AUTOMATED ONLINE ECOLOGICAL MODELING AND EVALUATION FOR EVERGLADES MANAGEMENT AND RESTORATION

Leonard Pearlstine[1]
Suresh Goldconda[2]
Kevin Suir[3]
Alicia LoGalbo[1]
Craig Conzelmann[3]
Janice Parsons[1]

[1] National Park Service,
Everglades National Park, South Florida Natural Resources Center

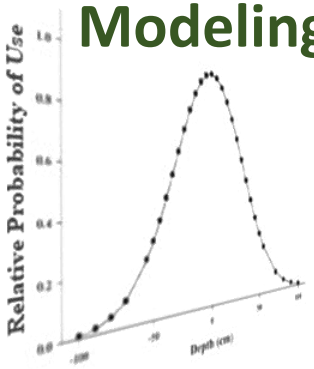
[2] University of Louisiana at Lafayette,
Center for Advanced Computer Studies

[3] U.S. Geological Survey,
National Wetlands Research Center, Advanced Applications Team

Automated Online Ecological Modeling

External Data Acquisition

Evaluation Modeling



Web-based Spatio-temporal Results and Reports

Flexibility that encourages use as a standard framework for future additional evaluations of ecological modeling.

Facilitate integrated understanding of hydrologic conditions and ecological responses

- Spatial and temporal variability
- Ecosystem connectivity
- Rapid access via web
- Linkage from planning to implementation

Pilot implementation integrates a wood stork evaluation module

- Wading birds are high priority indicators
- Well-established and analyzed datasets linked tightly to surface water hydrology
- Hydrology readily available online from Everglades Depth Estimation Network (EDEN)
  - ✓ daily, interpolated water-level
  - ✓ Entire greater Everglades
  - ✓ Updated online every few days
  - ✓ 1991 - present

Decision support in Everglades water management and restoration

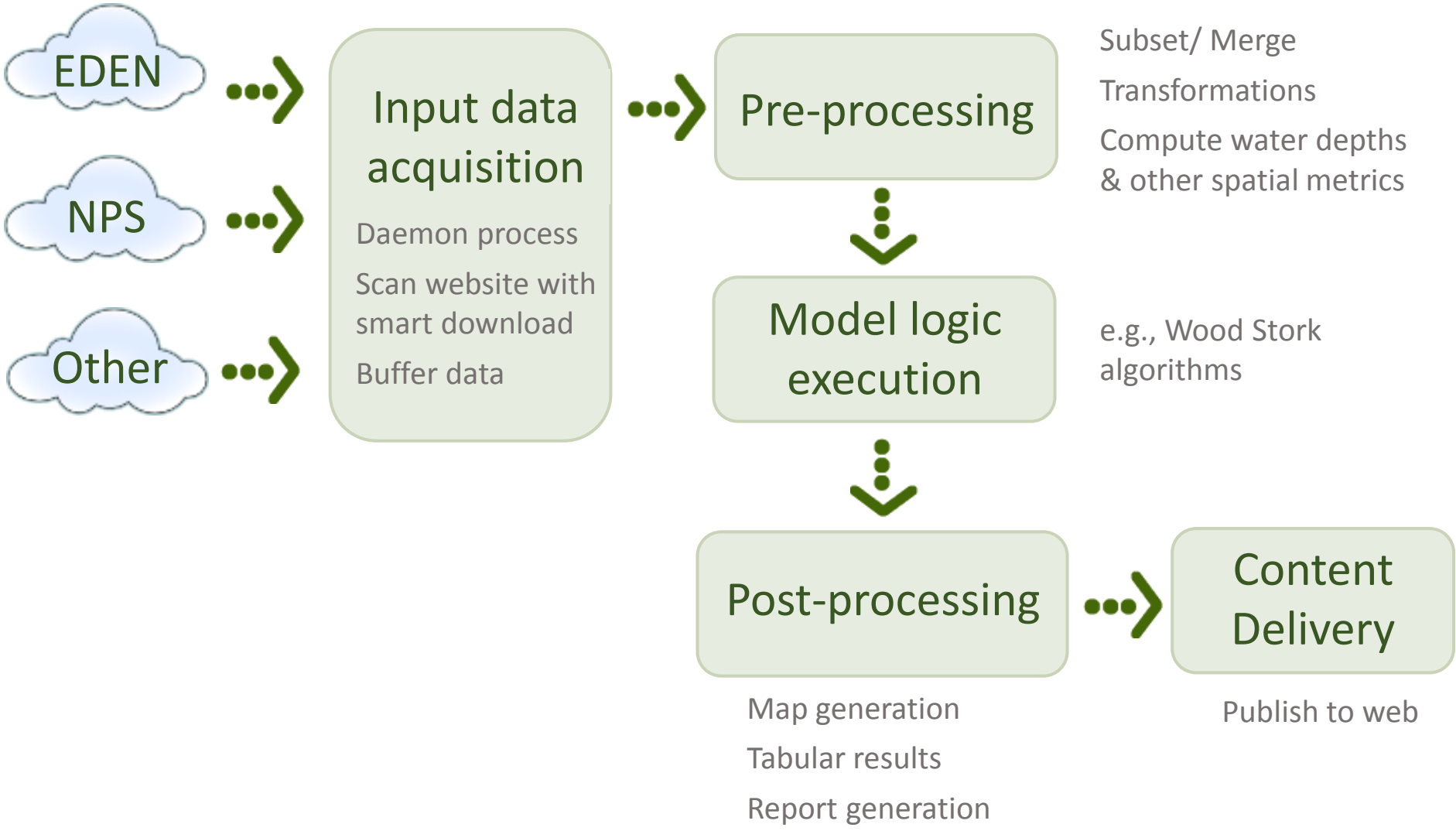
1. Periodic Scientists Call	~every 3 weeks
2. Tuesday Biologists Call	weekly
3. Multi-Species Recovery Plan	3x per year
4. Multi-Species Water Management Meeting	weekly

