# Effects of Faunal Communities on Phosphorus Cycling in the STAs

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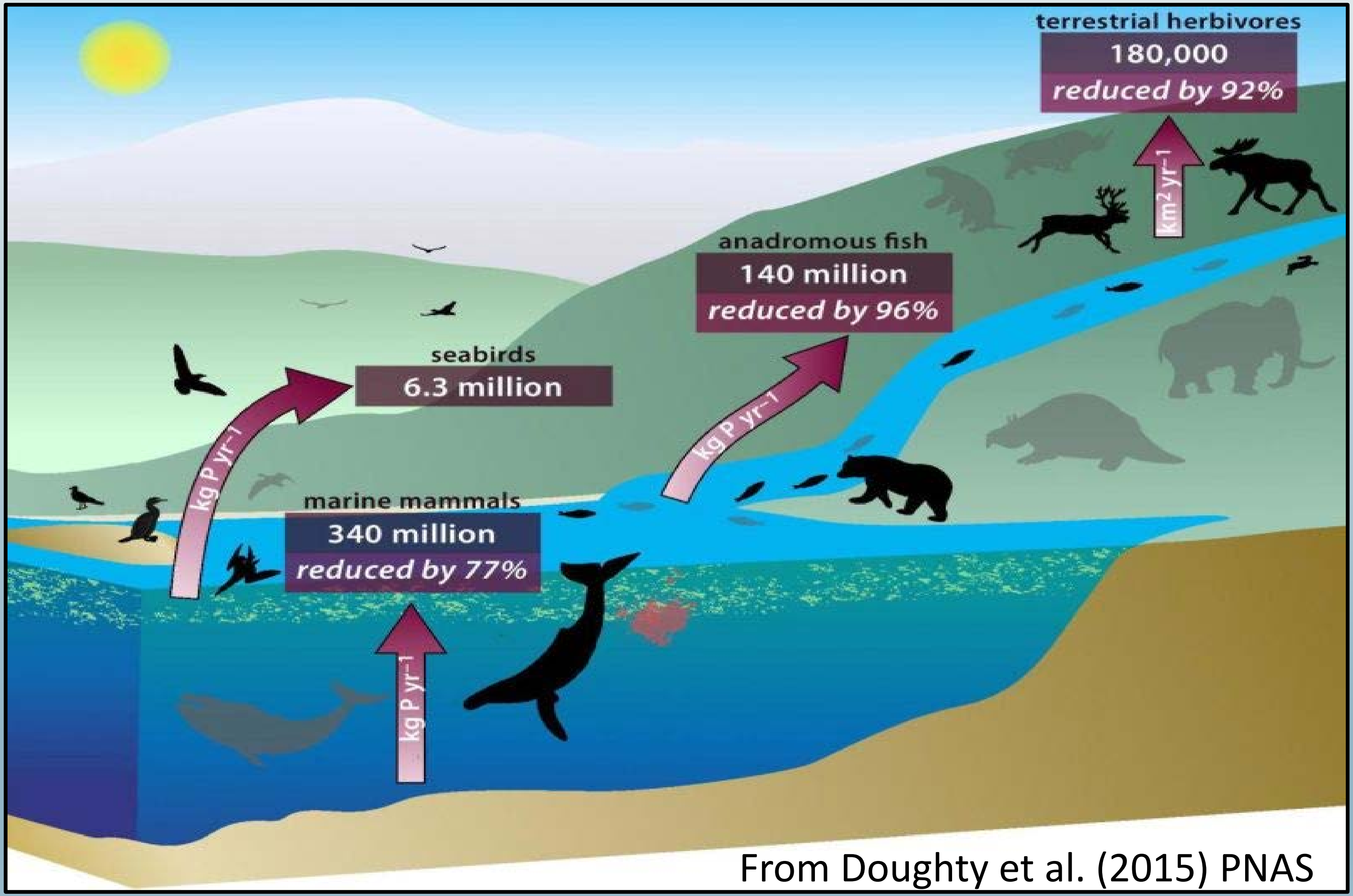
**Restoration Strategies Science Plan**

