Ad-Hoc INDUSTRY
NATURAL RESOURCE MANAGEMENT GROUP

A BEST PRACTICE FRAMEWORK:

Coordinating Remediation and Restoration

Updated November 15, 2023

Note to Reader: This document is one of four Best Practice Approach Frameworks presented and discussed at (and subsequent to) the Natural Resources Symposium held in September 2022 at The George Washington University Law School in Washington, DC. See www.NaturalResourcesSymposium.com. Symposium participants were unanimous that the Draft for Discussion Best Practice Frameworks should be made available broadly within multistakeholder law, policy and practice communities. Ongoing Working Groups on this and other topics, coordinated by the Ad-Hoc Industry Natural Resource Management Group, continue to address possible refinements and expansions to the Frameworks and identify additional documents or activities as appropriate. In fact, a multistakeholder Workshop on this Framework and related issues is planned for 2024.

Feedback on this Framework is welcomed. Contact us at info@NRDonline.org with your comments and suggestions, requests to be added to distribution for updates or join our ongoing activities on this important issue.

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Introduction

This document presents a Best Practice Framework on how to encourage consistency across stakeholder groups and at sites nationwide in addressing coordination of remediation and natural resource restoration. It assumes advance knowledge of the natural resource damage assessment (NRDA) process as defined in various federal and state statutes and regulations[1]. The process outlined here consists of six main steps, each of which is detailed below.

The Framework is intended for multistakeholder use and is aimed at building consistency in practice as to how these issues can be considered. While there are rapidly changing legislative, regulatory and policy requirements related to this practice arena, the fundamental underpinnings and principles of the Best Practice Approach presented here remains constant until and unless there are specific changes in the state-of-the art that require an update.

We first outline the legal and regulatory context of the remediation/restoration paradigm below, followed by presentation of the Framework and some cost-benefit considerations. Appendix A contains a case example application of the Framework and Appendix B includes additional resources pertinent to the Framework and related issues.

Legal and Regulatory Context

Key Laws. Natural resource damages are typically regarded as residual after cleanup and, as such, the statutes, regulations and guidance largely separate the two processes governing the relationship between cleanup/restoration and NRDA and restoration. Despite this, experience has shown that joint consideration of the two processes can save time and money, including opportunities for coordination of data collection and analysis, and accelerate the restoration of injured natural resources, enabling their use(s) to be returned more quickly to the affected communities.

Under the federal law, the Comprehensive Environmental Response, Compensation, and Liability Act of 1990 (CERCLA) or Superfund, Potentially Responsible Parties (PRPs) are accountable for reducing exposure of humans and the environment to hazardous substances through remediation or other mechanisms. The US Environmental Protection Agency (EPA) manages these remedial requirements while another CERCLA provision, separate from remediation, allows natural resource trustees[2] to make a claim against PRPs for natural resource damages.

Since passage of CERCLA in 1980, thousands of sites have been remediated and over 1,000 legal claims for natural resource damages have been settled – totaling over $17 billion. A large proportion of these cases took many years to settle and there are cases currently that have been going on for decades; however, many of these settlements could have proceeded more effectively and expeditiously had remediation and restoration been coordinated from the start.

Some PRPs have coordinated their remedial work with restoration at CERCLA sites which has allowed them to reduce mobilization and construction costs, while garnering

[1] For further background on natural resource damage (NRD) liability and related issues, see www.NRDonline.org, https://darrp.noaa.gov/ and https://www.doi.gov/restoration.

[2] Natural resource trustees include federal, state and tribal officials designated under federal or state laws to hold natural resources (land, water, biota) in the public's trust.

improvements to natural resources sooner than might have been achieved otherwise. Some PRPs may argue against coordination since it might give a real or implied acknowledgement of liability for harming natural resources or may result in improvements much greater than what are needed to offset the potential claim.

While the material presented in this Framework focuses on the advantages of remediation and restoration coordination at hazardous waste sites under CERCLA, the considerations and proposed solutions herein may be equally applicable to state hazardous wastes sites, as well as emergency response and restoration activities in the context of oil spills[3].

