

# Risk & Remediation

## Overview of Natural Resource Damages

*Previously you just cleaned up a site; now, you may have to clean up a site and restore it.*

Environmental contamination has traditionally been addressed by site remediation, with the goal of either removing or isolating contaminants from the environment. More recently, focus has shifted to the twin goals of remediation and restoration, where the aim of restoration is to return the environment to its pre-contamination state, including renewing ecological habitats and human recreational resources. This paradigm shift has occurred with the recognition that while remediation may stop releases to the environment, it may not correct injury that has occurred during the time that the environment was contaminated.

*It is clear that in some instances the cost of settling an NRD claim can exceed the cost of remediation.*

The result of this new focus is that a variety of Natural Resource Damage (NRD) claims are now being brought against potentially responsible parties (PRPs) by trustees, who include any federal, state, or tribal

agency responsible for publicly-owned resources.

The basic premise of an NRD claim is that an injury to a resource has resulted in a lost service (see box for definitions). There are three components to an NRD claim: an assessment of the extent of injury resulting from the contaminant release, a plan for restoration, and a determination of the dollar value of the lost resource. Tools used by the trustees in the assessment phase can include ecological studies (e.g., as population surveys) or the Habitat Equivalency Analysis (HEA) model developed by NOAA (1996), which is based on the premise that compensation for losses can be provided through additional services of the same type in the future. Establishing a dollar value for lost services may be done in a variety of ways. One method would be to use surveys to determine the public's value for resources by estimating what they would be willing to pay for specific improvements in those same resources (Mitchell and Carson, 1989). Some or all of these approaches may be used by the trustees, depending on the complexity of the site and the extent of injury to the resources.

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## Letter to our Readers

January 1999


Dear Colleague,

In this issue of *Trends in Risk & Remediation*, we focus on Natural Resource Damages (NRD). We examine the overall goals and processes for assessing Natural Resource Damages, and we discuss the potential for NRD claims to far exceed the cost of the remedy at some sites. We compare and contrast the Ecological Risk Assessment (ERA) process under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) with the Natural Resource Damage Assessment (NRDA) process, noting similarities in the data to be collected and significant differences in how the data are to be used. In addition, the roles of various stakeholders are explored, particularly the dual role of agency trustees as advisors to the ERA process *via* the Biological Technical Assistance Group (BTAG) and as decision makers in the NRDA process. Finally, we present a guest opinion on some of the policy challenges presented by NRD.

Contributors to this issue include Dr. Teresa Bowers, a Principal and expert in exposure modeling and negotiating risk-based remediation targets. She is joined by Mr. Richard Blanchet, senior environmental toxicologist at Gradient, who specializes in ecological risk assessment and ecotoxicology. We are pleased to welcome to this issue Ms. Sandra Stash, Vice President of ARCO Environmental Remediation L.L.C. We thank her for her thought-provoking guest editorial on the need for a different approach to CERCLA NRD based on her first-hand experiences. This is the first in a series of guest editorials by risk professionals in industry and regulatory agencies that we will provide in future issues of *Trends*.

We trust that you will find the information in this *Trends* issue helpful in your work. As always, we welcome your comments.

Yours truly,

  
Neil Shifrin  
President

## Gradient Corporation

*Trends in Risk & Remediation* is a quarterly publication of Gradient Corporation. As a national leader in risk assessment and negotiation of risk-based remediation, Gradient offers this publication free of charge to interested groups and individuals. If you have a colleague who would benefit from this publication - or if you have comments or suggestions - please contact Carol Counihan, Editor, at 617-576-1555 or email us at [trends@cam.gradcorp.com](mailto:trends@cam.gradcorp.com).

# Overview of Natural Resource Damages

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The NRD claim can include a requirement for primary restoration, which is equivalent to remediation, and either compensatory restoration or damages. Compensatory restoration generally takes the form of an agreement to restore or create habitats or services equivalent to those that were damaged or lost, while damages are a cash payment. These cash payments can fund projects such as creating new wetlands, restocking fish, or additional remediation beyond site boundaries. Settlement of an NRD claim generally also involves a release on the part of the trustees of their rights to sue for further damages, other than in situations where new information or conditions previously unknown may arise in the future.

