Reference SON: *2015-ER-14 Data Assessment of Species and Habitat Migration Due to Changing Conditions*

Lead PI: *Jacob Jung (ERDC)*

Project Development Team (PDT): *Eric Britzke, Austin Davis, Richard Fischer, Michael Guilfoyle, Christina Saltus (ERDC)*

Proponent(s)/District Collaborators: *Timothy Fleeger (LRP); Mark Cornish (MVP); Rena Weichenberg (CoP Lead), Mike Vissichelli (NAD); Todd Randall (NAN); David Schulte (NAO); Beth Adams (NAP); Mike Scuderi (NWD); Gina Paduano Ralph (SAJ)*

Funded: *2016-2020*

Keywords: *Changing Conditions, Habitat migration, Restoration prioritization, TES, TERS*

Last updated: 05/09/2025

Data Assessment of Species Habitat Migration due to Changing Conditions[1]

Research Need

USACE is tasked with the monitoring and conservation of numerous threatened, endangered, and at-risk species (TER-S) over more than 12 million acres. Managing a number of TER-S spread across a large geographic area makes conservation efforts difficult particularly when complicated by habitat shifts driven by changing conditions.

Changing conditions, such as temperature and precipitation changes, can impact vegetation phenology and may disrupt ecosystems in ways that change the habitat of TER-S; such changes may also influence the dispersal of invasive species.

With the wide breadth of potential impacts from changing conditions, earlier efforts have focused on developing tools for specific circumstances and/or impacts. However, as influencing factors change independently, a more comprehensive methodology is needed to predict the impacts of changing conditions across a variety of situations and locations. What is needed is a tool that enables managers to prioritize conservation actions to get the most return on investment. Given that a large number of species/geographic areas are impacted by changing conditions, a framework is needed to enable site comparisons and allow for prioritization of restoration efforts.

Project Objectives & Plan

This effort will develop a working model that can serve as a tool to predict range shifts of threatened, endangered, at-risk species (TER-S), and invasive species as environmental conditions are altered. This tool will assist the USACE with restoration project planning and preparation that incorporates management for TER-S and invasive species. A case study of the tool will be in the North Atlantic Division (NAD). The tool also will serve as an early detection warning for invasive species that are likely to invade sites and thus allow for proactive management to reduce impacts to the environment and to TER-S.

Products developed from the proposed work will directly support the USACE Environmental Changes Adaptation Plan and the Infrastructure and Installation Resilience Community of Practice. While the initial development will utilize NAD as an example of its utility, this approach will be easily transported to other locations throughout USACE.

The primary products will be a series of Tech Notes that demonstrate and detail the capabilities of the predictive model for TER-S and invasive species migration associated with changing conditions. A web-based GIS visualization tool will also be developed to display regions of vulnerability for given species. Additional major deliverables will include the conceptual and actual predictive model for TER-S migration in the NAD. Results will also be disseminated to the USACE via a webinar demonstration.

Payoff

The predictive model for TER-S in NAD will assist USACE in both Planning and Operations business lines (restoration efforts and mission requirements for project operations) by predicting range shifts of TER-S and invasive species that occur within the NAD. This model can be extended to incorporate other Areas of Responsibility (e.g., USACE Divisions, training areas) to assist in a proactive approach and early awareness to changes in habitat, shifts in plant communities associated with both TER-S and invasive species, and species composition. In addition, the model could aid the USACE in establishing better interagency cooperation to support environmental change adaptation including involvement with groups such as the Infrastructure and Installation Resilience CoP and the Climate Data and Tools Working Group.

Products

Technical Reports (TRs)

Jung, J.F., Guilfoyle, M.P., Saltus, C.L., Britzke, E.R., Fischer, R.A. and Davis, A.V. (2021). Threatened, endangered, and at-risk species for consideration into climate change models in the Northeast (ERDC/EL SR-21-7), Special Report. U.S. Army Engineer Research and Development Center, Vicksburg, Mississippi.

Technical Notes (TNs)

Davis, A.V., Fuentes, A.A., Jung, J.F., Theel, H.J., Britzke, E.R. and Fischer, R.A. (2019). Tools for predicting wildlife species distribution response to ecological shifts (ERDC/TN EMRRP-EI-05), Technical Note. U.S. Army Engineer Research and Development Center, Vicksburg, Mississippi.

[1]Project Alias–Work Unit Documentation Title: *Data Assessment of Species and Habitat Migration due to Changing Conditions*