

EPCAMR



2012 Year in Review for the Eastern Pennsylvania Coalition for Abandoned Mine Reclamation

The EPCAMR organization is an extensive network of volunteers, non-profits and supporting agencies at the county, state, local, and federal levels versed in reclaiming abandoned mine lands (AML) and restoring our watersheds impacted by abandoned mine drainage (AMD). We have also developed an exhaustive set of technical, educational, and financial tools and resources that are continually updated on our website, www.EPCAMR.org. *(Make note of the hyperlinks underlined in blue throughout this document, which will take you to more information).*

EPCAMR administers the multi-year, base-level grant funding from the PA DEP Section 319 Clean Water Act Program (approximately 80% of funding for staff) and provides an office that is centrally located in the EPCAMR region (just a mile from the Nanticoke Exit off Route 81) at 101 South Main Street in Ashley, PA. The EPCAMR organization celebrates its 15th Anniversary this year.

EPCAMR staffs two full time employees: Executive Director, Robert E. Hughes, with over 19 years experience in abandoned mine reclamation. Program Manager, Michael A. Hewitt, with over 10 years experience, started with EPCAMR as an OSM intern for two summers before coming on full-time. Justyna Sacharzewska, a recent Wilkes University grad, continues to work part time with us aiding in GIS work.

Welcomed on board 2 Environmental Science majors from King's College, Dan Gilbert and Zach Yodis, who were interested in interning with EPCAMR for the Winter/Spring 2012 semester as unpaid interns and Sarah-Jane Gerstman, senior from Wilkes University, with a background in environmental science, for a non-paid internship for credit through Wilkes. EPCAMR also brought on board Kelsey Biondo, recent Penn State Grad, as an interns and a Community Service Volunteer Coordinator position with EPCAMR.



Iron oxide stained trees in the Solomon Creek floodplain behind the Wyoming Valley Levee System creating an optical illusion.

The EPCAMR staff is always available to answer any questions and concerns or to provide ideas and technical assistance on issues related to AMD / AML in northeastern and north central PA.

EPCAMR Initiatives:

Mine Pool Mapping - Anthracite Strategy



EPCAMR and SRBC staff checking out the discharge from the Markson Colmunway

Building upon the Anthracite Strategy Plan completed in 2011, SRBC and EPCAMR continued to gather and process data in the Northern and Southern Anthracite Coal Fields related to Mine Pools. Made a formal presentation of results to Anthracite Region Legislators and Assistants at the Capitol Building in Harrisburg in January. Worked with the LRCA to “daylight” the Winton Street borehole in Peckville (Gravity Slope Mine Pool) and the Jermyn borehole (Jermyn Mine Pool) to aide in delineation of these mine pools from the Scranton Metro Mine Pool that feeds the Old Forge Borehole Discharge.

Continued to processed cross section data, created a 3D model and calculated mine pool volumes for the Upper Lackawanna portion of the Northern Field and southern tip (Brookside and Markson Mines) in the Southern Field. Field investigations were conducted in the Southern Anthracite Coal Fields around the Rausch Creek Headwaters to find and monitor discharges and boreholes which will be used to better refine the 3D Model. SRBC hydrogeologists proposed a way to hold back water in the Brookside Mine Pool via manipulation of the Valley View Tunnel to store seasonal high flows and release during seasonal low flows to aide in a more regular flow of water to the Rausch Creek Treatment System, based on EPCAMR data.

Continued to update mine pool GIS files in the Southern and Western Middle Anthracite Fields and North Western Semi-Anthracite fields. Created contiguous set of 100’ contours for the Southern Field. Produced a 3D Mine Pool Video and printed 4 cross sections for presentation to a national audience at the National Association of Abandoned Mine Land Programs (NAAML) Conference in Des Moines, IA.

Solomon Creek Coldwater Heritage Plan

EPCAMR staff conducted several stream walks and sampling events the main stem and tributaries of Solomon Creek to complete a Coldwater Heritage Plan for the watershed. Trout Unlimited staff aided in completing a fish survey throughout the watershed. The report and specific sampling results were provided to the PA DEP to remove portions of the watershed from Impaired Waters List. Submitted a grant to the Coldwater Heritage Partnership, and other sources, for implementation of the plan recommendations.



Electroshocking Solomon Creek with TU

A Holistic Look at Watershed Planning: QHUPs, WIPs, and TMDLs

In order to qualify for BAMR funding through SMCRA, watersheds must be approved as qualified hydrologic units (QHU) by DEP. In response, several groups have begun finding funding and working on Watershed Restoration Action Plans with Cost/Benefit Analysis and providing them to DEP for QHUP consideration. EPCAMR staff prepared cost estimates for treatment systems in Lackawanna, Catawissa, Nanticoke, and Hazle Creek Watersheds to supplement previously created watershed restoration action plans. The Shamokin Creek Restoration Association has also taken the initiative to hire a consultant to prepare similar information for the Shamokin Creek Watershed.

Resource Recovery

EPCAMR and SRI continue to collect small amounts of AMD oxides and create products such as pigment, chalk, and pottery glazes.

With the help of Wilkes-Barre Area School District and PPL EPCAMR was able to construct two (2) Solar kilns to dry iron oxide laden sludge into a powder cake form and ready for pigment processing. On a good sunny day, the kilns can absorb and hold enough solar energy to heat the interior to 140° F. It is built on the same principal of a “cold box” to raise seedlings in the early spring or how your car traps heat in when the windows are rolled up. A solar panel provides energy to power a small fan installed at the top to draw out moisture. EPCAMR staff lead 2 tie dye workshops and 2 solar energy demos for students.