Settlement of NRD claims can be very costly. For example, ARCO's recent settlement with federal, state, and tribal trustees for the Silver Bow Creek/Clark Fork River Basin, MT site amounted to nearly one quarter billion dollars in damages and estimated restoration costs (see related article). While a U.S. General Accounting Office report issued in 1995 showed that there were many NRD claims settled with no cost, 36 sites were settled for less than \$500,000, an additional nine sites were settled for between \$500,000 and \$5 million, and five sites were settled for damages greater than \$12 million. Additional sites have been settled since 1995 for damages in excess of these amounts. Other potentially more costly settlements are pending. It is clear that in some instances the cost of settling an NRD claim can exceed the cost of remediation.

Until recently, NRD claims were limited to sites under CERCLA, the Clean Water Act, and the Oil Pollution Act (OPA) (the claim over the Exxon Valdez accident is the most notable example). The more recent involvement of both state and tribal trustees, as well as the growing number of large claims, demonstrates the importance and longevity of the NRD issue. Since NRD is here to stay, PRPs need to develop a clear understanding of the NRD process and strategies for navigating it.

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## DEFINITION OF TERMS

**Damages** — the amount of money sought by the natural resource trustee as compensation for injury, destruction, or loss of natural resources

**Injury** — a measurable adverse change in the chemical or physical quality or the viability of a natural resource resulting from the exposure to a discharge of oil or release of a hazardous substance, *e.g.*, impairment or loss of habitat, displacement of species.

**Natural resources** — land, fish, wildlife, biota, air water, ground water, drinking water supplies, and other resources belonging to or controlled by the United States or other governments.

**Services** — the physical and biological functions performed by the resource including the human uses of those functions, *e.g.*, recreational fishing, hiking.

**Trustee** — any federal or state natural resources management agency, or Indian Tribe that may prosecute claims for damages.

**Source:** adapted from 43 CFR Section 11.14

## References

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# NRD: Parallels to Ecological Risk Assessment

*One must be cognizant of the potential uses of ecorisk data in NRDA and of the roles of the various stakeholders.*

The Natural Resource Damage (NRD) provisions of CERCLA, OPA (the Oil Pollution Act), and other federal statutes empower federal, state, and tribal trustees to pursue damage claims against responsible parties for injury to, destruction of, or loss of natural resources and services from exposure to stressors (e.g., chemical releases, habitat degradation). These resources may not be sufficiently considered when CERCLA remedial actions are selected.

Upon cursory examination, Natural Resource Damage Assessment (NRDA) appears similar to an Ecological Risk Assessment (ERA). Many parallels can be drawn between the NRDA and ERA processes (see figure). Both describe systematic approaches to organizing and analyzing

data, assumptions, and uncertainties associated with ecological disturbances from human activities (U.S. EPA, 1997, 1998; NOAA, 1997). These parallels include:

- **Preassessment Phase:** Prior to initiation of a formal NRDA, trustees must perform a review of existing information, jurisdiction, and determine whether a damage claim should be filed. This step corresponds to Problem Formulation in

