REstoration, COordination, VERification (RECOVER)

2023 Integrated Delivery Schedule

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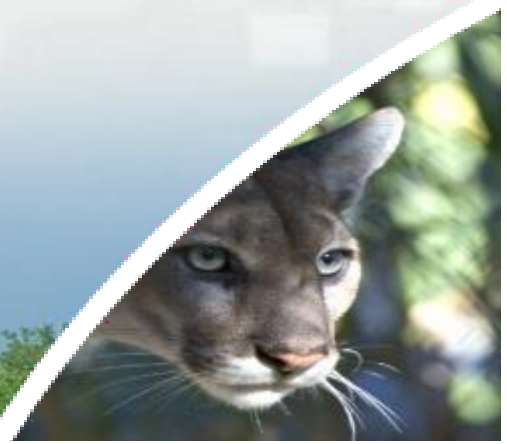
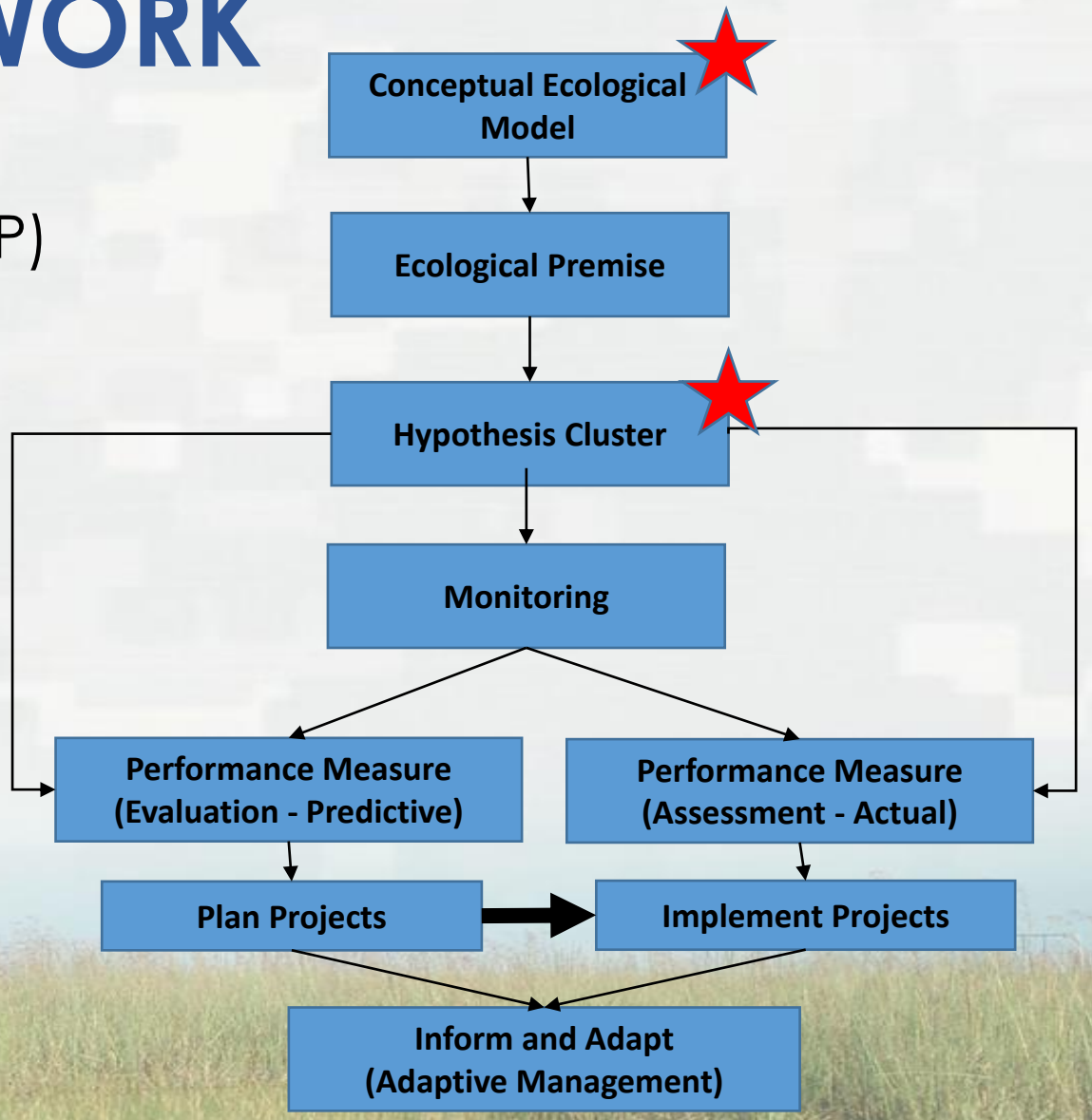


