

ATLSS SESI Model: Snail Kite

Breeding Potential Index

Provides a relative estimate of the breeding potential of the snail kite for any given year



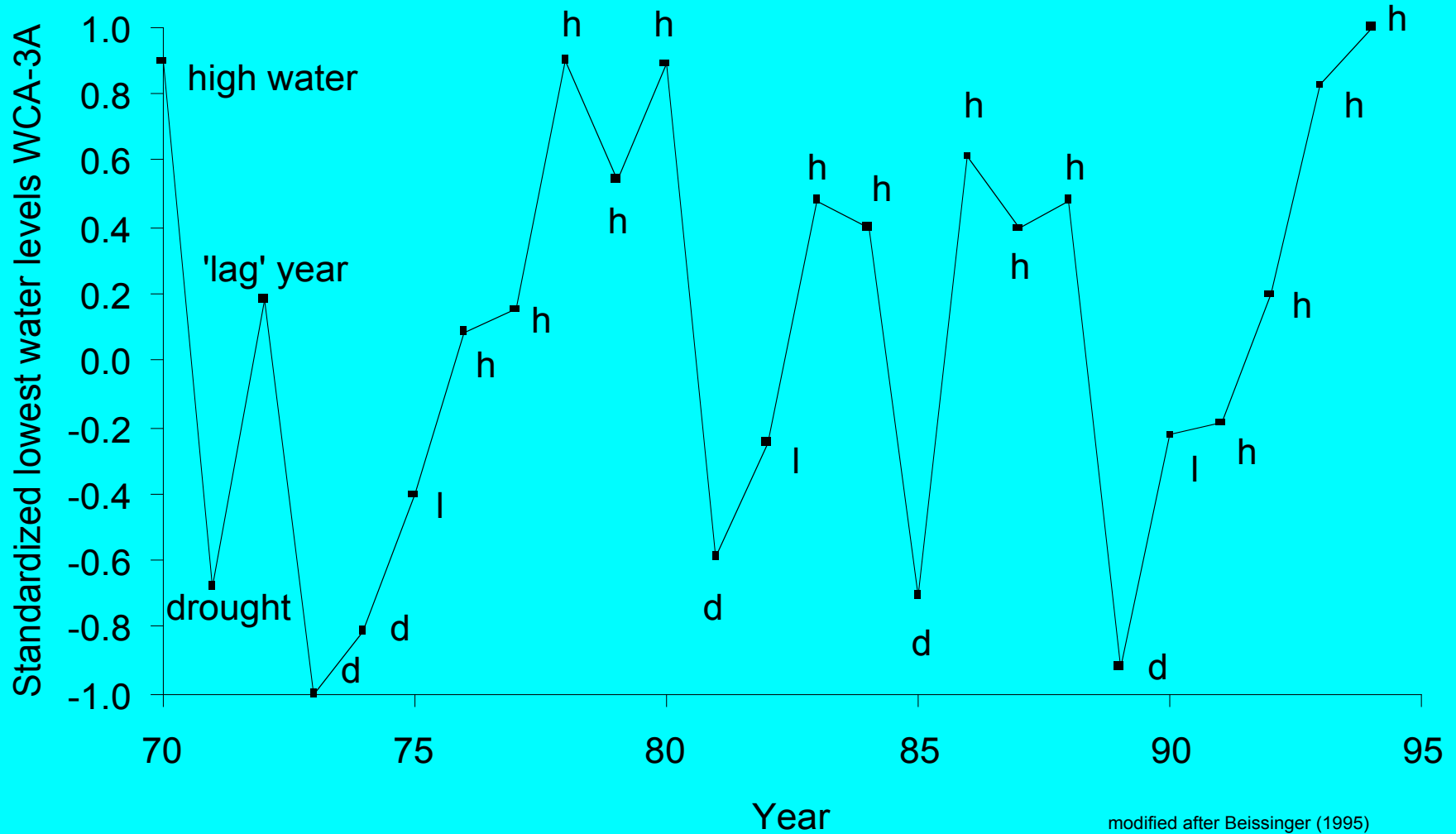
Snail Kite Spatially Explicit Species Index Model

Underlying ecological basis for model:

The snail kite feeds exclusively on apple snails, which require sufficiently deep water to survive and be available to snail kites.

Snail kite habitat is largely open water habitat (e.g., Eleocharis marsh) that is usually inundated, but is maintained by occasionally dry-downs. Typical variations in water level are shown in the next slide, where 'd' denotes a dry-down.

