Nutrient Storage and Transport Processes on Ranchlands in the Northern Everglades: Consequences for Greater Everglades Restoration

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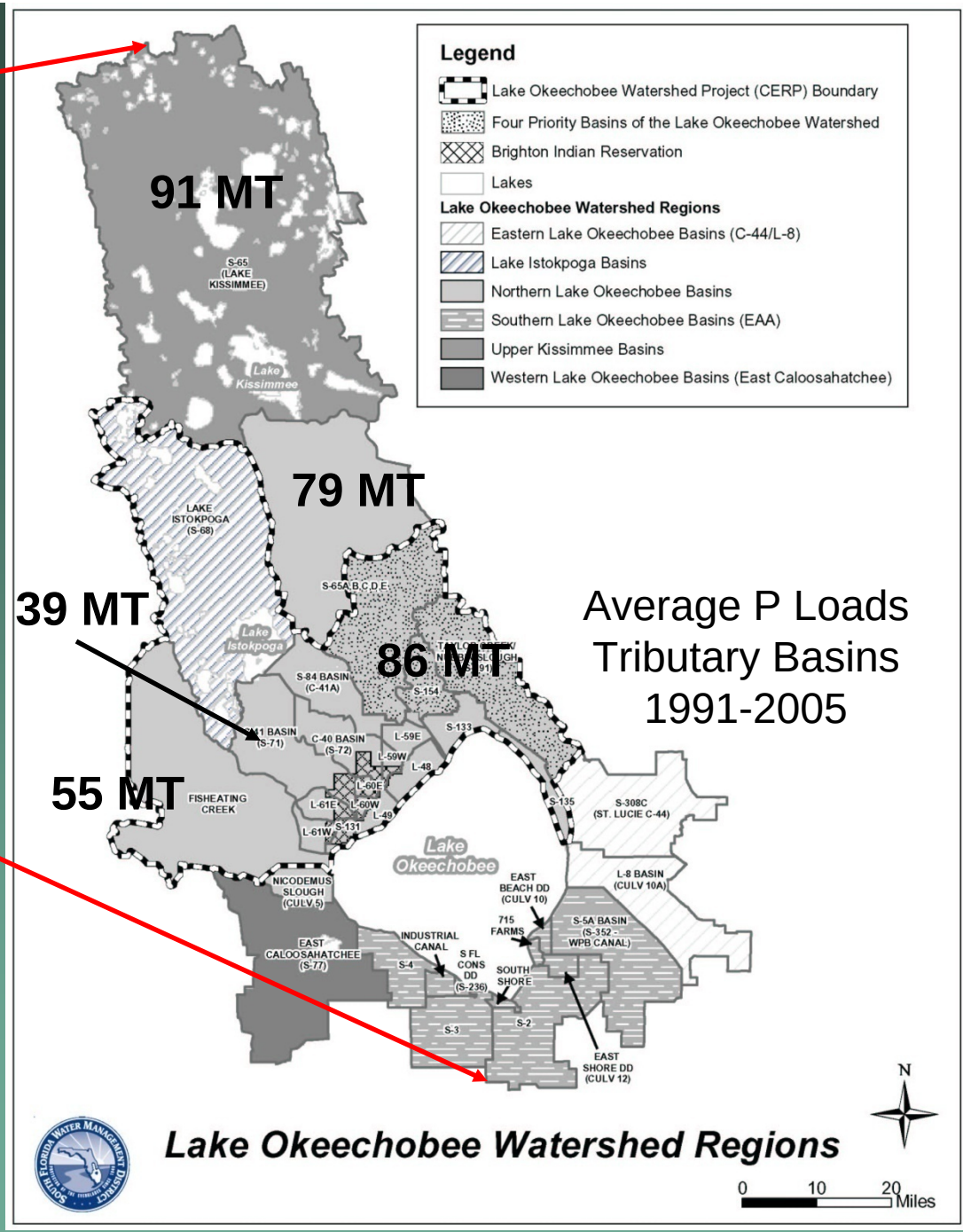
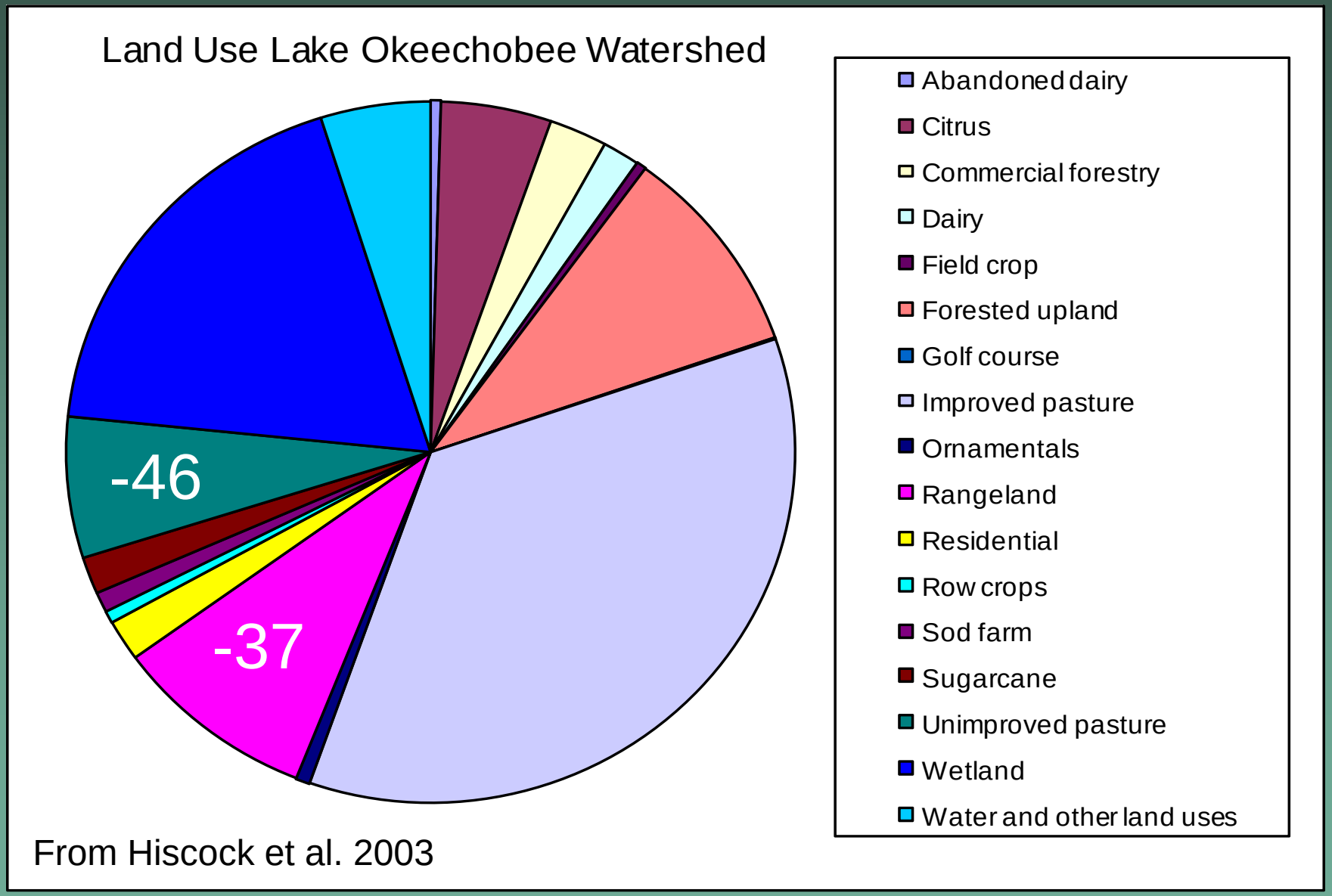