Key Responsibilities/Current Practice. CERCLA created two complementary regimes for cleaning up contaminated sites and restoring damaged natural resources. The cleanup component of CERCLA consists of statutory provisions that specify the process for investigating sites and, thereafter, evaluating the feasibility of alternative cleanup options (42 U.S.C. § 9604(a)), while the NRDA component consists of procedures for investigating the impact of contaminants on natural resource uses and the methods available for restoring, or obtaining compensation for damages to impacted resources (42 U.S.C. § 9607(f)).

The two regimes typically proceed on different tracks and different timelines. The nature and extent of cleanup activities required by EPA can affect the magnitude of restoration activities that the natural resource trustees will require. While EPA is assigned primary federal responsibility for undertaking investigation and cleanup measures, it also has an obligation to promptly "notify the appropriate Federal and State natural resource trustees of potential damages resulting from release under investigation … and to coordinate the assessments, investigations and planning … with such Federal and State trustees" (42 U.S.C. § 9604(b)(2)). [4] The remedial investigation/feasibility study (RI/FS) and remedial selection process under CERCLA requires the consideration of whether natural resources "… are or may be injured by the release…"[5] as part of the evaluation of remedial alternatives, thereby providing an opportunity to evaluate net environmental benefits of remedial alternatives, including potential enhancements of ecological and human use services, prior to implementing the site remedy. In theory, under CERCLA, the net benefits analysis is part of the feasibility study (FS) process reviewed by both EPA/state agencies and trustees (e.g., Biological Technical Assistance Group, BTAG). However, in practice, the remedial investigation (RI) and FS process is more often than not compartmentalized, with scientists doing the RI and handing off the FS to remedial engineers. Communication between EPA and natural resource trustees concerning opportunities to coordinate remediation and restoration often lag behind communication regarding remedial response.

Integrating the CERCLA cleanup process more closely, and earlier, with the NRDA and restoration process can shorten the timeline for implementing restoration measures and lead to more cost-effective cleanup plans. Certain case-specific or site-specific factors will often de facto favor or disfavor drawing the two processes closer together. For example, Table 1 notes a few of the situational factors that might favor or

[3] Emergency response, assessment and restoration actions are often governed under the federal law, the Oil Pollution Act 33 U.S.C. §2701 et seq. (1990), and similar state statues.
[4] Interior, U. S., Natural Resource Damage Assessment and Restoration Federal Advisory Committee; Bureau of Reclamation, 376 Technical Service Center: Denver, Colorado, May 2007, 2007; p 73.
[5] 40 CFR §300.430 (b)(7)

disfavor remediation/restoration coordination. Reducing the cost and time required for site investigations, remediation and potential restoration efforts, among other benefits, could provide an important incentive for PRPs to coordinate remediation and restoration at hazardous waste sites. \6 Other stakeholders, notably local government and the communities in which the resources reside, also can benefit from these efficiencies. Under the typical CERCLA cleanup process, several years or more can pass before the NRDA begins. In that time, the magnitude of the resource damages and scope of required restoration measures may continue to increase. **It is possible, and often desirable, to increase the pace of cleanups and reduce the damage to affected resources by bringing the NRDA process into the very first steps of a CERCLA site investigation.** \7

In cases where there appear to be obvious efficiencies and cost savings from coordinating remediation and restoration planning, there are still sometimes legal and regulatory barriers to this sort of coordination. For example, starting the NRDA during the investigative process is complicated because EPA has primary authority to manage onsite cleanups at CERCLA sites.\8 There is no legal requirement that resource trustees work jointly and continuously with EPA. Occasionally, there are disincentives to the early coordination of remediation and restoration planning. For example, it is not always apparent whether trustees ever will weigh in with formal demands for restoring resources. PRPs also may face financial penalties if they fail to meet agreed-upon cleanup timelines. The additional time required to coordinate trustee investigations with EPA may increase the risk that penalties will be imposed. But, at sites where there is no reason to doubt the existence of injured natural resources, there are often compelling reasons for coordinating remediation with natural resource damage restoration.

