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Blackbird Mine Natural Resource Trustee Council

State of Idaho
U.S. Forest Service
National Oceanic and Atmospheric Administration

DATA REPORT

PANTHER CREEK BIOLOGICAL RESTORATION AND COMPENSATION PLAN

SMOLT SURVIVAL PLAN ELEMENT 2 - LIVESTOCK EXCLUSION ON PRIVATE LANDS OUTSIDE OF PANTHER CREEK BASIN

MARCH , 2012

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Smolt Survival Plan Element 2 - Livestock Exclusion on Private Lands
Outside of Panther Creek Basin

BACKGROUND

The Biological Restoration and Compensation Plan (BRCP) is included as Appendix B to the Blackbird Mine Site Consent Decree[1]. The BRCP contains provisions to restore injured natural resources and compensate the public for interim losses resulting from injury to or destruction of natural resources. Element 2 of Section II (Smolt Survival Plan) of the BRCP involves fencing the riparian corridor of selected stream reaches on private lands in cooperation with landowners. Plan requirements are 2.0 miles within the Panther Creek basin (50 yr project) and 5.0 miles or 8.0 miles (100 yr and 50 yr project options, respectively) outside the Panther Creek basin. The intent of this element is to improve Chinook salmon habitat by re-establishing a riparian vegetation community, which will develop and maintain stream bank and channel structure, moderate water temperatures, and improve spawning and rearing habitat. BRCP implementation is the responsibility of the Settling Defendants (M.A. Hanna Company and Rojet Enterprises, Inc.; Noranda Mining, Inc.; Noranda Exploration, Inc.; Blackbird Mining Company; and Alumet Corporation), with Trustee oversight. The Blackbird Mine Site Group (BMSG) represents the Settling Defendants in BRCP implementation.

On May 1, 1997, the BMSG entered into an agreement with Karl Tyler, owner of the Little Eight Mile Ranch, near Leadore, Idaho, to fence and exclude livestock from at least 8.0 contiguous miles of stream along the Lemhi River and Big Springs Creek, with the 50 year option identified in the Smolt Survival Plan. The project location is at T 13S, R 26E, Boise Meridian, Custer County, Idaho, in sections 3, 10, 11, 12, 13, NS 18. Construction of approximately 13.5 miles of wooden jack and pole fencing creating a livestock exclusion area along 6.1 miles of the Lemhi River and 2.2 miles of Big springs Creek was completed in late winter 1998. On August 26 and 27, 1997, a monitoring team representing the Blackbird Mine Trustee Council assessed riparian conditions along selected segments of the Lemhi River and Big Springs Creek to establish a baseline for evaluating the recovery of riparian habitat. Subsequent monitoring events were completed in 1998, 2004, and 2011.

[1] Natural Resource Damage Consent Decree No. 83-4179 (State of Idaho, et al. v. The M.S. Hanna Company, et al.) Entered on September 1, 1995.

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SITE SELECTION

The Lemhi River is a low gradient, spring-fed system that flows through fertile valley bottoms. The average flow of the Lemhi River, for the years 1955-1990, is 270 cubic feet per second (cfs). Peak flows generally occur in June (as high as 550 cfs) and the lowest flows are experienced in August (less than 100 cfs). The drainage area is 1,260 square miles and the area contains 1,330 miles of streams. The hydrology of much of the river has changed dramatically since the mid-1840's, beginning with intensive beaver trapping and dam removal efforts, and continuing today with extensive irrigation diversions and related channel alterations. Channelization, diversion of tributary streams and a lack of connectivity to the floodplain has changed the hydrograph of the system from one where beaver dams and a sinuous, meandering stream channel kept most water storage within the system to one where most storage is off channel on the irrigated lands. These activities have also decreased seasonal fluctuations in flows, reducing the ability of the river to maintain it historical characteristics, reducing deep pools and meanders which provided necessary fish habitat. The climate in the area is dry, receiving approximately 7 inches of rain annually. Most of this occurs during winter months in the form of snow and in the spring and fall as rain. The Lemhi River is a major tributary of the Upper Salmon and historically a major spawning and rearing tributary for the federally-protected Snake River spring/summer run Chinook salmon and Snake River steelhead.

The reach of the Lemhi River on Little Eight Mile Ranch contains a mix of good and degraded habitat and is within the portion of the river currently used as spawning and rearing habitat by Snake River spring/summer Chinook salmon (listed as threatened species under the Endangered Species Act) and as rearing habitat by Snake River Basin steelhead (listed as a threatened species under the Endangered Species Act). The Lemhi River and Big Springs Creek are within the watersheds designated as critical habitat for Snake River spring/summer Chinook salmon and Snake River Basin steelhead (Federal Register 58FR68543, Federal Register 70FR52630).