Multi-agency: local, state, regional, and federal scientists, technical staff, and decision-makers.

Regular review of compliance with water release regulations and impacts on ecological, agricultural, urban and cultural priorities.

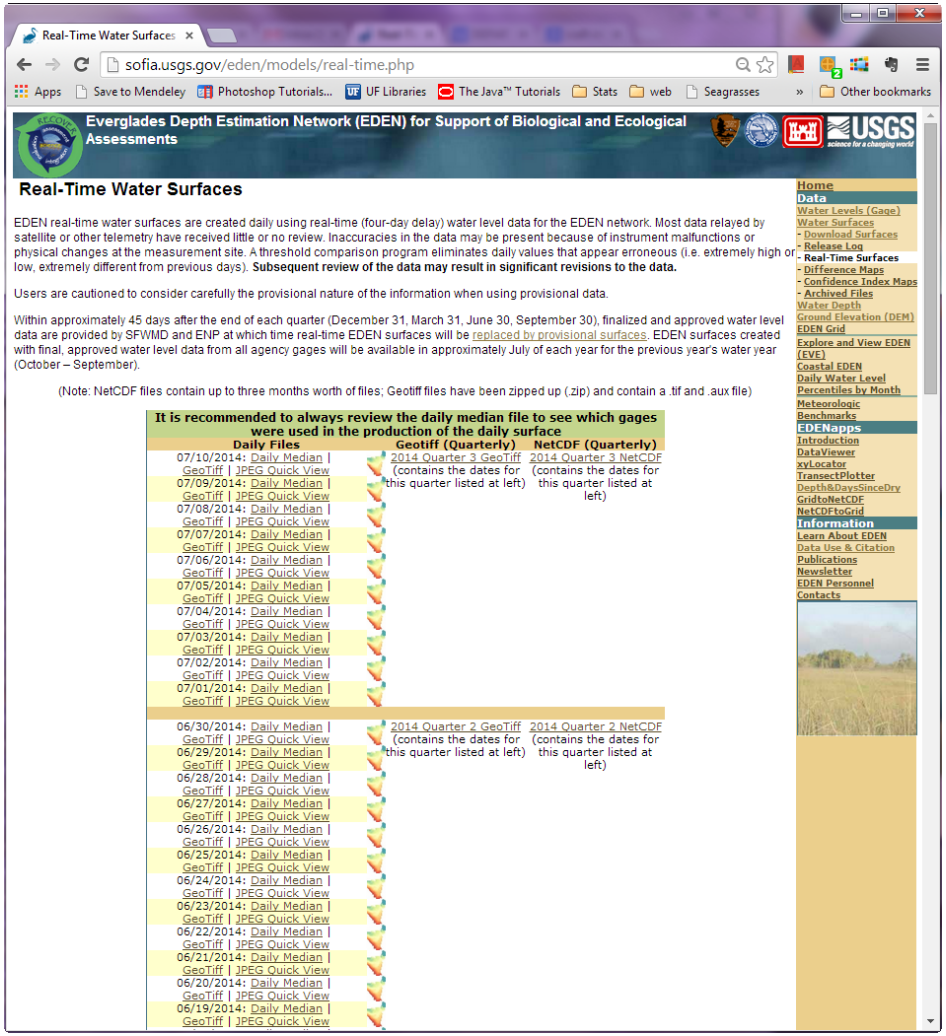
Flexibility within regulation schedules and structural capacities for modification of water delivery timing and spatial distribution.

