



AQUATIC RESOURCES MANAGEMENT, LLC

December 19, 2011

United States Army Corps of Engineers
Louisville District
845 Sassafras Creek Road
Sassafras, KY 41759-8806



Re: DNR# 813-0360

2006 - 368

Dear Reviewer,

Please find enclosed one (1) original copy of the First Year Monitoring report for the Big Sue Branch Reach 10 Mitigation site.

Should you require any more information upon your review of this package or require a site visit feel free to contact me at 859-388-9595 or by e-mail at nbaker@aquaticresources.us.

Sincerely,

Nick Baker
Vice President and Environmental Scientist

YEAR ONE MONITORING REPORT
UNITED STATES CORPS OF ENGINEERS
Big Sue Branch Reach 10
KDNR PERMIT NO. 813-0360



Laurel Mountain Resources, LLC.

Prepared:
December 19, 2011

Prepared by:



**Aquatic Resources
Management**

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Laurel Mountain Resources, LLC Big Sue Branch Reach 10 Mitigation Year One Monitoring Report

Project Overview

This report is to notify the United States Army Corps of Engineers (USACE) of the completion of one full growing season for the Laurel Mountain Resources, LLC (LMR) Big Sue Branch Reach 10 Mitigation site. This USACE permit (ID # 200600368) is an Individual Permit associated with LMR KDSMRE Permit # 813-0360 (previously 813-0310). Aquatic Resources Management is the agent responsible for conducting the monitoring reports on behalf of LMR. The inspection date of the field visit was conducted on 10 November 2011.

Purpose of the Approved Project

This mitigation project was conducted in order to offset stream impacts associated with LMR's 813-0360 mining project. Stream impacts occurred from the surface mining method of extraction of coal reserves. Two in-stream sediment structures at this project were necessitated to control sediment runoff. Restoration performed at Big Sue Branch partially mitigates losses of 1,895 linear feet from the structures. The mitigation provided for the associated impacts to this permitting action equates to 1,090 linear feet of intermittent stream mitigation and 3,110 linear feet of perennial stream mitigation. Total length of off-site stream mitigation is 4,200 linear feet.

Site Location

The Big Sue Branch is located approximately 2 miles east of the intersection of Highway 30 and Highway 542 in Breathitt County. The latitude and longitude of the project is 37° 35' 17.19" and -83° 9' 11.01" respectively. Big Sue Branch is located on Big Caney Creek of Quicksand Creek in the North Fork of the Kentucky River watershed Hydrologic Unit Code (HUC) 05100201.

Mitigation Commencement and Completion Dates

Construction on Big Sue Branch was started in the fall and winter of 2010. Construction began downstream and worked upstream to an existing pond, where construction was suspended due to weather. Construction of the remaining mitigation will be conducted when appropriate.

Performance Standards

After one full growing season of construction completion at segments 1 through 4 all performance standards are being met. The restoration activities have decreased the amount of sediment entering the stream from the past impacts, improved bank stability, created macroinvertebrate habitat, as well as achieved vertical and lateral channel stability. Further tree plantings are necessary along the riparian corridor and construction is required along the aforementioned upstream segments to achieve full potential of the mitigation reach. These problems will be corrected in 2012. After transplanting trees and completing the described construction, LMR will be meeting all of their performance standards.

Requirements

The requirements as stated in the approved Clean Water Act Section 404 permit are as follows; Mitigation efforts were implemented by the applicant using their own qualified equipment operators to conduct the mitigation plan under Best Management Practices. The stream morphology will be determined successful when the proposed structures are constructed in the approximate location proposed in this mitigation plan. Stream stability will be examined for successful erosion controls. The erosion controls will be considered successful if the stream and proposed stream structures are stable laterally and vertically. The limits of the mitigation sites will be delineated and flagged with surveyor's stake to indicate restored reaches.

The vegetation will be maintained at an 80% success rate for native species in the riparian corridors. It is also anticipated that natural succession of native species will occur on-site in the riparian zones. Non-native and invasive species will be kept to less than 20% overall on the project restoration area.

After stream restoration standards have been met for all areas, the applicant or consultant will be responsible for conducting annual monitoring reports to inform the Louisville District of the United States Army Corps of Engineers of progress. The applicant is obligated to maintain the project area mitigation by following requirements set forth by DSMRE and USACE. Monitoring and maintenance of the mitigation site will continue until final mitigation approval is achieved. The compensatory mitigation project site is successfully achieving the standards set forth in the approved USACE permit. As stated, the aforementioned tree plantings and remaining construction will be performed by LMR to meet performance standards. The Rapid Bioassessment Protocol demonstrates trends toward the stated mitigation goals in table 1.

Table 1.

