Trade-offs in Wetland Ecosystem Services in Working Landscapes

Identification, spatial scale, and management implications

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Grant #

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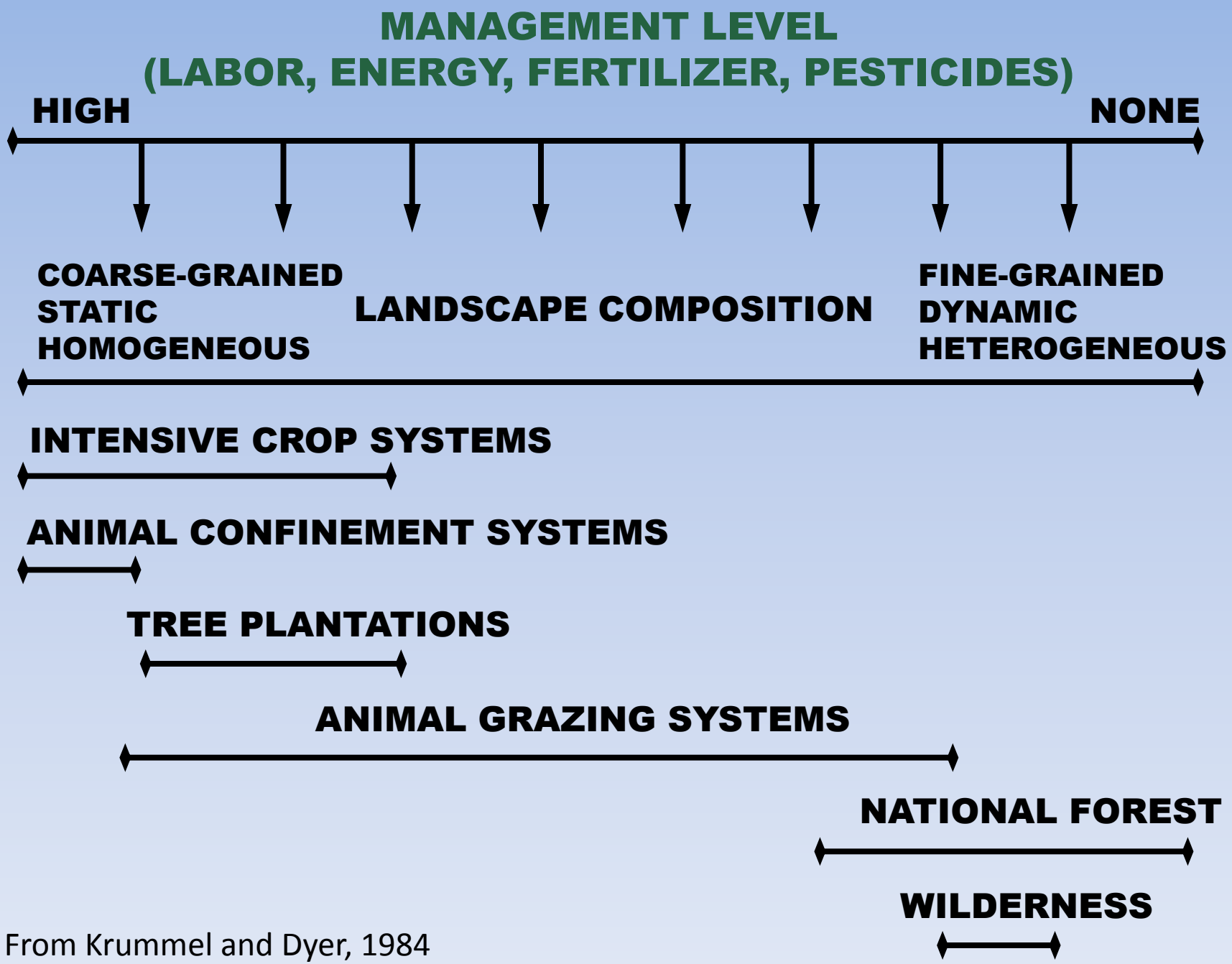
Wetland Ecosystem Services in Working Landscapes

Part I

- Wetlands in working landscapes
- Trade-offs in ecosystem services
- Introduction of session speakers

