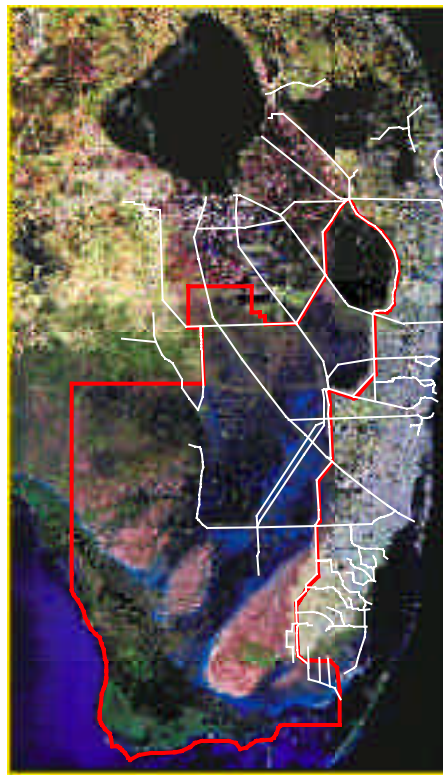


# Application of the Everglades Landscape Model for Restoration Initiatives

**Everglades  
Landscape  
Model**



<http://www.sfwmd.gov/org/wrp/elm/>

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N. Wang  
J. Godin  
A. Morales  
Y. Wu  
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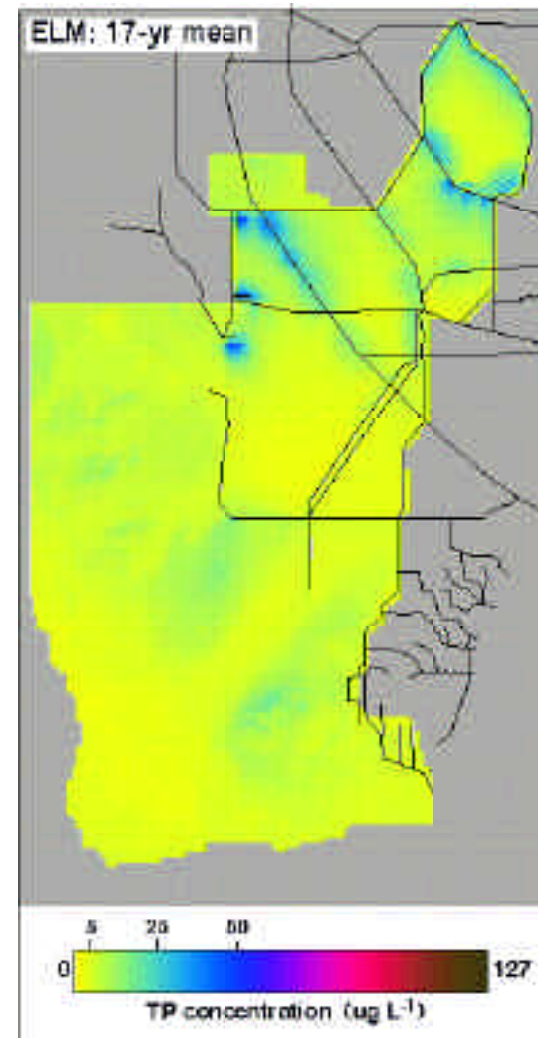
# **Everglades Landscape Model (ELM) Objectives**

**Integrate hydrology, biology and nutrient cycling in spatially explicit simulation**

- **Understand ecosystem dynamics at regional scale**
- **Develop predictions of landscape response to altered water & nutrient management**
- **One tool to aid in Everglades restoration**

## Performance measures (web-enabled)

- Regional maps
  - § Multi- year summaries: TP, periphyton, vegetation, ...
  - § Animations (annual or monthly)
  - § Difference maps

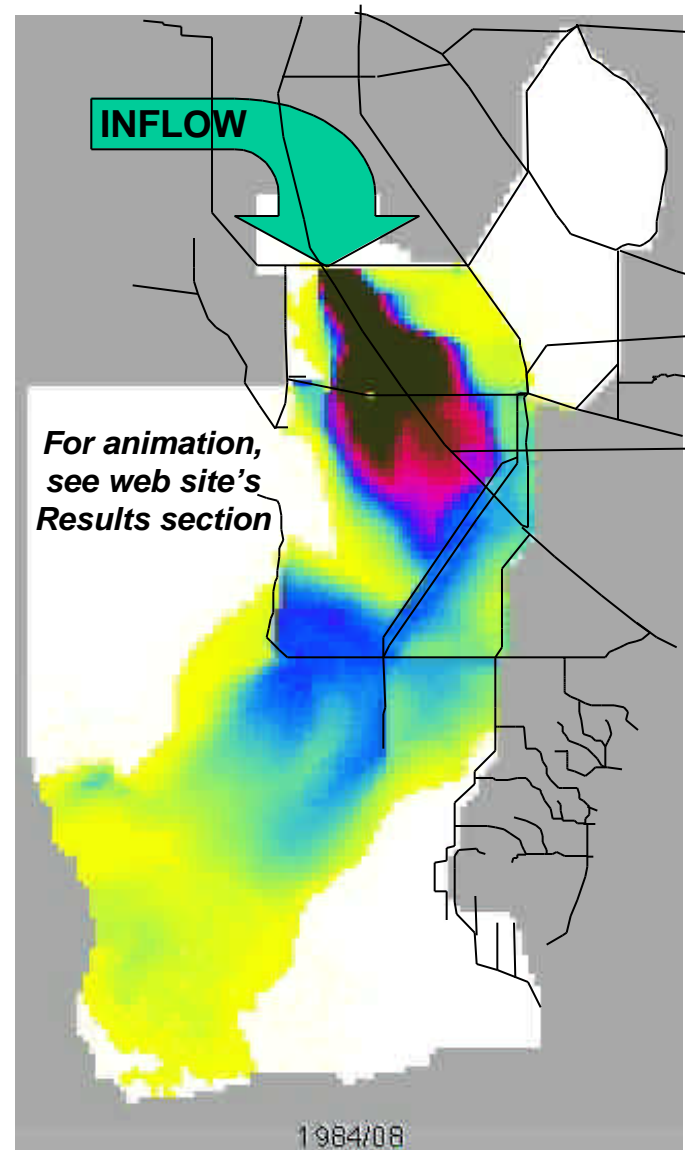


<http://www.sfwmd.gov/org/wrp/elm/>



## Example: tracer flow in surface water

- Track inflows from S-8
- Monthly mean concentrations
- Distribution via overland and canal flows