Fully operational Solar AMD Kiln (left) with 45 Watt Solar Panel Kit (right) powering a ventilation fan

EPCAMR staff also discovered and processed a new color of iron oxide pigment: Silverbrook Purple. The pigment comes from one discharge near Tamaqua and it is most likely due to the highly alkaline fly ash that was used to reclaim the strip mines above the mine pool to the discharge. The pigment produced from this discharge has a purple hue to the typical red color when baked. We continue to process the 2 other colors of iron oxide pigment: Yellow Boy Orange and Anthracite Red. EPCAMR also teamed up with Sean Kinney, Managing Partner with C & S Carbon Resources, a Carbon Trading company from Gahanna, OH with a regional AMD Tour of the Southern Wyoming Valley to discuss future possibilities of working with him on marketing and future resource recovery efforts in the iron oxide arena

Mining Impacted Stream and Treatment System Monitoring with Datashed

SRI, EPCAMR and WPCAMR collaborated on www.Datashed.org to maintain and build upon it for Operation Maintenance & eventual Replacement (OM&R) of the aging 300+ inventory of PA passive treatment systems. Each treatment system has a page on the site where visitors can find background information, water quality, performance statistics, links to designs, OM&R Plans and more. Secure connections allow watershed groups to upload water sampling, inspection results and update information about the treatment systems they oversee. SRI has linked to the DEP's SIS Water Sampling Database, which gathers thousands of lab samples gathered by DEP and relates them to the treatment systems. OSM no longer maintains the AMD Treatment System Inventory for the Appalachian Region.

EPCAMR Staff sampled several AMD Treatment Systems throughout the EPCAMR Region as a part of a large sampling sweep of state-wide AMD Treatment Systems with funding provided for the sampling analysis to be covered by Stream Restoration Inc.

EPCAMR has continued AMD sampling handbook updates/dissemination via the web and encourages sampling data upload to www.Datashed.org. EPCAMR continues to seek funding to build a sampling equipment inventory to aide in water sampling throughout the region. EPCAMR conducts an AMD sampling protocol certification training for watershed groups members, volunteers and interns as needed and will loan equipment to groups when needed.

Funding for AMD/AML

EPCAMR received \$125,000 for FY 2012-FY2013 with a contract amendment to our existing 3 year agreement with the PA DEP 319 Program. In addition, EPCAMR staff submitted grants and proposals totaling ~\$138K eventually awarded in matching funds for regional projects (not including “in-kind” donations) to our 319 Base Grant. Details are listed below.

- Completed a draft 2012-2013 EPCAMR Operational Budget for approval by the board.
- EPCAMR and WPCAMR assisted the Anthracite Region Independent Power Producers Association (ARIPPA) in their efforts to award reclamation projects in the Anthracite and Bituminous regions of PA. In 2012, EPCAMR awards the ARIPPA AMD/AML Reclamation Grant to the three grant recipients: Loyalsock Creek Watershed Association for limestone replenishment at WALA Lake AMD Treatment (\$2500), Babb Creek Watershed Association to help pay for a portion of the micro-hydroelectric equipment installed at the Antrim AMD Treatment System (\$1000), EMARR also to help pay for a portion of the micro-hydroelectric equipment at the Audenreid AMD treatment System (\$1000), and Shamokin Creek Restoration Alliance to aide in the repair of a haul road / removal of sediment that was washed into the Carbon Run Site #42 Treatment System (\$500).
- EPCAMR met a professor from Philadelphia and avid wild trout fisherman, Bob Kent, who has been providing us with field equipment that he has bought over the years and no longer uses. We consider him a good friend, a “non-traditional source of funding” for much needed field equipment and keep him apprised of our efforts especially headwater stream restoration. He has given us GPS units, waders, boots, and fly fishing gear.
- EPCAMR Staff worked on, completed, & submitted our FY2012-2013 Scope of Work & Detailed \$125,000.00 and submitted with expediency to PA DEP 319 Program Staff. Corresponded with Doug Goodlander, the new Chief for the PA DEP 319 NPS Program, who notified us that the application was approved and that PA DEP is hoping to do a contract amendment to our existing 3 year agreement.
- EPCAMR and WPCAMR were able to secure approximately \$7K from registration of the conference and approximately \$11K in donations to execute the 2012 AMR Conference.
- Completed an application to the Cora Brooks Foundation in which EPCAMR asked for \$15,000 to create a Water Quality Monitoring and Technical Assistance Program (WQM TAP) with the addition of new monitoring equipment, training individuals in the proper AMD monitoring techniques and providing technical support to the Anthracite Remediation Strategy. This proposal was not funded.
- Completed a letter of request for a \$5,000 from the Foundation for Pennsylvania Watersheds to assist in the coordination efforts related to uploading of geographic information systems (GIS) data to the ChesapeakeCommons.org and FracTracker.org websites. This proposal was not funded.
- EPCAMR staff submitted a grant proposal to supplement existing programs for up to \$50K to the Chesapeake Bay Trust Fund. This proposal was not funded.
- EPCAMR Staff worked with RETTEW, Skelly & Loy, Inc., and Borton-Lawson Engineering on putting together an OSM-RFP 119-006 Request for Professional Services (RFP) to assist the PA DEP BAMR on AMD, AML, and reclamation projects. This proposal was not funded.
- Secured a PPL Grant for \$2K that will allow 6th grade students to assist EPCAMR in designing and constructing 3 mobile Solar Kilns to dry iron oxide.

- Provided some grant writing assistance to the Huber Breaker Preservation Society for a \$2500 FFA Living2Serve grant from the USDA that we've partnered with the W-B Career & Technology Center on for the Huber Miner's Memorial Park in Ashley on a 3 acre AML Site
- EPCAMR staff submitted a \$10,000 proposal to the Pocono Forest and Waters Conservation Landscape Conservation Assistance Program (CAP) to assess the Greenway Redevelopment Potential of AMD at the Old Forge Borehole and Duryea Outfall between Old Forge and Duryea, PA along the Lackawanna River Corridor. This proposal was not funded.
- EPCAMR Staff worked on the budget, narrative, and Scope of Work for 5 grant proposals: the Lewis AMD Mine Bond Forfeiture Discharge Treatment System Revamp proposal to Growing Greener (~\$97,000), a proposal to gather data and create GIS layers related to the Good Spring Mines to BF Environmental (~\$1,000), the Espy Run AMD Treatment System AMD Water Monitoring Proposal to Earth Conservancy (~\$2,400) and the ARIPPA Reclaimed Areas GIS proposal to ARIPPA (~\$8K). The last proposal was not funded.
- Submitted a \$10,000 grant to implement recommendations from the Solomon Creek Coldwater Conservation Implementation Plan to the Coldwater Heritage Partnership.