Snail Kite habitat is subject to large fluctuations in water level



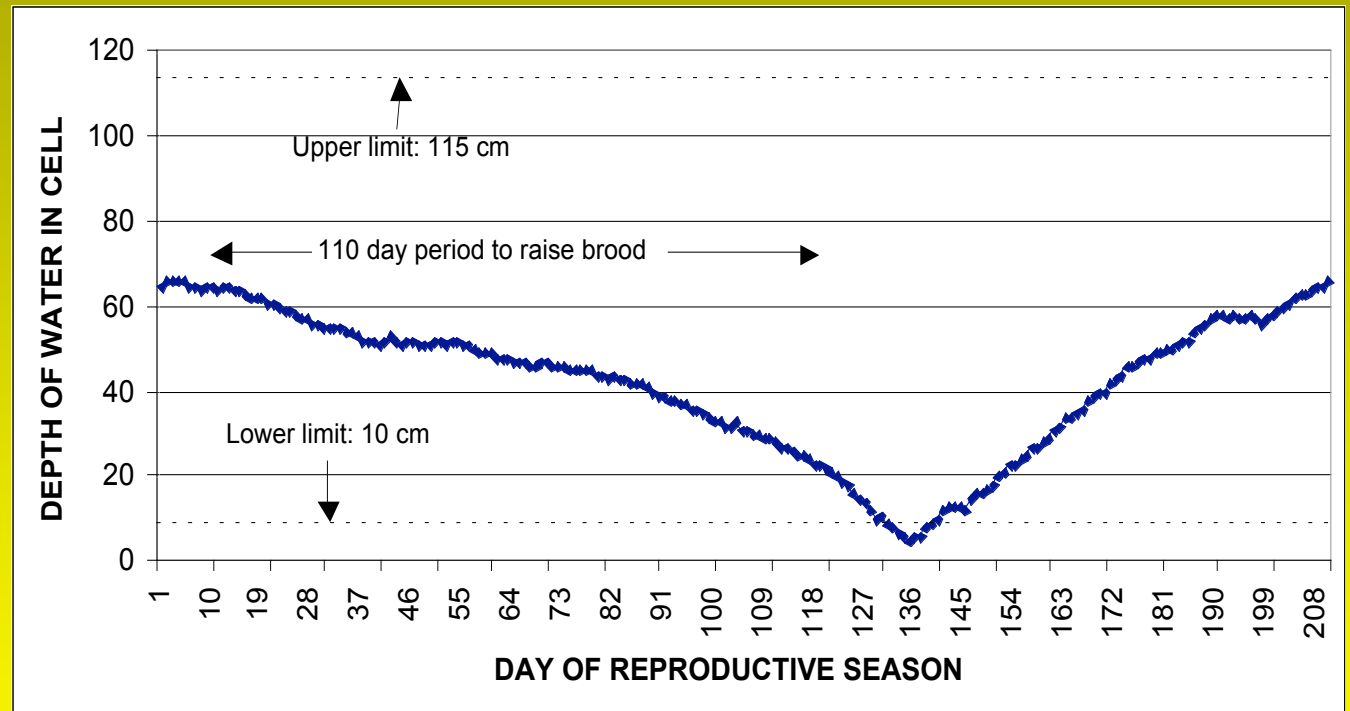
Snail Kite Spatially Explicit Species Index Model

The following quantitative rules are formulated based on the above ecological considerations:

- **Water depth during the breeding season rule**
- **Time since last dry-down rule**
- **Fraction of 10-year period inundated rule**

