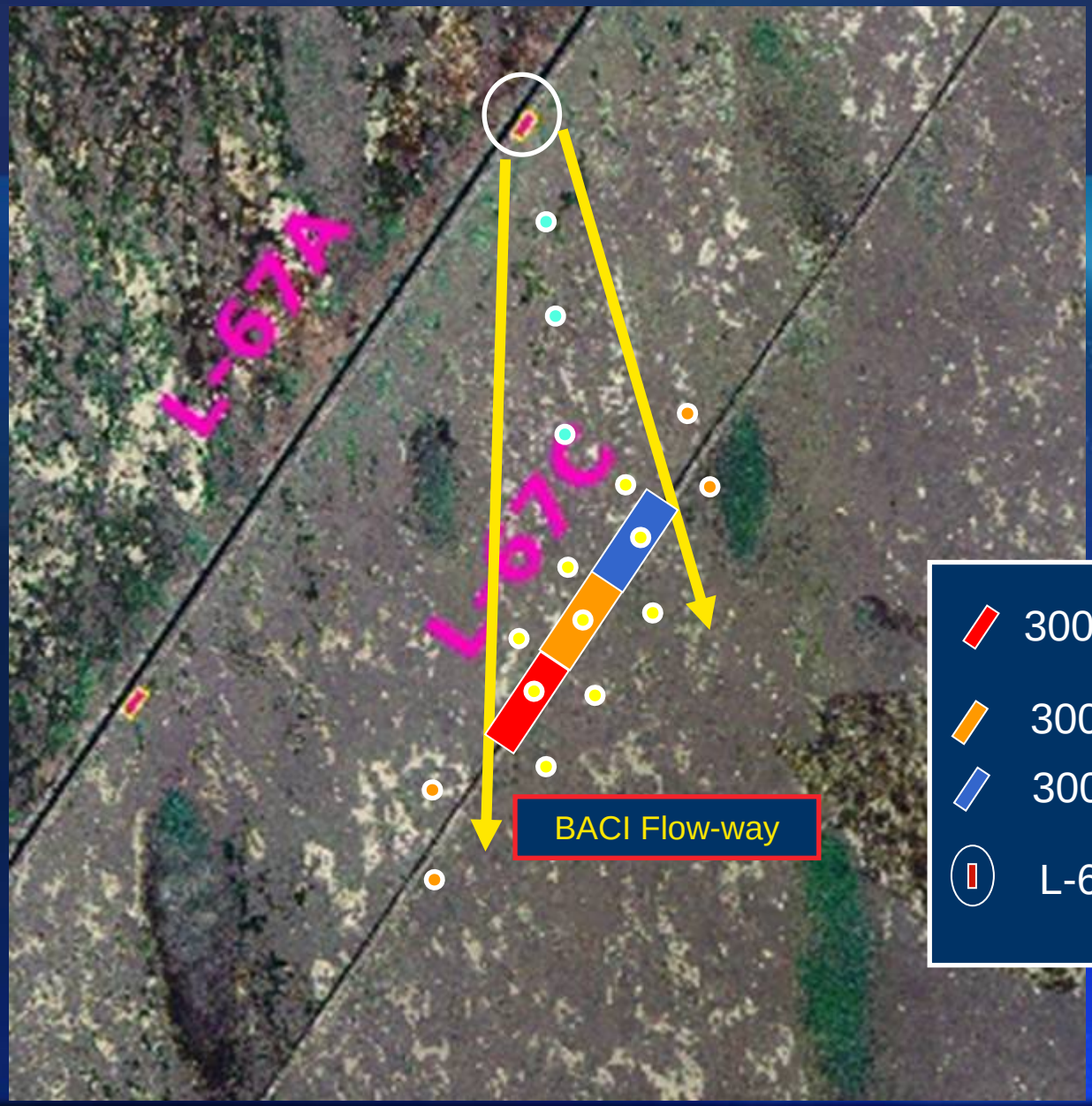
Prius Model: Repeated Measure Design

3000 ft gap with partial back-fill

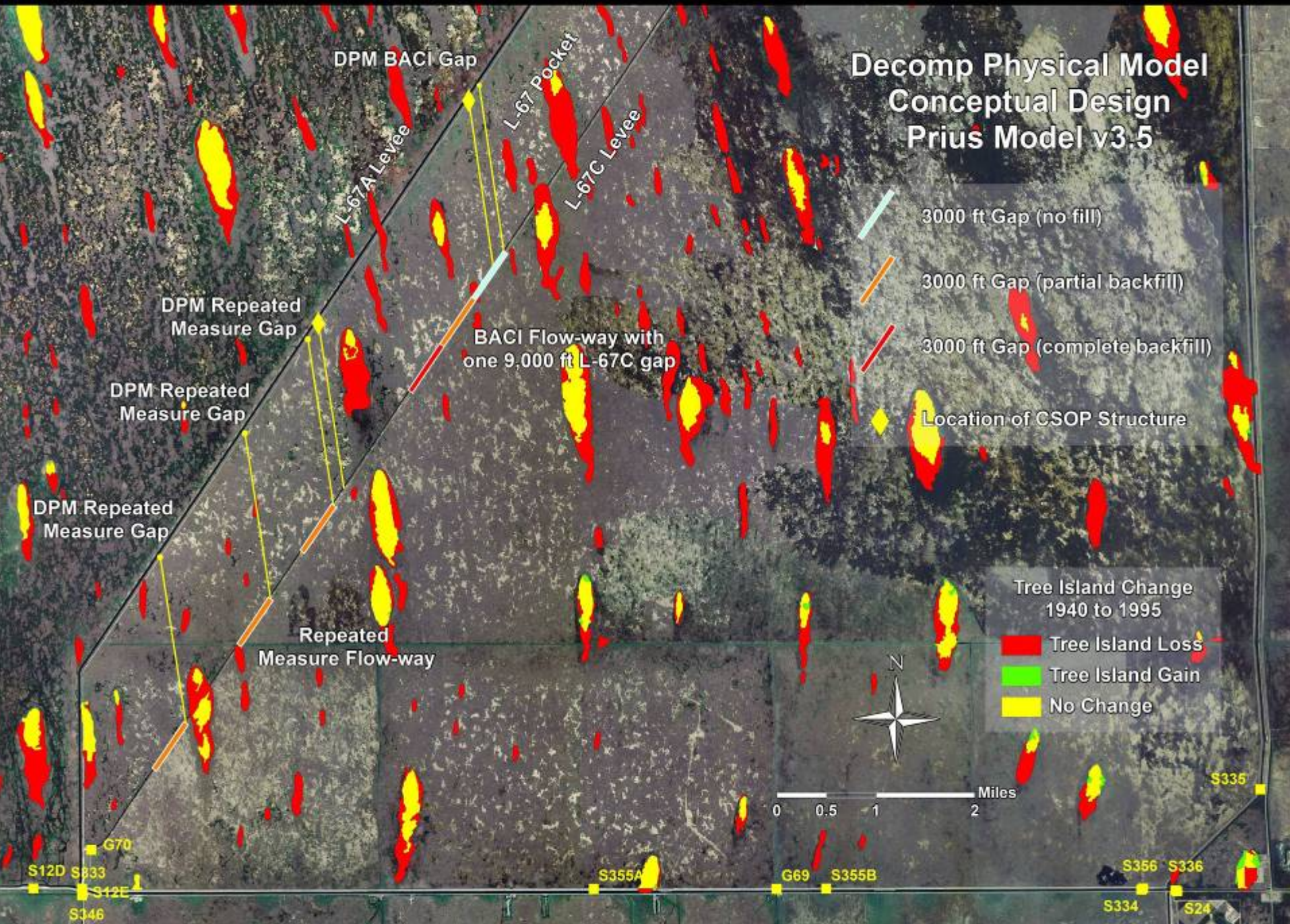
Treatment-reference site pair

Prius Model v3.5

BACI Design



- 3000 ft gap (complete backfill)
- 3000 ft gap (partial backfill)
- 3000 ft gap (no fill)
- L-67A Opening


