

Improving Hazardous Waste Site Remediation and Restoration Decisions Using Ecosystem Services

Wayne R. Munns, Jr.¹, Anne W. Rea² and Mace Barron³

¹ U.S. Environmental Protection Agency, Narragansett, RI, USA

² U.S. Environmental Protection Agency, Research Triangle Park, NC, USA

³ U.S. Environmental Protection Agency, Gulf Breeze, FL, USA

Hazardous site management in the US includes remediation of contaminated environmental media and restoration of injured natural resources. Site remediation decisions are informed by ecological risk assessment (ERA), while restoration and compensation decisions are informed by the natural resource damage assessment process (NRDA). The focus of ERA is to determine the risk to ecological receptors posed by chemical and physical stressors at the site and, ultimately, to inform clean-up decisions. In the NRDA process, natural resource trustees quantify the magnitude of injury (impact) sustained by natural resources and the services they provide due to the release of oil or hazardous substances. Then, restoration actions are scaled to compensate the public for lost services. ERA and NRDA have been conducted largely independently of one another, often considering different ecological receptors and different scales of biological organization. As a result, the information provided to decision makers to inform remediation and restoration decisions typically lacks coherence.

The effectiveness of hazardous waste site management can be enhanced by focusing ERA and NRDA activities on common ecological assessment endpoints. Further, the value of assessment results to decision making can be improved by using ecosystem services as assessment endpoints. Ecosystem services are the outputs of ecological functions or processes that directly or indirectly contribute to social welfare or have the potential to do so in the future. The benefits of a shared focus on ecosystem service assessment endpoints by ERA and NRDA include greater coherence in the information provided to the remediation and restoration decision making processes, enhanced societal relevance of that information, and greater transparency of remediation and restoration decisions to the public. Building on earlier efforts by the U.S. Environmental Protection Agency, we encourage development of a suite of generic ecosystem service assessment endpoints (GESAEs) for consideration in hazardous site investigations. GESAEs are broadly described ecosystem service endpoints (e.g., production of recreational fish populations) that can be applicable in a variety of environmental management contexts. After consideration of their individual relevance, GESAEs can be tailored to the decision support needs of any particular hazardous waste site. Coordinated consideration of GESAEs in the problem formulation activities of ERA and NRDA will help to achieve risk reduction and restoration goals.

Contact Information: Wayne R. Munns, Jr., Office of Research and Development, U.S. Environmental Protection Agency, 27 Tarzwell Drive, Narragansett, RI 02882 USA, Phone: 401-782-3017, Email: munns.wayne@epa.gov