Supporting Innovation in 404 Stream Mitigation for Improved Ecological Outcomes

Problem Statement and Recommended Solutions

Section 404 of the Clean Water Act established a permitting program for the dredging and filling of navigable waters. Administered by the Environmental Protection Agency and U.S. Corps of Engineers, the 404 program issues permits for impacts to wetlands and streams. In some cases, these “404 permits” require appropriate compensatory mitigation, or offsetting, of similar aquatic resources nearby. Under the Section 404 program, early mitigation projects mainly focused on wetland rather than stream conservation, which led to concerns that the program was systematically replacing losses to streams with wetlands. In response to this “out-of-kind" mitigation problem, stream-specific methodologies have been developed and broadly implemented.

Between November 2022 and May 2023, Meridian Institute, with the support of the Walton Family Foundation and Ecological Restoration Business Association convened mitigation bankers, agency staff, non-profit organizations, and academic experts in a series of roundtables. Together, they explored the challenges to and opportunities for improving ecological outcomes and encouraging innovation under Section 404 of the Clean Water Act. The outcome of this collaborative, multistakeholder process is a Problem Statement that articulates a consensus on problems in the current CWA Section 404 stream mitigation program’s operation and a set of Recommended Solutions.

This consensus document is intended to highlight the key challenges identified by experts in the field and propose a range of potential solutions to the stated problems. Participants recognize that the U.S. Army Corps of Engineers and the Environmental Protection Agency are key audiences for the Problem Statement and Recommended Solutions; however, improving ecological outcomes of the 404 stream mitigation program will require contributions from a range of actors across the nation, including mitigation bankers, state and Tribal agencies, developers, scientists, environmental groups, consultants, and others.

The following Problem Statement and Recommended Solutions were developed by 25 meeting participants. The participants reached consensus in their individual capacity as experts and practitioners, but do not necessarily have organizational sign off on the statements below. Federal and State agency members participated to inform deliberations and did not participate in the consensus process.

Problem Statement

FINDING 1. THERE IS A RANGE OF APPROACHES TO RESTORE STREAMS THAT CAN RESULT IN POSITIVE ECOLOGICAL OUTCOMES IN PARTICULAR SETTINGS, BUT THE FULL RANGE OF APPROACHES IS NOT BEING USED IN SECTION 404 STREAM MITIGATION.

1.1. No single approach should be the default or presumed stream restoration approach for compensatory mitigation.

1.2. Restoration projects that focus on channel form and stability have demonstrated positive ecological outcomes across some but not all settings. Restoration projects that utilize alternative restoration approaches can result in positive ecological outcomes in some settings.[1]

1.3. Each location is different and thus requires restoration particular to the watershed context of the project.

FINDING 2. THE CURRENT EMPHASIS ON CHANNEL FORM AND STABILITY FOR THE MITIGATION REVIEW PROCESS CAN CREATE BARRIERS TO PROPOSING ALTERNATIVE APPROACHES.[2]

2.1. In the mitigation review process, restoration projects that focus on channel form and stability are regarded as lower risk than "less common" approaches.

2.2. In many cases, established policies and practices are barriers for alternative approaches. The mitigation review process provides few, if any, incentives to pursue alternative approaches.

FINDING 3. CURRENT PLANNING, MONITORING, AND EVALUATION OVEREMPHASIZE METRICS TIED TO CHANNEL FORM AND STABILITY INSTEAD OF THE SUITE OF PHYSICAL, BIOLOGICAL, AND CHEMICAL PROCESSES WHICH SUPPORT ECOLOGICAL OUTCOMES.

3.1. Monitoring and performance metrics underlie the evaluation of mitigation. The current metrics for measuring stream mitigation outcomes are often disconnected from project goals and objectives by largely focusing on channel form and stability, which does not capture the complexity and long-term outcomes associated with dynamic systems.

3.2. Dynamic stream processes can be difficult to measure and will require changes in planning, monitoring approaches, performance metrics, and crediting methodologies.