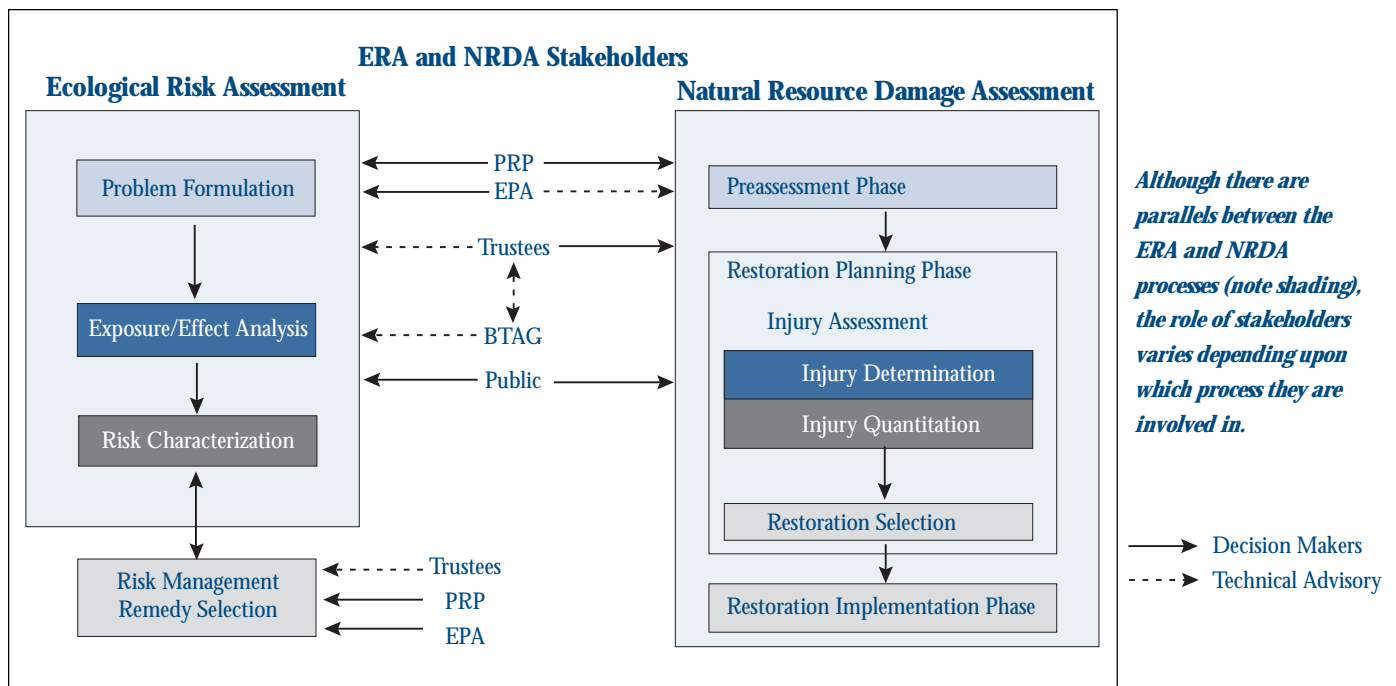
an ERA. Both processes define ecological receptors at risk, evaluate existing data, and describe causal relationships between chemical releases and ecological disturbances.

- **Restoration and Planning Phase (Injury Assessment):** Under this phase, the two components of Injury Assessment (Injury Determination and Injury Quantification) are analogous to the Analysis and Risk Characterization steps of an ERA, respectively. The goal of Injury Assessment is to determine the nature, degree, and extent of any injuries to natural resources and services. Both processes can analyze receptor exposures by comparing similar data to different metrics (ERA compares site data to toxicity criteria to assess risk, while NRDA compares site data from an impacted area to that from a non-impacted area to quantify injury).
- **Restoration and Planning (Restoration Selection) and Restoration Implementation Phases:** These two phases are comparable to the Risk Management step that follows ERA. Because risk management is outside the scope of the actual ERA process, this step has not been as well defined as the NRDA equivalent. However, both processes involve the review and selection of appropriate measures to ensure risk reduction following either remediation after ERA or restoration under NRD.

Although both ERA and NRDA rely on similar biological and chemical data, the use of the data can differ dramatically.

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**Whereas an ERA estimates the likelihood of risk to receptors exposed to stressors, NRDA assesses and quantifies the injury to natural resources and the resulting service losses.**



# Strategies: Navigating the NRD Maze

*Two courses of action are available. Either one could be beneficial depending on site circumstances.*

As with many programs, the Natural Resource Damage (NRD) claim process can resemble a maze. Multiple trustees on the state and federal levels (sometimes with overlapping jurisdiction) may appear to have conflicting program requirements. However, selecting an appropriate approach for addressing restoration needs can lessen the confusion.

The development of a restoration plan to address natural resource damage claims at a site can follow one of two courses: either integrated with the ecological assessment and remediation

**Regardless which approach is chosen, it is always wise to be on the lookout for critical data that can be gathered throughout the process...**

planning stages, or after the remediation is complete. Both approaches offer distinct advantages and disadvantages, and either may be appropriate, depending on site-specific circumstances.

The integrated approach involves meeting with the trustees early in the process, and developing early sampling strategies to meet the needs of both ecological assessment and injury assessment programs. This approach can limit the amount of data to be collected when the same data can be used for both purposes, resulting in economies of scale. Additionally, the remedial strategy can be planned to simultaneously address restoration needs. Often, potentially responsible parties (PRPs) do not view this approach as viable, because they are hoping that the trustees will not become interested in their site. However, large sites where significant resource damage has occurred are rarely ignored by the trustees, and this approach may prove to be the most cost-effective.