Integrated Delivery Schedule Workshop
September 6, 2023

CERP'S SCIENCE FRAMEWORK

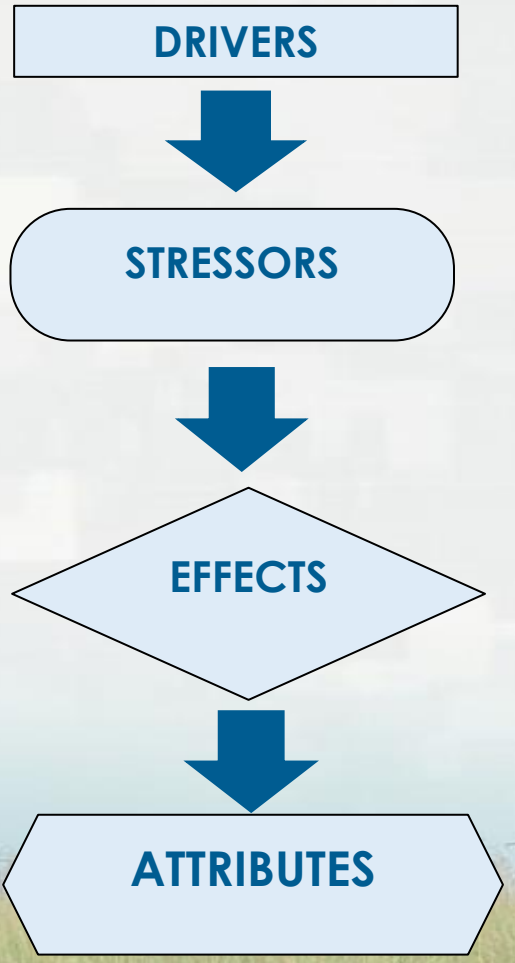
- The Science Behind CERP
- The Monitoring and Assessment Plan (MAP)
  - Organized around Conceptual Ecological Models (CEMs)
  - Hypothesis Clusters
  - Indicator Species
  - Performance Measures
- Adaptive Management
  - Feedback Loop
  - Action



CONCEPTUAL ECOLOGICAL MODELS

- Non-quantitative planning tools
- Identify
  - Major anthropogenic drivers and stressors
  - Ecological effects
  - Biological attributes or indicators
- Primary communication, planning, and assessment link among scientists and policy makers
- Show how the natural system has been altered by human stressors
- Provide information to focus CERP efforts

CONCEPTUAL ECOLOGICAL MODELS



Drivers represent any type of physical or biological force that can significantly influence a natural system.

Stressors are physical, chemical, and biological mechanisms that cause change(s) in the ecosystem. Stressors are the particular effects of Drivers in the ecosystem.

Ecological effects are physical, chemical, and biological responses that are intrinsic to the ecological system and are triggered by stressors. Ecological effects can be dynamic processes, and can be positive, negative, or neutral.

Attributes are a parsimonious subset of ecosystem components that are thought to be representative of overall ecological conditions of the system.

CONCEPTUAL ECOLOGICAL MODELS

…S, Vol. 25, No. 4, December 2005, pp. 843–853
…S, The Society of Wetland Scientists

BIG CYPRESS REGIONAL ECOSYSTEM CONCEPTUAL ECOLOGICAL MODEL

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Abstract: The Big Cypress region of southwest Florida is a diverse mosaic of upland pine flatwoods and hardwood hammocks, herbaceous wet prairies and marshes, and forested wetlands. Besides large natural landscapes, it includes extensive areas of residential and agricultural development. Dominant natural controlling factors are hydrology on the low relief land surface and fire in a subtropical environment with a strong wet-dry seasonal cycle of rainfall. Human influences on the Big Cypress ecosystem are all associated with extensive residential and agricultural development. Lowered water levels and shortened hydroperiods cause shifts to drier communities, which leads to habitat loss and more intense fires. Higher nutrient concentrations associated with agriculture and more mineralized ground-water inputs from a variety of sources favor nuisance and exotic plant species. Fragmentation of the plant community mosaic interferes with seasonal expansion and contraction of wetland water bodies and associated seasonal movements of animal populations. Fragmentation also interferes with wildlife movements and the natural spread of fire across the landscape. Disturbed environments along edges created by fragmentation facilitate invasion of natural plant and animal communities by exotic species. Efforts to eradicate fire have eliminated large areas of early successional communities, while creating high fuel loads that ultimately result in very destructive fires. The spread of exotic plants is resulting in the replacement of large areas of native plant communities, but the effects of exotic animal invasions on native animal populations are poorly known. The objective of this paper is to present a conceptual model of the major human influences on the Big Cypress region, and how they affect natural processes and selected components of the ecosystem.

