

“Scientist to Scientist” Discussion of the Bayesian Linked Population Model Presented by Sara Reynolds and Mike Colvin of Mississippi State University (MSU) in the 4 November Fall Science Meeting Fish Webinar

Date: 11 November 2020

Attendees: Steven Bartell (ISAP), Mike Colvin (MSU), Darcy Piccard (ESSA), Sara Reynolds (MSU), Robert Turner (TPSN), William Warren-Hicks (ISAP)

Objective: Provide members of the ISAP additional insight into the mathematics of the Bayesian Linked Population Model, including data inputs, state of development, and outputs that aid in adaptive management (AM).

Major Findings:

- Mike provided a detailed overview of the model framework, including presentation and discussion of the JAGS code, mathematics of the linked fish age groups up to adult, explanation of likelihood functions and prior distributions, data requirements, and outputs.
- The participants discussed possible outputs and advances in the model that might be useful in AM, including (1) calculation and presentation of the conditional probabilities when moving from one age group to another, (2) inclusion of predictive covariates in both the river bend binomial function and the logit survival function (e.g., distance measurements from the shore or down the river), (3) possible graphical outputs that would communicate to decision makers, including the number of fish caught (as a distribution) between years based on management decisions, (4) the use of informative priors, and (5) linking model outputs to management decisions (e.g., estimating the optimal number of ICRs needed for population increase, given the uncertainty in model predictions), and (6) estimation of age-0 fish abundance when sampling found no age-0 fish from information contained in future catches.
- The ISAP members were impressed by the possible use of this model in AM, and came away with a better understanding of the current model and possible future updates.