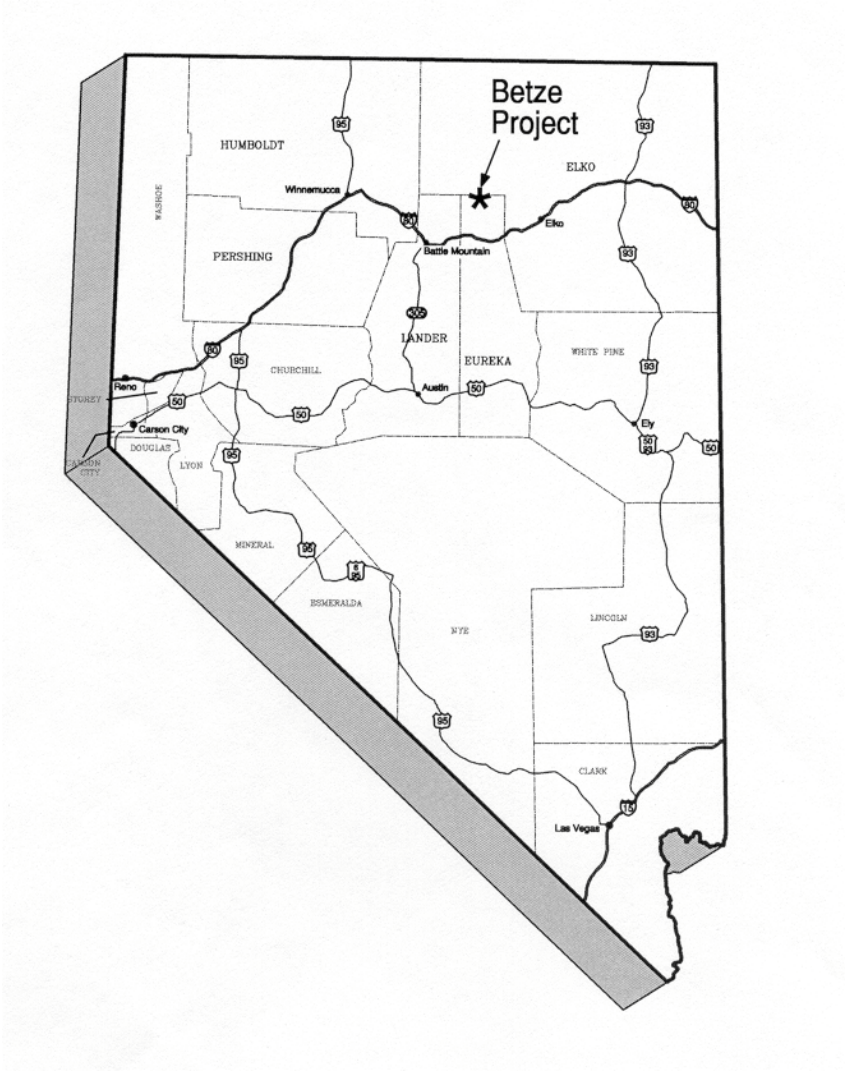
United States Department of the Interior
Bureau of Land Management

Elko Field Office
Elko, Nevada

January 2003

Final Supplemental Environmental Impact Statement Betze Project

Barrick Goldstrike Mines Inc.



BLM MISSION STATEMENT

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United States Department of the Interior
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Elko, Nevada 89801-4611
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In Reply Refer To:
1793.3/3809
NVN-070708

January 31, 2003

Dear Reader:

Enclosed for your review is the Final Supplemental Environmental Impact Statement (SEIS) for Barrick Goldstrike Mines Inc.'s Betze Project. The SEIS evaluates the environmental effects of Barrick's ongoing water management operations based on information collected since the original Betze Project Final EIS and Record of Decision (ROD) were issued in 1991.

This Final SEIS has been prepared in an abbreviated format and must be used in conjunction with the Draft SEIS issued in September 2000. The Draft and Final SEIS constitute the complete SEIS. The Final SEIS includes responses to comments received during the public review period on the Draft SEIS and revisions to the Draft SEIS. The Final SEIS also contains a comprehensive mitigation plan committed to by Barrick to eliminate or reduce both the predicted direct environmental impacts from Barrick's dewatering operations and the predicted cumulative impacts from Barrick's dewatering operations and other dewatering operations on the Carlin Trend. In addition, the Final SEIS incorporates the Upper Willow Creek Habitat Enhancement Plan to provide for mitigation in advance of potential environmental impacts from dewatering operations.

Following a 30-day public review period, a ROD will be published. The decision reached in the ROD is subject to appeal to the Interior Board of Land Appeals. The 30-day appeal period starts with the publication of the ROD, and implementation of the Plan of Operations will not begin until the ROD has been issued.

Your interest in the management of public lands is appreciated. If you have any questions, please contact Kirk Laird, SEIS Coordinator, at the Bureau of Land Management, Elko Field Office, 3900 Idaho Street, Elko, NV 89801.

Sincerely,

Helen Hankins

Helen Hankins
Field Manager

FINAL

SUPPLEMENTAL ENVIRONMENTAL IMPACT STATEMENT (SEIS)
BARRICK GOLDSTRIKE MINES INC.
BETZE PROJECT

LEAD AGENCY:

U.S. Department of the Interior
Bureau of Land Management
Elko Field Office

COOPERATING AGENCIES:

U.S. Fish and Wildlife Service
Nevada Division of Wildlife

PROJECT LOCATION:

Elko and Eureka Counties, Nevada

COMMENTS ON THIS FINAL SEIS SHOULD BE DIRECTED TO:

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DATE DRAFT SEIS FILED WITH EPA: September 15, 2000

DATE FINAL SEIS FILED WITH EPA: January 31, 2003

ABSTRACT

Following issuance of the Final Environmental Impact Statement (EIS) and Record of Decision for the Betze Project in 1991, Barrick's implementation of ground water pumping, water management operations, and monitoring provided new information regarding pumping requirements and potential impacts of the operations. In addition, Barrick has built a water treatment plant and a buried pipeline and open conveyance system to discharge up to 70,000 gallons per minute to the Humboldt River under a National Pollutant Discharge Elimination System Permit issued in 1996. Lastly, in 1997 Barrick submitted an application to the Bureau of Land Management (BLM) to amend an existing right-of-way to allow installation of a second pipeline across public domain. The Draft Supplemental EIS analyzed the potential impacts of Barrick's existing and future water management operations and the proposed buried pipeline, which was the Proposed Action. Since the preparation of the Draft Supplemental EIS, Barrick has withdrawn its application to amend the existing right-of-way for a second water pipeline across public lands in Boulder Valley; therefore, the sections of the Draft Supplemental EIS addressing this water pipeline are no longer relevant.

This Final Supplemental EIS is an abbreviated document. This document contains revisions to the Draft Supplemental EIS and the responses to comments received by the BLM during the public comment period on the Draft Supplemental EIS. Appendix A contains the Mitigation Plan developed by the BLM and Barrick. Appendix B contains Barrick's proposed Upper Willow Creek Habitat Enhancement Plan. The U.S. Fish and Wildlife Service's memorandum of concurrence relative to Endangered Species Act Section 7 consultation is provided in Appendix C. Appendix D contains documentation relating to Native American consultation.

Responsible Official for FSEIS:

Helen Hankins
Manager, Elko Field Office

SUMMARY

Barrick Goldstrike Mines Inc. (Barrick) owns and operates the Goldstrike property, which is located in Elko and Eureka counties, Nevada, approximately 23 miles northwest of Carlin, Nevada. In 1989, Barrick submitted a Plan of Operations (Plan) to the Bureau of Land Management (BLM) for the Betze Project. As provided by the National Environmental Policy Act of 1969 as amended (NEPA), BLM prepared an environmental impact statement (EIS) with respect to Barrick's proposed Plan. The Final EIS (BLM 1991b) and Record of Decision (ROD) (BLM 1991d) for the Betze Project were issued on June 10, 1991. The Final EIS included a description of the environmental impacts projected to result from ground water pumping to be conducted by Barrick to lower the local ground water elevations below the proposed Betze mining operations.

In 1992, Barrick proposed to develop the Meikle Mine, an underground deposit located approximately 1 mile north of the Betze-Post Pit; the BLM prepared an environmental assessment (EA) for the Meikle Mine in May 1993 (BLM 1993a). The EA analyzed the potential impacts of dewatering this underground operation to the operation's ultimate depth of 3,600 feet above mean sea level (amsl). In 1994, the BLM prepared a Biological Assessment (BA) of Barrick's Dewatering Operations (BLM 1994b), including both the Betze-Post Pit and the Meikle Mine. The BA analyzed dewatering to an elevation of 4160 feet amsl. Also in 1994, the U.S. Fish and Wildlife Service (USFWS) prepared a Biological Opinion (BO) (USFWS 1994), which concluded that Barrick's dewatering operations to an elevation of 4160 feet would not likely jeopardize the Lahontan cutthroat trout (LCT). The BLM ultimately approved the Meikle Mine Plan of Operations in the Finding of No Significant Impact and Decision Record (BLM 1994c).

Barrick has conducted ground water modeling and implemented ground water monitoring programs in association with all of these analyses. The monitoring data collected since 1989 have been used to continually update and refine Barrick's ground water model as the basis for the prediction of the depth and areal extent of the cone of depression associated with mine dewatering and water management activities. The results of the data collection programs and ground water analyses are described in this Supplemental EIS. A description of Barrick's ground water model is included in Appendix D ***of the Draft Supplemental EIS***.

Supplemental EIS

Since the Betze EIS was issued, Barrick's implementation of the ground water pumping and management operations and its monitoring of ground water elevations have provided new information regarding the pumping requirements and potential environmental impacts of Barrick's ground water pumping operations at the Goldstrike Mine, which includes the Betze-Post Pit and the underground Meikle Mine. Also, in July 1996 the Nevada Division of Environmental Protection (NDEP) issued a National Pollutant Discharge Elimination System (NPDES) Permit to Barrick authorizing the discharge of up to 70,000 gallons of water per minute (gpm) to the Humboldt River. Barrick completed construction of a treatment plant and conveyance system in August 1997 and discharged water to the Humboldt River from September 1997 through February 1999. In May 1997, Barrick and Elko Land and Livestock Company (ELLCO) submitted an application to the BLM to amend an existing right-of-way ***(ROW)*** to authorize the installation of an additional buried pipeline across public domain land administered by the BLM as part of the existing water conveyance system. ***ELLCO and Barrick subsequently have withdrawn their application to amend the existing ROW for this water pipeline.***

The BLM prepared a Cumulative Impact Analysis (CIA) report (BLM 2000b) to address potential cumulative dewatering and discharge impacts associated with Barrick's Betze Project and Newmont Gold Company's (Newmont's) proposed South Operations Area Project Amendment and Leeville Project. The results of this analysis are summarized in Chapter 5.0 of ***the Supplemental EIS***. The CIA resulted in the implementation of mitigation measures to address the cumulative impacts of the ground water pumping and water management operations of these three mines.

This ***Final Supplemental EIS*** evaluates the environmental effects of Barrick's ongoing Goldstrike Mine water management operations.

Summary of Impacts

Geology

Two sinkholes have been documented to-date in the area affected by dewatering at the Goldstrike Mine: (1) a sinkhole approximately 3.5 miles northwest of the center of the Betze-Post Pit, and (2) a sinkhole approximately 2.8 miles west of the center of the Betze-Post Pit. In addition, an open fracture was discovered in the bottom of the south-central portion of TS Ranch Reservoir in 1990. This fracture presumably existed prior to reservoir development; however, piping and/or dissolution of the fracture-filling material occurred after the reservoir was used to store water.

Available information on the geology in the region and prediction of ground water drawdown were used to identify areas that potentially could be susceptible to sinkhole development. These areas include the large area underlain by carbonate rock located between the Betze-Post Pit and the Gold Quarry Pit, and the area northwest of the Betze-Post Pit. The development of sinkholes can pose a hazard to livestock, humans, and wildlife. If a sinkhole develops in an area containing buildings, roads, or other structures, damage to these structures may result.

Water Resources and Geochemistry

Impacts from Mine Dewatering and Localized Water Management Activities

As of the end of 1998, over 1,500 feet of drawdown of the water table had occurred in the vicinity of the Goldstrike Mine. The area with at least 10 feet of measured drawdown extends approximately 15 miles northwest-southeast and 5 miles northeast-southwest.

Barrick began delivering water to the TS Ranch Reservoir in May 1990. A large percentage of the water that flowed into the reservoir seeped through a fracture in the floor of the reservoir and flowed into the rhyolite formation. The seepage resulted in mounding (increased ground water elevations) in the rhyolite and alluvial aquifers in upper Boulder Valley. In 1992 and 1993, seepage from the reservoir resulted in three new springs (Sand Dune, Knob, and Green springs) in the northeastern portion of Boulder Valley. Barrick continued to infiltrate water into the fracture until early 1996 when ground water mounding and discharge from the springs in Boulder Valley reached a maximum with the combined flows reaching a peak of approximately 30,000 to 35,000 gpm. At the end of 1998, water levels in the Boulder Valley region had risen approximately 70 feet in the Sheep Creek Range and 50 feet in the alluvium in upper Boulder Valley. From April 1996 through early 1999, water management activities were modified to include discharge to the Humboldt River such that excess mine water no longer seeped through the fracture. As a result, the flows in the springs diminished to approximately 5,000 gpm by the end of 1998; ground water mounding also diminished during this period. Beginning again in 1999 and under Barrick's current water management plans, excess water would be allowed to infiltrate into the rhyolite formation in Boulder Valley through the end of mining. However, ground water levels are carefully monitored to keep spring discharges to a minimum. Under this scenario, the area affected by ground water mounding would persist through the end of mining and would gradually dissipate in the postmining period.

A numerical model was used to estimate the areal extent, magnitude, and timing of drawdown from the Goldstrike Mine through the end of mining and into the postmining period. The extent of the 10-foot drawdown contour would expand after mining ceases and would reach a maximum extent approximately 100 years postmining. At 100 years, the 10-foot drawdown contour is predicted to extend approximately 11 miles northwest, 15 miles southeast, and up to 12 miles southwest from the center of the Betze-Post Pit. The expansion of the area of drawdown would result in part from continual long-term passive inflow of ground water to the pit.

As of the end of 1998, there were 14 identified spring sites located within the existing 10-foot drawdown contour; several of the monitored springs had either dried up or had reduced flow. These springs are located in Boulder Creek, Brush Creek, and upper Rodeo Creek in the vicinity of the Betze-Post Pit. Mine dewatering

activities have probably caused at least three of these monitored springs to dry up. It is possible that other springs in these areas, in addition to those currently included in the annual monitoring program, also have been affected by mine dewatering.

