BIOLOGICAL ASSESSMENT

FOR THE

Happy Creek Allotment Livestock Grazing Permit

Winnemucca Field Office – Nevada, Bureau of Land Management

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August, 2007

Happy Creek in the Happy Creek Allotment

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Introduction

The purpose of this Biological Assessment (BA) is to review the proposed action of the Happy Creek Allotment Livestock Grazing Permit to ensure that this plan is not likely to jeopardize the continued existence of any listed species or result in the destruction or adverse modification of designated critical habitat. The proposed action is subject to section 7 consultation under the Endangered Species Act (ESA) for the Lahontan cutthroat trout (*Oncorhynchus clarkii henshawi*), LCT. The proposed action may effect, and is likely to adversely affect the threatened LCT in the Happy Creek Allotment Livestock Grazing area.

Consultation History

1-30-07 BLM requested a Species List from USFWS.

2-08-07 BLM received the Species List from USFWS via email.

2-09-07 Pre-Consultation conference at USFWS with Laurie Sada (USFWS – Reno), Selena Werdon (USFWS – Reno), David Potter (USFWS – Reno), Chad Mellison (USFWS – Reno), Allen Taylor (USFWS – Reno), Steve Blair (BLM – Winnemucca), and Greg Lynch (BLM – Winnemucca) to begin discussion of upcoming consultations.

3-20-07 Conference call with USFWS-Reno: Laurie Sada, Selena Werdon, David Potter, Chad Mellison, Allen Taylor, Todd Gilmore, and Greg Lynch (BLM – Winnemucca).

Description of the Action Area

The Action Area is the Happy Creek Allotment that is within the northern portion of the Jackson Mountain Range just south of Highway 140, which is located approximately 50 miles northwest of Winnemucca, Nevada. The allotment is approximately 95,127 acres of public land (see Map 1, page 7).

The Happy Creek Allotment is divided into three pastures: Upper Happy Creek, South of the Highway, and North of the Highway (see Map 2, page 8). Happy Creek flows through the Upper Happy Creek and South of the Highway pastures. Happy Creek is a currently unoccupied recovery stream for Lahontan cutthroat trout (LCT). LCT are scheduled to be reintroduced into Happy Creek by NDOW in the next few years following a safe harbor agreement with the NDOW/USFWS and the private land owner. Most of the LCT habitat exists within the Upper Happy Creek pasture due to surface flowing water within the South of the Highway pasture being diverted through a pipeline near the elevation of 4,550 feet (downstream end of Reach 5), and piped to the Happy Creek Ranch for irrigation purposes (see Photos 1 & 2). The Upper Happy Creek pasture is partially fenced to reduce livestock straying from the South of the Highway pasture.

Photo 1. Water diversion into pipeline (May 2007).

Photo 2. Distance between downstream end of Reach 5 (fenceline) and the Water Diversion (May 2007).

Proposed Action & Project Description

The Proposed Action is to issue a ten year grazing permit to Happy Creek, Inc. for the Happy Creek Allotment. This would allow 500 head of cattle (3724 AUMs) to graze at approximately 25.5 acres per AUM. The permitted season of use for 500 cows would be from 4/1 to 8/30, and 272 cows from 10/15 to 2/28 (Tables 1, 2 & 3).

Table 1. Grazing Permit under Proposed Action

Livestock Number	Livestock Kind	Begin Date	End Date	% Public Land	Type Use	AUMs
500	Cattle	04/01	08/30	100	Active*	2499
272	Cattle	10/15	02/28	100	Active*	1225
Total AUMs						3724
*Portion of the grazing preference that is available for livestock use under a permit or lease based on livestock carrying capacity and resource conditions in an allotment and not in suspension						

Table 2. Grazing System under Proposed Action

Pasture	**Year 1**	**Year 2**
Upper Happy Creek	REST until PFC is met*	REST until PFC is met*
South of Highway	500 cows 4/1-8/30	272 cows 10/15-2/28
North of Highway	272 cows 10/15-2/28	500 cows 4/1-8/30

* After PFC is met, graze 150 cows from 5/15-6/15 every other year in Upper Happy Creek