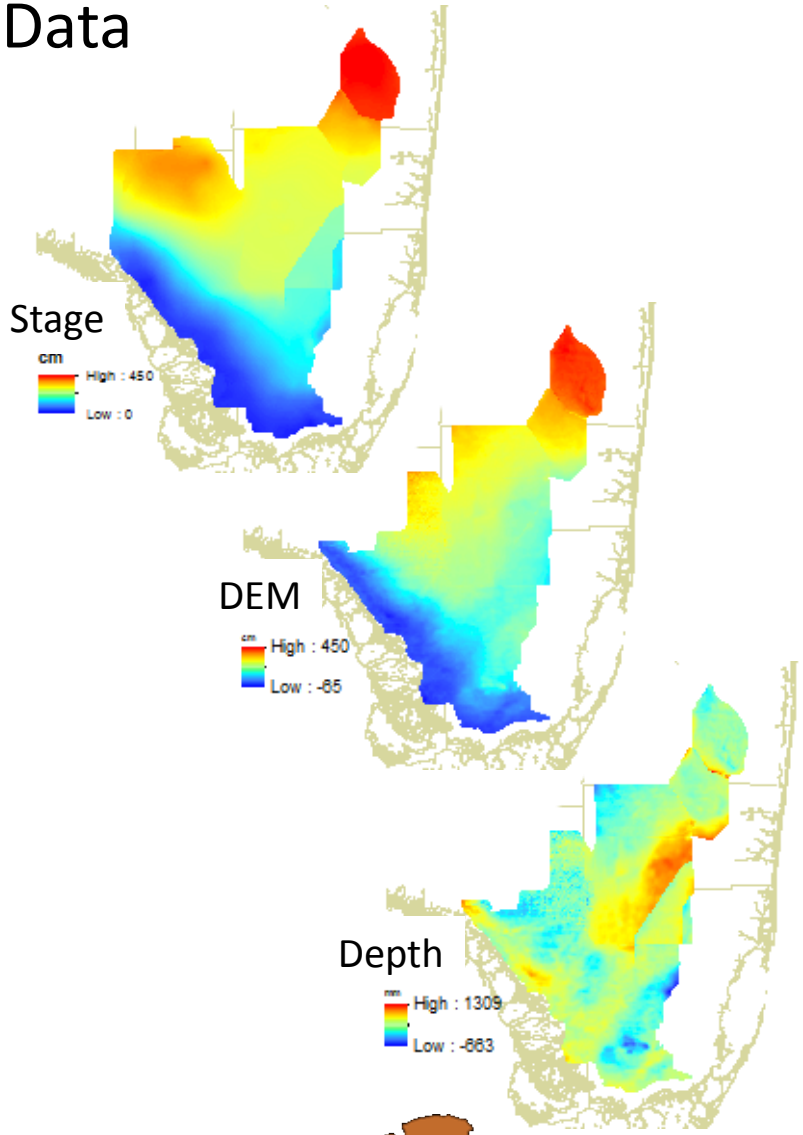
Automated Online Ecological Modeling



Automated Online Ecological Modeling

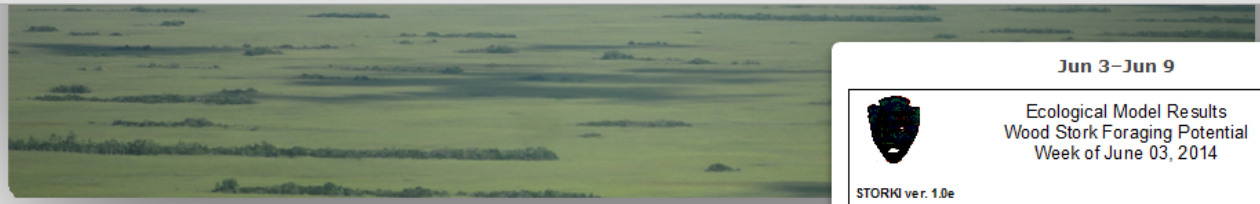
Input Source Data





DEPARTMENT OF THE IN | SFRNC Modeling R&D Ne | JEM.gov - Wood stork mo

Apps | Save to Mendeley | Photoshop Tutorials... | UF Libraries | The Java™ Tutorials | Stats | web | Seagrasses | Color Wizard - Color... | Google Scholar | Other bookmarks



Everglades National Park Automated Web Modeling

Everglades Wood Stork Foraging Potential Model

A wood stork foraging suitability model developed to predict the relative suitability of foraging conditions for wood storks within Everglades freshwater marshes during the breeding season. This model calculates wood stork foraging probabilities surrounding colonies in Everglades freshwater marshes based on estimated water depth and recession rates.

