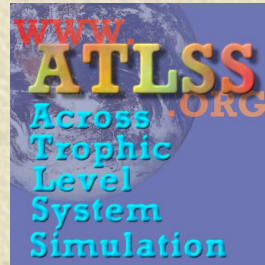


Alligator SESI Model

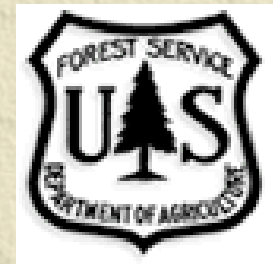
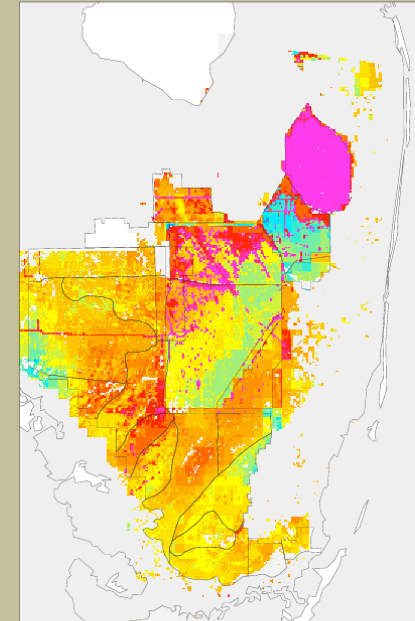


The SESI model for the American Alligator provides a measure of possible reproductive production for any given year.

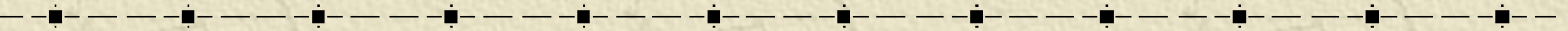


Developed in collaboration with M. Palmer, U. Tennessee

Alligator Potential Index for 1992 (Average)



Alligator Production Index



Underlying ecological basis for model:

Vegetation type an influence on nest building

Nest-building also depends on water conditions during the preceding time period

Nesting success depends on the elevation at which the nest is built, which depends on water levels at the time of nesting, and the water levels during the incubation period.

Alligator Production Index

- ✦ Tool for comparing restoration alternatives.
- ✦ Base contains 2x2 water level model (SFWMD) and GAP Vegetation Map.
- ✦ Uses POR of 1965-1995 for verification.
- ✦ Very simplified model.
- ✦ 500m x 500m scale ~ adult female home range.
- ✦ Available for use.

