

# Acid Mine Drainage Treatment and Recovery in the Monday Creek Watershed



Presented By:

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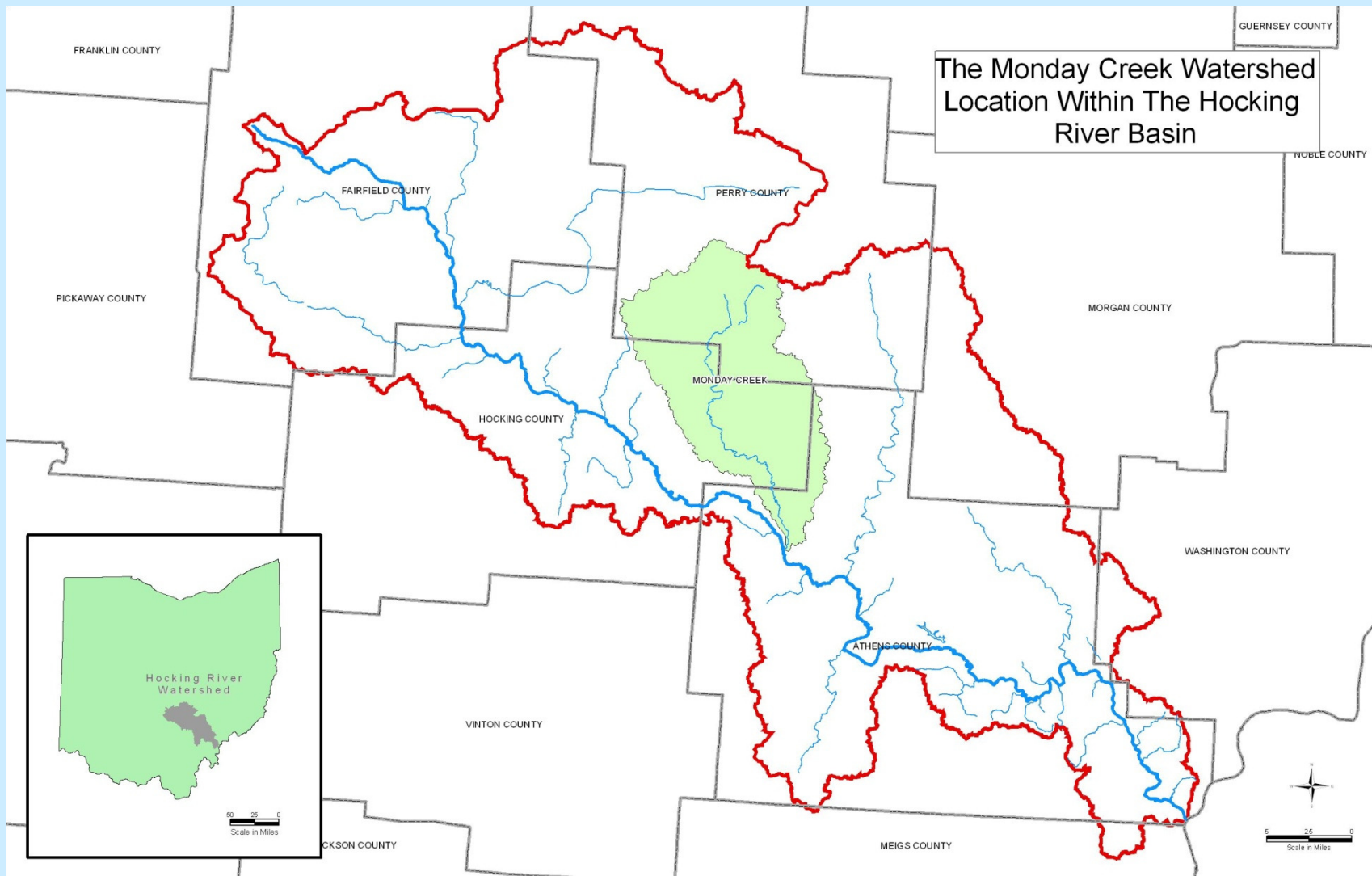
Monday Creek Restoration Project