Key Words: Big Cypress, hydrology, fire, landscape fragmentation, wildlife, southwest Florida plant communities, exotic plants, exotic animals, nutrients, agricultural development, residential development, pesticides, organic soils

BACKGROUND

The Big Cypress region covered by this conceptual ecological model includes the freshwater portions of the area extending from the southern edge of the Caloosahatchee River watershed boundary in Lee, Hendry, and northern Collier Counties, and west of the Everglades, as delimited approximately by the eastern and southern boundary of Big Cypress National Preserve (Figure 1). In this region, historic water flows were primarily south to the Gulf of Mexico, with minor flows in small creeks that pass through the west coast ridge to the Gulf (Klein et al. 1970). I define the water table throughout Big Cypress as being at the top of the surficial aquifer, which is above ground over much of the area during wet season and below ground over most of these same areas during dry season.

The Big Cypress region has three distinct subregions based on the kind and degree of development present in each (Lehman 1976). The least disturbed area, where hydrology is largely rainfall-driven, is located within Big Cypress National Preserve in the southeastern portion of the region (Duever et al. 1986). The most developed portion of the area, including both urban and agricultural development, is located on and just east of the coastal ridge from Naples north to Fort Myers. The rest of the area is a mixture of agricultural lands, suburban and rural communities, and small-to-large natural areas that have been altered to varying degrees by upstream and/or adjacent development. Despite varying degrees of development in the three subregions, kinds of stressors and their effects on ecosystem attributes are similar throughout the Big Cypress region, and they differ only in severity of their impacts.

The Big Cypress region is comparable to the freshwater Everglades in natural community diversity, although Big Cypress communities are primarily forested and tend to form more of a mosaic, as opposed to vast expanses of a number of primarily herbaceous community types. The most extensive natural communities in Big Cypress are distributed throughout the region along very gentle topographic gradients from short-hydroperiod pinelands on uplands through marshes to long-hydroperiod cypress forests on lower elevations (Davis 1943, Klein et al. 1970, Craigher

