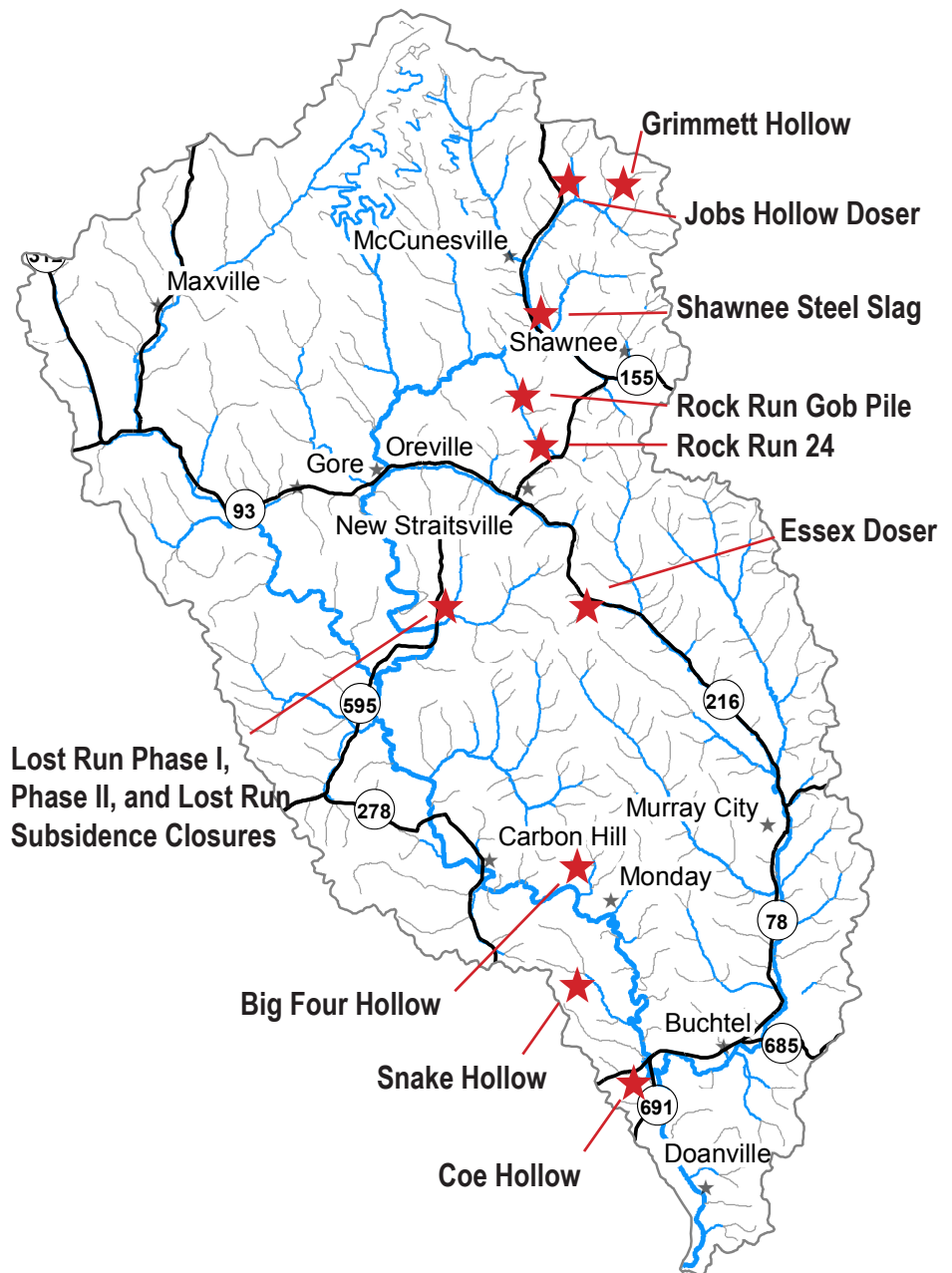


2010 NPS Report - Monday Creek Watershed

*Generated by Non-Point Source Monitoring System
www.watersheddata.com*

- Monday Creek, located in the Appalachian Region of southeastern Ohio, is a 27-mile long tributary of the Hocking River, the latter which flows directly into the Ohio River. The Monday Creek Watershed drains a 116 square-mile area, with streams winding through portions of Athens, Hocking, and Perry Counties.
- Monday Creek Restoration Project is a program of Rural Action, Inc., a non-profit group working to revitalize Appalachian Ohio. Our project is a collaborative partnership of officials and residents of the Monday Creek watershed, along with more than 20 other organizations and state and federal agencies. Our shared goal is to restore the watershed for the benefit of local communities. Large portions of Monday Creek and its tributaries are dead due to acid mine drainage (AMD) left behind from a century of coal mining.
- Since 1994, our partnership has worked together to identify water quality problems, conduct field research and site characterization, and prioritize and plan ongoing restoration activities.
- In 1997-1998, we identified issues to be addressed for the long-term improvement of the watershed, and to the benefit of local communities. These issues, along with goals, objectives, action strategies, and progress indicators are discussed in detail in the Monday Creek Comprehensive Management Plan.
- To learn more about the Monday Creek Restoration Project, visit our website at www.mondaycreek.org or call 740-394-2047



363,425,000 gallons of stream water per year eliminated from entering into the deep mines as the result of conducting seven stream capture closure projects in Monday creek



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Reductions

Total acid load reduction = 3,507 lbs/day