Part II

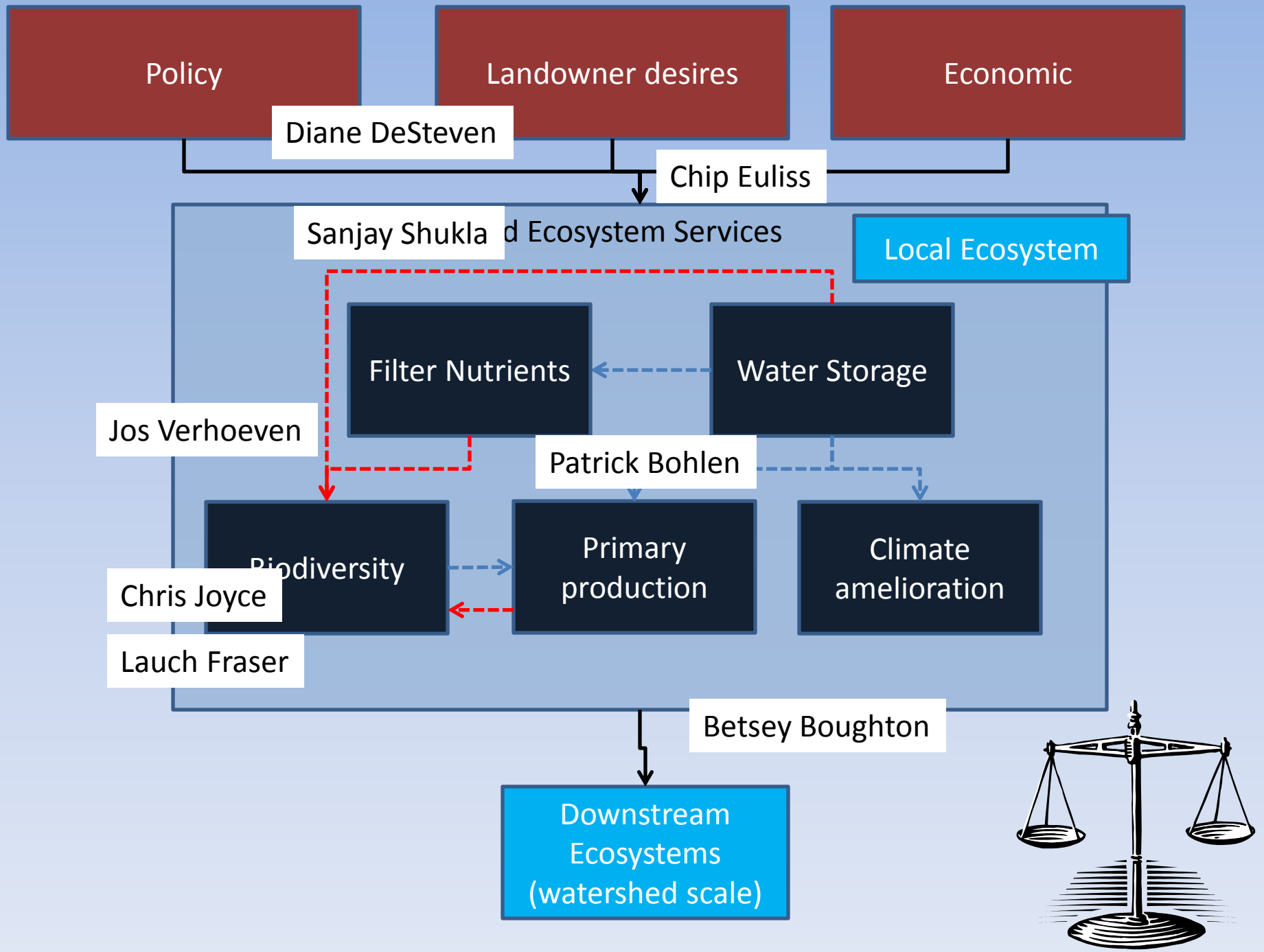
- Spatial trade-offs
- Key future directions



From Krummel and Dyer, 1984

Wetland ES in working landscapes

Wetland Ecosystem Service	Wetland Ecosystem Function	Service Classification	Scale of influence/benefit
Irrigation	Water storage	Provisioning	Local


Policy
Landowner desires
Economic
Diane DeSteven
Chip Euliss
Sanjay Shukla
d Ecosystem Services
Local Ecosystem
Filter Nutrients
Water Storage
Jos Verhoeven
Patrick Bohlen
Biodiversity
Primary production
Climate amelioration
Chris Joyce
Lauch Fraser
Betsey Boughton
Downstream Ecosystems (watershed scale)

