

**APPENDIX B**

**UPPER WILLOW CREEK HABITAT ENHANCEMENT PLAN**

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## **Introduction and Purpose**

The purpose of this Upper Willow Creek Habitat Enhancement Plan (Plan) is to improve aquatic and riparian environments while providing mitigation for direct environmental impacts and potential cumulative environmental impacts analyzed in the Betze Project Supplemental Environmental Impact Statement (the “SEIS”). The habitat enhancement measures described in this Plan will take place outside of the area of any projected or potential environmental impacts analyzed in the SEIS. Those measures will also provide environmental benefits before certain of the potential impacts analyzed in the SEIS would occur and whether such impacts occur or not.

### **A. Description of Upper Willow Creek Enhancement Area.**

The Upper Willow Creek Habitat Enhancement Area (“Enhancement Area”) is generally described as the drainage area upstream of the Willow Creek Reservoir and within the Squaw Valley Allotment. The Enhancement Area is depicted in Figure 1. The Enhancement Area encompasses all of Lewis Creek and Nelson Creek, the Nelson Field, and the reach of Willow Creek between Willow Creek Reservoir and the eastern boundary of the Squaw Valley Allotment (“Upper Willow Creek”). The Enhancement Area encompasses approximately 12,300 acres. It includes approximately 20.5 miles of streams that are inhabited by LCT, or that might become inhabited by LCT as conditions improve, and associated riparian zones. The uplands within the Enhancement Area include a variety of habitats for avian and terrestrial wildlife species, including sage grouse and mule deer. The majority of the private lands within the Enhancement Area are owned by Barrick. The Enhancement Area is outside, but reasonably nearby, the area of any potential impacts from dewatering activities at the Goldstrike Mine.

## **B. Grazing Management**

Implementation of alternate grazing practices in the Enhancement Area will occur in three phases. Phase One will occur from the present until August 1, 2003. Phase 2 will occur from August 1, 2003 until the Stream and Riparian Criteria (as defined below) are achieved. Phase 3 will occur after the Stream and Riparian Criteria are achieved.

Phase 1. From the present until August 1, 2003, grazing will be actively managed to minimize impacts within the Enhancement Area. From the Willow Creek Reservoir, Cattle will be trailed along the ridges toward the northeast into Lower Nelson Field, instead of being trailed along the riparian zone of Willow Creek. Cattle will be kept in Lower Nelson Field and then be moved to Upper Nelson Field for a combined maximum of two weeks. Cattle will be out of Upper Nelson Field by no later than August 1. Salt blocks will be placed away from springs and streams in both Upper and Lower Nelson Fields to encourage cattle to stay out of riparian areas. Gates in the fence on the ridge between Toe Jam Creek and Lewis Creek will be kept closed to prevent cattle ranging in the Upper Rock Creek and Toe Jam Creek area from drifting into the Enhancement Area. Barrick, or its lessee, will remove any stray cattle drifting into the Upper Willow Creek drainage area after August 1st.

The BLM advises that new fencing might result in increased sage grouse mortality. Accordingly, with the exception of the wooden rail fence to be built in Key Area No. 4, described below, no new livestock fences will be constructed in the Enhancement Area or along its boundaries unless active herding practices and existing fences prove to be inadequate to preclude livestock drift into the Enhancement Area. Before any new livestock fences are constructed, Barrick would confer with BLM on the extent and type of construction of new fences.

Phase 2. During Phase 2, the Enhancement Area will be completely rested from livestock grazing. Phase 2 will continue until the Stream and Riparian Criteria in the Enhancement Area are met.

Once the Stream and Riparian Criteria have been met in the Enhancement Area, the monitoring program will be modified in consultation with the BLM to develop a reduced “maintenance” stream and riparian monitoring program (the “Phase III Monitoring Program”). The purpose of Phase III monitoring is to demonstrate that the Stream and Riparian Criteria are being maintained.