The Model Watershed Plan (Idaho Soil Conservation Commission, 1995**)** reports that the section of the Lemhi River that includes the Little Eight Mile Ranch contains good spawning gravels, but only 70% of stream banks are stable, causing siltation problems that impair habitat quality. High water temperatures and limited stream side vegetative cover also adversely affect habitat quality. Big Springs Creek supported Chinook salmon and steelhead historically but current use is limited by high water temperatures, insufficient pool diversity and depth, lack of stream side vegetative cover, and severely limited spawning habitat due to sedimentation from unstable stream banks (Idaho Soil Conservation Commission, 1995).

The monitoring team selected stream segments (three on Lemhi River, two on Big Springs Creek) as sites to monitor the recovery of the riparian corridor (Figure 1). The site assessment in 1997 was to establish baseline (pre-fencing) conditions. However, fencing was not completed until late winter 1998 and grazing continued in some of the unfenced sections continued, so some

of the 1998 survey data may be more representative of "baseline" conditions.

Sites were designated as TR (Tyler Ranch) and numbered in the order of establishment. Stream segments were between 100 and 200 yards long, with lengths dependent on stream bank access and bank and vegetation condition. Since the intent of the fencing is riparian habitat restoration, site selection was biased toward poor stream side habitat, and all reaches contained some unstable banks and degraded vegetative community. Metal T-posts were placed in the ground along one stream bank to permanently mark upper and lower site boundaries. Steel concrete reinforcing bar (re-bar) was placed streamward of the T-posts to mark the upper and lower greenline boundaries. Upper and lower site boundaries on the opposite bank were marked with re-bar placed in the ground directly across the stream from the T-posts. Latitude and longitude of the upper and lower boundary T-posts were marked using a Global Positioning System. Right and left bank designations are based on the sampler facing downstream. General site location descriptions follow.

METHODS

The initial survey used Modified Green Line Vegetation Composition surveys, Percent Hydric Plants, Woody Species Regeneration surveys, and photographs from established points to characterize the riparian community conditions. Method descriptions follow.

Modified Green Line Vegetation Composition survey

Riparian vegetation is important for the stability of streambanks, determining streambank morphology (width, depth, and shape), water quality, and aquatic habitat quality. Determining the species along streambanks provides an indication of the condition, based on the health and amount of deep, strong-rooted vegetation. The survey consists of an ocular estimate of the vegetative community type at the water's edge. The method used in this survey is a modification adopted by the Bureau of Land Management's Lemhi Resource Area of the protocol in the Integrated Riparian Evaluation Guide (USDA, 1992**)**. The green line is defined as that specific area where a more or less continuous cover of perennial vegetation is encountered when moving away from the water source.

We established the green line at the water's edge, with upper and lower boundaries of the reach to include a mix of bank and vegetative community types representative of the stream section. Beginning at the point on one stream bank where the boundary transect (upper or lower) intersects the stream, the sampler proceeds upstream or downstream along the green line toward the other boundary, taking uniform steps and recording his/her observations of the green line vegetation community type composition covered in each step on a field data sheet. Vegetation community type composition is recorded as: (1) *Carex* (to include > 70% *Carex* spp.), (2)

Carex/other grass/forb mix (can include 20% - 70% *Carex* spp.), (3) Other grass/forb, (4) riparian shrub, (5) mesic shrub, and (6) bare soil. Upon reaching the boundary marker, the sampler crosses the stream and repeats the sampling process on the other bank, beginning a separate tally. The number of steps on the right and left banks may not be the same due to the difference in lengths of meanders on each side of the stream. The total number of each vegetative community type encountered along the green line on each bank is tallied and divided by the total number of steps on that bank to calculate the percent composition for each community type. Left and right bank data are calculated separately.

Percent Hydric Plants. This is the proportion of the composition consisting of hydric (or water loving) plants. It is calculated by summing the total percent composition of plants rated as "hydric" divided by the total percent composition of all plants. "Hydric" is defined as those plants classified in the Wetland Indicator Status as Facultative Wet to Obligate. In this report we consider *Carex*/other grass/forb mix to be a transitional hydric stage and include only the categories *Carex* and riparian shrub in the hydric classification calculation.