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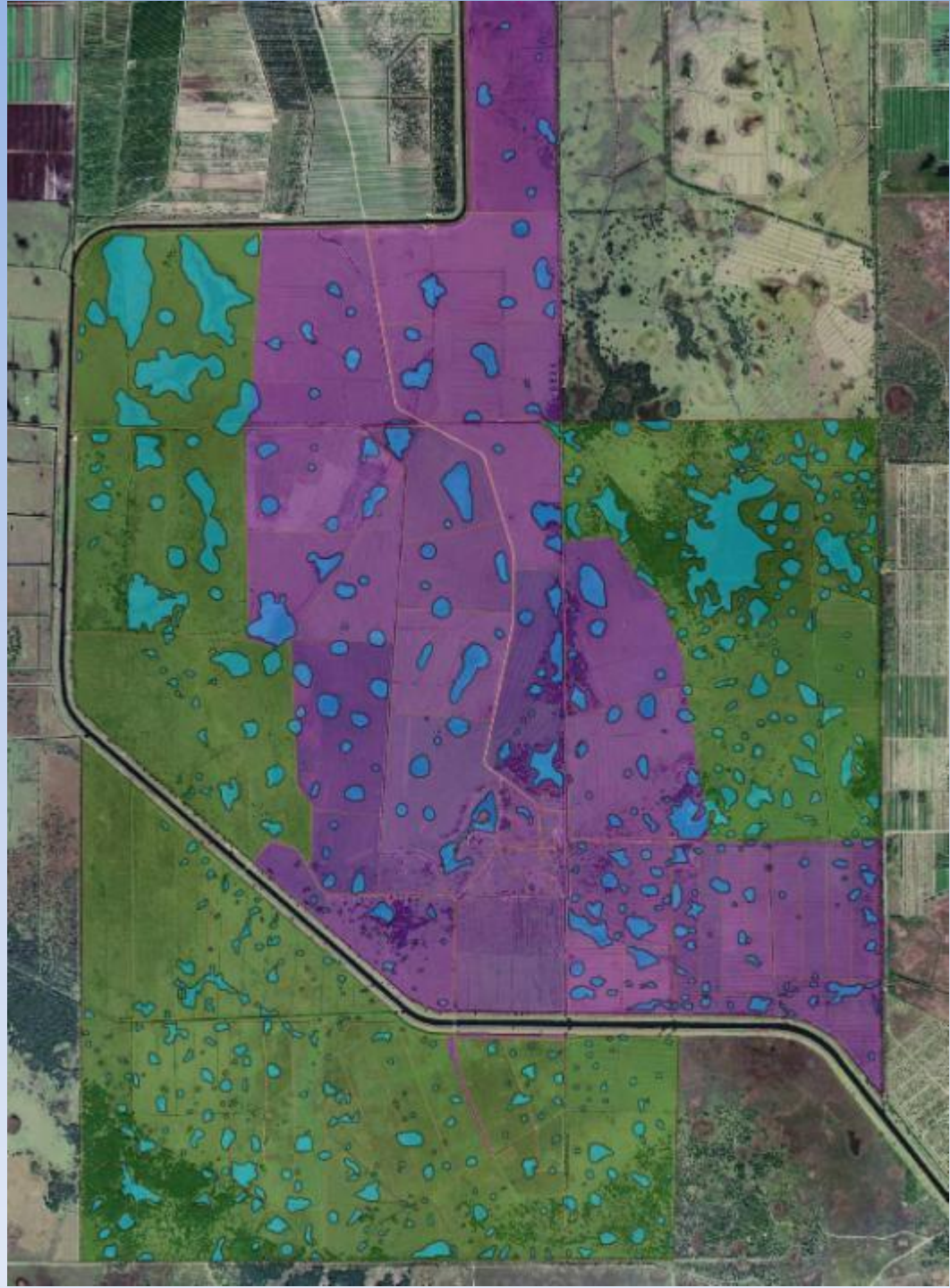
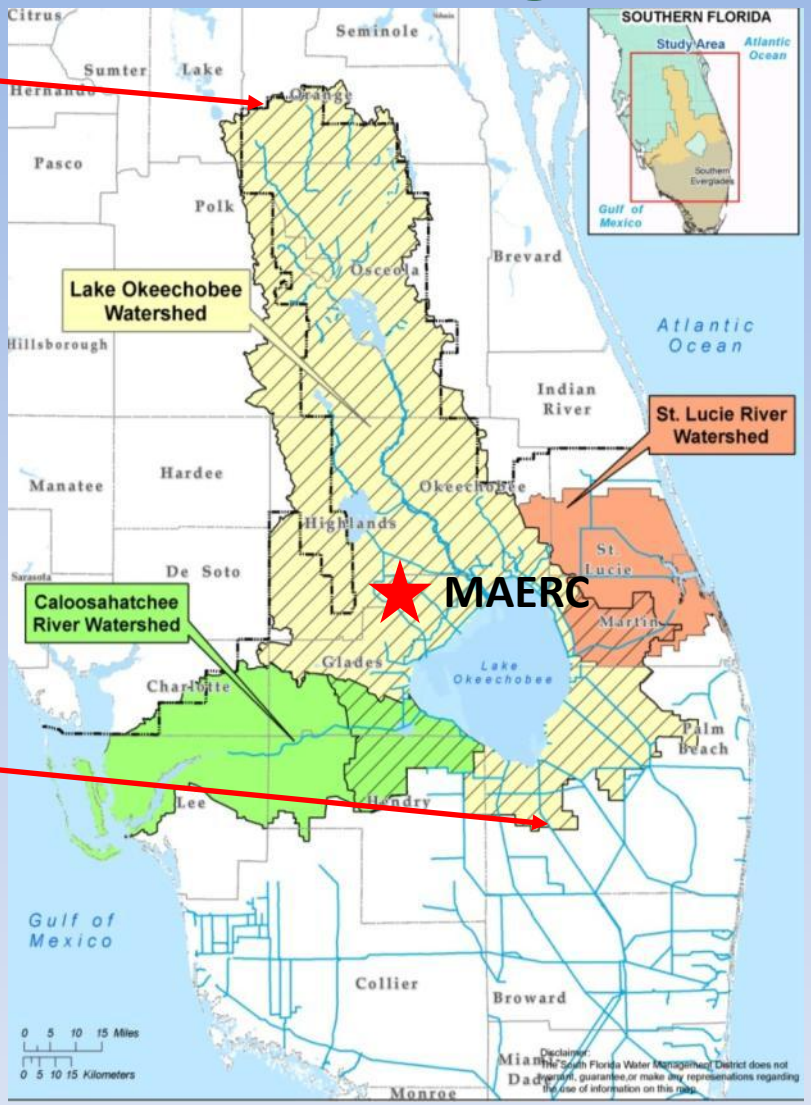