# Performance measures (web-enabled)

## Subregional summaries

### § *Water quality*

- TP concentration & load
- LOK water tracer

### § *Soils*

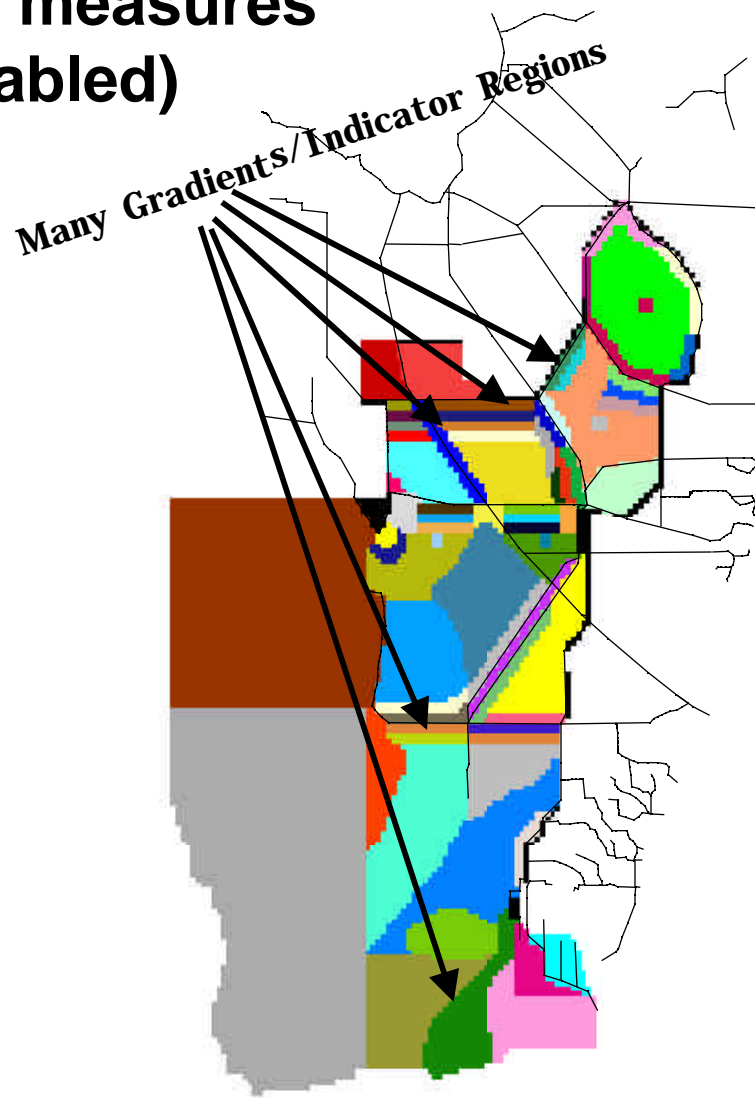
- peat accretion
- TP concentration

### § *Periphyton*

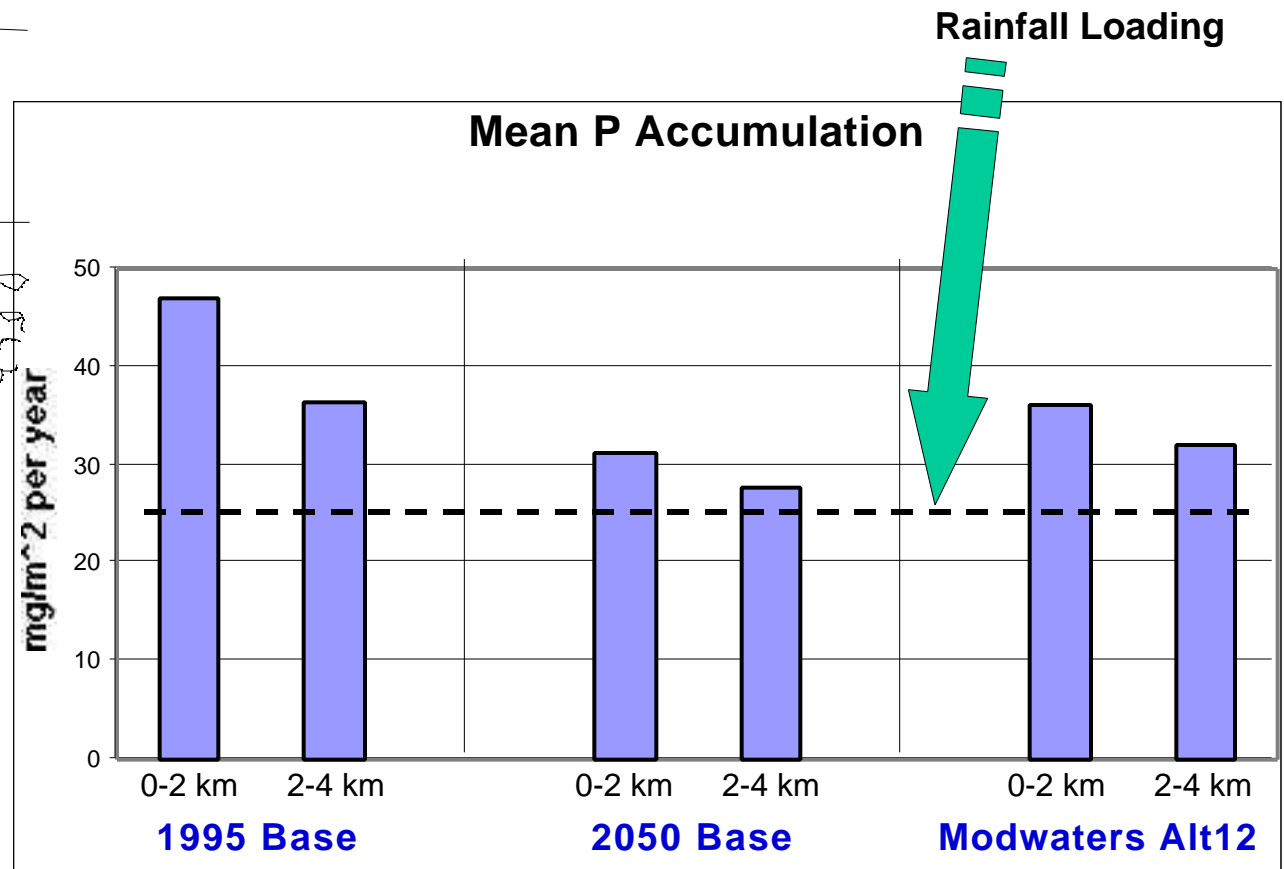
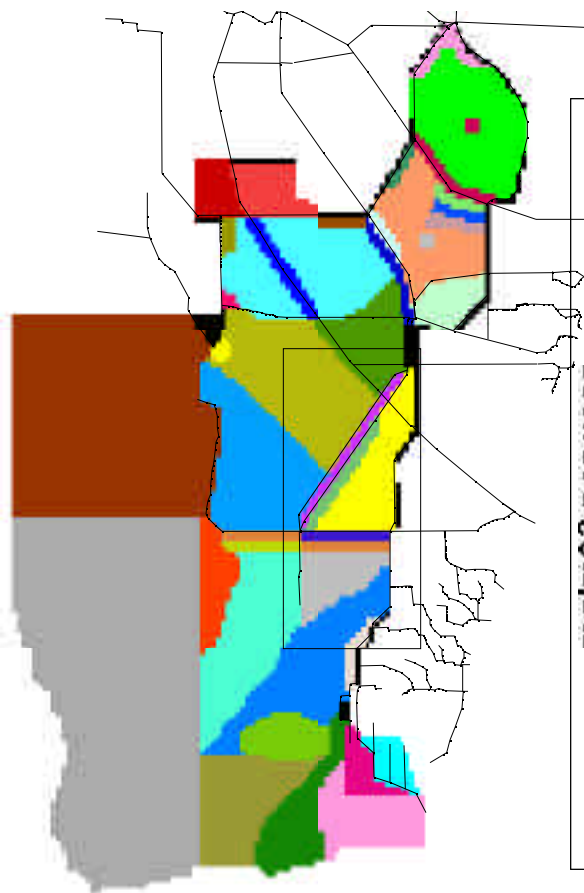
- biomass & community type
- tissue TP concentration

