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Aquatic plant restoration threshold identification & 2024-2112 River and reservoir aquatic plant restoration and establishment

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Project Development

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Other Partners:

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Establishing Sustainable Aquatic Vegetation Communities in Rivers and Reservoirs

Research Need

Aquatic ecosystem restoration (AER) projects are necessary to overcome environmental impacts and restore native aquatic vegetation on USACE-managed reservoirs and rivers. The current paradigm is to establish small-scale, protected (from direct biotic disturbance and herbivores) plant colonies, which will contribute to seed and tuber banks and produce propagules to promote recruitment at broader spatial scales. However, factors limiting spread and recruitment at active restoration sites are poorly understood, increasing uncertainty for large-scale implementation.

Current restoration strategies need further refinement to better understand how to overcome biotic and abiotic factors inhibiting recruitment and spread across a larger landscape. Knowledge gaps exist in identifying thresholds (not just factors) that must be overcome to establish sustainable aquatic vegetation communities arising from AER efforts.

Project Purpose & Objectives

The proposed project aims to identify thresholds required to scale-up aquatic vegetation establishment efforts to a broader landscape through the following approach:

- Identify factors that limit scaling-up aquatic plant establishment efforts related to biotic disturbance impacts (benthic feeding or fish nesting activities) compared to direct grazing/herbivory; and abiotic impacts (water level fluctuations, water clarity, prolonged inundation/desiccation),
- Evaluate methods experimentally to determine thresholds,
- Demonstrate methods in the field.

Value of Research and Development (Payoff)

This work will help establish restoration methods that are resistant and resilient to biotic and abiotic factors limiting large scale revegetation to improve design and operation of aquatic

vegetation management, reduce overall project costs, and minimize technical and ecological risk over the life of the project.

Products and Deliverables

Journal Articles (JAs)

Goss, M., L. Dodd, T. Slack, N. Fauchaux, D. Ruppel, J. Collins, and A. Schad. (In preparation). Identifying Thresholds to Improve Methods to Establish Native Aquatic Vegetation.

Technical Reports (TRs)

Dodd, L., E. Russ, T. Slack, M. Goss, N. Fauchaux, D. Ruppel, and A. Schad. (In preparation). Guidance for establishing sustainable submersed and emergent aquatic vegetation communities in rivers and reservoirs, Technical Report. U.S. Army Engineer Research and Development Center, Vicksburg, Mississippi.

Other Reports/Models/Tools/Datasets

Dodd, L., E. Russ, T. Slack, M. Goss, N. Fauchaux, D. Ruppel, and A. Schad. (In preparation). Identifying knowledge gaps in establishing native aquatic vegetation in rivers and reservoirs, Special Report. U.S. Army Engineer Research and Development Center, Vicksburg, Mississippi.

Dodd, L., T. Slack, M. Goss, N. Fauchaux, D. Ruppel, and A. Schad. (In preparation). Annual report on Year 2 study findings and activities: Field and mesocosm studies to identify thresholds to improve methods to establish native aquatic vegetation, Project Report. U.S. Army Engineer Research and Development Center, Vicksburg, Mississippi.

Goss, M., L. Dodd, T. Slack, N. Fauchaux, D. Ruppel, and A. Schad. (In preparation). Mesocosm experiment to determine flood and desiccation, and herbivore tolerance of establishing macrophytes. Dataset, U.S. Army Engineer Research and Development Center, Vicksburg, Mississippi.

Slack, T., M. Goss, N. Fauchaux, D. Ruppel, J. Collins, A. Schad, and L. Dodd. (In preparation). Faunal surveys of active aquatic plant restoration sites. Dataset, U.S. Army Engineer Research and Development Center, Vicksburg, Mississippi.

Conference Presentations/Webinars/Workshops

Dodd, L., E. Russ, T. Slack, M. Goss, N. Fauchaux, D. Ruppel, and A. Schad. (In preparation). Benefits and challenges of active restoration of emergent and submersed aquatic vegetation

efforts in rivers and reservoirs. Workshop. U.S. Army Engineer Research and Development Center, Vicksburg, Mississippi.

Dodd, L., E. Russ, T. Slack, M. Goss, N. Fauchaux, D. Ruppel, and A. Schad. (In preparation). Findings of technical development workshop: Benefits and challenges of active restoration of emergent and submersed aquatic vegetation efforts in rivers and reservoirs. Webinar. U.S. Army Engineer Research and Development Center, Vicksburg, Mississippi.

Dodd, L., E. Russ, T. Slack, M. Goss, N. Fauchaux, D. Ruppel, and A. Schad. (In preparation). Field demonstration: Guidance for establishing sustainable submersed and emergent aquatic vegetation communities in rivers and reservoirs. Workshop. U.S. Army Engineer Research and Development Center, Vicksburg, Mississippi.