Decomp Physical Model
Conceptual Design
Prius Model v3.5
DPM BACI Gap
L-67 Pocket
L-67A Levee
L-67C Levee
3000 ft Gap (no fill)
3000 ft Gap (partial backfill)
3000 ft Gap (complete backfill)
Location of CSOP Structure
DPM Repeated Measure Gap
BACI Flow-way with one 9,000 ft L-67C gap
DPM Repeated Measure Gap
DPM Repeated Measure Gap
Repeated Measure Flow-way
Tree Island Change 1940 to 1995
Tree Island Loss
Tree Island Gain
No Change
N
Miles
0
0.5
1
2
S335
G70
S12D
S333
S12E
S346
S355A
G69
S355B
S356
S336
S334
S24

Draft DPM Schedule and Costs

Physical Model Construction & Implementation Schedule and Costs

2nd QTR	3rd QTR	4th QTR FY 07	1st QTR	2nd QTR	3rd QTR	4th QTR FY08	1st QTR	2nd QTR	3rd QTR	4th QTR FY09	1st QTR	2nd QTR	3rd QTR	4th QTR FY10	1st QTR	2nd QTR	3rd QTR	4th QTR FY 11	1st QTR	2nd QTR	3rd QTR	4th QTR FY 12

EA/EIS for DPM

P & S

DPM Construction

Pre-Construction Monitoring

Post-Construction Monitoring

Evaluation, Synthesis, and PIR Phase 2 & 3 Planning

FY07 Cost:	
SFWMD FTE:	$20,400
SFWMD Supplie	$0
CORPS FTE:	$250,970
CORPS Contrac	$150,000
TOTAL:	$421,370

FY08 Cost:	
SFWMD FTE:	$62,475
SFWMD Supplies:	$0
CORPS FTE:	$210,726
CORPS Contracts (Note	$4,000,000
TOTAL:	$4,273,201

FY09 Cost:	
SFWMD FTE:	$ 206,167
SFWMD Supplies:	$ 500,000
CORPS FTE: ($15,160+	$ 65,160
CORPS Contracts:(Note	$ 1,400,000
TOTAL:	$2,171,327

FY10 Cost:	
SFWMD FTE:	$206,168
SFWMD Supplies:	$500,000
CORPS FTE:	$4,400
CORPS Contracts:	$700,000
TOTAL:	$1,410,568

FY11 Cost:	
SFWMD FTE:	$174,930
SFWMD Supplies:	$500,000
CORPS FTE:	$4,400
CORPS Contracts:	$800,000
TOTAL:	$1,479,330

FY12 Cost:	
SFWMD FTE:	$124,950
SFWMD Supplies:	$200,000
CORPS FTE:	$4,400
CORPS Contracts:	$200,000
TOTAL:	$529,350

Conclusion: The DPM is designed specifically to be conducted at a relevant scale such that the results obtained are directly applicable to DECOMP.

Direct ways the data will be used:

1) Input directly to the DECOMP PIR, primarily relating to the L-67's and Tamiami Trail.
2) Hydrologic data will be used to calibrate the 2x2 and RMA models used in the evaluation of DECOMP alternatives.
3) Evaluation of Performance Measures that will be used to evaluate DECOMP.
4) The timing and duration of tests can be coordinated with other CERP projects (e.g., L-30 seepage management).
5) Improve our scientific understanding between hydrology and ecology. In this case, primarily flow.

The DECOMP Physical Model (DPM)

Questions?

Discussion!

What is an Adaptive Management Physical Model … NOT?

- It is <u>not</u> a guarantee or the solution for all problems.
- It is <u>not</u> justification to stall or cancel a restoration project.
- It is <u>not</u> irrevocable (projects are designed to be reversible).
- It does <u>not</u> mean choosing a management plan and "adapting as you go" through a process of "trial and error."
- It is <u>not</u> a more expensive approach for designing, implementing, or managing restoration. It is less expensive because it increases the probability of success and decreases the threat of litigation.