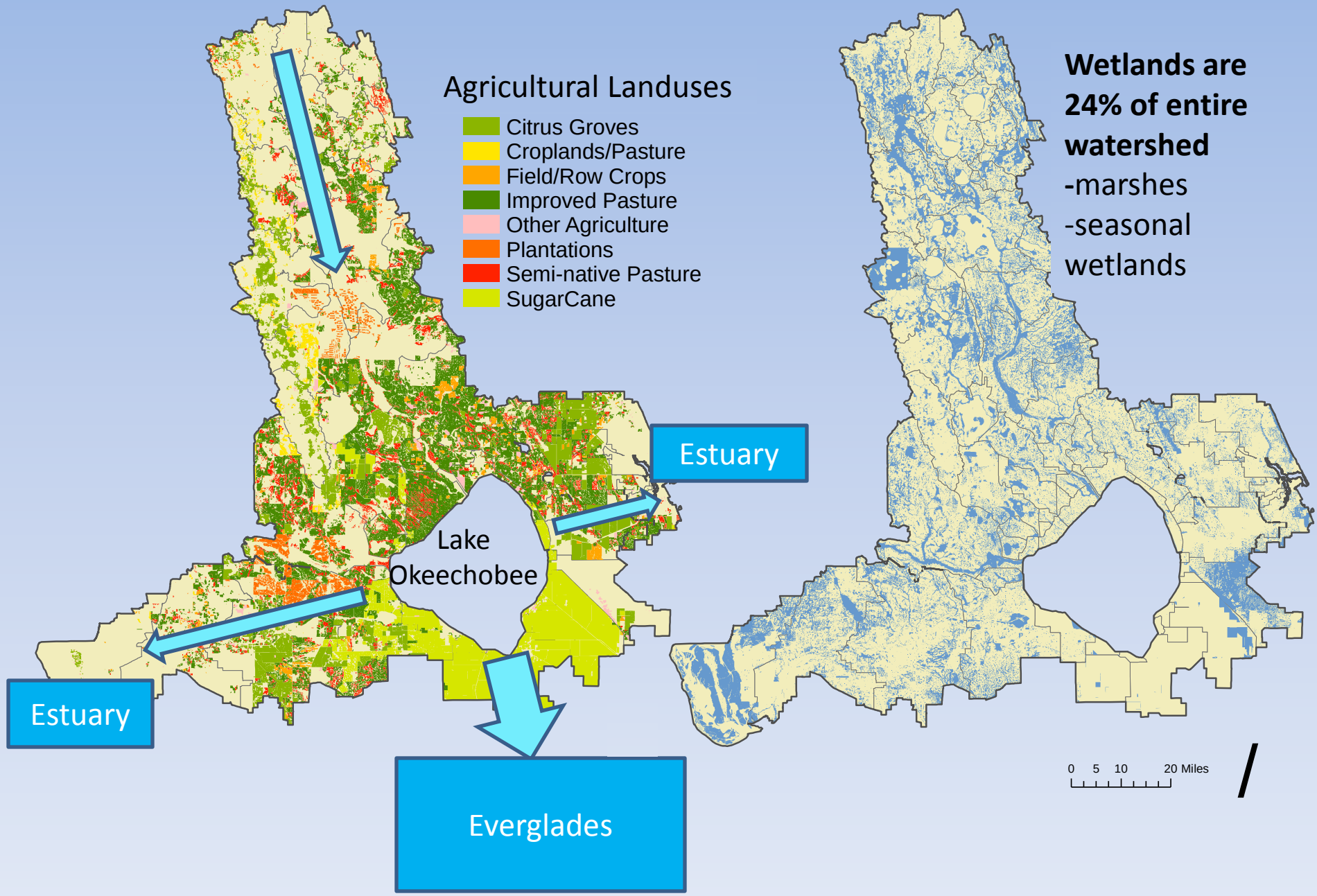
- Cow calf 3,000 head
- 10,500 acres
- ~5,500 improved
- ~4,500 semi-native
- Bahia sod
- Hunt lease



