

APPENDIX C

U.S. FISH AND WILDLIFE SERVICE CONCURRENCE MEMORANDUM

DESCRIPTION OF THE ACTION AREA

The *Action Area* is delineated by the 10-foot-aquifer drawdown contour line (determined by the combination of both Barrick and Newmont's model simulations) which defines the maximum extent of hydrogeologic impact due to groundwater pumping associated with Barrick and Newmont's mine operations (see attached Figure 8-4). Portions of the Boulder Flat, Maggie Creek, Marys Creek, Rock Creek Valley, Susie Creek, and Willow Creek Valley subbasins are located within the Action Area. Only the Maggie Creek Subbasin may be affected by Barrick and Newmont's water pumping operations.

The Goldstrike property is situated in the Boulder Flat Subbasin, a topographic feature that contains the drainages of Bell, Boulder, Brush, and Rodeo creeks. Brush and Bell creeks drain to Rodeo Creek, and Rodeo Creek converges with Boulder Creek in the northern portion of the Boulder Flat Subbasin, west of the active mining area. Elevations in Boulder Flat Subbasin range from 5,100 feet average mean sea level (amsl) in the foothills to over 8,700 feet amsl at the peak of the Tuscarora Mountains, a north-trending range typical of the Basin and Range physiographic province. All of Barrick's mining facilities are being conducted on private land owned by Barrick or Newmont with the exception of approximately 300 acres of a waste rock disposal area, ore stockpiles, and topsoil stockpiles, that are located on public lands.

AFFECTED SPECIES

LCT. The Maggie Creek Subbasin has a number of streams that either support or have the potential to support LCT, all within the upper portion of the Maggie Creek subbasin. Studies indicate that LCT occur in 9 of the 17 streams with potential to support trout in the Maggie Creek Subbasin. These streams include Maggie, Little Jack, Jack, Beaver, Toro Canyon, Coyote, Little Beaver, Williams Canyon, and Lone Mountain creeks. Potential LCT streams include Lake, Dip, Upper Maggie, Coon, Chicken, Simon, Spring, and Indian Jack creeks. Estimated miles of occupied/unoccupied LCT habitat in each of these streams is shown in Table 1. The length of habitat in each stream may vary annually depending upon streamflow and water temperature.

Table 1. Estimated miles of occupied/unoccupied LCT habitat in the Maggie Creek Subbasin Streams		
Stream	Miles Occupied Habitat	Miles Unoccupied Potential Habitat
Maggie Creek (mainstem)	8.0	
Little Jack Creek	4.6	
Coyote Creek	6.5	
Beaver Creek	8.0	
Little Beaver Creek	1.1	
Toro Canyon Creek	2.3	
Williams Canyon Creek	1.1	
Jack Creek (spring-fed channel)	0.3	
Lone Mountain Creek	2.2	
Lake Creek		4.2
Dip Creek		1.6
Coon Creek		3.9
Chicken Creek		1.4
Simon Creek		2.0
Spring Creek		2.0
Indian Jack Creek (mainstem)		6.9
Upper Maggie Creek		6.3

Bald Eagle. There are no known nesting bald eagles in the project area. However, bald eagles infrequently winter along the Humboldt River.

PROPOSED ACTION

The gold deposits that Barrick is presently mining and plans to mine in the future are situated below the natural groundwater elevation. In order to mine the gold deposits, Barrick initiated a groundwater pumping program in February 1990. Barrick has pumped up to approximately 70,000 gpm. From 1990 to the first quarter of 1996, Barrick lowered groundwater elevations

by approximately 1,300 feet and pumped approximately 446,000 acre-feet of water. In April 1996, Barrick reduced pumping rates to match water demand for mining, milling, and irrigation uses for a period of approximately 12 months. During that period, water levels rose approximately 225 feet due to Barrick's curtailment of groundwater pumping operations.

In 1997, Barrick increased pumping levels to approximately 65,000 gpm, and water levels began to recede. At the end of 1998, water levels were at approximately the 3,738-foot elevation (1,527 feet below the pre-mining elevation); and approximately 621,000 acre-feet of water had been pumped. Pumping rates were maintained above 60,000 gpm through the first quarter of 1999. As of February 2001, Barrick was pumping just under 31,000 gpm. In approximately 2010, dewatering would cease; however, approximately 2,000 to 4,000 gpm of ground water would be pumped for up to an additional 10 years for mine reclamation and mineral processing activities.

