

Chapter 10 Mitigation, Reclamation, Restoration and Recovery

Introduction

The U.S. Department of the Interior (DOI or Interior) extensively supports—through its mission, policy, programs, and funding—the study, planning, implementation, and monitoring of ecosystem restoration. As described in Chapter 4 of the FY 2011 DOI Economic Contributions Report, every bureau and several offices in Interior engage in some form of restoration, including ecological, human use, or physical structures. This chapter focuses on four programs that represent the full range of mitigation, reclamation, restoration and recovery activities at Interior: (1) the Bureau of Land Management’s (BLM) Abandoned Mine Lands Program, (2) natural resource damage assessment and restoration (NRDAR) implemented through the DOI Restoration Program, (3) the U.S. Fish and Wildlife Service’s (Service or USFWS) Environmental Contaminants Program, and (4) remediation and environmental restoration of DOI contaminated sites funded through the Department’s Central Hazardous Materials Fund (CHF) Program. Highlights of ongoing efforts to estimate economic values and economic contributions associated with restoration activities are also provided.

Background

Activities intended to improve injured ecosystems may be referred to as “restoration,” “rehabilitation,” “remediation,” “reclamation,” etc. These terms are often used interchangeably in practice, but their definitions vary by authorizing and implementing agencies.

For purposes of this chapter, ecosystem (or ecological) restoration is defined as an intentional activity that initiates or accelerates the recovery of a degraded, damaged, or destroyed ecosystem (both floral and faunal organisms) with respect to its health, integrity, services, and sustainability (SERI 2004). Ecosystem health provides a useful metaphor for human health, and helps emphasize that most of DOI’s

Urban Restoration: Watts Branch

The Anacostia Watershed lies within the Chesapeake Bay drainage basin, and is one of the most urban watersheds within the basin. Restoration efforts were focused on a highly polluted 1.8 mile stretch of Watts Branch, a tributary of the Anacostia. The project was a collaborative effort between DOI, USDA, EPA and other non federal entities. Total restoration project costs were over \$3 million (2011\$). The local economy surrounding the project location includes 20 counties in Virginia, West Virginia, and Maryland within commuting distance of the D. C. metropolitan area. Due to the urban nature of this project and the wide local availability of materials, much of the money spent stayed within the local economy. In total, USGS estimated that restoring Watts Branch supported 45 jobs, \$2.6 million in labor income (salaries, wages, and benefits), and \$3.4 million in valued added (the contribution of expenditures to Gross Domestic Product). For additional details, see: [Restoring a Stream, Restoring a Community— Urban watershed restoration fosters community improvement](http://pubs.er.usgs.gov/publication/70045790) (<http://pubs.er.usgs.gov/publication/70045790>).

lands and managed resources play an integral role in the welfare of many Americans and most of these resources have been altered by people. For example, chemicals or oil may be present and need to be addressed prior to restoration through removal, cleanup, or remediation of the land. Some ecosystems may have been changed so dramatically that a return to the original landscape is no longer possible and rehabilitation or on-site mitigation—a partial return to a previous state—could be the only option. Reclamation is the process of reconvertng disturbed land to its former or other productive uses. It is commonly used in the context of mined lands. Reclamation projects that are more ecologically based can qualify as rehabilitation or even restoration.⁸⁴ Off-site mitigation is an action intended to compensate for environmental damage. Regardless of approach, monitoring is needed to ensure the desired goals are actually achieved. A resource is considered recovered when it can sustain itself structurally and functionally.

Outputs

The primary measures of mitigation, reclamation, restoration and recovery success have been physical—numbers of acres, stream/shoreline-miles, and sites; and percent recovery of species—as described below. It is widely recognized that these types of program outputs are important for understanding and conveying restoration success, but they do not fully reflect the outcomes of restoration investment. Interior’s lands and managed resources produce a wide range of valuable ecosystem services, including agriculture, drinking water, energy, flood and disease control, carbon sequestration, recreation, and cultural resources. Interior’s ecosystem restoration activities play an important role in maintaining and enhancing the services from departmental lands and managed resources. Although the jobs and economic contributions from restoration are substantial and important, they do not represent the full economic value of ecosystem restoration because they do not capture the net benefits associated with environmental goods and services not bought and sold in markets. Restoration, reclamation, rehabilitation, and remediation activities are often very costly. A fundamental question for most decision makers is whether the total benefits exceed the total costs (i.e., generates positive net benefits). While investment in these projects provides value to the public by restoring ecosystem function and structure to damaged, degraded, and destroyed ecosystems, they are often non-market benefits. If proper economic analysis is not conducted, an incomplete measure of these benefits could lead to under-investment in restoration or selection of a project option with lower actual net benefits than other alternatives. Challenges remain to develop metrics to quantify and value restoration outcomes.