There are 67 identified spring sites located within the maximum model-predicted area having at least 10 feet of drawdown. Individual springs and perennial stream reaches are supported by discharge from either the regional ground water aquifer system or from more isolated or perched aquifers residing above the regional ground water system. Only those perennial sources that are hydraulically connected to the regional ground water system could potentially be impacted by mine-induced drawdown. Based on available information, significant impacts to springs and perennial waters located on the eastern slope of the Tuscarora Mountains are generally not anticipated. Impacts are likely at local spring and stream reaches located east of the Betze-Post Pit on the western slope of the Tuscarora Mountains as the magnitude and area of drawdown expands in the future. In this region, springs and perennial streams at higher elevations (generally above 6,000 feet) are less likely to be affected than those at lower elevations. Current drawdown patterns and projected drawdown indicate that the area of drawdown is expanding in a northwest direction toward the upper Antelope Creek and Squaw Creek areas. If drawdown extends to this area in the future, some springs and perennial stream reaches, particularly in upper Antelope Creek (below the confluence with Squaw Creek) and lower Squaw Creek, could be affected.

A potential reduction in the baseflow of perennial springs and streams could affect surface water rights within the drawdown area. There are 19 surface water rights that potentially could be impacted by dewatering-induced drawdown. Of these, seven are used for irrigation, seven for stock watering, three for mining and milling, and two for wildlife. The actual potential for impacts to individual water rights would depend on the site-specific hydrologic conditions that control surface water discharge.

The results of hydrologic modeling indicate that water levels in 64 wells potentially could be lowered by 10 to over 100 feet as a result of Barrick's ground water pumping. Specific impacts to individual wells would depend on the well completion, including pump setting, depth, yield, and premining static and pumping water levels. Lowering the water levels in these water supply wells potentially could reduce yield, and/or increase pumping cost, or if the water level were lowered below the pump setting or below the bottom of the well, the well would become unusable.

No detectable changes in ground water quality have been observed in monitoring wells located in areas of Boulder Valley where water management activities have caused ground water mounding. Based on the monitoring to-date, future infiltration activities in Boulder Valley associated with the mine water management activities are not expected to affect water quality in the alluvial and rhyolite ground water system.

Once dewatering operations cease, a pit lake would begin to develop in the Betze-Post Pit. The pit lake is predicted to attain steady state (or equilibrium) conditions at greater than 200 years after mining. After the pit lake level reaches equilibrium, the numerical ground water model predicts that because of evaporation, a long-term cone of drawdown would persist for the foreseeable future. Based on the hydrologic model, the pit lake is predicted to behave as a long-term hydraulic sink; therefore, outflow from the pit lake to the surrounding ground water system is not expected. In the long term, the pit lake water is predicted to be near neutral pH. The predicted concentrations of total dissolved solids and sulfate and concentrations of antimony are predicted to exceed Nevada drinking water standards. Total dissolved solids and sulfate concentrations would gradually increase over time as a result of evapoconcentration of the lake waters. However, since the pit lake is not expected to discharge to either surface or ground water, the pit lake is not expected to degrade surrounding waters of the state.

Impacts to the Humboldt River

Discharges to the Humboldt River from the Goldstrike Mine were initiated in September 1997 and continued through February 1999. The maximum recorded discharge rate was approximately 57,000 gpm (127 cubic feet per

second) during October and November 1997; much smaller discharges occurred due to irrigation during the growing season of 1998. Discharges to the river varied between approximately 22,000 and 50,000 gpm (50 to 110 cubic feet per second) in late 1998 and early 1999 before ceasing altogether.

During the period of Goldstrike Mine discharges, Humboldt River flows were within the natural range of historic flows and mimicked the high snowmelt-derived flows of the 2 years prior to the mine discharges. Since there is a substantial reduction in river channel flows in the downstream direction, modifications to flow conditions were less at Comus and farther downstream than they were at Battle Mountain. Water levels in the river during the high-flow seasons were not affected, and low-flow levels increased by approximately 1 foot. Changes to channel geometry likely were limited to erosion and sedimentation in the low-flow section of the river; these effects were removed or substantially mitigated by much higher flows in the river during spring runoff. Lateral channel migration is not known to have been directly caused by mine discharges. The reaches immediately upstream and downstream of the Goldstrike Mine outfall have undergone changes in position historically, and natural channel modifications are difficult to separate from potential discharge impacts to-date. If future Goldstrike Mine discharges occur, computer simulations indicate that projected impacts would be similar in their limited extent and magnitude to the impacts to-date. Major changes to water uses or water rights for the Humboldt River have not occurred to-date and are not expected from future Goldstrike Mine discharges, if they occur. Based on projected ground water drawdown at the end of mining and 100 years postmining, baseflow impacts to the Humboldt River directly from Goldstrike Mine dewatering are not anticipated.

It is conceivable that if Barrick discharges to the river in wet years, a very small portion of the annual evaporation from the Humboldt Sink may be accounted for by the discharge contributions. As a result, temporarily greater water depths and extent are possible at the sink; in high water years, this additional water could contribute to spillover into the Carson Sink. Impacts from these conditions would not be expected to be frequent or especially detrimental since they have occurred historically, because there are substantial withdrawals from the river upstream of the sinks.

Barrick's outfall discharges recorded between September 1997 and February 1999 have been within permit limitations. Provided that the mine discharges are in accordance with the permit limitations, impacts to water quality in the river are not anticipated. On an average annual basis, the mine discharge represents a load increase in total dissolved solids, boron, copper, fluoride, and zinc compared with Humboldt River premine conditions. The loads from continued Goldstrike Mine discharge would likely increase total dissolved solids, boron, and fluoride loads in the Humboldt Sink over the mine discharge period; however, the relative magnitudes of these potential increases do not appear to be substantial. Nevertheless, depending on concentrations in the Humboldt Sink, parameter solubilities, and other physical and biological factors, these increased loads to the sink potentially could increase concentrations in the sink wetlands.

Riparian Vegetation

Mine-induced drawdown from Barrick's dewatering could affect 137 acres of the 662 acres of riparian vegetation located within the 10-foot drawdown area. Of these, approximately 135 acres occur in Boulder and Bell creeks (Rock Creek Watershed), 1 acre occurs in Welches Creek (Rock Creek Watershed), and 1 acre associated with Soap Creek (Maggie Creek Watershed). Approximately 13 acres of wetland vegetation associated with isolated seeps and springs also could be affected. Therefore, a total of approximately 150 acres of riparian/wetland vegetation would potentially be affected by mine-induced drawdown.

Previous Goldstrike Mine discharges to the Humboldt River generally did not affect riparian vegetation since the flows were within the natural range of historic flows; minor fluctuations in the water level during this period likely had minimal effects on the extent of riparian and wetland vegetation along the river. Future discharges, if they occur, may affect riparian and wetland vegetation since channel configuration, depth,

and sinuosity may change as a result of the increased water level during low-flow periods.

Terrestrial Wildlife

Mine dewatering could reduce the amount and extent of surface water and associated riparian habitats of springs, seeps, and perennial stream reaches within the study area that are used by a variety of terrestrial wildlife species. Potential reduction or loss of available water could affect wildlife resources by: (1) a decrease in available water for consumption; (2) loss of breeding, foraging, and cover habitats; (3) reduction in regional carrying capacity; (4) displacement and loss of animals; (5) decrease in biological diversity; (6) possible genetic isolation; (7) reduction in prey availability; and (8) possible long-term impact to population numbers, depending upon the species and relative habitat quality. Incremental habitat loss could affect big game, upland game birds, waterfowl, shorebirds, raptors, songbirds, nongame mammals, reptiles, and amphibians. Ground water drawdown could affect 150 acres of riparian habitat and wetlands used by terrestrial wildlife species. Available water and associated riparian vegetation would be affected in mule deer summer and transitional ranges, resulting in reduced carrying capacity and displaced animals. Pronghorn summer and transitional ranges also would be affected. In addition, increased leaching of minerals and salts into the soils of Boulder Valley would occur as mine dewatering ceases, modifying the upland vegetation into a more salt-tolerant plant community. Over the long term the pit lake is predicted to have a near neutral pH. However, there is a small potential (5 percent probability) that the lake could be acidic during the early years with the pH gradually increasing over time to near neutral conditions. Long-term exposure to future pit lake water quality is not anticipated to cause acute impacts to wildlife, chronic impacts from reduced pH are unknown.

Discharges to the Humboldt River could result in a short-term increase in available water and support of riparian habitats. The support and development of additional backwater or slough areas would provide nesting, brooding, foraging, and resting habitat. Additional open water may occur in the winter period, which would provide increased foraging opportunities. Potential habitat loss (e.g., nesting or foraging areas) from seasonal flooding along the river during high-flow periods (spring and early summer) would be offset by the creation and enhancement of other wetland areas along the river corridor that currently do not receive sufficient water for optimal wildlife habitat. Increased flows into the Humboldt Sink would improve breeding, foraging, and resting opportunities for resident and migratory wildlife species in the short term.

Potential risks to wildlife from additional mine discharges and possible contaminant loading in the Humboldt Sink would likely be similar to those assessed for premining conditions. However, a number of variables exists that make it difficult to predict future conditions. These variables include the dynamic system of the sink, upstream water demands and fluctuating water levels, bioaccumulation factors of certain constituents of concern (e.g., boron, selenium, mercury), and a number of environmental factors.

Aquatic Resources

Goldstrike Mine dewatering could reduce water levels or flows in some springs and perennial reaches within the Boulder Creek and upper Antelope Creek drainages. Drawdown is not expected to affect flows in other streams. The effect of decreased perennial streamflows or water levels on aquatic resources would be a reduction of aquatic habitat that supports native fish species, periphyton, and macroinvertebrate communities. Habitat reductions would likely result in decreased numbers in these communities. If stream segments become dry as a result of reduced flows, aquatic habitat and associated biota would be eliminated. Potential changes in water quality as a result of flow reductions would not likely affect biotic communities, since biota are tolerant of fluctuating temperatures and other parameters.

The effects of flow increases on aquatic communities in the Humboldt River would include both beneficial and adverse impacts. Discharges to the river would result in a beneficial impact of increased habitat for fish, macroinvertebrates, and periphyton. However, the possible reduction of shallow pools and braided channels could adversely affect the development of young fish. Increased flows are not expected to affect fish

composition. Fish dispersal patterns are expected to be similar to present conditions. Overall, the effects of increased flows on water quality conditions, such as sediment levels, temperature, and metal concentrations, would be minor.

Threatened, Endangered, Candidate, and Sensitive Species

Mine dewatering could result in reduction of riparian habitats that may be used by the following terrestrial wildlife species: Preble's shrew, six sensitive bat species, bald eagle, golden eagle, Swainson's hawk, ferruginous hawk, northern goshawk, burrowing owl, sage grouse, white-faced ibis, black tern, and Nevada viceroy. The potential reduction in perennial flows or water levels in springs could reduce the amount of riparian and wetland habitats, which may be used by certain species for cover, foraging, breeding, or other biological requirements. The incremental loss of potential foraging areas would not be considered significant for Federally-listed species (i.e., the bald eagle), based on the incidental use by migrating and wintering eagles of the area potentially affected by the project.

Over the long term the pit lake is predicted to have a near neutral pH. However, there is a small potential (5 percent probability) that the lake could be acidic during the early years with the pH gradually increasing over time to near neutral conditions. Long-term exposure to future pit lake water quality by species, such as the bald eagle or bat species, would not cause acute effects from either increased metals or reduced water pH (5 to 6); potential chronic effects from reduced pH levels are more of an unknown. However, since it is expected that future aquatic communities would likely remain low and would not represent a substantial food source for avian or mammalian wildlife, the incidence of potential foraging in the future pit lake by species of special concern would be expected to be incidental and sporadic.

Discharges to the Humboldt River would result in a short-term increase in available water for many of the special status species identified for the study area. Increased flows in the Humboldt River could improve and enhance the riparian community, which could be used by these species for breeding, foraging, resting, and cover. Increased annual flows may result in a greater amount of open water areas during the winter season, which would increase available foraging areas for wintering bald eagles. The potential impacts to species occurring in the Humboldt Sink area from chemical constituents of concern would be the same as discussed for terrestrial wildlife.

The potential short- and long-term effects to special status species would parallel those discussed for general wildlife resources. Possible effects from increased water discharges to the Humboldt River and Humboldt Sink would be the same as discussed for terrestrial wildlife.

The potential effects of drawdown on aquatic species would be limited to springsnails. Water level reductions in springs located in upper Antelope Creek could decrease habitat for springsnails. Drawdown would not affect one known spring inhabited by springsnails in upper Willow Creek. Drawdown from the Goldstrike Mine is not predicted to affect flows in the Maggie Creek and Rock Creek subbasins, which support existing populations of the Lahontan cutthroat trout and potential habitat and existing populations of the California floater ***and the Columbia spotted frog***.

Grazing Management

Impacts that may occur as a result of ground water drawdown from Barrick's water management operations include reduced flow or complete cessation of flow in springs and other water sources. The long-term loss of water sources would result in the reduction or loss of permitted active grazing use within an allotment if alternative water sources are not present within the vicinity of the affected water sources or if lost water sources are not mitigated. The reduced flow or change in a water source from perennial to intermittent would result in a reduction in season of use, which also would affect permitted active grazing use. Drawdown impacts could be localized to water sources within one or several pastures within an allotment. The loss of the majority or all of the water sources within these pastures would likely affect livestock distribution, forage utilization, and grazing management operations.

Some of the water sources (i.e., water-related range improvements and natural perennial water sources) in the Twenty-five and T Lazy S allotments potentially could be affected by Goldstrike Mine drawdown. In the Twenty-five allotment, approximately 30 percent of the natural perennial water sources within the Boulder Creek pasture could potentially be affected by Goldstrike Mine ground water drawdown. Approximately 25 percent of the water related range improvements and approximately 10 percent of the natural perennial water sources in the T Lazy S allotment could be affected by Goldstrike Mine drawdown. The potential long-term loss of these water sources may result in the long-term loss of permitted active grazing use or reduced forage utilization.

During the period of mine dewatering discharge, slightly increased water levels within the Humboldt River floodplain would likely increase the areal extent of herbaceous wetlands immediately adjacent to the river channel. Forage production and the carrying capacity of these narrow areas also would likely increase temporarily. Discharge waters reaching the Humboldt and Carson sinks would not affect grazing management since livestock grazing is not allowed within these areas.