**Rural Action**

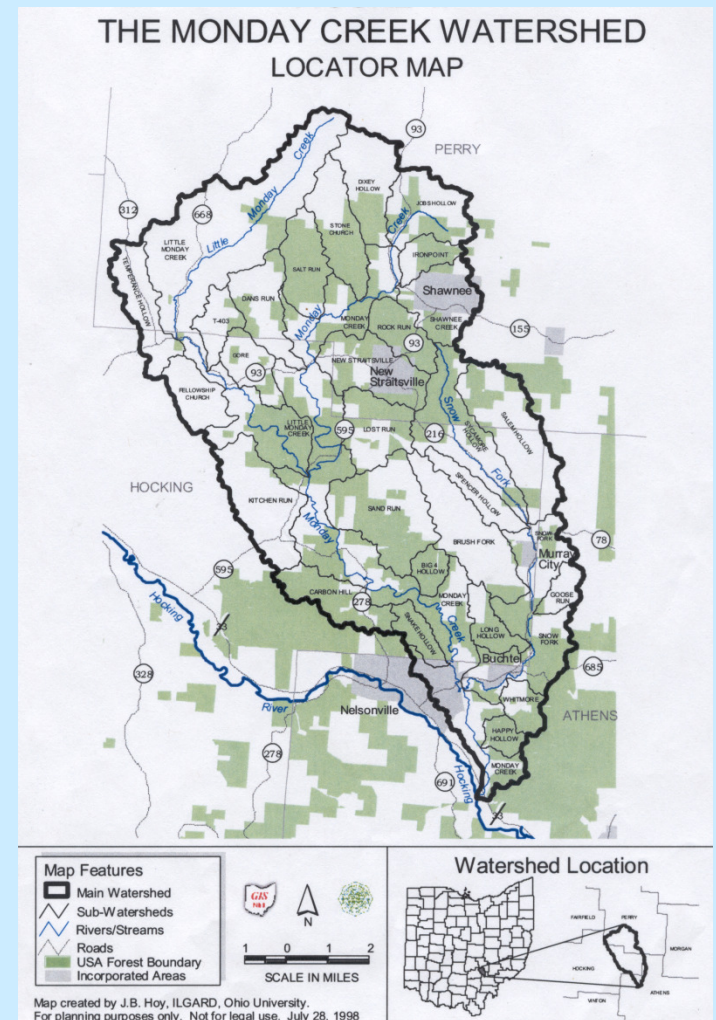
Working Together to Revitalize Appalachian Ohio

# Hocking River Watershed



# Monday Creek

- 27 miles long
- 116 square miles
- Flows into the Hocking
- 87% forested
- 44 % of streams degraded by acid mine drainage