In the early stages of a site investigation, coordinating field sampling may yield significant cost savings. Adding some additional samples and lines of evidence to the RI field program to address trustees' concerns can be done earlier and often easily. Having an eye towards both cleanup and potential restoration during the RI could provide information essential for assessing whether the site itself or nearby habitats are suitable for restoration.\9 More importantly, some aspects of cleanup (excavation, capping, backfilling, planting covers on landfills, etc.) could be better understood early in the remedial process and combined with on-site restoration. That could yield a faster and more cost-effective restoration of injured natural resources, and potentially smaller natural resource damage claims, because the resources then can be brought back sooner to baseline (but for the release) conditions.

\6 Goldsmith, B. J., Beyond the Headlines: Best Practices to Restore Natural Resources Injured by Long-Term Hazardous Waste Releases, Oil Spills and Transport and Other Accidents. *Bloomberg Daily Environmental Report* 2014, August 18, 2014, 12.

\7 Stahl Jr, R. G.; Bingman, T. S.; Grimsted, B. A.; Waldron, C. S., How Might We Pick Up the Pace of Remediating Contaminated Sites in the United States? *Integrated Environmental Assessment and Management* 2019, 15, (6), 1029-1031.

\8 Gouguet, R. G.; Charters, D. W.; Champagne, L. F.; Davis, M.; Desvouges, W.; Durda, J. L.; Hyatt, W. H.; Jacobson, R.; Kapustka, L.; Longoria, R. M., Effective coordination and cooperation between environmental risk assessments and natural resource damage assessments: A new synthesis. *Integrated Environmental Assessment and Management* 2009, 5, (4), 523-534.

\9 Stahl, R. G., Jr.; Gouguet, Ron; DeSantis, Amanda; Liu, Jenny; Ammann, Michael, Prospective environmental restoration / restoration up front: A concept for an incentive-based program to increase restoration planning and implementation in the United States. *Integrated Environmental Assessment and Management* 2008, 4, (1), 6-14.

Best Practice Framework

The proposed solution described here is a process that integrates NRDA and compensatory restoration for injury through all phases of site characterization, remedial design (RD), and implementation of remedial actions (RA) for contaminated sites. The approach allows for early identification of the likelihood of a natural resource damage claim, opportunity for early engagement with trustee agencies, collection of data for assessing injury and service loses prior to destructive remedial actions, and opportunities for enhanced primary restoration and on-site compensatory restoration. Although the approach is modeled after the Superfund process of RI/FS, RD, and RA, it is also applicable to other federal, state, and tribal programs.

Benefits of the approach can be many. Early identification of a likely damage claim and engagement with trustees can identify data needs for an injury assessment, which can be integrated with and collected concurrently with data for human health and ecological risk assessments during the RI or similar site investigation phase. Evaluation of remedial alternatives during the FS can eliminate over engineered or potentially destructive alternatives and identify opportunities for enhanced primary restoration and/or compensatory restoration. The approach has several opportunities for data collection for injury assessment and restoration planning during the RD. One potentially significant benefit is the economy of scale recognized in providing compensatory restoration on-site concurrent with implementation of an RA. The latter minimizes, or eliminates, the need for off-site compensation, which can include significant additional time and costs for planning and construction of restoration projects.

Using the Superfund process as a model, the Best Practice Framework, shown in the Table 2, outlines how restoration, both primary and compensatory, can be considered throughout site investigation and remedial design and implemented concurrent with remediation actions. The approach was developed for use by companies, practitioners, trustees, and regulators to facilitate development and implementation of work plans that efficiently integrate requirements for investigation and remediation with data for assessing injury and determining compensation, where appropriate.

Table 2 illustrates opportunities for more effective coordination of remediation and NRDA and restoration through each phase of the site investigation and remediation process. Actions include those that can be undertaken by EPA, PRPs and trustees, and are also intended to highlight junctures in the processes where there are potential opportunities for settlement. **The changes from current practice illustrated here include: engaging ecologists and natural resource damage practitioners earlier in the remedial process; identifying potential restoration projects before remediation is complete; and simultaneous collection of data for site characterization, RD, NRDA purposes, and others — all of which can render the processes more efficient and cost-effective for all parties involved.** While most of the information provided here relates to on-site coordination of remediation and restoration, off-site restoration options can also be investigated and explored. In addition, as the remediation process can typically last 5+ years, practitioners should also be aware of possible opportunities to collect data for injury assessment prior to completion of remediation.