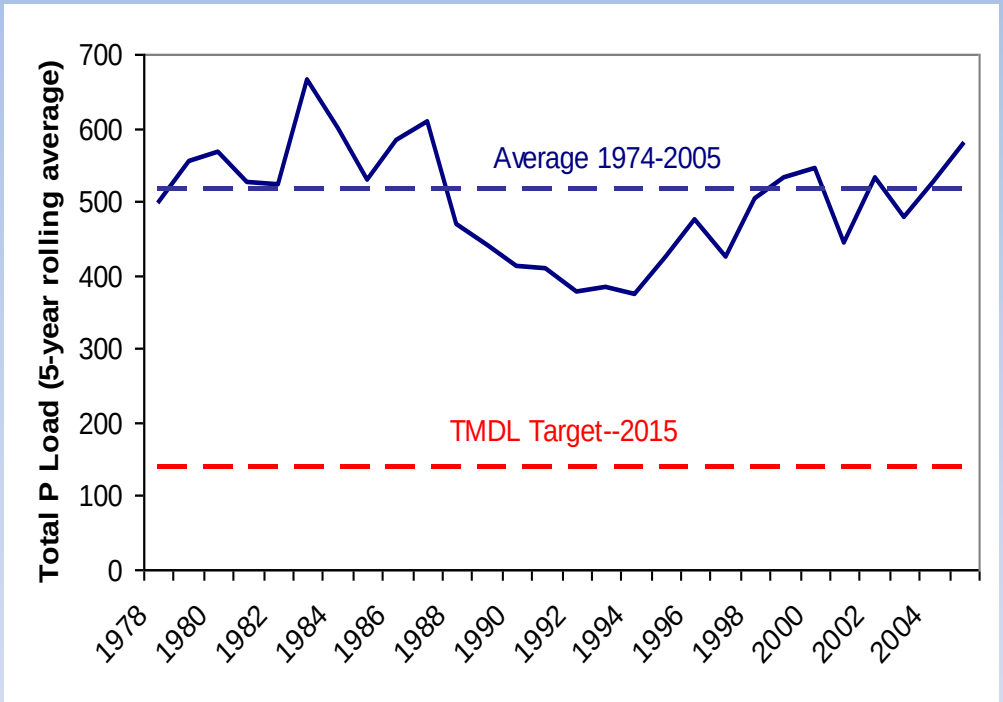
Northern Everglades



Land Use and Wetlands in the Northern Everglades



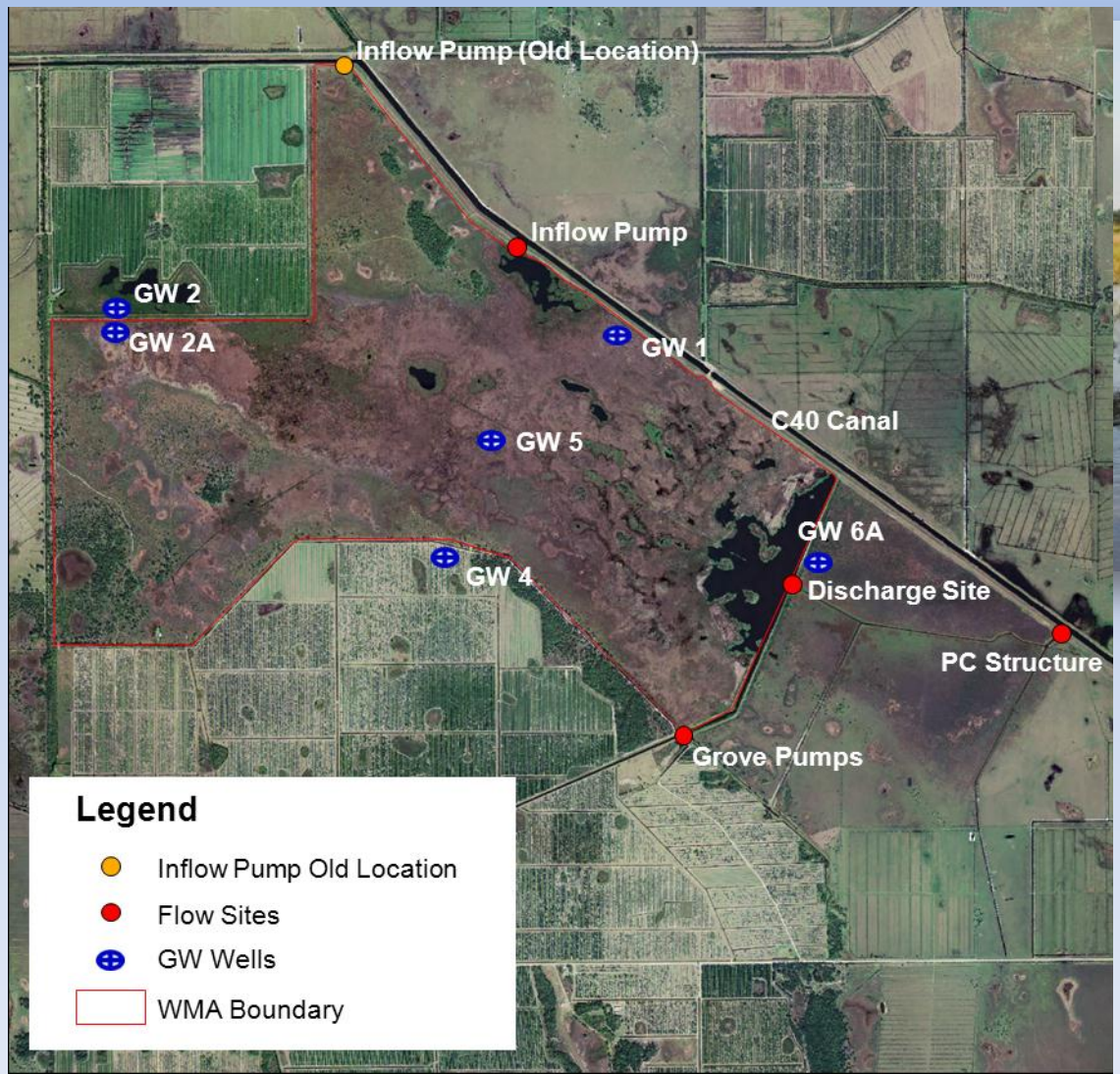
Regional Downstream Ecosystem: Lake Okeechobee



- Receives 558 metric tons of P/year
- 140 MT/year is target (meet by 2015)
- 51,000 MT of P in sediment

What happens to local ecosystems when we manage primarily for regional downstream ecosystem benefits?

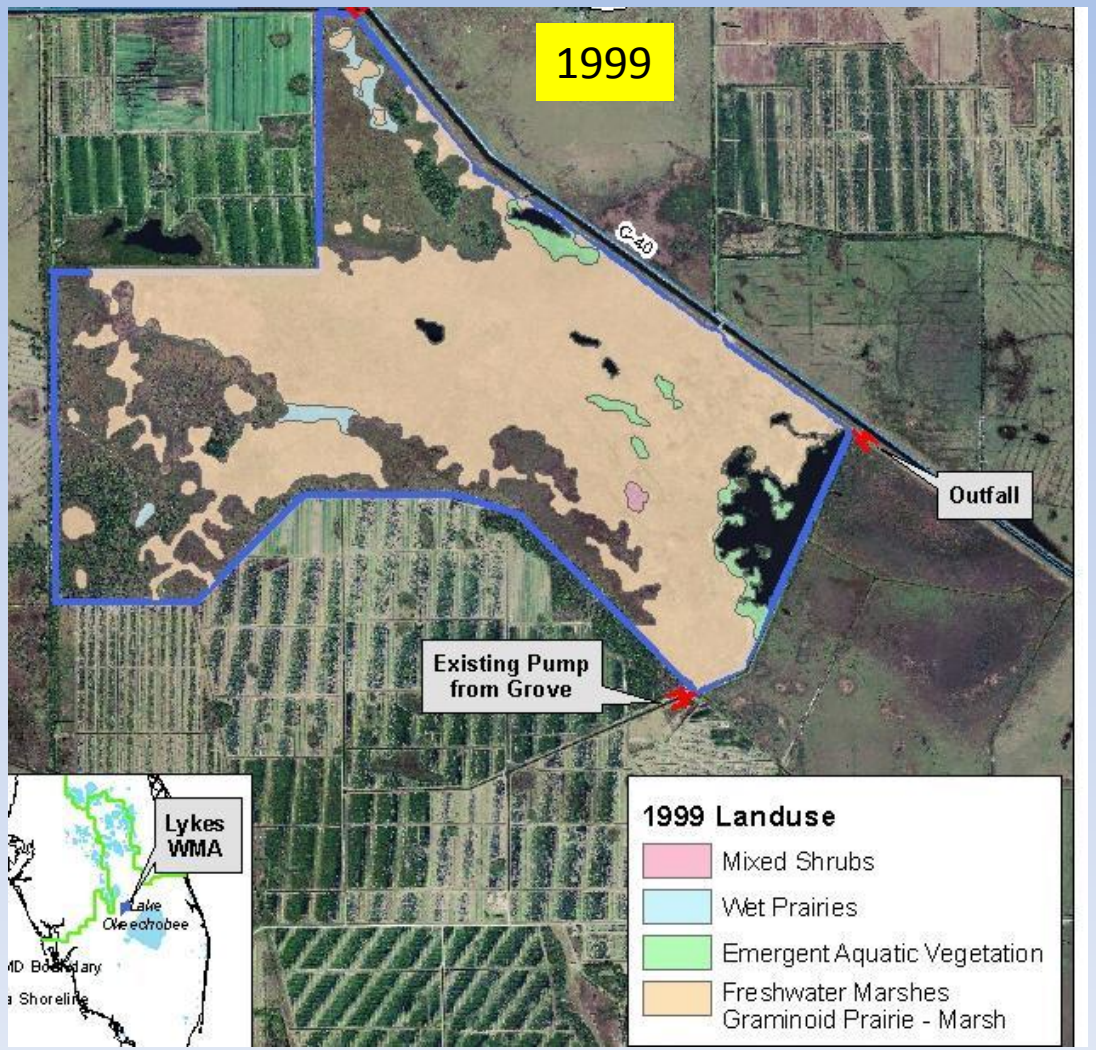
Local Ecosystem Managed for Regional Watershed: Lykes West Waterhole Marsh