BLM’s Abandoned Mine Lands (AML) Program

The [AML](#) Program enhances public safety and improves water quality by reducing or eliminating the effects of past mining (primarily hardrock) in the western United States. Spatially, the program deals with contaminated sites and specific features on these sites. Features include open physical hazards and piles of contaminated material. The program seeks to apply the “polluter pays” principle to achieve [cost recovery/cost avoidance](#) for funding AML projects wherever possible. The ultimate goal is to reclaim AML to productive uses including, but not limited to, recreation, fish and wildlife habitat, and preservation of historical and cultural resources. BLM maintains an inventory of known AML on public

⁸⁴ See Stahl, P.D., *et al.*, 2006, for more discussion on reclamation and ecosystem restoration.

lands. In some cases, data or historical records—such as those from the former Bureau of Mines—were available to support quick validation of the location and status of past mines. In other cases, though, the locations of these historic mines were not well documented and accurately determining their locations and status involves additional effort. BLM is continuing to work with its partners to locate and evaluate these remaining historic mines, and to prioritize their restoration and protection. BLM and its partners are also working on sharing and displaying AML spatial data within a National Mine Land Inventory at www.geocommunicator.gov.

As shown in Figure 10-1, as of January 2013, the BLM database includes 38,982 AML sites in a variety of remedial and restoration stages.

Table 10-1 provides a 6-year overview of the AML inventory and activities, showing an increase in both funding and site inventories. According to BLM, their ability to identify additional sites was supported by additional funding made available to the AML program. The funding increase supported efficiency improvements and innovative management initiatives. Such improvements included establishing inventory teams and field validation studies to improve the completeness of the inventory and enhance data quality.

FY2012-FY2013: USGS Assessment of Ecosystem Service Values for the Central Everglades Planning Project

Economists at USGS, in collaboration with the University of Florida, U.S. Army Corps of Engineers (USACE), and other federal and state agencies, are conducting an interdisciplinary assessment of the value of ecosystem services that will be affected by restoration activities in Florida's central Everglades. The team will monetize the value of select ecosystem services using existing data and benefit transfer methods, and provide a qualitative description of those services that lack existing data or will not be significantly impacted by restoration activities. This effort will highlight gaps in the existing literature to efficiently guide future ecosystem service valuation research in the central Everglades. This ecosystem services assessment is unique in that it will result in an estimate of the future value of a restored ecosystem, significant for the Comprehensive Everglades Restoration Plan and its stakeholders, the general public, USACE Jacksonville District, and USACE nationally. The results will also be relevant to others who may want to use ecosystem services valuation as a means of choosing among restoration options.