Barrick collects ground water from in-pit wells and sumps, horizontal drains, and perimeter wells. Initially the majority of the water was pumped from in-pit wells and sumps; however, Barrick has now established a well field outside the boundaries of the present mine that is capable of pumping most of the water needed to achieve Barrick's ground water drawdown objectives. Barrick has drilled over 134 wells in this field. In addition, Barrick has installed approximately 500,000 feet of horizontal drains in the walls of the mine that produce between 0 and 200 gpm. Water production from individual horizontal drains drops rapidly with time, usually stopping within a 4-week period. In the future, Barrick may drill additional wells on private land to replace existing wells that have gone dry.

Water is pumped from the production wells through a network of high-density polyethylene and steel pipes either to process water tanks or to a 72-inch-diameter gravity-flow pipeline. Approximately 4,000 to 8,000 gpm of water are delivered to the Goldstrike or Newmont Mine for mining and milling uses. Mining and milling uses of water include process make-up water for mill ore slurry or heap leach solution, road dust control watering, exploration drilling, and sanitary uses.

Water that is not used for mining or milling purposes is delivered to the gravity-flow pipeline. Barrick discharges water produced by its groundwater pumping operations to ground waters of the state via percolation, infiltration, and irrigation. Barrick anticipates that the present practice of delivering water from the well field to the TS Ranch Reservoir area through the gravity-flow pipeline will continue throughout the remaining life of the mine.

In 1990, Barrick, Newmont, and Elko Land and Livestock Company (ELLCO) (subsidiary of Newmont) implemented a Water Management Plan that described the manner in which water produced by Barrick's groundwater pumping operations would be used in Boulder Valley. The

1990 Water Management Plan envisioned Barrick providing water to ELLCO to irrigate more than 5,000 acres of lands on the TS Ranch. Barrick purchased and installed 15 center-pivot irrigation sprinklers in Boulder Valley and began delivering water from the TS Ranch Reservoir to these pivots in 1991. Since then, ELLCO has used the water delivered by Barrick to grow alfalfa and grass that it uses in its ranching operations or sells. In addition, ELLCO has used some water for livestock on the TS Ranch.

In 1993, Barrick identified an outcrop of rhyolite in upper Boulder Valley that was determined to be an effective infiltration area. Barrick initially developed a 4-acre infiltration basin and began delivering water to the basin in April 1994. In the fall of 1995, Barrick expanded the basin to 6 acres, which increased the infiltration capacity of the basin to approximately 15,000 gpm. Per protocol established by Barrick and Newmont, Barrick, in April 1994, began injecting water from Barrick's groundwater pumping operations into the rhyolite formation through wells. At present, Barrick estimates the capacity of the existing injection wells at approximately 28,000 gpm on an instantaneous basis.

In January 1997, Barrick completed construction of a water treatment facility and conveyance system and began discharging water produced by groundwater pumping operations to the Humboldt River. The treatment facility uses lime treatment and pH adjustment to lower the naturally occurring levels of total dissolved solids, fluoride, and boron in the ground water to levels that are below the Humboldt River water quality standards. The sludges from the treatment process are used as an alternative feedstock for the autoclave neutralization process. Cooling towers are used to lower the water temperature so that the Humboldt River temperature standards and dissolved oxygen standards are met. Barrick constructed a conveyance system composed of buried pipelines and a synthetically lined upland canal from the treatment plant to an outfall at the Humboldt River that is adequate to discharge up to 65,000 gpm of treated water from the groundwater pumping operations.

Barrick suspended operation of the Boulder Valley water treatment plant and discharges to the Humboldt River in early February 1999. At present, the use of infiltration and irrigation is sufficient to manage dewatering flows without the need for discharge to the Humboldt River.

Barrick presently anticipates that water will continue to be used for mining and milling purposes and delivered to Boulder Valley for irrigation during the irrigation season. Water that is not used for mining, milling, or irrigation purposes would be infiltrated. If excess dewatering water could not be infiltrated, it would be treated and discharged to the Humboldt River. The capacity of infiltration, injection, irrigation, and other beneficial uses to receive ground water produced by Barrick may be limited by Barrick's delivery of groundwater flows from the springs in Boulder Valley to those uses, by regulatory and other legal restrictions, and by other binding obligations to third parties.