### § *Macrophytes*

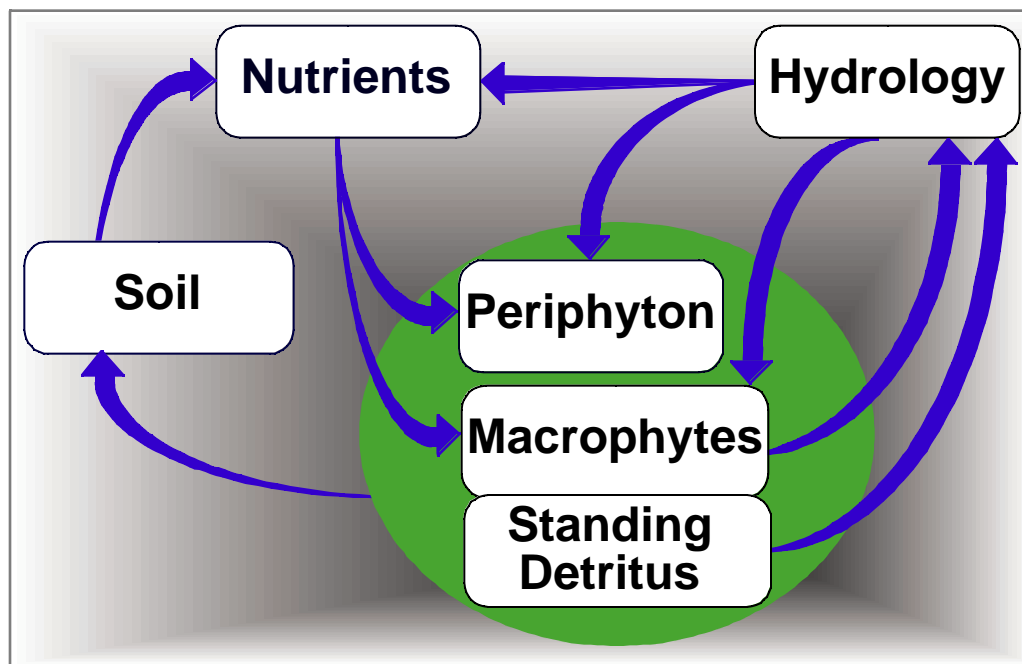
- biomass & community type
- tissue TP concentration



## Example: P Accumulation in upper NESS



## Ecological interactions



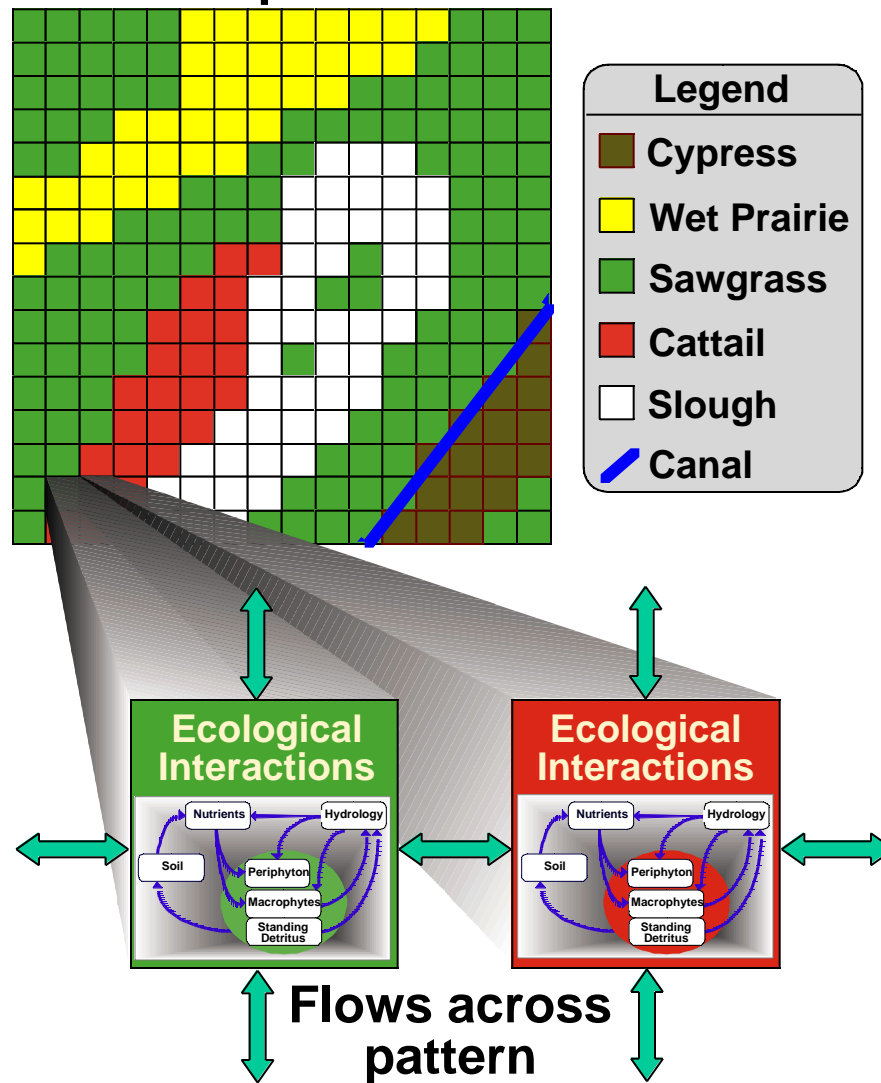
**SFWMM (&ELM) hydrology  
+ ELM water quality + ELM ecology**