Cost-Benefit Considerations

Whether remediation and restoration is considered can affect how much restoration must be undertaken. The earlier remediation is undertaken and completed, the lower the interim losses will be, the faster benefits will begin to accrue, and the lower the amount of restoration required to offset interim losses.

In principle, PRPs and trustees are supportive of implementing restoration as early as possible, but a number of challenges can keep restoration from occurring prior to the completion of remediation. For example, if restoration is completed prior to completing remediation:

- Will the restoration create an attractive nuisance (i.e., will exposure be higher than it would otherwise be but for the restoration project)?
- Will the restoration be undone by the implementation of the remedy (e.g., if new habitat is created within a study area, could that new habitat be removed and/or modified by the remedy)?
- How will PRPs be credited for restoration that is implemented prior to the remedy, especially if damages have not yet been estimated, and regardless of what happens to the restoration project following the remedy?\10

Evaluating the benefits and costs of restoration versus remediation requires each of the following:

- Understanding the tradeoffs between implementing restoration prior to remedy implementation versus post implementation; and
- Understanding the relationship between the PRP and trustee positions, how the damage assessment process may be improved by changing the timing of restoration implementation, and how the remedial process may be affected.

Consider an extreme example where a PRP views no service change from a particular release and therefore no natural resource damages. In order for the PRP to support its position, it needs to undertake specific studies to document that the effect of the release has no service change. This increases the PRP's study costs and potential for litigation to support its position. However, if instead of trying to support an extreme position of no service loss, the PRP is able to accept a reasonable level of service loss and implement restoration projects prior to the remedy's completion, the PRP will be able to lower its overall restoration costs because benefits begin to accrue earlier. Moreover, the PRP may be able to reduce its overall costs by not having to defend a "no service-loss" position.

Summary

The Framework described here sets forth a Best Practice Framework for coordinating remediation and restoration in site-specific instances. It is intended to be used by the different parties at a given site, including PRPs, response agencies, natural resource trustees, and others. **Using this Framework can save time and costs and align NRDA objectives, including desired end points, of the parties involved at specific sites.**

\10 A Framework detailing how PRPs can receive appropriate credit for restoration completed during the remedial phase can be developed.

While the material presented in this Framework focuses on natural resource issues under US laws, the considerations and proposed solutions herein may also be applicable to natural resource regimes in the UK, EU and other countries.

TABLE 1

Factors Favoring Coordination Versus Separation Remedy and Restoration Actions

Factors Weighing in Favor of the Coordination of Remedy and Restoration Planning	Factors Weighing in Favor of Separating Remedy and Restoration Planning
PRP liability is clear or likely.	PRPs have good faith defenses to liability.
Release has caused obvious damage to natural resources.	Release does not appear to have caused significant damage to natural resources.
Damage is significant enough to warrant the time and cost of conducting an NRD assessment.	Damage is slight, transitory, or unrelated to substances associated with some or all of the PRPs.
Coordination of sampling and data collection can save time and money because remedy and restoration data will be collected from the same or similar areas, at the same or similar times. This is typical in water contamination cases in rivers, lakes, harbors, and coastal areas.	There is little or no similarity in sampling locations or schedules. Remedy investigation proceeds in one area, while NRD assessment proceeds in a different area at a different time, as in the case of migratory species that pass through a spill site on their way to distant nesting or foraging grounds.
Potential remedy alternatives likely to be evaluated include work that can create or improve wildlife habitat, such as: (i) revegetation of impacted land, (ii) reconstruction of impacted streams or shorelines, or (iii) improvements to surface water quality. A coordinated restoration project in the same area around the same time could reduce construction costs, restore resources more quickly, and shorten the period of interim loss, allowing NRD claims to be resolved for less.	Restoration is needed in a different location unrelated to the remedy. This is typical for migratory species damage claims, where the contamination and remedy occur in one region of the US, while the restoration project occurs at breeding grounds in a different region or country.

