



Indiana Department  
of Natural Resources  
Division of Reclamation



# Restoration Program

## 2011 Annual Accomplishments Report

### Project Summary

Project Type	Number	Funds Applied	These figures represent Abandoned Mine Land Reclamation projects that received funds in 2011. All construction projects listed were completed during the year. Special Services projects, which involve research, mapping, or design, are separated into completed and ongoing projects. Ongoing projects were not completed in 2011 and will require additional work in future years.
AML	5	\$11,718,866.48	
Emergency	11	\$63,482.27	
Unit Price Contract	21	\$196,058.11	
Tree Planting	7	\$47,278.11	
Sycamore Trails RC&D	3	\$18,751.12	
<b>Construction Total</b>	<b>47</b>	<b>\$12,044,436.09</b>	
Special Services (completed)	3	\$302,016.53	
Special Services (ongoing)	10	\$372,739.94	
<b>Special Services Total</b>	<b>13</b>	<b>\$674,756.47</b>	
<b>GRAND TOTAL</b>	<b>60</b>	<b>\$12,719,192.56</b>	

### Natural Stream Design Workshop

The Indiana Restoration Program hosted a field trip intended to examine natural geomorphic design approaches to stream reconstruction on surface mined lands as part of OSM's Natural Stream Design Workshop held on May 17<sup>th</sup> – 19<sup>th</sup>, 2011 in Mount Vernon, IL. In recent years, increasing pressure has been put on the mining industry to improve landform reclamation and mitigation of stream impacts. This workshop focused attention on the unique challenges and ecological benefits of utilizing natural



stream design methods and practices for both active coal mine and abandoned mine land reclamation projects, specifically in the Midwest. The workshop's 142 attendees represented a wide range of state restoration and regulatory programs, as well as several federal agencies, private organizations and universities. This workshop featured two field trips, one in Indiana and the other in Illinois. Combined, the two tours provided the participants a unique opportunity to explore a variety of design and monitoring practices and discuss these with personnel directly involved with the restoration efforts. The Indiana field tour visited both active and abandoned mine land projects including: Peabody's Somerville Central Mine, AML Site 2082 (Hedges Highwall), Triad's Augusta South Mine, United Mineral's Somerville East Mine, and AML Site 900 (Log Creek Church).

# Project Highlights



Above: Drilling an angled borehole.  
Below: Introducing grout into a hole.



Workshop renter standing on a concrete floor slab that is no longer supported by the ground due to subsidence of an abandoned mine. Do not try this at home!



An excavator applies aggregate to the shaft.

Flowable fill covers the aggregate.



## AML Projects

Site: 2078 Terre Haute Regional Airport  
Location: T12N, R8W, S28, Vigo County  
Cost: \$8,488,742.32  
Dates: 1/28/11– 9/23/11

Problem Description: This airport had experienced several subsidences due to the collapse of underground mine voids. Worsening of the subsidence could present a serious safety risk and cause extensive structural damage.

Reclamation: High-priority areas selected for grouting included the runway, radar tower, terminal building, Building 2, and Apron area. Grouting is accomplished by drilling boreholes through surface rock layers to penetrate mine voids. The grout introduced through the holes helps support the roof and minimize surface impacts of future subsidence.

### Other AML Projects Completed in 2011

Site No.	Site Name
130	Blackfoot*
291	Sunshine Mine*
807	Selsam Pit
2147	Loge Elementary Grouting

## Emergency Projects

Site: 3006 Booe Subsidence  
Location: T10N, R6W, S30, Clay County  
Cost: \$7,131.22  
Dates: 7/29/11– 8/09/11

Problem Description: A dangerous opening 20 feet in diameter and 5 feet deep formed beneath a workshop at a sawmill as a result of the collapse of an abandoned underground mine. Damage to the shop or worker injury was likely.

Reclamation: The opening was excavated to a stable base and backfilled with aggregate and soil. The site was partially revegetated and gravel was laid to restore the driveway to the workshop.

### Other Emergency Projects Completed in 2011

Site No.	Site Name
1620	Wilson Subsidence
1621	Hayden IV Subsidence
3000	Sullivan Subsidence
3001	Jukes III Subsidence
3002	Frasier Subsidence
3003	Miles Subsidence
3004	Bradley Funeral Home Sub.
3005	Mahan Subsidence
3007	Rogers Subsidence
3008	West Subsidence

## Unit Price Contracts

Site: 2173 Summers Shaft  
Location: T4N, R8W, S20, Knox Co.  
Cost: \$20,198.88  
Dates: 7/11/11– 7/13/11

Problem Description: A previously-filled mine shaft settled five feet, leaving a 7' x 18' opening.

Reclamation: The shaft was filled with aggregate and capped with flowable fill, which penetrates the spaces in the aggregate layer and prevents future settling. The area was then revegetated.