2014

Click an image to enla
Multiple images can be
Click and drag the hea


Apr 1–Apr 7


Apr 8–Apr 14


Apr 15–Apr 21


Apr 22–Apr 28


Apr 29–May 5


May 13–May 19


May 20–May 26


May 27–Jun 2

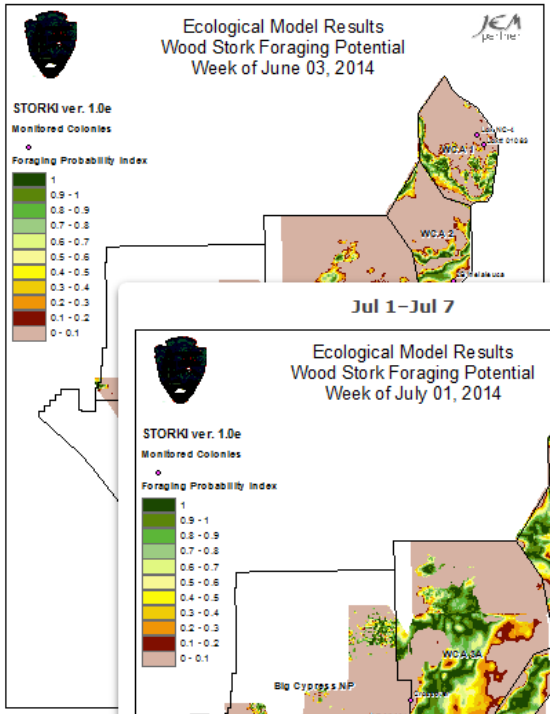

Jun 3–Jun 9


Jun 10–Jun 16


Jun 24–Jun 30

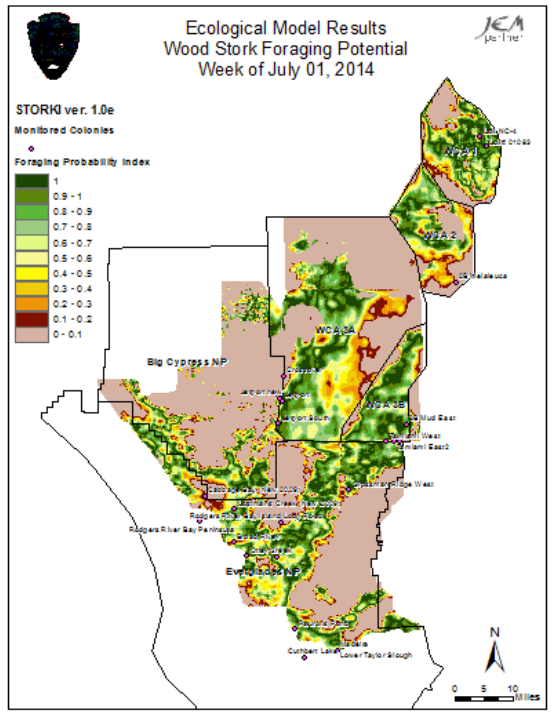

Jul 1–Jul 7

Jun 3–Jun 9



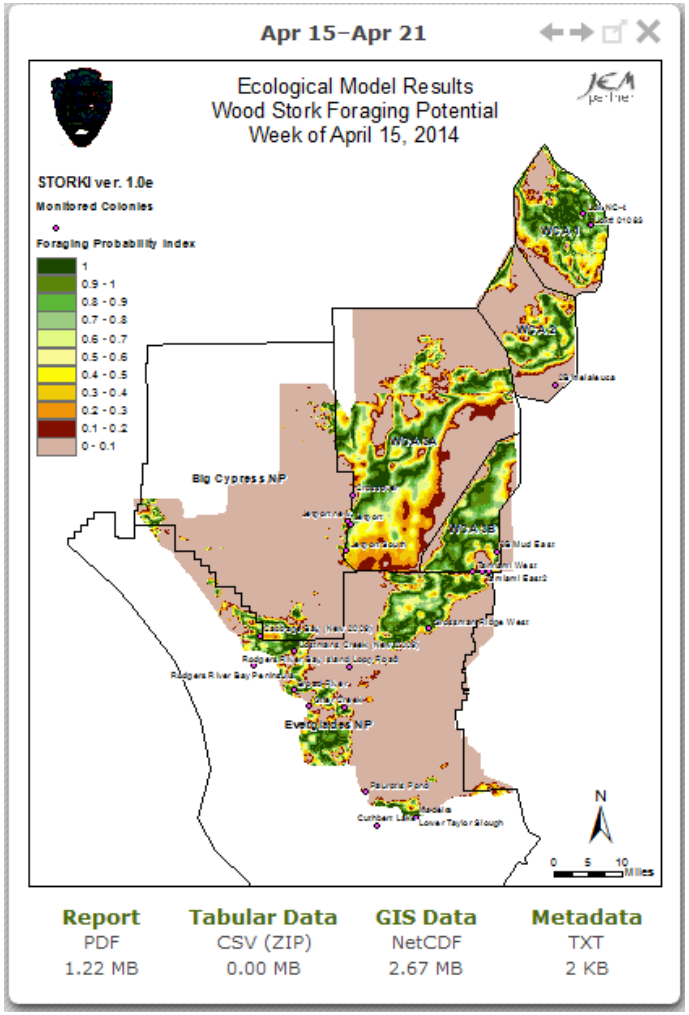
Report
PDF
1.08 MB

Jul 1–Jul 7



Report	Tabular Data	GIS Data	Metadata
PDF	CSV (ZIP)	NetCDF	TXT
1.36 MB	0.00 MB	2.67 MB	2 KB

metadata.txt | woodstork_template.pdf | NPS_OnlineDecisio....pptx | toads_presentation_....pptx | freq_fig11.pdf | Show all downloads...