Socioeconomics

Barrick's mine dewatering and water management operations have provided water for approximately 8,000 additional acres of irrigated hay fields with resulting hay production. In the unlikely event that Barrick were to discharge mine dewatering water to the Humboldt River, there could be a minor increase in available irrigation water associated with additional storage in Rye Patch Reservoir. Mine-induced ground water drawdown from Barrick's dewatering could result in some reduction in water availability for cattle grazing and a slight reduction in hunting and fishing opportunities associated with a reduction in surface water resources.

Alternatives

As ELLCO and Barrick have withdrawn their ROW grant amendment application for a buried water pipeline, which was the Proposed Action addressed in the Draft Supplemental EIS, there is no longer a Proposed Action upon which the BLM will make a decision. Consequently, there are no alternatives to the Proposed Action considered in the Final Supplemental EIS. The Supplemental EIS evaluates the direct, indirect, and cumulative environmental impacts of Barrick's ongoing water management operations.

Impact Summary Table

Table S-1 summarizes the impacts and monitoring and mitigation measures associated with the:

- Betze Project, as analyzed in the Betze Project Final EIS (1991b) and the associated Record of Decision (BLM 1991d).
- Meikle Mine Development EA (BLM 1993a) and the associated Finding of No Significant Impact and Decision Record (BLM 1994c), and the Biological Assessment of Barrick's Dewatering Operations (BLM 1994b).
- Continued Goldstrike Mine dewatering and water management operations, including possible discharge to the Humboldt River, as analyzed in this Supplemental EIS.

The table enables the impacts and the associated monitoring/mitigation measures to be tracked between the Final EIS (BLM 1991b), the Meikle Mine EA (BLM 1993a), and this ***Final Supplemental EIS***.

The impact analysis in this ***Final Supplemental EIS*** reflects the monitoring programs and mitigation commitments specified in the Betze Project ROD (BLM 1991d). Additional monitoring and mitigation measures for this ***Supplemental EIS*** are associated mainly with the dewatering and water management activities. Where applicable, these additional monitoring and mitigation measures tier from relevant monitoring/mitigation identified in the Final EIS.

The Draft Supplemental EIS identified possible mitigation measures for the Betze Project. Comments on the Draft Supplemental EIS addressed some of the possible mitigation

measures and suggested additional possible measures. The BLM has considered the Draft Supplemental EIS comments and has engaged in discussions or consultation with the USFWS, Nevada Division of Wildlife, Native Americans, and Barrick to develop final mitigation for the Betze Project. The mitigation for the Betze Project Final Supplemental EIS comprises the Mitigation Plan included as Appendix A to this Final Supplemental EIS, and the Upper Willow Creek Habitat Enhancement Plan included as Appendix B to this Final Supplemental EIS. This mitigation was included in the Biological Assessment/Evaluation submitted to the USFWS as a part of the BLM's Section 7 consultation and is incorporated by reference into the USFWS concurrence memorandum (dated July 15, 2002), which is included in Appendix C of this Final Supplemental EIS.

Table S-1
Summary of Dewatering and Water Management Impacts and Monitoring/Mitigation

Betze Project EIS (1991)		Meikle Mine EA/BA (1994)		Betze Project Supplemental EIS	
Impacts	**Monitoring/Mitigation**	**Impacts**	**Monitoring/Mitigation**	**Impacts**	**Monitoring/ Mitigation**
GEOLOGY					
• No anticipated impact.	• None	• No anticipated impact.	• None	• Two sinkholes have formed in response to mine dewatering; areas underlain by carbonate rock located northwest and southeast of the Betze-Post Pit could be susceptible to future sinkhole development.	• Reporting of any suspected subsidence features to BLM. • Develop and implement site-specific remedial measures as approved by the BLM.
WATER RESOURCES AND GEOCHEMISTRY					
Dewatering and Drawdown					
• Dewatering expected to continue through 2000; target elevation 4,160 feet, with rates up to 29,300 gpm.	• NA	• Decision authorized continuation of dewatering through 2001; dewatering to the target elevation authorized by the Betze EIS.	• Significant modifications of the Plan of Operations for the Meikle Project affecting federal lands must be reviewed and approved by the BLM prior to implementation.	• Dewatering expected to continue until 2010; target elevation 3,576 feet, with rates up to 69,000 gpm.	• NA
• Drawdown: Area projected to experience ≥10 feet of drawdown would extend up to 6 miles from pit at end of mining (year 2000), and continue to expand (up to 10 miles from the pit) up to year 2030 and then start to contract.	• Monitoring ground water levels and water quality, and flow and water quality at surface water stations on a monthly basis; monitoring plan reviewed annually by the BLM to determine necessary changes. • Barrick would continue monitoring for a period extending up to 30 years after completion of mining. Monitoring after this period would be funded by a Long-Term Monitoring Fund.	• Area projected to experience >10 feet of drawdown would expand up to 17 miles approximately 30 years after mining (see Figure D-11) followed by recovery to within 45 feet approximately 100 years postmining.	• Expand monitoring network (surface and ground water) between the mine and any LCT habitat, in consultation with BLM and the Nevada State Engineer. • BLM may require additional monitoring as necessary to monitor impacts to LCT or other sensitive resources.[1] • Submittal of all monitoring reports to BLM, quarterly. • Barrick to install and operate reinjection wells, if necessary, to prevent adverse impacts to LCT waters.[1] • If no reasonable or prudent alternatives exist to mitigate impacts to endangered or threatened species, BLM may direct Barrick to cease mining.[1]	• Drawdown: Area projected to experience ≥10 feet of drawdown would extend up to 12 miles from pit at end of mining (year 2010), and continue to expand (up to 15 miles from pit) until 100 years postmining and then start to contract.	• ***Continue ground water monitoring program, which has been expanded since the Betze EIS.*** • ***See impacts to seeps and springs and streams below for monitoring and mitigation associated with ground-water-dependent resources.***

Table S-1 (Continued)

Betze Project EIS (1991)		Meikle Mine EA/BA (1994)		Betze Project Supplemental EIS	
Impacts	**Monitoring/Mitigation**	**Impacts**	**Monitoring/Mitigation**	**Impacts**	**Monitoring/ Mitigation**
Seeps, Springs, and Perennial Streams					
• Seeps and Springs: 10-foot drawdown contour projected to encompass 57 springs by end of mining (2000), and 111 seeps and springs by 2030; most of these were expected to show reduced flow or dry up (if hydraulically connected to the regional system).	• Monitoring of stream segments, seeps, and springs (annually), and some stream sites (monthly) and providing results to the BLM. • Establishment of Wetland Mitigation Fund ($660,000) available to the BLM for the protection and or enhancement of riparian and wetlands to mitigate drawdown impacts.	• Seeps and springs could be impacted from drawdown (number not estimated).	• None	• Seeps and Springs: At the end of 1998, several spring and seep sites showed reduced flow or dried up. The projected 10-foot drawdown contour is predicted to encompass 70 spring sites; 44 of these are located in areas where surface waters could be impacted, 26 are located in areas where impacts are less likely.	• ***Continue annual seep and spring monitoring program, which has been expanded since the Betze EIS, until 2030. After 2030, the Long-term Monitoring Fund would pay for monitoring; Barrick has added an additional $300,000 to this fund.*** • ***Improve up to 15 springs within 3-year period, in coordination with BLM and NDOW.***
• Streams: The lower perennial reaches of Brush, Bell, and Boulder creeks were expected to have reduced flows.	• Provide funds for the acquisition and maintenance of alternative water sources (e.g., guzzlers, cisterns, purchase of water rights, etc.) (maximum of $50,000).	• Additional impacts to perennial flows from drawdown not identified.	• None	• Streams: Similar to the original EIS, except that drawdown could reduce flows in Antelope Creek and tributaries .	• ***Continue surface water monitoring program, with the addition of station ANT-1a on Antelope Creek.*** • ***Riparian habitat mitigation associated with impacts to streams is provided in the Upper Willow Creek Habitat Enhancement Plan.***
Water Rights					
• Reduction in ground water levels in ground water supply wells during dewatering and recovery.	• If monitoring demonstrates impairment of water rights, the Authorizing Officer may, in consultation with the Nevada State Engineer, require Barrick to provide alternative water sources or assistance to mitigate or eliminate such impacts.	• Impacts to water rights associated with drawdown not identified.	• None	• Additional water rights (surface and ground water) could be affected by mine-induced drawdown.	• Barrick would continue to monitor surface and ground water to determine the extent of drawdown as required by the State Engineer. Adverse impacts to water rights (surface water or ground water) would be mitigated as required by the Nevada Division of Water Resources.
Ground Water Mounding					
• Mounding would occur in Boulder Valley due to irrigation infiltration.	• None	• Mounding predicted by modeling; impacts associated with ground water mounding not identified.	• None.	• Ground water mounding from infiltration of excess mine dewatering water has been more extensive than originally estimated; mounding reached a maximum in 1996 and is predicted to gradually subside in the future.	• None

Table S-1 (Continued)

Betze Project EIS (1991)		Meikle Mine EA/BA (1994)		Betze Project Supplemental EIS	
Impacts	**Monitoring/Mitigation**	**Impacts**	**Monitoring/Mitigation**	**Impacts**	**Monitoring/ Mitigation**
Pit Lake					
• Lake predicted to have neutral pH; potential for elevated arsenic levels.	• Quarterly monitoring of pit water quality for arsenic and other identified constituents of concern until at least 2030,and thereafter if necessary; monitoring activities after 2030 would be funded by the Long-Term Monitoring Fund. • Funding of research of issues related to postmining pit water quality at $50,000 per year for 10 years.	• No additional evaluation.	• None	• Updated predictions indicate lake is likely to have near-neutral pH with antimony concentrations ranging from 0.04-0.06 mg/L; TDS and sulfate are predicted to gradually increase over time. Slight possibility lake may be acidic in early (up to 26) years with associated elevated metals concentrations. • Pit lake predicted to act as a long-term hydraulic sink; outflow to ground water is not expected. Arsenic concentrations predicted to be at or below detection limits.	• None
Humboldt River Flow					
• No anticipated impacts.	• Barrick is providing $1,000,000 for USGS Humboldt River study.	• No anticipated impact; direct discharge not proposed.	• None	• Excess mine dewatering water was discharged to the Humboldt River from September 1997 through February 1999 at rates ranging from 22,000 to 50,000 gpm. Flows measured in the river were within historic ranges during the discharge period. • Barrick's current plans indicate that future discharges are unlikely; however, Barrick is permitted to discharge in the future up to 70,000 gpm.	• None • Monitoring of the river channel in the vicinity of the discharge outfall, prior to, during, and after the discharge period, ***as required by Barrick's NPDES permit.*** • If impacts are identified, Barrick would be responsible for mitigating these impacts with approval from applicable Federal and state agencies.

Table S-1 (Continued)

Betze Project EIS (1991)		Meikle Mine EA/BA (1994)		Betze Project Supplemental EIS	
Impacts	**Monitoring/Mitigation**	**Impacts**	**Monitoring/Mitigation**	**Impacts**	**Monitoring/ Mitigation**
Humboldt River Water Quality					
• No anticipated impact.	• None	• No anticipated impact; direct discharge not proposed.	• None	• Discharges were within permit limitations; discharges would likely result in a relatively small incremental increase in TDS, arsenic, boron, and fluoride loads in the Humboldt Sink.	• ***Contribute $25,000 to USFWS for biological monitoring during years with Barrick discharge to the Humboldt River.***
VEGETATION (INCLUDING RIPARIAN)					
• Dewatering activities could potentially affect up to 330 acres of riparian vegetation.	• Provide funds for protection and enhancement of riparian and wetland vegetation (maximum contribution of $660,000).	• No dewatering impacts identified.	• None	• Ground water drawdown could affect 136 acres of riparian vegetation in the Boulder Creek drainage and 1 acre in the Maggie Creek drainage. In addition, ground water could affect 13 acres of wetland vegetation associated with isolated seeps and springs.	• ***Improvement of 635 acres of riparian habitat and associated uplands as part of Upper Willow Creek Habitat Enhancement Plan*** (also being implemented for cumulative effects mitigation).
	• Provide funds for post-dewatering revegetation of riparian and wetlands with seedings of container plants (maximum of $40,000).			• Approximately 13 acres of wetlands associated with 44 seeps and springs could be affected by flow reductions.	• ***Improve up to 15 springs within 3-year period, in coordination with BLM and NDOW.*** • ***Riparian habitat mitigation associated with impacts to streams is provided in the Upper Willow Creek Habitat Enhancement Plan.***
• Dewatering discharges could increase the amount of riparian vegetation in the irrigation area and an unnamed drainage.	• Monitor riparian and wetlands until at least 2030. • Provide funds for the acquisition and maintenance of alternative water sources (e.g., guzzlers, cisterns, purchase of water rights, etc.) (maximum of $50,000).			• Increased discharge to Humboldt River could result in additional support of riparian vegetation and short-term expansion of riparian community.	• None

Table S-1 (Continued)

Betze Project EIS (1991)		Meikle Mine EA/BA (1994)		Betze Project Supplemental EIS	
Impacts	**Monitoring/Mitigation**	**Impacts**	**Monitoring/Mitigation**	**Impacts**	**Monitoring/ Mitigation**
TERRESTRIAL WILDLIFE					
Dewatering and Drawdown					
				• Minor restrictions to small animal movement from water conveyance canal.	• None
• Dewatering could result in reduction or loss of available surface water for wildlife use in an estimated 111 seeps and springs by 2030.	• Monitor springs, seeps, riparian areas, and wetlands until at least 2030 (up to $250,000).	• Continued availability of water at the TS Ranch Reservoir for wildlife use.	• None	• Approximately 44 springs, and associated wildlife habitat, are located in areas where surface waters could be affected in the long term.	• None
• Dewatering could result in reduction in available water in the lower perennial reaches of Brush, Bell, and Boulder creeks.	• Variety of monitoring points along perennial drainages.			• Potential long-term impacts to perennial stream reaches and associated wildlife would be similar to the Betze FEIS; however drawdown could reduce flows in Antelope Creek and its tributaries.	• ***Improve 635 acres of riparian habitat and associated uplands as part of Upper Willow Creek Habitat Enhancement Plan (also being implemented for cumulative effects mitigation).***
• Dewatering activities could potentially affect up to 330 acres of riparian habitat.	• Fund protection and enhancement of riparian and wetlands areas (maximum contributed $660,000).			• Ground water drawdown could potentially affect 136 acres of riparian habitat in the Boulder Creek drainage and 1 acre in the Maggie Creek drainage.	• ***Improve 635 acres of riparian habitat and associated uplands as part of Upper Willow Creek Habitat Enhancement Plan, which would provide off-site habitat enhancement for terrestrial wildlife species*** (also being implemented for cumulative effects mitigation).
• Overall impacts to terrestrial wildlife resources from ground water drawdown activities could include the overall long-term reduction in available surface water; riparian and mesic vegetation; wetland areas; possible loss or reduction in cover, breeding sites, and foraging areas; animal displacement and incremental habitat fragmentation; and possible reduction in the associated habitat carrying capacity of affected areas.	• Fund post-dewatering revegetation of riparian and wetlands with seedlings or container plants (maximum of $40,000). • Fund the acquisition and maintenance of alternative water sources (guzzlers, cisterns, etc.) (up to $50,000). May include (but not be limited to) purchase of water rights at off-site locations or acquisition of wildlife easements to water sources.			• Ground water drawdown could affect 13 acres of wetland habitat and wildlife associated with perennial reaches and 44 seeps and springs. • Reduction in mesic areas. • Possible decreased riparian plant vigor or loss of vegetative cover. • Possible reduction or loss of cover, breeding sites, and foraging areas.	• ***Improve up to 15 springs within 3-year period, in coordination with BLM and NDOW.*** • ***Improve overall habitat conditions as part of Upper Willow Creek Habitat Enhancement Plan (also being implemented for cumulative effects mitigation).***