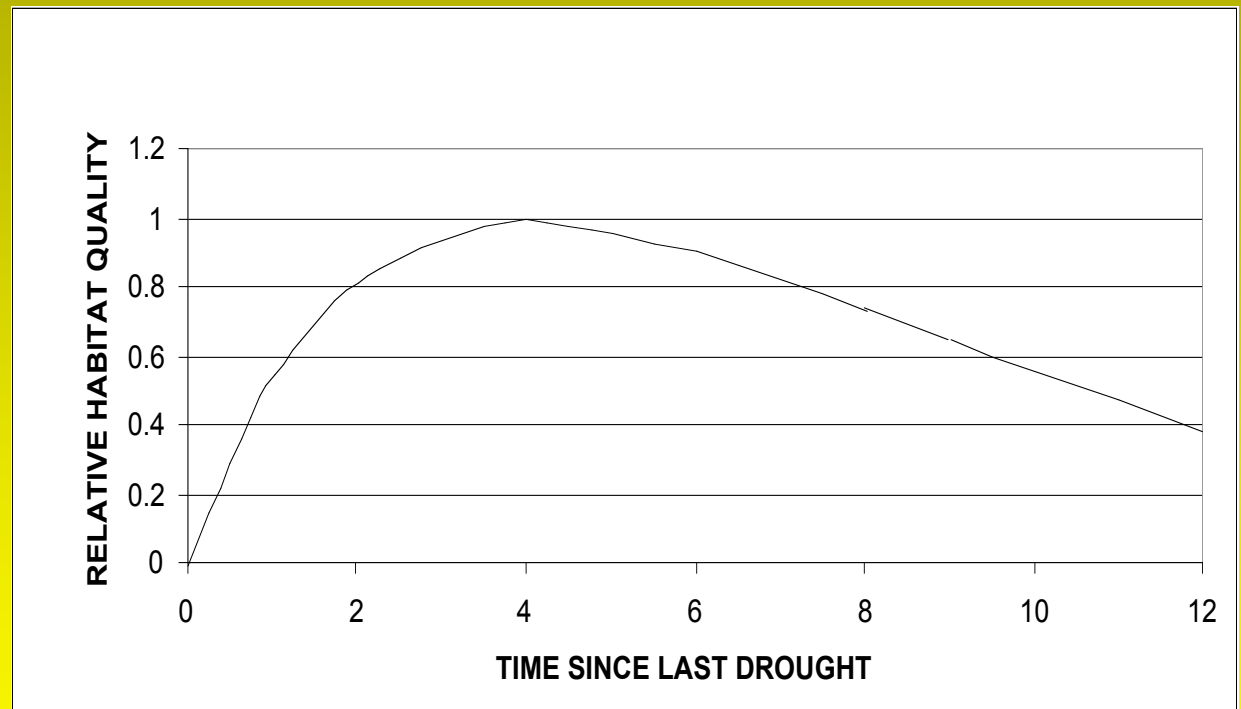
Water depth during the breeding season rule

To be classified as habitat a spatial cell must have daily water depth > 20 cm at start of breeding, then above 20 cm and below 115 cm for the rest of the period.



Time Since Last Dry-Down Rule

The habitat quality of a cell is diminished to zero the year of a drydown, and for a few years following the drydown. By the fourth year, recovery is assumed complete. However, deterioration of the habitat begins when time from last drought increases beyond four years.



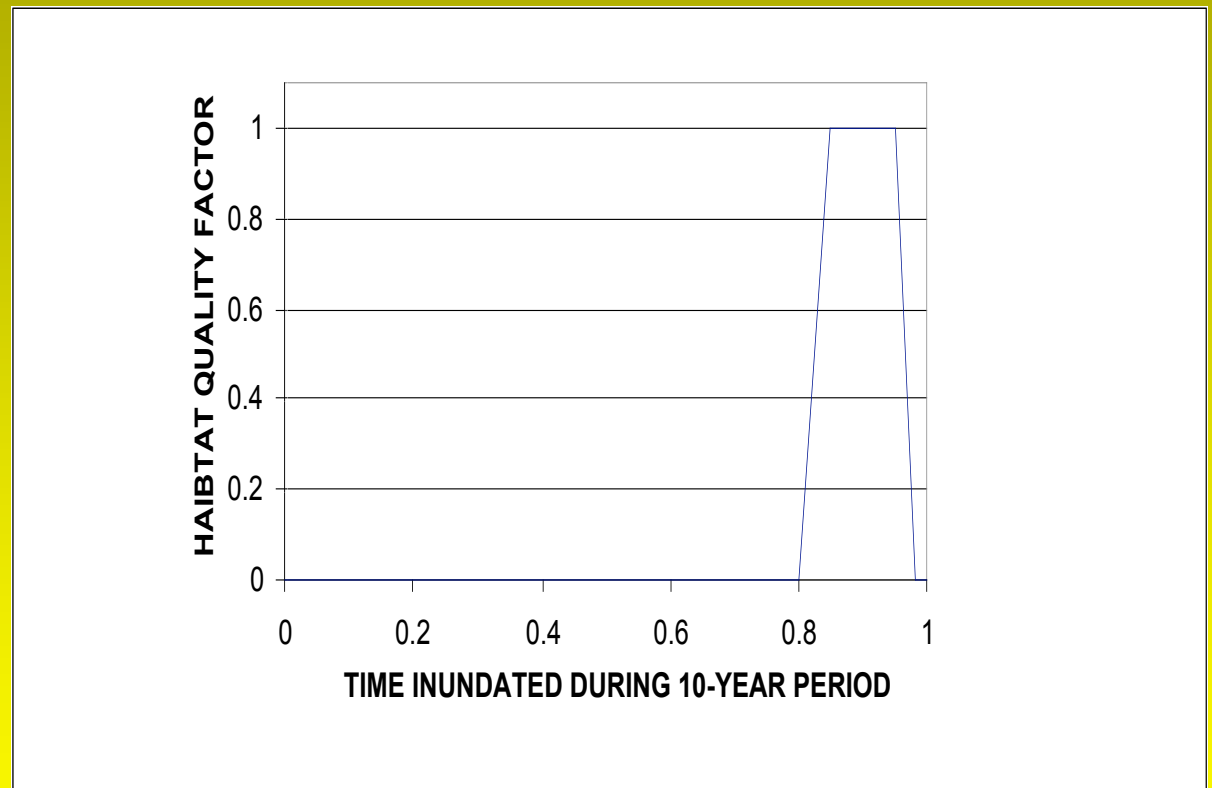
The factor here is the 'dryfactor'.