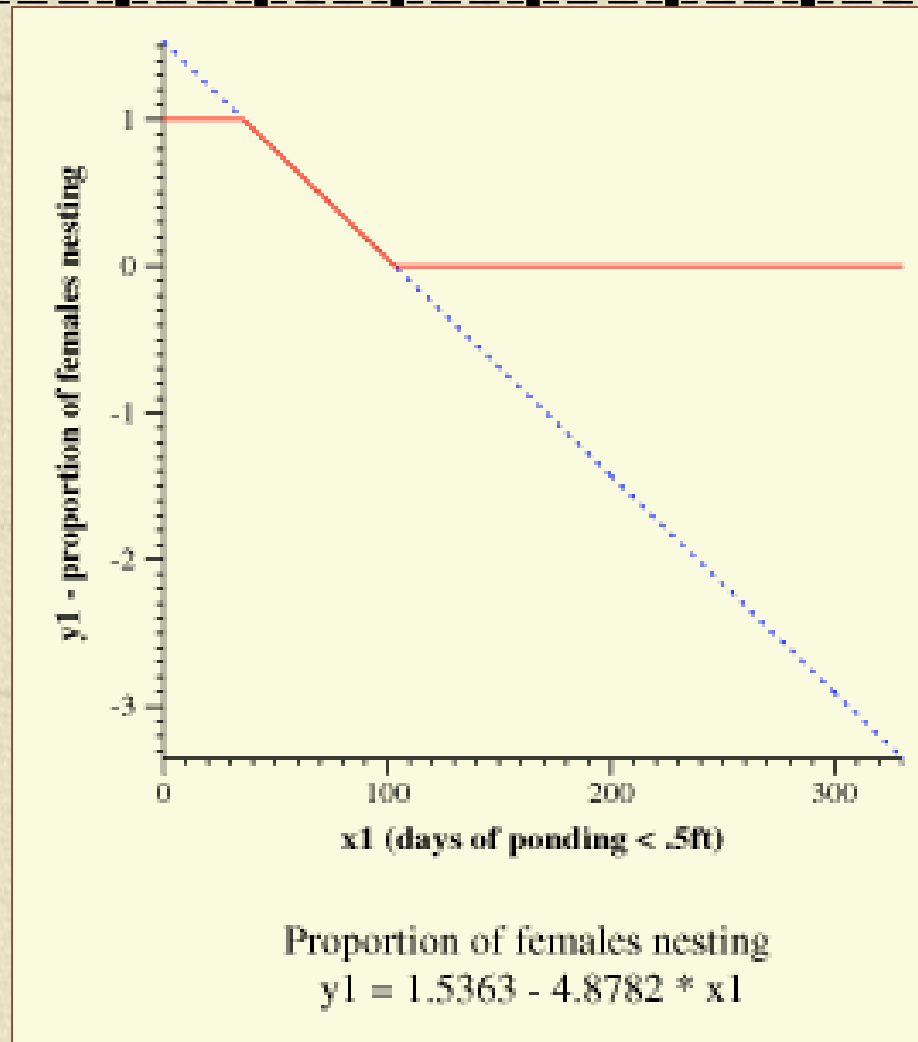
Alligator Production Index

- ✦ The index, I, is a product of three factors,
$$I = P(\text{nesting}) * P(\text{habitat}) * (1 - P(\text{flooding})).$$
- ✦ Each of these factors, or