Total metal load reduction = 538 lbs/day

*Data derived using the Mean Annual Load
Method (Stoertz, 2004).*

Costs

Design \$345,056 (excluding Snake Hollow)

Construction \$5,366,297

Total costs through 2010 = \$5,711,352

Monday Creek Stream Capture Projects

Project status: Six subsidence closures projects were completed from 1995-2007

Project Name	Year project complete	Acres Captured	Agencies funding	Estimated gallons/yr of water diverted from entering the deep mine
Majestic Mine	1999	100	ODNR-DMRM	36,860,000
Salem Hollow	2000	60	ODNR-DMRM	22,116,000
Murray City	2004	5	ODNR-DMRM	1,843,000
Goose Run	1995	506	ODNR-DMRM	186,512,00
Snow Fork	1999	140	ODNR-DMRM	51,604,000
Lost Run	2007	100	USFS	35,000,000
Coe Hollow	2010	80	USFS	29,490,000

Seven stream captures located in the Monday Creek Watershed were closed and completed from 1995 to 2010. A total of 991 acres surface drainage area drained year round into the deep mines and as a result of closing these subsidences holes. Using the equation for annual average discharge where 1 sq. mile = 1 cfs (USGS 2001), approximately 363,425,000 gallons per year were diverted from entering into the deep mine thus abating the generating of acid mine drainage.

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Completion



Sub-target 2: Total projects proposed in 1999 AMDAT = 13
Total projects complete = **12 (plus 5 subsidence closures)**

Attainment Miles



Total stream miles assessed impacted by mine drainage = **83 miles**

Target #1 indicates 30% attainment of impaired streams by 2010 = **25 miles**

2006 progress = **0 miles** meeting Full WWH attainment (*33 miles assessed in 2006*)

Cumulative BMP's Installed

Coe Hollow Treatment/BMP	
Passive Wetland	9.2 acres
Steel slag leach bed	13,608 sq.ft.
Subsidence closures	80 captured acres
Limestone leach bed	54,320 sq.ft.
Limestone J-trench	276 linear feet