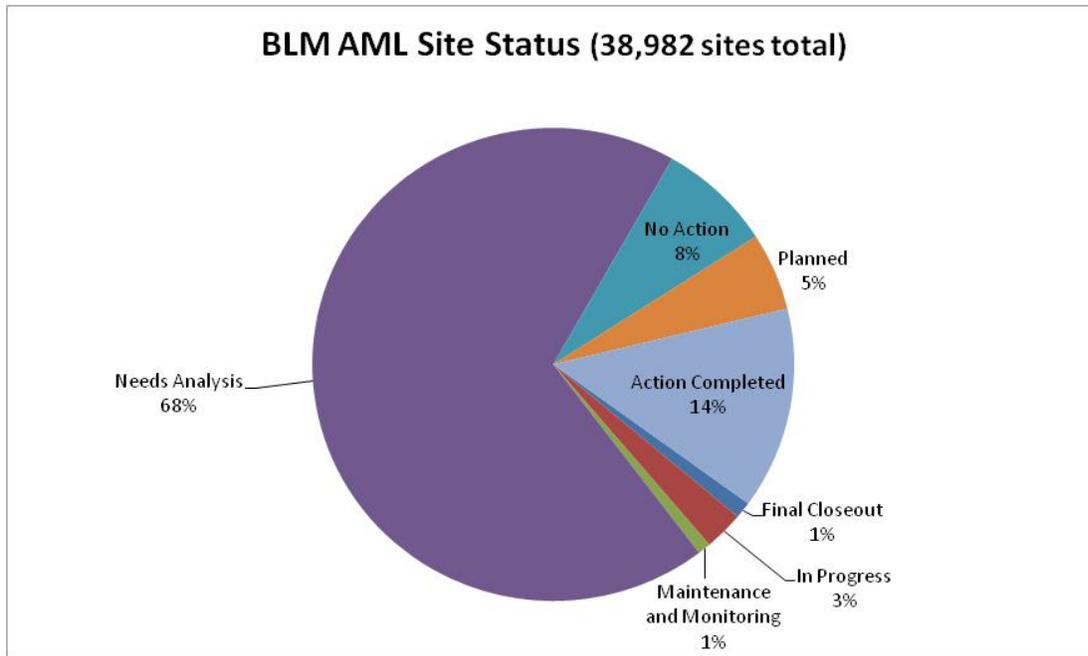


Figure 10-1. BLM AML Site Status (as of January 10, 2013)

Source: BLM data

Table 10-1. BLM's FY 2006-2011 Abandoned Mine Land Accomplishments-at-a-Glance

Inventory Status	FY 2006-2008*	FY 2009-2011
BLM AML Funding	\$27 million	\$77 million
AML inventory of known sites on public lands	16,000 sites	28,000 sites
Number of AML sites discovered, evaluated, prioritized for funding	3,487 sites	11,840 sites
# Restored AML sites	1,288 sites	3,143 sites
# Acres AML restored	4,137 acres	4411 acres
# Acres of AML addressed to restore water quality	≈1,470 acres	≈1,600 acres
# Restored AML sites monitored and maintained	949 sites	2,070 sites

*BLM baseline for future accomplishments reporting.

Source: BLM, *Abandoned Mine Lands: A New Legacy*, December 2012.

The Office of Restoration and Damage Assessment (ORDA) and the DOI Restoration Program

Under the authorities of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (also known as CERCLA or “Superfund”), the Clean Water Act, and the Oil Pollution Act of 1990, federal, state, and tribal trustees seek to identify and restore natural resources injured from hazardous substances or oil through the DOI [Restoration Program](#). The program is administered by ORDA and comprised of staff from BIA, BLM, USFWS, National Park Service (NPS), Reclamation, Solicitor’s Office, U.S. Geological Survey (USGS), and the Office of Policy Analysis. The Department’s trust resources include national parks, national wildlife refuges, lands managed by BLM, Indian lands, and natural resources held in trust by the federal government, waters managed by Reclamation, and federally-protected migratory birds and endangered and threatened plants and animals. The Restoration Program ensures the responsible parties, not taxpayers, bear the cost of restoring these injured resources to the quality and level of services provided had the event not occurred. Table 10-2 provides a 5-year overview of Restoration Program performance. As shown in Table 10-4, FWS had 277 NRDAR cases in progress in FY 2012. With ORDA’s support, staff at the USGS Environmental Research Center in Columbia, Missouri, are actively working to develop ecosystem services metrics to better measure the ecological outcomes of restoration activities.

FWS Environmental Contaminants (EC) Program

The EC Program is dedicated to protecting fish, wildlife and their habitats from the harmful effects of pollutants, climate-related ecological changes, and the interactions between the two. The EC staff work in three important areas: (1) identifying and assessing the effects on species and habitats exposed to contaminants; (2) preventing trust resources from being exposed to hazardous levels of contaminants; and (3) restoring habitats and DOI trust resources injured by contaminants. Table 10-4 provides a 5-year overview of select activities conducted by EC staff.

Central Hazardous Materials Fund Program

Established in 1995, the Central Hazardous Materials Fund (CHF) is a significant source of funding for the cleanup of the most highly contaminated sites located within national parks, national wildlife refuges,

CHF and America’s Great Outdoors: Anacostia Riverwalk Trail in Washington, DC

In FY 2012, the CHF funded 18 projects in BLM, 14 projects within USFWS, and 17 in NPS, along with others in the Bureau of Indian Affairs and USGS. Many of these contaminated areas indirectly impact tourism and recreation in the local areas, and in some instances recreational opportunities for the public are dependent on a site’s cleanup. Six CHF funded sites are near, or impact the completion of America’s Great Outdoors Projects. One example is the Anacostia Riverwalk Trail in Washington, DC. Once the trail is completed, it will cross three NPS CHF projects (Kenilworth Landfill, Poplar Point, and Washington Gas and Light). The final segments of the trail will be constructed once the cleanup has been completed. The trail will provide residents and visitors opportunities for connection to the Anacostia River, along with commercial and recreational destinations.