functions, determines the influence of a particular factor on reproductive success.
- ✦ The functions, P, are based on empirical data.

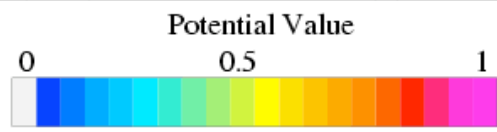
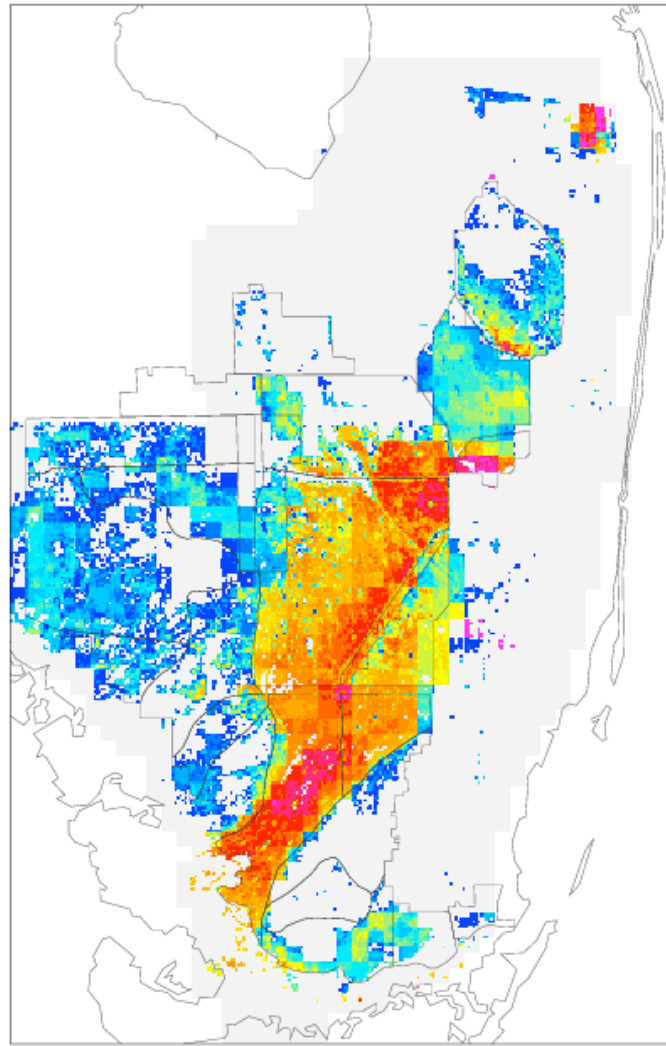
P(Nesting)