### Other Unit Price Contract Projects Completed in 2011

Site No.	Site Name
130	Blackfoot*
232	Bennett #1*
273	Chinook*
280	Alfordsville #1 / Alfordsville #2*
287	Friar Tuck*
297	Enoco*
318	Peabody #48*
847	Lynnville Gob Pile*
863	Lacy Mine (AMD)*
921	Hudson CO2
934	Anna Mae Strange*
983	Star Highwall*
1037	Christian - Roos Pit #1*

Continued on page 4.

# Project Highlights Continued



Before: A dangerous pile and embankment in 2010.

After: The seedlings in this newly-planted field should leaf out this spring.



## Tree Planting Projects

Site: 2101 Steve Reed Dangerous Pile and Embankment

Location: T9N, R9W, S35, Sullivan County

Cost: \$3,157.88

Dates: 5/08/11– 5/09/11

Problem Description: This site was an attractive nuisance to hikers and ATV riders.

Reclamation: In 2011, 4400 trees representing numerous native taxa were planted on 5.5 acres at this site. Earlier reclamation of the site involved dumping and leveling cover material without driving over the soil, minimizing compaction to facilitate root growth. Wood chips were also incorporated as a soil amendment to increase its organic content and water-holding capacity, encouraging the growth of soil organisms.

## Other Tree Planting Projects Completed in 2011

Site No.	Site Name
147	Wheeler Creek / Mason
196	Floyd Cemetery
380	Lowland Western
1087	Midwestern #1
1740	Norrick Tree Planting
1741	Lents Tree Planting

One of many sags left behind by an old rail grade.



## Sycamore Trails RC&D

Site: 2514 Stephens Spoil Area

Location: T12N, R7W, S22, Clay Co.

Cost: \$9,134.66

Dates: 8/30/11– 9/15/11

Problem Description: This site was an old rail grade from a surface mine. A number of sags along the sides of the grade retained water, and stretches of barren ground and fines made re-vegetation by the owner almost impossible.

Reclamation: The area was graded and leveled to establish a good drainage path. Lime and fertilizer were added to neutralize soil acidity and encourage the growth of plants. The owner is now in the process of reseeding and controlling invasive plants.

## Other Sycamore Trails RC&D Projects Completed in 2011

Site No.	Site Name
273	Chinook*
2513	Reece - Agricultural Flooding



The area is now level and ready to be revegetated.

## Special Services Contract Projects

Site: 264 Green Valley

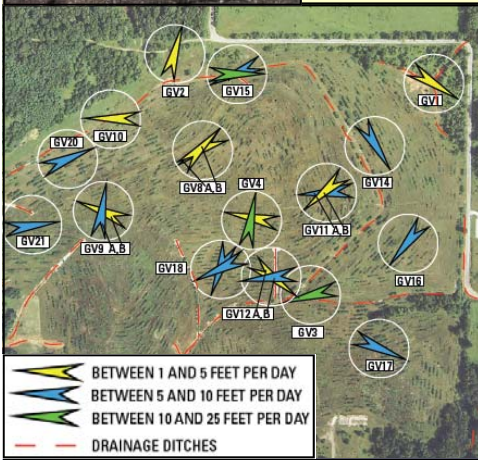
Location: T12N, R10W, S 3-4 & 9-10, Vigo County

Cost: \$36,254.30 (period), \$414,720 (contract total)

Dates: 7/01/08– 9/30/12

Project Description: Green Valley is a coal refuse site that was reclaimed in 1993 by grading gob piles, filling tailings ponds, and adding new soil. The US Geological Survey has been contracted to investigate the hydrogeology of the site, utilizing a data-collection network to measure stream flow, groundwater levels, and other features. The goal is to create a groundwater flow model that can be used to simulate future remediation activities. A scientific report was published in 2011, but the Survey has installed additional water monitoring stations to provide more data and refine understanding of the surface water flow of the seeps at this site.

Full list and project descriptions on page 4.



Groundwater flow direction and velocity data from Green Valley in 2009. Adapted from the U.S. Geological Survey Scientific Investigations Report 2011-5116.