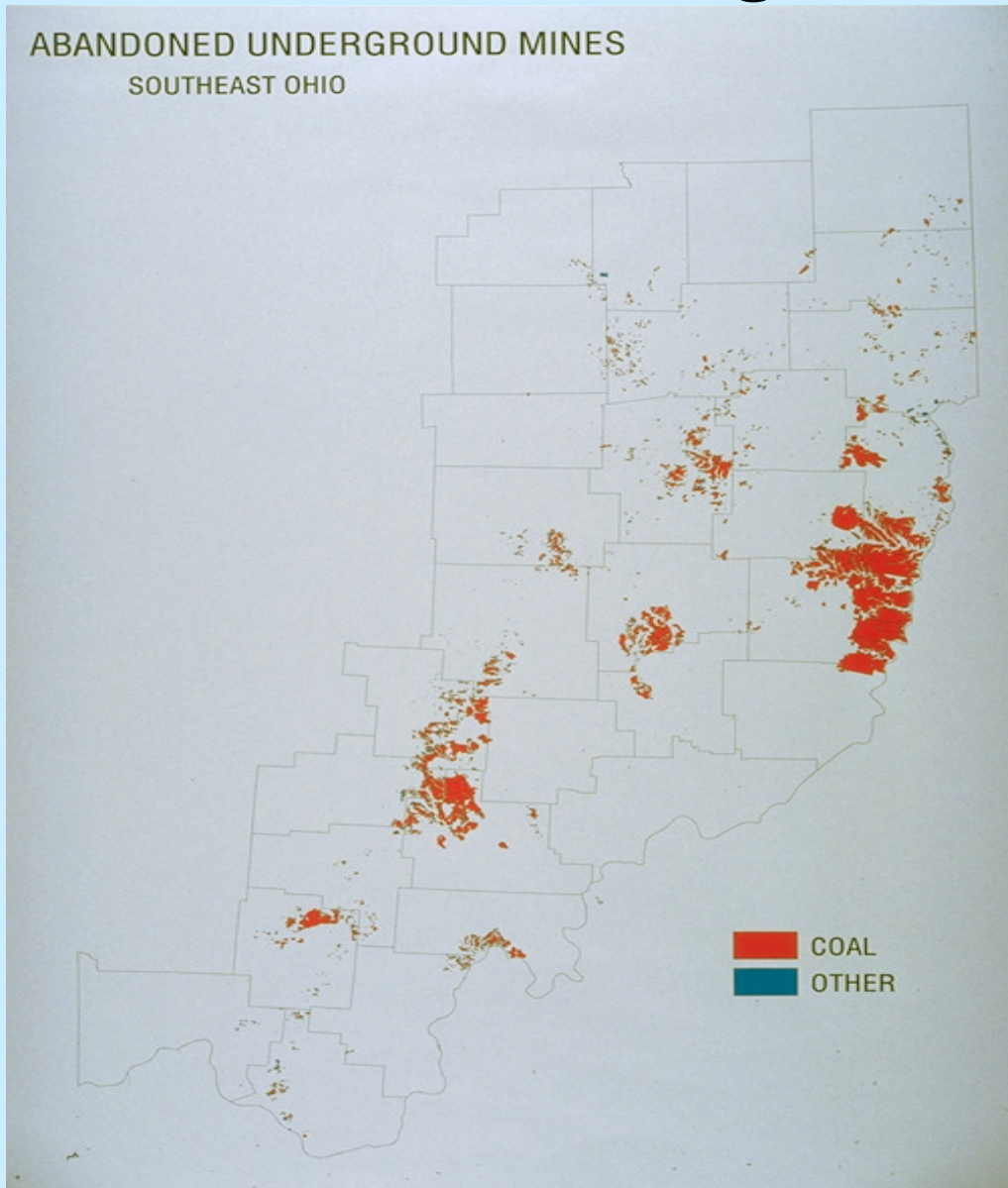


# Monday Creek Industrial History

- Iron
- Timber
- Oil and Natural Gas
- Salt mining
- Clay – used to make bricks
- Furs
- COAL MINING

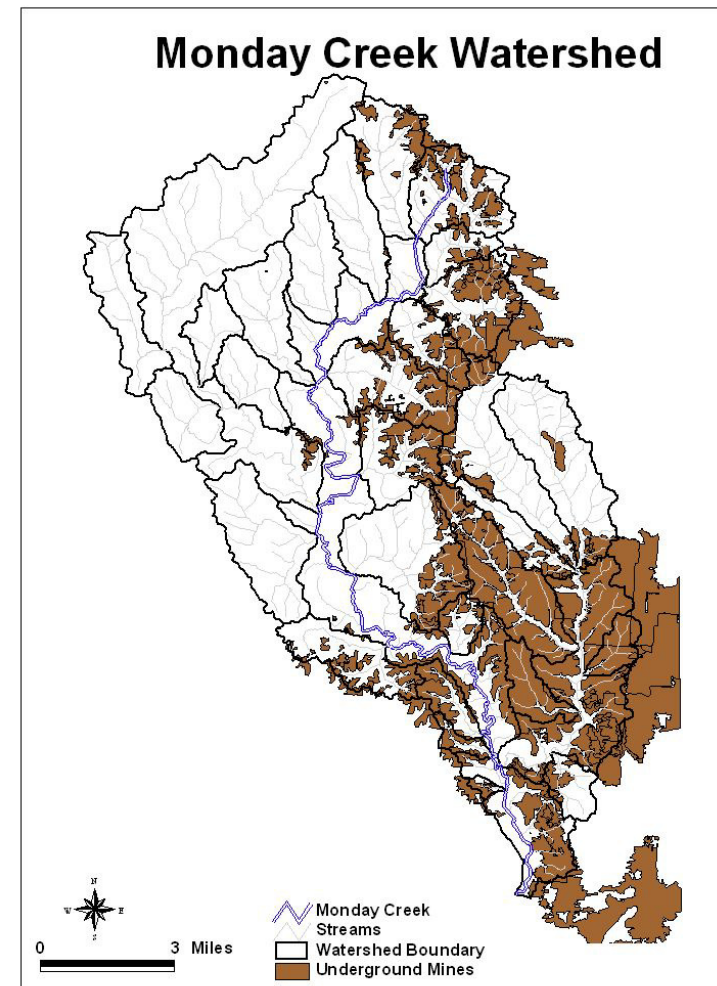


# Coal Mining



# Coal Mining in the Monday Creek Watershed

- 15,000 acres of underground mines
- 4,000 acres of surface mines



# Coal Mining Impacts



# Monday Creek Restoration Project

- Formed in 1994
- Based out of New Straitsville
- A highly collaborative venture among officials, residents of the Monday Creek watershed, and more than 15 other organizations and agencies to rehabilitate the watershed
- Mission Statement – A partnership committed to improving watershed health for the benefit of the community







# A Program of Rural Action



- A nonprofit regional development organization
- Membership based
- 21 years of experience advancing development that improves the quality of life for Appalachian Ohioans.
- Provides members the tools necessary to craft strategies that improve the economy, restore the environment and strengthen our communities.



