

# Ecosystem Management & Restoration Research Program



**US Army Corps  
of Engineers.**  
Engineer Research and  
Development Center

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### ENVIRONMENTAL LABORATORY

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### Urban Stream Restoration

The effects of urbanization exert extensive and ever-increasing impacts on aquatic resources. This team is developing a web-based technical support system that includes an interactive conceptual model, an urban stream classification system and a toolkit to equip the Corps to plan and design effective restoration projects in urban environments.

POC: Craig Fischenich

### Modeling Incorporating Ecosystem Goods and Services:

In response to increased pressure by Congress and others to illustrate the value of Ecosystem Restoration projects, this project addresses the need to more fully account for environmental benefits in Corps project planning by investigating the utility of an Ecosystem Goods and Services (EGS) framework.

POC: Elizabeth Murray & Janet Cushing

### Engineering with Nature for Sustainable Coastal Ecosystems

The complex array of industry, recreation, and human well-being surrounding coastal systems have exposed the need for robust science and engineering capability to improve the efficiency and expand the benefits from our projects while improving the resilience of coastal systems. This team, among other things is exploring the manipulation of sediments using coastal processes to help achieve restoration or to sustain restored coastal features in the face of short and long-term stressors.

POC: Todd Bridges

### Assessing Hydrologic Connectivity for Ecosystem Restoration

Land use conversion, dams, road crossings, levees, water diversions, and myriad other actions impact connectivity by altering flow regimes, organism movement, local geomorphology, and nutrient cycling. This project provides a scientific basis for assessing and quantifying connectivity for a variety of ecological processes as well as concrete examples applying these methods to restoration project planning.

POC: Kyle McKay

### Oyster Suitability and Benefits Modeling

This effort will provide USACE with a certified oyster ecosystem output model that is applicable on the Atlantic and Gulf coasts and used for impact analysis and restoration for projects that affect oysters. This model will enable Corps districts to plan, design, and implement oyster restoration projects that restore functional integrity and dynamism in coastal and estuarine environments.

POC: Todd Swannak

## **Interactions of Flow and Vegetation**

The already familiar HEC-RAS will be expanded to include a riparian vegetation module for predicting the interactions between flow and riparian vegetation in the flood plain and aiding the science, economics, and policy of riparian ecosystem management and restoration. POC:

Billy Johnson

## **Assessing Barrier Islands Environmental Vulnerability**

This interdisciplinary team is developing an integrated suite of models to assess barrier island ecosystem change through the assimilation of field data, remotely sensed data, landscape evolution, and hydrodynamic, morphological, and ecological modeling.

POC: Candice Piercy

## **Planning Practices and Techniques**

In order to better equip planners for Smart Planning requirements a Risk Register tool that implements practices and techniques emerging from planning modernization efforts and facilitates development of risk-informed study reports.

POC: Erin Rooks

## **Critical Species Modeling for Restoration and Planning**

The goal of this project is to develop and standardize a general methodology for critical species modeling that meets the guidelines certification guidelines and allows models to be developed in a faster, more efficient manner, while maintaining scientific integrity and transparency in the model development process.

POC: Todd Swannack

## **Managing Movement of T&E and Invasive Species**

This work was prompted by needs of the navigation modernization feasibility study for three locks on the upper Ohio River and also the USFWS Biological Opinion on the Ohio River Navigation System. To meet these specific needs as well as provide broader solutions for Nation-wide application, hydrodynamic models are being developed of navigation facilities supporting proposed fish passage strategies with predictions of fish movement near locks and dams, and benefits of proposed alterations.

POC: Dave Smith

## **Spatial Removal Patterns for Riparian Invasive Species**

This research will identify invasive woody riparian plants that are most problematic to USACE ecosystem restoration efforts and develop guidelines that suggest when and where on the landscape to control invasive woody plants. Additionally, the research will investigate how faunal communities respond to various woody invasive plant removal methods in densely vegetated riparian habitats.

POC: Rich Fischer

## **Effects of Beneficial Uses of Dredged Material**

While the ecosystem benefits associated with beneficial use of dredged material is readily recognized, resource constraints prevent the monitoring necessary to quantify and validate those benefits. This team will use geospatial data paired with field data collection to quantify and validate landscape changes to quantify restoration benefits and assess the potential to promote and protect land building functions.

POC: Glenn Suir

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<http://cw-environment.usace.army.mil/restoration.cfm>