Table S-1 (Continued)

Betze Project EIS (1991)		Meikle Mine EA/BA (1994)		Betze Project Supplemental EIS	
Impacts	**Monitoring/Mitigation**	**Impacts**	**Monitoring/Mitigation**	**Impacts**	**Monitoring/ Mitigation**
	• Long-term Monitoring and Mitigation Fund of $1,000,000 for review, monitoring, and mitigation of effects not specifically identified in EIS and not covered by reclamation plan.			• Possible increases in surface water temperature. • Reduced carrying capacity in habitats affected by loss of available water or riparian vegetation. • Possible reduction in certain animal populations that depend on affected springs, wetlands, or stream reaches. • Reduction in overall biodiversity. • Animal displacement and incremental habitat fragmentation. • Possible genetic isolation of localized, less mobile species dependent on affected riparian sites. • Reduction in available water, riparian habitats, mesic areas, and potential nesting and brooding habitats for upland game birds.	
• Potential increase in mule deer mortalities from shifts in mule deer migration patterns.	• Fund mule deer habitat improvements, in consultation with the BLM and NDOW (maximum contribution $125,000). • Funds for the acquisition and maintenance of alternative sources of water (e.g., guzzlers cisterns, purchase of water rights, etc.) (maximum contribution of $50,000).			• Reduction or loss of water in mule deer summer and transitional ranges, resulting in reduced carrying capacity and animal displacement. • Reduction or loss of water in pronghorn summer and transitional ranges, resulting in reduced carrying capacity and animal displacement.	• Improve overall habitat conditions ***as part of Upper Willow Creek Habitat Enhancement Plan*** (also being implemented for cumulative effects mitigation).
• Potential loss of raptor breeding habitat (e.g., red-tailed hawk), based on habitat loss and reduction of prey abundance.	• Monitoring and mitigation of riparian habitats, wetlands, and perennial streams, as discussed above.			• Potential reduction in prey base for predators, such as raptors, from reduced water levels and riparian habitats.	• None

Table S-1 (Continued)

Betze Project EIS (1991)		Meikle Mine EA/BA (1994)		Betze Project Supplemental EIS	
Impacts	**Monitoring/Mitigation**	**Impacts**	**Monitoring/Mitigation**	**Impacts**	**Monitoring/ Mitigation**
• No anticipated impacts.	• None			• Gradual decrease in shorebirds and waterfowl in Boulder Valley, as surface water levels return to pre-mining levels and habitats return to upland communities.	• None
• No anticipated impacts.	• None			• As mine dewatering ends and soils dry in Boulder Valley, increased leaching of minerals and salts into the soil surface and subsurface layers, modifying associated plant communities.	• None
• Discharge of water into the unnamed drainage that flows into the TS Ranch Reservoir could change the amount, character, and duration of wildlife habitat along the unnamed drainage, around the reservoir, and in irrigated areas in Boulder Valley.	• Monitoring and mitigation of riparian habitats, wetlands, and perennial streams. • Monitor creek channels and mitigate with channel armoring, as necessary.			• NA	• NA
Pit Lake					
• Lake predicted to have neutral pH; potential for elevated arsenic levels.	• Monitor post-mining pit lake water quality quarterly until at least 2030. • Fund research on pit lake water quality ($50,000/year up to 10 years).	• NA	• NA	• Slight potential for short-term chronic impacts due to low pH.	• ***Continue to monitor post-mining pit lake water quality quarterly until at least 2030.***
Humboldt River Flow					
		• NA	• NA	• Increased flows in Humboldt River would result in improved maintenance and establishment of riparian vegetation in the short term. • Increased river flows could improve water quality and quantity and riparian habitat for wildlife species. • Increased river flows could result in more open water during low-flow periods.	• None

Table S-1 (Continued)

Betze Project EIS (1991)		Meikle Mine EA/BA (1994)		Betze Project Supplemental EIS	
Impacts	**Monitoring/Mitigation**	**Impacts**	**Monitoring/Mitigation**	**Impacts**	**Monitoring/ Mitigation**
				• Greater flows and water depths in the river and Humboldt Sink could limit use by breeding and foraging individuals, although other areas should become established. • Increased flows in the Humboldt Sink would provide additional breeding, foraging, and resting areas for waterfowl and shorebirds. • Increased flows in the Humboldt Sink would increase relative prey availability for area predators.	
Humboldt River Water Quality					
		• NA	• NA	• Given existing data, additional mine discharges would not likely pose additional risks to wildlife in the Humboldt Sink beyond premining conditions.	• ***Contribute $25,000 to USFWS for biological monitoring during years with Barrick discharge to the Humboldt River.***
AQUATIC RESOURCES					
Dewatering and Drawdown					
• Dewatering activities would reduce habitat for aquatic biota in Boulder Creek drainage.	• None	• No dewatering impacts identified.	• Barrick shall prevent the introduction of nonnative aquatic species into TS Ranch Reservoir and other water bodies subject to their ownership or control.	• Dewatering activities could reduce habitat for native fish and other aquatic biota in Boulder Creek and upper Antelope Creek drainages.	• Continued monitoring of flows in perennial reaches of Boulder Creek and upper Antelope Creek drainages ***with the addition of station ANT-1a on Antelope Creek***. ▪ Off-site enhancement involving improvements in land use practices in the Squaw Valley Allotmont ***as part of the Upper Willow Creek Habitat Enhancement Plan*** (also being implemented for cumulative effects mitigation).
Humboldt River Flow					
		• NA	• NA	• Dewatering discharges into Humboldt River would increase habitat for fish and other aquatic biota.	• None

Table S-1 (Continued)

Betze Project EIS (1991)		Meikle Mine EA/BA (1994)		Betze Project Supplemental EIS	
Impacts	**Monitoring/Mitigation**	**Impacts**	**Monitoring/Mitigation**	**Impacts**	**Monitoring/ Mitigation**
TERRESTRIAL SPECIAL STATUS SPECIES					
Dewatering and Drawdown					
• Potential impacts to species associated with water sources and riparian or wetland vegetation could be affected by loss of seeps, springs, and perennial stream reaches.	• Monitor springs, seeps, riparian areas, and wetlands until at least 2030 (up to $250,000). • Variety of monitoring points along perennial drainages. • Monitor creek channels and mitigate with channel armoring, as necessary. • Fund protection and enhancement of riparian and wetlands areas (maximum contributed $660,000). • Fund post-dewatering revegetation of riparian and wetlands with seedlings or container plants (maximum of $40,000). • Fund the acquisition and maintenance of alternative water sources (guzzlers, cisterns, etc.) (up to $50,000). May include (but not limited to) purchase of water rights at off-site locations or acquisition of wildlife easements to water sources. • Long-term mitigation funds of $1,000,000 for review, monitoring, and mitigation of effects not specifically identified in EIS and not covered by reclamation plan.	• No dewatering impacts on terrestrial special status species were identified.	• Additional mitigation could be implemented for terrestrial species associated with riparian areas and streams if a review of ground water data indicates potential effects on surface flows.	• Potential impacts to special status species from incremental loss of available surface water, riparian vegetation, or wetlands.	• ***Continue to monitor seeps, springs, riparian areas, and wetlands until 2030. After 2030, the Long-term Monitoring Fund would pay for monitoring; Barrick has added an additional $300,000 to this fund.*** • ***Improve up to 15 springs within 3-year period, in coordination with BLM and NDOW.*** • Improve overall habitat conditions for special status species that utilize riparian communities and aquatic systems ***resulting from the Upper Willow Creek Habitat Enhancement Plan*** (also being implemented for cumulative effects mitigation).
Pit Lake					
• See Terrestrial Wildlife.	• See Terrestrial Wildlife.			• Note: Potential impacts to wildlife from pit lake water quality would be the same for all species that use these areas.	• See Terrestrial Wildlife.

Table S-1 (Continued)

Betze Project EIS (1991)		Meikle Mine EA/BA (1994)		Betze Project Supplemental EIS	
Impacts	**Monitoring/Mitigation**	**Impacts**	**Monitoring/Mitigation**	**Impacts**	**Monitoring/ Mitigation**
Humboldt River Flow					
• See Terrestrial Wildlife.	• See Terrestrial Wildlife.			• Note: Increased flows along the Humboldt River would result in short-term increase in water and riparian vegetation.	• None
Humboldt River Water Quality					
• See Terrestrial Wildlife.	• See Terrestrial Wildlife.			• Note: Potential impacts to wildlife from increased loading of metals in Humboldt Sink would be the same for all species that use these areas.	• ***Contribute $25,000 to USFWS for biological monitoring during years with Barrick discharge to the Humboldt River.***
Preble's Shrew (if present)					
• See general discussion for Terrestrial Special Status Species above.	• See general discussion for Terrestrial Special Status Species above.			• Long-term reduction in potential habitat. Short-term increase in potential habitat along Humboldt River. Potential exposure to constituents of concern at Humboldt Sink.	• ***Improve up to 15 springs within 3-year period, in coordination with BLM and NDOW.*** • ***Improve overall habitat conditions as part of Upper Willow Creek Habitat Enhancement Plan (also being implemented for cumulative effects mitigation).***
Long-eared Myotis, Small-footed Myotis, Spotted Bat					
• See general discussion for Terrestrial Special Status Species above.	• See general discussion for Terrestrial Special Status Species above.			• Long-term reduction in potential foraging habitat. Short-term increase in potential foraging habitat along Humboldt River. Potential exposure to future pit lake water and constituents of concern at Humboldt Sink.	• ***Improve up to 15 springs within 3-year period, in coordination with BLM and NDOW.*** • ***Improve overall habitat conditions as part of Upper Willow Creek Habitat Enhancement Plan (also being implemented for cumulative effects mitigation).***
Long-legged Myotis, Fringed Myotis, Townsend's Big-eared Bat					
• See general discussion for Terrestrial Special Status Species above.	• See general discussion for Terrestrial Special Status Species above.			• Same as for other three bat species discussed above.	• Same as for other three bat species discussed above.

Table S-1 (Continued)

Betze Project EIS (1991)		Meikle Mine EA/BA (1994)		Betze Project Supplemental EIS	
Impacts	**Monitoring/Mitigation**	**Impacts**	**Monitoring/Mitigation**	**Impacts**	**Monitoring/ Mitigation**
Bald Eagle, Golden Eagle, Swainson's Hawk, Ferruginous Hawk					
• See general discussion for Terrestrial Special Status Species above.	• See general discussion for Terrestrial Special Status Species above.			• Long-term, incremental reduction in: **Bald Eagle:** potential foraging habitat for wintering and migrating eagles. **Golden Eagle:** potential foraging habitat and individual roost sites in riparian zones. **Swainson's Hawk:** potential foraging and nesting habitat. **Ferruginous Hawk:** potential foraging habitat. **All Four Raptor Species:** • Short-term increase in potential foraging habitat along Humboldt River. Potential exposure to future pit lake water and constituents of concern at Humboldt Sink.	• ***Improve up to 15 springs within 3-year period, in coordination with BLM and NDOW.*** • ***Improve overall habitat conditions as part of Upper Willow Creek Habitat Enhancement Plan (also being implemented for cumulative effects mitigation).***
Northern Goshawk					
• See general discussion for Terrestrial Special Status Species above.	• See general discussion for Terrestrial Special Status Species above.			• Long-term, incremental reduction in potential foraging and nesting habitat. Short-term increase in potential foraging habitat along Humboldt River for wintering birds. Potential exposure to future pit lake water and constituents of concern at Humboldt Sink.	• ***Improve up to 15 springs within 3-year period, in coordination with BLM and NDOW.*** • ***Improve overall habitat conditions as part of Upper Willow Creek Habitat Enhancement Plan (also being implemented for cumulative effects mitigation).***
Burrowing Owl					
• See general discussion for Terrestrial Special Status Species above.	• See general discussion for Terrestrial Special Status Species above.			• Long-term, incremental reduction in potential foraging habitat. Short-term increase in potential foraging habitat along Humboldt River.	• ***Improve up to 15 springs within 3-year period, in coordination with BLM and NDOW.*** • ***Improve overall habitat conditions as part of Upper Willow Creek Habitat Enhancement Plan (also being implemented for cumulative effects mitigation).***

Table S-1 (Continued)