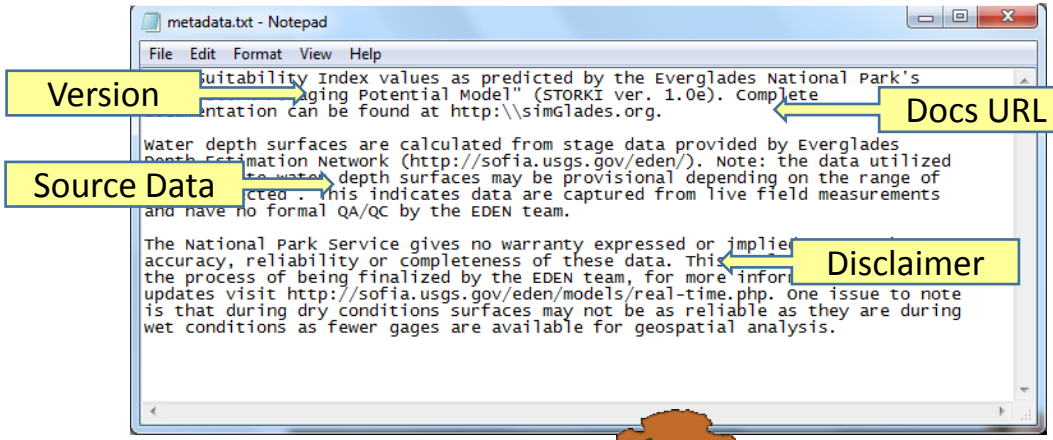
Tabular Data

Acreage by HSI categories for each colony

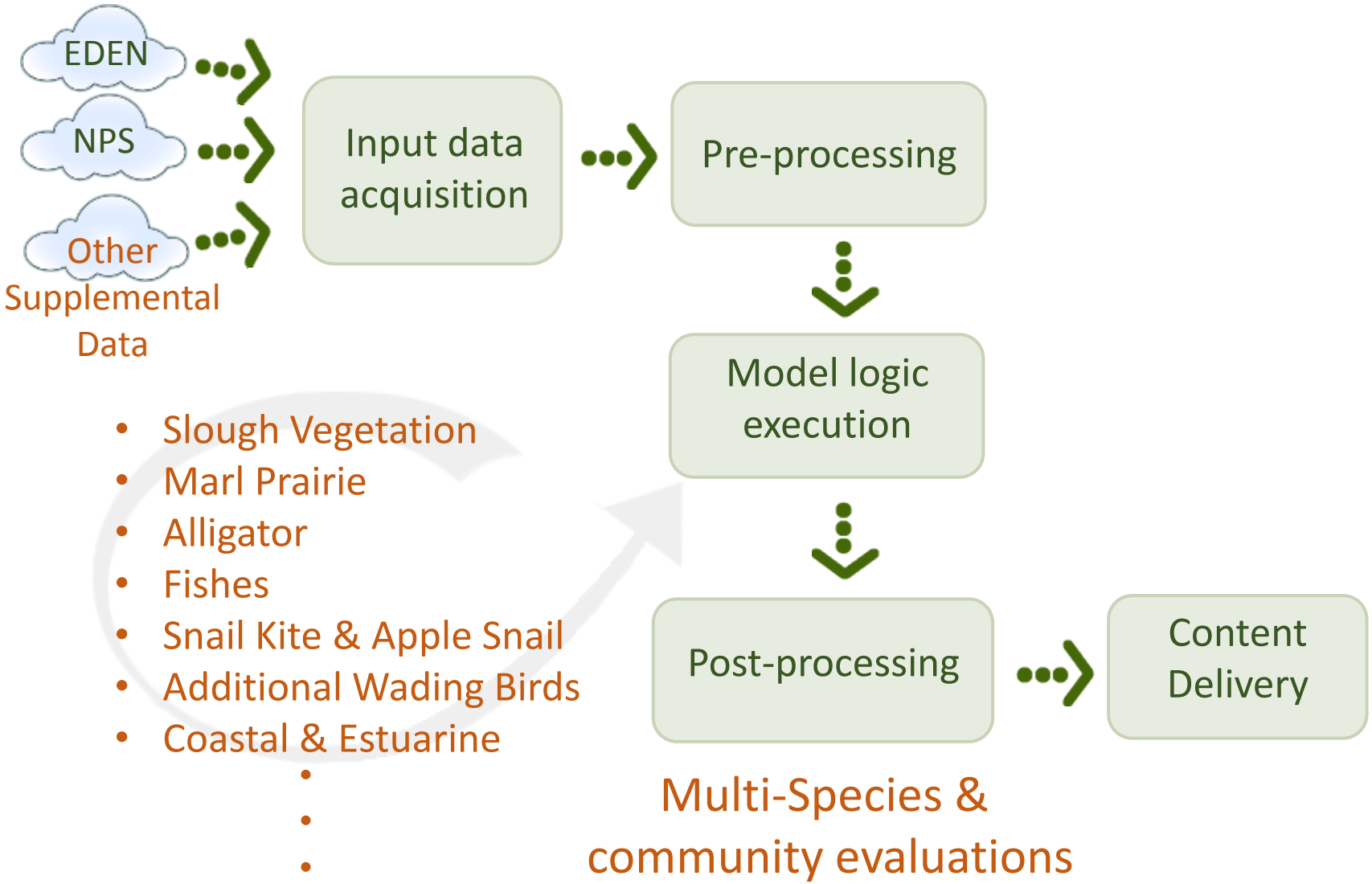
Acreage by HSI categories for each colony. A colony area is defined by distance from center of colony point.

Colony	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
Lox NC-4	138,891	10,675	7,947	8,619	8,935	7,433	9,252	12,612	16,170	38,034
Lox# 01083	255,445	0	0	0	0	0	0	0	0	0
Jetport	245,442	23,208	28,703	21,943	17,119	14,945	14,984	14,589	14,233	29,494
3B Mud East	424,661	0	0	0	0	0	0	0	0	0
Jetport South	256,038	20,796	27,043	20,164	15,103	13,521	13,798	13,719	14,668	29,810
Jetport new	247,419	23,247	28,822	22,061	17,356	14,866	14,194	14,194	13,561	28,941