- ✦ This gives the probability of alligator nesting for a given spatial cell, based on water depth over the previous year.
- ✦ It is a weighted average of P(breeding or y_1) and P(nest construction or y_2).
- ✦ Both of these are based on water depth
- ✦ Regression relationships based on ENP data.
- ✦ Problems – based only on ENP data, Lox assigned as 1.0.

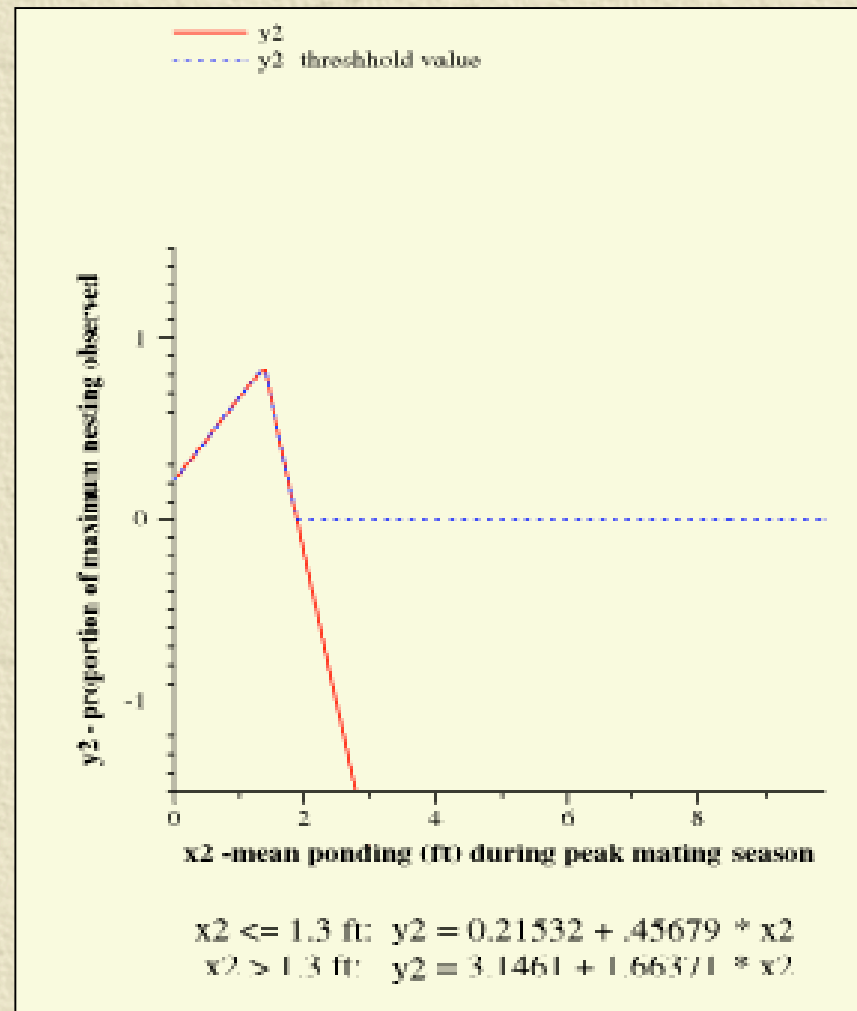
Breeding



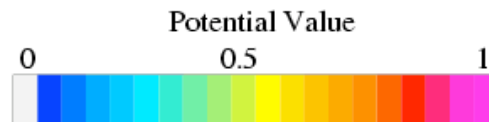
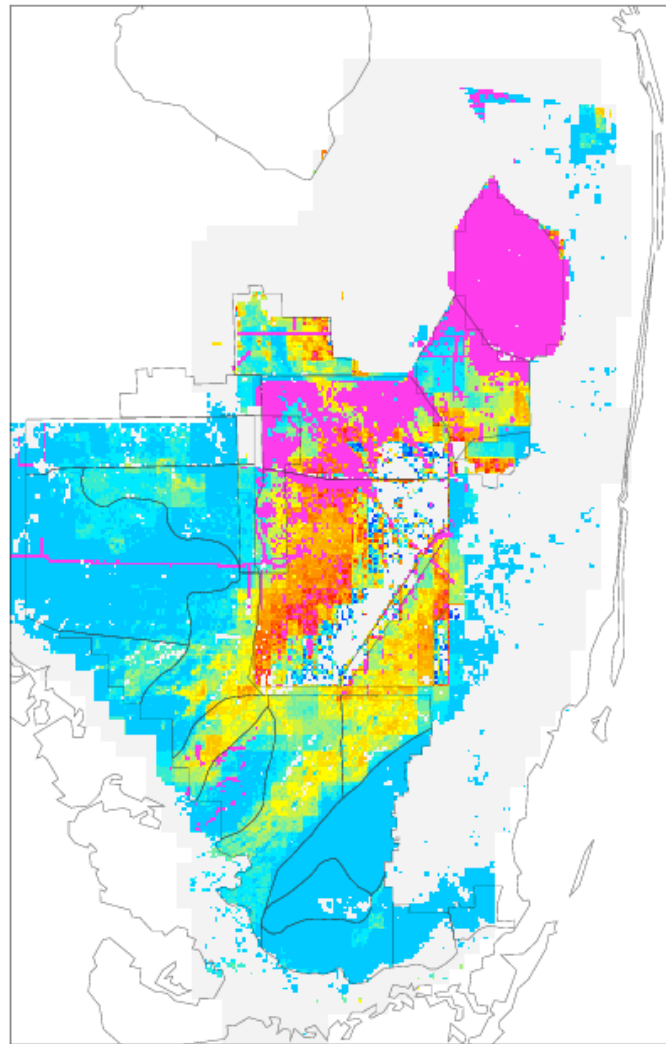
Alligator Breeding (Y1) Potential for 1985