Table 3. Current and Proposed Grazing System

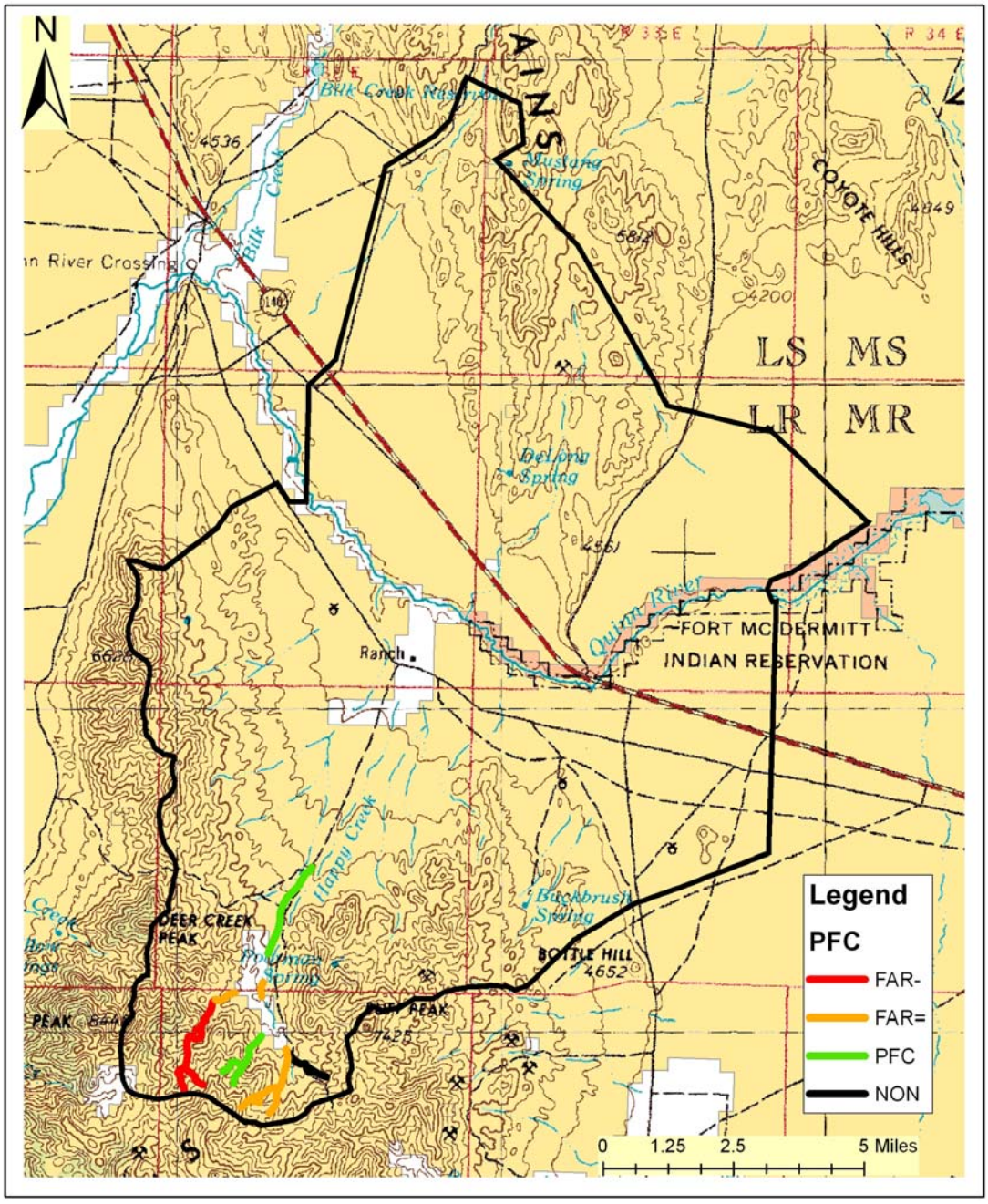
HAPPY CREEK ALLOTMENT			1997 FMUD			2007 PROPOSED		
Species	Stream	**Use Area**	Existing Use Dates	Existing AUM's	Existing LCT Monitoring	Proposed Change of Use Dates	Proposed Change of AUM's	Proposed LCT Monitoring
		South of Highway Pasture	4/1 – 5/14 5/15 – 7/15 7/16 – 8/30	723 713 756		Year 1: 4/1 – 8/30 Year 2: 10/15 – 2/28	2499 1225	
LCT	Happy Creek	**Upper Happy Creek Pasture**	5/15 – 7/15	306	Streambank riparian plant and woody species (30% utilization)	**Years(?):** Rest Pasture until PFC is met on Happy Creek reaches 1-9 **Years(?) after PFC is met:** Year 1: 5/15 – 6/15 Year 2: Rest	0 (150)*	Streambank riparian plant species (6" stubble height), woody riparian species (30% utilization), streambank alteration (10%)
		North of Highway Pasture	10/15 – 2/28	1225		Year 1: 10/15 – 2/28 Year 2: 4/1 – 8/30	1225 2499	