Crossover	224,606	26,964	31,550	23,880	18,977	17,356	15,854	15,617	15,419	34,436
2B Melaleuca	354,444	0	0	0	0	0	0	0	0	0
Tamiami West	240,579	19,175	20,005	15,775	10,359	11,307	13,521	17,791	25,027	51,121
Cabbage Bay (New 2009)	424,661	0	0	0	0	0	0	0	0	0
Paurotis Pond	278,771	0	0	0	0	0	0	0	0	0
Lostmans Creek (New 2009)	424,661	0	0	0	0	0	0	0	0	0
Rookery Branch	424,661	0	0	0	0	0	0	0	0	0
Rodgers River Bay Peninsula	424,661	0	0	0	0	0	0	0	0	0
Broad River	424,661	0	0	0	0	0	0	0	0	0
Cuthbert Lake	0	0	0	0	0	0	0	0	0	0
Grossman Ridge West	296,286	16,329	13,877	10,438	6,603	6,919	8,935	11,347	15,736	38,192
Tamiami East1	424,661	0	0	0	0	0	0	0	0	0
Lower Taylor Slough	214,643	0	0	0	0	0	0	0	0	0
Tamiami East2	424,661	0	0	0	0	0	0	0	0	0
Rodgers River Bay Island	424,661	0	0	0	0	0	0	0	0	0