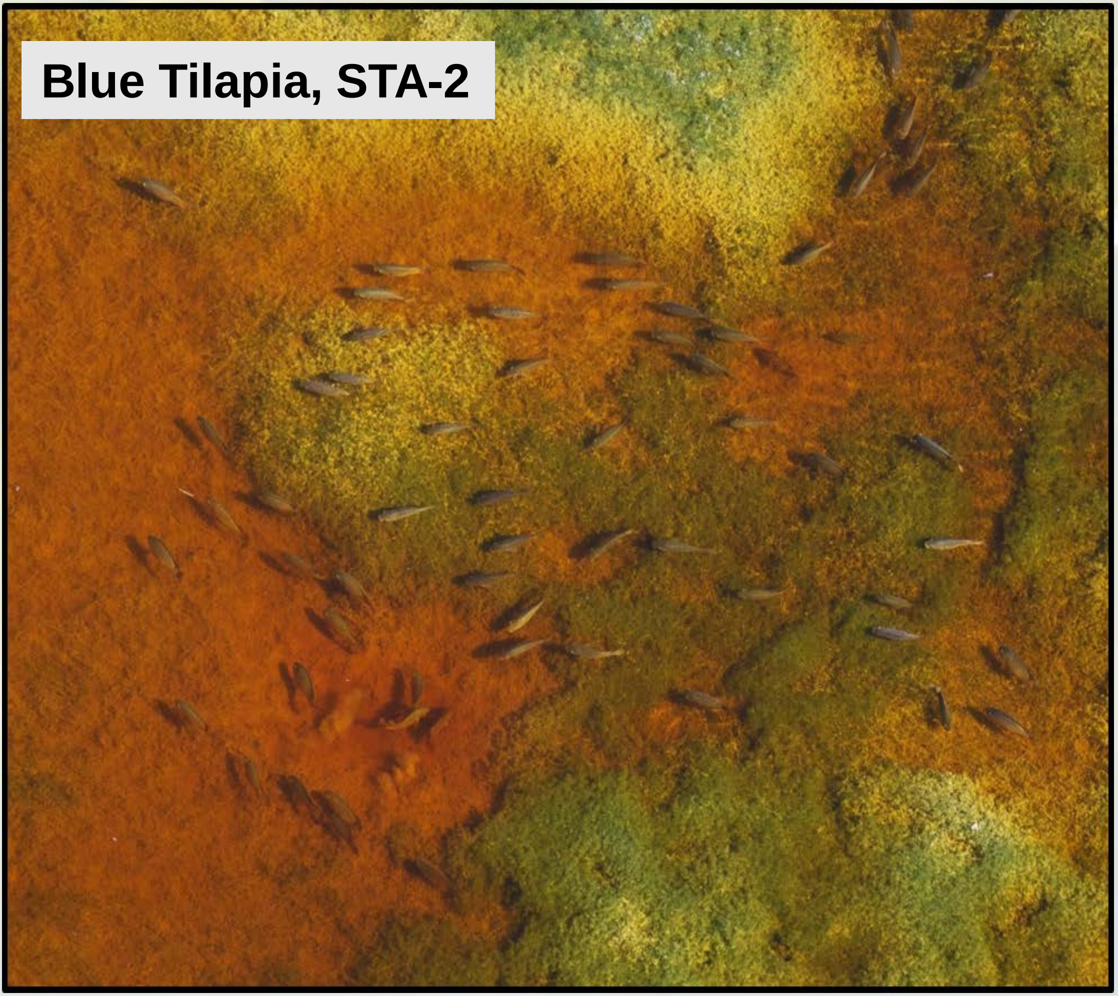

**Mark Cook & Sue Newman**
**Applied Sciences Bureau**
**SFWMD**

# Animals Play a Much Larger Role in Nutrient Cycling than Expected




An interlinked system of animals that carry nutrients from ocean depths to deep inland -- through their poop, urine and decomposing bodies.