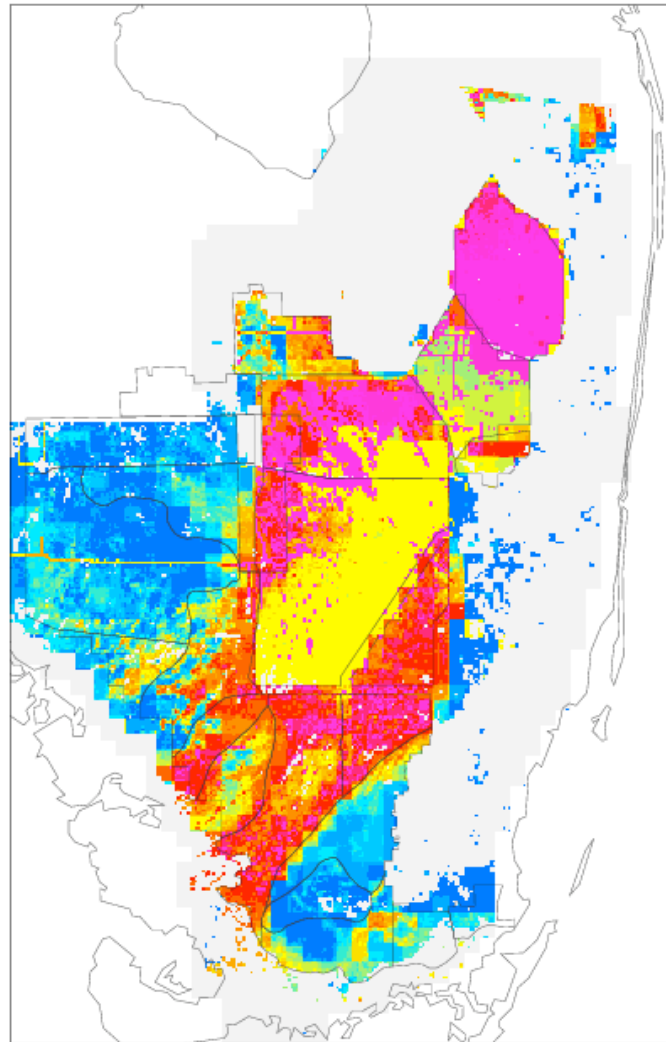
Nest construction



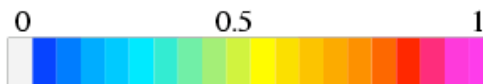
Alligator Nest Construction (Y2) Potential for 1992



Alligator Nesting Potential for 1993



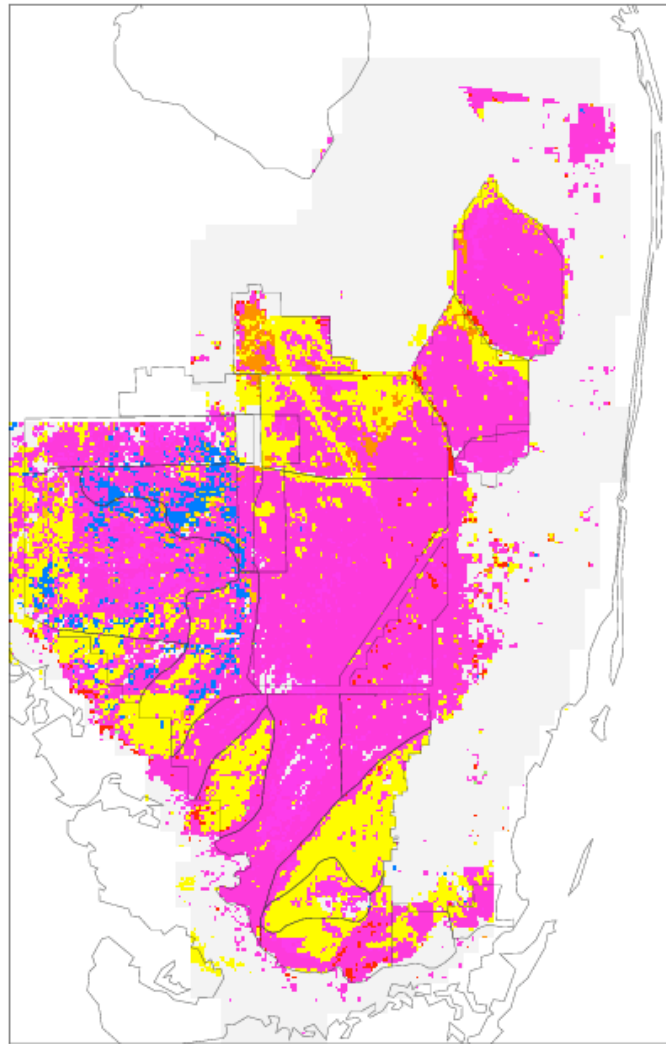
Potential Value



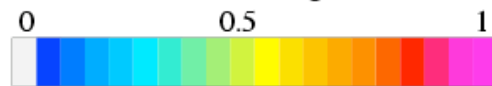
P(habitat)

- ✦ Relative Habitat Quality for Nesting
- ✦ Uses the dominant vegetation type within each cell.
- ✦ Static habitat rank.
- ✦ Example – sawgrass = 1.0, open water = 0.0
- ✦ Problems – static, levees not represented.