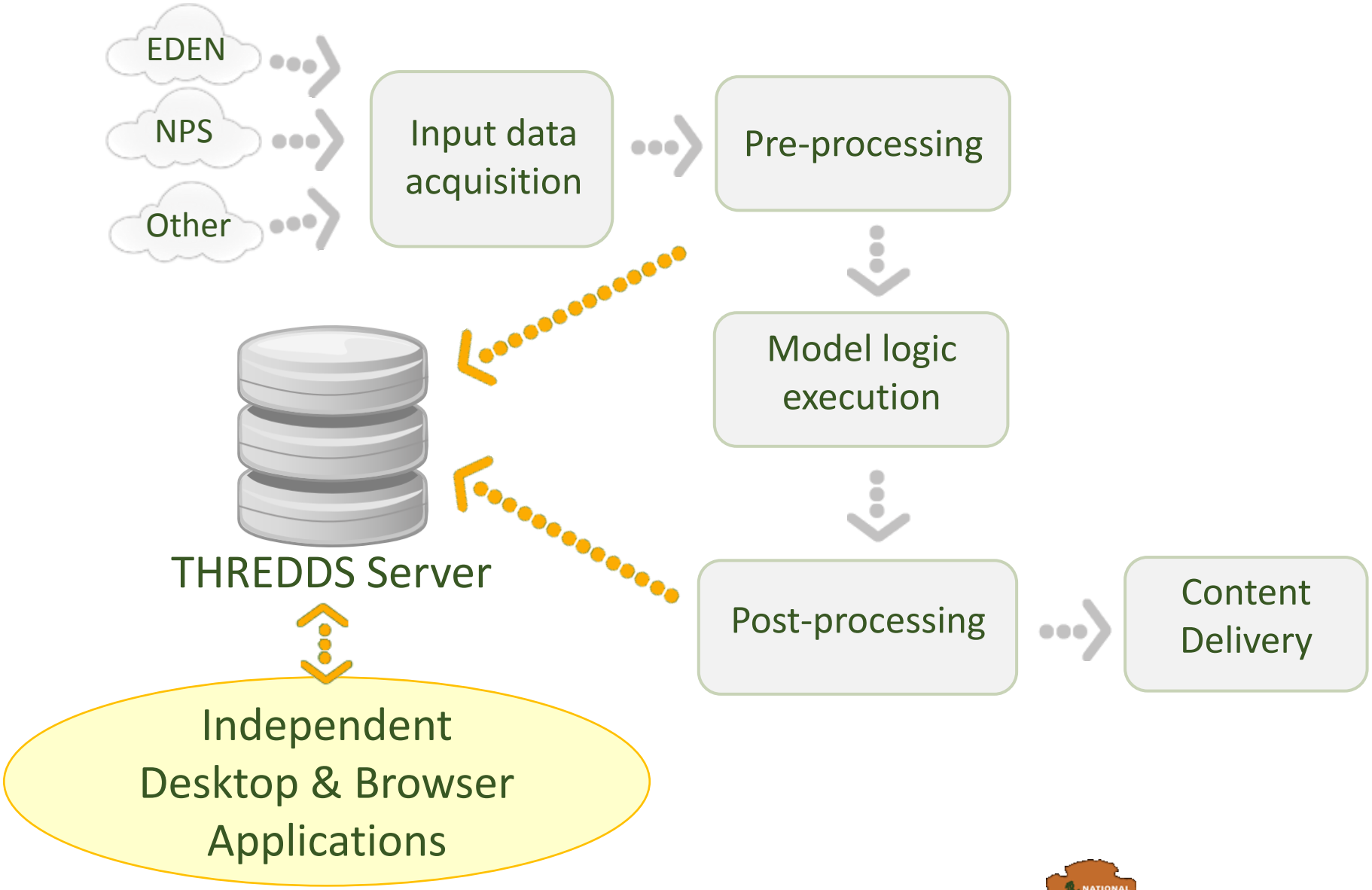
MetaData



Automated Online Ecological Modeling – NEXT STEPS

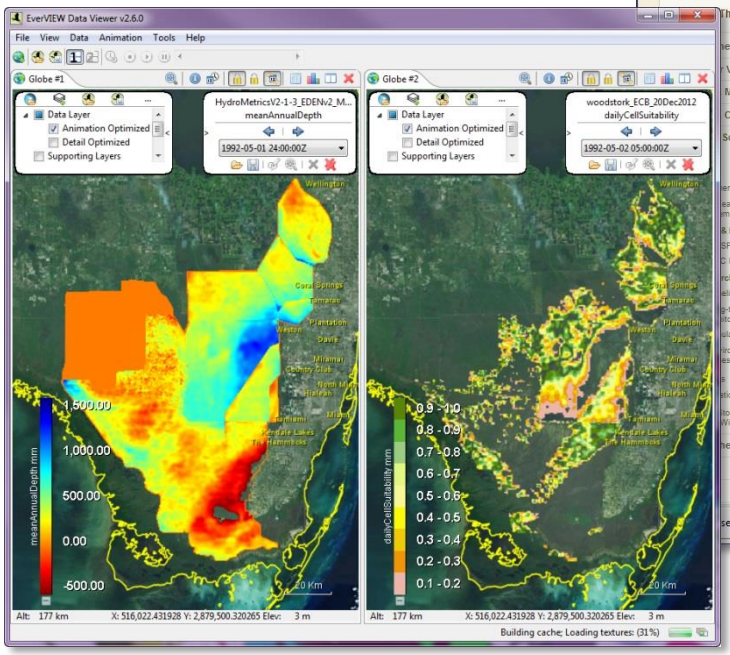


Automated Online Ecological Modeling – NEXT STEPS

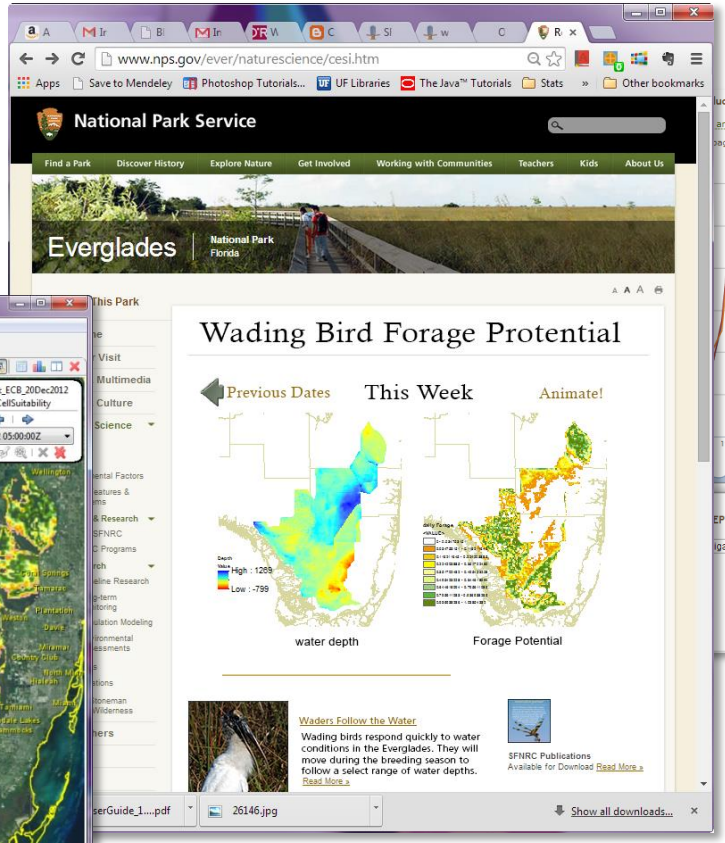


Automated Online Ecological Modeling – NEXT STEPS

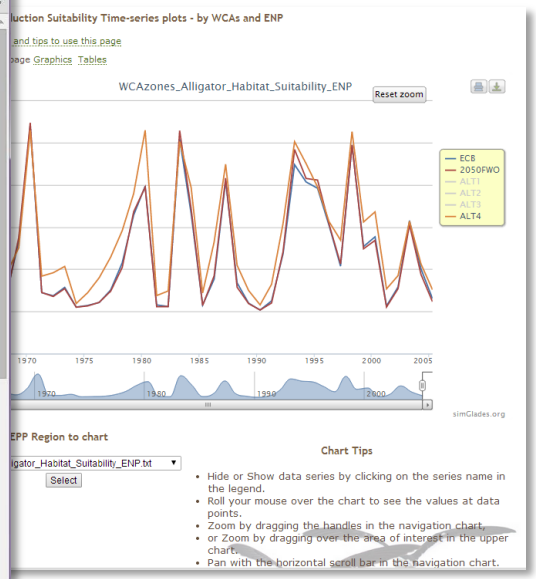
THREDDS-served Desktop & Web Apps



JEM EverVIEW data viewer



Live updates for public communication
(mock-up)



Interactive Charts

Challenges

- Develop automated system using input data from resource that are not designed to support machine readable format
- Build a heterogeneous system with a long chain of actions to work coherently
  HTTP reading, NetCDF modification, biological modeling, ArcMap communication , Java coding & python scripting
- Create tools to meet the needs of resource managers for rapid ecological evaluations under changing environmental conditions

Recommendations of Real-Time Performance Measures

- Additional performance measure to provide ecosystem approach to natural resource management
- Increased focus on ecosystem spatial conditions to maximize system-wide benefits to natural resources
- Improved integration between water management operators and natural resource managers
- Additional flexibility in water management to implement recommendations by natural resource managers