<http://www.sfwmd.gov/org/wrp/elm/>



# Spatial interactions

## Landscape Pattern

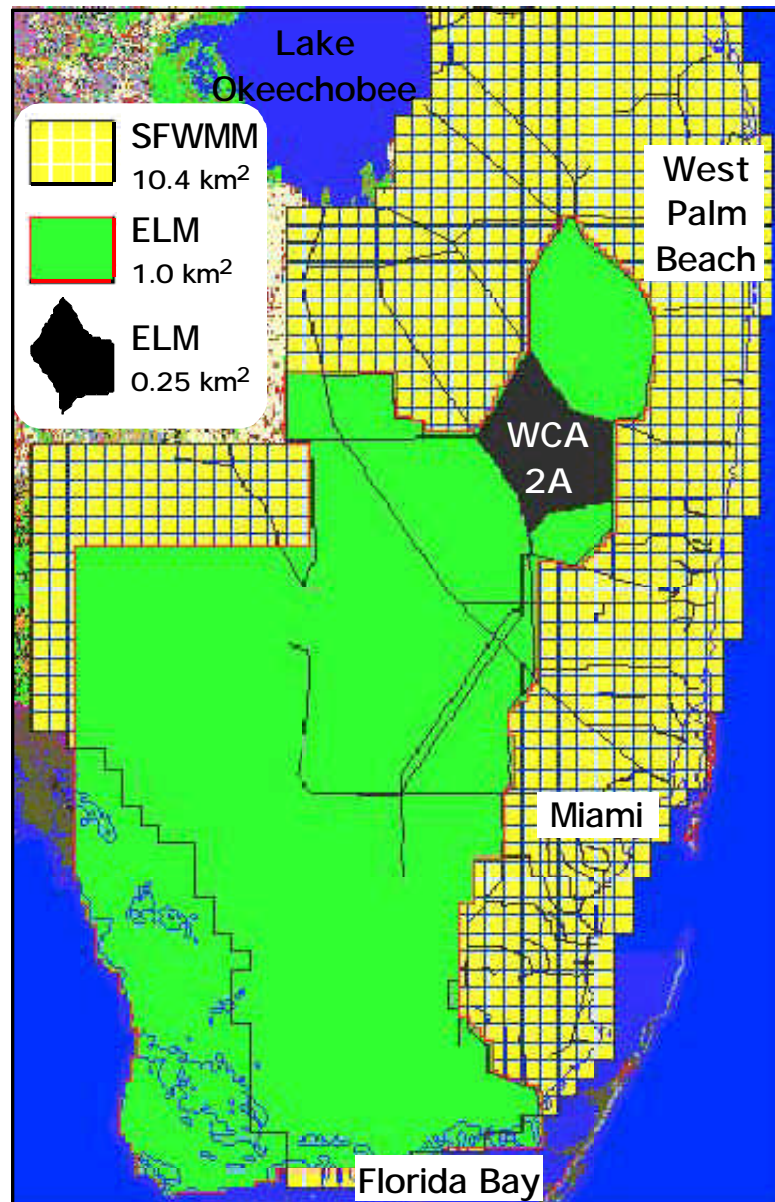


<http://www.sfwmd.gov/org/wrp/elm/>





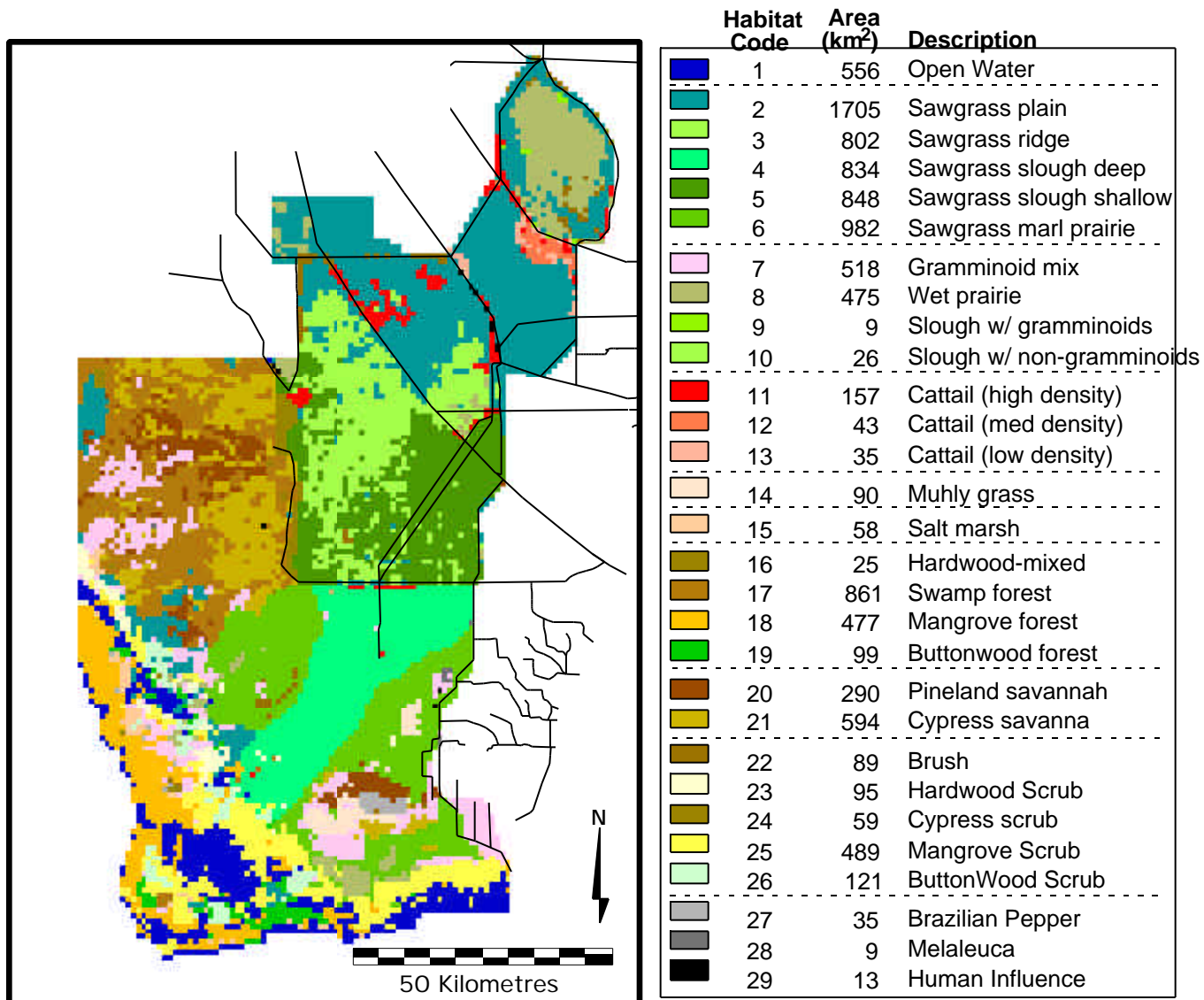