Phase 3. After the Stream and Riparian Criteria in the Enhancement area have been achieved and the Phase III Monitoring has been implemented, grazing may resume in the Enhancement Area under the following conditions:

1. A carrying capacity would be established for the Enhancement Area in animal unit months (AUMs) in consultation among BLM and Barrick.
2. The Enhancement Area could be used in either spring or fall season but not both seasons in the same year.
  - a). Spring use period would be prior to July 1<sup>st</sup>. No flexibility in off-date would be allowed.
  - b). Fall use period would be after September 16<sup>th</sup>. No flexibility in the on-date would be allowed.
3. The Enhancement Area shall be rested following any year of grazing use.
4. The following conditions would be met after removal of livestock:
  - a). A herbaceous 4” stubble height would be left.
  - b). Woody utilization would not exceed:
    - 20% on willows and/or
    - 10% on aspen.
  - c). Streambank trampling would not exceed 10%.
5. If monitoring shows that the ranching operation was found in non-compliance of the above resource criteria and restrictions (numbers of livestock, season of use, herbaceous and woody plant utilization criteria and streambank trampling criteria) the following terms and conditions would be implemented:
  - a). The Enhancement Area would receive two (2) consecutive years of rest; and
  - b). Barrick would take the necessary actions to assure that the herbaceous and woody plant utilization criteria and streambank trampling criteria identified above would

be met in the future. Actions would include the reduction in season of use or reduction in numbers of livestock or a combination of both of these strategies.

**C. Stream and Riparian Monitoring.**

The Stream and Riparian Criteria are the goals desired to be achieved by this Plan. Stream and Riparian monitoring will take place on Lewis Creek, Nelson Creek and Upper Willow Creek during low flow or base flow conditions. The stream and riparian monitoring program will measure the parameters that make up the Stream and Riparian Criteria as well as parameters that are informational. Achievement of the Stream and Riparian Criteria will also reflect improvements in upland habitat conditions that are attendant to achieving improvements in stream conditions. Monitoring of upland habitat will allow for a better understanding of the correlation between upland improvements and aquatic improvements.

Stream and Riparian Criteria are described in narrative detail below. They are summarized as follows:

**Lewis, Nelson and Upper Willow Creek**

| Habitat Parameters                            | Criteria   |
|---|--|
| Riparian Condition Class<br>(percent optimum) | 70% (Lewis and Nelson)<br>65% (Upper Willow Creek)                     |
| Stream Width/Depth Ratio                      | 15:1 or a 30% reduction from baseline,<br>whichever is achieved first. |
| Proper Functioning Condition                  | PCF per BLM Manual TR 1737-15 (1998)                                   |

1. Stream and Riparian Criteria Monitoring.

The Stream and Riparian Criteria for the Enhancement Area address (1) riparian condition class (a combination of bank stability and bank cover), (2) stream width-to-depth ratio and (3) Proper Functioning Condition.

a) Riparian Condition Class

Bank cover and bank stability will be monitored as specified in BLM Manual Handbook 6720-1, Phase III Inventory, Elko District 2001 draft (“BLM 2001”). Bank cover and bank stability will be combined to determine the riparian condition class. The standards to be met are a minimum of 70 percent of optimum for Lewis and Nelson Creeks and a minimum of 65% of optimum for Upper Willow Creek.

b) Stream Width-to-Depth Ratio

The ratio of stream width-to-depth will be determined as specified in BLM 2001. At each depth transect, the water depth will be recorded to the nearest .05 feet at  $\frac{1}{4}$ ,  $\frac{1}{2}$  and  $\frac{3}{4}$  of the distance across the stream. Average depth will be based on the total of the depth of the depth measurements divided by four, if the shorewater depths are zero, or by three, if one or both shorewater depths are greater than zero (Platt et al 1983; USFS 1990). The wetted stream width will also be measured along each depth transect. At least five width depth transects will be measured at each stream monitoring station. The standards to be met and maintained are either a maximum of 15:1, or a 30 percent reduction from the baseline monitoring, whichever is achieved first. The stream width-to-depth ratio is not applicable to stream segments or reaches influenced by beaver activity.

c) Proper Functioning Condition

The standard to be met is Proper Functioning Condition for Lewis, Nelson and Upper Willow Creeks. Proper functioning condition will be assessed according to BLM Manual TR 1737-15 (1998, A User Guide to Assessing Proper Functioning Condition and the Supporting Science for Lotic Areas).

