Objective: Develop a tool to quantitatively predict impacts of hydrological management practices on wetland-dependent species

Hydroecological criteria (i.e. wetland community preference, salinity tolerance, inundation, recession rate and depth requirements) can be defined at the taxonomic level of interest and evaluated under various hydrological management options. Results provide potential impacts to foraging and/or reproductive districts. As a demonstration case for the modeling effort, wood stork nesting and foraging habitat during the nesting season in central Florida over a 10 year period (1996-2005) was predicted for two different management options. Initial assessment utilized binary scoring for broad effects, with subsequent score refinement to allow for marginal habitat. Seasonal summaries were generated annually for each scenario and converted to hectare-days of inundation.

Wood Stork Evaluation

Hydroecological Criteria

Scoring Criteria
• Unavailable = 0
• Sub-optimal = 0
• Optimal score = 1

Criteria based on Curtis et al. 2012 and Tarboton et al. 2004

Ponded Depth Calculation (GIS: Hydroperiod Tool)

Ponded depth was generated using a grid cell (raster) based method evaluating stage (water elevation) and DEM (land elevation) data; ponded depth equals stage minus DEM (after Sorenson and Maidment, 2004). Total wetland area evaluated was 82 km². Using a 15 meter grid and daily time step over 10 years for 2 scenarios (baseline and alternate), a total of 2,650,524,285 grid cell values were generated.

References

Conclusions
• Wood stork nesting habitat was available in 1998 and unavailable during all other years
• Small hydrologic changes can have a large effect on projected foraging area
• Alternate Scenario had measurable effects on wood stork foraging habitat
• Overall inclusion of additional criteria (recession rate) and score refinement reduced overall available foraging
and nesting habitat, but did not alter relative changes between scenarios

References

The Wood Stork Evaluation as a demonstration case for the modeling effort, wood stork nesting and foraging habitat during the nesting season in central Florida over a 10 year period (1996-2005) was predicted for two different management options. Initial assessment utilized binary scoring for broad effects, with subsequent score refinement to allow for marginal habitat. Seasonal summaries were generated annually for each scenario and converted to hectare-days of inundation.