Legend
Lake Okeechobee Watershed Project (CERP) Boundary
Four Priority Basins of the Lake Okeechobee Watershed
Brighton Indian Reservation
Lakes
Lake Okeechobee Watershed Regions
Eastern Lake Okeechobee Basins (C-44/L-8)
Lake Istokpoga Basins
Northern Lake Okeechobee Basins
Southern Lake Okeechobee Basins (EAA)
Upper Kissimmee Basins
Western Lake Okeechobee Basins (East Caloosahatchee)
91 MT
79 MT
39 MT
86 MT
55 MT
Average P Loads
Tributary Basins
1991-2005
S-65 (LAKE KISSIMMEE)
Lake Kissimmee
LAKE ISTOKPOGA (S-68)
Lake Istokpoga
S-65A,B,C,D,E
S-84 BASIN (C-41A)
S-154
S-133
C-41 BASIN (S-71)
C-40 BASIN (S-72)
L-59E
L-59W
L-48
L-60E
L-60W
L-61E
L-61W
S-131
L-49
FISHEATING CREEK
S-135
S-308C (ST. LUCIE C-44)
Lake Okeechobee
NICODEMUS SLOUGH (CULV 5)
EAST BEACH DD (CULV 10)
L-8 BASIN (CULV 10A)
715 FARMS
S-5A BASIN (S-352 - WPB CANAL)
EAST CALOOSAHATCHEE (S-77)
INDUSTRIAL CANAL
S-4
S FL CONS DD (S-236)
SOUTH SHORE
S-2
S-3
EAST SHORE DD (CULV 12)
N
Lake Okeechobee Watershed Regions
0 10 20 Miles