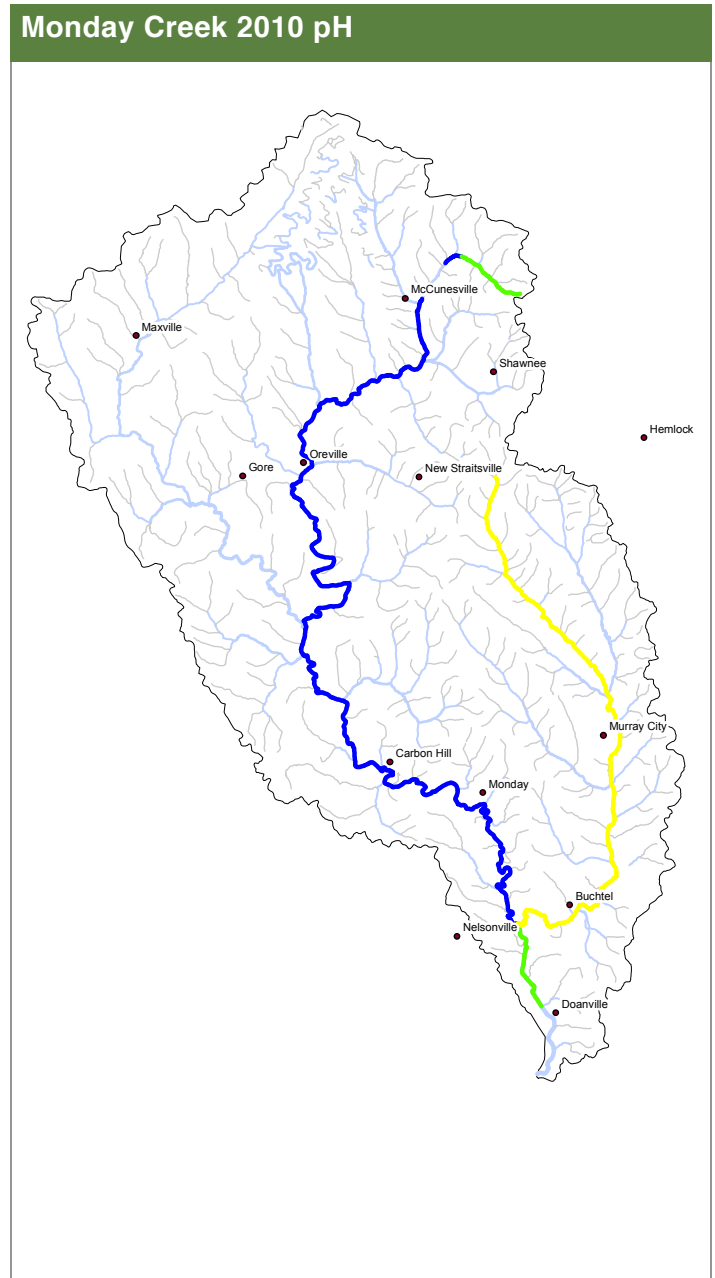
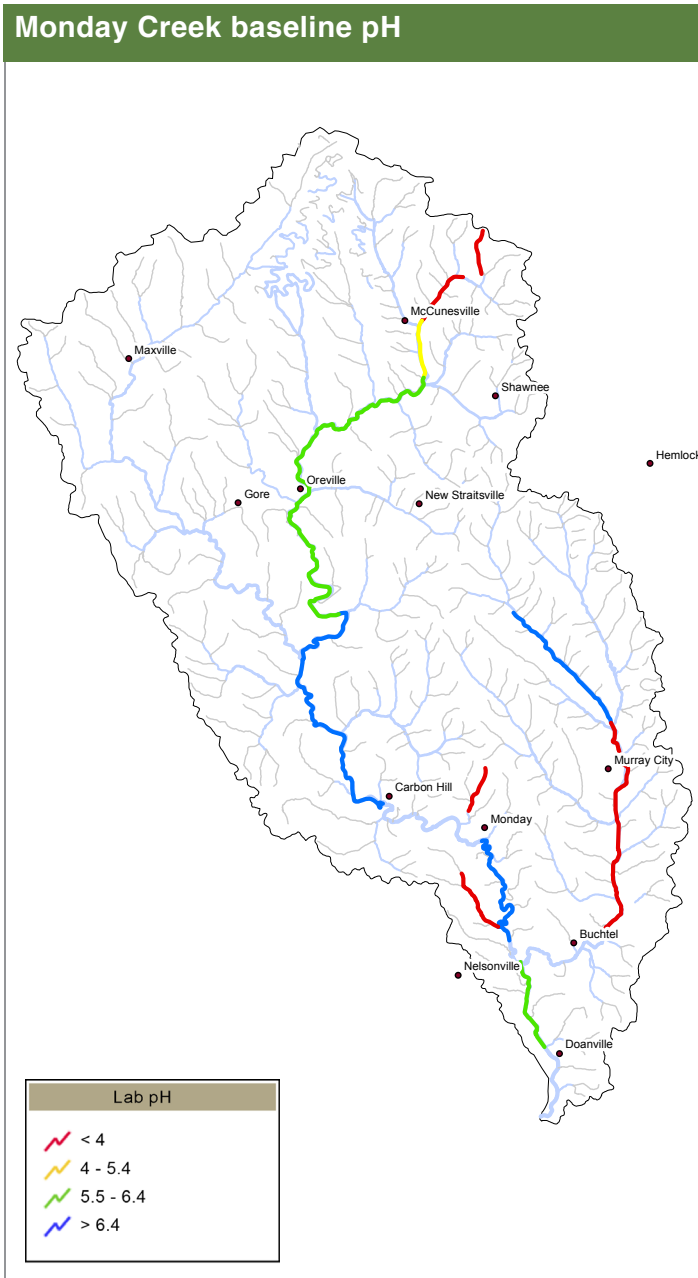
Projects Completed Jan. 1, 2010–Dec. 31, 2010