Big Sue Branch Reach 10 Mitigation Monitoring						
Reach 10 Segment 1 - Intermittent						
RPB Habitat Parameters	Pre-mitigation	Year One	Year Two	Year Three	Year Four	Predicted Five Year
Epifaunal Substrate	13					14
Embeddedness	11					12
Velocity/Depth Regime	10					11
Sediment Deposition	11					11
Channel Flow Status	8					11
Channel Alteration	20					20
Frequency of Riffles	15					16
Bank Stability (both)	14					14
Veg. Protection (both)	16					18
Riparian Width (both)	18					20
Total Habitat Score	136					147
Reach 10 Segment 2 - Intermittent						
RPB Habitat Parameters	Pre-mitigation	Year One	Year Two	Year Three	Year Four	Predicted Five Year
Epifaunal Substrate	14					14
Embeddedness	11					12
Velocity/Depth Regime	11					11
Sediment Deposition	13					13
Channel Flow Status	11					11
Channel Alteration	19					19
Frequency of Riffles	13					16
Bank Stability (both)	18					18
Veg. Protection (both)	20					20
Riparian Width (both)	20					20
Total Habitat Score	150					154
Reach 10 Segment 3 -Perennial						
RPB Habitat Parameters	Pre-mitigation	Year One	Year Two	Year Three	Year Four	Predicted Year Five
Epifaunal Substrate	0	13				15
Embeddedness	0	12				12

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Velocity/Depth Regime	0	10				14
Sediment Deposition	0	14				12
Channel Flow Status	0	14				14
Channel Alteration	0	13				10
Frequency of Riffles	0	14				15
Bank Stability (both)	0	16				14
Veg. Protection (both)	0	16				14
Riparian Width (both)	0	12				14
Total Habitat Score	0	134				134
Reach 10 Segment 4 - Intermittent						
RPB Habitat Parameters	Pre-mitigation	Year One	Year Two	Year Three	Year Four	Predicted Year Five
Epifaunal Substrate	7	13				15
Embeddedness	4	12				12
Velocity/Depth Regime	10	10				14
Sediment Deposition	8	14				12
Channel Flow Status	11	14				14
Channel Alteration	10	13				10
Frequency of Riffles	13	14				15
Bank Stability (both)	12	16				12
Veg. Protection (both)	6	16				12
Riparian Width (both)	18	12				18
Total Habitat Score	99	134				134
Reach 10 Segment 5 - Perennial						
RPB Habitat Parameters	Pre-mitigation	Year One	Year Two	Year Three	Year Four	Predicted Year Five
Epifaunal Substrate	10	13				12
Embeddedness	9	12				11
Velocity/Depth Regime	14	10				14
Sediment Deposition	10	14				11
Channel Flow Status	13	14				13
Channel Alteration	13	13				13
Frequency of Riffles	15	14				15
Bank Stability (both)	10	16				12
Veg. Protection (both)	12	16				12

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Riparian Width (both)	20	12				20
Total Habitat Score	126	134				133
Reach 10 Segment 6 - Perennial						
RPB Habitat Parameters	Pre-mitigation	Year One	Year Two	Year Three	Year Four	Predicted Year Five
Epifaunal Substrate	12	13				14
Embeddedness	7	12				11
Velocity/Depth Regime	12	10				15
Sediment Deposition	6	14				11
Channel Flow Status	10	14				12
Channel Alteration	10	13				10
Frequency of Riffles	15	14				15
Bank Stability (both)	14	16				14
Veg. Protection (both)	10	16				12
Riparian Width (both)	20	12				20
Total Habitat Score	116	134				134
Reach 10 Segment 7 - Perennial						
RPB Habitat Parameters	Pre-mitigation	Year One	Year Two	Year Three	Year Four	Predicted Year Five
Epifaunal Substrate	14	13				15
Embeddedness	9	12				12
Velocity/Depth Regime	12	10				15
Sediment Deposition	11	14				12
Channel Flow Status	11	14				14
Channel Alteration	10	13				10
Frequency of Riffles	14	14				14
Bank Stability (both)	12	16				12
Veg. Protection (both)	12	16				12
Riparian Width (both)	18	12				18
Total Habitat Score	123	134				134

Summary Data

The success of the project is based on the stabilization of the stream as well as the creation of macroinvertebrate habitat. The Pre-mitigation vs. year one post mitigation scores are listed in table 1 above. The table shows the general trend toward the stated goals in the compensatory mitigation plan.

The Big Sue Branch restoration project had various challenges to overcome to ensure its success. The entrenched stream bed was causing unstable banks and the introduction of excess sediment. LMR was able to remedy impacts by dredging, re-grading, planting native riparian species, and improving habitat to a minimum width of 50 feet beyond stream banks to create a continuous corridor along the channel. Rock and log cross vanes were installed at designed intervals within each segment to increase sediment transport, and create macroinvertebrate habitat.

Pictures of the mitigation site illustrating the current condition (figures 1-6), as well as the map showing the locations of the photos (figure 7), and site location map (figure 8) are included. The only part of the mitigation that is not meeting the stated standards is the riparian survival rate and incomplete segments as aforementioned.



Figure 1. Big Sue Branch Reach 10 11/10/11
Pic. 816 Facing Upstream, 37.58811, -83.15306



Figure 2. Big Sue Branch Reach 10 11/10/11
Pic. 813 Facing Upstream, 37.58716, -83.15246



Figure 3. Big Sue Branch Reach 11/10/11
Pic. 811 Facing Upstream, 37.58621, -83.15148



Figure 4. Big Sue Branch Reach 10 11/10/11
Pic. 808 Facing Upstream, 37.58516, -83.15075



Figure 5. Big Sue Branch Reach 10 11/10/11
Pic. 806 Facing Upstream, 37.58482, -83.15015



Figure 6. Big Sue Branch Reach 10 11/10/11
Pic. 802 Facing Upstream, 37.58461, -83.14854

Conclusions

The Big Sue Branch mitigation site is meeting performance standards with the exception of tree survival rate and aforementioned incomplete segments. LMR will return to the site and transplant more trees and perform necessary construction in 2012. Once this condition is corrected the LMR mitigation site will continue to trend toward the stated mitigation performance standards in the Clean Water Act 404 permit.