Woody Riparian Vegetation Regeneration

The survey consists of a measurement of woody species regeneration along the same green line and in a similar manner that the modified green line vegetation composition survey is measured. The sampler uses a 6-ft pole to define the width of the observation area. Measurements are made by walking the bank on each side of the stream holding the pole perpendicular to the stream with one end of the pole along the stream edge. Woody species observed within the 6 ft wide area covered by the pole are recorded. All rooted woody species within the area defined by the ends of the pole are tallied on field data sheets based on the following age categories: (1) Seedling/Sprout, (2) Young/Sapling, (3) Mature, (4) Decadent, and (5) Dead. The dominant woody species on this segment of the Lemhi River is willow (*Salix* spp.). In this survey, we counted single unbranched stems in the seedling/sprout category; multiple stems growing from one location, and single branched stems in the young/sapling category. Larger diameter, multi-branched trees with leaves were counted as mature; trees without leaves that appeared to be dying were counted as decadent. The total number of each age category encountered along the green line on each bank is tallied and divided by the total number of steps on that bank to calculate the percent composition for each age class. Left and right bank data are calculated separately.

Photographic Documentation

Photographs were taken at the upper and lower boundaries of each site to document conditions within and around the site. The initial surveys used a 35 mm autofocus/autoexposure camera equipped with a 28 mm lens and loaded with ISO 200 color print film. The camera was positioned atop the T-post at each boundary (except for TR5) and the azimuth recorded for each

photograph. Upstream, downstream, and across stream angles were photographed at most stations; a panoramic series was taken at some. At TR5 (photographic point only), the camera was positioned on the upstream and downstream ends of the bridge railing on the left bank of the stream for upstream and downstream photos. A list of photo point location descriptions is included as Appendix 1. Copies of site photographs are included as Appendix 2.

Surveys were conducted in 1997, 1998, 1999, 2004, and 2011. Woody Riparian Vegetation Regeneration monitoring turned out to be difficult and time-consuming to monitor as willows began growing and was conducted in 1997 and 1998 only.

SITE DESCRIPTIONS

TR1
Lemhi River. The site is downstream of a rail car bridge placed in 1997. The upper boundary T-post is located on the right bank, 12 feet downstream of the right bank bridge abutment. The distance from the lower boundary T-post to the bridge is 109 yds, as measured by a Bushnell Laser Ranging rangefinder. The upper T-post is on right bank at 44^0 43' 3.9" N, 113^0 24' 48.2" W. The lower T-post is on right bank at 44^0 43' 05.2" N, 113^0 24' 49.5" W. The re-bar marking the upper right bank greenline boundary is streamward of the T-post (12 ft downstream of bridge abutment). The re-bar marking the lower right bank greenline boundary is 10 ft streamward of the T-post. The rebar marking the upper left bank greenline boundary is 16 ft downstream of the bridge abutment. The lower left greenline boundary re-bar is directly across the stream from the right bank T-post, just downstream of a mature willow.

TR2
Lemhi River. The site is near the upstream property boundary. The upper boundary T-post is located on the left bank, 60 feet downstream of an existing fence line. The upper T-post is on the left bank at 44^0 42' 51.1" N, 113^0 24' 29.1 W. The lower T-post is on the left bank at 44^0 42' 52.8" N, 113^0 24' 24.9" W. Re-bar marking the upper left bank greenline boundary is streamward of the T-post. The lower left bank greenline boundary re-bar is streamward of the lower T-post, immediately upstream of a mature willow. The right bank lower greenline boundary is marked with re-bar directly across the stream from the left bank T-post, just upstream of a mature willow. The right bank upper greenline boundary re-bar is directly across the stream from the left bank T-post, just downstream from a large willow clump.

TR3
Big Springs Creek. The site is near the upper property boundary, downstream of a stream crossing near a fish screen. The upper T-post is on the left bank at 44^0 42' 57.9" N, 113^0 24' 54.6" W. The lower T-post is on the left bank at 44^0 42' 57.3" N, 113^0 25' 00.2" W. Re-bar marking the upper left bank greenline boundary is 11 ft streamward of the T-post. The lower left bank greenline boundary re-bar is streamward of the T-post, just upstream of a willow clump.