and other DOI-managed lands. These sites typically pose potential risks to employees, public health and welfare, and the environment. This effort integrates Interior's interests in remediation and environmental restoration of the contaminated sites it manages into CERCLA response actions. The CHF Program cost-effectively leverages DOI's legal, technical, and project management expertise to address the highest priority cleanup sites, which are typically so costly and complex to clean up that they cannot adequately be addressed using available bureau resources. CHF sites range from AMLs to landfills and former industrial facilities. Some of the larger sites include the Crab Orchard National Wildlife Refuge, Illinois; Valley Forge National Historic Park, Pennsylvania; Red Devil Mine, Alaska; Phosphate Mines, Idaho; and Orphan Mine, Grand Canyon National Park, Arizona. In 2012, the following types of sites were provided new funding: AMLs, prior industrial facilities, prior utility sites, landfills, firing ranges, and a former in-holding that was contaminated with hazardous waste. Table 10-3 provides an overview of CHF Program activities.

Table 10-2. Resources Restored, Enhanced and Protected by the DOI Restoration Program

Performance Goal	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012
# acres restored or enhanced	13,403	15,462	24,914	41,183	68,834	87,709	97,813
# stream-miles or shoreline miles restored or enhanced	42	171	391	186	377	401	409

Source: DOI Office of Restoration and Damage Assessment, May 2013.

Table 10-3. CHF Program Activities

Activity	FY 1995-2012*
CHF funding	\$175 million
Recoveries from potentially responsible parties (PRPs)	\$65.4 million
In-kind work	≈\$250 million
# contaminated sites	65
# sites with cleanup complete	20

*CHF baseline for future accomplishments reporting.

Source: Office of Environmental Policy and Compliance, March 2013.

Table 10-4. FWS Environmental Contaminants Program Activities

Activity	Performance Goal	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012
Investigation/ Assessment	# contaminant actions benefiting FWS lands	N/A	N/A	1,764	1,006	1,755
	# of NRDAR cases in progress	277	258	267	TBA	277
Restoration*	Number of non-DOI riparian (stream/ shoreline) miles restored, including through partnerships, as specified in plans or agreements that involve DOI	9,796	11,054	3,334	891	1,748
	Number of non-FWS upland acres restored, including acres restored through partnerships, as specified in plans or agreements that involve FWS	384,960	271,138	240,345	191,288	166,718
	Number of non-FWS wetland acres restored, including acres restored through partnerships, as specified in management plans or agreements that involve FWS	974,658	458,713	363,141	372,004	235,537
Recovery	Percent of populations of native aquatic non-T&E species managed or influenced by the Fisheries Program for which current status and trend is known	40% (592/1,472)	34% (526/1,569)	32% (502/1,708)	34% (542/1,723)	35% (578/1,632)
	Percent of all migratory bird species that are at healthy and sustainable levels	62.3% (568/912)	62.3% (568/912)	72.0% (725/1,007)	72.1% (726/1,007)	72.1% (726/1,007)

*FWS NRDAR restoration activities are reported under the DOI Restoration Program

Source: FWS Environmental Contaminants Program, May 2013.

Economic Contributions and Economic Values

There is limited information available about the connection between expenditures and associated economic impacts of restoration projects, and even less information on economic values. Although several studies have addressed economic impacts of specific restoration projects, these estimates are not easily generalized to other restoration projects. The most comprehensive study of the economic impacts of restoration was conducted by the University of Oregon (Nielsen-Pincus & Moseley, 2010). This study specifically addressed forest and watershed restoration projects in the state of Oregon, and provides reliable and transferable estimates, but only for forest and watershed restoration projects in the Northwest.

Starting in FY 2011, ORDA and BLM have been supporting a research effort by USGS and Office of Policy Analysis to collect and analyze data for a broad range of restoration activities across the nation in order to develop better information on the economic impacts associated with restoration. For the FY 2011 DOI Economic Contributions Report, USGS quantified expenditures and economic impacts for nine restoration projects supported by DOI bureaus and partners. The results from these case studies confirmed that there is a large amount of variation in the economic impacts supported by restoration investments. Specifically, this preliminary work suggested that the type of restoration and the costs and availability of inputs and labor play a large role in impact estimates. Because of this substantial variation, it has become clear that applying generic economic impact multipliers from studies that estimate impacts of non-similar restoration projects is likely to result in large errors.

The nine case studies (available on-line at <http://www.doi.gov/ppa/upload/Chapter-4.pdf>) represent only a small subset of the broad range of restoration projects supported by DOI. In work planned for FY 2013, USGS anticipates surveying federal restoration case managers and supporting contractors to obtain additional information on the actual costs of various restoration activities, along with an improved understanding of the relationship between restoration investments, job creation, and economic impacts.