Keeping Track of the Numbers for the Anthracite Coal Region:

New Mine Drainage Treatment Projects and Innovation in Treatment

Schuylkill Watershed: Mary D treatment systems was in the process of being built at the location of the Mary D Ball Field, the town's only recreational site. Using nearly \$600,000 in grants and 10 acres of donated abandoned mine land, the Schuylkill Headwaters Association teamed up with Rettew, Associates, Inc. to build a new Mary D Fire Company Sports Complex. The site includes a little league regulation ball field as well as an all-purpose field, an ice skating pond and a walking trail.

Research toward new treatment technologies:

- Developed a new partnership with Blue Wing Environmental Solution & Technology Inc.'s, who has a concept for treating AMD that involves floating wetlands; Ted Gattino, Managing Partner, will be coming up in the Spring '12 for a tour of the region
- Pagnotti Enterprises, owns land surrounding many discharges in the anthracite region, was recently interested in hydro power production on the Jeddo Tunnel. EMARR requested technical assistance from the National Renewable Energy Laboratory (NREL) and obtained a study related to using AMD water for energy production.
- Microcrystalline Diodes being used to clean up water using electrical fields. Potential for AMD treatment was explored by a company to whom EPCAMR submitted AMD Discharge data.

Treatment System Operation, Maintenance and Replacement (OM&R) Matters

Any construction projects for AMD treatment systems funded by state dollars are required to have an OM&R plan as one of the deliverables. The plan needs to address basic maintenance issues along with a replacement schedule for the future, and who the responsible party is for each section of the plan. Also possible funding sources to implement the plan must be identified. Projects are listed below.

- Lewis Treatment System Rehabilitation: EPCAMR was asked to look at the Lewis Mine Discharge Treatment System as it is in need of a repair and possibly expansion. EPCAMR teamed up with Hedin Environmental, the original designers of the system in 2005 to apply for a 2012 Growing Greener Bond Forfeiture Grant. The vertical flow pond system treats water from the collapsed Gutten Mine Drift before it reaches Birch Creek a Tributary to

Loyalsock Creek in the Dushore Area Sullivan County. Created a 3D Mine Pool Model of the Bernice Mine Basin in a demonstration that Semi-Anthracite and Bituminous mining geology data can be put into earthVision, modeled and mine pool volumes calculated.

- Bell Colliery minimum permitting is in process and on schedule for construction this summer as well. Bell Colliery a draft design is still in the works and should be ready in next 2 months (only existing system modifications). Phase 3 plan approved and planned for construction in spring 2013
- Catawissa Creek: 2 of 3 tanks are running at the Audenreid Treatment System and stood up to storms this year. Oneida #1 and #3 are working fine. Oneida #1 been online for about 12 years and needs a clean out of the intake again (about every 5 years). Tomhicken Creek seeing a pH of 7. Looking at creating a “Fishing Access Coalition” for the Cattie as it is nearing restoration.
- Oneida #1 intake needs to be cleaned out and Audenreid is a work in progress to figure out the hydro turbines and third tank.
- Catawissa Creek – Continue to “tinker” with Audenreid to get the Micro Hydro Turbines to run at a better efficiency. Controversy on upgrades due to the amount of AMD now going through the system has lowered residency time of water in tanks and therefore reduced the pH exiting the treatment system.
- Oneida #1 is back on track after some minor maintenance and functioning well again.
- Wiconisco Creek – Bear Creek Treatment System is having problems again with the discharge bypassing the system. Looking into a repair and funding. Board suggested WPCAMR for Quick Emergency Repair Funding

Reclamation to repair AML, reduce AMD and revitalize the economy

171 projects were completed by PA DEP Bureau of Abandoned Mine Reclamation (BAMR) cleaning up 732.5 acres at a cost of \$14,911,550 statewide. Twenty-Seven percent of those projects (47 projects) were completed in the Anthracite Region cleaning up 234.7 acres at a cost of \$3,331,448 (source PA DEP Bureau of Abandoned Mine Reclamation reports to the Mining Reclamation Advisory Board).

In Carbon County, an abandoned surface reclamation project was completed on North Junedale, near Banks Twp.

In Dauphin County, an abandoned deep mine reclamation project was completed on the Little Vein Cropfall, near Wiconisco.

In Lackawanna County, an abandoned mine land reclamation project was completed to repair openings in Wetland “A” Eynon Jermyn near Archbald. An abandoned mine land reclamation project was completed to repair a dangerous highwall/embankment at Riverside East (a bond forfeiture of American Silt Proc) near Archbald. A deep mine reclamation project was completed on the Kolcharno Subsidence near Blakely. A subsidence was reclaimed on Sand Street in Carbondale, on Franklin Street in Jermyn, on Robinson Street in Scranton, and at the Dushney Subsidence II near Olyphant. A vertical opening subsidence and dangerous pit/embankment was reclaimed on Colliery Road in Dickson City. A deep mine vertical opening subsidence was reclaimed on Clarkson Ave in Jessup, on Adams Ave. in Scranton, and on Orange Street in Moosic. A vertical opening subsidence was reclaimed at Cravetts Subsidence and Emick Subsidence both in Scranton. A mine subsidence control project was completed at the Seletyen Subsidence and Willow Street Subsidence both in Scranton. A stream reconstruction to reestablish a stream channel was completed on Jessup Cemetery Channel in Jessup.

In Lebanon County, an abandoned deep mine cropfall on State Game Lands 211 was reclaimed near Cold Spring.

In Luzerne County, mine subsidence control project was completed at Courtdale (Corby Road) Subsidence in Courtdale and Foote Ave Subsidence in Duryea. A dangerous highwall was reclaimed with the Hollars Hill Repair Project in Hazle Twp. Spoil piles, hazardous (and non-hazardous) equipment and facilities, a dangerous pit/embankment, dangerous highwalls, mine openings, pits and spoil areas were reclaimed in the Cranberry West Project in Hazle Twp. A vertical opening subsidence was reclaimed along Alden Mountain Road in Newport Twp. Mine facility reclamation was completed on Bond Forfeiture 427 in Newport Twp. Hazardous and explosive gasses were taken care of at Langdon Mine near Plains.