# Model domains



<http://www.sfwmd.gov/org/wrp/elm/>



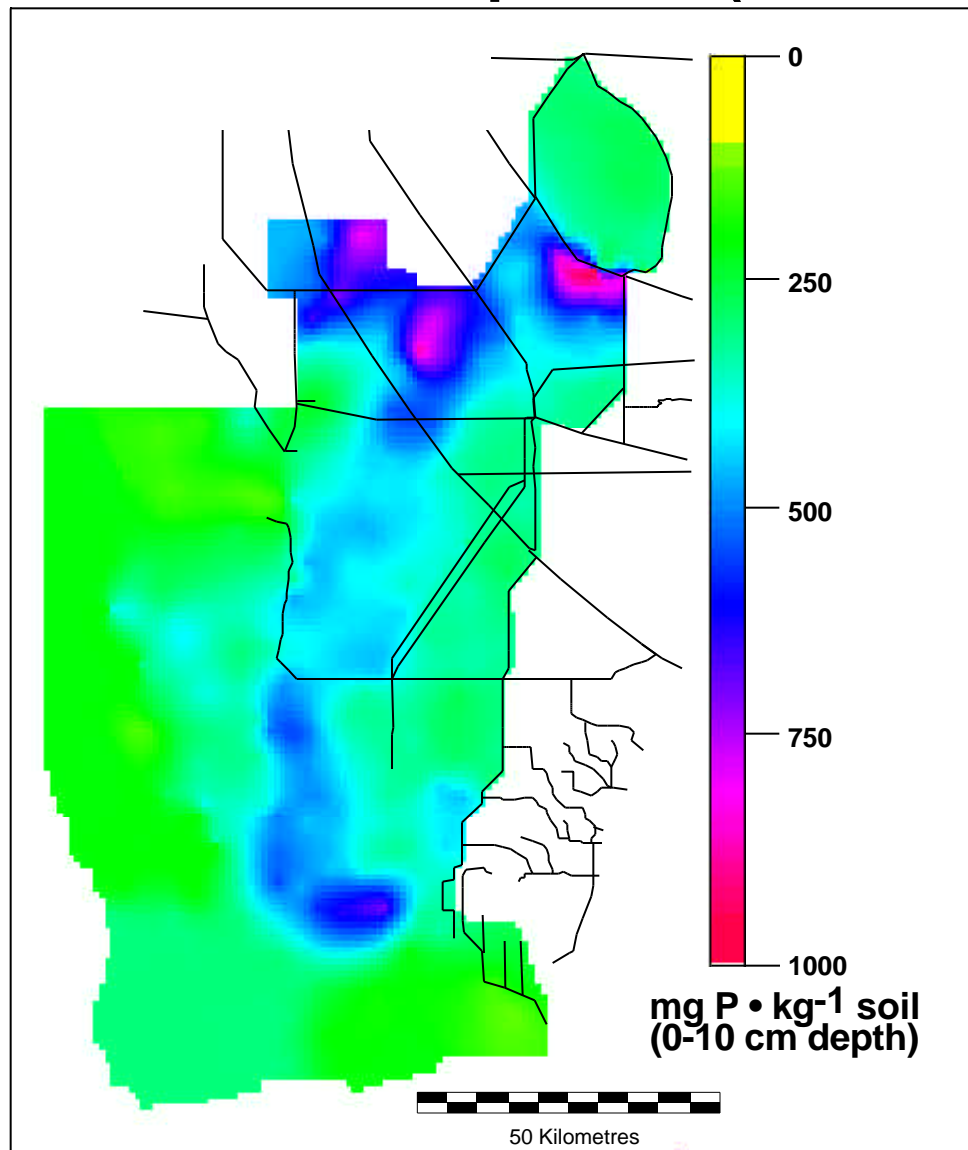
# ELM vegetation classes, ca. 1995



<http://www.sfwmd.gov/org/wrp/elm/>



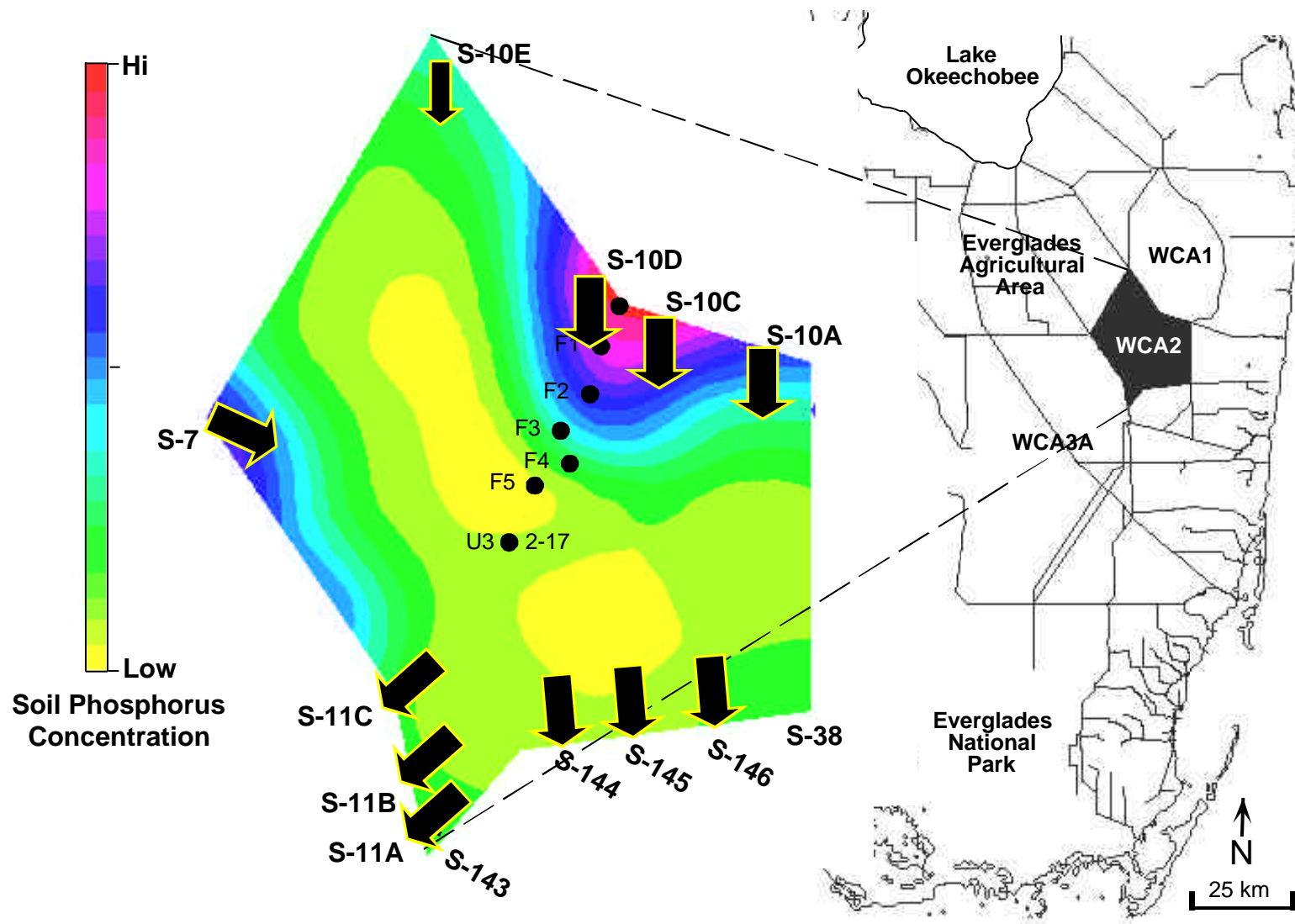
## Soil Total Phosphorus (ca.1995)