Both Newmont and Barrick have developed numerical ground water models that encompass the regional hydrologic study area. Each model was used to predict the cumulative groundwater drawdown resulting from dewatering and water management at three mines (Goldstrike, Gold Quarry, and the proposed Leeville project). The Newmont model predicts the cumulative drawdown will encompass a substantially larger area than does the Barrick model. For purposes of National Environmental Protection Act cumulative effects analysis, the results from both the Barrick and Newmont model simulation were combined to illustrate the projected maximum extent of the 10-foot ground water drawdown associated with the three mine operations. The predicted maximum extent of the 10-foot drawdown contour line of the water table in the aquifer was selected to represent the general area of potential hydrogeologic impact. The 10-foot drawdown contour was created by selecting the maximum extent of the 10-foot drawdown isopleth in any modeled year. Therefore, the contour does not represent the actual 10-foot isopleth in one specific year, but its maximum extent for any location.

Most springs in the *Action Area* are fed by perched and colluvial aquifers, and therefore are not likely to be affected by mine dewatering. Field examinations, hydrogeologic evaluations, and geochemical studies indicate that most springs in the region are not hydraulically connected to the deeper ground water systems. Using chemical and isotopic data and geological information from Little Jack, Coyote, and Beaver creeks, Balleau Groundwater Consulting (BGC) developed a conceptual model for streams along the eastern slope of the Tuscarora Mountains. The model shows that springs and perennial streams at elevations above 6,000 feet are supported by locally recharged water stored in colluvial material. In 1998, the Desert Research Institute (DRI) evaluated the surface and ground water relationships in the eastern portion of the Tuscarora Mountains, and generally confirmed BGC's conceptual model of locally derived water. However, DRI also concluded that some of the flow in springs below 6,000 feet on the east side of the Tuscarora Mountains may come from deeper sources.

BARRICK MINIMIZING/ENHANCEMENT MEASURES

Wetland Mitigation Fund and Water Level and Flow Monitoring.

Wetland Mitigation Fund

Barrick established a trust fund that is available to be used by BLM to initiate onsite or offsite riparian and wetland protection or enhancement projects to minimize the impacts of Barrick's groundwater pumping and water management operations. In 1991, the trust fund was established at \$660,000. By the end of March 2001, the fund had grown to over \$1,002,000. BLM proposes to use monies (either principle and/or interest) to fund the following projects, listed in priority order, which were designed to enhance and protect LCT habitat within the Humboldt River Basin:

1. **Culvert Removal and Replacement in the Maggie Creek Subbasin (\$100,000).** Currently culverts beneath the county road are believed to be restricting movement of LCT between tributary streams and the main-stem of Maggie Creek in the Maggie Creek Subbasin. Replacement of impassible culverts with structures designed for fish passage will facilitate development of a more functional metapopulation.
2. **Maggie Creek Land Exchange (\$80,000).** The completion of this exchange will put more than 5 miles of Susie Creek in public ownership. Susie Creek is potential habitat for LCT. Increased public ownership of the Susie Creek drainage would ensure long-term protection of restored areas and increase opportunities for improved management of upstream reaches now under private ownership.
3. **Squaw Valley/Spanish Ranch Allotment Division Fence (\$120,000).** BLM proposes to complete the construction of a division fence between the Squaw Valley and the Spanish Ranch Allotments. The Squaw Valley Allotment supports potential LCT metapopulations in the Toe Jam/Rock Creek and Upper Willow Creek drainages.
4. **Sherman Creek Land Exchange (\$80,000).** BLM proposes to pursue a land exchange in which approximately 6 miles of the East and West branches of Sherman Creek would become public land. The West branch of Sherman Creek presently supports a small viable population of LCT.
5. **Dixie Creek Fish Barrier (\$ Unknown).** The Humboldt River Distinct Population Segment (DPS) team has identified a need for a fish barrier in the lower reaches of Dixie Creek above the South Fork of the Humboldt River. Nonnative salmonids in the South Fork currently have unrestricted access to habitat occupied by LCT in the headwaters of Dixie Creek.