In Northumberland County, a mine subsidence control project was completed at the No. 9 Vein Slope Subsidence in Coal Twp. A deep mine vertical opening was reclaimed along Northwestern Academy Drive, at the Shurock Subsidence, the No. 12 Vein Shaft, the Savlov Subsidence all in Coal Twp., and the Excelsior Mine Cropfalls near Mount Carmel. Water problems related to a vertical opening were remediated at Boydtown in Coal Twp. A dangerous highwall was reclaimed at Shamokin South Subsidence near Mount Carmel.

In Schuylkill County, an abandoned deep mine vertical opening was reclaimed at the Little Orchard Vein Slope Subsidence near Ashland, Crystal Run Reservoir Subsidence in Foster Twp., and at the Leiby Subsidence in Norwegian Twp. An abandoned vertical opening was reclaimed at the Maurer Mine and Skidmore Slope Opening both in Porter Twp., and the Good Spring No. 1 Mine Subsidence near Hegins. An abandoned dangerous highwall was reclaimed at the Green Mountain South Project in East Union Twp., and at the Mount Pleasant South Subsidence in Foster Twp. Maintenance to the Rausch Creek Treatment System was completed to remove storm debris near Hegins. A mine subsidence control project was completed to reclaim a vertical opening at Bulls Head Road Subsidence in Norwegian Twp. A clogged stream was cleaned out at Sheridan North Detention Pond in Porter Twp. A vertical opening, hazardous water body, dangerous highwall, pit, spoil area, water problems and mine openings were reclaimed at Newton South 2 in Reilly Twp. Growing Greener Proposal to conduct a \$185K feasibility study for the Oak Hill Boreholes and water losses in West Creek. Not much room to treat.

Statewide, 8 Growing Greener grants and 7 Section 319 NPS grants were awarded for AMD related projects.

Growing Greener Proposal for \$100k Schuylkill Floodplain Restoration. Essentially removing silt and spoil piles from the floodplains. Test bores were drilled and tested to determine BTU value and what to do with it.

In Sullivan County, abandoned mine drainage passive treatment system was remediated of water problems at Loyalsock Creek Ditch A and D in Colley Twp.

Schuylkill County – Schuylkill Headwaters Association is developing concept plans for parks near Silver Creek, New Philly Pond, and Otto Discharge. The Rohersville Pit aka. The “Patata Patch” is going to be reclaimed now due to a change over in ownership. An undersized culvert creating poor drainage from the Reppilier Pit Reclamation site near the Village of Greenberry is being looked into in the Heckscherville Valley and parts of the West Branch of Schuylkill River creek bed will be lined to prevent surface water seepage into the mines below. The Wagner Run remediation project is on hold because a coal company is going to deep mine above.

Luzerne County - Produced a case study showing 72% of reclamation, not accounted for in AMLIS (near the Hanover Industrial Park), was a result of Co-gen industry activity at no cost to taxpayers. EPCAMR put together a proposal to document reclamation by the co gen industry for the ARIPPA. A pilot project was approved starting with 3 volunteer plants to begin to develop methodologies and plans to calculate the data statewide.

Anthracite Region Independent Power Producers Association (ARIPPA) member plants continue to burn coal waste and reclaim lands with coal ash. ARIPPA reports that all their member plants combined are producing 1,500MW of power while cleaning up AML piles and reclaiming land. Looking forward to working with EPCAMR to produce GIS layers to show progress.

PA Game Commission have been studying Mine Openings as Bat Hibernacula and have been placing gates on the openings to keep trespassers out, but let bats continue to use the “caves”. They have traditionally secured mine openings only on State Properties, but are branching out to do projects with private landowners as a part of their cooperative agreements. The District Mining Offices continue to facilitate the reclamation of AML including places of subsidence and elimination of dangerous highwalls.

Under the new **Full Cost Bonding** system, the DEP District Mining Offices have required mine operators to post a separate bond or trust which will insure sufficient funds to continue annual operational, maintenance and replacement activities on AMD treatment facilities in perpetuity even if the operator should abandoned the facility. Under this system District Mining Offices have completed 4 land reclamation projects, 16 treatment systems are in design; 7 treatment systems are completed or under construction. DEP staff conducted O&M activities on 11 sites, contracted another 13 sites and 3 are under grant agreements.

Removing Miles of Streams from the List of Impaired Waters

To date the PA DEP has been able to document **the removal of 106 miles of streams** from the Integrated List as well as 1,862 lake acres. Within the past 5 years 10 streams, formerly impacted by AMD, were *fully restored and removed* from the Impaired Waters List (former 303d list) statewide.

EPCAMR Staff and Interns conducted two full days of 12 electro-shocking surveys on the Solomon Creek Watershed with Trout Unlimited as part of the Solomon Creek Coldwater Heritage Conservation Planning effort. A portion of Sugar Notch Run that was on the impaired waters list actually was supporting a trout population. Data will be sent to DEP to support removal from the list.

EPCAMR has been aiding in the search for streams to “de-list” and has been tasked with providing current water quality data to the state which shows improvement. In turn, the state will go back to reassess the stream and make the determination. If you know of an improving stream, please let us know.

**Abandoned Mine Drainage Pollutant Load Reduction Estimates
In Pennsylvania-**

Units reported	Iron		Aluminum		Manganese		Acidity	
	2011	2012	2011	2012	2011	2012	2011	2012
lbs/day	216	37	40	11	5	0	323	NA
lbs/year	78,840	13,505	14,600	4,015	1,825	0	117,895	NA

Source: Pennsylvania Nonpoint Source Management Program FFY2012 Annual Report

There are dozens of Watershed Implementation Plans (WIP) completed and being implemented in AMD Impacted watersheds statewide. This year, Watershed Implementation Plans were in development for 5 Abandoned Mine Drainage (AMD) impacted streams statewide Bear Creek (Dauphin County); Pine Run (Jefferson County); Johnson Creek (Tioga County); Montgomery Creek (Clearfield County); and Hartshorn Run (Clearfield County).