2. Informational Monitoring

In addition to stream and riparian criteria, informational monitoring will be used to evaluate effectiveness of the plan.

a. Riparian Zone Width

The Riparian Zone width will be monitored as specified in BLM 2001.

b. Other Riparian Vegetation Parameters

Vegetation cross-section composition, greenline composition, and woody species regeneration will be monitored using procedures described in Winward (2000).

c. Temperature

Four thermographs will be installed; one in Lewis Creek, one in Nelson Creek, one below the confluence of Lewis and Nelson Creeks and one in Upper Willow Creek above the inlet to the Willow Creek Reservoir. The thermographs will be calibrated and set to record temperature readings every two hours and will run throughout the year. It is recognized that thermographs occasionally malfunction, or are damaged or washed away, Barrick will check the thermographs three times annually, report the data available and replace malfunctioning, damaged or lost thermographs.

d. Photography

Each monitoring station will be annually photographed looking upstream, downstream, and across the stream. Photography will be conducted annually through the start of Phase II and every three years thereafter.

e. Vegetation Overhang

Vegetation overhang will be monitored as specified in BLM 2001.

f. Pool Quality

Pool Quality will be monitored as specified in BLM 2001.

g. Grazing Impacts.

During years that grazing occurs on the Enhancement Area, grazing impacts will be monitored by reference to herbaceous plant stubble height, streambank trampling and woody plant utilization.

i. Herbaceous Plant Stubble Height

Using the methodology described in Interagency Technical References 1996 average stubble height of herbaceous riparian vegetation will be measured and recorded along transects to be established at the monitoring sites. Transects will be established parallel to the stream channel in the active flood plain or “flood prone area” (as defined by Rosgen 1996). In general, the transects will be located within five feet of the shoreline (bankful channel edge) as described by Platts (1990). A minimum of 20 measurements will be recorded for each transect.

ii. Streambank Trampling.

Streambank trampling will be determined by measuring the percent of streambank trampled or compacted by livestock along two one-hundred foot transects. The transects will be established at each of the monitoring sites for the right and left streambanks along the bankful channel line (as defined by Rosgen 1996).

The number of feet of streambank showing recent (current growing season) evidence of trampling, bank shearing, or compaction from livestock will be recorded along each transect. Streambanks inaccessible to livestock, including banks protected by rock, logs or other features will be included in the measurements.

iii. Woody Riparian Plant Utilization.

Estimates of utilization of the current years growth of woody riparian vegetation by livestock will be made based on comparisons to ungrazed plants at transects established at the monitoring sites using the key forage method. Key Forage Method – Nevada Range Studies Task Group 1984. Only those woody riparian plants (typically aspen and willow) that are available to livestock and located in or adjacent to the active flood plain will be sampled.

3. Frequency, Location and Baseline for Stream and Water Quality Criteria Monitoring and Informational Monitoring.

| Monitoring Type  | Location  | Baseline*                              | Survey Frequency  |
|--|---|--|---|
| Riparian Condition Class.<br>Stream Width-to-depth.<br>Riparian Zone Width.<br>Vegetative Overhang.<br>Pool Quality. | Survey points NS1, NS3-5, LS1, LS2, WS1-8 described in Appendix A and depicted in Figure 1. | Establish baseline during Summer 2002. | 2003, 3 to 5 year intervals thereafter.                     |
| Grazing Impacts  | Survey points BGMI 5,6,7 and 9 described in appendix A and depicted in Figure 1             | Establish transects in Summer 2002     | In the years the enhancement area is grazed.                |
| Photo Points   | Survey points NS1, NS3-5, LS1, LS2, WS1-8 described in Appendix A and depicted in Figure 1. | Re-established by 2002 Photos.         | Annually for first five years, every third year thereafter. |
| Proper Functioning Condition.  | Lewis, Nelson and Upper Willow Creeks   | Establish baseline during Summer 2002. | 2003, 3 to 5 year intervals thereafter.                     |

|  |  |   |  |
|--|--|---|--|
| <p>Thermal Monitoring with Thermographs</p> <p>(continued on next page.)</p> | <p>Lewis Creek (BGMI 5), Nelson Creek (BGMI 6), below the confluence of Lewis Creek and Nelson Creek (BGMI 7) , Upper Willow Creek above reservoir inlet (BGMI 9).</p> | <p>Establish baseline during Summer 2002.</p> | <p>Program will be established in Summer of 2001 and will continue annually for ten years. Program will continue after ten years only if and only to the extent additional data is useful.</p> |
|--|--|---|--|

\*Data developed by Cedar Creek Associates during the Summer of 2001 will be evaluated by BLM and may be used in establishment of baseline.