The sequential approach, where natural resource damages are not considered until remedial planning is complete, has been the more typical approach applied to date by PRPs. This approach may be most appropriate for those sites where the baseline resource value is low and/or where the planned remediation addresses restoration needs. Another situation where the sequential approach may work best is where human health risks are significant and require immediate attention. In such a circumstance it would not be prudent to spend time planning ecological restoration before taking action to address human health needs. An obvious disadvantage to this approach is that field sampling may have to be undertaken twice — once in support of remedial decision making, and a second time to assess restoration needs. In the worst case, elements of the remedy may have to be implemented twice as well.

In selecting an NRD strategy, PRPs should be aware in either approach that trustee members of the Biological Technical Assistance Group (BTAG) may have dual roles. It is important to note that their silence as advisors on ecological assessment activities does not necessarily indicate a lack of interest in NRD claims once they assume their decision-making role as trustees.

Regardless which approach is chosen, it is always wise to be on the lookout for critical data that can be gathered throughout the process that may be helpful in determining appropriate restoration. Additionally, once PRPs enter negotiation with the trustees, it is best to ensure that all trustees, including federal, state and tribal, are involved in the process. This will provide the opportunities for all trustees to have a voice in the restoration planning process, thus limiting the potential for conflict concerning the best approach to restoration.

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## NRD: Parallels to Ecological Risk Assessment

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Whereas an ERA estimates the likelihood of risk to receptors exposed to stressors, NRDA assesses and quantifies the injury to natural resources and the resulting service losses. This is the fundamental difference between the two processes.

Furthermore, ecological studies conducted as part of the Remedial Investigation/Feasibility Study (RI/FS) under CERCLA are not intended as preliminary work toward an NRDA, but sometimes are used that way. Such was the case when sediment data were collected by a PRP for the ERA at a Region III Superfund site. The sediment data subsequently were used against the PRP in an NRD claim, causing the PRP to regret having collected the data in the first place. Nonethe-

less, a properly designed ERA may resolve some questions that otherwise require lengthy NRDA's, resulting in delays for a comprehensive settlement.

Just like ERA, momentum from peer review and rapid development of guidance can only benefit the NRDA process. Last year, the National Oceanic and Atmospheric Administration (NOAA) released new, peer-reviewed NRDA guidelines (NOAA, 1997) which received positive reviews from industry (Renner, 1998). These guidelines focus on reducing the time and cost for assessing injury, and getting to the benefit of

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## What's New at Gradient

### Dr. Neil Ram Joins Gradient

Dr. Neil Ram has joined Gradient as Principal and General Manager. Dr. Ram has over 20 years of environmental engineering, hazardous waste assessment, and remediation experience. At Gradient, his practice will focus on environmental liability assessments, cost allocation, site assessment and remediation, and litigation support for industrial clients. Dr. Ram was previously Vice President and General Manager of the New England District of Fluor Daniel GTI, which was acquired by the IT Group in December 1998.

### Dr. Beck Named to RAM TIP

Gradient Principal, Dr. Barbara Beck, was invited to join the Chemical Manufacturers Association (CMA) Risk Assessment Methods (RAM) Technical Implementation Panel (TIP). The RAM TIP, which will develop research to improve the scientific basis for risk assessment, is one of the groups responsible for implementing CMA's Long-range Research Initiative.

### Upcoming Presentations

**Nassau, Bahamas. January 24.** Barbara Beck. "ILSI Research Initiatives: Relationship to Recent Risk Assessment Developments," at the International Life Sciences Institute 1999 Annual Meeting.

**Keystone, CO. March 11-14.** Barbara Beck. "Strategies for Prosecuting and Defending Toxic Tort Litigation," panel member at the American Bar Association's Annual Environmental Law Conference.

**New Orleans, LA. March 15.** Tracey Slayton. "Analysis of Public Health Impacts Associated with Removal of Lead Paint from NYC Bridges," at the Society of Toxicology (SOT) 38th Annual Meeting.

**New Orleans, LA. March 16.** Heather Daly. "Aggregate Exposure Model for Pesticide Drift," at SOT 38th Annual Meeting.

**New Orleans, LA. March 17.** Leslie Beyer. "Is Perchloroethylene (Perc) a Probable Carcinogen in Humans?," at SOT 38th Annual Meeting.

### Recent Articles

Bowers, T.S. and J.T. Cohen. 1998. Blood lead slope factor models for adults: comparisons of observations and predictions. *Environmental Health Perspectives* 106 (Supplement 6), December.

