# WETLACULTURE: UTILIZING NUTRIENT POLLUTION TO SUPPORT AGRICULTURAL CROPS IN SOUTH FLORIDA

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Waters around the world are experiencing algal blooms as a result of excess anthropogenic nitrogen and phosphorus, largely from agricultural runoff. Wetlaculture- the periodic flipping of land between wetlands and agriculture- offers a landscape-scale solution to not only sequester these nutrients from aquatic systems, but to recycle them to agriculture, thus reducing the need for additional fertilizer. Wetlands are well-known to effectively remove N and P from water and store them in the soil. By flipping wetlands that store nutrients with agriculture that consumes them, Wetlaculture presents a sustainable agricultural system with the potential to significantly mitigate algal blooms. A wetlaculture mesocosm experiment was started in 2018 at Freedom Park wetlands in Naples, Florida. Twenty-eight $1m^2$ mesocosms were filled with site soil and planted with *Cladium jamaicense*. These mesocosms are evenly split between high and low flow, and high and low water level, for a total of four treatments of seven mesocosms each. Water is pumped into the mesocosms from an urban drainage ditch onsite. Periodic measurements are taken of the nutrient content of water flowing into and out of the mesocosms to evaluate their efficacy and estimate nutrient retention. After four years, one mesocosm from each hydrologic treatment will be drained and planted with a popular South Florida crop to determine their capacity to support agriculture. Soil samples after 3 or 4 years will determine the N and P accumulated in the experimental wetland mesocosms, and crop yield (biomass) will ultimately be measured and compared with regional agricultural standards. Two major crops from the Everglades Agricultural Area are being evaluated for suitability: sweet corn (*Zea mays var. saccharata*) and sugarcane (*Saccharum officinarum*) although energy crops may be investigated too. Estimates of N and P retention in mesocosms will be compared with known N and P demand values for these crops to determine which is most appropriate.

**PRESENTER BIO:** Kyle Boutin is a first-year student in the Environmental Science M.S. program at Florida Gulf Coast University.