TABLE 2

Opportunities for Improved Coordination Between Remediation and Restoration within the CERCLA Process

<table>
<tr><th>Investigation/ Remediation Phase</th><th colspan="2">Natural Resource Damage Assessment & Restoration Evaluation</th><th>Settlement Opportunity</th><th rowspan="2">Comments</th></tr>
<tr><th>EPA Action</th><th>Companies Action</th><th>Trustees Action</th><th>Companies/ Trustees Action</th></tr>
<tr><td colspan="5">Remedial Investigation</td></tr>
<tr><td colspan="5">Tier 1 Remedial Investigation</td></tr>
<tr><td rowspan="3">Screening Level Ecological Risk Assessment (SLERA)</td><td rowspan="2">Potential NRD Liability Assessment</td><td rowspan="2">Pre-Assessment</td><td rowspan="3">Moderate See Notes</td><td>- Ecologists/NRD specialists should be engaged as early as possible</td></tr>
<tr><td>-Sufficient data should be collected to determine if NRD is likely
- If NRD not probable, Companies may be finished with NRD with minimal investment
- Settlement opportunity is low due to conservatism of SLERA and insufficient data for complete injury assessment.</td></tr>
<tr><td colspan="2">Memorandum of Agreement (MOA) (if considered desirable by Companies and Trustees)</td><td>- If NRD likely, parties can negotiate MOA for further assessment, establish ground rules and minimize delays in Companies/Trustees discussions</td></tr>
</table>

TABLE 2 (CONT.)

Opportunities for Improved Coordination Between Remediation and Restoration within the CERCLA Process

Investigation/ Remediation Phase	Natural Resource Damage Assessment & Restoration Evaluation		Settlement Opportunity	Comments
EPA Action	**Companies Action**	**Trustees Action**	**Companies/ Trustees Action**	
Tier 2 Remedial Investigation				
Tier 2 Work Plan See Notes	BERA/Baseline/ NRD Data	Assessment Plan	Moderate to High Dependent on lines of evidence and results of data collected for Tier 2 RI See Notes	- NRD is probable - Data to support injury assessment can be incorporated into the Tier 2 RI - Tier 2 RI typically requires additional data - with or without remediation/restoration - *Major decision point for Companies - minimum to complete RI or comprehensive program to conduct injury assessment*
BERA	Risk Assessment and/or Injury Assessment			- BERA complete - Additional data from this point forward will be for injury assessment, preferably prior to remediation
Feasibility Study				
Feasibility Study Investigation	Additional Data for Injury Assessment		Moderate to High Dependent on lines of evidence and results of data collected for FS Investigation	- Opportunity to collect additional data for injury assessment
Alternatives Evaluation	Net Environmental Benefits Analysis (NEBA)			- Ecologists/NRD specialists should be part of FS team
	Restoration Opportunity/Constraints			

TABLE 2 (CONT.)

Opportunities for Improved Coordination Between Remediation and Restoration within the CERCLA Process

Investigation/ Remediation Phase	**Natural Resource Damage Assessment & Restoration Evaluation**		**Settlement Opportunity**	**Comments**
EPA Action	**Companies Action**	**Trustees Action**	**Companies/ Trustees Action**	
Record of Decision				
Select Remedial Measures	Go/No Go Decision in Restoration/Remediation (and this is just EPA)			*- Decision point for determination of Restoration/ Remediation to move forward*
Remedial Design				
Pre-Design Investigation (PDI)	Data for Injury Assessment		High	Opportunity to collect additional data for injury assessment
	Co-Operative Injury Assessment	Injury Assessment		Results of PDI can be used for injury assessment, ideally conducted co-operatively
Remedial Design Investigation	Data for Restoration	Post-Assessment		Data for design of restoration (e.g., hydrology, substrate, etc.)
30% Remedial Design	Conceptual Restoration Plans			Incorporate restoration features in design documents
60% Remedial Design	Development of Detailed Restoration Plans			- Progressively more detail as design progresses
90% Remedial Design				
Final Remedial Design				

TABLE 2 (CONT.)