Fraction of 10-year period inundated rule

A spatial cell should be inundated at least 80% of the preceding 10 years to be suitable habitat.

However, inundation more than 98% of a 10-year period makes the cell unsuitable.

The factor here is the 'wetfactor'.



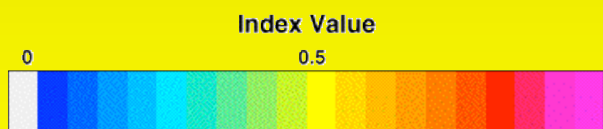
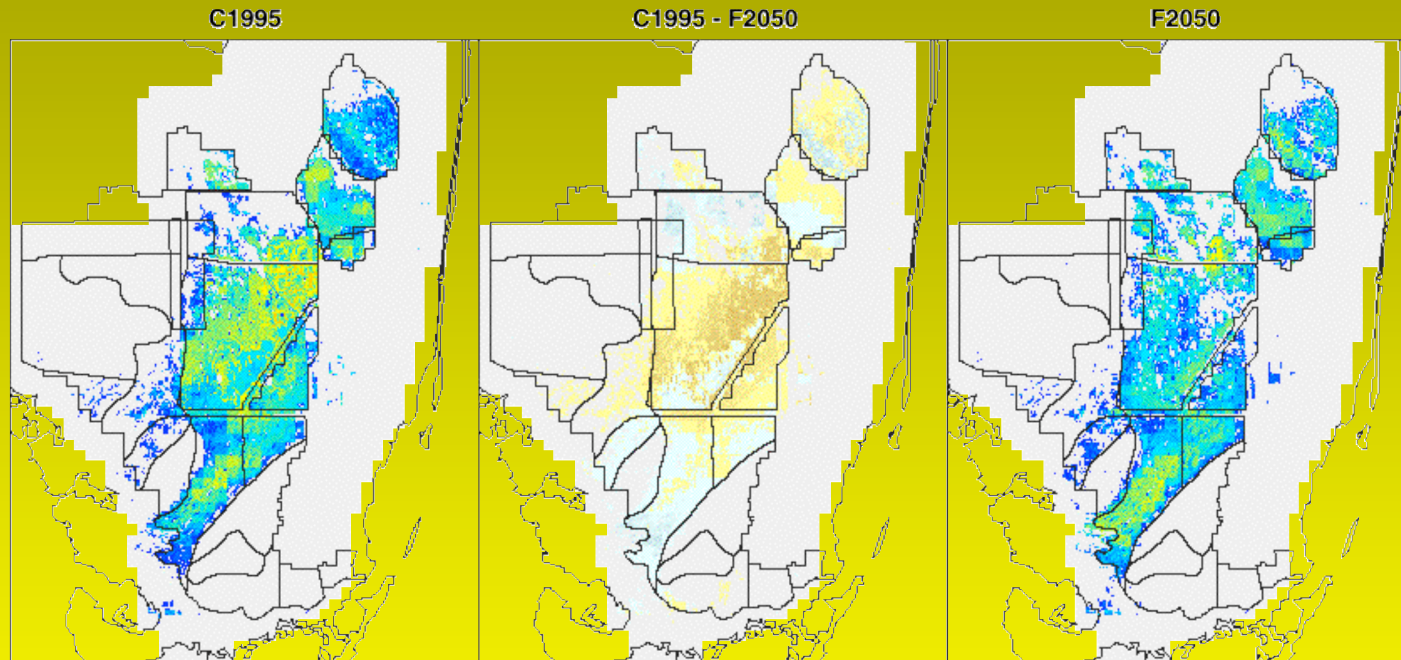
Total Snail Kite Breeding Potential Index

To obtain the total breeding potential index we take the ratio of the number of potential cycles, NC, to the maximum potential MaxNC, and multiply the minimum of the wetfactor and dryfactor:

$$\text{BPI} = (\text{NC}/\text{MaxNC}) * \text{Min}(\text{Wetfactor}, \text{Dryfactor})$$



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Snail Kite Index Mean

Snail Kite SESI Model: Comparative habitat quality

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