Photo by: Carlton Ward

Ranches are the Major Land Use in the Northern Everglades



From Hiscock et al. 2003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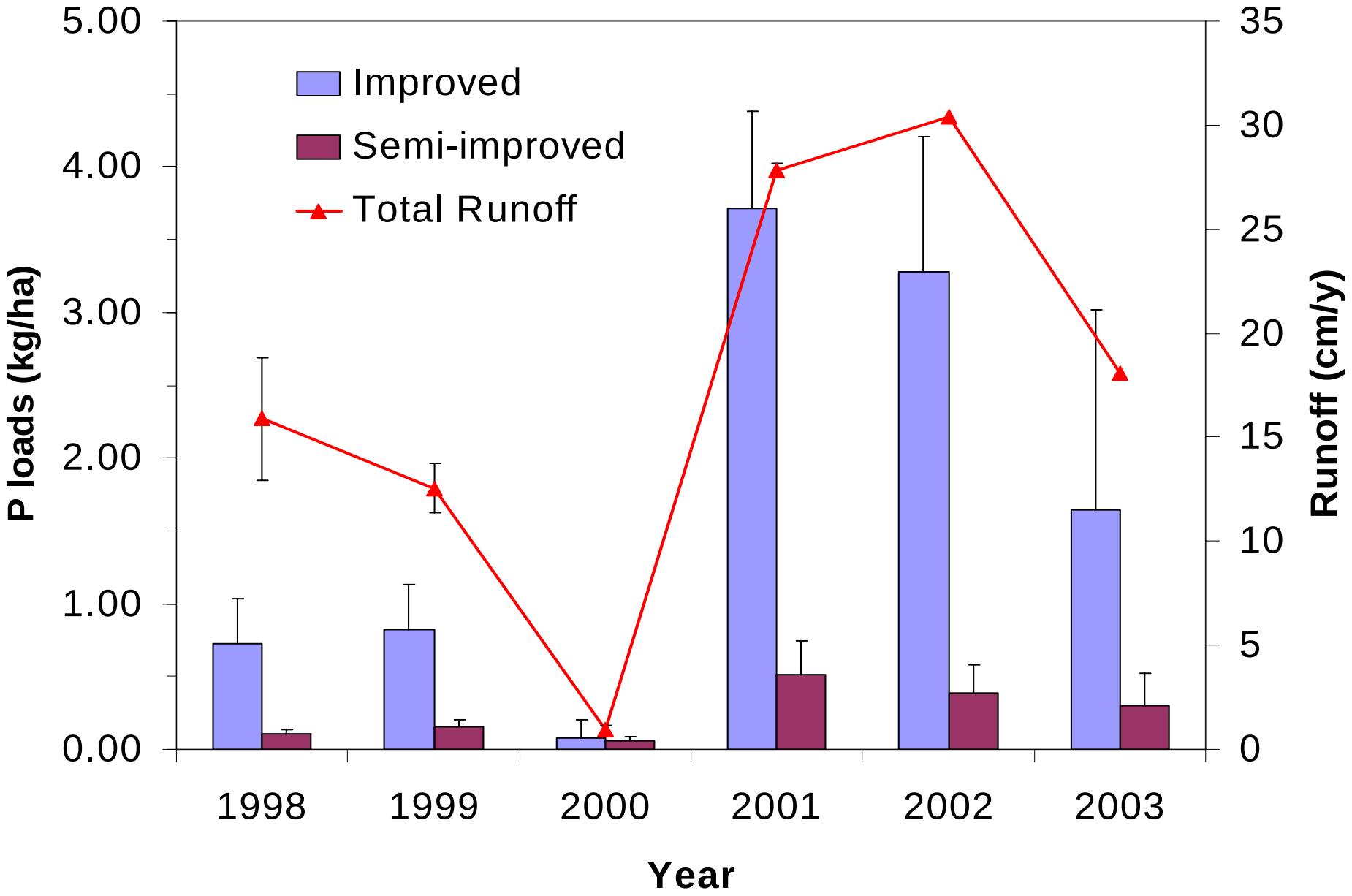
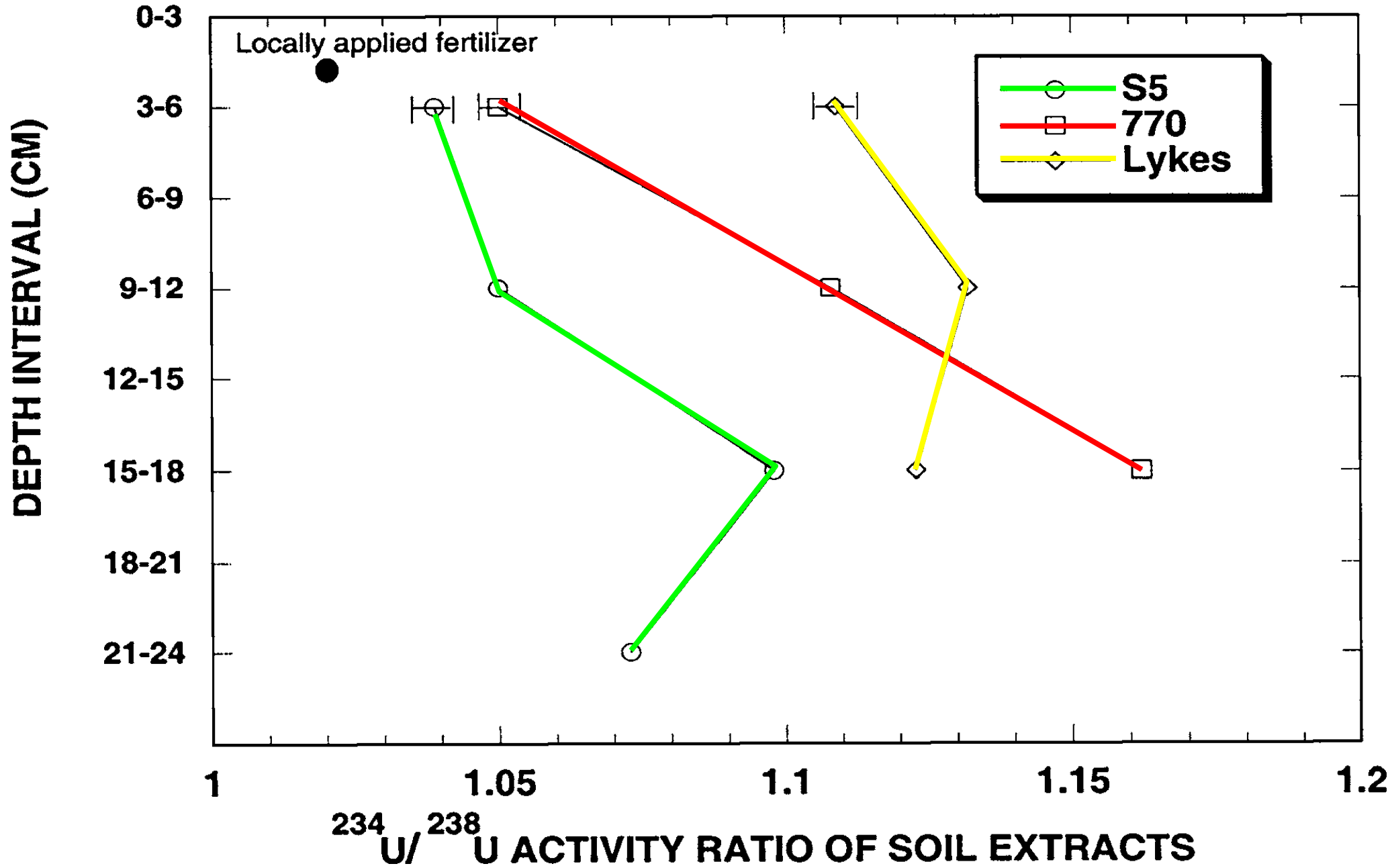
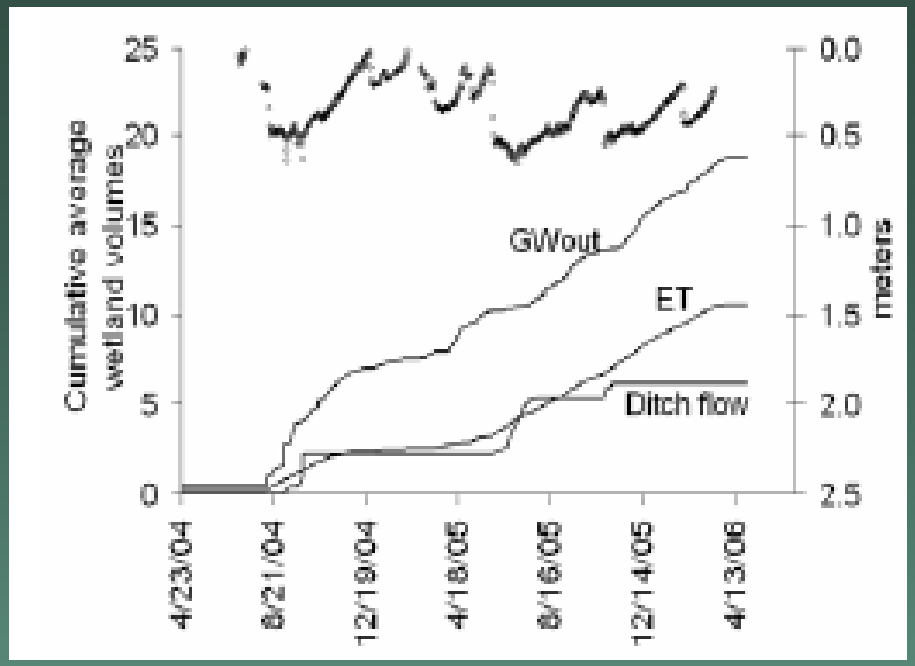
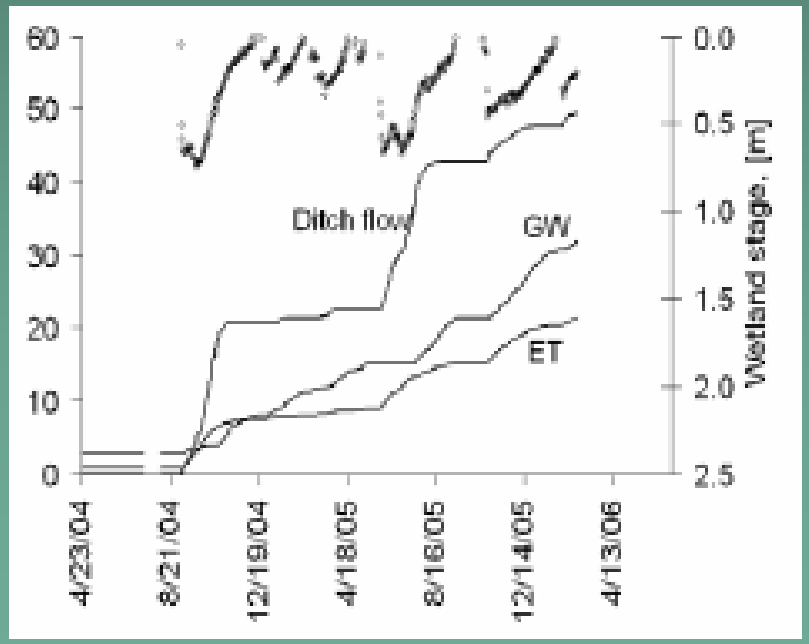