In the Anthracite Region-

Progress updates and estimated load reduction data are explained below for EPCAMR Region Watersheds:

The Bear Creek watershed is impacted by AMD discharges which contribute metals, low pH and siltation from a variety of old mining sources. A TMDL for the Bear Creek watershed was developed by the Susquehanna River Basin Commission (SRBC) in March 2001 and approved by the EPA in April 2001. The Bear Creek TMDL includes pollutant reduction targets for metals, pH and siltation. The Bear Creek Watershed TMDL Implementation Plan was completed by the Dauphin County Conservation District and finalized in 2005. The Plan addresses known AMD pollutant sources in the watershed including those from the Lykens Water Level Tunnel. Section 319-funded projects are addressing the Lykens Tunnel AMD discharge site which is one of the largest AMD discharges in Bear Creek watershed. *To date, 82 lbs/day of Iron is being removed from the stream by the treatment system, which exceeds the load reduction needed for Iron, but Acidity and Aluminum reductions are still needed.*

The Johnson Creek watershed is a tributary to the Tioga River watershed. Johnson Creek is impaired by AMD discharges which contribute high metals and acidity loadings to the creek. A TMDL for the Tioga River Watershed was completed in 2003. This TMDL includes metals and acidity reduction goals for the Johnson Creek sub-watershed. A Watershed Implementation Plan for the Johnson Creek sub-watershed was completed in February 2007. The Plan includes remediation measures for the priority AMD discharge sites within the watershed. AMD remediation work has been completed at the Arnot No. 2 Mine AMD discharge site. *To date, ~83 lbs/day of Acidity, 3.5 lbs/day of Aluminum, and 3.1 lbs/day of Manganese are being removed from the stream by treatment system. Continued remediation work in this watershed will be needed to meet TMDL load reduction goals.*

The Lackawanna River Corridor Association has taken the initiative to develop a Lower Lackawanna Watershed Restoration Action Plan that shall serve as a basis for DEP to develop a QHUP for the Lackawanna. One issue in that quest was the lack of reliable flow data for discharges in the watershed. When one transducer was destroyed in an attempt to calculate flow directly from the borehole, SRBC pulled together a group of their hydrogeologists to come up with an alternative flow monitoring scheme that consisted of cutting into the concrete capped discharge channel and placing the transducer in a stilling well (pipe) to measure the water level and relate that with a ratings curve to flow. EPCAMR Staff worked with SRBC, PA Tectonics, and LRCA to install the pressure transducer in a second attempt to



Downloading OFBH Pressure Transducer Data

measure pressure, water depth and calculate a flow of the mammoth discharge. A flow rating curve was developed by manually calculating flow with a Swiffer Flow Meter monthly to associate the height of water gauged every 15 minutes to an approximate flow. Past estimated flows exceed 50 million gallons per day (35,000 gallons per minute (gpm)) out of the 42" bore. An average flow of 64.5 million gallons per day (~100 cubic feet per second or 44,000 gpm) was calculated. The site remains as a stop on many AMD tours that EPCAMR leads. The Duryea Discharge downstream on the Lackawanna River was also monitored for flow with an average of about 16,000 gpm. It was confirmed that the Duryea Discharge, in addition to its own drainage area, acts as an overflow for the OFBH as seen with reoccurring spikes in flow that would double the amount of flow from the discharge when the OFBH surcharged past 100 cubic feet per second. As suggested by the SRBC Anthracite Strategy Report, when treatment occurs, both discharges will most likely be combined and now with reliable flow data, a cost/benefit analysis can be performed to make a case for treatment of discharges in the Lower Lackawanna.

Technical Assistance & Project Coordination Summary:

- EPCAMR continues to update the Reclaimed Abandoned Mine Lands Inventory (RAMLIS) GIS Tool CDs, now in version 12. The Reclaimed Abandoned Mine Lands Inventory GIS Tool is a conglomeration of statewide and regional GIS Data related to mining, abandoned mines, land use and water quality which aides in gathering statistics and producing maps of mine scarred lands throughout Pennsylvania. Specifically this database shows AML Priority 1, 2 and 3 statewide with information on PA DEP BAMR's plans for reclamation. AMD Treatment Systems from Datashed.org are also included in this tool. The project was made possible with funding from the Foundation for PA Watersheds, PA DEP's 319 Program and the use of OSM's ArcGIS License. Updates are produced yearly with updated datasets and future development may lead to an online ARC IMS System.
- In the absence of the OSM Office in Wilkes-Barre and residents unsure of where to turn for underground mine subsidence potential information, EPCAMR staff conducted several RAMILS and OSM Folio investigations for residents to educate them of the potential and possible need to mine subsidence insurance. Later it was made evident that such investigations were available through the state California District Mining Office staff through the www.pamsi.org website and the building of the underground mine map online repository, which had good coverage for the bituminous region, but not for the anthracite region. OSM folios were later posted to this site to download, but until georeferenced the maps are still cumbersome to use and interpret.
- Added RAMLIS data to www.cheasapeakecommons.org at the request of the Foundation for PA Watersheds, notified the availability of and distributed CDs to contacts on the signup list.
- EPCAMR provided GIS related technical support by creating and updating dozens of GIS layers, statistical databases, published map files, printed maps and converting GIS datasets to AutoCAD format for partners.
- Informed by OSM that the W-B Office will be closing soon; EPCAMR has requested that some office equipment and supplies be donated or acquired by EPCAMR to utilize in our region
- Investigated a water quality stormwater issue with runoff from an abandoned mine site that was a part of the Westmoreland Colliery in West Wyoming along W. Brady Street through a private property that occurs when a pit fills up in the owner's backyard and runs across the property.
- EPCAMR staff sampled 16 boreholes in the Lackawanna Valley, 26 in the Wyoming Valley and measured flow on 2 discharges (Duryea and Glen Lyon) monthly. Found 2 new

boreholes to monitor and working on opening 2 others to close data gaps in the Northern Field. Updated 7 GIS databases and processed flow data for partners. “day-lighted” 3 boreholes. Measured flow on 2 discharges bi-weekly, 2 discharges monthly and setup a transducer to continuously monitor water levels on the Old Forge Borehole. 2 other discharges in the Wyoming Valley were monitored sporadically to get a ballpark estimate on their flow. Researched Water Quality probes and Sulfates Water Quality Test Kits for possible future purchase.