* After PFC is met on Happy Creek (reaches 1-9), graze 150 cows from 5/15 – 6/15 every other year in the Upper Happy Creek pasture. Upper Happy Creek pasture would be grazed in conjunction with the South of the Highway pasture – the 150 cows grazed upon Upper Happy Creek would be taken from the cattle in South of the Highway pasture, and would not be additional AUM's.

Table 4. Recent Happy Creek Monitoring.

HAPPY CREEK		**LCT STREAM MONITORING**		
Year	Pasture	Stubble Height > 4-6"	Woody Species < 30% Utilization	Streambank Alteration < 10%
2006	Upper Happy Creek	3.2"	N/A	20.6%
2005	Upper Happy Creek	N/A	N/A	N/A
2004	Upper Happy Creek	< 4"	> 30%	49.4% (only west fork)
2003	Upper Happy Creek	1.4" (east fork) Good (west fork) Excellent (exclosure)	N/A	N/A

Map 1. Happy Creek Allotment.



Happy Creek Allotment

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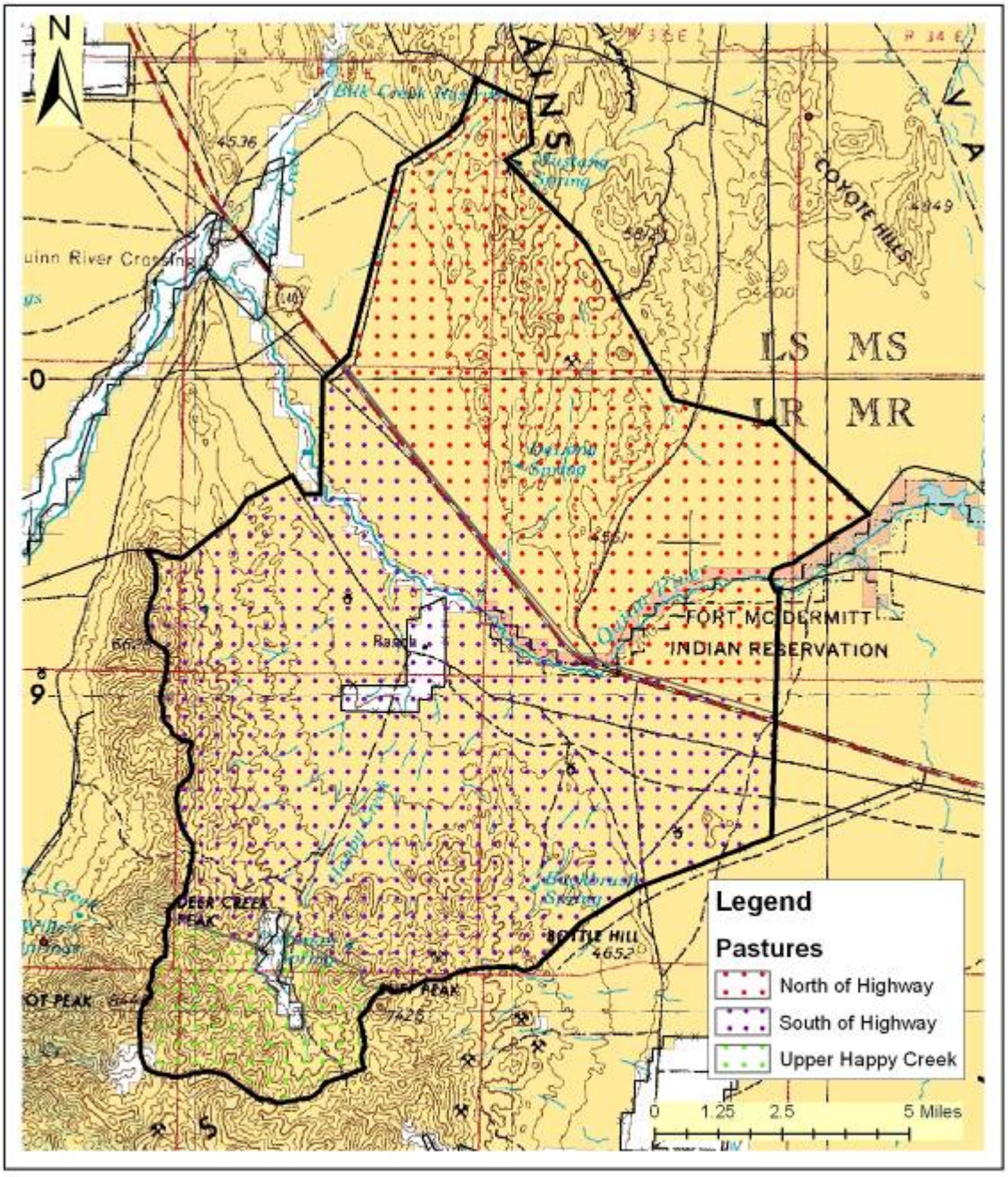
Map 2. Happy Creek Allotment Pastures.