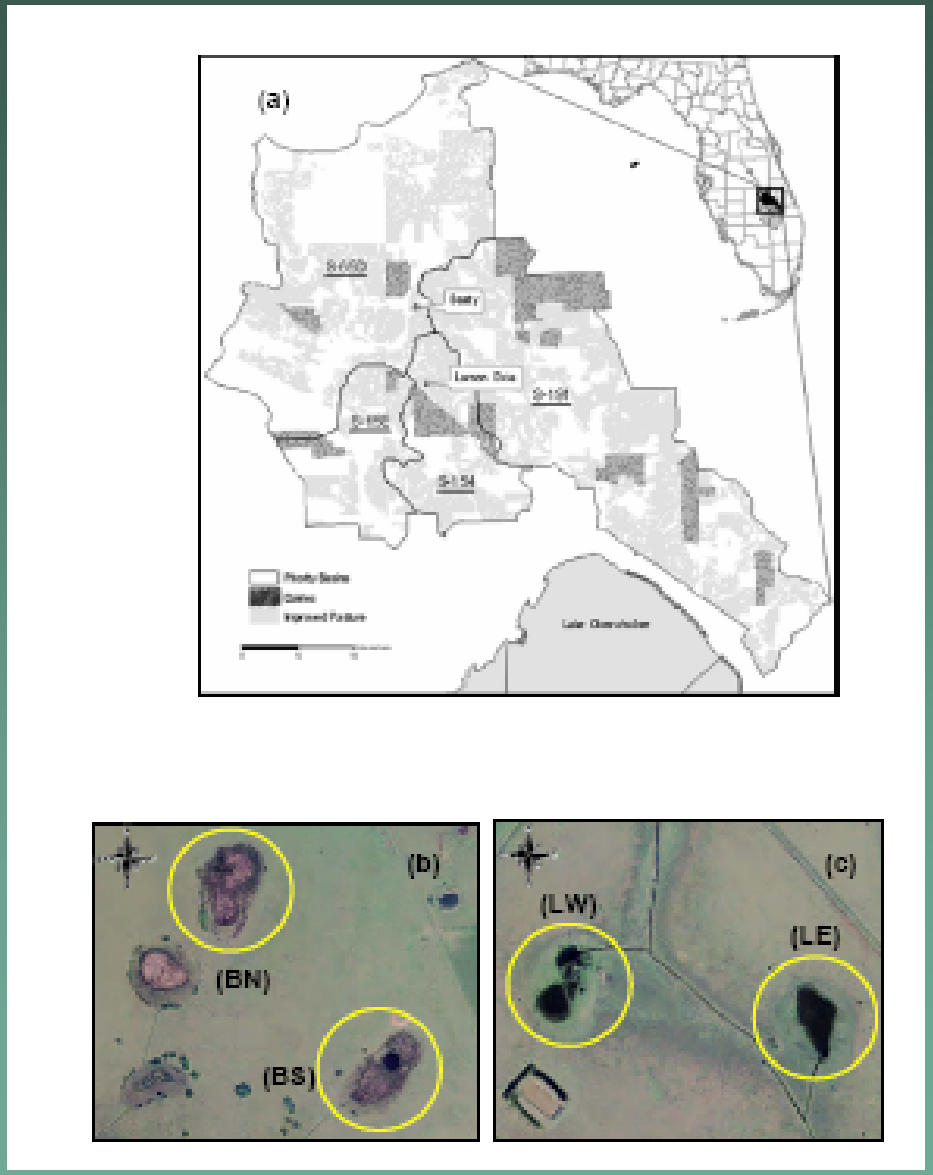
Also more SRP in the improved pasture runoff, ~70% vs. ~40%