Water Level and Flow Monitoring

Barrick identified 19 seep and spring sampling locations that have been monitored annually since 1991, for flow rate, water quality, and vegetation. These sampling locations are situated along the crest and flanks of the Tuscarora Mountains. In 1995, Barrick began monitoring of an additional 17 stream, seep, and spring locations. Barrick prepares and submits annual monitoring reports to BLM. Barrick has agreed to conduct monitoring of surface waters, ground water observation ports, process solutions as required by other permits and approvals granted by state agencies, and to provide the results of the monitoring to BLM, until 2030. The following funds were established by Barrick to fulfill their monitoring and mitigation commitments:

Riparian Restoration Fund. Barrick has established a fund in the amount of \$40,000 for BLM to use for the purchase and planting of seedlings or container plants in riparian or wetland areas to accelerate revegetation of areas adversely affected by Barrick's groundwater pumping and water management operations. To date, no riparian or wetland areas have been adversely affected by Barrick's groundwater pumping and water management operations, therefore, no expenditures have been made from this fund.

Long-term Review, Monitoring, and Mitigation Trust Fund. In 1991, Barrick established a \$1,000,000 trust fund for BLM to use for the review, monitoring, or mitigation of potential impacts from Barrick's operations that were not specifically addressed in the mitigation stipulations or reclamation plan for the Betze Project. As of March 2001, the fund had grown to over \$1,700,000. To date, no expenditures have been made from this fund.

Upper Willow Creek Habitat Enhancement Plan.

Under the plan, approximately 20.5 miles of occupied and/or potential LCT streams will be enhanced through extended rest from livestock grazing followed by the implementation of a riparian friendly grazing program. The Upper Willow Creek Enhancement Area (UWCEA) includes a total of 12,900 acres, with 2,838 acres in public ownership and 9,915 acres owned by Barrick. The proposed grazing program for the UWCEA will be implemented in three phases.

Phase 1. Continue to graze UWCEA under the existing livestock grazing program until August 1, 2003. Existing livestock grazing program is as follows:

Trail livestock between the Willow Creek Reservoir and the Lower Nelson Field using the ridges and not the riparian area along Willow Creek.

Livestock use of either or both the Lower and Upper Nelson Fields must not exceed two weeks in duration.

Remove livestock from the Upper Nelson Field by August 1.

Place salt blocks away from springs and streams in both the Upper and Lower Nelson Fields.

Phase 2. The UWCEA will be closed to livestock grazing until the streams within the UWCA (Lewis and Nelson Creeks and that reach of Willow creek located between Willow Creek Reservoir and the eastern boundary of the Squaw Valley Allotment) reach proper

functioning condition (PFC) criteria as defined in BLM Technical Reference 1737-9 and achieves desired future condition (DFC) criteria outlined in section C, of Barrick's *Upper Willow Habitat Enhancement Plan*.

Phase 3. Implement the long-term grazing system upon achieving the PFC/DFC criteria outlined in section C, of Barrick's *Upper Willow Habitat Enhancement Plan*. Livestock grazing would be authorized at appropriate levels consistent with carrying capacities defined as AUMs to maintain or improve PFC/DFC criteria achieved through rest. Annual riparian stubble height and streambank trampling objectives will be established to ensure significant progress towards attainment of objectives is being made. The permittee will be responsible for ongoing observations to ensure that stubble height, streambank trampling criteria, upland, and riparian utilization associated with livestock use are not exceeded. The criteria for riparian/streambanks are: 1) herbaceous utilization shall ensure a 4-inch stubble height is left when livestock are removed and a 6-inch stubble height is present at the end of the growing season; 2) woody utilization shall not exceed 20 percent on willows and/or 10 percent on aspen; 3) streambank trampling shall not exceed 10 percent; and 4) grazed pastures shall be rested the following year. Under the long-term grazing system, livestock grazing in the UWCEA will be permitted under the following conditions:

Even Years. The UWCEA may be used in either the spring or fall season but not both seasons in the same year. Spring use period is defined as prior to July 1 with a three-day flexible on-date and no flexibility in off-date. The fall use period is defined as September 16 through October 15 with no flexibility in on-date and a three-day flexible off-date. Flexibility in on- and off-dates will not allow for livestock use in excess of carrying capacity.