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12/01/06

Under the proposed action, the Happy Creek Allotment objectives would be updated as follows:

A. Short Term Monitoring Criteria (annual implementation monitoring) (Cowley & Burton 2005; USDOI 1996):

1. Utilization of key streambank riparian plant species sedges (Carex spp), rushes (Juncus spp), bluegrass (Poa spp), on Happy Creek reaches 1, 2 & 3 will maintain a minimum of a 6-inch stubble height (see Map 3, page 11) which will remain at the end of September, as measured along the greenline[a], based upon site potential and stream characteristics.

2. Utilization of willow (Salix spp), aspen (*Populus tremuloides*), and wild rose (*Rosa woodsii*) on Happy Creek reaches 6, 7, 8, & 9 will not exceed 30 percent, based upon site potential and stream characteristics.

3. Streambank alteration from livestock trampling on Happy Creek reaches 1, 2 & 3 will not exceed 10 percent as measured along the greenline, based upon site potential and stream characteristics.

4. Utilization of key upland plant species; Thurber's needlegrass (*Achnatherum thurberianum* (ACTH7)), crested wheatgrass (*Agropyron cristatum* (AGCR)), Idaho fescue (*Festuca idahoensis* (FEID), bottlebrush squirreltail (*Elymus elymoides* (ELEL5)), basin wildrye (*Leymus cinereus* (LECI4)), bluebunch wheatgrass (*Pseudoroegneria spicata* (PSSP6)), winterfat (*Krascheninnikovia lanata* (KRLA2), needle and thread (*Hesperostipa comata* (HECO26), and Indian ricegrass (*Achnatherum hymenoides* (ACHY)), will not exceed 50% on any key species. Occasional use up to 60% is acceptable since 41 to 60% use is considered moderate grazing. Repeated utilization (two consecutive seasons) of more than 50% on any one species will be considered as not meeting the criteria. Moderate use means that half of the available forage (by weight) on key species appears to have been utilized and 15 to 25% of the current stalks remain intact.

5. Improve Happy Creek lotic systems (upstream from the water diversion in designated reaches-see Map 3) to properly functioning condition PFC.

[a] Greenline – the first perennial vegetation that forms a lineal grouping of community types on or near the water's edge. Most often it occurs at or slightly below the bankfull stage. (BLM TR 1737-20)

B. Long Term (effectiveness monitoring):

1. Manage, maintain and improve public rangeland conditions to provide forage on a sustained yield basis for big game, with an initial forage demand of 262 AUMs for mule deer and 38 AUMs for bighorn sheep.

2. Manage, maintain and improve public rangeland conditions to provide forage on a sustained yield basis for livestock, with an initial stocking level of 3724 AUMs.