# Monday Creek Partners



Friends of Monday Creek

County Commissioners



Soil & Water Conservation Districts



# Getting the Job Done

- ODNR Watershed Coordinator Grant
- ODNR, Division of Mineral Resources Management
- U. S. Forest Service – Wayne National Forest
- Grants – OSM / OEPA
- Americorps Members – Ohio Stream Restore Corps

# Americorps Program

- Matching funds contributed by ODNR, Division of Mineral Resources Management
- 8 Americorps members working with watershed groups
- Only Environmental Program in Ohio



# Americorps Successes 2011 - 2012

- 2,967 hours stream monitoring
- 3,048 volunteers leveraged
- 7,414 volunteer hours served
- 5,381 youth participated in education activities
- \$127,593.50 non-cash resources leveraged
- \$254,000 brought into the region
- 4 New Species of fish indentified



# Working Together to Fix the Problem

- Over \$12 million leveraged
- Reclamation / Prevention
  - Subsidence Closures
  - Gob Piles
- AMD Treatment
  - Limestone Doser
  - Limestone Leach Beds
  - Successive Alkaline Producing System
  - Steel Slag



# Reclamation / Prevention

- Over 100 Subsidence holes closed
- 16 acres of gob piles reclaimed



# Gob Pile Reclamation

Before

After





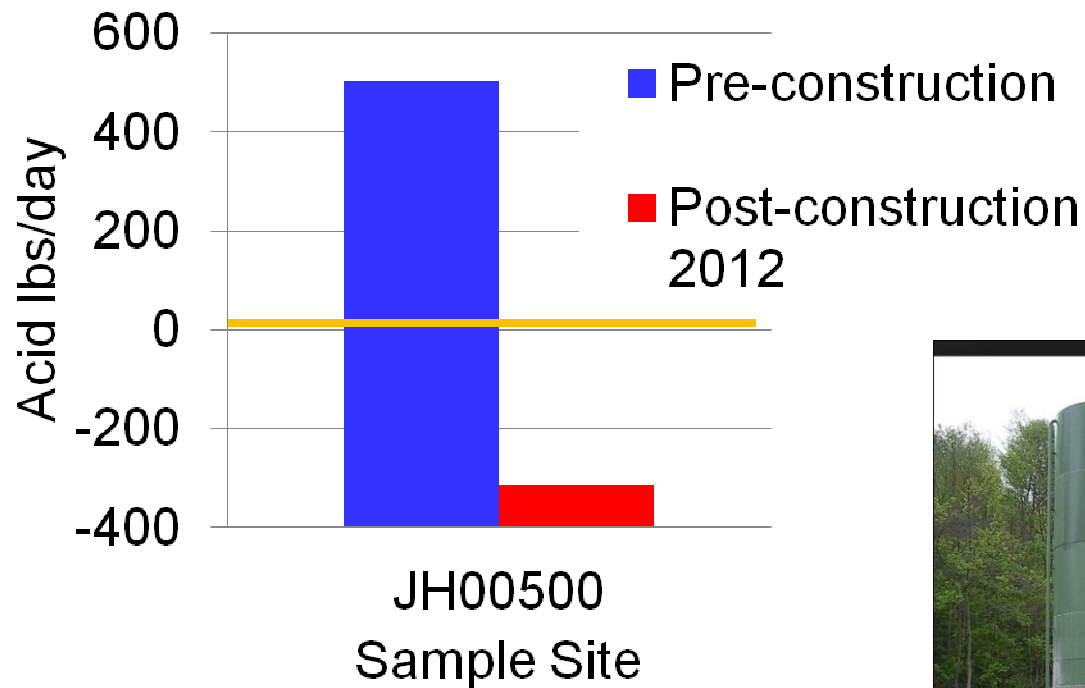
# AMD Treatment

- 14 treatment systems installed
  - Limestone Doser
  - Limestone leach bed
  - Successive Alkaline Producing System
  - Steel Slag Leach Bed



