

Joint Ecosystem Modeling (JEM): Models and Data Tools for Greater Everglades Restoration

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Joint Ecosystem Modeling (JEM)

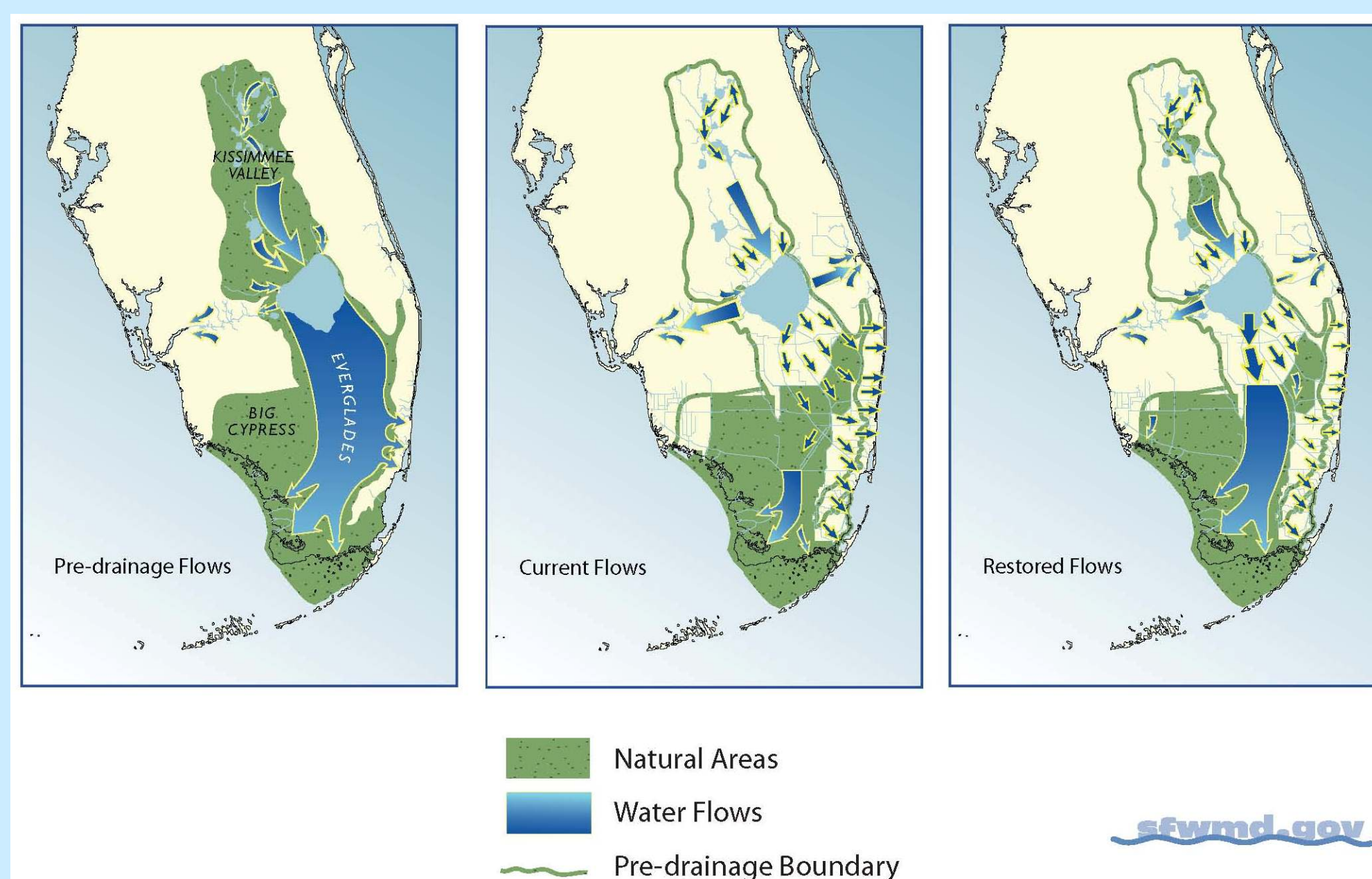
- Mission: “Get Ecological Models into the Hands of Users”
- Established in 2004 as an umbrella group of ecological model practitioners in the Greater Everglades
- JEM is a partnership among federal and state agencies (USGS, USFWS, NPS, USACE, SFWMD), universities, and other organizations
- Work with users to understand their needs and deliver accordingly
- JEM participants include ecologists, hydrologists, modelers, & computer programmers



