

Opportunities and Challenges of Integrating Ecological Restoration into Assessment and Management of Contaminated Ecosystems

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Introduction

- Early integration: Consideration of restoration goals from the outset in developing solutions for contaminated ecosystems
- Goal: Concurrently achieve clean-up objectives, enhance ecological value, accelerate return to baseline, and reduce environmental liability
- Opportunities and challenges:

How can we realize benefits?

How do we avoid pitfalls?

How can we advance early integration?



Photo: E. Hinesley

How can we realize early integration benefits?



Understand and Communicate Advantages

OPPORTUNITY	IMPLICATIONS
Expedites restoration delivery	<ul style="list-style-type: none">• Faster return of ecosystem function• Reduced interim loss
Enhances ecological value of onsite remedies	<ul style="list-style-type: none">• Appropriate species selection• Avoiding attractive nuisance
Incentivizes offsite restoration	<ul style="list-style-type: none">• Can provide injury offsets• Address response injury
Harmonizes data collection and implementation	<ul style="list-style-type: none">• Data for assessment and restoration plans• Consolidates mobilization
Realizes cost/time efficiencies	<ul style="list-style-type: none">• Less mobilization = lower \$• Time and staff efficiency
Expedites stakeholder engagement	<ul style="list-style-type: none">• Public planning input• Broader acceptance of outcome
Resolves natural resource liability	<ul style="list-style-type: none">• May avoid or streamline NRDAR• Opportunity for restoration-based settlement

**How do we avoid early
integration pitfalls?**

A photograph of a small, clear stream flowing through a lush green forest. The water is shallow and flows over moss-covered rocks, creating a gentle waterfall effect. The surrounding vegetation is dense and vibrant green, with some fallen logs and branches visible on the banks. The overall scene is peaceful and natural.

Plan for Obstacles

CHALLENGE	IMPLICATIONS
Diverse stakeholders; varied objectives	<ul style="list-style-type: none">• Response and restoration responsibilities differ• Limited bandwidth for concurrent efforts
Timing incongruence	<ul style="list-style-type: none">• Perception of slowing remedial process• Uncertainty re. restoration type & amount
Long term stewardship	<ul style="list-style-type: none">• Varied performance periods• May be limited post-remedy onsite options
Offsite restoration	<ul style="list-style-type: none">• Reverse NIMBY• Environmental justice issues
Limited guidance/precedent	<ul style="list-style-type: none">• Inconsistency in approach• Perceived or real inflexibility for innovative approach



Photo: Marlene Machmer

How can we advance early integration?



Creative Options and Incentives

- Ecosystem services/markets
 - Internal (NRDAR, offset operations)
 - External (credit trading)
- Regional/landscape/seascape scale
 - Leverage greater ecological uplift
 - Advanced planning / buy in
 - Priority restoration needs
 - Adaptation (refugia; corridors)
 - Resiliency (SLR, climate vulnerability)
 - Uniquely sensitive habitats / resources
- Restoration banking
- And more. . .be innovative



Measuring GHG benefits of wetland restoration at Pocosin Lakes NWR

Thanks!