- EPCAMR Staff completed the 3D model for the Jeddo Highland #5 project in the Eastern Middle Coal Field.
- Began transferring old archived content from Nuke to WordPress format on www.epcamr.org. Administered the EPCAMR facebook page and Google Apps for Nonprofits account.
- For several years, EPCAMR staff have participated in the registration of eleven (11) ASTM Geospatial Coal Mine Data Standards on the OSM National Geospatial Data Team, a subcommittee of the National Coal Mining Geospatial Geocommittee. Since the consolidated standards that we’ve worked on for several years have now been approved, the subcommittee is inactive until needed again.
- EPCAMR staff continue to use a suite of software and technical services provided by the TIPS program. EPCAMR, in turn, serves as “guinea pig” and beta testers of new software and services being released to all OSM, State and Tribal personnel doing Title IV and V SMRCA work. EPCAMR provides troubleshooting information for install instructions for several Windows versions and hardware issues. OSM-Pittsburgh, has once again come through, big time for EPCAMR by providing us with a copy of Global Mapper, an alternate to ArcGIS software, through an Enterprise License Agreement that has been awarded to DOI and is available to TIPS partners, including EPCAMR
- Attended the Exeter Borough Planning Commission Meeting to explain the Hicks Creek Natural Stream Channel Design Project and obtain their approval to move forward with the final design permit applications and approvals before moving to construction.
- Completed Espy Run Treatment System Sampling Report.
- Measured flow and chemistry on 4 more discharges with a grad student at Lehigh U.
- EPCAMR Staff discovered the Avondale #35 borehole in the middle of State Route 11 in Plymouth Township and tried to coordinate the “daylighting” of it with PA DOT who was milling the road, however, they couldn’t work around an existing contract already in place, but they did mark the location in case we decide to open it at a later time. Currently two other shallow/deep wells are being monitored along Flat Road, nearby, but we are unsure if they are connected to the same mine pool/groundwater source since they are reported to only be drilled into “the buried valley”.
- Discovered another 3 discharges to the Solomon Creek Watershed. The Doran Farm Discharge is an iron discharge runs along one of the last remaining farm properties in the Wyoming Valley directly to the Solomon Creek Mainstem. The discharge emanates from



Huber AMD Discharge to an Unnamed Tributary to Solomon Creek along the Doran Farm property

back end of the Hanover Industrial Estates from the Huber Colliery workings caught between an anticlinal ridge and barrier pillar. The Carey's Patch Discharge emanates from an outcrop of coal, also from the Huber Colliery. It was found upstream on Sugar Notch Run from the Carey's Patch section of Ashley and seems to be a mix of aluminum and iron metals. The Inman Borehole Discharge emanates from a collapsed monitoring borehole into the Inman Colliery along Middle Road across from St. Mary's cemetery. The discharge is clear of metals/acidity pollution as evidenced by koi fish living in the pond. This indicates a shallow connection and preferential flow of surface water inundating the mines. The discharge feeds a small unnamed tributary that flows through Lee Park.

Outreach Summary:

Policy and Legislative Outreach

- DEP and other organizations continue to study the possibility of using mine water for "fracking" and drilling for gas in the Marcellus Shale. A draft "white paper" was produced and the state continues to take comments on the potential policy guidance that could support this initiative. SRBC continues to promote "lesser quality waters" use with financial incentives in water withdrawal permits when AMD is used or treated and used.
- Followed up and commented on the "The Keeley Decision." The outcome could require that anyone who installs and/or operates an AMD treatment system (passive or active) and creates a point source discharge to obtain a NPDES permit. On January 9, 2009, the federal court in Clarksburg, WV ruled in the case of WV Highlands Conservancy and WV Rivers Coalition vs. Randy Huffman.
- Prepared written testimony as it relates to the Chesapeake Bay TMDL and Abandoned Mine Impacts within its Tributaries and submitted to the US EPA Region III
- EPCAMR staff held informational meetings with Senator Yudichak, Senator Blake, and Congressman Barletta's Office to update them on our Mine Pool Mapping and Borehole Awareness Monitoring Campaign, to regain monitoring access to mine pool water levels, throughout Lackawanna and Luzerne County.
- EPCAMR Staff and SRBC staff met with Anthracite Region Legislators & Assistants at the Capitol Building, to inform them about the Anthracite Region AMD Remediation Strategy & Mine Pool Mapping Initiative.
- Coal Residuals Reuse and Management ACT a "Hot Button Issues". HR 227 passed by House and on to Senate. Support Letter from Sec. Krancer. Act will allow states to continue to operate existing programs and implement a coal combustion residuals permit program. There is still a potential for projects to lose the beneficial use of fly ash on reclamation sites.
- Utilization of AMD in Well Development for Natural Gas. White Paper and information available from DEP. Board encouraged EPCAMR and WPCAMR to approach the Marcellus Shale Coalition to talk about Mine Pool Waters and how we could work with industry. Bruno suggested starting in Sullivan County. Sulfates are the main issue with water quality of AMD.
- Submitted EPCAMR comments on the draft PA DEP White Paper on the Utilization of AMD in Well Development for Natural Gas Extraction to the full membership of the State Mining & Reclamation Advisory Board (MRAB), the MRAB Reclamation Committee, and the SRBC Water Quality Advisory Committee for review Submitted EPCAMR comments to SRBC for the 2013-2014 Water Resources Program
- State Conservation Commission officially appointed EPCAMR Executive Director to the Mining & Reclamation Advisory Board as a voting member.
- EPCAMR sought the expertise of the Law Clinic at Widener University, Wilmington, DE who provided EPCAMR with the first of many Citizen's Guides that were requested: the first one

being on the topic of "The Pennsylvania Environmental Good Samaritan Act". The Act would appear to provide the potential for some immunity for non-profit organizations. The language concerning how making a profit might impact the ability of someone providing materials or services from claiming immunity. They purposely kept this language vague and general--in large part because it may not be an issue for most citizens. They included it, however, because EPCAMR has indicated that some organizations may want to make a profit (by selling water or minerals removed) in connection with their reclamation work. This "entrepreneurial" focus creates some risk of losing the protection of the Act. EPCAMR has shared this analysis with colleagues who are pushing for similar protection at a national level.