Role of JEM

- Conceived in response to a need for ecological models to be accessible in the decision process in a timely manner
- Link ecological models with hydrologic models
- Develop desktop tools to make models, data and outputs accessible, user friendly, and easily understood
- Use interagency collaboration as a mechanism to meet needs

In Florida’s Greater Everglades, predictive models have been developed to examine potential responses of , for example, vegetation and suitable habitat for wildlife, to changes in hydrology as water flows are restored.



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Need for linked models

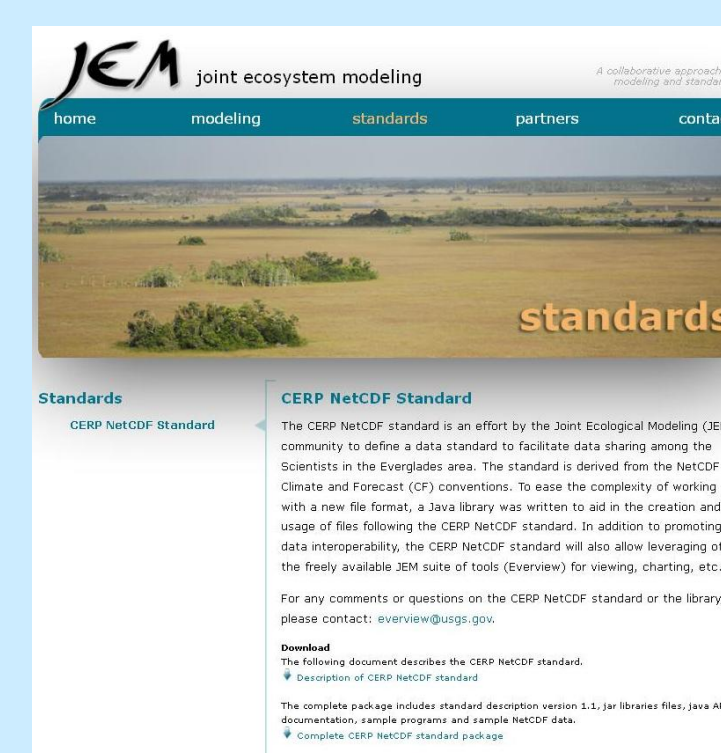
- Integration of ecological, hydrologic and other models allow users to look at ecosystem responses rather than individual parts
- Many models were not developed with integration in mind so in their current form, many cannot ‘talk to’ each other
- Need collaborative framework for streamlined model integration
- Example of existing models that would be informative if they were linked...



- Wading bird habitat model
- Vegetation succession model
- Prey fish biomass model
- Water depth model

Development of standards

- Multi-agency effort to develop NetCDF ‘CERP standard’ (Comprehensive Everglades Restoration Plan)
 - Fixed grid standard
 - Variable mesh standard
- Standard format for sharing data, model inputs & outputs
- Reduces duplication of efforts; allows shared suite of tools to be used for visualization



Open modeling framework

- Exposes code and rules that drive models and tools
- Allows transparency & continual improvement
 - e.g., other users & modelers can add new science, improve
- Changes get documented and put back in open framework for additional users/modelers
- Effective for works in progress (to improve them) not just for finished/published products

Using models in decision making

- Visualization software, EverVIEW, see adjacent poster by Conzelmann (#184) for details