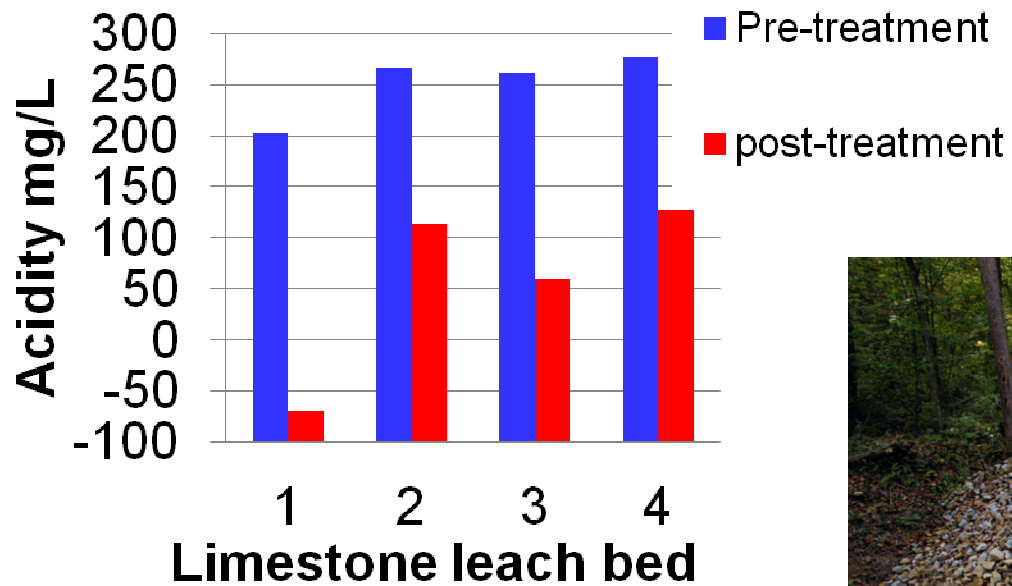
# Limestone Doser

Jobs Doser Acid Load Reduction



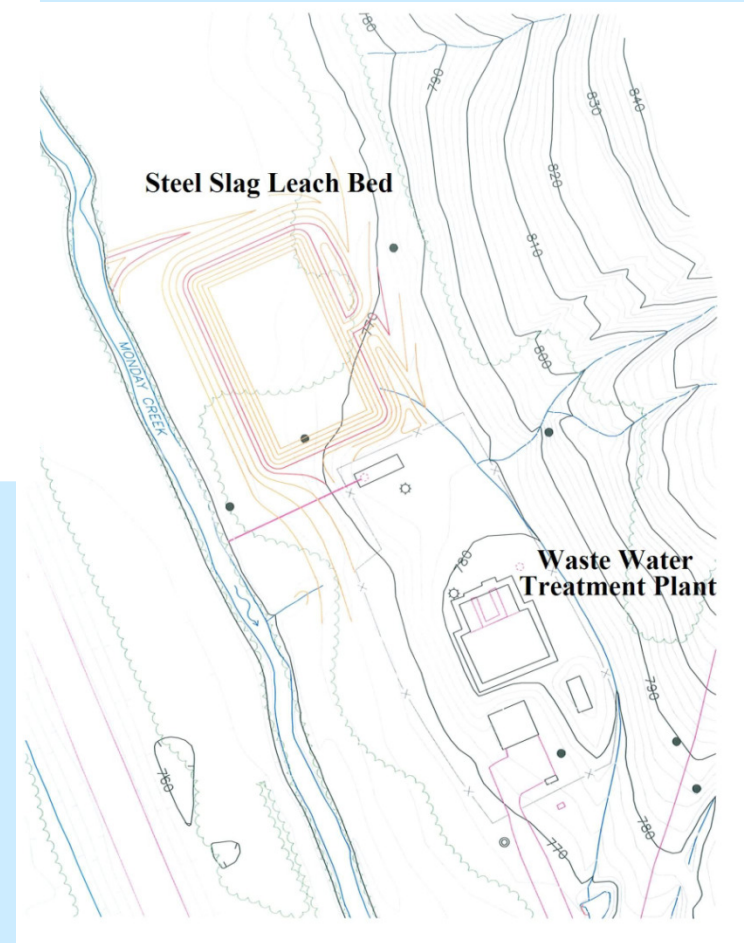
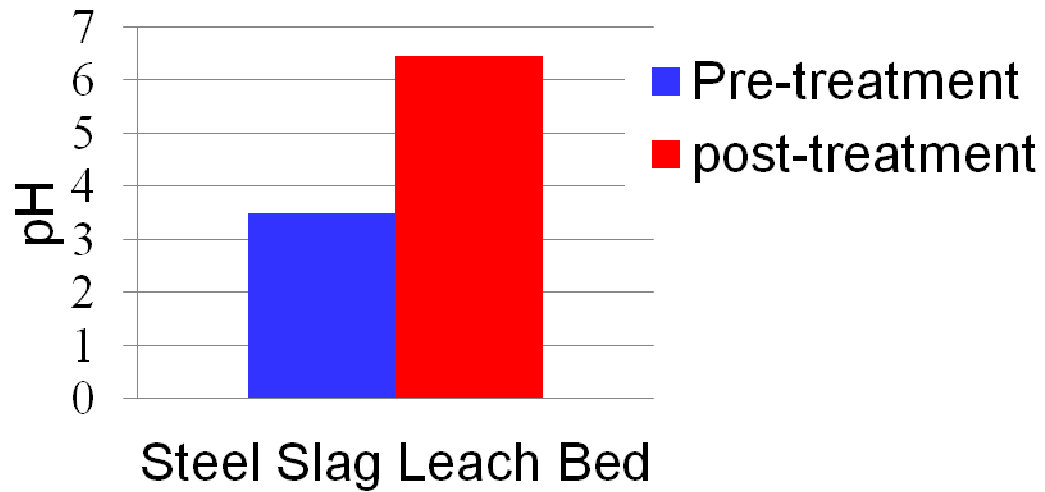
# Limestone Leach Beds