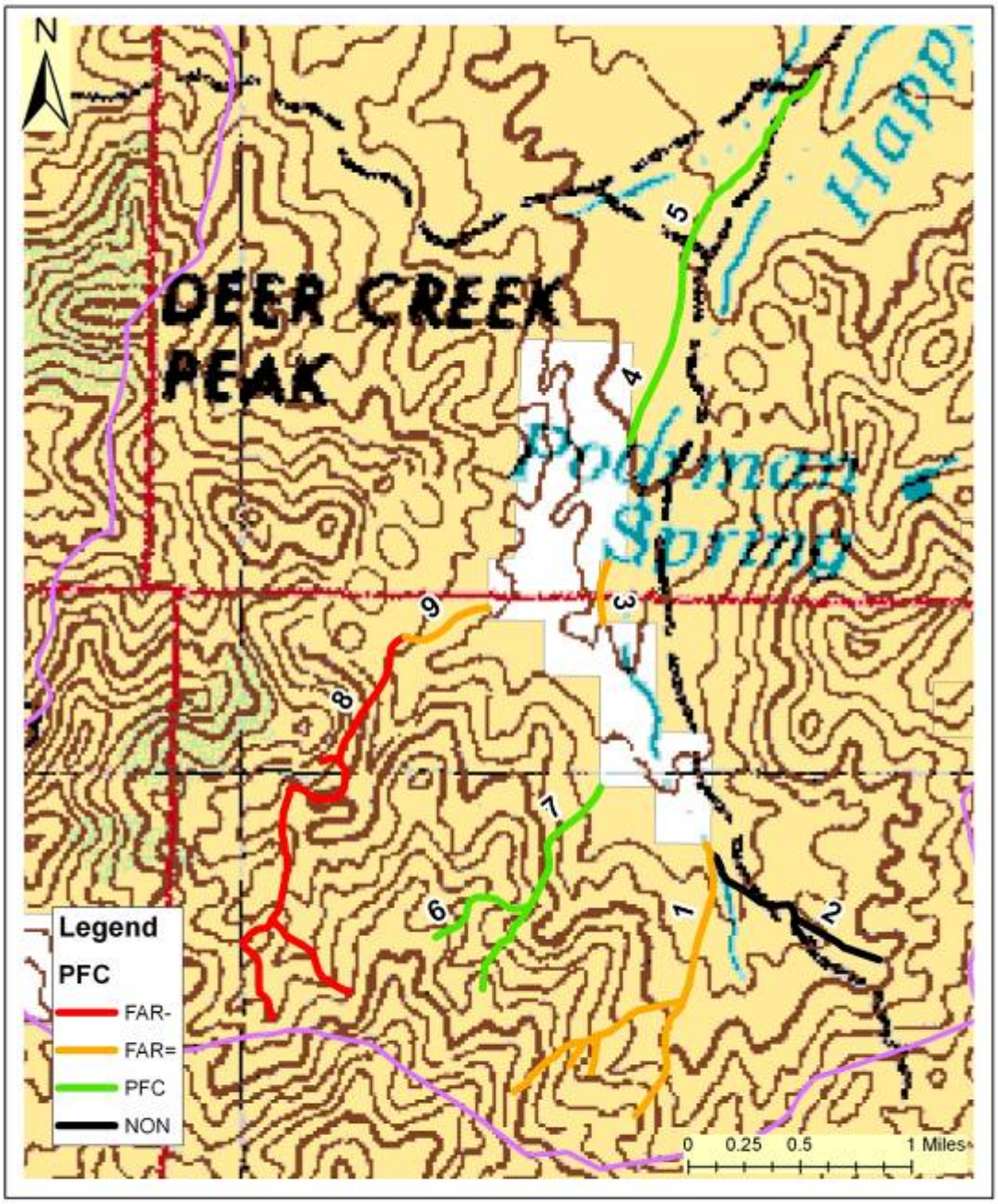
3. Sagebrush Habitat-Sagebrush Obligates

   Maintain and improve sagebrush plant communities on stable soils with structurally diverse shrub component in various age classes (within a stand or among stands across the landscape) with vigorous, diverse self-sustaining under story of native grasses and forbs. Emphasis will be placed on maintaining and improving the composition of the following native grasses: bluebunch wheatgrass (*Pseudoroegneria spicata*), Indian ricegrass (*Achnatherum hymenoides*) and Thurber's needlegrass (*Achnatherum thurberianum*).