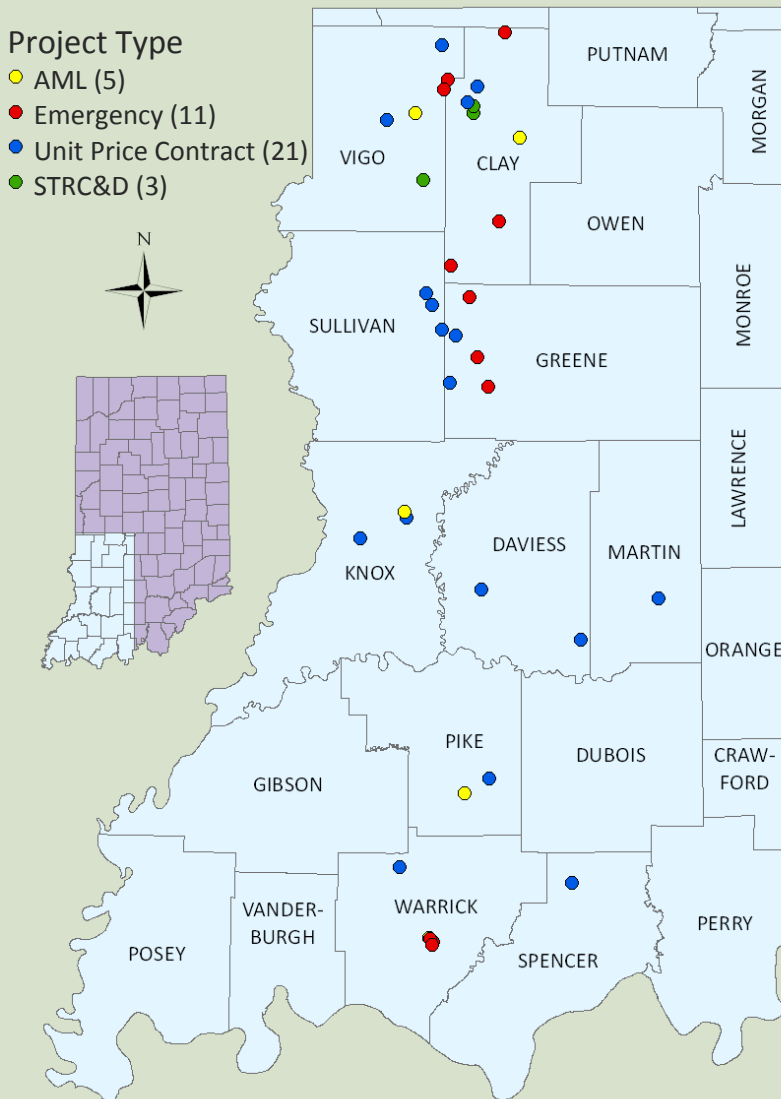
\*Maintenance project

## Other Special Services Contract Projects in 2011

\*\*Ongoing project

Project or Site Name	Project Description
AMD Treatment Research**	IGS is monitoring the effect of bioreactor cells on acid mine drainage at sites 863 Lacy and 1087 Midwestern.
Coal Mine Information System**	IGS continues to develop an integrated geographic information system with online viewing capabilities.
Tree Survival on Coal Mine Land**	Purdue University is researching the survival of American Chestnut and Oaks on surface mined lands.
Williams Aerial & Mapping	This company performed aerial photography and digital photogrammetric mapping of reclamation sites.
Site 130: Blackfoot**	IGS is assessing the efficacy of a large wetland/bioreactor system at this site.
Site 130: Blackfoot**	IGS is performing quantitative characterization of bacterial communities within the bioreactor system.
Site 882: Snow Hill	ATC Associates, Inc. evaluated AMD sources and reclamation alternatives at this site.
Site 921: Hudson CO2**	USGS is studying CO2 migration into a home and possible mitigation options.
Site 1087: Midwestern #1	IGS is studying toxic metal leaching from coal residues used as structural fills in reclamation settings.
Site 2078: Terre Haute Reg. Airport	CTL Engineering performed investigative drilling and oversight for this mine void grouting project.
Site 2095: Nevins Twp. Water Supply**	Nevins Township is planning to install new water lines in areas where water is impaired by past mining.
Site 2140: Coalmont Grouting**	CTL Engineering is performing investigative drilling and oversight for this mine void grouting project.

## 2011 Project Locations



### Other Unit Price Contract Projects Completed in 2011

Continued from page 2.

Site No.	Site Name
2020	Fontanet Shaft
2078	Terre Haute Regional Airport*
2147	Loge Elementary Grouting*
2164	Larry Crabb - Vertical Opening
2166	Dale/Floyd Vertical Openings
2167	Cory-Staunton Vertical Opening
2168	Susan Phillips Vertical Opening

\*Maintenance project

### Staff Awards

#### Outstanding Achievement Award:

Mark Bredehoft, Hydraulic Engineer  
 Ray Brumfiel, Project Manager Supervisor  
 Marvin Ellis, Field Operations Coordinator  
 Nick Lorenzo, Emergency Coordinator

#### 25 Years of Service:

Mark Stacy, Environmental Specialist

### Staff News

There were several personnel changes in 2011. First, Andy Ripley was hired as Field Investigator on March 21, replacing Randy Hoffman. After 29 years with the Division, Ed "Gone Fishin" Kirby retired on April 29. Laura Montgrain accepted a position with the Indiana Geological Survey, and her last day was September 16. Jim Metzger accepted a position with the Department of Defense, and he and his whole family moved to Italy. His last day

was October 14. Jill Flachskam was hired on November 28, replacing Laura as GIS Inventory Specialist. Finally, Mark Stacy formally accepted the role of Technical Management Supervisor on December 11, replacing Jim.