# STAs Support a Highly Abundant & Species Rich Animal Community



Blue Tilapia, STA-2

Plecostomus catfish, STA-1W

Non-native apple snails, STA-1E

# Wading Birds, White Pelicans & Waterfowl

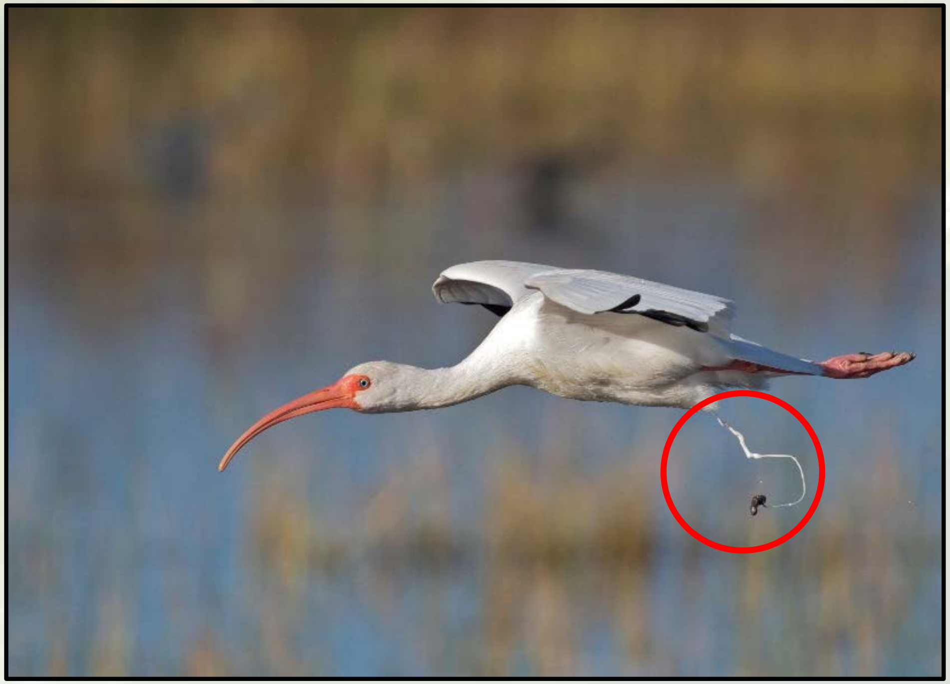

Pelicans, STA-2


Wading birds, STA-1E


Ducks/Coots, STA-1W

# Alligators in STA-1E

# Mechanism 1. Consumption & Excretion



Transport of P from sediments to water column is a "new" source of P

Excretion alters the nature of biological material and rates of nutrient cycling

# 2. Top Down Effects (Consumption of SAV)

Coot consumption of submerged aquatic vegetation

# 3. Disturbance of Sediments (Bioturbation)



# 4. Nutrient Sinks (Storage)

- Large, long-lived species
- Growing populations

# 5. Transportation of Phosphorus Across Ecosystem Boundaries

Wading birds feed in the STAs and transport prey to nesting colonies

# Hypothesis IV-1:

# Fauna impact P concentrations in the water column of the outflow cells via excretion, translocation, sequestration, bioturbation, and herbivory.

# Initial Objectives

1. Estimate abundances of waterbirds and aquatic animals (fish, crayfish, etc.)

2. Obtain food consumption and excretion rate data

   (from scientific literature & aquarium studies)