Coe Hollow	\$1,748,446
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Chemical Water Quality



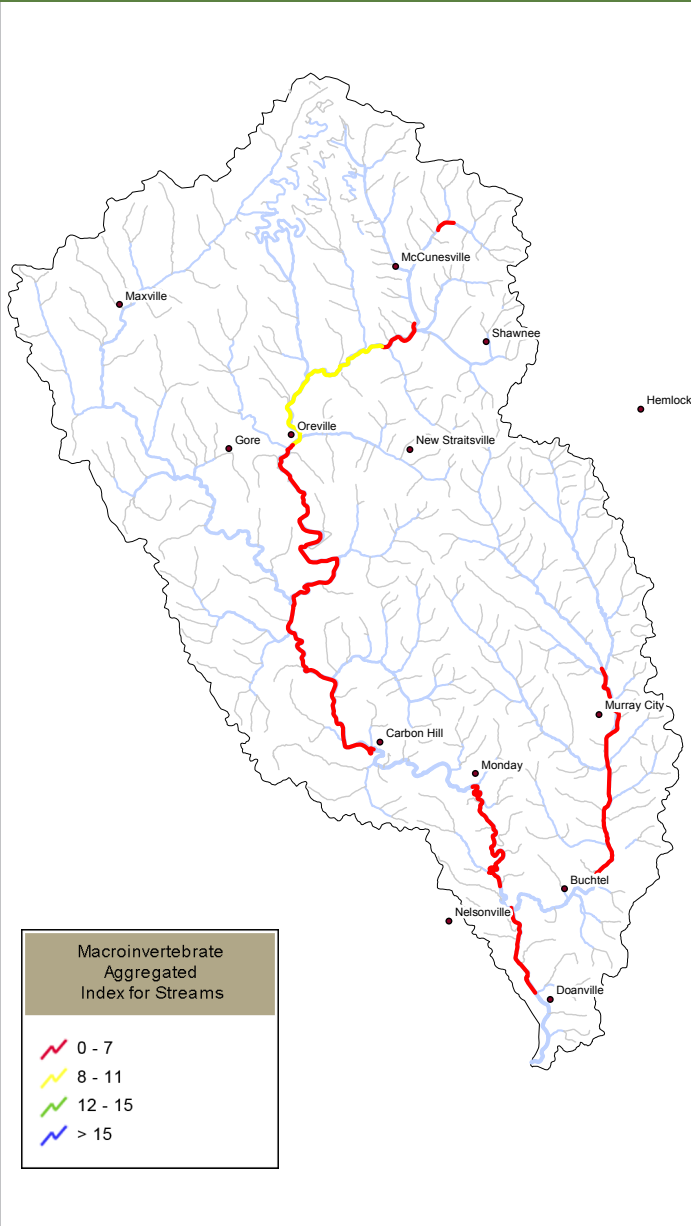
In Monday Creek pH values have improved throughout the watershed from baseline conditions (2001) to 2010.

