



Species Distribution Modeling with Google Earth Engine

July 7 & 14, 2026

Session A: 9:00 - 10:30 EDT (UTC-4)

Session B: 16:00 - 17:30 EDT (UTC-4)

Species Distribution Models (SDMs), sometimes referred to ecological niche or habitat suitability models, are a commonly used analytical technique to link known species locations with environmental predictor variables to assess patterns of species occurrence and habitat suitability. SDMs have been successfully used to model the distributions of various species, from butterflies to baleen whales, with a goal of using associations with habitat variables, such as elevation, vegetation greenness, or distance to human settlements, to map a species' potential distribution across a land or seascape. To implement SDMs, we will fit models using Google Earth Engine (GEE), a cloud-based spatial analysis platform that can greatly simplify the process of accessing and analyzing huge quantities of remotely sensed data.

This course begins by introducing key SDM concepts for participants working in ecology, conservation, or wildlife biology. The course then provides a basic introduction to Google Earth Engine (GEE) and JavaScript coding before moving on to spatial data manipulation and example workflows for species distribution mapping in GEE. Participants need no prior experience working with GEE, but we assume participants have a basic understanding of GIS data and concepts, such as rasters (including stacks or multi-band images), vectors, projections and spatial resolution.

Part 1: Foundations of Species Distribution Modeling with GEE

ARSET Instructor: Justin Fain (BAERI/ARC) & Sativa Cruz (BAERI/ARC)

Guest Instructors: Jared Stabach (Smithsonian), Grant Connette (Smithsonian), & Ramiro D. Crego (University College Cork)

- Introduction to SDMs and Habitat Suitability
- SDMs in GEE
- Understanding SDMs (High-level Overview)
- Model Inputs
- Brief Overview of GEE
- Summary and Q&A

Part 2: Building, Evaluating, and Interpreting a MaxEnt Model

ARSET Instructor: Justin Fain (BAERI/ARC) & Sativa Cruz (BAERI/ARC)

Guest Instructors: Jared Stabach (Smithsonian), Grant Connette (Smithsonian), & Ramiro D. Crego (University College Cork)

- Building a Machine Learning Model
- Model Fitting and Evaluation
- Model Tuning
- Interpreting Model Outputs
- Additional Considerations
- Summary and Q&A



ARSET empowers the global community through remote sensing training.