Alligator Habitat Weights from FGAP V2.1



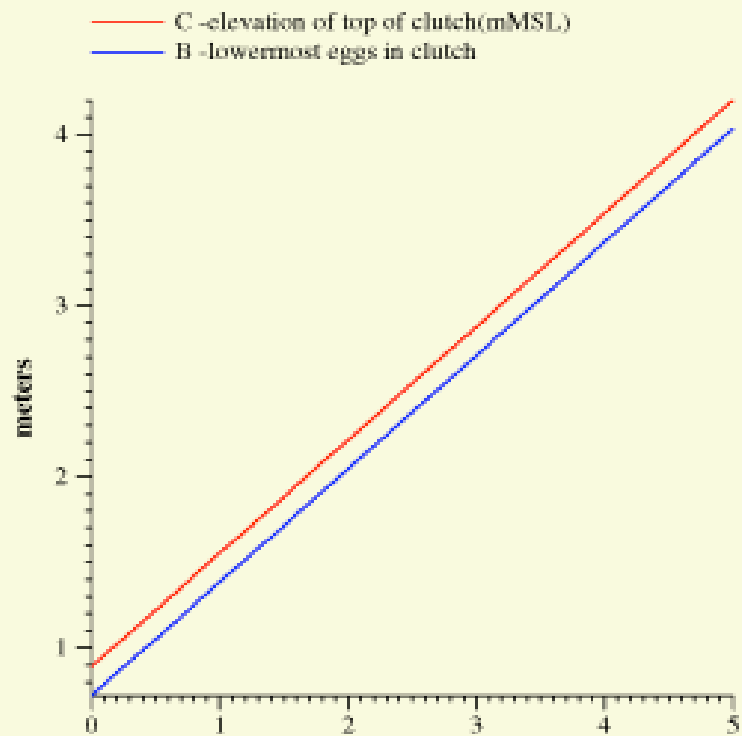
Habitat Weights



P(Flooding)

- ✦ Uses a regression relationship to predict clutch height.
- ✦ Flooding is proportion of clutch inundated over incubation period.
- ✦ Levees and tree islands assigned as 0.
- ✦ Problems – uses only ENP data, Lox assigned as 0.

Clutch Elevation



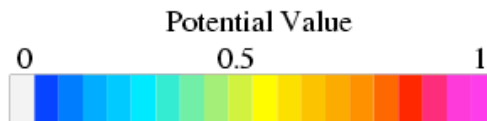
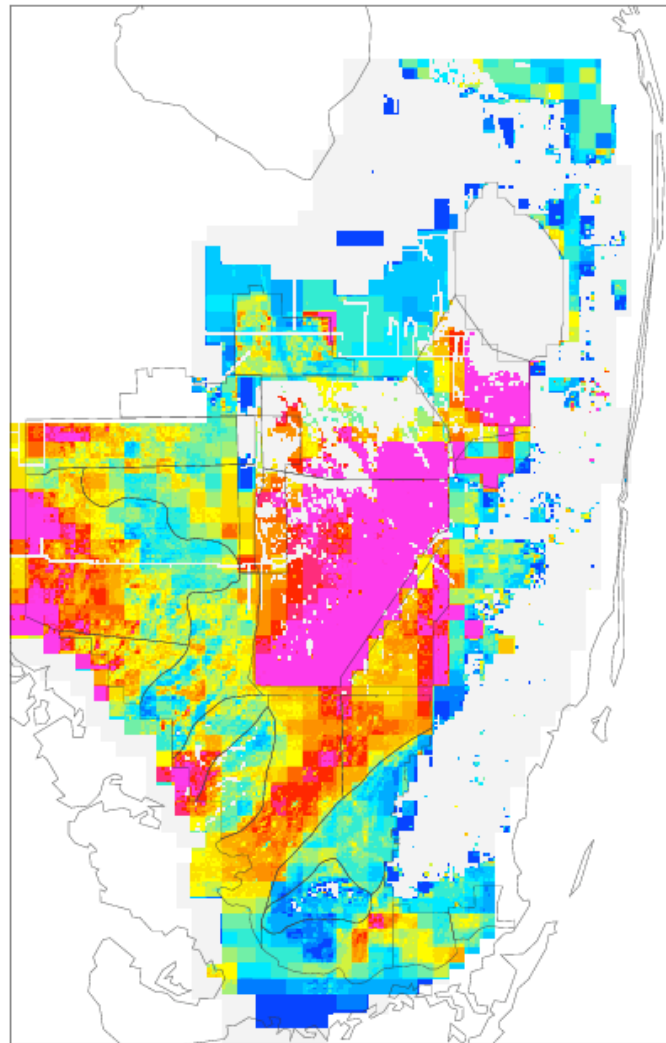
x3 - mean water level (mMsl) for nest construction period