**To request copies of articles or presentations, please contact us at [trends@cam.gradcorp.com](mailto:trends@cam.gradcorp.com) or telephone Carol Counihan at (617) 576-1555.**

## NRD: Parallels to Ecological Risk Assessment

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restoration as quickly and efficiently as possible. NOAA (1996) also unveiled a streamlined Habitat Equivalency Analysis model that can be used as a screening tool for a quick estimate of liability at a site. With the advent of these tools, the NRDA process is less unwieldy than in its early history; however, additional peer-reviewed guidelines and assessment techniques are required to further streamline the process.

Finally, good communication between stakeholders involved in ERA and NRDA processes is paramount to ensure that remedial actions are selected to best protect and restore natural resources. Although stakeholders' responsibilities differ under the two processes, cooperation and coordination are essential to the eventual success of the remediation and restoration effort.

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# Guest Editorial: Reforming CERCLA NRD

*ARCO's recent experience with NRD provides it with a unique perspective on opportunities to improve the process.*

The original purpose underlying CERCLA's natural resource damage (NRD) program was a noble one; to mitigate residual injury and restore public natural resources. However, this regime has produced little actual resource restoration over the eighteen years since its enactment. The General Accounting Office recently conducted a study of federal trustees' CERCLA NRD settlements and found that:

*"Expenditures have gone mostly to reimburse trustees for performing past damage assessments and to pay for preparing natural resource restoration plans. With the exception of one small experimental restoration project, no restoration actions had been taken with the moneys collected as of July 1995" (GAO, 1996).*

The failure of CERCLA's NRD program to produce significant resource restoration is due, in part, to the fact that some trustees have transformed the NRD process from the one

*... CERCLA's language, its legislative history, and even common sense all indicate that trustees' efforts to restore natural resources be coordinated with response actions.*

originally envisioned by Congress to a litigious system driven to recover monetary damages. Another reason CERCLA's NRD regime has gotten off track is that a lack of communication between U.S. EPA

and the trustees often fails to foster coordination of restoration measures with remediation measures. However, CERCLA's language, its legislative history, and even common sense all indicate that trustees' efforts to restore natural resources be coordinated with response actions.

An example of the failings of NRD arose in the context of the state of Montana's Clark Fork River Basin claim. The state, in their October 1995 Restoration Determination Plan, based a portion of its restoration damages claims upon a scenario involving complete removal of mining wastes from the floodplain and bed of Silver Bow Creek. The Record of Decision for

the Silver Bow Creek site determined that only partial removal would be protective of human health and the environment. While the state acknowledged that it made "good sense" to coordinate restoration with remediation, it rejected the notion that a restoration scenario was unacceptable if it conflicted with the remedial action. Even more troubling, the state of Montana, the lead agency for remedial actions at Silver Bow Creek, had a dual role as a plaintiff trustee in litigation and regulator, raising the potential for conflict in its decision-making responsibility. Only recently ARCO, the state of Montana, and the United States succeeded through settlement negotiations in breaking the impasse created at Silver Bow Creek by the conflict between restoration and remediation. That impasse was broken only after both remediation and restoration issues were addressed in one overarching settlement.

In order to avoid such conflicts in the future, legislation or policy changes are needed to provide that NRD restoration methods must be consistent with cleanup actions. Moreover, such legislation or policy changes should restate CERCLA's restoration goal, eliminate provision for recovery of non-restoration damages, and prohibit selection of remedies that are, in effect, resource restoration actions, unless defendants are given credit. Similarly, trustees should not be able to use the NRD program to finance what are, in effect, remedial actions that could not pass muster under CERCLA's remedy selection provisions. The NRD provisions of CERCLA must be reformed if the original intent of this legislation is to be realized. Otherwise, the real loser will be the environment where unnecessary delays in restoration and unnecessary destruction of resources in the name of cleanup continue to plague this process.

**Sandra M. Stash, P.E.**

**Vice President, ARCO Environmental Remediation L.L.C.**

## References

U.S. General Accounting Office. 1996. *Superfund: Outlook for and Experience with Natural Resource Damage Settlements*. GAO/RCED-96-71.

## In the next issue:

*Performance- versus Activity-based Measures*

*Prioritization*

*Voluntary Action Programs*

*Guest Editorial: State Regulator's Perspective on Use of Voluntary Programs*

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