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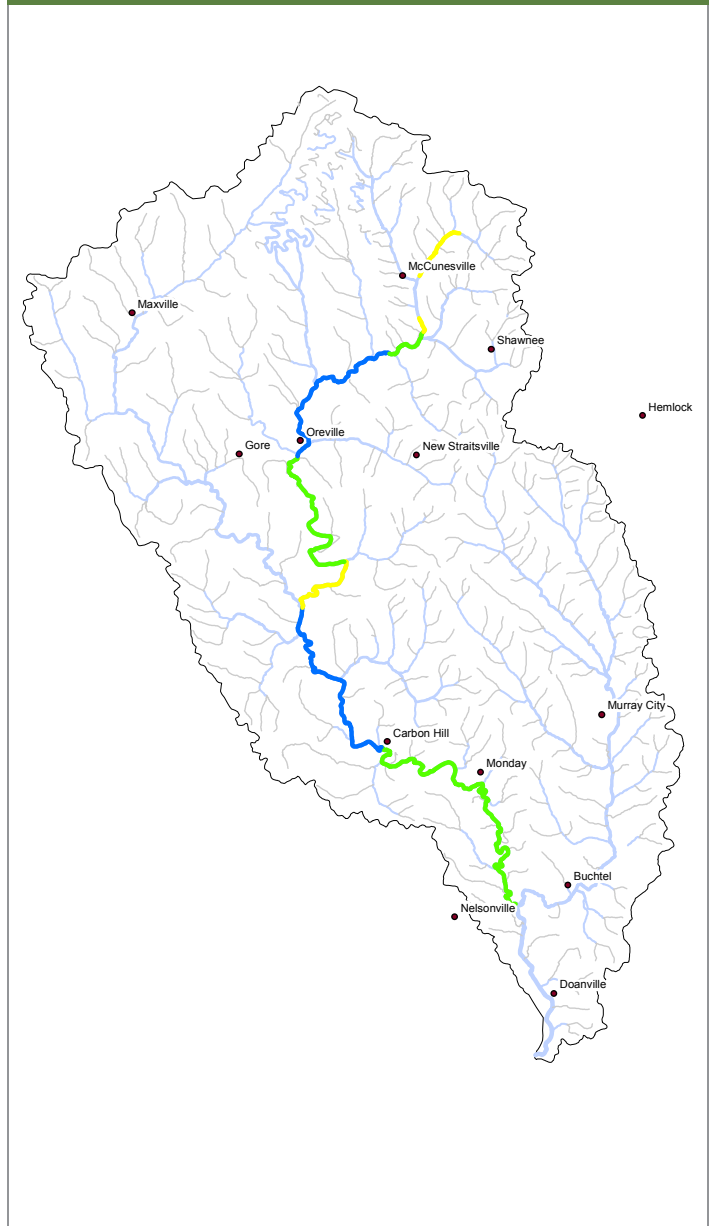
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Biological Water Quality

Monday Creek baseline MAIS



Monday Creek 2010 MAIS



MAIS samples were collected throughout Monday Creek at established annual monitoring stations from 2001 through 2010.

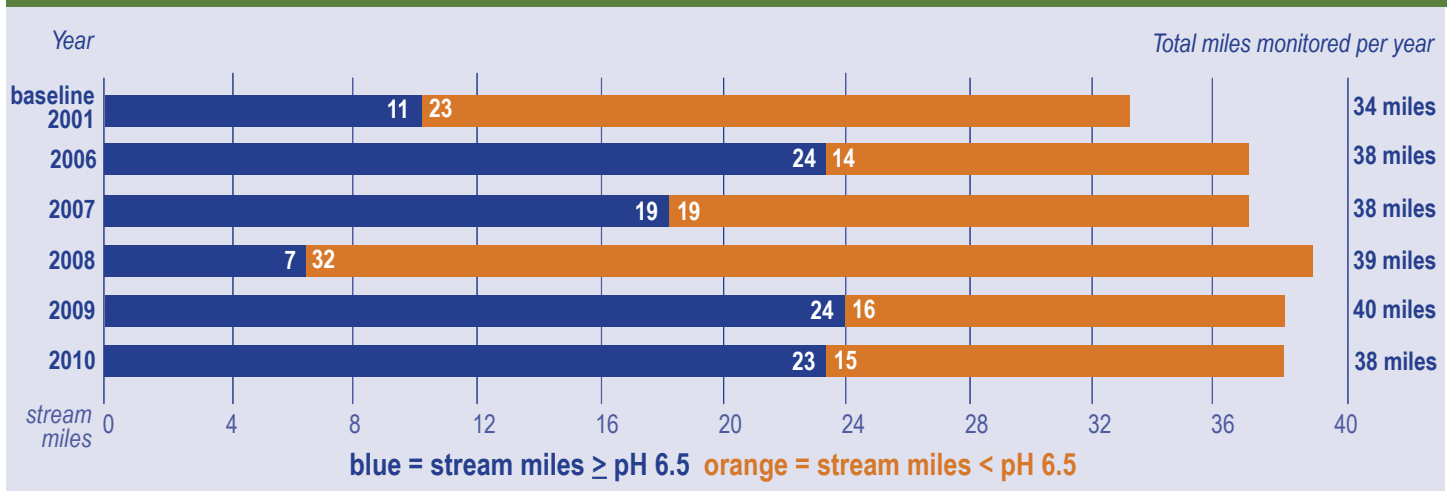
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Chemical Water Quality

There are approximately 38 stream miles monitored each year along the mainstem of Monday Creek and major tributary Snow Fork. A restoration target for pH is 6.5. Since 2007 there have been increases and decreases in the number of stream miles that meet this target. In 2007, 19 stream miles of the 38 monitored met the pH target of 6.5. However in 2008 only 7 miles of the 39 miles monitored met this target. In 2009 and 2010 data shows an increase again with approximately 24 of the 39 miles monitored meeting the pH target (Figure A).