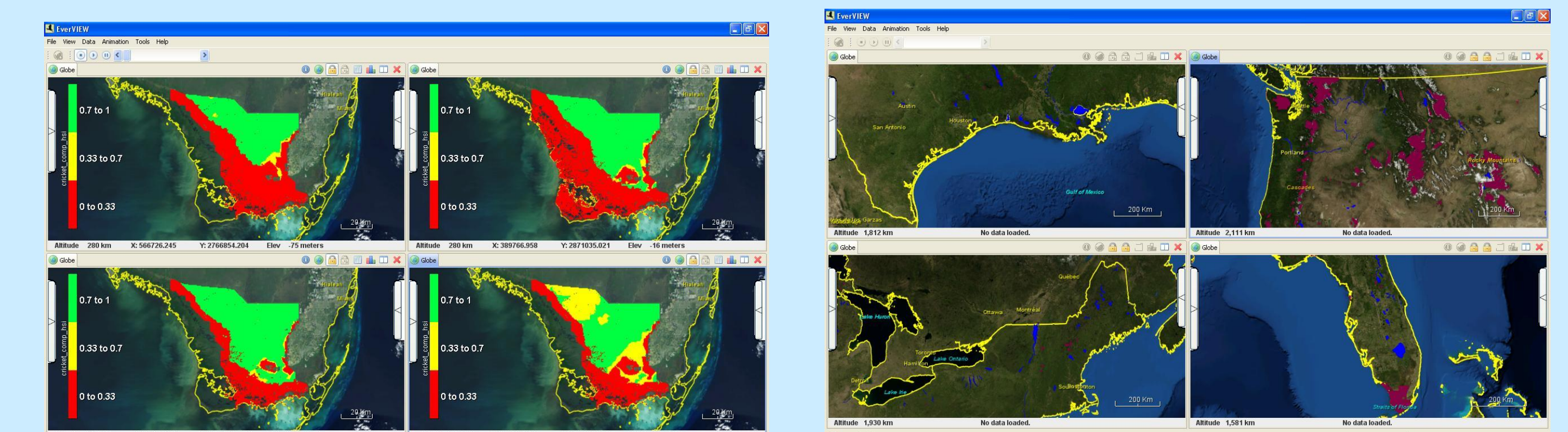
- Models have been prepared for use in the Central Everglades Planning Process (CEPP) to inform decision makers about impacts to the ecology of the regions

- Models selected:

- Amphibian Community Species Richness
- Everglades Landscape Vegetation Succession
- American Alligator Habitat Suitability Index
- Small Sized Freshwater Fish Density
- Wood Stork Model
- Cape Sable Seaside Sparrow Model
- Apple Snail Population Model

- Decision makers can use side-by-side panels to compare maps for up to four:

- Alternative restoration plans
- Species or habitat responses
- Geographic regions

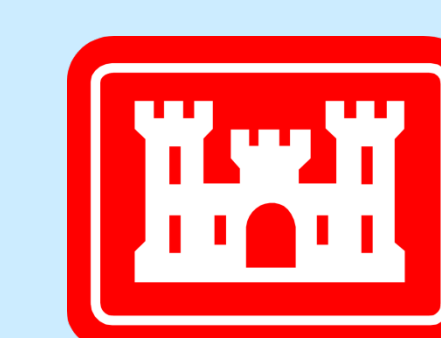


Model output showing habitat suitability scores (with 1, green being best) on May 31 of four years (1994-1998) for one species of amphibian in the Everglades.

Locations of water bodies (blue) and wilderness areas (purple) in four geographic regions. Data are served to EverVIEW by a WMS server; USGS National Atlas.

Acknowledgements

The Greater Everglades modeling community continually provides feedback that helps us improve models and tools. The computer programmers at the Spatial Analysis Branch of the National Wetlands Research Center (USGS) make the models and tools user friendly. This work is largely funded by USGS Greater Everglades Priority Ecosystems Science program and donations of staff time from JEM partners.



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