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TR4
Big Springs Creek. The site is upstream of bridge crossing Big Springs Creek near the confluence with the Lemhi River. The lower boundary T-post is located at the neck of lyre-shaped meander, along the left bank at 44^0 43' 35.0" N, 113^0 25' 58.3" W. The upper T-post is on the left bank at 44^0 43' 32.5" N, 113^0 25' 57.6" W. The re-bar marking the lower left bank greenline boundary is located 12 ft streamward of the T-post at azimuth 271^0. The re-bar marking the upper left bank greenline boundary is 15 ft streamward from the T-post at azimuth 269^0. The lower right bank greenline boundary re-bar is located at azimuth 271^0 from the left bank T-post.

TR5
Lemhi River. This is a photo point only, established at the downstream left bank abutment of a newly placed (1997) rail car bridge crossing the Lemhi River upstream of the confluence with Big Springs Creek. Photo point location is at 44^0 43' 40.1" N, 113^0 25' 57.4" W.

TR6
Lemhi River. The site is downstream of the confluence with Big Springs Creek. Access along right bank is via a road to fish screen. The upper T-post is located near a goose nesting platform on the right bank at 44^0 43' 48.7" N, 113^0 26' 11.9" W. The lower T-post is located on the right bank at 44^0 43' 52.2" N, 113^0 26' 12.3" W. The upper right bank greenline boundary re-bar is aligned with with the T-post and the goose nesting platform, 9 ft streamward of the T-post. The lower right bank greenline boundary re-bar is 12 ft streamward of the T-post, near a white PVC fish return pipe (from the fish screen). The lower left bank greenline boundary re-bar is adjacent to the stream, aligned with the T-post on the opposite bank and the notch in the Beaverhead Mountain skyline. The upper left bank greenline boundary re-bar is aligned with the T-post and goose nesting platform on the opposite bank.

OBSERVATIONS

Summary data for the modified green line and woody species regeneration surveys are presented in Appendix 3. Data are reported by site as observed numbers and percent composition of vegetative community types from green line surveys, and observed numbers of woody species age classes from woody species regeneration surveys. Percent composition of vegetative community categories for the modified green line are arranged in figures from most stable (riparian shrub, *Carex*) to least stable (bare soil).

Lemhi River

TR-1. While the year to year data were variable, the percentage of hydric vegetation along the greenline increased along both banks from the initial 1997 survey. Between 1997 and 2011 the percentage of hydric vegetation increased from 24.4% to 57.1% along the left bank, and from 54.3% to 75.8% along the right bank. Hydric vegetation gradually filled in a channel braid along the right bank (Appendix 2, photo TR-1, A3) and by 2011 the area was completely overgrown with willows. Bare soil, occurring along the outside curve of a left bank meander, decreased from 11% in 1997 to 0.7% in 2004, then increased to 8% in 2011, possibly the result of higher than average spring runoff discharges in 2009 and 2010 (USGS, 2012).

TR-2. There was an increase in greenline hydric vegetation at this site between 1997 and 2011, increasing from 17.2% to 43.3% along the left bank, and from 42.3% to 88.4% along the right bank. The steep eroding bank on the outside curve of the left bank showed little improvement, with bare soil reduced from 56.6% to 49.4% between 1997 and 2011 (Appendix 2, photo TR-2, A7). Willows appeared along the left bank in 1998 and gradually increased from 0% in 1997 to 6.1% in 2011. On the right bank, willow coverage increased from 6.2% in 1997 to 17.0% in 2011.

TR-6. This site showed one of the more dramatic increases in hydric vegetation along the greenline between 1997 and 2011, increasing from 24.2% to 71.1% along the left bank, and from 17.4% to 77.0% along the right bank (Appendix 2, photos TR-6, B7, B10). Much of the left bank is a low-lying wet meadow with saturated soils and the hydric vegetation transitioned from *Carex* and *Carex*/other grass/forb mix to 100% willows in 2011. Higher areas along the left bank remained relatively stable as other grass/forb. Along the right bank, willow coverage increased from 5.6% to 21.4%, and *Carex* increased from 12.9% to 55.6%.

Big Spring Creek

TR-3. Hydric vegetation along the left bank greenline showed little change between 1997 and 2011, measuring at 57.4% and 56.3%, respectively. Right bank hydric vegetation increased from 38.7% in 1997 to 52.1% in 2011. Few willows existed along Big Spring Creek in 1997 and the by 2011 incidence increased from 2.8% to 10.7% along the left bank, and 0% to 2.1% along the right bank (Appendix 2, photo TR3-A11). A notable change at this site was the reduction in bare soil along the right bank, which decreased from 29.0% in 1997, to 4.6% in 2004, then increased to 14.6% in 2011 (Appendix 2, photo TR-3, A11). Discharge data are not available for Big Spring Creek but it is probable that higher than normal spring runoff discharges recorded on the Lemhi River in 2009 and 2010 also occurred on Big Spring Creek and increased erosive forces resulted in the increase in bare soil. Between 2004 and 2011, the percentage of hydric vegetation increased from 39.1% to 52.1% along the right bank, and the increases in bare soil occurred along areas dominated by other grass/forb (coverage reduced from 26.4% to 13.5% between 2004 and 2011).