<http://www.sfwmd.gov/org/wrp/elm/>



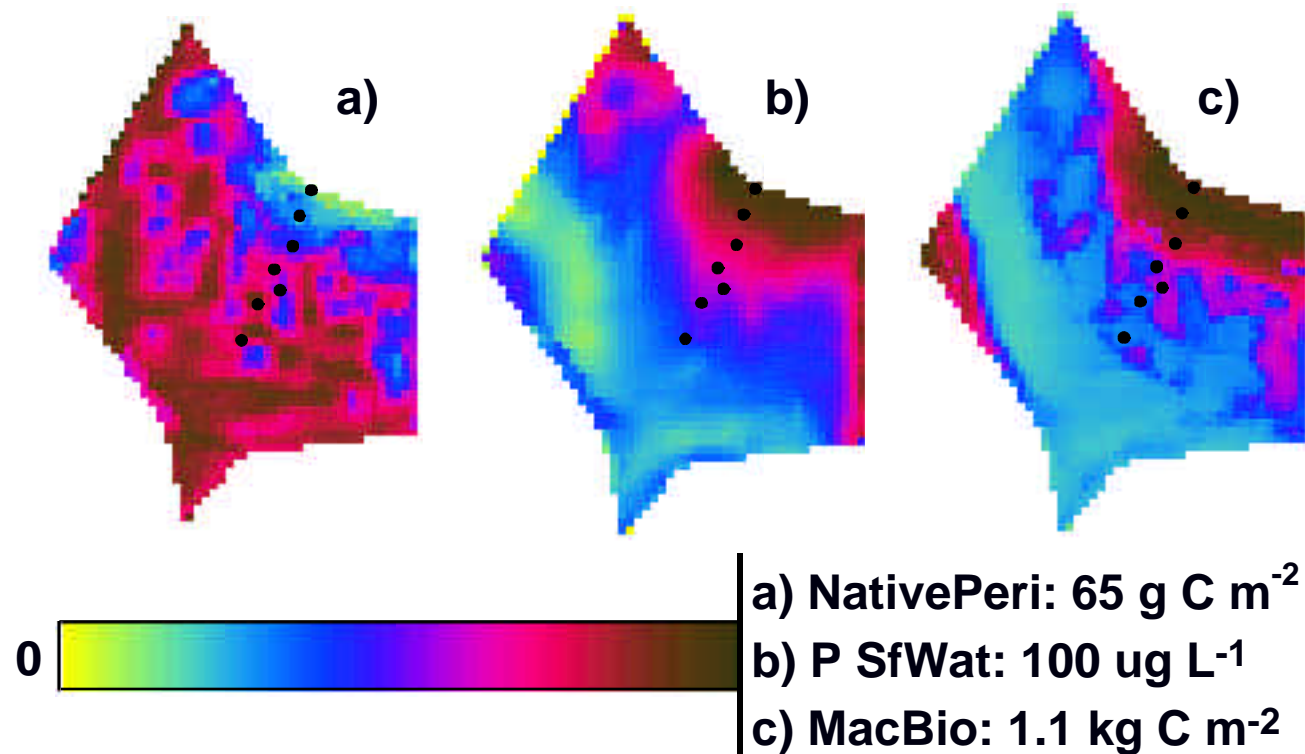
# Water Conservation Area 2A



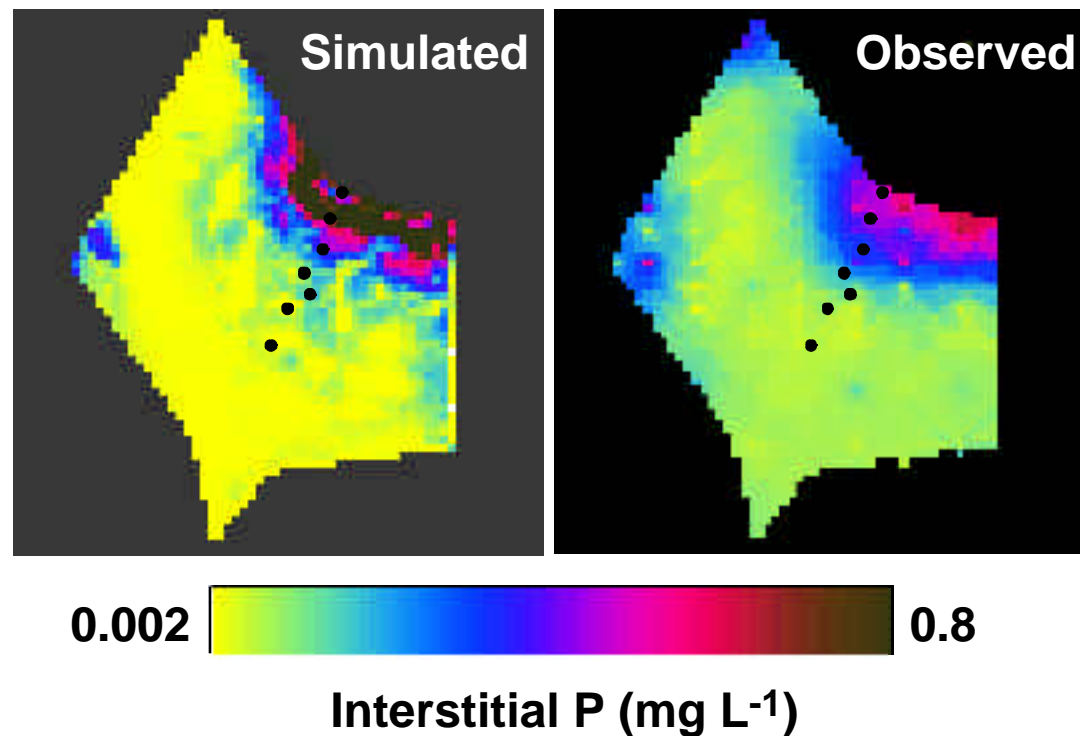
<http://www.sfwmd.gov/org/wrp/elm/>



## Periphyton, phosphorus, and macrophyte patterns



## Soil porewater P calibration



*(ELM version 1.0)*

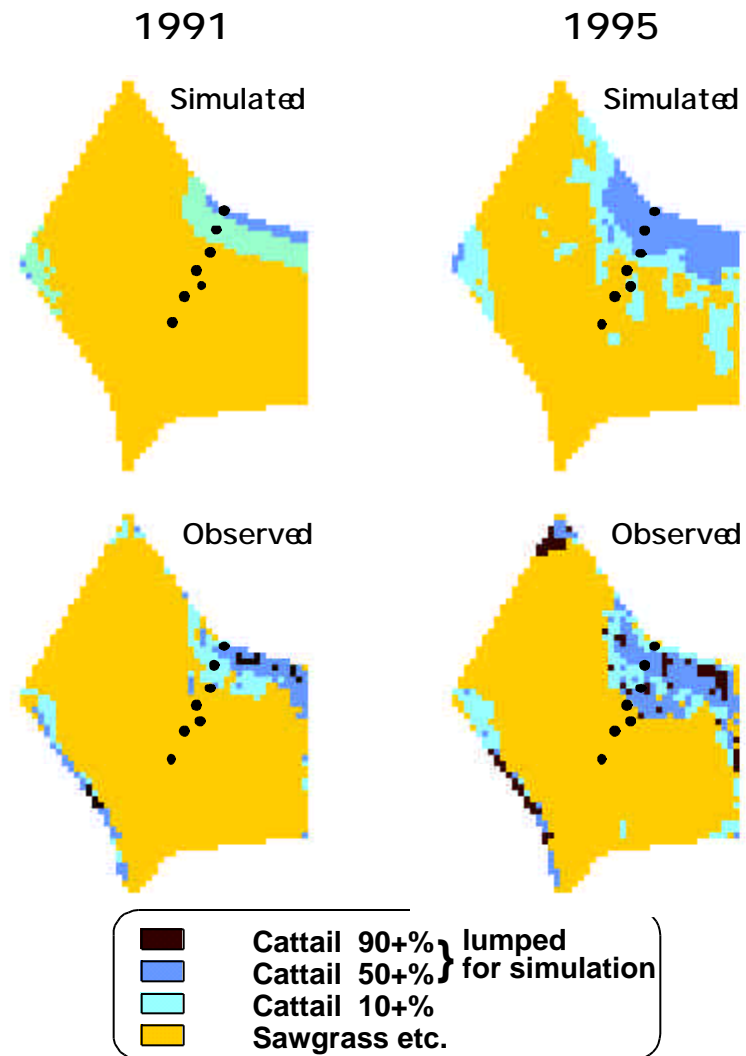