Locally applied fertilizer
S5
770
Lykes
0-3
3-6
6-9
9-12
12-15
15-18
18-21
21-24
DEPTH INTERVAL (CM)
1
1.05
1.1
1.15
1.2
234U/238U ACTIVITY RATIO OF SOIL EXTRACTS

UF-IFAS Isolated Wetland Studies -- Hydrology

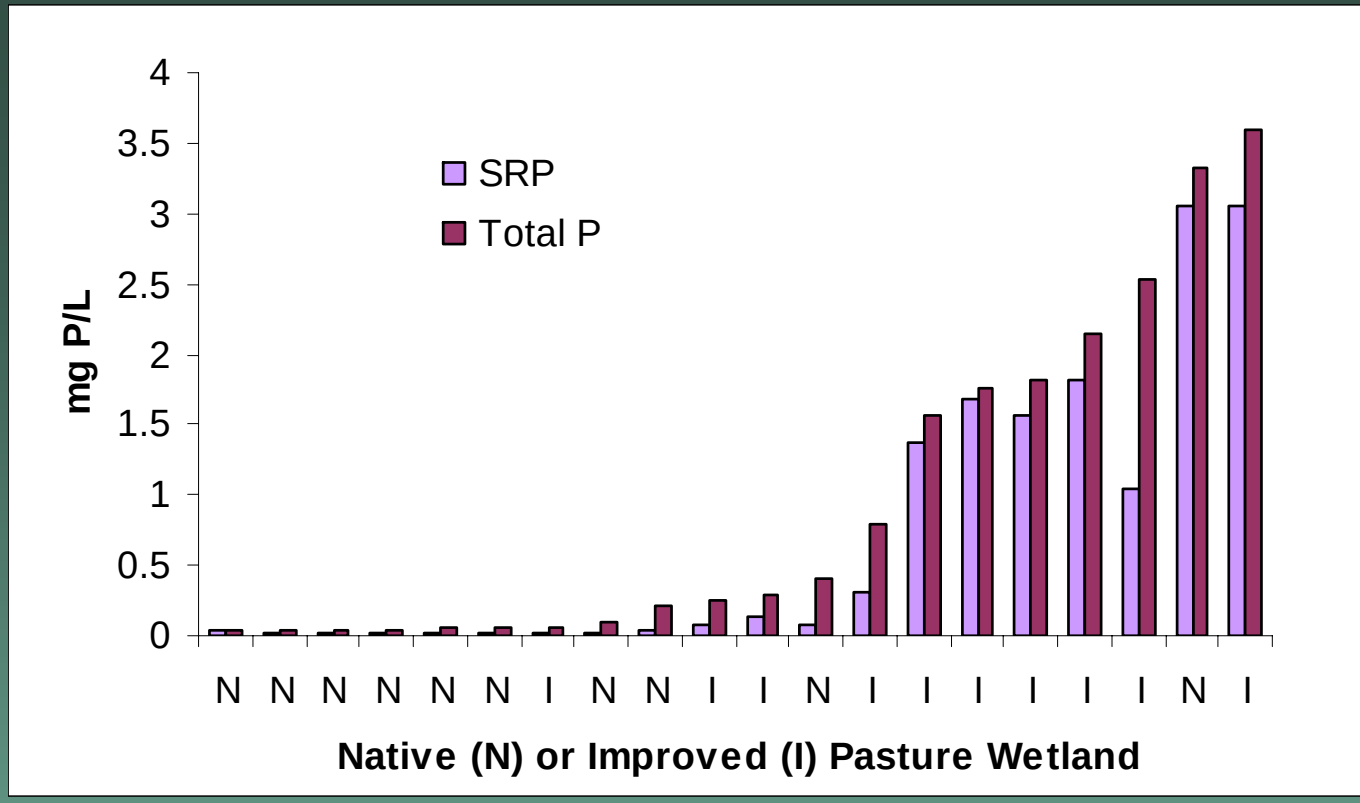






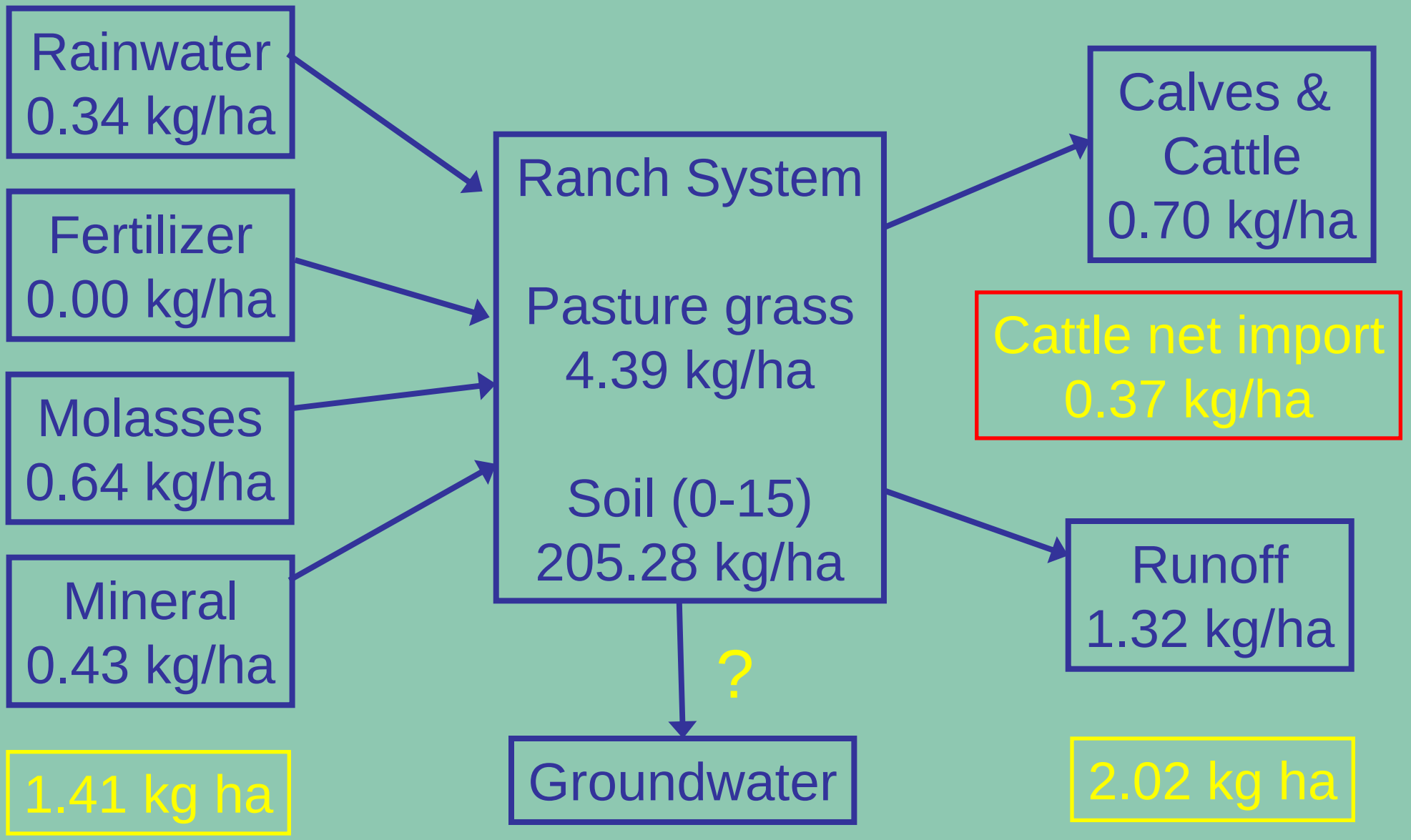
Nutrient Studies

Eutrophication of Pasture Wetlands



Land Use	Sites	Total P	TDP	SRP
Dairy	4	2.52 ± 0.83	1.92 ± 0.8	1.96 ± 0.7
Improved	11	0.29 ± 0.05	0.21 ± 0.04	0.16 ± 0.03
Unimproved	1	0.04 ± 0.00	0.027 ± 0.003	0.016 ± 0.004

