Fallax Crayfish Model
Requirements Document

INPUTS

The Fallax crayfish model requires two input layers: water depth and soil composition.

Water Depths

The water depth's layer will be produced by Everglades Depth Estimation Network (EDEN), which uses a series of water stations that measures water depth throughout the EDEN geographical area. Measurements from these stations are then extrapolated to produce depth approximations between these stations. These daily data are collected into quarter-yearly data, converted into Netcdf format over 400m grids in units of meters and/or centimeters.

Soil Composition

The soil composition layer will consist of a single ASCII grid file with 400m fixed grid cells. All cells will contain a coded value of 1 or 0 to represent heavy or light soils for that soil location. Soil compositions are based on their location within the classified boundaries of EDEN, which was reclassified into two distinct areas for the study: The Water Conservation Area (WCA) and The EDEN National Park (ENP). The only geographic requirement of this input data is that the grid cells and projection represents the same geographic area as a cell in the same position in the water depth input data.

Inputs

Input layer will consist of EDEN Netcdf files that contains fixed 400m grids in the UTM zone 17R projection. Files are to be of a contiguous daily time-steps that contains a "stage" (water levels) variable that contains three dimensions: X, Y and time.

The input layer will also consist of a Digital Elevation Model (DEM) EDEN Netcdf file containing a "dem" variable to represent the ground elevation for the study area. The ground elevation data is subtracted from the stage data to produce the water depths.

Outputs

The model generate two hydrological indices that are important to Everglades crayfish and subsequently used to generate the model's output.

Output	**Inputs**	**Time Resolution**	**Type**	**Optional**
Drought Stress	Water Depths	Time Step	Map	No
Long-Term Average Depth	Water Depths	Time Step	Map	No
HSI	Above outputs	Annual	Map	No

Drought Stress

For each year, sum the total number of days between August 31 (of the current year) and the previous September 1st (both inclusive) with water depths less than 0 cm to determine the length of the drought (LD) for each year at each point in the landscape. If the location of a cell is inside WCA 1, 2 or 3 then use the mapping described by the points (0, 1), (80, 1), (160, 0), where the first value of each ordered pair is the total number of days with water depth less than zero, and the second value is the resultant index. If the location is inside Everglades National Park apply the equation described by the points (0, 0.35), (100, 0).

Long-Term Average Depth

For each year, calculate the average depth for the current hydrological year and previous hydrological year; average the depth from June 1 from the previous calendar year through May 31 of the following calendar year. Using the calculated depth extract the Long-term Average Depth (LTAD) parameter value by the graph generated by the points (≤5 ,0), (10, 0.1), (15, 0.5), (25, 1), (35,1), (55, 0.4), (65,0.1), (≥80,0).

HSI

The HSI for a given year in ENP is equal to Drought Stress (parameter 1), but the HSI for WCA is the geometric mean of the two parameters for that year (the HSI for any given year is assigned the value of Drought Stress if the cell is within the ENP, and the geometric mean of, Drought Stress and Long-Term Average Depth if the cell is within WCA).

Optional outputs

The model also provides the option of viewing the daily depths for all available dates within the study.