Odd Years. The UWCEA will be rested.

BLM and Barrick will evaluate the monitoring data collected on the UWCEA to determine if the previous season of use exceeded the utilization criteria for riparian herbaceous and/or woody vegetation and/or exceeded the bank trampling criteria. If any of these criteria are exceeded, BLM will initiate the following actions:

BLM and Barrick will modify the existing grazing system for the UWCEA (e.g., reduction in season of use, reduction in numbers of livestock, extended period of rest or a combination of all these strategies) for purposes of avoiding exceeding the criteria for utilization of riparian vegetation and bank trampling. BLM will repeat this strategy until the criteria for utilization of riparian vegetation and bank trampling are met.

SERVICE CONCURRENCE

The Service concurs that BLM's approval of Barrick's proposed Betze Project, as proposed, is not likely to adversely affect LCT or the bald eagle and their habitat. The Service bases its concurrence on the following:

- Hydrologic studies conducted in the Maggie Creek Subbasin show that most of the springs/streams located above 6,000 feet are not hydraulically connected to the deeper groundwater systems and therefore, would not be affected by groundwater pumping;
- Combined ground water modeling from Barrick and Newmont which illustrates the maximum extent of the cone of depression predicts that the occupied LCT streams within the Maggie Creek Subbasin below 6,000 foot would not be affected by the groundwater pumping;
- Absence of any evidence from existing monitoring wells that the current groundwater pumping is impacting the water table or spring/stream surface flows in the upper Maggie Creek Subbasin;
- Presence of a network of existing monitoring wells located in various geological strata and at a range of depths for the purposes of monitoring changes in the water table throughout the extent of the dewatering cone of depression, plus a commitment by Barrick to install up to three additional wells, if warranted;
- Presence of a trust account in the amount of over \$1,000,000, to be used by BLM to initiate onsite or offsite riparian and wetland protection or enhancement projects to minimize the impacts of Barrick's groundwater pumping and water management operations. BLM proposes to use the fund for the following riparian or wetland projects: 1) culvert removal and replacement in the Maggie Creek Subbasin, 2) Maggie Creek land exchange, 3) the Squaw Valley/Spanish Ranch Allotment division fence, 4) Sherman Creek land exchange, and 5) Dixie Creek fish barrier;
- Presence of a trust account (*Long-term Review, Monitoring, and Mitigation Trust Fund*) in the amount of over \$1,700,000, to be used by BLM to review, monitoring, or mitigation of potential impacts from Barrick's operations that were not specifically addressed in the mitigation stipulations or reclamation plan for the Betze Project;

- Presence of a trust account (*Riparian Restoration Fund*) in the amount of \$40,000 for BLM to use for the purchase and planting of seedlings or container plants in riparian or wetland areas to accelerate revegetation of areas adversely affected by Barrick's groundwater pumping and water management operations;
- Commitment by Barrick to implement the *Upper Willow Creek Enhancement Plan*; and
- BLM will initiate an annual multi-cooperators (BLM, FWS, NDOW, Barrick) interdisciplinary field evaluation of the ongoing riparian monitoring program.

After further review of the revised proposed action, subsequent discussions and review of information submitted as part of this consultation, we have determined formal consultation pursuant to section 7 of the Act is not required.

This response constitutes informal consultation under 50 CFR § 402.13 of our interagency regulations governing section 7 of the Act. BLM should reinitiate section 7 consultation if: (1) the proposed action is changed or (2) new biological information becomes available concerning listed or candidate species which may be affected by the proposed action.