## Lost Run Limestone Leach Beds



# Steel Slag Leach Beds

Lost Run Steel Slag Leach Bed pH



# Successive Alkaline Producing System (SAPS)

	Source water	treated discharge
Total Iron	22.3 mg/L	0.12 mg/L
Total Aluminum	12.5 mg/L	<0.05 mg/L
pH	3.39	7.2
Net Acidity	138 mg/L	-88.65 mg/L



# Water Quality Monitoring

- Shows changes in Monday Creek and its tributaries
- What is sampled?
  - Chemical water quality
  - Fish - IBI
  - Macroinvertebrates - MAIS



# Chemical Water Quality



# Fish Sampling

## Electrofishing





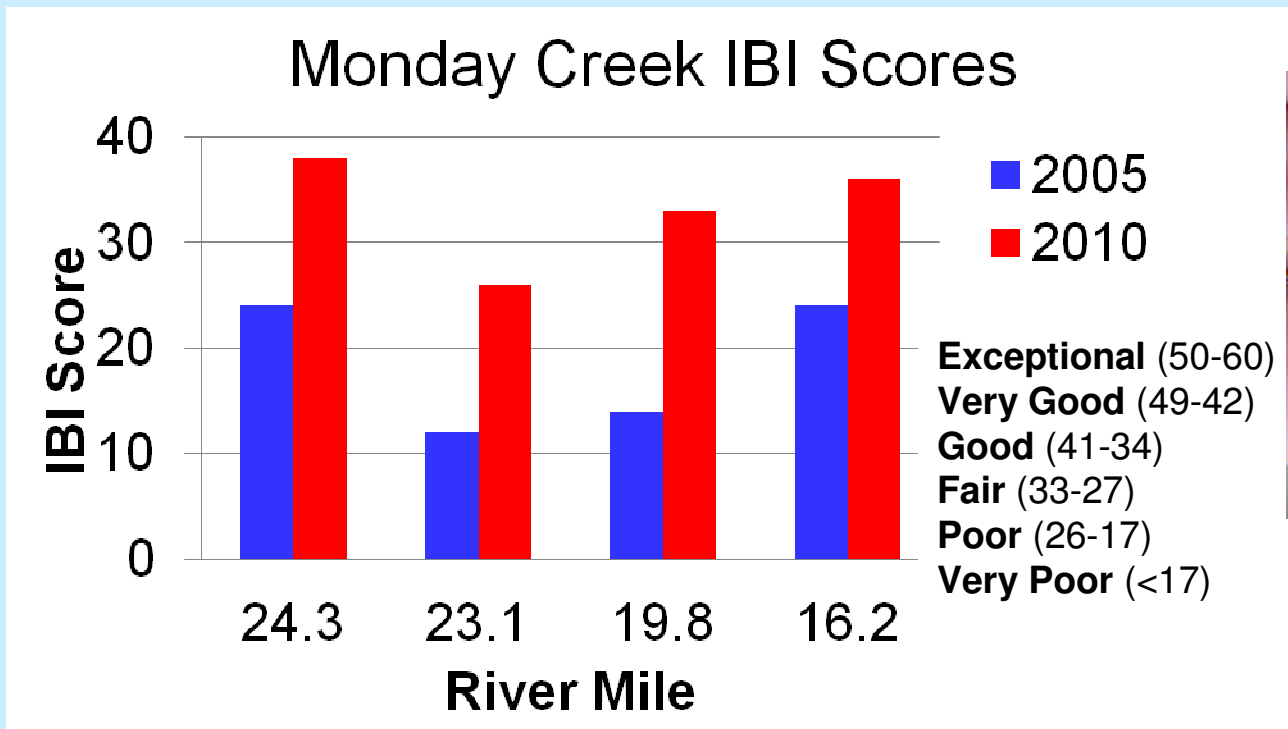
# Macroinvertebrate Sampling

MAIS



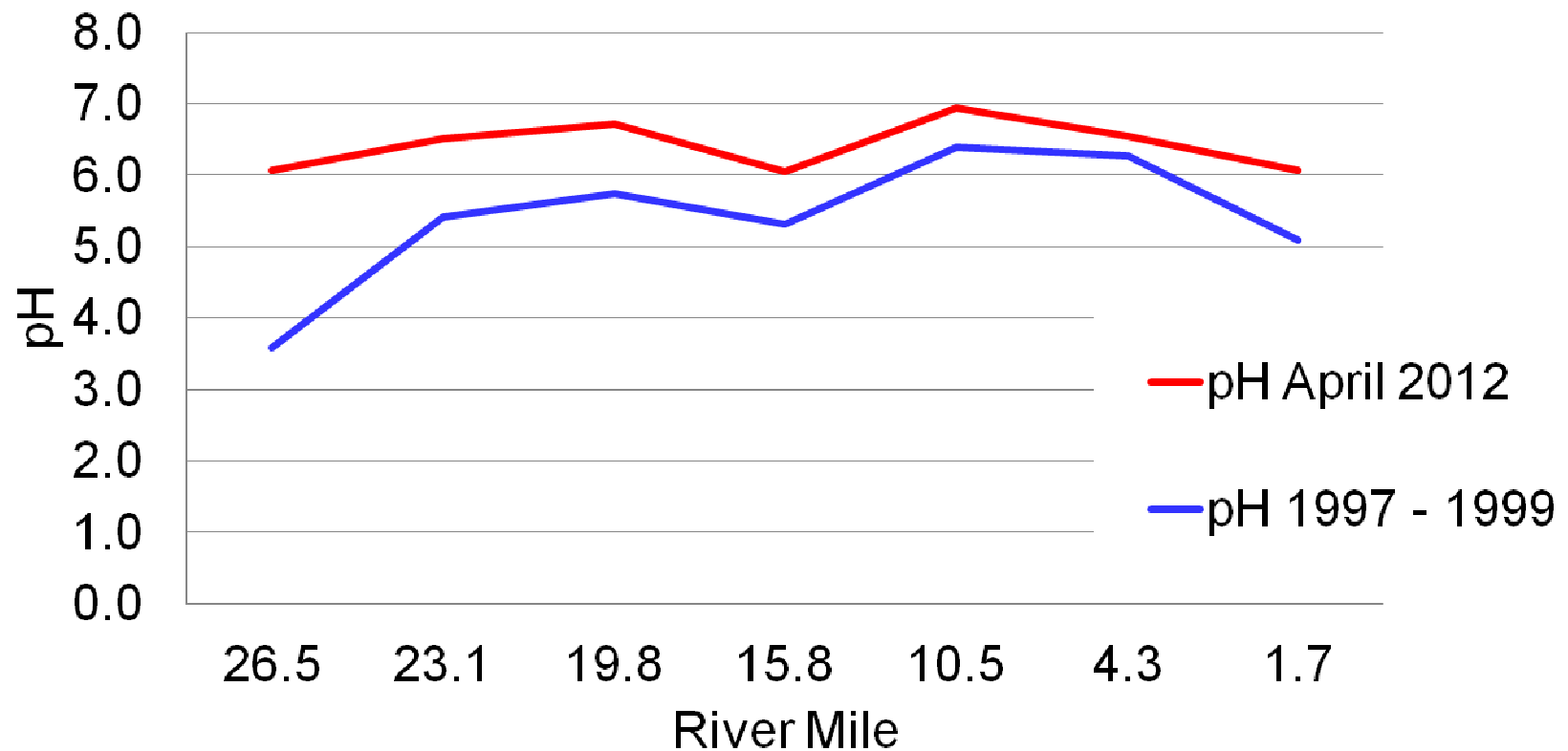
# Biological Improvements

- 25 Native Species of Fish
- Significant improvements in aquatic macroinvertebrate communities



