

Title: Machine Learning with R for USACE Ecological Modeling

Abstract: Machine learning (ML) approaches excel at using data to generate insights and make predictions, and therefore have considerable potential for understanding and predicting how restoration projects will impact species, communities, and ecosystem processes. ML has a reputation for technical complexity and incomprehensibility, but recent advances make using and interpreting ML models more accessible, including the Tidymodels package in R. Tidymodels is an integrated ecosystem that streamlines complete ML workflows using numerous different algorithms in R. In this workshop, we will provide a brief overview of ML, and particularly the commonly used ML algorithm Random Forest. Then, we will demonstrate the use of Tidymodels in a planning-relevant analysis in which we assess the relationship between environmental predictors and the presence of a common restoration target, the bluegill. This type of analysis can be used to improve ecological models used in restoration planning contexts, and this session should give attendees the tools to begin exploring ML models in their own work.

Presenter: Ed Stowe, PhD
ORISE Postdoctoral Fellow
Environmental Lab
Engineer Research and Development Center
Athens, GA

Bio: Ed Stowe is an ORISE Postdoctoral Fellow with the U.S. Army Engineer Research and Development Center (ERDC) Environmental Lab. He holds a B.S. in Biology from Yale University and a PhD in Ecology from the University of Georgia. His research focuses on using quantitative tools and models to evaluate the effects of management and restoration activities on freshwater fish and other organisms.