Betze Project EIS (1991)		Meikle Mine EA/BA (1994)		Betze Project Supplemental EIS	
Impacts	**Monitoring/Mitigation**	**Impacts**	**Monitoring/Mitigation**	**Impacts**	**Monitoring/ Mitigation**
Sage Grouse					
• See general discussion for Terrestrial Special Status Species above.	• See general discussion for Terrestrial Special Status Species above. • Also, habitat improvement fund, as specified for Proposed Action. • Fund $50,000 for sage grouse mitigation.			• Potential reduction in riparian and mesic communities, affecting the amount of potential brooding and foraging habitats for sage grouse. Habitat effects could alter sage grouse distribution and possibly reduce regional grouse population.	• To improve off-site sage grouse habitat, ***contribute an additional $50,000 to fund habitat rehabilitation***. • ***Improve nesting and riparian habitat in the Upper Willow Creek drainage as part of the Upper Willow Creek Habitat Enhancement Plan*** (also being implemented for cumulative effects mitigation).
American White Pelican, Osprey					
• See general discussion for Terrestrial Special Status Species above.	• See general discussion for Terrestrial Special Status Species above.			• No impacts to lakes or reservoirs anticipated for both species. Short-term increase in potential foraging habitat along Humboldt River for osprey. Potential exposure to constituents of concern at Humboldt Sink for both species.	• ***Contribute $25,000 to USFWS for biological monitoring during years with Barrick discharge to the Humboldt River.***
White-Faced Ibis, Black Tern					
• See general discussion for Terrestrial Special Status Species above.	• See general discussion for Terrestrial Special Status Species above.			• Long-term, incremental reduction in potential foraging and nesting habitat. Short-term increase in potential foraging habitat along Humboldt River. Potential exposure to constituents of concern at Humboldt Sink.	• ***Improve up to 15 springs within 3-year period, in coordination with BLM and NDOW.*** • ***Improve 635 acres of riparian habitat and associated uplands as part of Upper Willow Creek Habitat Enhancement Plan (also being implemented for cumulative effects mitigation).*** • ***Contribute $25,000 to USFWS for biological monitoring during years with Barrick discharge to the Humboldt River.***
				• As mine dewatering ends and soils dry in Boulder Valley, increased leaching of minerals and salts into the soil surface and subsurface layers, modifying associated plant communities.	• None

Table S-1 (Continued)

Betze Project EIS (1991)		Meikle Mine EA/BA (1994)		Betze Project Supplemental EIS	
Impacts	**Monitoring/Mitigation**	**Impacts**	**Monitoring/Mitigation**	**Impacts**	**Monitoring/ Mitigation**
Nevada Viceroy					
• See general discussion for Terrestrial Special Status Species above.	• See general discussion for Terrestrial Special Status Species above.			• Possible effects to potential habitat for Nevada viceroy.	• ***Improve up to 15 springs within 3-year period, in coordination with BLM and NDOW.*** • ***Improve overall habitat conditions as part of Upper Willow Creek Habitat Enhancement Plan (also being implemented for cumulative effects mitigation).***
AQUATIC SPECIAL STATUS SPECIES					
• No effects on aquatic species were identified.	• None	• No effects on aquatic species were identified.	• Barrick shall expand their network of monitoring surface water elevations in streams inhabited by LCT. • Additional mitigation could be implemented for LCT, if a review of ground water data indicates effects on flows in streams inhabited by LCT.	• ***No effects on LCT, spotted frog, and California floater from Betze Project.*** • ***Potential flow reduction impacts on LCT and California floater due to cumulative mine dewatering.***	• ***Improve 20.5 miles of LCT habitat and restoration of former habitat as part of the Upper Willow Creek Habitat Enhancement Plan (also being implemented for cumulative effects mitigation).*** • ***Convey 1.5 cfs instream flow right in Rock Creek to NDOW and BLM.***
			• If monitoring data indicate that drawdown is expanding into streams inhabited by LCT, Barrick shall use reinjection wells to recharge the ground water system.	• Potential reductions in habitat and loss of individuals for springsnails in upper Antelope Creek and Squaw Creek.	• ***Contribute $50,000 for research grant to study springsnail relocation techniques.***

Table S-1 (Continued)

Betze Project EIS (1991)		Meikle Mine EA/BA (1994)		Betze Project Supplemental EIS	
Impacts	**Monitoring/Mitigation**	**Impacts**	**Monitoring/Mitigation**	**Impacts**	**Monitoring/ Mitigation**
GRAZING MANAGEMENT					
• Potential flow reductions in seeps and springs could result in a loss of 345 acres of grazing land.	• Provide funds for acquisition and maintenance of alternative water sources (e.g., guzzlers, cisterns, purchase water rights, etc.) (maximum of $50,000).			• Possible effects on water sources in the Twenty-five and T Lazy S allotments.	• Continued annual monitoring of flows and water levels in representative seeps and springs within drawdown area. • ***Barrick would continue to monitor surface and ground water to determine the extent of drawdown as required by the State Engineer. Adverse impacts to water rights (surface water or ground water) would be mitigated as required by the Nevada Division of Water Resources.***
SOCIOECONOMICS					
• No anticipated impact.	• None	• No anticipated impact.	• None	• In unlikely event of Humboldt River discharge, minor increase in available irrigation water. • Possible effects on grazing water sources. • Possible effects to hunting and fishing activities.	• None • See Grazing Management • None
NATIVE AMERICAN RELIGIOUS CONCERNS					
• No anticipated impact.	• None	• No anticipated impact.	• None	• No anticipated impact.	• Native American consultation has been conducted and completed.
CULTURAL RESOURCES					
• ***No anticipated impact.***	• ***None***	• ***No anticipated impact.***	• ***None***	• ***No effects from the Betze Project.*** • ***Potential flow reduction impacts on the Rock Creek TCP due to cumulative mine dewatering.***	• ***None.*** • ***Convey 1.5 cfs instream flow right in Rock Creek to NDOW and BLM.***

NA = Not applicable.

[1]These measures may no longer be enforceable as the land associated with the Meikle Mine is no longer administered by the BLM.

UNIT CONVERSION TABLE

From	To	Multiply By
Area		
acres	square feet	43,560
square miles	acres	640
Volume		
acre-feet	gallons	325,829
gallons	cubic feet	7.48
Flow		
cubic feet per second (cfs)	gallons per minute (gpm)	449
gpm	acre-feet per year	1.61
cfs	acre-feet per year	724
Concentration		
parts per million (ppm)	milligrams per liter (mg/L)	1
mg/L	micrograms per liter (µg/L)	1,000
Loads		
tons per day (tpd)	tons per year (tpy)	365
tpy	pounds per day	5.48

ACRONYMS AND ABBREVIATIONS

°F	Fahrenheit
µg/g	micrograms per gram
µg/L	micrograms per liter
ALNINC	*Alnus incana*
amsl	above mean sea level
ANFO	ammonium nitrate fuel oil
AUM	animal unit month
BLM	Bureau of Land Management
BVMP	Boulder Valley Monitoring Plan
bw	body weight
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
cfs	cubic feet per second
CIA	Cumulative Impact Analysis
CO	carbon monoxide
CTQ	Community Tolerance Quotient
EIS	environmental impact statement
ELLCO	Elko Land and Livestock Company
EPA	Environmental Protection Agency
ET	evapotranspiration
FFR	Fenced Federal Range
FLPMA	Federal Land Policy and Management Act of 1976
gpm	gallons per minute
H_2S	hydrogen sulfide
LCT	Lahonton cutthroat trout
LMC	Lower Maggie Creek
LOAEL	Lowest Observed Adverse Effects Levels
m^2	square meters
MCBMP	Maggie Creek Basin Monitoring Plan
MCWRP	Maggie Creek Watershed Restoration Project
mg/kg	milligrams/kilograms
mg/L	milligrams per liter
Na	sodium
NAAQS	National Ambient Air Quality Standards
NAC	Nevada Administrative Code
NaCl	sodium chloride
NDCNR	Nevada Department of Conservation and Natural Resources
NDEP	Nevada Department of Environmental Protection
NDOW	Nevada Division of Wildlife
NDWR	Nevada Department of Water Resources
NEPA	National Environmental Policy Act
NNHP	Nevada Natural Heritage Program

NO_2	oxides of nitrogen
NOAA	National Oceanographic and Atmospheric Administration
NOAEL	No Observed Adverse Effects Levels
NOI	Notice of Intent
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NRS	Nevada Revised Statute
NTU	nephelometric turbidity units
OHWM	ordinary high water mark
PM_{10}	particulate matter with an aerodynamic diameter of 10 microns or less
ROW	right-of-way
RTi	Riverside Technology, inc.
SAR	sodium adsorption ratio
SHPO	State Historic Preservation Officer
SO_2	sulfur dioxide
SO_4	sulfate
SOAP	South Operations Area Project
SOAPA	South Operations Area Project Amendment
TDS	total dissolved solids
TSS	total suspended solids
UIC	underground injection control (permit)
USCOE	U.S. Army Corps of Engineers
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
VRM	Visual Resource Management
WMA	Wildlife Management Area

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1.0 INTRODUCTION

This Final Supplemental Environmental Impact Statement (EIS) for the Betze Project contains:

- ***Revisions to the Draft Supplemental EIS (Chapter 2.0).***
- ***A record of the written comments received on the Draft Supplemental EIS and responses to the substantive comments (Chapter 3.0).***
- ***The Betze Project Supplemental EIS Mitigation Plan (Appendix A), which outlines mitigation measures Barrick would implement to reduce or eliminate impacts. This mitigation plan was developed in coordination with the BLM, U.S. Fish and Wildlife Service, and the Nevada Division of Wildlife.***
- ***Barrick's Upper Willow Creek Habitat Enhancement Plan (Appendix B), which is designed to provide improved habitat for a variety of terrestrial and aquatic species in advance of potential impacts identified in the Supplemental EIS.***
- ***Results of the BLM's informal consultation with the U.S. Fish and Wildlife Service under Section 7 of the Endangered Species Act. The USFWS memorandum of concurrence that the Betze Project is not likely to adversely affect the Lahontan cutthroat trout or the bald eagle and their habitat is provided in Appendix C.***
- ***Documentation of Native American consultation (Appendix D).***

The Betze Project Draft Supplemental EIS was distributed for public comment on September 15, 2000. The BLM held a public meeting to receive comments during the public comment period, which ended on November 14, 2000. None of the comments received during the public comment period required major changes or revisions in the analyses or conclusions presented in the Draft Supplemental EIS. The Draft Supplemental EIS has not been reprinted; therefore, this abbreviated Final Supplemental EIS must be read in conjunction with the Draft Supplemental EIS. Minor revisions to the text of the Draft Supplemental EIS are provided in Chapter 2.0 of this document.

2.0 EIS MODIFICATIONS AND CORRECTIONS

This chapter contains specific modifications and corrections to the Betze Project Draft Supplemental EIS. These revisions were made in response to:

- ***Barrick's and ELLCO's withdrawal of the application to amend the existing right-of-way for a second water pipeline across public lands in Boulder Valley.***

- ***Comments received during the public comment period.***

The text revisions are identified in Table 2-1. Where text has been added or modified, the new text appears in bold italic print. Revised tables and figures are presented in their entirety following Table 2-1.

<u>Summary of Native American Consultation</u>

The Draft Supplemental EIS (Section 5.9) described the BLM's conduct of Native American consultation relative to cumulative mine dewatering in the Carlin Trend. This consultation has been ongoing since October 1, 1998, and has included meetings, field trips, letters, and telephone <u>communications</u>.

The BLM has concluded Native American consultation for the Betze Project Supplemental EIS. The BLM held a final consultation meeting with the Western Shoshone on July 17, 2002 to discuss the Betze Project Supplemental EIS and associated mitigation. Meeting attendees included the BLM, Barrick, and lenders and representatives from the Te-Moak Tribal Council, Elko Band Council, Battle Mountain Band Council, South Fork Band Council, and other interested members of the Western Shoshone community. The comment period for consultation ended on August 16, 2002.

In response to Native American concerns, the BLM and Barrick have developed mitigation measures relative to potential cumulative impacts to the Rock Creek Traditional Cultural Property (TCP) and to sage grouse. These mitigation measures are outlined in the Supplemental EIS Mitigation Plan (Appendix A) and the Upper Willow Creek Habitat Enhancement Plan (Appendix B).

Key documents associated with Native American consultation are provided in Appendix D; these documents include:

- ***Tribal resolutions relative to the Betze Project (Te-Moak Tribe, Elko Band Council, and South Fork Band Council);***

- ***BLM letter (August 5, 2002) requesting final comments on the Betze Project Supplemental EIS;***

- ***Western Shoshone Defense Project response letter (August 16, 2002) to BLM; and***

- ***BLM letter (September 6, 2002) to the State Historic Preservation Office (SHPO) requesting final comments on the Betze Project Supplemental EIS mitigation and concurrence with the BLM's assessments regarding impacts to the Tosawihi and Rock Creek TCPs.***

Table 2-1
Modifications and Corrections

Page	Paragraph[1]	Line	Revised Text
1-17	5	5	pipeline; ***BLM permitted water conveyance in the existing pipeline pursuant to a right-of-way grant issued to the TS Ranch Joint Venture in September 1991.*** Approximately…
1-24	4	16	A report describing the data collected in March 2001 was submitted to the USFWS in April 2002.
1-25	7	9	***yield 500 to 5,000 gpm***, while..
1-25	7	11	***typically yield 10 to 600 gpm (McDonald Morrissey Associates, Inc. 1998).*** Within…
3-1	1	New	***Monitoring and mitigation measures for affected environmental resources are identified in Appendix A. An important part of the Mitigation Plan is the Upper Willow Creek Habitat Enhancement Plan, which would improve riparian and aquatic habitat in the Upper Willow Creek drainage and the Squaw Valley Allotment. This habitat enhancement plan is described in Appendix B.***
3-6	Figure 3.1-3		See revised Figure 3.1-3
3-16	3	4	spring ***JBR6***. Dewatering…
3-23	Figure 3.2-1		See revised Figure 3.2-1
3-28	Table 3.2-3		See revised Table 3.2-3
3-30	4	20	…(Barrick 1999***a***).
3-32	Figure 3.2-6		See revised Figure 3.2-6
3-39	2	13	Hydrographic basins, ***three hot springs (Newmont spring designation numbers 24, 40, and 43) and one warm spring (Newmont spring designation number 52) were identified. The location and description of these springs are provided in BLM 2000a***.
3-52	5	3	bicarbonate-type water***.*** Calcium and sodium…
3-52	7	3	type water***.*** There are…
3-53	5	11	historic mine dump (***in the Beaver Creek drainage area***) had acidic…
3-66	Table 3.2-13		See revised Table 3.2-13
3-67	Table 3.2-14		See revised Table 3.2-14
3-78	2	11	the river, ***reservoir management***, evaporative losses, ***and seepage into alluvial aquifers***. It is…
3-86	5	18	(net loss of approximately 2,700 ***acre-feet/year***) (Delete gpm)
3-111	2	8	…elevation of ***approximately 3,930*** feet amsl;
3-111	2	11	…elevation of ***approximately 4,050*** feet amsl. The two…
3-111	2	13	…reaching an ***approximate*** elevation of ***4,430*** feet amsl.
3-116	2	14	…value of ***603*** mg/L and ***283*** mg/L…
3-121	7	4	baseflow impacts to the Humboldt…
3-130	Figure 3.2-38		See revised Figure 3.2-38
3-145	Table 3.3-1 footnotes		See revised Table 3.3-1; the previous footnote 5 has been deleted.