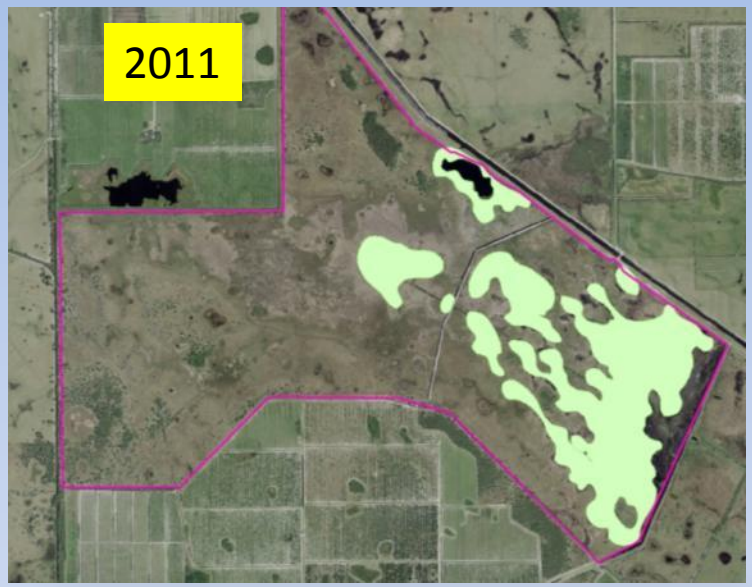


Lykes West Waterhole Marsh – Results 2008-2011

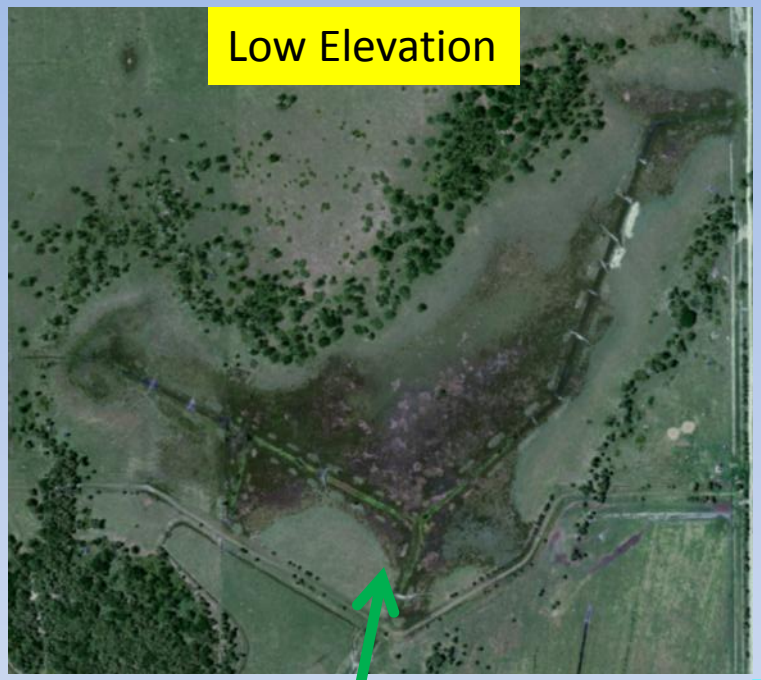
	2008	2010	2011
Retention (%)	60	94	92
Metric Tons of P	4	8.3	1.3

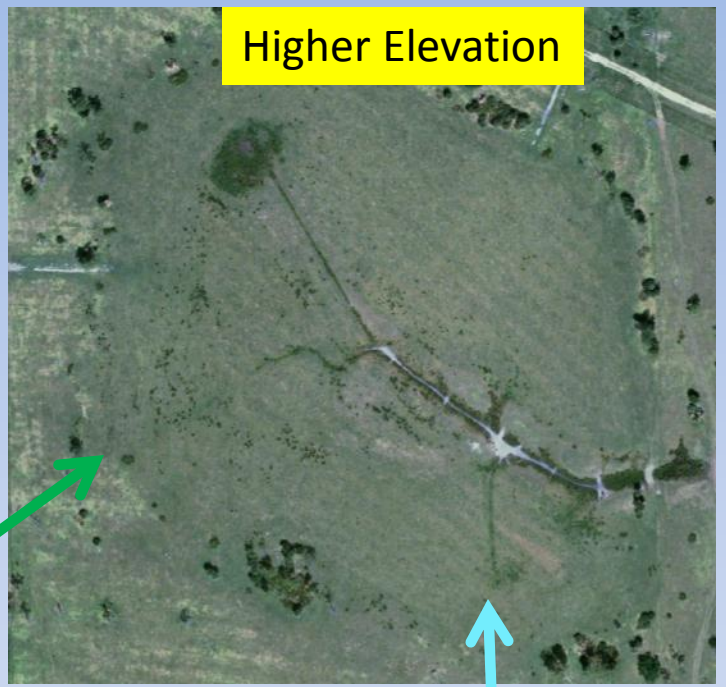
P reduction to regional watershed but expanding cattail on-site