Marketing

- EPCAMR staff continued to work with university students from Marywood to complete Ad Campaign posters and from Wilkes to design a solar kiln to dry AMD. Meghan Calderone, another graduate student from Marywood University's Graphics Design Program completed a Macro Mayhem Bug Identification Chart for use in our environmental education programs; A 5' X 6' Banner was printed by Coal Creative.
- Worked with Laurie Popeck with Clean Creek Products & Stream Restoration Inc., to donate 150 iron and manganese oxide glazed fish magnets for our 15th Anniversary Dinner
- cds Creative and John Dawe, LLC through the NEPA Create-A-Thon, selected EPCAMR as a recipient of a professional donated services Marketing Application submission provide us with free professional services and technical assistance to help us market our work. Sonnia Hove, a freelance graphics designer and marketing entrepreneur from Florida has also offered to provide EPCAMR with free marketing technical services.
- Created an EPCAMR Services 2-page document as a sort of marketing tool to explain our services to prospective "clients". Also formatted an executive summary describing the Mine Pool Mapping Program to look like a 1-page example project success
- EPCAMR staff worked with Professor Brower and Dana Marie Wren, from Marywood University Graphics Design Department to design a new label for iron oxide products.
- Conference call with Sonnia Hove, a marketing strategist from Florida, who offered pro-bono consultant time and her expertise to helping EPCAMR further develop our Marketing Strategy & Strategic Plan.

Meetings and Events

EPCAMR and WPCAMR both have developed and continue to maintain very informative and up-to-date websites to disseminate information to the World Wide Web. EPCAMR's www.EPCAMR.org and WPCAMR's www.WPCAMR.org are excellent conduits for distributing information and news in a cost effective, paperless way. As a part of these websites, AMD/AML related news is distributed through EPCAMR's "EC Express" and WPCAMR's "AML Posts" and "Video Diaries" to readers statewide and beyond. In addition the organizations maintain www.treatminewater.com and www.AMRClearinghouse.org, respectively, as additional resource sites and social media fan pages on Facebook, Twitter and YouTube to continue outreach to a new generation.



Coordinated the 14th Annual PA AMR Conference with WPCAMR and the PA AMR Conference Planning Committee at the Ramada Inn, State College, PA from August 2nd thru the 4th. **120** people attended the 1 ½ day conference to attend over 20 presentations on a range of Abandoned Mine Land (AML) Related issues. Attendees also gained insight from keynote speaker Keynote-John Arway, PA Fish & Boat Commission Executive Director and other guest speakers. A mix of

for-profit and non-profit exhibitors setup in the halls. In addition ~40 attended a Pre-Conference Tour AMR, AMD Treatment, and AMD sites, including a TU AMD Education Curriculum Presentation along the Banks of the West Branch Susquehanna River by Rebecca Holler. Scholarships were provided and there was also some money left over for next year's conference. Conference Call was held after the conference to evaluate the positive feedback, review evaluations/budget, suggest minor improvements and the discussions moved to next year's conference. Visit www.TreatMinewater.com for more.

EPCAMR continued its education programs including AMD tours, stream sampling events with hundreds of middle school students, cleanups and workdays with Vo. Tech. students and volunteers, Tie Dye/Chalk and Teacher Training Workshops; Several Environmental Education grants were awarded to EPCAMR to support education youth and adults on AMD/AML issues.

- EPCAMR staff hosted 5 AMR Conference Calls, an EPCAMR Board Meeting, and EPCAMR 15th Anniversary Dinner / Fundraiser Committee Meeting. Attended a SAN Meeting, "The Inquest" theatrical performance, the Philanthropy Forum, a MRAB Mtg. and a meeting with CCRA and PA DEP BAMR reps.. Participated in an Earth Day event at Nesbit Park and a conference call with Weatherly Borough and PA DEP BAMR reps. and an ARRI tree planting. Presented at the Watershed Specialist Annual meeting, corresponded with Luzerne County Commissioner to help with an AMD problem and attended a Catawissa Creek QHUP meeting, and released the 2010 EPCAMR Year In Review.
- EPCAMR staff attended and setup at the Wild and Scenic Film Festival, an EPCAMR Board Meeting, an Anthracite Remediation Strategy meeting, NPS Liaison Committee Resource Extraction Sub-Committee conference call, and hosted a Huber Breaker tour and a Renewable Energy on AML Mtg.
- EPCAMR Staff completed the website development for the 13th Annual AMR Conference and our 15th Anniversary Fundraiser/Dinner along with brochures and Save the Date Cards
- EPCAMR staff hosted 5 AMR Conference Calls. EPCAMR staff worked on a 3,000+ Insight.ly contact database (Google Apps donated premium service). Sent 235 hard copy invitations to dinner and registered 80+. Registered 105 for the conference. Conducted 7 field tours and 3 indoor educational events to educate approximately 425 students total from both the Wyoming Valley and New Jersey Homeschoolers. Coordinated 2 watershed tours: for approximately 12 teachers with the Chesapeake Bay Foundation in the Shamokin Creek Watershed and a pre-conference tour.
- EPCAMR staff became certified to train teachers and students in the nationally acclaimed, "PROJECT LEARNING TREE", the environmental education program sponsored by the PA DCNR Bureau of State Parks, Nescopeck State Park
- Hosted a meeting of 22 Environmental and Non-Traditional Educators at the EPCAMR Office with the PCEE and PAEE. Attended a SRBC WQAC conference call, an Anthracite Remediation Meeting, an OFBH Monitoring Project Partners on site.
- EPCAMR staff conducted 5 Tree Trout Field Trips for Wilkes-Barre Area, met with 3 Wilkes U professors, HBPS rep., OSM staff, EC staff and exhibited at Chalk Fest related to outreach/education.
- Conducted an AMD Tie-Dye T-shirt Education and Outreach Program for over 60 youth at the Newport Township Community Organization's FUN DAY at the Wanamie Recreational Park
- EPCAMR staff conducted a Teacher In-Service Field Trip for Wilkes-Barre Area; participated in 2 OFBH on-site meetings, a Penn Future Meet & Greet, a strategy meeting with SRBC staff and a Catawissa Creek Watershed Tour.
- EPCAMR staff participated in monthly conference calls to plan for the 2012 PA AMR Conference that will be held at the Ramada Inn, State College, PA from August 2-4th, 2012,

with WPCAMR taking the lead. Also built a website at www.treatminewater.com, tracked conference registrations as they roll in, planned a tour route for the conference and converted over 20 PPT presentations to PDF to post after the conference as conference proceedings.