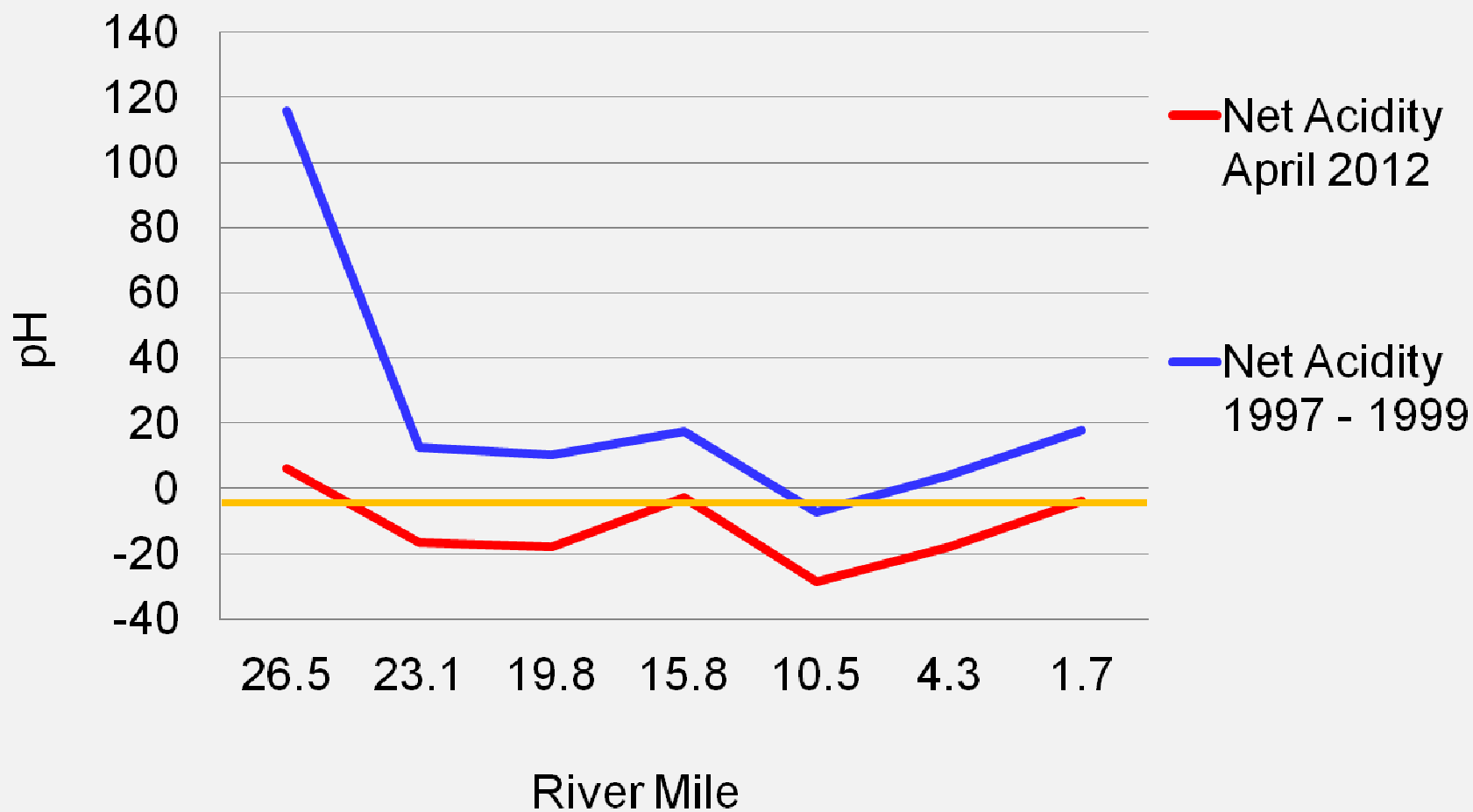
# Results

Monday Creek pH 1997 - 1999 Vs. April, 2012



# Results

Monday Creek Net Acidity 1997 - 1999 Vs. April, 2012



# Results

From June 2011 – June 2012 approximately 257 tons of acid was prevented from entering Monday Creek.



257 tons = 32 Empty School Buses

# Other Projects

- Connecting people to watersheds and science based restoration
- Educating for the future
- Community Development



# Connecting People to Watersheds and Science Based Restoration



# Educating for the Future





# Community Development





For more information or to become a member email [water@mondaycreek.org](mailto:water@mondaycreek.org), check us out on facebook or visit our website [www.mondaycreek.org](http://www.mondaycreek.org) or [www.ruralaction.org](http://www.ruralaction.org)