Elevation of top of clutch: $C = 0.889 + 0.663 * x3$

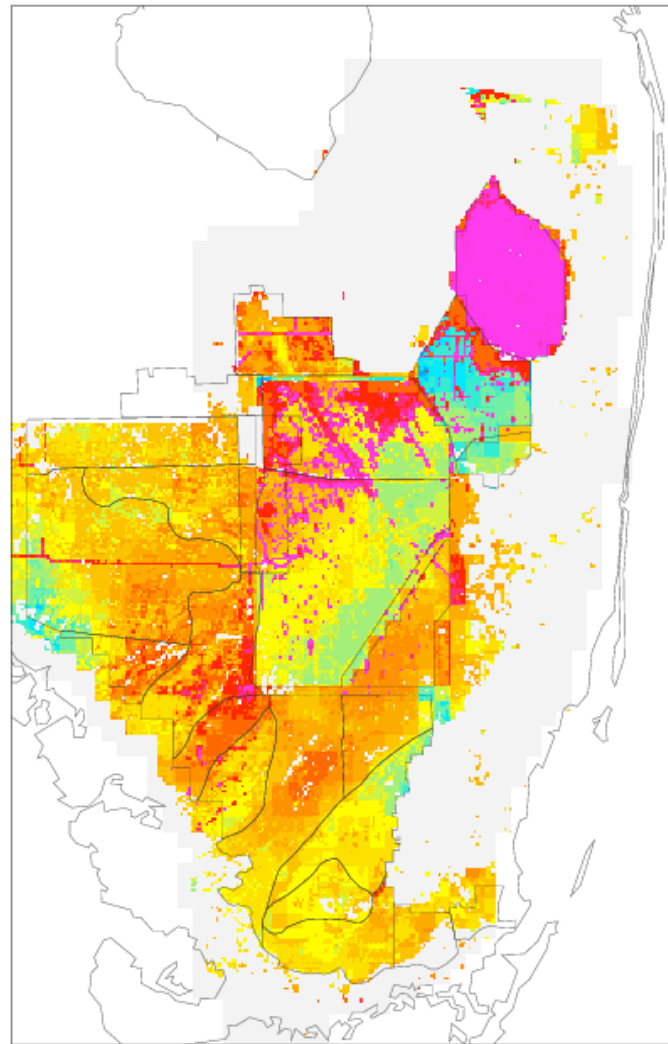
Lowermost eggs in clutch: $B = C - 0.169$

(mean clutch cavity is 16.9 cm in height)