Table 2-1 (Continued)

Page	Paragraph[1]	Line	Revised Text
3-154	3	11	…conditions. ***However, if noxious weed populations become established in these riparian areas during reduced baseflow periods, vegetation would consist of a mixture of riparian and noxious weed species after water levels returned to premine conditions.***
3-157	5	New	***BLM would monitor exposed channel sediments during reduced baseflow periods to determine if noxious weeds are present using funds from the Riparian Habitat Mitigation Fund. If noxious weeds become established in these areas, BLM could implement noxious weed control measures (e.g., herbicide application, mowing) to minimize or eradicate weed populations in riparian areas using funds from the Riparian Habitat Mitigation Fund.***
3-175	2	23	habitat associations. (Delete remainder of paragraph)
3-176	3	15	…comparison, ***four*** species…
3-176	3	17	hawk, ***great blue heron***, and…
3-176	3	22	these ***four*** species…
3-177	Table 3.4-1		See revised Table 3.4-1
3-178	7	4-7	Vegetation, and increased areas of open water during the winter. These potential effects…
3-178	7	5	the winter. These potential effects…
3-188	4	7	Restoration ***Project (MCWRP)*** and …
3-188	5	13-15	Controlled grazing initiated in 1993 resulted in stable, well-revegtated streambanks ***by 2000; however, much of the recovered riparian zone was burned by a wildfire in 2001*** (Evans ***2001***).
3-189	1	6	Coyote, Little Jack***, Jack, Lynn***, and Simon creeks.
3-190	1	5	…NDOW 1996***c***; …
3-190	2	9	riparian zone. ***Habitat quality in the middle portion of upper Rock Creek has improved in terms of bank cover and stream width-to-depth ratio (BLM 1998c). However, problems including poor streambank development and lack of quality pools still exist.***
3-190	6	15	1998c). ***In August 2001, a wildfire burned the majority of the Frazer Creek watershed including the aspen/willow riparian community along the stream. Small numbers of LCT were observed to survive the fire, although the long-term impacts to the population are unknown.***
3-193	1	6	1996 results. ***Additional macroinvertebrate samples also were collected in 2000 at some sites between the Carlin gage to Golconda.***
3-200	3	13	The ***greater*** sage grouse…
3-200	4	19	Shoshone ***c***ulture (see
3-200	5	1	***The history of sage grouse accounts for Little Boulder Basin is complex. However, the BLM has been involved with a long and detailed process in an effort to protect this species from cumulative mining impacts along the Carlin Trend.*** Available data…
3-200	5	11	1995).

Table 2-1 (Continued)

Page	Paragraph[1]	Line	Revised Text
3-200	6	New	Overall surveys conducted within the Little…
3-200	7	2	a ***small number*** of concentration…
3-201	2	2	be currently active. ***Unless there is official consensus between the BLM and the Nevada Division of Wildlife that a given lek is obviously lost due to disturbances associated with mining, the agencies treat the lek as historic or inactive. It is the BLM's position to consider these historic or inactive leks as lek sites that could potentially be active in the future.*** The lek summary…
3-205	4	3	Creeks in 1997 ***and 2000*** showed…
3-205	4	11-16	(JBR 1992e). LCT that have been found in the lower reaches of ***tributary*** streams ***and in the mainstem of Maggie Creek are thought*** to be "outwash victims" that have been removed from the reproducing population ***(AATA 1997). However, there is evidence that at least some adult LCT from Maggie Creek are accessing or attempting to access tributary streams. NDOW (1999, 2000) documented very large LCT (assumed to be of Maggie Creek origin) in Coyote and Beaver creeks, while Evans (1999) observed a single large LCT attempting to ascend a perched culvert on Beaver Creek in June 1998. In addition, adult LCT have been found stranded in pools below culverts on a number of occasions in late spring or early summer (Evans 1999).*** Winter habitat…
3-205	5	New	***The effect of the 2001 wildfire on LCT populations in the Beaver Creek drainage is unknown. Although small numbers of trout were observed to have survived the fire, almost complete loss of the riparian zone along with anticipated sediment loading is expected to significantly impact this population in 2002.***
3-209	Figure 3.6-2		See revised Figure 3.6-2.
3-210	3	4, 5	…with pools that were ***located in the lower reaches of Little Jack and in Spring Creek*** (JBR…
3-210	3	9-11	…1996), ***nor during a followup survey conducted on Antelope Creek in 2001 (JBR 2001).*** Spotted frogs…
3-210	3	15	…Spring Creek (Ports 2001).
3-213	7	1	***The intent of the SEIS sage grouse analysis was to provide an overview of the overall population decline in Little Boulder Basin and surrounding areas.*** A quantitative summary…
3-215	8	4-6	***Spring*** Creek. No spotted…
3-215	8	8	…subbasin, ***Antelope Creek***, or remaining…
3-215	8	11	…been reported. (Delete remainder of paragraph)
3-217	2	10	…spotted frog. ***Residual impacts could occur to special status aquatic species if flow augmentation is required, and if the physical and chemical characteristics of the water used to augment flows are incompatible with survival of specific sensitive organisms.***
3-221	4	17	1992). No ***authorized*** livestock…

Table 2-1 (Continued)

Page	Paragraph[1]	Line	Revised Text
3-221	4	3	respectively. ***However, some unauthorized grazing has occurred in the northern portion of the Humboldt Wildlife Management Area in recent years.***
5-20	2	9	…the area. ***Proposed water augmentation projects for the Maggie Creek watershed have been described in the Maggie Creek Streamflow Augmentation Plan. Although this plan was developed in 1993 and funds are available for construction, the development of these projects has not been initiated to date. Additional water augmentation projects, possibly including groundwater reinjection, also may be proposed by Newmont for the area (BLM 1993d).***
5-20	3	5	***1,705*** acres of riparian vegetation…
5-28	6		***Hydrologic modeling predicts cumulative ground water drawdown may cause a temporary reduction of surface water flows in the following streams that are LCT habitat: the lower sections of Little Jack, Coyote, and Beaver creeks (Figure 5-5). Such reductions would occur decades in the future. As explained in Section 5.2 the cumulative drawdown would result from the combined dewatering operations of Barrick (the Goldstrike Mine), and Newmont's SOAP/SOAPA and Leeville Projects are projected by the Newmont model. Standing alone, the dewatering associated with the Goldstrike Mine is not expected to contribute to potential flow reductions in these stream sections or other surface waters occupied by LCT in the Maggie Creek basin (see Section 3.2.2.1). In addition, Barrick is not expected to contribute directly or cumulatively to flow reductions in Susie Creek, which has been identified as a potential LCT re-introduction stream (Coffin and Cowan 1995).***
5-37	3	8	drawdown. (Delete remainder of paragraph.)
5-37	5	1-3	Based on these data, it appears that without mitigation some level of impact could occur to the Rock Creek Traditional Cultural Property.
8-2	9	New	***Barrick Goldstrike Mines Inc. 2002. Correspondence to H. Hankins, District Manager, Elko District Office, Bureau of Land Management from Rich Haddock, dated April 10, 2002, regarding withdrawal of application to amend right-of-way (N-52388).***
8-2	10	New	***Barrick Goldstrike Mines Inc. 2001a. Personal communication from J. Zhan, Barrick Goldstrike Mines Inc. to P. Plumley, Short Elliott Hendrickson Inc., regarding model simulation. March 2001.***
8-3	10	New	***Berger, D. L. 2000. Water Budget Estimates for the 14 Hydrographic Areas in the Middle Humboldt River Basin, North-Central Nevada. U.S. geological Survey Water Resources Investigations Report 00-4168.***
8-4	4	New	***Bureau of Land Management. 2002. Final Environmental Impact Statement, Newmont Mining Corporation's South Operations Area Project Amendment. Elko Field Office. Elko, Nevada.***

Table 2-1 (Continued)

Page	Paragraph[1]	Line	Revised Text
8-9	11	New	***Gephardt, J. 2001. Nevada Division of Wildlife. Personal communication with J. Alstad, ENSR, February 12, 2001.***
8-10	3	New	***Gray, K. 2001. Nevada Division of Wildlife. Personal communication with L. Nielsen, ENSR, Fort Collins, Colorado. January 26, 2001.***
		New	***Horton, G. 1998. Facsimile from G. Horton (Nevada Division of Water Planning) to T. Grady (Maxim technologies, Inc.) of Preliminary 1995 Water Use Data for Nevada.***
8-12	3	New	***JBR Environmental Consultants, Inc. 2001. Spotted Frog Survey Report, Antelope Creek, Elko County, Nevada. Prepared for Barrick Goldstrike Mines Inc., Elko, Nevada.***
8-16	15	New	***Nevada Division of Wildlife. 1998d. Big Game Status and Quota Recommendations. Prepared by Mike Hess.***
8-17	9	New	***Nevada State Engineer's Office. 2001. Personal communication with B. Kightlinger and K. Owsley, Nevada Department of Conservation and Natural Resources, Division of Water Resources, Elko, Nevada, with J. Burrell, Riverside Technology, inc. March 30, 2001***
8-19	6	New	***Ports, M. A. 2001. Memo to C. Evans Showing Locations of Spotted Frog Observed March 23, 1994, in the Maggie Creek Basin. Bureau of Land Management, Elko Field Office Files. Elko, Nevada. Memo Dated October 23, 2001.***

[1]Paragraph number includes first partial paragraph at top of page, if applicable.

REVISED TABLES

Table 3.2-3
Summary of Hydrostratigraphic Unit Hydraulic Properties

Hydrostratigraphic Unit	Yields (gpm)	Estimated Hydraulic Conductivity (feet/day)	Estimated Transmissivity (feet^2/day)	Estimated Storage Coefficient (no units)
Younger Basin Fill	Up to 3,600 in Boulder Valley[2]	1 to 100[2]	4,500[1] - 13,400[2]	0.0025[1]
Older Basin Fill	<100 - 1,000[1]	0.05 - 5[2]	20 - 900[2]	0.0038[2]
Intrusive Rocks	Generally <10[2]	0.01 - 1	NA	NA
Volcanic Rocks	Up to 5,800 in Boulder Valley[2]	0.5 - 250[2]	300 - 100,000[2]	0.0007 - 0.003[2]
Marine Clastic Rocks	***10 - 600[2,3]***	0.0014 - 100[1]	30 - 800[2]	0.0001 - 0.004[2]
Marine Carbonate Rocks	***500 - 5,000[2]***	***0.01 - 40[2]***	13 - 300,000[2]	0.0002 - 0.014[1]

[1]Maurer et al. 1996.
[2]McDonald Morrissey Associates, Inc. 1996a,b, 1998.
[3]Where highly fractured, may yield more than 600 gpm.
NA - No data available.

Table 3.2-13
Mean Annual Humboldt River Gains *(+)* and Losses *(-)* (cfs)

River Reach	January 1946 - May 1990 Flows	June 1990 - December 1996 Flows
Carlin to Palisade	+51	+76
Palisade to Argenta	-43	-83
Argenta to Battle Mountain	+4	+17
Battle Mountain to Comus	-30	-47
Comus to Imlay	-60	-58

Source: RTi 1998.

Table 3.2-14
Mean October Gains *(+)* and Losses *(-)* in the Humboldt River (cfs)

River Reach	January 1946 - May 1990 Mean October Flows	June 1990 - December 1996 Mean October Flows
Carlin to Palisade	+18.4	+20.6
Palisade to Argenta	-29.7	-30.1
Argenta to Battle Mountain	+5.1	-1.2
Battle Mountain to Comus	-9.7	+12.3
Comus to Imlay	+14.4	-4.5

Source: RTi 1998.

Table 3.3-1
Acres of Riparian and Wetland Vegetation in the Study Area

Watershed (*Stream*)	Area[1]	Streambar	Herbaceous Streambar	Wet Meadow	Salix Streambar	Salix/Wet Meadow	Salix/Mesic Meadow	Salexi/ Wet Meadow	ALNINC/Mesic Meadow	Total
Maggie Creek										
Beaver Creek	M1	2	1	1	0	0	0	1	47	52
Beaver Creek	M2	121	6	3	22	0	42	0	77	271
Coyote Creek	**M3**	**0**	**2**	**0**	**22**	**0**	**0**	**1**	**64**	**89**
Coyote/Spring Creeks[2]	M4	87	10	99	1	1	3	24	0	225
Little Jack Creek	**M5**	**41**	**23**	**1**	**9**	**0**	**0**	**0**	**51**	**125**
Little Jack and Jack[3] *Creeks*	M6	31	32	128	13	0	1	37	0	242
Maggie Creek	--	125	176	464	0	0	0	163	0	928
James Creek	--	1	6	0	0	0	0	2	0	9
Soap Creek	--	0	3	<1	0	0	0	0	0	3
Marys Creek	--	2	12	<1	0	0	0	3	0	17
Mack Creek	--	0	7	0	0	0	0	1	0	8
Lynn/Simon Creeks	**--**	**0**	**2**	**29**	**0**	**0**	**0**	**0**	**0**	**31**
Cottonwood Creek	**--**	**3**	**4**	**0**	**0**	**0**	**0**	**0**	**0**	**7**
E. Cottonwood Creek	--	0	<1	6	0	0	0	0	0	6
Fish Creek	--	5	3	0	0	0	0	<1	0	8
Indian Creek	--	<1	1	0	0	0	0	0	0	1
Bob's Creek	--	0	2	0	0	0	0	0	0	2
Subtotal	--	*418*	*290*	*732*	*67*	*1*	*46*	*232*	*239*	*2,025*[4]
Rock Creek										
Rock Creek	R1	8	90	0	0	0	0	0	0	98
Rock Creek	R2	23	78	0	0	0	0	0	0	101
Rock Creek	R3	29	171	0	0	0	0	0	0	200
Rock Creek	R4	0	74	0	0	0	0	0	0	74
Willow Creek	R5	0	107	80	12	0	0	139	0	338
Willow Creek	R6	0	102	1	2	0	0	0	0	105
Willow Creek	R7	20	69	7	1	0	0	3	0	99
Willow Creek	R8	0	4	2	0	0	0	0	0	6
Willow Creek	R9	0	70	7	0	0	2	1	0	80
Willow Creek	R10	0	4	0	0	0	0	0	0	4
Willow Creek	R11	0	0	1	0	0	1	1	<1	3
Antelope Creek	R12	0	48	0	0	0	0	0	0	48
Antelope Creek	R13	0	67	0	0	0	0	0	0	67
Antelope Creek	**R14**	**0**	**75**	**0**	**0**	**0**	**0**	**0**	**0**	**75**

Table 3.3-1 (Continued)