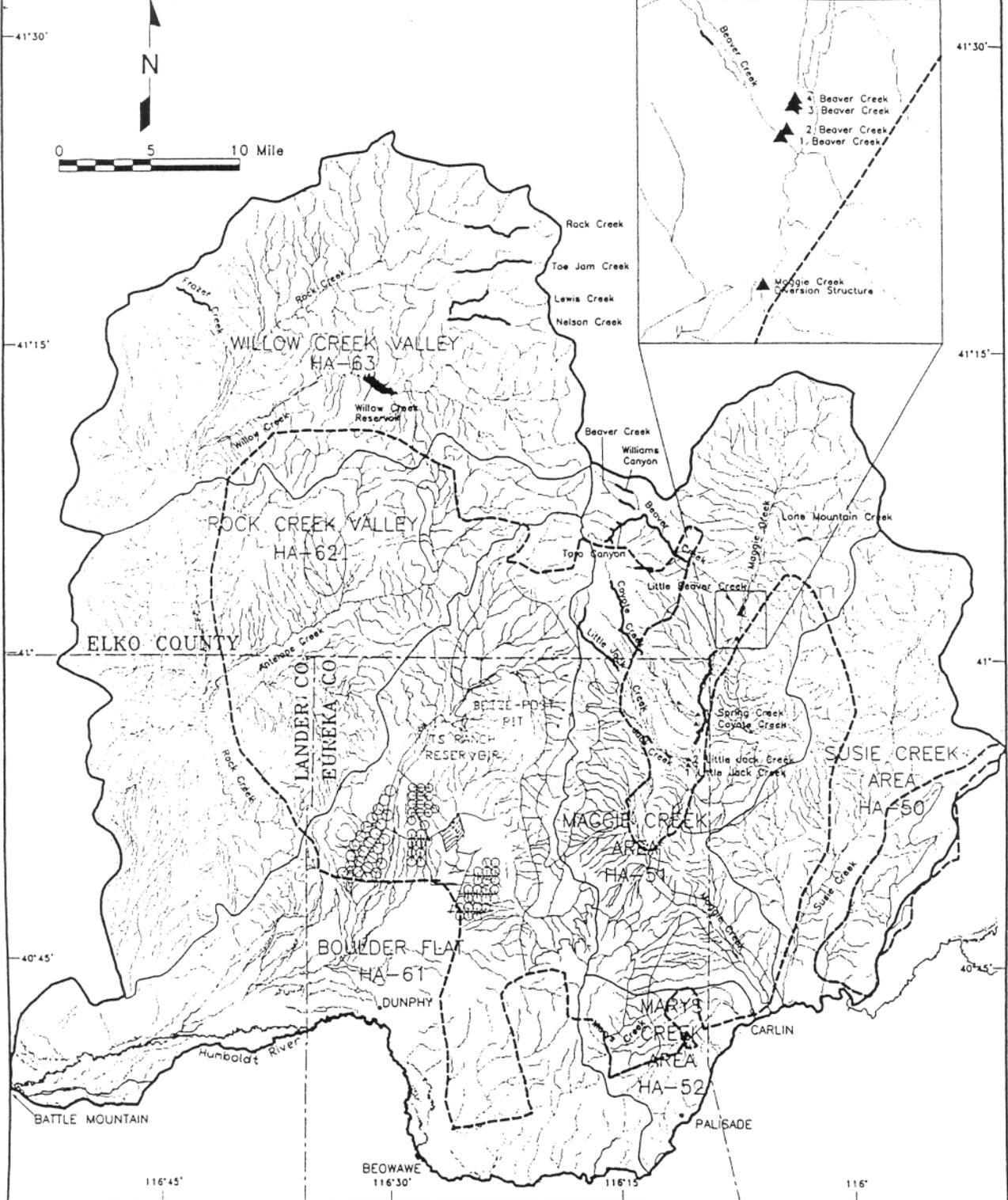
We appreciate the cooperation of BLM and Barrick throughout this consultation process. If you have any questions regarding this informal consultation, please contact me or Mark Maley at (775) 861-6300. Thank you for your concern for threatened and endangered species.


For Robert D. Williams

Attachment (Figure 8-4)

cc:

Richie D. Haddock, esq., Barrick Management Corporation, Salt Lake City, Utah



Legend

- Ground Water Basin Boundary
- Stream
- County
- Lahontan Cutthroat Trout Habitat
- Cumulative Drawdown Area (≥10 Feet of Drawdown)
- Areas where Perennial Waters could Potentially be Impacted by Drawdown ¹
- Areas where Perennial Waters have a Low Probability of Being Impacted by Drawdown ¹
- Center Pivot Irrigation

¹ Does not include potential impacts to perennial waters located outside the cumulative 10-foot drawdown contour.

Figure 8-4

Lahontan Cutthroat Trout Habitat Potentially Affected by Cumulative Drawdown

8-10