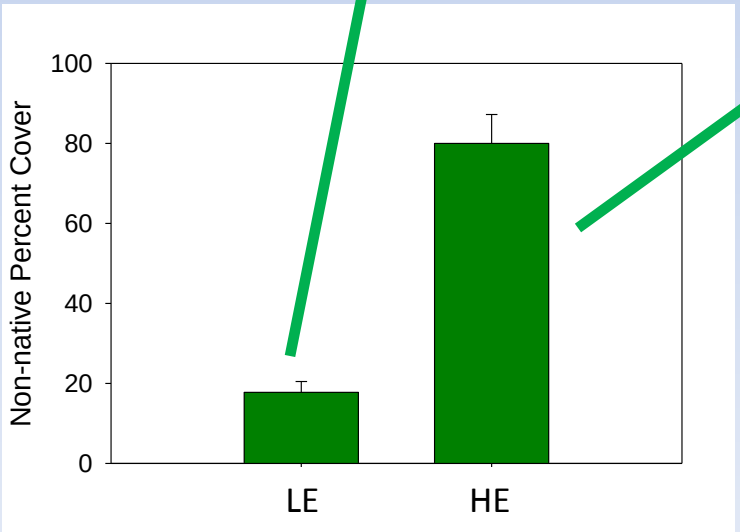


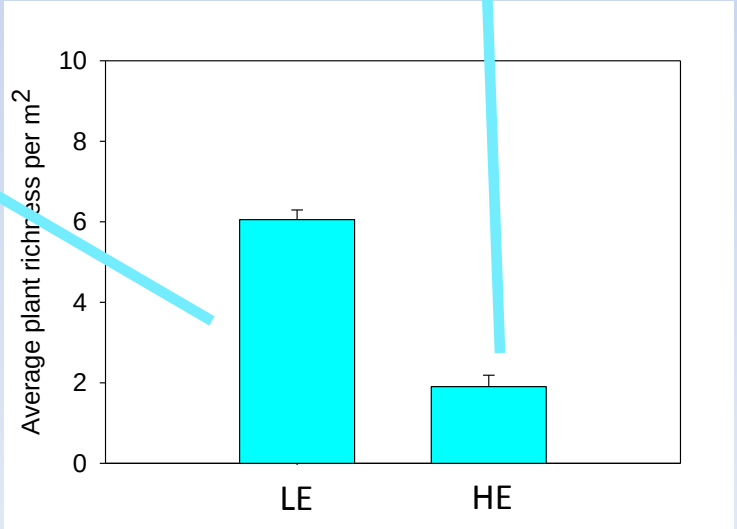


High storage value , low biodiversity value?









