

RESES Project: Understanding and Evaluating Ecosystem Services at Superfund Cleanups and Applying their Benefits to Sustainability for Communities

Office of Research and Development, Office of Land and Emergency Management, Region 3, Region 10



Purpose/Utility of Research

The Superfund Program seeks to better integrate consideration of ecosystem services (ES) during remediation of contaminated sites. This research will improve Superfund's greener cleanups strategy and the EPA 2012 *Methodology for Understanding and Reducing a Project's Environmental Footprint* by defining metrics for quantification of ES impacted by site cleanup and reuse activities. Evaluation of ES may help the selection of best management practices (BMPs) to mitigate impact on ES and revitalize ES for land reuse.



Figure 1. Core Elements of Greener Cleanups. Ecosystem services evaluations are a tool to address the Land & Ecosystems element.

This project attempts to use the ecosystem goods and services framework and tools developed by EPA ORD through projects SHC 1.62 and SHC 2.61.

Highlights

- Identification of the relevance of ecosystem services (ES) in Superfund cleanup operations, ecological reuse of contaminated sites, and community involvement.
- Development of a conceptual framework for the identification and evaluation of ES during Superfund cleanups. The evaluation will be a component of a cleanup's environmental footprint analysis.
- Review and assessment of the utility of ES evaluation tools, e.g. Final Ecosystem Goods and Services Classification System (FEGS-CS) Query Tool and EnviroAtlas.
- Application of the framework and tools for an ES evaluation at two Superfund sites.



Darby Creek Site



Wetland in the Lower Basin Site



Lower Basin Site

Application & Translation

During summer 2016, ecosystem services evaluation tools were applied at two Superfund sites:

- The Lower Darby Creek Area (Region 3) in Philadelphia is a former landfill. It is 66 acres and adjacent to the Eastwick Neighborhood and the John Heinz National Wildlife Refuge. Forest and wetland habitats currently exist on the site, and there is potential for ecological reuse.
- The Lower Basin of the Coeur d'Alene River (Region 10) in northern Idaho is impacted by past mining activities. About 18,000 acres of wetland habitat are contaminated, yet ecologically functional and currently used by waterfowl for feeding, and by humans for a wide range of recreational activities.

Findings from the evaluations at these sites are being used to develop a common framework for ES quantification and BMP selection at Superfund sites.

Intended End Users

The incorporation of ES into cleanup processes, including the ES evaluation framework and BMP selection, is intended for use by Remedial Project Managers (RPMs) and their teams.

This collaborative research project from EPA ORD, Superfund headquarters (OLEM/OSRTI), and Superfund programs in Regions 3 and 10 involves significant input from RPMs and stakeholders.

Lessons Learned

This research applies the concepts of ecosystem goods and services to contaminated sites and identifies how they may be quantified during Superfund remedial operations.

Lessons learned from evaluations at the two sites:

- Ecological and spatial data commonly collected at sites are important inputs to ES estimates.
- Differences between the two sites led to use of different approaches and tools during ES evaluation BMP selection activities.
- Use of a combination of evaluation tools provides better information about ES at the sites.

RESES Project Team

ORD/NCEA: Michael Kravitz (Kravitz.Michael@epa.gov)
 ORD/NHEERL: Matthew Harwell, Greg Grissom, Anne Neale
 OLEM/OSRTI: Jewel Lipps, Michele Mahoney, Carlos Pachon (Pachon.Carlos@epa.gov)
 Region 3: Joshua Barber, Bill Hagel, Bruce Pluta
 Region 10: Bill Adams, Kira Lynch (Lynch.Kira@epa.gov), Ed Moreen, Kim Prestbo