- Exhibited at the Wild and Scenic Film Festival
- Attended both Wilkes University and King's College Career Fairs to seek internship applications for the Summer/Fall 2012
- EPCAMR staff attended an ARIPPA Technical Symposium, a Wildlife Diversity Forum and an AMD for Frack Workshop in Ebensburg EPCAMR staff presented at a meeting with Northumberland County reps.
- EPCAMR Staff Meeting with Glenn Rider-PA DEP BCR in Harrisburg to provide input into the PA DEP's prioritization plans for moving forward with future AMD remediation projects, watershed restoration projects, and abandoned mine land reclamation projects throughout PA
- Assisted with the Coordination of an EPCAMR/WPCAMR/ARIPPA Technical Meeting at Toftrees, State College, PA to serve as a small fundraiser for administrative funds for the Coalitions and hear grant awardees talk about their projects that were funded.
- Participated in a stream cleanup along the Lackawanna.
- EPCAMR Staff, along with Tom Clark-SRBC co-presented our Abstract on Mine Pools at the 2012 National Association of Abandoned Mine Lands Program (NAAML) Conference and attended the conference from 23rd-27th of September in Des Moines, Iowa.
- EPCAMR staff conducted a tour for DCNR Community Connections to Our Watershed Forum students, attended the LRCA 25th Anniversary Dinner and attended the PEC NEO Dinner as an awardee.
- Participated in the 2012 Watershed Congress focusing on the Schuylkill and Delaware River watersheds
- Attended and exhibited at the 6th W. Branch Susquehanna Restoration Symposium in State College being hosted by Trout Unlimited's Eastern PA AML Program, the W. Branch Restoration Coalition.
- Attended a PA Game Commission Wildlife Action Plan Forum in State College, in June 2012 to provide input into the plan for a reclamation, wildlife, and watershed restoration perspective.
- Attended ARIPPA Annual Meeting at Toftrees in State College, PA.
- Attended the Stakeholders Meeting at the Cambria District Mining Office, Ebensburg, PA, along with WPCAMR, TU, and others to have a discussion on activities surrounding Gas Extraction from the Marcellus Shale, potential use for AMD in the fracking industry, and opening doors to building stronger relationships.
- EPCAMR Staff attended the LRCA Roast to honor Bernie McGurl's 25 years of service with the Lackawanna River Corridor Association at the Scranton Cultural Center

Education, Mentoring, and Training

- Updated www.orangewaternetwork.org, www.epcamr.org, and www.treatminewater.com. Administered the EPCAMR facebook page, Google Apps account and pyritebad yahoo group listserv. Helped 2 member orgs with webhosting issues.
- EPCAMR staff continued to assist a Harvard graduate student, Jessica Wolf, on her thesis project tying renewable energy to abandoned mine sites.
- Completed an ACCT AmeriCorps National Program Application that will place members in direct service positions with community/watershed improvement organizations (Separate from the VISTA program). Participated in a phone survey on the OSM/VISTA ACCWT Program.

- Prepared 3 Letters of Invitation to local area school districts to participate in EPCAMR's "Tree Trout & AMD" Aquatic Resources Outdoor Education Program funded by the PA FBC. Applied for a collectors permit. Developed materials and a schedule for the program in late Spring.
- Provided Stephanie DeBalko and her photographer from THE WEEKENDER Magazine with an AMD Tour of the Wyoming Valley and provided Erin Miles, a independent filmmaker from Hazleton, PA with a tour of the perimeter property of the Huber Breaker for a short-film she is producing similar to the movie "Contagion" and "I Am Legend"
- Committed EPCAMR to being a member of the Environmental Education Working Group for PAEE who is working with the NAEE to certify PA Non-Formal Educators
- Set up our EPCAMR Display and Exhibit at Boscov's Department Store as a part of their "Friends Helping Friends" Community Support Program
- Submitted EPCAMR's ideas for a grant proposal to PPL in partnership with the Wilkes-Barre Area School District to build a few scalable mobile solar kiln units.
- Completed an online 6 module training conducted by Penn-State University to become re-certified as a Master Well Owner Volunteer as of March 15, 2012; Final Cumulative score on all exams was a 97%
- EPCAMR Staff attended a Professional Geologists course and an informal QuickBooks training.
- EPCAMR staff conducted a Teacher Training Workshop, led students on a tour of AMD sites, participated in 2 AMR Conference calls and hosted an EPCAMR board meeting. Printed 4 posters for an educational display and designed a car magnet to market EPCAMR during field work.
- Conducted a field tour with Anna Lenzer, a freelance journalist from Mother Jones Magazine, to the Gowen, Derringer, and Jeddo AMD Mine Tunnel discharges in the Hazleton area to provide her with a better understanding of mine drainage impacts in the Greater Hazleton Area
- Coordinated an AMD Tour of Luzerne/Lower Lackawanna Counties for PACD/SCC, Luzerne, and Lackawanna County Conservation Districts.
- EPCAMR Staff participated in and AMD/Outreach Earth Day Festival at Camp Kresge, White Haven with the entire Bear Creek Charter Elementary School consisting of 430 students
- Presented to the Scranton Rotary Club, the Peckville Genealogical Society and the Northeast Genealogical Research Society, along with LRCA Executive Director, on our Mine Pool Mapping Work for the Lackawanna Valley.