**D. Uplands Monitoring.**

Although this plan does not establish specific criteria for Uplands, it does establish an uplands monitoring program for informational purposes. Wildlife habitat conditions within the Enhancement Area will be monitored at four different representative “Key Areas.” The Key Areas will be established in coordination between NDOW, BLM and Barrick during the Summer of 2001. The important vegetation characteristics differ for each key area and accordingly different monitoring parameters differ for each key area.

1. Key Area Number 1. Key Area No.1 will be established in Lower Nelson Field (See Figure 1 for the location of Lower Nelson Field.). The purpose of this key area will be to monitor perennial grass and browse species condition. The monitoring parameters for the Lower Nelson Field Key Area No. 1 shall be:

- Perennial Grasses                      percent cover
- Perennial Forbes                        percent cover
- Shrubs                                      percent cover
- Age and form class of low sagebrush as measured by Cole Browse Method

- % Canopy cover

2. Key Area Number 2. Key Area No. 2 will be established in Upper Nelson Field. (See Figure 1 for the location of Upper Nelson Field.). The purpose of this key area will be to monitor perennial grass and browse species conditions. The monitoring parameters for the Upper Nelson Field Key Area No. 2 shall be:

- Perennial Grasses            percent cover
- Perennial Forbes            percent cover
- Shrubs                        percent cover
- Age and form class of low sagebrush as measured by Cole Browse Method

3. Key Area Number 3. Key Area No. 3 will be established in the vicinity of Lewis Creek and the Willow Creek Ridge (See Figure 1 for the approximate location of Key Area No. 3). The purpose of this key area will be to monitor the condition of Mule Deer transitional habitat and Sage Grouse nesting habitat. The monitoring parameters for Key Area No. 3 shall be:

- Age and form class for bitterbrush and serviceberry.
- Age and form class of low sagebrush as measured by Cole Browse Method

4. Key Area Number 4. Key Area No. 4 will be established in and around an existing aspen stand in the Enhancement Area. A portion of the key area will be fenced using wood split rail type fencing to inhibit livestock but not wildlife access and the remainder will be left outside of the split-rail fence enclosure. The purpose of this key area is to measure improvement to aspen stands when livestock are excluded. The monitoring parameter shall be the number of single stemmed saplings per acre. Saplings are defined as single-stemmed aspen that are at least 4.9 feet in height and less than 3.9 inches in diameter at the breast level (4.5 feet above ground level).

## **E. Other Considerations.**

1. Failure to achieve Stream and Riparian Criteria. If the Stream and Riparian Criteria have not been achieved after ten years of rest, the Stream and Riparian Criteria will be deemed to have been established at too high of level. Barrick, NDOW and BLM will thereafter confer to re-establish more appropriate criteria to replace the Stream and Riparian Criteria.

2. Wild Horses. Wild horses are known to intermittently range in the Enhancement Area. If monitoring and observation demonstrates wild horses are impairing the Enhancement Area from achieving the Stream and Riparian Criteria, BLM, NDOW and Barrick shall confer to determine the appropriate response, which may include, without limitation, revising the Stream and Riparian Criteria or removing the wild horses. Barrick, however, shall not be responsible to exclude or remove wild horses from the Enhancement Area.

3. Acts of God. Fire, disease, insect infestations or other events beyond the control of Barrick (collectively “Acts of God”) may affect the Enhancement Area. In the event Acts of God prevent the achievement of Stream and Riparian Criteria, Barrick shall be under no obligation to offer replacement area for the Enhancement Area or to undertake affirmative measures to restore the Enhancement Area. Barrick’s sole obligation in the event of an Act of God shall be to rest the Enhancement Area from livestock grazing and monitor in accordance with this plan.

4. Changes in Land Use. In the event Barrick, or any successor, changes land use within the Enhancement Area from grazing to another use that renders Barrick unable to achieve the Stream and Riparian Criteria (including without limitation, road construction or mining), Barrick will confer with NDOW and BLM and implement habitat enhancement at an alternative location prior to such land use.

