**File descriptions:**

**Folder “EmpiricalAnalysis”:**

* **FHC\_VonBgrowth.R** : R script for quantifying the intraspecific spatial variability of flathead catfish (FHC) growth using a Bayesian hierarchical von Bertalanffy growth model
* **FHCLengthAtAgeData.csv** : file containing observed flathead catfish length-at-ages

**Folder “PowerAnalysis”:**

* **PowerAnaylsis.R** : R script for running the power analysis. All steps are commented out. The framework is encouraged to be adapted to investigate other effects [magnitude and direction], species, sampling scenarios, and estimating effects on other growth parameters
* **Age\_structure.txt** : text file of FHC proportion-at-ages calculated from the observed data

**Abbreviated steps for assessing the ability to detect a macroscale effect of fish growth:**

**Step 1**: Use FHC\_VonBgrowth.R script to run the Bayesian hierarchical von Bertalanffy growth model using observed FHC length-at-age data

**Step 2**: Save MCMC output from spatial growth model as RDS file

**Step 3**: Open PowerAnalysis.R script and read in the spatial growth model output from step 2

**Step 4**: Edit input parameters as needed (e.g.; effect magnitude, number of fish sampled from each lake, and number of lakes sampled)

**Step 5**: Read in Age\_structure.txt file which will be used to generate length-at-age data with the same proportion of ages as observed data

**Step 6**: Grab MCMC parameter estimates from the range of posterior parameter distributions estimated from the empirical analysis (step 1)

**Step 7**: Generate a population of length-at-age data for each lake using information in steps 5 and 6

**Step 8**: Randomly sample a specified number of fish from each lake population

**Step 9**: Fit von Bertalanffy growth model (step 1) with added covariate to simulated datasets

**Step 10**: Steps 7-9 are repeated for every simulation run

**Step 11**: Calculate statistical power, and or, detection probability of the sampling design

\*For a more detailed description see Massie et al. 2020

\*\*Important to note that the power analysis process is computationally intensive and could take up to three weeks to complete (depending on the sampling design being investigated)