

ATLSS SESI MODEL: EVERGLADES AND SLOUGH CRAYFISH SESI MODELS

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Everglades and Slough Crayfish SESI Models

Underlying ecological basis for model:

- Crayfish density and biomass estimates are generally higher for wet prairies, where *P. alleni* predominates, than for slough habitats, where *P. fallax* are more commonly found.
- *P. alleni* tends to occupy more complex habitats that provide more food resources and refuge from predators (e.g. higher plant biomass, higher stem density).
- Water depth is generally negatively correlated with *P. fallax* densities in sloughs, but not with densities of *P. alleni* in wet prairies.
- Densities of *P. fallax*, associated with slough habitats, decreases with increasing depth and prolonged hydroperiod, due in part to increased predation from fish.

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The index for crayfish is computed at year's end from 3 factors:

- **A static habitat factor, which measures the % of 30-m cells in each 500-m cell that is of suitable FGAP habitat type.**
- **Hydroperiod for the current year**
- **Pattern of drydowns over the past 3 years**

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Habitat factor, *Habitat*

- The habitat factor, HSI, is set to zero if the 500-m cell contains greater than any of the following percentages (based on classification of the 30-m pixels within each 500-m cell): 1% urban, 15% agricultural, or 60% other unsuitable types. For all other cells, if percent *Muhlebergia* grass > 60%, then HSI = 1 for *P. alleni* and 0.85 for *P. fallax*; If percent *Muhlenbergia* grass < 60%, then HSI = 0.85 for *P. alleni* and 1 for *P. fallax*.
- Unsuitable FGAP habitat types:
 - Mangrove, mixed woodland swamp, agricultural, pine, salt marsh, palmetto, open water, urban

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Hydroperiod factor, *Hydroperiod*, for current year:

- **The model tracks hydrologic condition through a whole year. For any year for which the hydroperiod is less than 60 days, the SESI is set to 0.**

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Drydown factor, *Drydown*

- **Cells inundated fewer than 335 days (eleven month hydroperiod) in a given year are considered to have experienced a significant drying event for that year (0 in drying history columns of table on next page). The pattern of drying events over a three year period is used to assess the relative suitability of each landscape cell for the two *Procambarus* species modeled. The table below lists all 9 possible combinations of the previous three years in terms of whether they had (1) or did not have (0) a drydown.**

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Table showing *drydown* index as a function of recent history

Drying history			P. alleni	P. fallax
yr-2	yr-1	yr	index	index
0	0	0	1.0	0.2
1	0	0	0.8	0.4
0	1	0	0.4	0.6
0	0	1	0.6	0.4
1	1	0	0.8	0.6
1	0	1	0.6	0.8
0	1	1	0.4	0.6
1	1	1	0.2	1.0

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Total Crayfish SESI:

Crayfish SESI = Habitat x Hydroperiod x Drydown

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Example Output