Watershed (*Stream*)	Area[1]	Streambar	Herbaceous Streambar	Wet Meadow	Salix Streambar	Salix/Wet Meadow	Salix/Mesic Meadow	Salexi/ Wet Meadow	ALNINC/Mesic Meadow	Total
Antelope Creek	**R15**	**0**	**98**	**5**	**0**	**0**	**0**	**0**	**0**	**103**
Antelope Creek	R16	0	47	11	1	1	5	0	0	65
Antelope Creek	R17	0	7	0	1	0	20	0	0	28
Boulder Creek	**R18**	**0**	**118**	**1**	**0**	**0**	**0**	**0**	**0**	**119**
Boulder Creek	**R19**	**0**	**35**	**0**	**1**	**0**	**1**	**0**	**9**	**46**
Green, Knob, and Sand Dune Springs[5]	R20	0	0	0	0	0	0	0	0	0
Green, Knob, and Sand Dune Springs[5]	**R21**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Welches Creek	**R22**	**0**	**24**	**1**	**0**	**0**	**1**	**0**	**0**	**26**
Subtotal	--	*80*	*1,288*	*116*	*18*	*1*	*30*	*144*	*9*	*1,685*[4]
Susie Creek										
Cold Creek[6]	--	3	2	0	0	0	0	0	0	5
Blue Basin Creek[6]	--	2	1	0	0	0	0	0	0	3
Adobe Creek[7]	--	1	<1	0	0	0	0	0	0	1
Swales Creek[6]	--	3	2	0	0	0	0	0	0	5
Camp Creek[7]	--	2	1	0	0	0	0	0	0	3
Susie Creek[2]	--	127	77	0	0	0	0	0	0	204
Middle Susie Creek[6]	--	0	<1	1	0	0	0	0	0	1
Hot Springs Drainage	--	2	3	0	0	0	0	0	0	5
Subtotal	--	*140*	*87*	*1*	*0*	*0*	*0*	*0*	*0*	*228*[4]
Humboldt River Tributaries										
Primeaux Creek	--	<1	<1	0	0	0	0	0	0	1
Palisade Creek	--	0	<1	0	0	0	0	0	0	<1
Buck Rake Jack Creek	--	0	5	0	0	0	0	0	0	5
Dry Susie Creek	--	0	<1	0	4	0	0	0	0	4
Subtotal	--	*0*	*6*	*0*	*4*	*0*	*0*	*0*	*0*	*10*[4]
Humboldt River	--	0	141	5	242	0	<1	0	0	388
Subtotal	**--**	*0*	*141*	*5*	*242*	*0*	*0*	*0*	*0*	*388*[4]
Total	**--**	*638*	*1,812*	*854*	*331*	*2*	*76*	*376*	*248*	*4,337*[4]

Table 3.3-1 (Continued)

FOOTNOTES:

[1]Inventory areas used by Whitehorse Associates 1995a,b.
[2]Riparian acreage for the lower portion of Susie Creek was based on acreages reported in BLM 1993b. Riparian acreage for the upper portion of Susie Creek was based on the
assumption stated in footnote 7. Riparian acreage estimates may be low since riparian habitat along upper Susie Creek has not been inventoried, and the area does support
several, large wet meadow complexes.
[3]Acreage was based on Whitehorse Associates 1995b; BLM 1993b.
[4]Numbers are approximate due to rounding.
[5]An additional 2,819 acres of Marsh/Transition to Marsh riparian vegetation was identified in R20 and R21 that was associated with the newly formed springs in Boulder Valley.
The dominant species present was *Typha latifolia* (cattail).
[6]An average width of 5 feet was assumed for riparian vegetation along these creeks since riparian inventories have not been conducted.
[7]Riparian vegetation associated with this creek has an average width of 35 feet.

Note: **BOLD** type indicates the riparian inventory areas that are within the 10-foot ground water drawdown area predicted for the Goldstrike Mine.

Sources: Whitehorse Associates 1995a,b; BLM 1993b; JBR 1993.

Table 3.4-1
Highest (from 10 to 233 years) Median Pit Lake Water Concentrations and Benchmark NOAELs[1] for Water Ingestion

Chemical	Highest Concentration (mg/L)	Year/Location	Water Ingestion NOAELs (mg/L)			
			Rough-winged Swallow	Red-tailed Hawk	*Great Blue Heron*	Little Brown Bat
Aluminum	<0.021	All[2]	471.4	1,930.0	***2,478.1***	8.188
Antimony	0.066	Yr 26; east lake				1.105
Boron	0.009	Yr 233; combined pit lake	124	507	***651***	457
Cadmium	<0.0024	All	6.23	25.51	***32.76***	15.757
Copper	<0.003	All	202.0	826.9	***1,061.7***	248.5
Fluoride	1.72	Yr 233; combined pit lake	33.5	137.2	***176.2***	666.2
Manganese	<0.002	All	4,284	17,541	***22,522***	1,438
Nickel	<0.017	All	332.61	1,361.76	***1,748.45***	653.42
Selenium	0.006	Yr 10; west pit lake	2.149	8.797	***11.295***	3.267
Strontium	0.185	Yr 26; west pit lake				4,296
Thallium	0.001	All				0.122
Zinc	<0.002	All	62.3	255.1	***327.6***	2,613.7

[1]Benchmark NOAELs are from Sample et al. 1996.
[2]"All" indicates the predicted concentration is the same in all pit lake configurations and years after mine closure.

REVISED FIGURES

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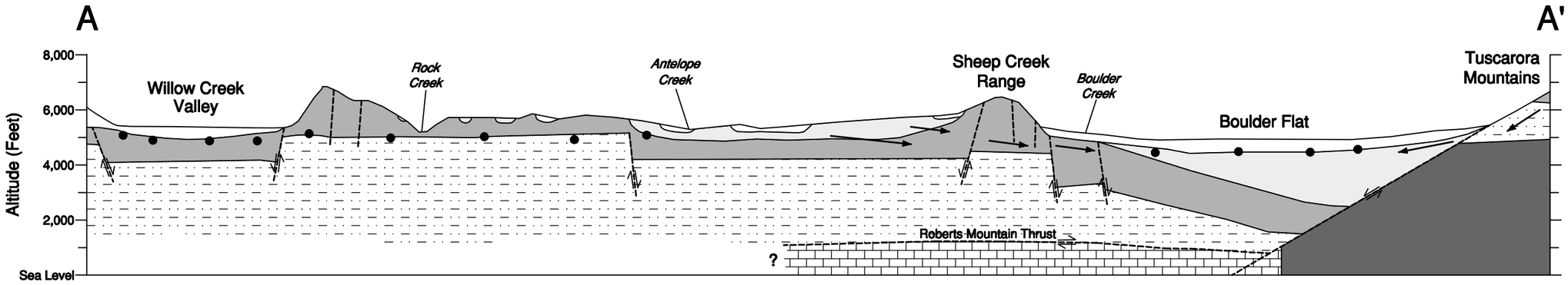
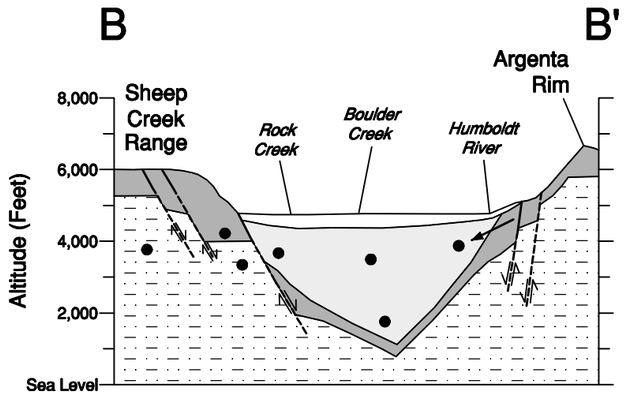
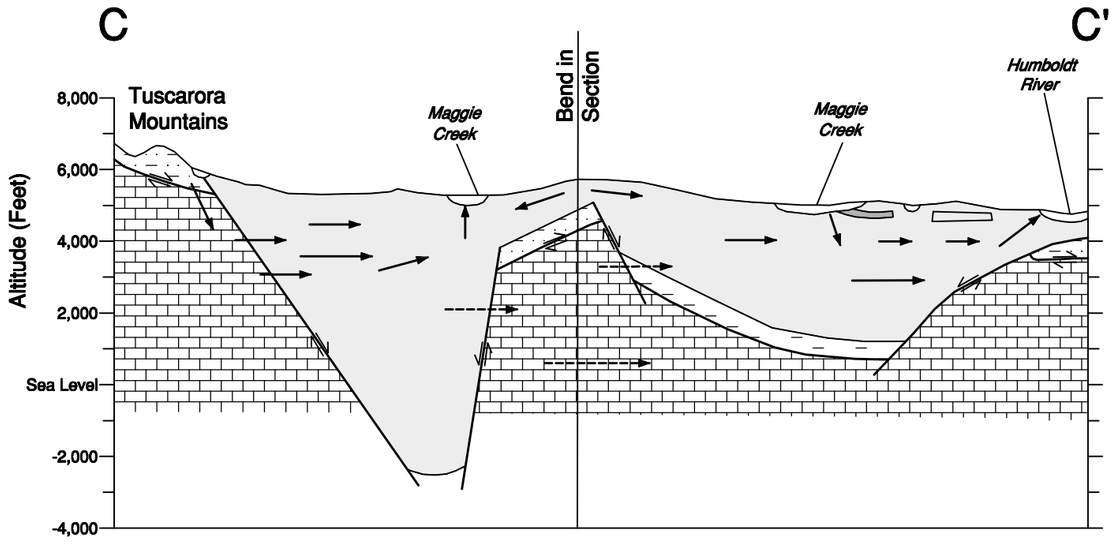






Legend

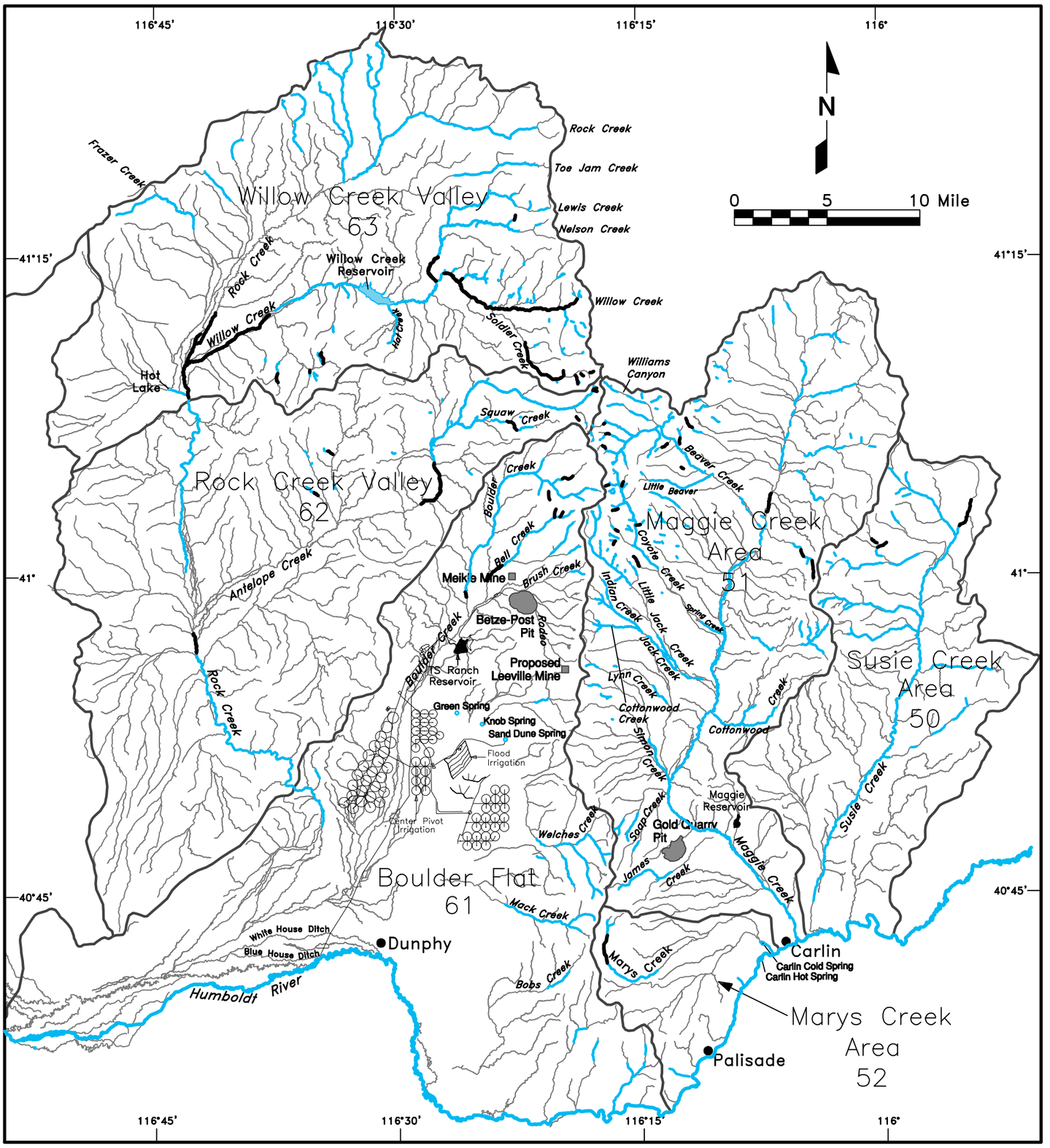
- Younger Basin Fill
- Older Basin Fill
- Intrusive Rocks
- Volcanic Rocks
- Marine Clastic Rocks
- Marine Carbonate Rocks
- Contact
- Fault (dashed where inferred)
- Ground Water Flow (dashed where direction or amount of flow is uncertain)
- Ground Water Flow (direction of ground water flow is toward viewer)

0 5 10 Miles

Vertical Exaggeration x4

Figure 3.1-3

Regional Geologic Cross Sections



Legend

- Ground Water Basin Boundary
- Stream (Intermittent or Ephemeral)
- Perennial Stream
- Discontinuous Flowing Stream Reach
- Center Pivot Irrigation

Figure 3.2-1

Hydrologic Study Area for Mine Dewatering and Localized Water Management Activities

Note: Stream locations are taken from USGS line graph database. Hydrographic Area Boundary locations are approximate.