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[1] An example of an alternative restoration approach resulting in positive ecological outcomes: Loadholtz, Logan; Huang, Tianshu; & Mason, Kathleen (2021). *Milburnie Dam: A case study for management implications of dam removal mitigation banks.* Duke University. https://hdl.handle.net/10161/22627.

[2] There are a variety of alternative approaches, which may include dam removal, process-based, stage zero, beaver-related restoration, and acid mine drainage remediation, among other approaches.

FINDING 4. CURRENT MITIGATION TRAINING RESOURCES DO NOT COVER A BROAD RANGE OF STREAM RESTORATION APPROACHES.

4.1. Training is essential for disseminating information and case studies, as well as building collective acceptance for alternative approaches across different regions and districts. Current training has focused more on a single approach with inadequate consideration of context. Training doesn't exist to match restoration approaches to context.

4.2. When alternative approaches or innovations are attempted and successful, it can be difficult to transfer the findings from one Corps district to another. This uneven sharing of insights among districts limits the scalability of innovation in mitigation.

4.3. Mechanisms for continuous learning and incorporating the latest information into permitting and crediting are insufficient.

FINDING 5. EXISTING POLICY MECHANISMS THAT ALLOW THE FLEXIBILITY TO APPLY A RANGE OF RESTORATION APPROACHES ARE UNDERUTILIZED.

5.1. The 2008 Mitigation Rule[3] provides authority for regulators to approve a range of approaches to restoration, but its full potential remains untapped.

5.2. The watershed approach,[4] a central feature of the 2008 Mitigation Rule, provides greater opportunity for alternative approaches but remains unevenly defined and underutilized.

5.3. In-kind and out-of-kind[5] determinations are unclear and inconsistently applied. Some crediting and debiting proposals and local policies can create barriers to application of the watershed approach by singularly relying on aquatic resource classifications for determining appropriate compensatory mitigation.

[3] Compensatory Mitigation for Losses of Aquatic Resources, EPA 73 FR 19593 (2008); USACE 33 CFR 332 (2008).

[4] General Compensatory Mitigation Requirements; Watershed Approach to Compensatory Mitigation, EPA 40 CFR 230.93(c) (2008); USACE 33 CFR 332.3(c) (2008).

[5] Definitions, 40 CFR 230.92 (2008); USACE 33 CFR 332.2 (2008).

Recommended Solutions | Proposed Actions to Support Innovation in Stream Mitigation for Improved Ecological Outcomes

The four sections below outline specific actions that will solve or improve the challenges in four broad areas: 1) learning and training, 2) measuring, permitting, and crediting, 3) regional and watershed approaches, and 4) implementation.

A. LEARNING AND TRAINING

Regulatory officials and practitioners will benefit from additional training in the variety of techniques for stream restoration beyond those emphasizing channel form and stability. There should be a strong focus on training materials that teach a variety of restoration approaches, their underlying processes, and analytical skills to determine which strategies are most appropriate in a particular setting. Foundational information such as regional stream types, ecosystem processes, and functions should also be covered.

1. **Build greater awareness of alternative restoration approaches.** A comprehensive inventory of current restoration practices is necessary to build recognition and acceptance of the range of practices used in the field. This information could be captured in the RIBITS tracking system and subsequently shared in a regular newsletter. Highlighting alternative approaches will help develop a shared understanding of available tools and policies, build stakeholders' confidence in alternative approaches, and encourage continuous learning. The following items and examples could be evaluated through such an effort:
    a. Monitoring, assessment methods, and performance standards being used that are tied specifically to processes over form
    b. Definitions and applications of the watershed approach
    c. Definitions and applications of 'in-kind' mitigation
    d. Examples of successful projects across the range of restoration approaches
    e. Examples of projects that were less successful and the conditions and/or mechanisms explaining why