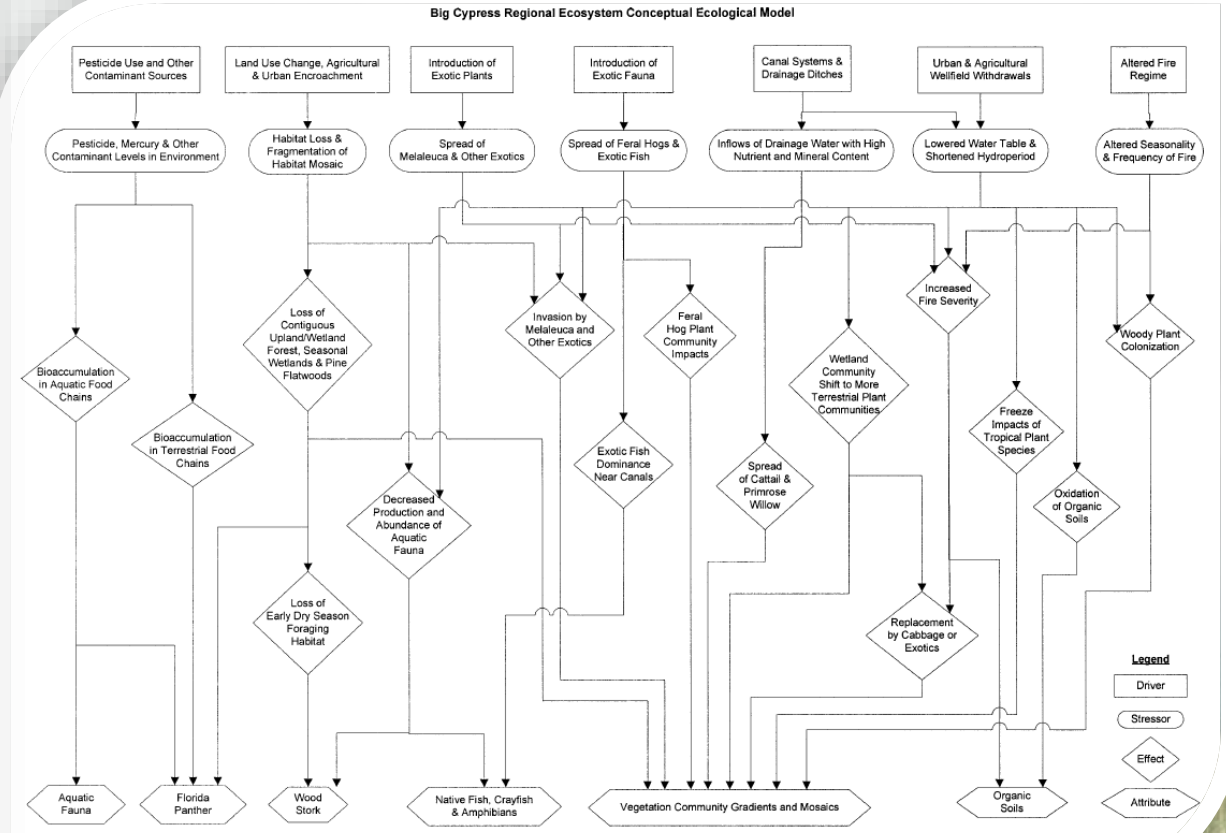

Figure 2. Big Cypress Regional Ecosystem Conceptual Ecological Model Diagram.

HYPOTHESIS CLUSTERS

- Causal relationships among ecosystem components and describe how these relationships are expected to change with restoration
- Set up as CERP expectations
- If we do X, then we expect Y to happen

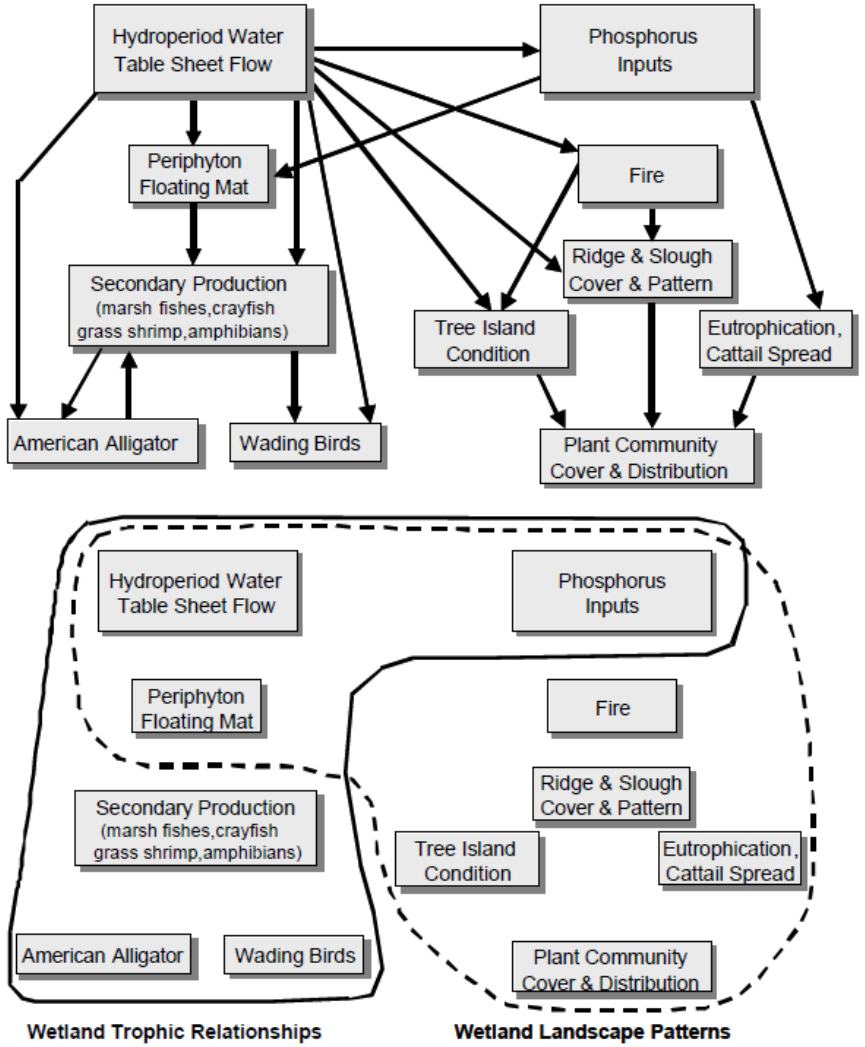

Figure 3-2: Simplified Conceptual Ecological Model to Reflect Expected CERP Influences in Everglades Ridge and Slough

WHY UPDATE CEMs & HCs?

- Much has been learned over past 10-15 years.
- New challenges, issues, and uncertainties have emerged.
- Restoration actions better defined.
- Need to update Monitoring and Assessment Plan and determine priorities for funding.
- Puts basic understanding of the ecosystem into one document.

HOW DID RECOVER UPDATE THE CEMs & HCs?

- RECOVER Regional Coordinators Review
- Incorporate new information
  - Agency Reports
  - Peer-reviewed literature
- Engage with subject matter experts for review
  - Principal Investigators, agency staff
- RECOVER Executive Committee Review/Approval

THANK YOU


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assessment
evaluation
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