TR-4. Greenline hydric vegetation increased along both banks at this site between 1997 ad 2011, increasing from 2.2% to 24.1% along the left bank, and from 29.7% to 62.3% along the right. The site was devoid of willows in 1997, with none recorded until the 2004 monitoring event. In 2011, willow coverage increased to 2.8% along the left bank, and 6.2% along the right. One of the photo points at this site (Appendix 2, TR-4, B3) shows the succession to a more stable condition, where a section of the bank had sloughed off (1997 photo). By 2004, the area behind the sloughing had filled in and supported *Carex* and willows. By 2011, the area appeared as a normal stable streambank.

SUMMARY

Measurement of community type composition at the water's edge can provide an indication of the general health of the stream. There is a strong relationship between the amount and kind of vegetation along the water's edge and bank stability. Improper livestock grazing and trampling can cause vegetative changes and physical disturbance to stream banks and subsequent erosion of weakened stream banks results in a wider, shallower stream profile.

Natural deep-rooted hydric type plant species forming the green line (e.g. sedges, willows) are generally good buffers of water forces, and the root density and mass associated with a well-developed green line vegetation community stabilizes stream banks, enhancing channel stability. Disturbance activities result in changes to mesic and xeric species such as Kentucky bluegrass or red top, which have reduced ability to buffer water forces, resulting in bank instability and erosion.

A tally of shrubs by age class provides a preliminary indication of regeneration of shrubs in that complex. A high proportion of plants recorded in the sprout, young, and early mature categories would indicate the shrub component of the complex is in an upward trend. Conversely, low numbers of plants in the sprout and young categories would indicate that current management may be suppressing woody species. However, not all riparian areas are suited for the establishment of woody species. Soil type and ability of the soil to retain moisture affect regeneration. Competition from herbaceous species, such as sedges and rushes (which can effectively stabilize stream banks) may prevent colonization by woody species.

The modified greenline composition survey is an accepted method of monitoring riparian conditions but is not without shortcomings. In this study, it was often difficult (and sometimes not possible) to locate the rebar identifying the beginning or end of the greenline boundary. In some cases, approximations were made of where to begin and/or end, as evidenced by the varying number of steps recorded during the different years. At some sites, thick growth of willows along the streambank required the observer to detour around them, approximating the number of steps. The observations, however, were useful in determining the effects of excluding livestock from the streams and all stream segments exhibited an increase in hydric vegetation and

a general increase in streambank stability during the survey period. Some areas, where channel braiding and bank sloughing occurred, filled in with vegetation, resulting in more stable stream banks and a narrower channel. Stabilization of steep eroding banks on the outside of meanders proceeded slowly and may occur as a natural state given the sinuosity, soil type, low rainfall and erosive forces of high flows. Exclusion of livestock resulted in habitat quality improvements in the riparian areas of the fenced segments of the Lemhi River and Big Spring Creek, and while changes have occurred slowly, the trajectory appears to be toward the development of the channel characteristics necessary to provide the stability, vegetative community, water depth, and temperature for spawning and rearing of Chinook salmon and steelhead.

REFERENCES

Federal Register. 2005. Final Critical Habitat for the Snake River Basin Steelhead ESU. Upper Salmon Basin. Federal Register / Vol. 70, No. 170 / Friday, September 2, 2005. P 52791.

Federal Register. 1999. Designated Critical Habitat: Revision of Critical Habitat for Snake River Spring/Summer Chinook Salmon. Federal Register / Vol. 64, No. 205. p 57399.

Idaho Soil Conservation Commission. 1995. Model Watershed Plan, Lemhi, Pahsimeroi, and East Fork of the Salmon River. Report DOE/BP-2772 funded by the Bonneville Power Administration.

USDA Forest Service. 1992. Integrated Riparian Evaluation Guide, Intermountain Region. Ogden, Utah.

USGS National Water Information System. Surface Water Monthly Statistics for the Nation. USGS gauge 13305000 Lemhi River near Lemhi, Idaho.