2. **Develop training programs and resources.** Training regulators and practitioners is fundamental to encouraging alternative approaches. Restoration approaches are harder to implement if they appear in conflict with or outside the practices referenced in training materials. As a result, serious consideration should be paid to the content, creation, and implementation of training programs that support alternative restoration approaches. Initial support for the creation and implementation of this training could be from EPA Wetland Program Development Grants and the U.S. Army Corps of Engineers' Engineer Resource and Development Center. Training programs should:
    a. Be developed by a broad group of stakeholders to ensure buy-in
    b. Include national-scale trainings as well as more specific regional workshops that highlight practical applications in specific geographies
    c. Be designed for the separate target audiences of regulators, permit writers, and project providers

d. Include models and mechanisms that ensure trainings are based on current science and alternative practices (e.g., a broad distribution RFP or a cooperative model that brings together experts to inform training development)

The content of the trainings could include:

a. A structured approach for evaluation of projects featuring techniques that have not yet been implemented in a particular district
b. Resources and training on how to match the appropriate restoration approach(es) to the watershed context
c. Resources and training on how to match monitoring, assessment methods, and performance standards to various restoration goals, ecosystem processes, and alternative restoration approaches
d. Methods that identify how to tell when a site is genuinely failing, what to do if a project fails, and adaptive management techniques

B. MEASURING, PERMITTING, AND CREDITING

1. **Ensure direct measurement of ecological processes.**
    a) Develop a guide for applying the watershed approach in permit decisions that address the appropriate replacement of stream processes, not stream forms
    b) Tie the goals and objectives of mitigation projects to appropriate ecological performance standards, practical metrics, and a plan to report ecological outcomes
    c) Develop an inventory of goals and their performance standards, as well as case studies of what people are doing
    d) Ensure that learning and training (from Section A) on alternative approaches ultimately informs guidance and metrics for implementation
    e) Update measurements and methodologies regularly with current science and information
2. **Take an ecological performance approach for credit release.** The 2008 Mitigation Rule provides authority for regulators to approve credit schedules tied exclusively to ecological performance standards regardless of the time it takes to meet the standard.
3. **Prioritize restoration of ecological processes**. Monitoring requirements, crediting protocols, and performance standards should focus on capturing the restoration of ecological processes when possible. Because some ecological processes may require longer time horizons than a typical monitoring period, trajectory-based credit release milestones may balance the need for ecological performance verification with timely credit release. Such an approach for projects could eliminate compliance risk by only releasing credits once predetermined ecological milestones have been achieved.
4. **Incentivize a watershed approach.** Consider granting a percentage of additional credits to encourage innovative or novel elements within an individual project that result in ecological benefits. Granting additional credits for watershed-approach projects and projects that test new measures/metrics could support the implementation of efforts that target specific ecological settings or impaired functions within a larger watershed than the mitigated stream bank.

C. REGIONAL AND WATERSHED APPROACHES

1. **Provide watershed approach guidance for permit writers.** Identify successful examples of implementing the watershed approach in the determination of appropriate compensation in the permitting process as well as expansive understandings of in-kind restoration. Building from this analysis, identify and develop criteria for specifying which types of aquatic resource degradation are most important to address in a watershed (this would ultimately support how regulators understand priority areas for restoration, priority ecological functions to restore or enhance, and priority aquatic resource types to restore). These considerations would be regionally/locally based and inform determinations of appropriate compensation for a given impact. This effort could be supported by Watershed Program Development Grants.

2. **Support watershed plan development.** Support the development of watershed plans so that project providers can identify on a broader scale where and what type of restoration would be most impactful.

D. JOINT GUIDANCE AND/OR REGULATORY GUIDANCE LETTERS

1. **Develop guidance (in the form of district guidance, a RGL, or joint guidance) for each of these issues:**
    a. Direct districts to develop policies and procedures for permitting alternative approaches for stream mitigation
    b. Early and durable achievement of ecological performance demonstrated by the direct measurement of ecological processes should be incentivized in credit release schedules.
    c. Clarify the watershed approach and the bounds of in-kind mitigation, the flexibility of the watershed approach, and how it can be applied to support the use of alternative approaches to stream mitigation

Participants

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