4. Improve or maintain the following stream habitat conditions from 60% on Happy Creek to an overall optimum of 70% or above, based on stream survey studies. The optimum is the Habitat Condition Index (HCI) that is collected from the following parameters that are measured during the stream surveys: pool measure, pool structure, stream bottom, bank cover, bank soil stability, and bank vegetation stability.

   1. Stream cover 60% or above
   2. Streambank stability 60% or above
   3. Maximum summer water temperatures below 72 degrees Fahrenheit.

Map 3. Happy Creek Reach Assessment.



Happy Creek Reach Assessment

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Listed Species

Lahontan Cutthroat Trout (*Oncorhynchus clarkii henshawi*)

Species Status and Historical Distribution: Lahontan cutthroat trout (LCT) was initially listed as endangered under the Endangered Species Conservation Act of 1969 based on evidence on hand at the time indicating they were endangered due to destruction, drastic modification or severe curtailment of their habitat; hybridization with introduced trout species was also a factor. LCT were reclassified as threatened in 1975 due to the ability to culture them and to successful reintroductions into a few areas where they had been extirpated. Critical habitat has not been designated for LCT.

LCT is one of 14 recognized subspecies of cutthroat trout in the western United States. Cutthroat trout have the most extensive range of any inland trout species of western North America and occur in anadromous, non-anadromous, fluvial, and lacustrine populations (Behnke 1979). LCT historically occurred in most cold waters of the physiographic Lahontan basin of northern Nevada, eastern California, and southern Oregon, including the Truckee, Carson, Walker, Humboldt, and Quinn River drainages. They are also present in the Coyote Lake basin of southern Oregon. The Coyote Lake basin is an isolated endorheic basin with no direct connection to the Lahontan basin in the south. Little is known of the history of colonization by cutthroat trout in the Coyote Lake basin, but Behnke (1992) believed the most plausible explanation for their presence was a headwater stream transfer from the neighboring Quinn River basin.

Large alkaline terminal lakes, major river systems, mountain streams and lakes, and small tributary streams were inhabited, resulting in the present highly variable subspecies. In the Quinn River basin, reduced abundance and distribution of LCT have been attributed to extensive long-term livestock grazing of riparian habitats and introductions of nonnative rainbow (*Oncorhynchus mykiss*) and brook trout (*Salvelinus fontinalis*) (USFWS 1995; Sevon *et al.* 1999; Meehan and Bjornn 1991). Drought conditions from 1987 through 1994 caused significant declines in many populations within the Great Basin, but good water years from 1995 through

1999 improved the abundance of LCT in many streams. However, drought conditions and a severely cold winter during 2000 may have reversed this trend. These populations remain subject to the vagaries of drought, flood and other environmental conditions and at least 12-15 populations have been lost rangewide since 1985. In areas where a functional metapopulation is not in place, these populations' losses are permanent unless LCT are reintroduced. However, there are risks associated with reintroductions, such as reduced numbers of fish in the donor populations. Population decreases may lead to genetic bottlenecks, loss of reproductive potential, and inbreeding depression.

Life History: LCT inhabit lakes and streams, but are obligatory stream spawners. Intermittent tributary streams are frequently used as spawning sites (Coffin 1981; Trotter 1987). Spawning generally occurs from April through July, depending on stream flow, elevation, and water temperature (Calhoun 1942; La Rivers 1962; McAfee 1966; Lea 1968; Moyle 2002). Eggs are deposited in one-quarter to one-half inch gravels within riffles, pocket water, or pool crests. Spawning beds must be well oxygenated and relatively silt free for good egg survival. Fry remain in shallow bank-line areas with small gravel/cobble for cover. By early fall the small (2-3 inches) fingerlings may school together in shallow pools.