Policy

Landowner desires

Economic

Wetland Ecosystem Services

Local Ecosystem

Filter Nutrients

Water Storage

Biodiversity

Primary production

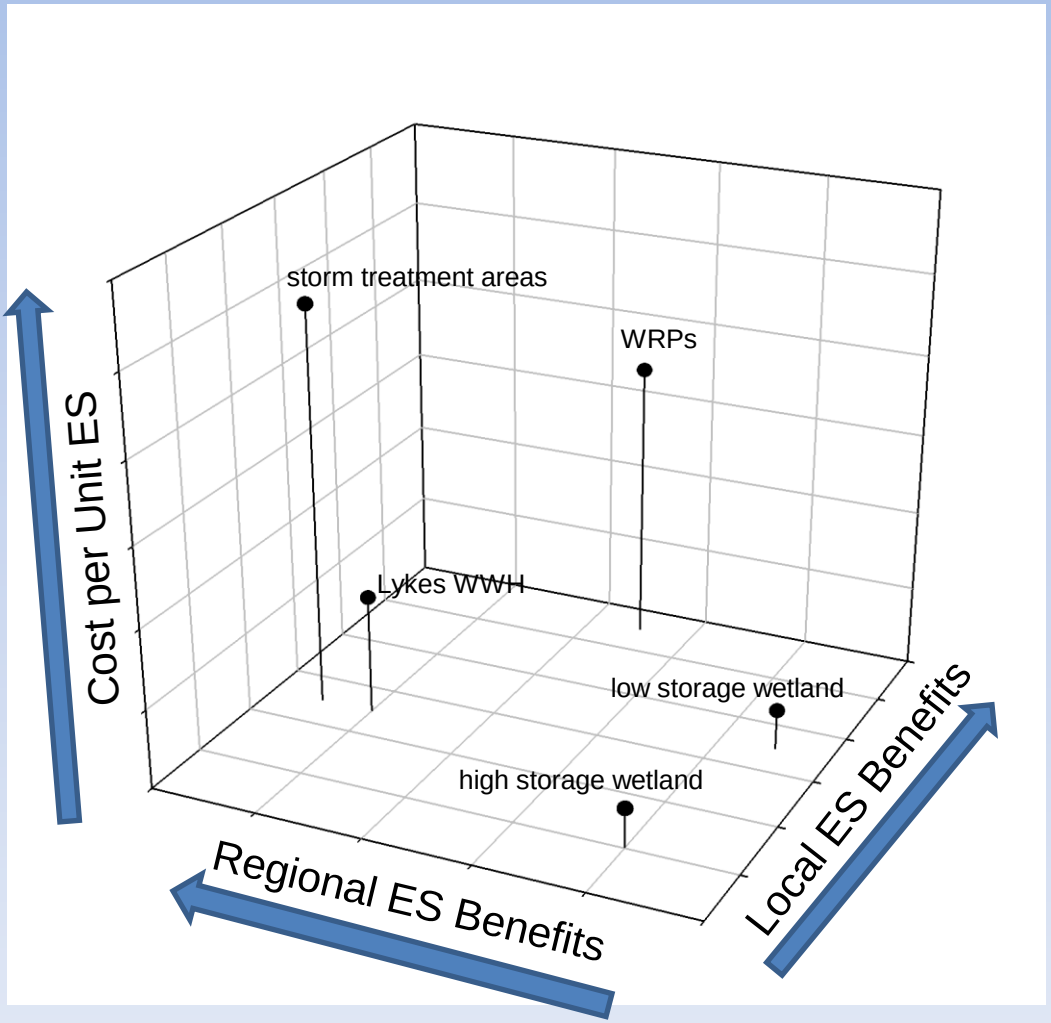
Climate amelioration

Downstream Ecosystems

Many programs available for landowners to establish wetland functions and services

- Wetland Reserve Program
- Conservation Reserve Program
- Conservation Reserve Enhancement Program
- Environmental Quality Incentives Program
- Wildlife Habitat Incentives Program
- Payment for Environmental Services

Conceptual Model of Trade-offs in Ecosystem Services in relation to on-site, off-site and cost



Future Directions

- How do we identify trade-offs and make management decisions?
  - Tabulation
  - Wetland ecosystem modeling
  - Decision support tools
  - Landscape bundling (too coarse grained?)
- Valuation of ES – is it possible?
- Cumulative effects of programs (local/regional)
- Spatial trade-offs (whether the effects of the trade-off are felt locally or at a distant location)
- Temporal trade-offs (whether effects take place rapidly or slowly)
- Reversibility (the likelihood that the perturbed ES may return to its original state if perturbation ceases)

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Participating Florida Ranchers

NRCS Natural Resources Conservation Service

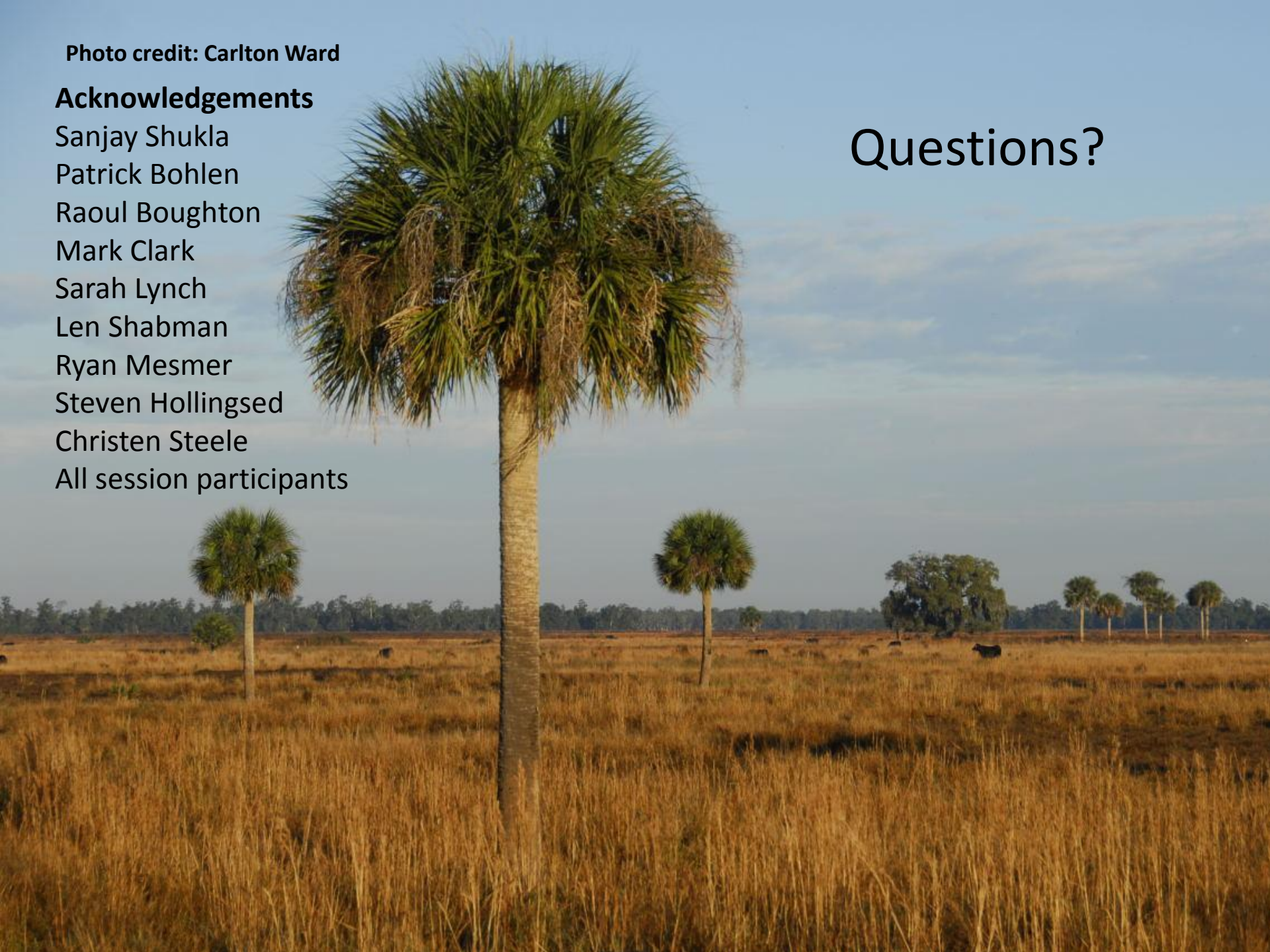

Photo credit: Carlton Ward

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Questions?