Opportunities for Improved Coordination Between Remediation and Restoration within the CERCLA Process

Investigation/ Remediation Phase	Natural Resource Damage Assessment & Restoration Evaluation		Settlement Opportunity	Comments
EPA Action	Companies Action	Trustees Action	Companies/ Trustees Action	
Remediation				
	Implement Remedial/Restoration Measures		Likely Required	- At this point, data for injury assessment will be difficult to collect, or coordinate with remediation work. Remediation (except for natural monitored recovery) will have disturbed/significantly altered natural resources. Injury assessment would have to rely on secondary sources of data/information (if available) rather that direct sampling (e.g., sediment for toxicity tests, samples for tissue analysis, benthic community characterization). - Damages and settlement costs likely higher

APPENDIX A

Case Application of Best Practice Approach Framework

PASSAIC RIVER (DIAMOND ALKALI SUPERFUND SITE) COOPERATIVE ASSESSMENT

Production of pesticides and other chemical products began at 80 Lister Avenue in the 1940s. The Diamond Alkali Company owned and operated the facility in the 1950s and 1960s , manufacturing agricultural chemicals, including the herbicides used in the defoliant known as "Agent Orange." A by-product of these manufacturing processes was the chemical 2,3,7,8-tetrachlorodibenzo-para-dioxin, (2,3,7,8-TCDD and hereinafter referred to as "TCDD"). In 1983, environmental sampling by the State of New Jersey and the U.S. Environmental Protection Agency (EPA) at and near 80 Lister Avenue and in the adjacent river revealed high levels of TCDD. In 1984 the site was listed on the Superfund National Priorities List (NPL). TCDD, pesticides and other hazardous substances were found in the soil and groundwater at 80-120 Lister Avenue. TCDD, polychlorinated biphenyls (PCBs), metals, polycyclic aromatic hydrocarbons (PAHs) and pesticides were also found in sediment of the lower Passaic River. The Diamond Alkali Superfund Site of the former Diamond Alkali facility at 80-120 Lister Avenue in Newark, New Jersey, the Lower Passaic River Study Area (LPRSA), the Newark Bay Study Area and the areal extent of contamination. EPA divide the area into four operable units.

- OU1, the former site of the Lister Avenue Plant;
- OU2, the lower 8.3 miles of the Passaic River (the "Lower 8.3 Miles");
- OU3, Newark Bay and portions of the Hackensack River, Arthur Kill, and Kill van Kull; and
- OU4, the 17-mile LPRSA.

In 2009 a group of 11 potentially responsible parties participated in a cooperative natural resource damage assessment for the Passaic River with the Federal Trustees. The cooperative agreement was established for a period of one year with the potential to renew. The PRPs agreed to extend the cooperative agreement if, during the first year, one human-use and one ecological restoration project were identified, costs scoped, NRDAR crediting process described, and a construction plan was developed.

Step 1: Screening Level Risk Assessment (Remediation)/Pre-assessment Screen (NRD)

The Diamond Alkali Superfund Site was listed on the NPL early in the development of the NRD process where integration of remediation and restoration was not common practice. Therefore coordination of remediation and restoration was not achieved for Steps 1 and 2.

Step 2: Work Plan Development (Remediation)/Assessment Plan (NRD)

See comment under Step 1.

Step 3: Baseline Ecological Risk Assessment (Remediation)/Injury Assessment and Early Restoration Scoping (NRD)

PRP representatives identified potential human use and ecological project ideas that were put forth as alternatives to the Federal trustees.

Primary proposed project – Removal of Dundee Dam:

a. Ecological benefits:
    i. River connectivity
    ii. Increase flow
    iii. Restore shad and trout habitat
b. Human use benefits:
    i. Development of a high-value fly fishery in densely population area

Additional Human Use Projects proposed:

a. Improvement of a boat launch and pier
b. Waterfront trail construction
c. Anticipated benefits – Improved riverfront access and connectivity between parks without increasing human-health risk

Additional Ecological Project proposed:

a. Acquiring and conserving riverfront property with potential for restoration following remediation

Attempt to coordinate remediation and restoration was unsuccessful

b. Cooperative assessment was terminated as the milestones identified were not met
c. Dundee Dam removal was rejected due to the possibility of increased contamination risk from sediment and fish movement
d. Agency representatives participating in the cooperative process raised concerns that any project interfacing with the river might increase human-health risk.
e. Boat launch improvements required the participation of State Trustees
f. Unable to agree on crediting for acquiring and conserving land

Step 4: Feasibility Study and Alternatives Evaluation (Remediation)/Further Early Restoration Scoping (NRD)

This attempt to integrate remediation and restoration at this site was unsuccessful.