<http://www.sfwmd.gov/org/wrp/elm/>





# Vegetation change calibration

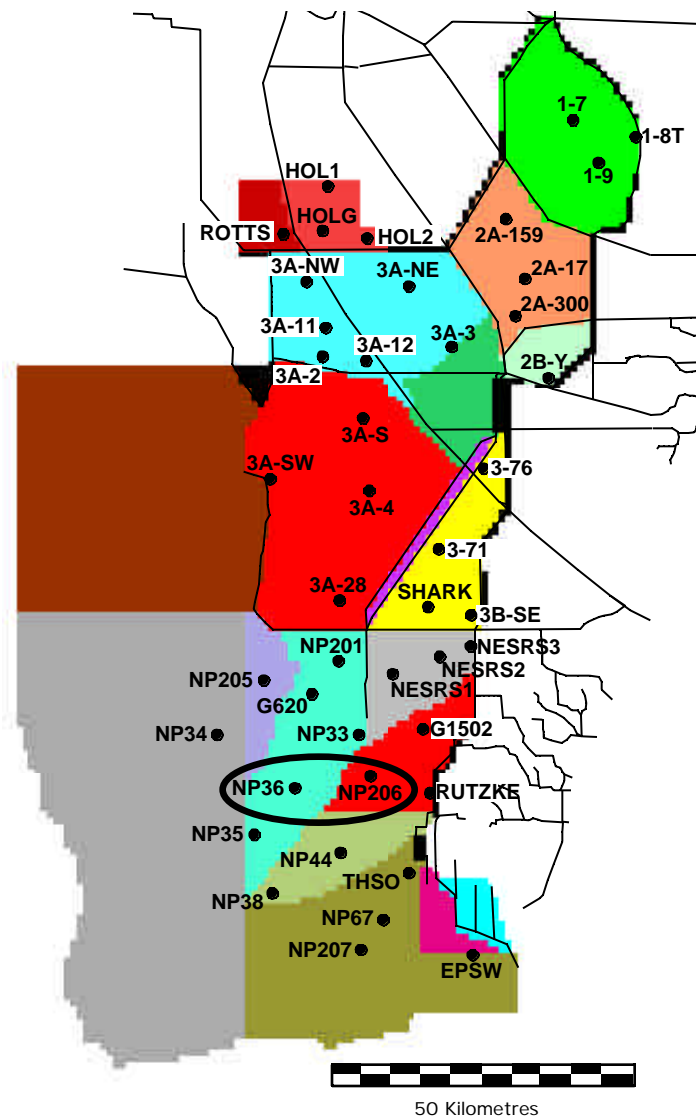
(ELM version 1.0)



<http://www.sfwmd.gov/org/wrp/elm/>



# Stage monitoring regions/points

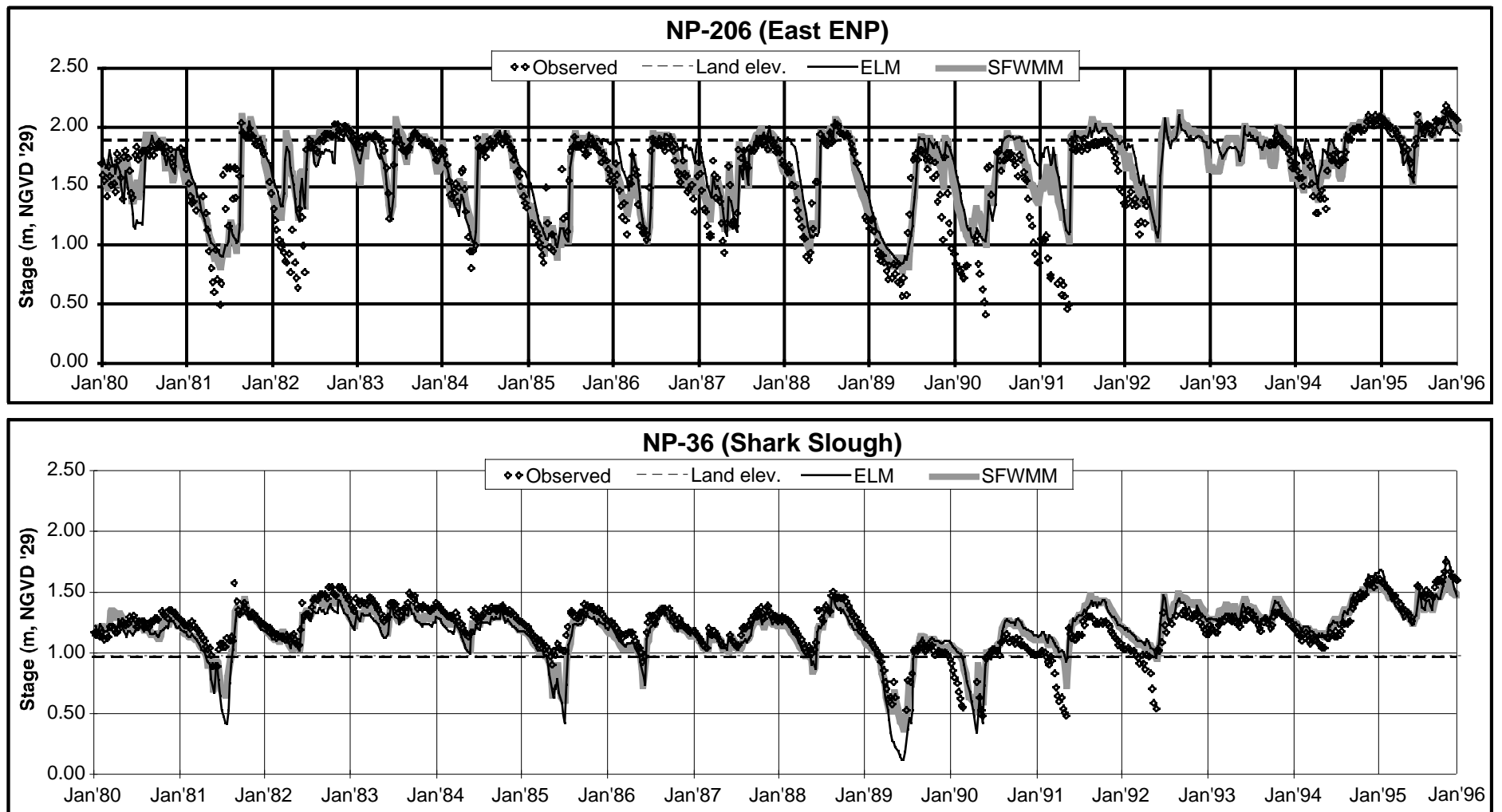


<http://www.sfwmd.gov/org/wrp/elm/>





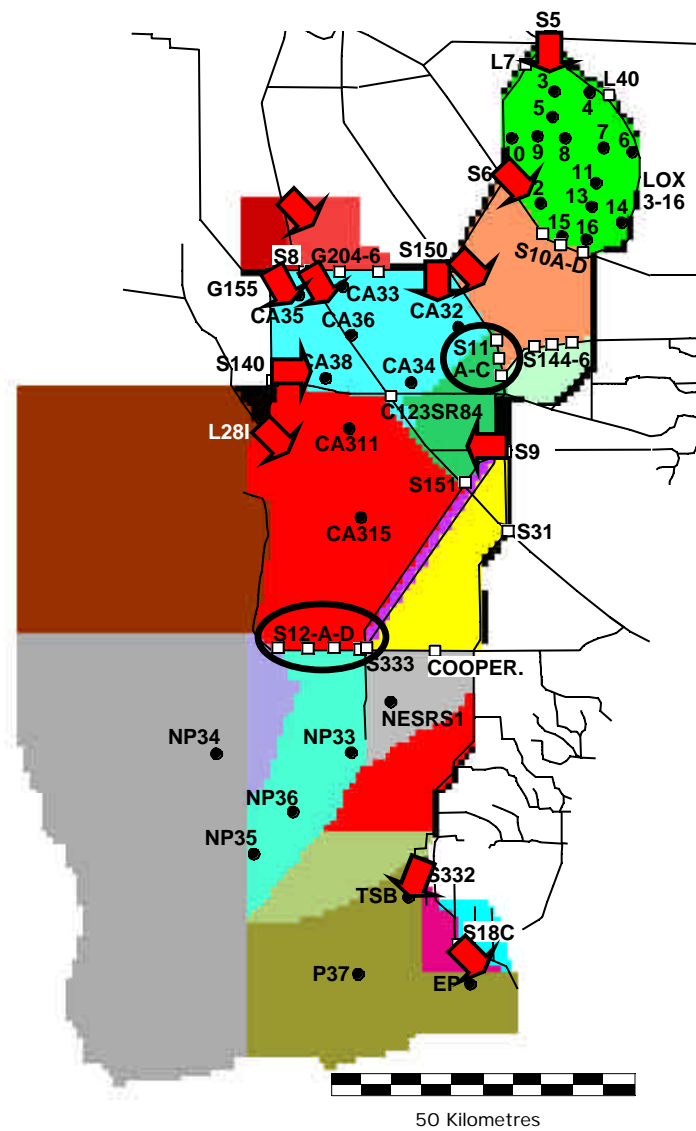
# Stage calibration examples (v.2.1)