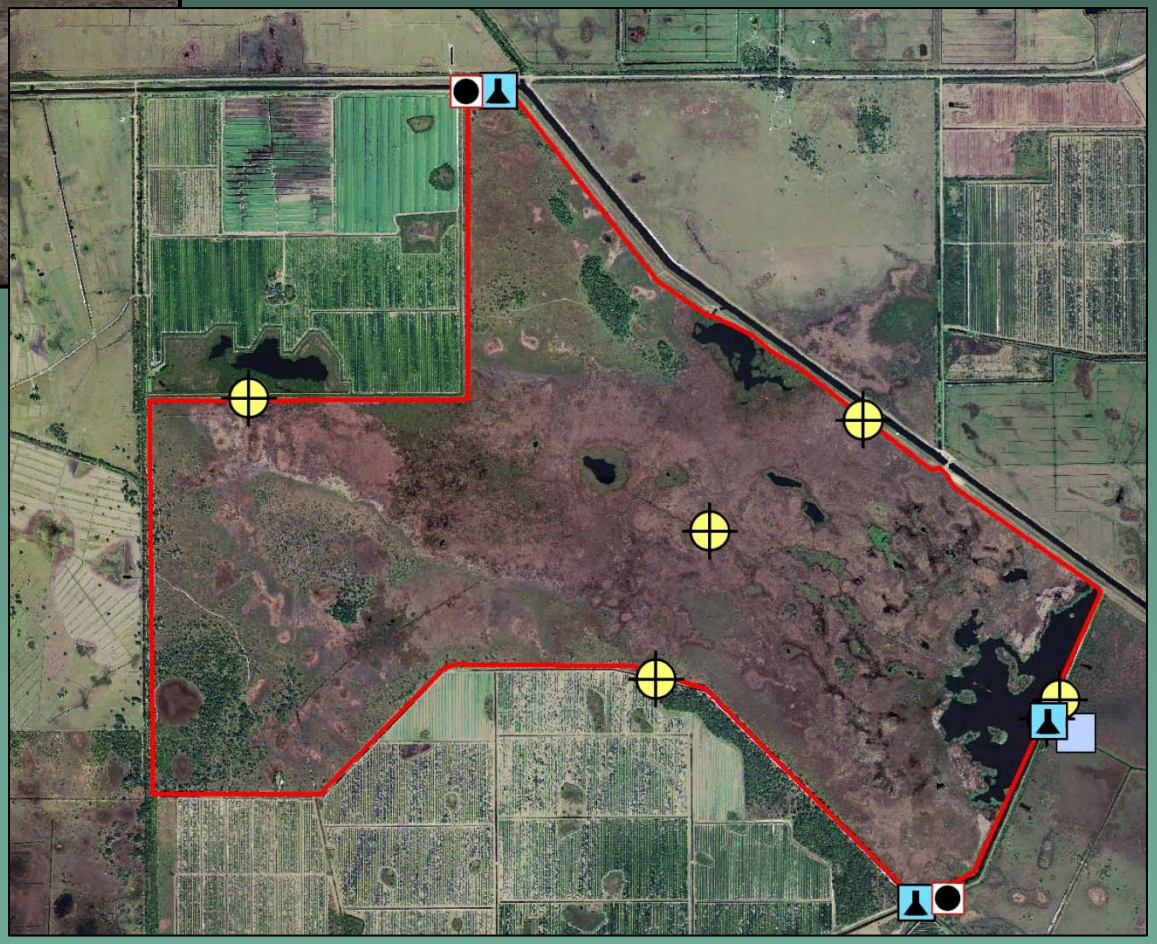
Phosphorus Management and Balance



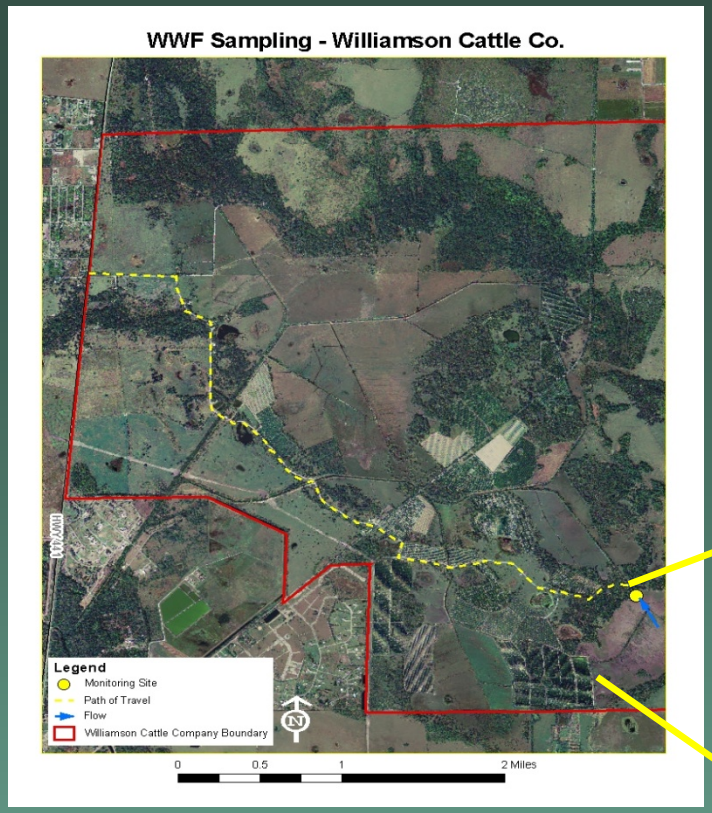
Ranchlands and Everglades Restoration

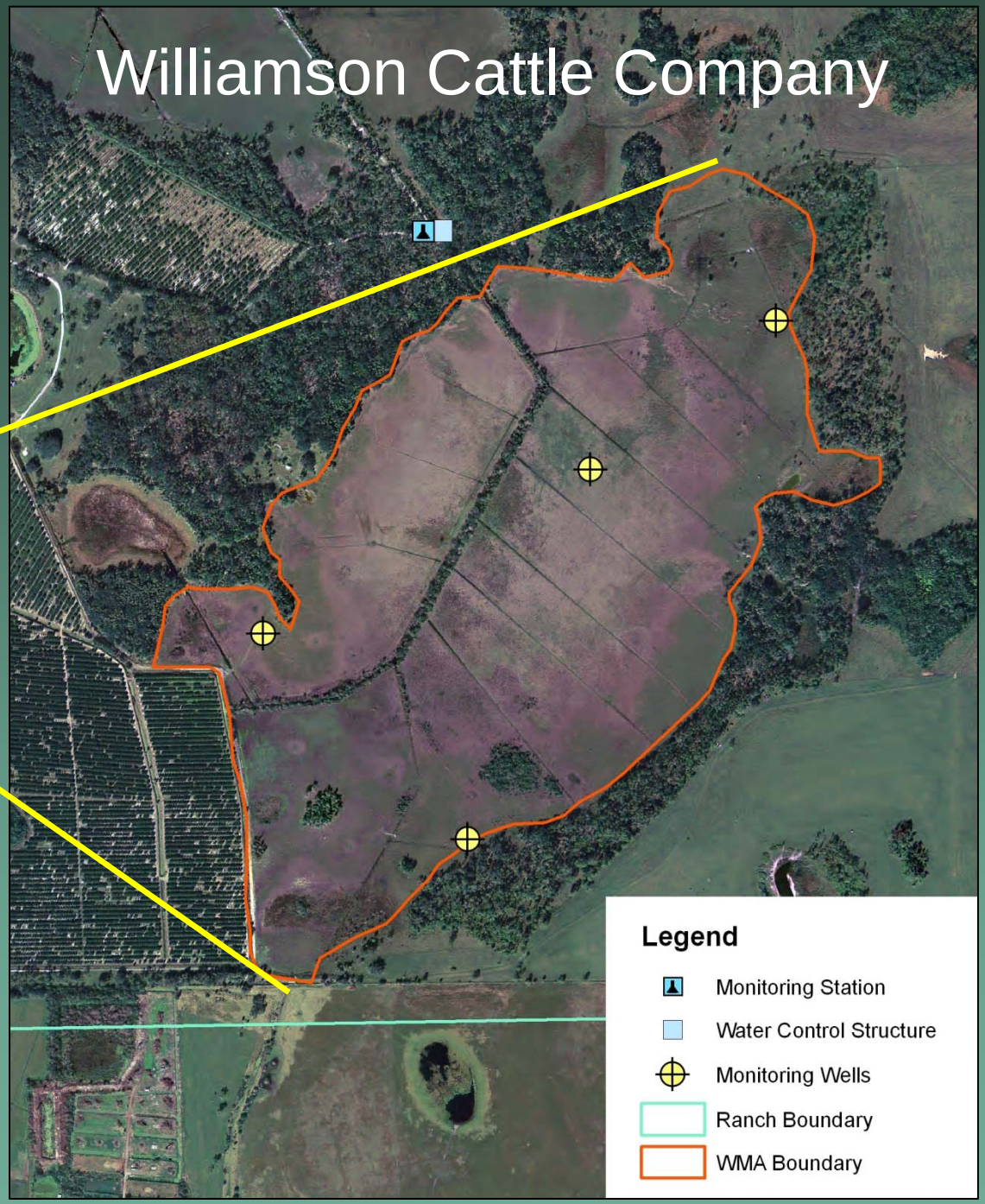
- Potential for water storage
  - ~900,000- 1.3 mil acre feet of storage needed
  - Ranches have infrastructure for managing water
    - Wetland restoration
    - Pasture water management
    - Pumping systems
- Nutrient load reduction
  - BMPs
  - Private STAs and water-related services