Literature Cited.

Bureau of Land Management (BLM). 2002. Elko BLM Revised Handbook 6720-1. Level III Inventory. Elko Field Office, BLM, Elko, Nevada.

Interagency Technical Reference. 1996. Utilization studies and residual measurements. Bureau of Land Management. National Applied Sciences Center, Denver, Colorado.

Nevada Range Studies Task Group, 1984. Nevada Rangeland Monitoring Handbook. Soil Conservation Service, Forest Service. Platts, William S. 1990. Managing fisheries And wildlife on rangelands grazed by livestock. Reference Document for Biologists Prepared for Nevada Division of Wildlife, Reno, Nevada.

Rosgen, David. 1996. Applied river morphology. Printed Media Companies Minneapolis, Minnesota.

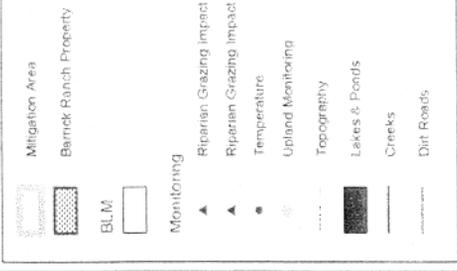
Winward, Alma H. 2000. Monitoring the vegetation resources in riparian areas. U.S. Dept Agriculture, Forest Service, Rock Mountain Research Station Gen. Tech. Rept. RMS-GTR-47.

# Appendix A

## Table 1

| NAME   | TYPE                                | NORTHING  | EASTING  | COMMENTS   |
|--------|-------------------------------------|-----------|----------|--|
| BGMI 5 | Temperature                         | 4571735.0 | 549905.9 |  |
| BGMI 6 | Temperature                         | 4569163   | 548178.6 | Same as NS2                                      |
| BGMI 7 | Temperature                         | 4568737.5 | 545762.1 |  |
| BGMI 8 | Temperature                         | 4568717.5 | 545785.6 |  |
| BGMI 9 | Temperature                         | 4562914.5 | 544743.8 |  |
| LS 1   | Riparian Grazing Impact / Fisheries | 4569182   | 546447   |  |
| LS 2   | Riparian Grazing Impact / Fisheries | 4570802   | 548069   |  |
| LS 3   | Riparian Grazing Impact / Fisheries | 4571725   | 549896   | Scaled from USGS Map                             |
| LS 4   | Riparian Grazing Impact / Fisheries | 4571983   | 550300   | Scaled from USGS Map                             |
| NS 1   | Riparian Grazing Impact / Fisheries | 4569146   | 546506   |  |
| NS 3   | Riparian Grazing Impact             | 4569553   | 549134   |  |
| NS 4   | Riparian Grazing Impact / Fisheries | 4569231   | 550713   |  |
| NS 5   | Riparian Grazing Impact / Fisheries | 4568736   | 552031   | GPS Pt. Is 100 Ft. Upstream of 1st Cross Section |
| US 1   | Upland Monitoring                   | 4568994   | 550410   | Scaled from USGS Map                             |
| US 2   | Upland Monitoring                   | 4568899   | 552067   | Scaled from USGS Map                             |
| US 3   | Upland Monitoring                   | 4569515   | 546341   | Scaled from USGS Map                             |
| US 4   | Upland Monitoring                   | 4569208   | 550557   | Scaled from USGS Map                             |
| WS 1   | Riparian Grazing Impact / Fisheries | 4570223   | 546627   |  |
| WS 2   | Riparian Grazing Impact / Fisheries | 4569036   | 545867   |  |
| WS 3   | Riparian Grazing Impact / Fisheries | 4567422   | 545916   |  |
| WS 4   | Riparian Grazing Impact / Fisheries | 4566088   | 545210   |  |
| WS 5   | Riparian Grazing Impact / Fisheries | 4564920   | 544896   |  |
| WS 6   | Riparian Grazing Impact             | 4564998   | 546493   |  |
| WS 7   | Riparian Grazing Impact             | 4562892   | 544738   |  |
| WS 8   | Riparian Grazing Impact             | 4562542   | 542890   |  |

# Figure 1



**Proposed Mitigation Area**  
 Private 9,915 Acres  
 Public 2,838 Acres  
 Total 12,900 Acres