<http://www.sfwmd.gov/org/wrp/elm/>



# Surface water TP monitoring regions/points

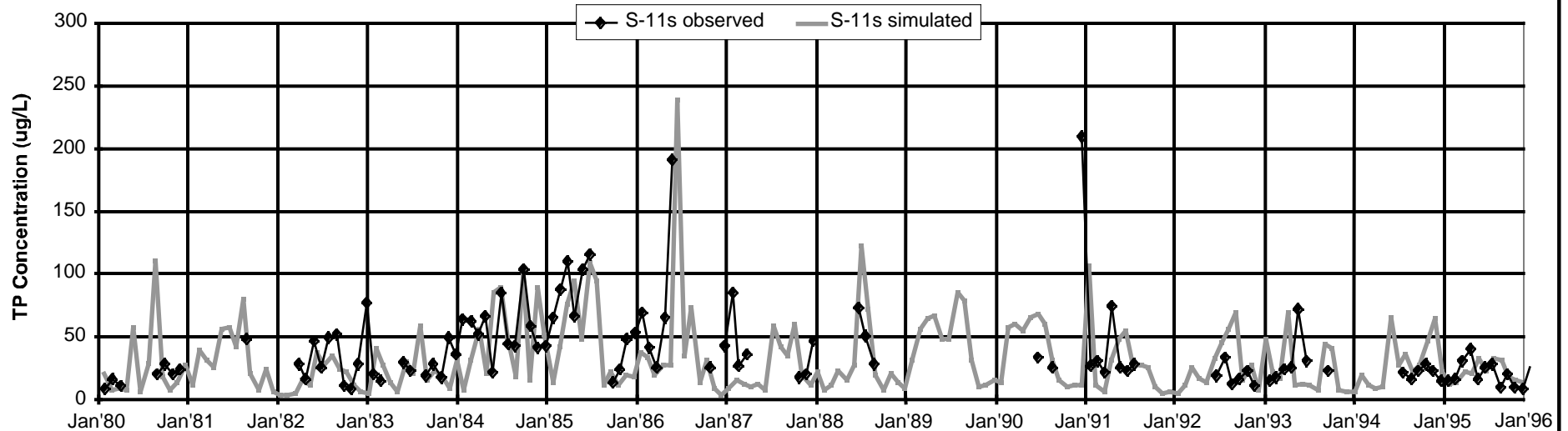


<http://www.sfwmd.gov/org/wrp/elm/>

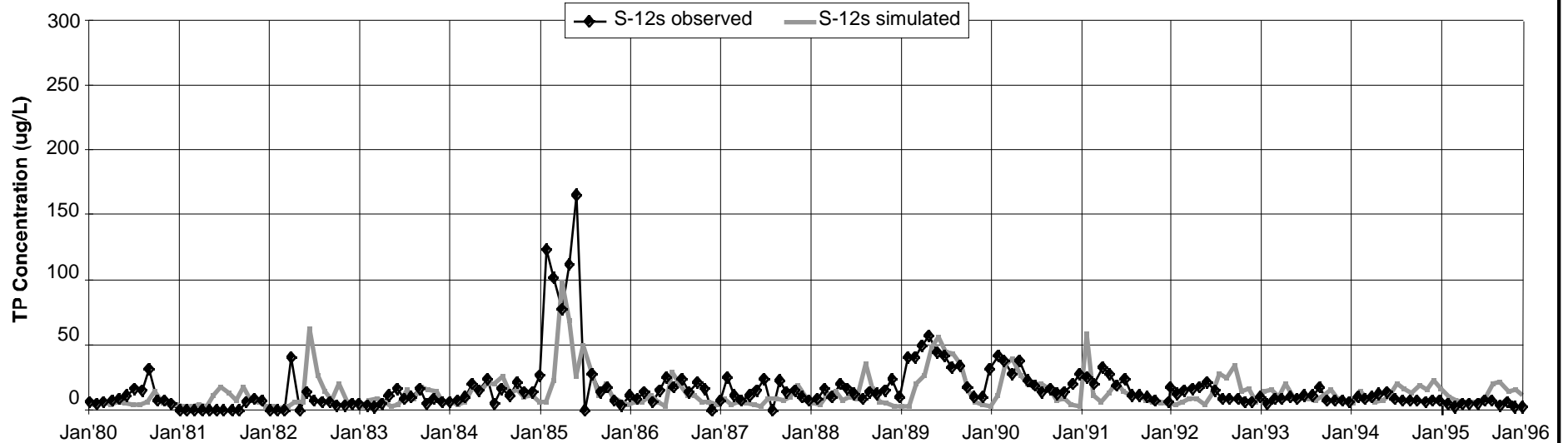


# Surface water TP calibration examples (v.2.1)

S-11 A-C Mean



S12 A-D Mean

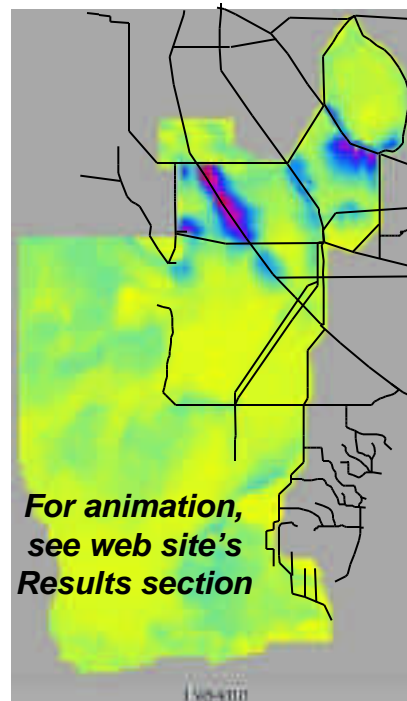


## **Project Alternative Evaluation: Hydrologic Considerations**

- **For each Alternative, SFWMM provides daily input data on managed flows through water control structures**
- **ELM hydrology (overland, groundwater, canal flows, etc) otherwise independent of SFWMM**
- **ELM uses SFWMM data on rainfall, topography, others**
- **Verify that ELM hydrology is consistent with SFWMM (stage, hydroperiod, budgets)**

# Status

- Available NOW for evaluations of surface water quality throughout the Everglades



TP in surface water:  
monthly, 1979-1995

- Finalizing calibration/refinement to evaluate other ecological (soils, periphyton, macrophytes) responses