Treating regional water on private land



Lykes Bros. West Waterhole Marsh

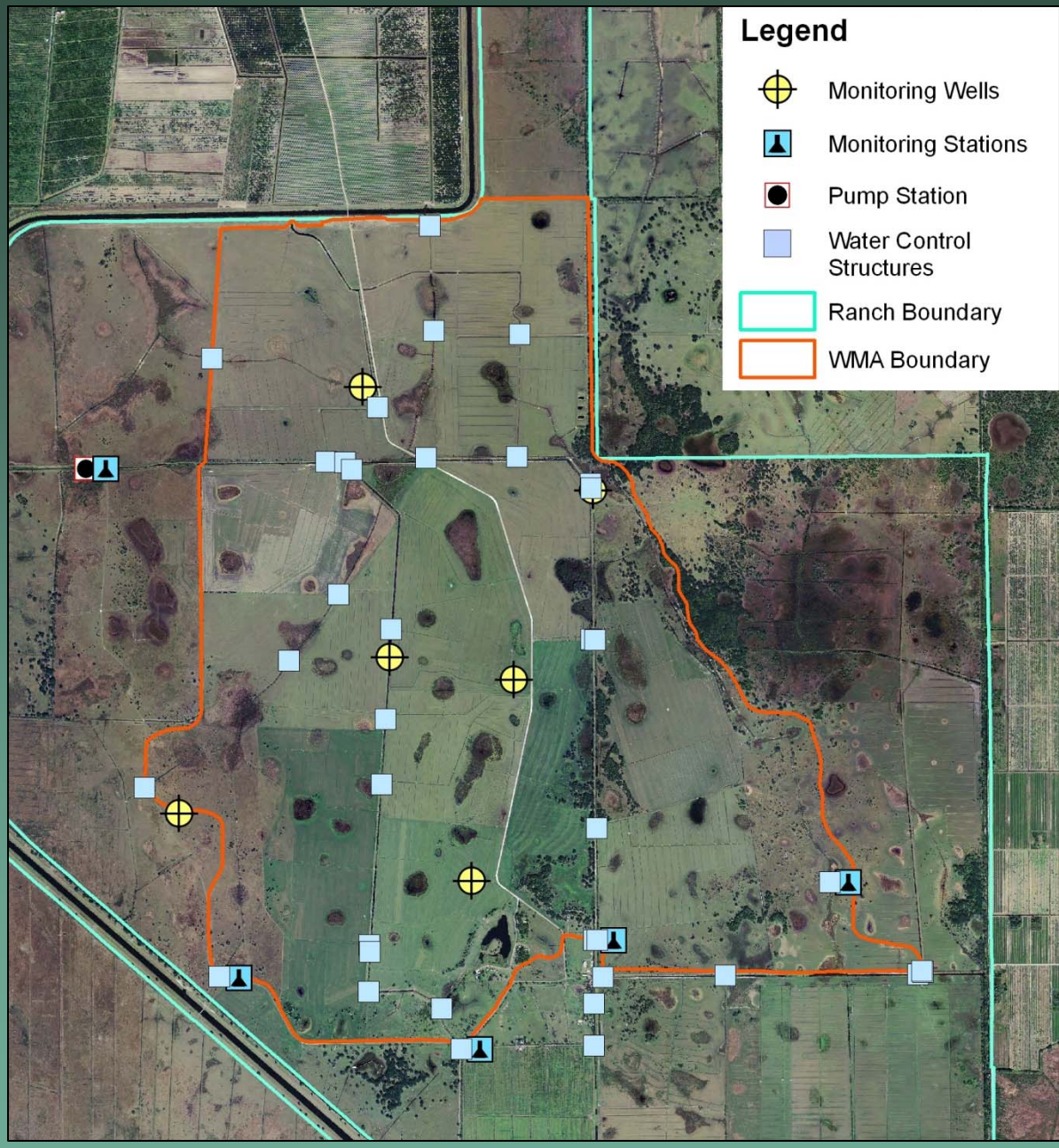




Restoring Drained Wetlands

Pasture Water Retention

Buck Island Ranch



Conclusions

Ranches can contribute to everglades restoration by:

- Maintaining a low-intensity land use on the landscape
  - Low nutrient runoff relative to other land uses
  - Native biodiversity and wildlife habitat
- Providing water-related environmental services
  - Water storage projects
  - Private storm treatment areas

But, ranches have low margins, high opportunity costs

- Pressure to intensify—counterproductive for restoration
- Need proper incentives
  - Cost share BMPs, conservation easements, environmental service payments

Thanks to all of our supporters and partners:

- South Florida Water Management District
- Florida Department of Agriculture and Consumer Services
- Florida Department of Environmental Protection
- USDA NRCS, CSREES
- World Wildlife Fund
- Florida Cattlemen’s Association