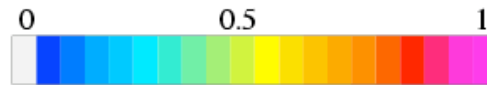
Alligator Nest Flooding Potential for 1985

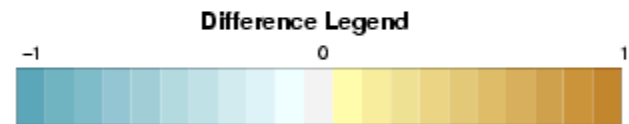
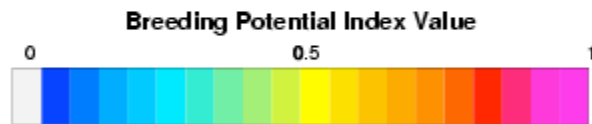
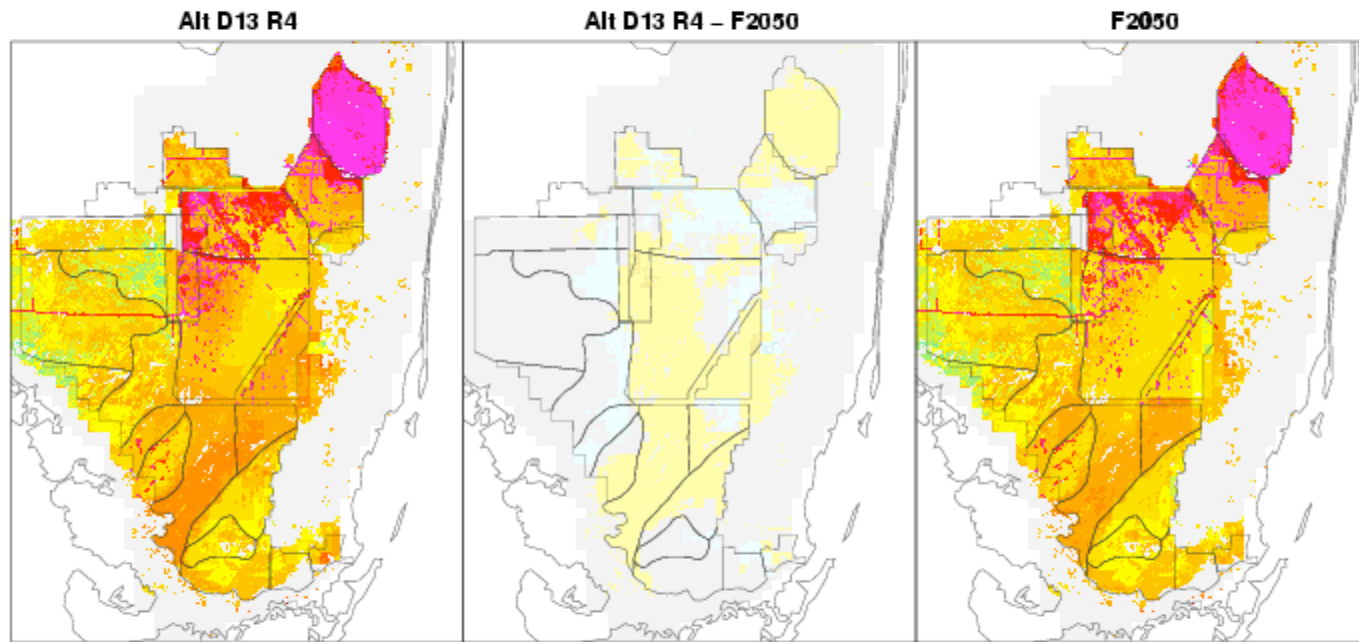


Alligator Potential Index for 1992 (Average)



Potential Value





Alligator Production Index Mean

Alligator Production Index - Future

✦ Calibration and Validation

- ✦ SRF data
- ✦ FFWCC data

✦ Updates

- ✦ Lox data
- ✦ USGS Coop Unit data
- ✦ SRF data