3. Calculate population-level excretion rates & compare with P-inflows and outflows and determine effect level.

# Aquatic Faunal Surveys

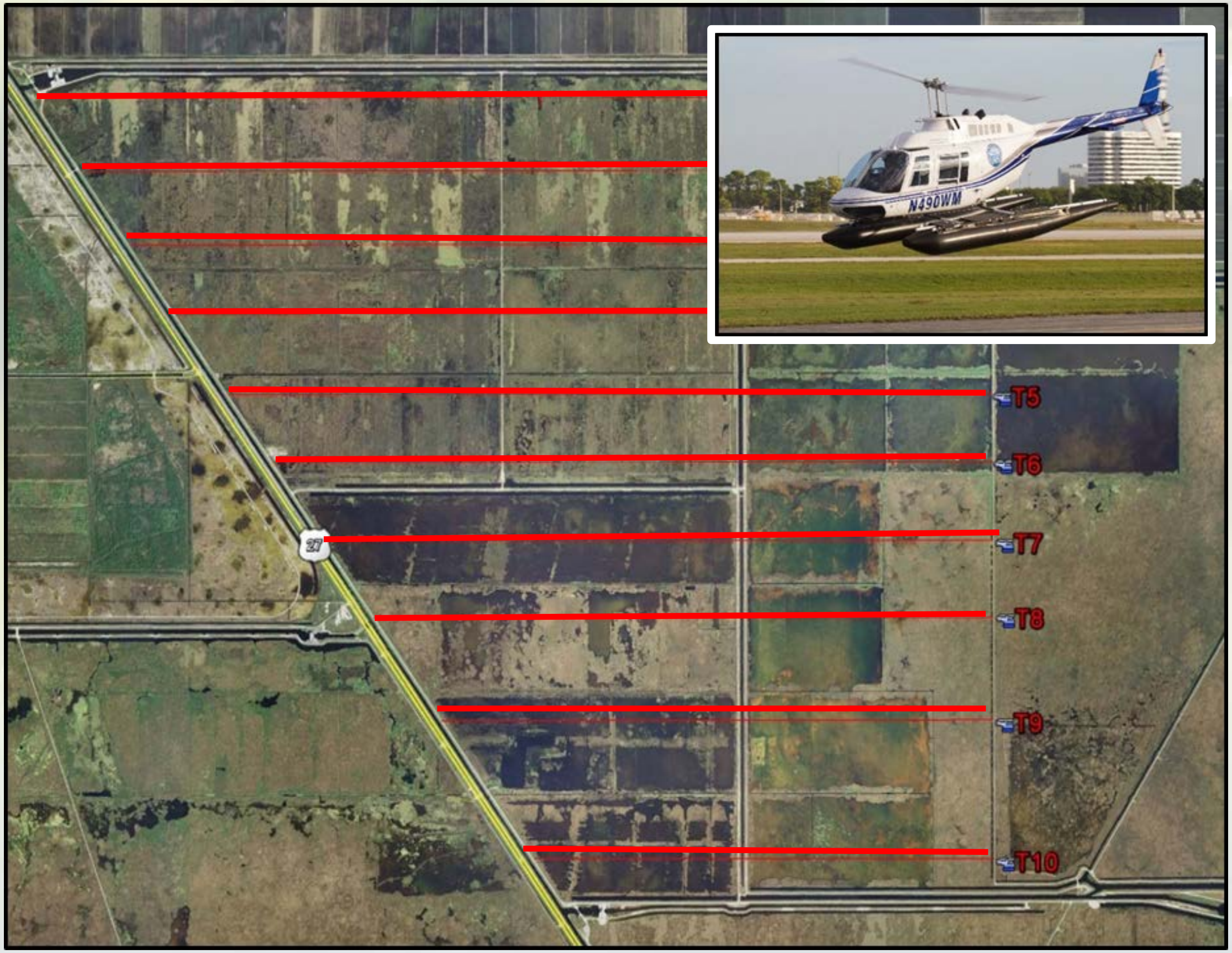
Small fish, macroinvertebrates


1 $m^2$ throw trap

Large fish:

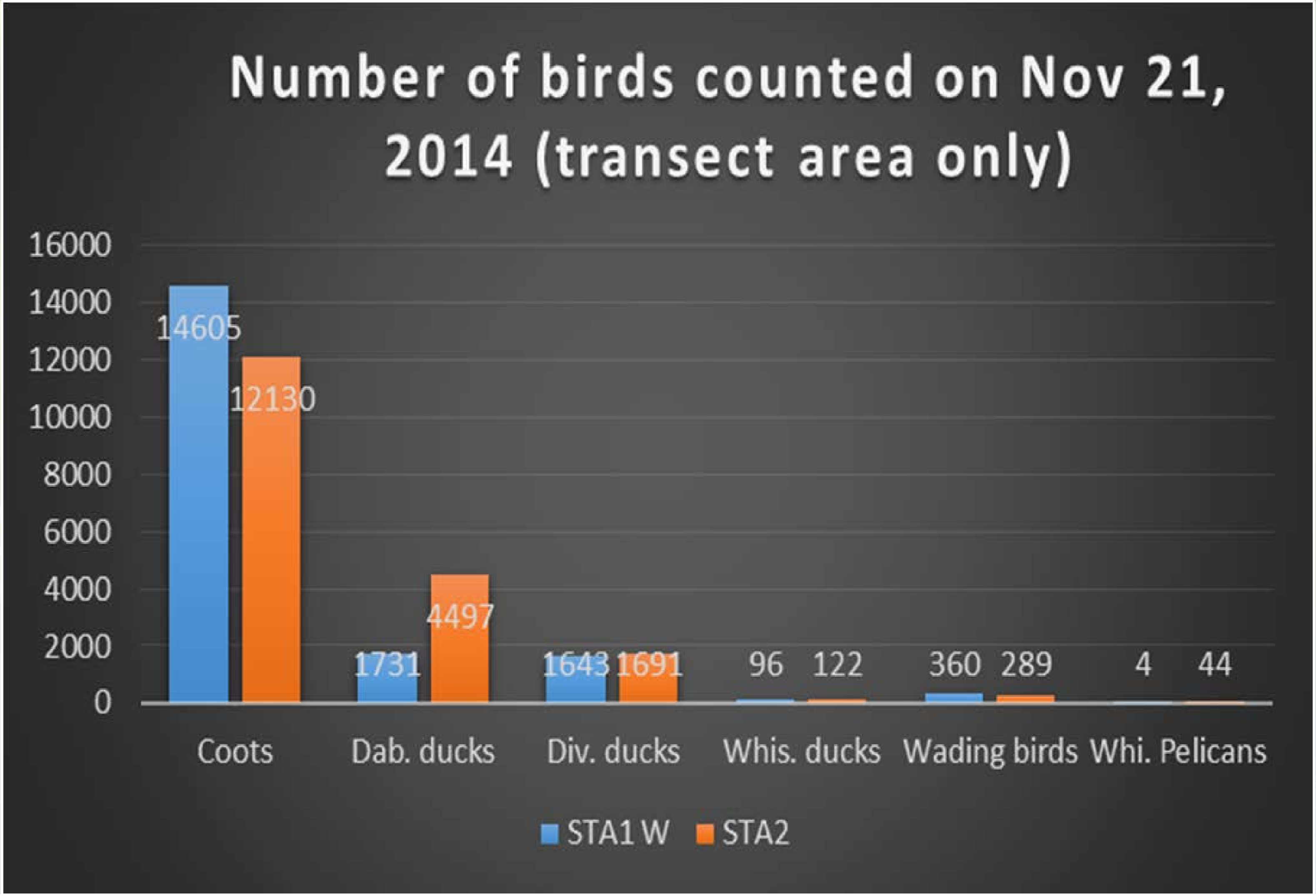
Electrofishing

# Wading Bird & Waterfowl Surveys (SFWMD)




- Aerial video surveys of SAV cells
- Fixed transects
- 10% areal cover
- Occur bimonthly from Nov-May (2 years)
- STAs 1E, 1W & 2

# A Preliminary Look at the Numbers….



# Coots are Eating and Excreting a Huge Biomass of Submerged Aquatic Vegetation (SAV)!

Assuming:

A count of 14,605 coots (highly conservative estimate)

A consumption rate of 90 g SAV/day (dry wt)

An excretion rate of 54 g guano/day (dry wt)

During 21 November, coots in STA-1W:

**Consumed 1315 kg SAV**

**Produced 789 kg guano**

# The Contribution of Coots to Total Phosphorus Loading Could be Significant

Assuming:

Coot guano = 1.4% P

14,605 Coots are present for 182 days/year

STA1W = 2648.3 ha

Coot TP loading in STA-1W = **0.08 $g/m^2/y^{-1}$**

TP loading is **4% of STA1w's external loading** (1.9 $g/m^2/y^{-1}$ )

# Questions?