Step 5: Record of Decision (Remediation)/Restoration Selection (NRD)

This attempt to integrate remediation and restoration at this site was unsuccessful.

Step 6: Remedial Design (Remediation)/Finalize Injury Assessment and Restoration Project Selection (NRD)

This attempt to integrate remediation and restoration at this site was unsuccessful.

APPENDIX B

Resources

By way of example, the following are additional resources.

Government

- **Department of Commerce/NOAA**: Oil Spill Guidelines and Resources; Environmental Response Management Application (ERMA); NAO 210-110: Damage Assessment, Remediation and Restoration Framework
- **US Department of the Interior**: Policy for Signature of Non-Case Specific Natural Resource Damage Assessment and Restoration (NRDA Restoration) Program-Related Documents and Documents Involving both CERCLA/OPA Response and NRDAR Program Activities- May 25, 2001
- **US Department of Energy**: NATURAL RESOURCE DAMAGE ASSESSMENT COOPERATION AND INTEGRATION (2012)
- **US Environmental Protection Agency:** Natural Resource Damages: Notification and Coordination Activities;
- **State of Louisiana:** Regional Restoration Planning Program (RRP Program)

Published Articles

- "If coordination of remediation and restoration under CERCLA is such a good idea, why is it not practiced more widely", Ralph G. Stahl, Jeffrey Martin, Theordore Tomasi and Barbara J. Goldsmith, Journal of Environmental Management (2023)
- "How Might We Pick Up the Pace of Remediating Contaminated Sites in the United States?", Ralph Stahl, Timothy S Bingman, Bradley A Grimsted, and Christopher S Waldron, Integrated Environmental Assessment and Management—Volume 15, Number 6—pp. 1029–1033 (2019)
- Coordinating ecological risk assessment with natural resource damage assessment: A panel discussion by Mike Ammann, Rebecca Hoff, Mark Huston, Ken Jenkins, Tony Palagyi, Karen Pelto, Todd Rettig, Anne Wagner (SETAC Integrated Environmental Assessment and Management Journal, 2015)
- Integrating Natural Resource Damage Assessment and Environmental Cleanup Activities at CERCLA and RCRA Sites, Remediation Journal, Vol. 23, Issue 2 by Matthew Duschesne, 2013
- Munns, JR., W. R., A. W. Rea, and M. G. Barron. Improving Hazardous Waste Remediation and Restoration Decisions Using Ecosystem Services. Presented at 4th Annual National Conference on Ecosystem Restoration, Baltimore, MD, August 01 - 05, 2011
- "The Nexus Between Ecological Risk Assessment and Natural Resource Damage Assessment Under CERCLA: Introduction to a Society of Environmental Toxicology and Chemistry Technical Workshop", Stahl RG, Gouguet R, Charters D, Clements W, Gala W, Haddad R, Helm R, Landis W, Maki A, Munns WR, Young D., Integr Environ Assess Manag. 2009 Oct; 5(4)

- "Translating Ecological Risk to Ecosystem Service Loss", Munns WR Jr, Helm RC, Adams WJ, Clements WH, Cramer MA, Curry M, DiPinto LM, Johns DM, Seiler R, Williams LL, Young D., Integr Environ Assess Manag. 2009 Oct; 5(4)
- "Ecological Risk Assessment and Natural Resource Damage Assessment: Synthesis of Assessment Procedures", Gala W, Lipton J, Cernera P, Ginn T, Haddad R, Henning M, Jahn K, Landis W, Mancini E, Nicoll J, Peters V, Peterson J., Integr Environ Assess Manag. 2009 Oct; 5(4)
- "Effective Coordination and Cooperation Between Ecological Risk Assessments and Natural Resource Damage Assessments: A New Synthesis", Ronald G Gouguet , David W Charters, Larry F Champagne, Mark Davis, William Desvousges, Judi L Durda, William H Hyatt, Rachel Jacobson, Larry Kapustka, Rose M Longoria, Integr Environ Assess Manag. 2009 Oct; 5 (4)

Note to Reader: We invite your suggested additions and/or corrections to the Resources identified above.