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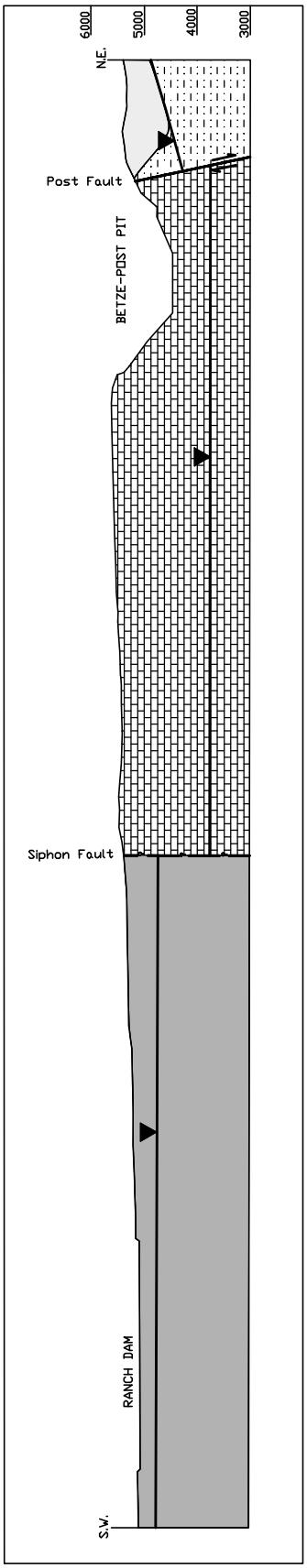


Looking Northwest

Scale in Feet
0 1000 2000 3000 4000 Feet
0 1 Mile

Legend

- Older Basin Fill
- Volcanic Rocks
- High Permeability Paleozoic Rocks
- Low Permeability Paleozoic Rocks
- Faults
- 12/31/98 Water Elevations

Figure 3.2-6

Hydrogeologic Cross Section Through Ranch Dam and Betze-Post Pit

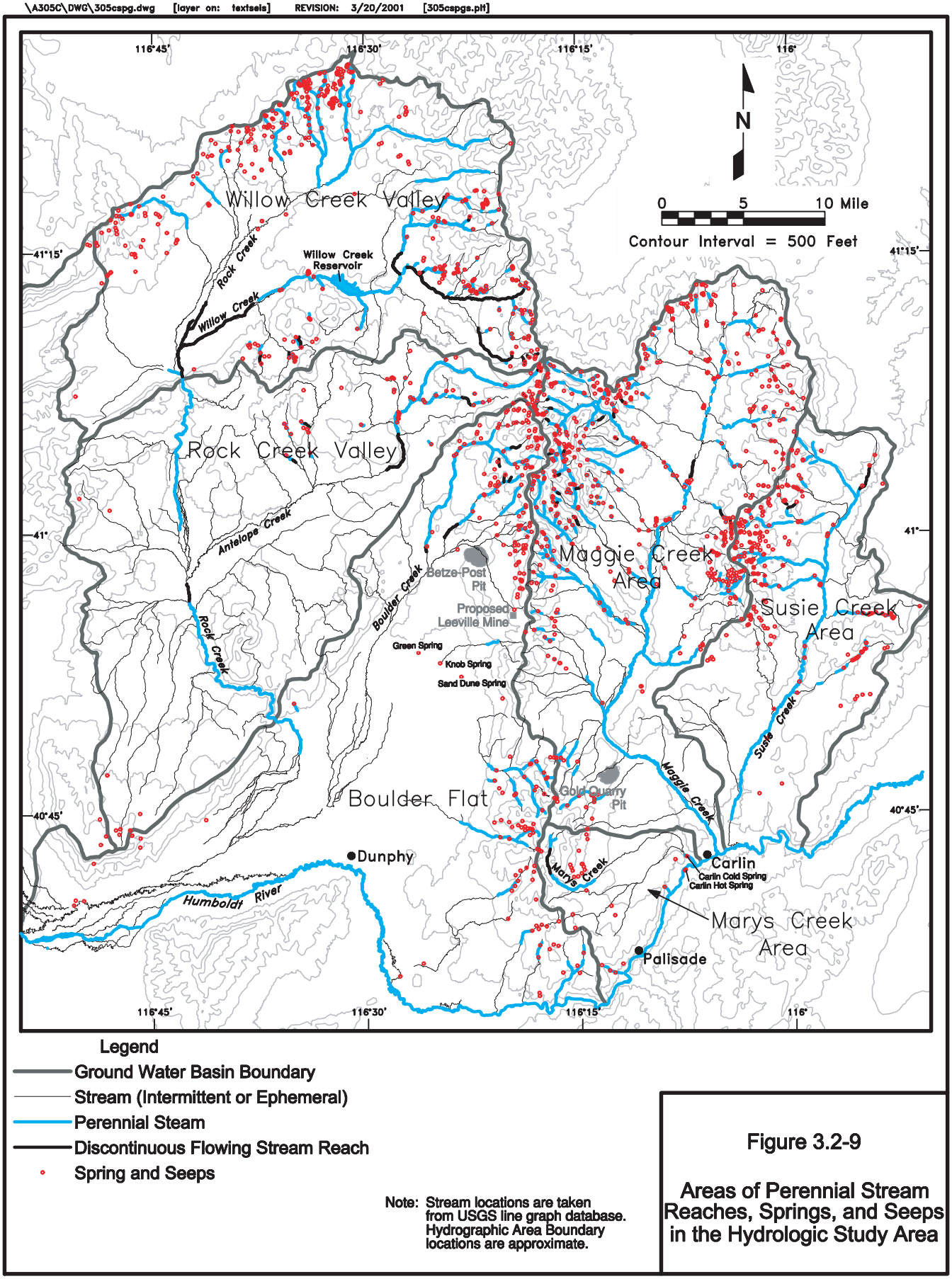
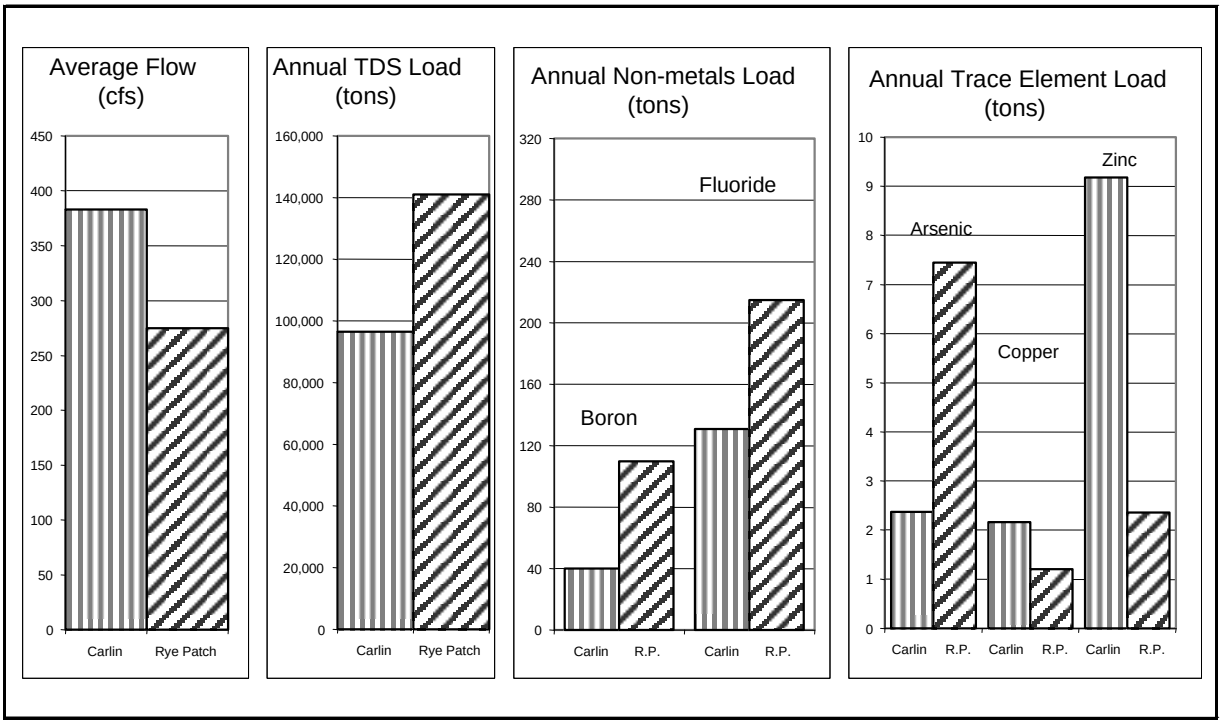


Figure 3.2-9

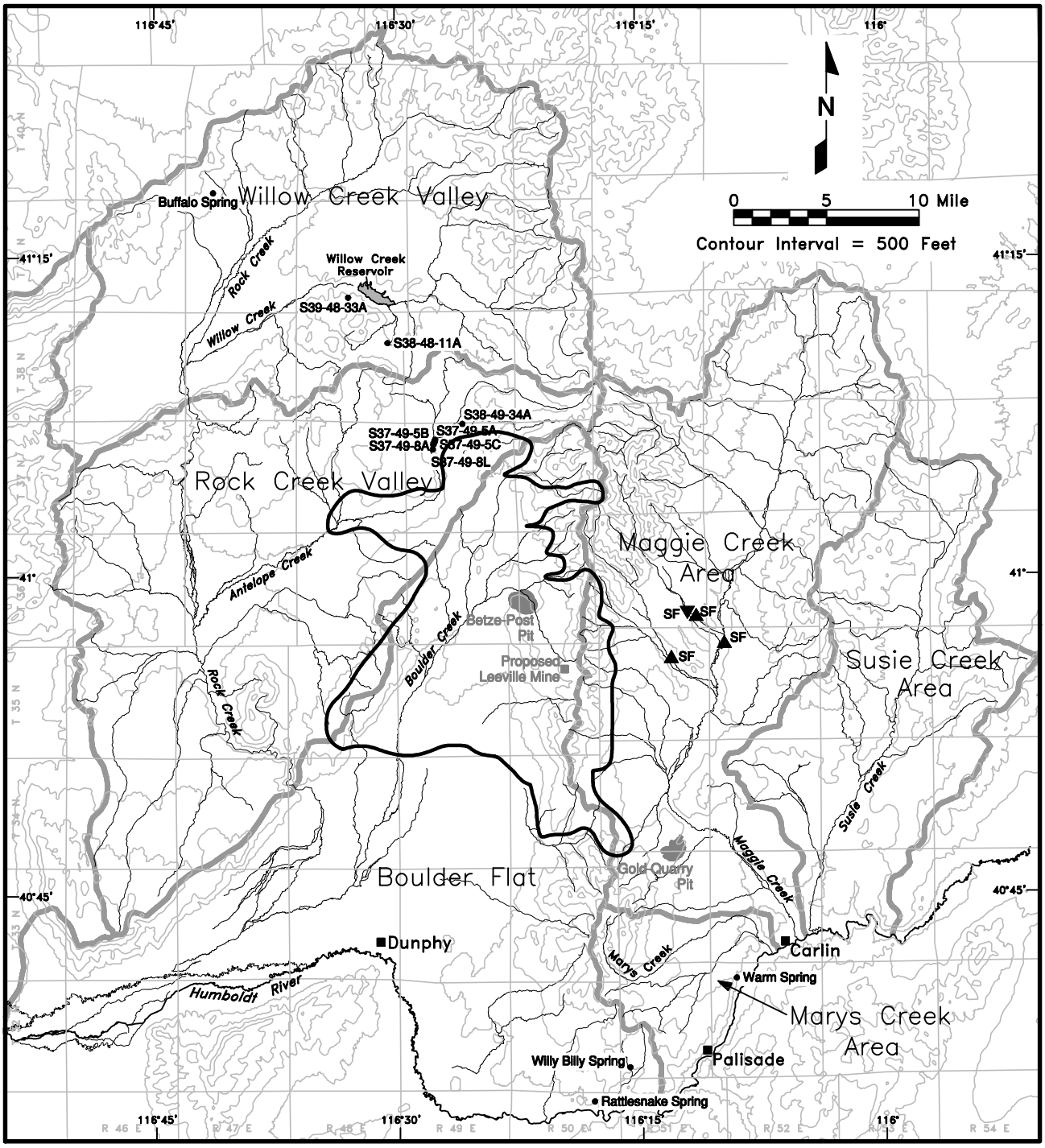
Areas of Perennial Stream Reaches, Springs, and Seeps in the Hydrologic Study Area



Comparison of the estimated average annual dissolved load transported by the Humboldt River at the Carlin and Rye Patch gages prior to mine discharges. Note that average annual loads are based on water quality data for the Carlin gage for the April 1979 through April 1991 period, and the Rye Patch gage for the October 1974 through July 1986 period.

Figure 3.2-38

Estimated Average Annual Premine Loads at the Carlin and Rye Patch Gages



Legend

- Ground Water Basin Boundary
- Stream
- Maximum Extent of 10-foot Drawdown Contour[1]
- S37-49-8A Springsnail Location
- SF▲ Spotted Frog Collection Sites
- SF▼ Spotted Frog Potential Habitat

[1] See text in Section 3.2.2.1 for explanation

Figure 3.6-2

Known Locations for Springsnail Populations and Spotted Frog Habitat

3.0 DRAFT SEIS REVIEW

The 60-day public comment period on the Betze Project Draft Supplemental EIS began on September 15, 2000, and ended on November 14, 2000. During the public comment period, the BLM received 19 comment letters. Table 3-1 lists each of the comment letters by respondent and the assigned letter number.

On September 26, 2000, the BLM held a public meeting at the BLM Elko Field Office in Elko, Nevada. Eleven people signed the attendance record for the public meeting. No written or verbal comments were submitted at the public meeting.

Comments that were received during the public comment period are presented on the following pages, together with the BLM's responses to these comments. Each comment is identified by the letter number and a comment number; the responses are identified by the associated reference letter and comment number. Each letter has been reviewed in its entirety and considered by the BLM in preparation of the Record of Decision for the Betze Project Supplemental EIS.

Table 3-1
Public Comment Letters

Letter Number	Respondent
1	U.S. Environmental Protection Agency
2	U.S. Geological Survey
3	U.S. Fish and Wildlife Service
4	State of Nevada
5	State of Idaho, Department of Environmental Quality
6	Pyramid Lake Paiute Tribal Council
7	Te-Moak Tribe of Western Shoshone
8	Western Shoshone Defense Project
9	Great Basin Mine Watch
10	Newmont Mining Corporation
11	Russell Parker
12	Art Castellanos
13	Claudette McCain
14	Gregory L. Taylor
15	Leslie H. Brooks
16	Max Lenaburg
17	Erik Taylor
18	Battle Mountain Band Council
19	U.S. Fish and Wildlife Service