Figure A. Monday Creek pH



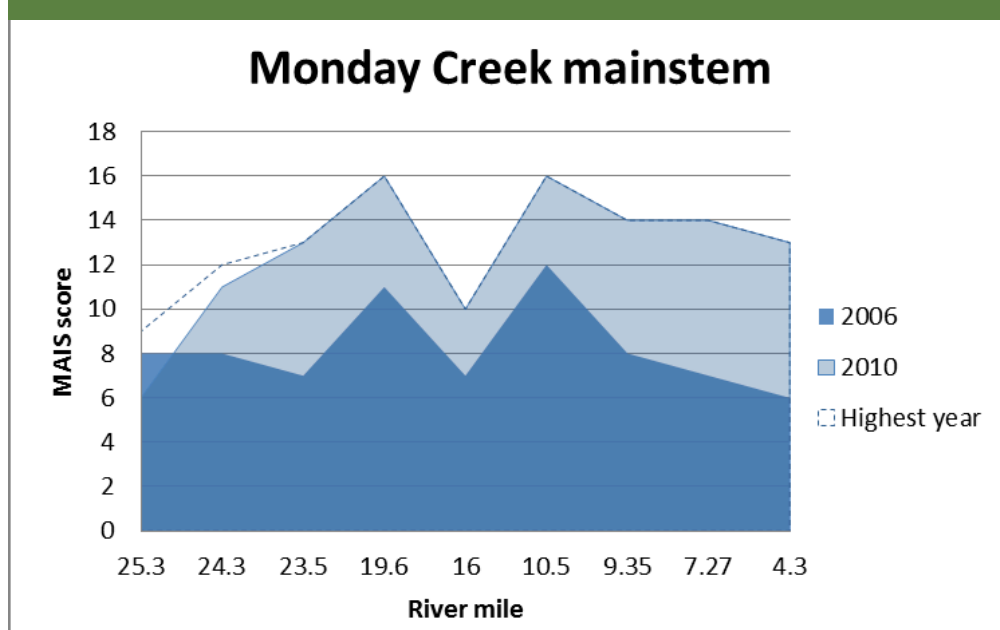
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Biological Water Quality

In 2010, most of the sample sites along the Monday Creek mainstem achieved the highest biological quality scores (macroinvertebrates) seen since monitoring began almost a decade ago, and many sites showed substantial gains in the last five years, since 2006 (Figure B). The improvements at RM 23.5 and downstream are reflected in substantially higher MAIS scores, and these trends were statistically significant ($P < 0.05$) or somewhat significant ($P < 0.10$) at ten of the thirteen sites for which the most long-term data is available (5 -9 years) (Figure C). The data indicate notable gains just in the last year, as 2009 scores at many of the sites were unremarkable.

Figure B. Area of Degradation



The blue dashed line identifies the highest MAIS score ever achieved at that site throughout the monitoring time period.

Figure C. Monday Creek MAIS Regressions

RM	MAIS Scores										Linear trends	P-value	No. of years
	2001	2002	2003	2005	2006	2007	2008	2009	2010				
JH00902				8	6	6	4	4	4		declined	0.010	6
JH00500	4	6	4	7	6	5	4	7	8		no change	0.154	9
25.3				7	8	7	4	9	6		no change	0.769	6
24.3				6	8	12	12	11	11		some improvement	0.091	6
23.5	5	3	1	11	7	9	12	7	13		improved	0.031	9
19.6	8	9	10	13	11	12	12	13	16		improved	0.001	9
16	2	6	6		12	11	10	10	10		improved	0.013	9
10.5	5	10	13	13	12	14		12	16		improved	0.019	9
9.4					8	9	10	9	14		some improvement	0.097	5
7.3				8	7	7	8	10	14		improved	0.058	6
4.3	2	6	2	8	6	9	7	4	13		some improvement	0.064	9
SY00080				9	4	13	6	7	8		no change	0.921	6
SY RM0.1				6	3	5	8	10	10		improved	0.040	6