Literature describes optimum LCT habitat as characterized by 1:1 pool-riffle ratios, well vegetated stable streambanks, over 50 percent cover, and a relatively silt free gravel/rubble substrate (Hickman and Raleigh 1982), but the subspecies inhabits a wide range of less than optimal habitat conditions. They tolerate higher alkalinities than other trout species and can survive wide daily temperature fluctuations of 25-35 ºF. Dunham *et al.* (1997) note that most LCT populations have a distribution limit corresponding closely to maximum summer temperatures of 78 ºF, which was similar to results of laboratory experiments on thermal tolerances. Populations in less than optimal habitat may be present, but with reduced numbers and age classes. In general, LCT appear to avoid maximum water temperatures of 78.8 ºF if possible (Dunham *et al.* 1997). Dunham *et al.* (1997) recommend that water temperatures for LCT should not equal or exceed a daily maximum of 72 ºF to minimize risk of mortality and sublethal thermal stress.

LCT are opportunistic feeders. In small streams they feed on terrestrial and aquatic insects, which are caught in the drift. Fish larger than 12 inches in larger water bodies turn to a fish diet where available (Sigler and Sigler 1987). In most basins within the historic Lahontan basin, LCT have other native fish species present to enhance their diet, but historically in the Summit Lake and Coyote Lake basins LCT was the only fish present.

Population Dynamics: Many LCT populations were historically metapopulations (USFWS 1995). The term "metapopulation" refers to a collection of discrete local breeding populations. LCT metapopulation dynamics result when local breeding populations in tributary streams are interconnected by larger downstream habitats. Interaction among tributary populations may occur through "straying" or dispersal of residents and/or fluvial fish (Reiman and Dunham 2000). The presence of several subpopulations increases the probability that at least one will survive through periods of disturbance and consequently protect the genetic variation available

for adaptation to change. In metapopulations, some local populations are more stable or robust than others.

Due to the high risk of extinction of the isolated streams, a recovery strategy for the Quinn River basin is to introduce fish from pure populations into streams, which potentially could support LCT. The introductions are intended to protect the genetic diversity of the basin, increase the numbers of populations, and establish metapopulations within the basin once habitat conditions are suitable. The numbers of LCT for use in the metapopulations currently are low and the habitat is not yet suitable. To increase both the numbers and the possibility for establishing metapopulations will require long-term improvements in habitat.

Extensive demographic studies of LCT in 14 streams (primarily in the Humboldt River basin) by the University of Nevada, Reno, indicate extreme year-to-year variability in numbers of each age class (ages 1-6). This variability in numbers reflects variability in recruitment and survival among years. Data from several populations indicate that recruitment is strongly associated with stream flow and that survival is a strong function of population density (Peacock *et al.* 1999). Recruitment of individuals to the 1-year-old age class appears to be a function of average stream flows from March through June. Low to moderate flows during the previous year correspond with high recruitment and high flows during the previous year correspond to low recruitment, perhaps due to mortality caused by flooding. Low to moderate flows in the spring immediately prior to hatching are positively correlated with recruitment of 1-year-olds in the following year for many streams, perhaps due to improved spawning conditions and/or higher egg survival (Peacock *et al.* 1999). Additionally, Peacock *et al.* (1999) found the 0-year-old age class cannot be used for their population viability analysis since they are not evenly distributed throughout the streams.

Habitat Needs: LCT populations require high quality stream and associated riparian conditions. One measure of conditions is the functioning conditions of riparian areas. A properly functioning condition (PFC) is a minimum requirement for healthy stream environments. Achievement of PFC is based on whether a stream has a low width to depth ratio appropriate for the associated channel type (Rosgen 1994), together with stable and densely vegetated streambanks and floodplain areas, and a riparian plant community with herbaceous and/or a woody plant component(s) appropriate to its site potential.

Historically riparian areas were considered sacrifice zones because they represented only a small portion of the allotment and livestock needed water, especially during the hot season of the year. As the value of these areas has become better understood, riparian area functionality has become a major focus on public lands. Riparian areas are some of the most diverse and productive areas on the landscape. These key areas visibly reflect the quality and success of land management activities in watersheds. Riparian functionality has been developed as a minimum standard to assess physical condition of wetland-riparian areas. A riparian-wetland area is considered to be in PFC when adequate vegetation, landform or large woody debris is present to:

- dissipate stream energy associated with high waterflow, thereby reducing erosion and improving water quality;
- filter sediments, capture bedload, and aid floodplain development;
- improve flood-water retention and ground-water recharge;
- develop root masses that stabilize streambanks against cutting action;
- develop diverse ponding and channel characteristics to provide the habitat and the water depth, duration, and temperature necessary for fish and other aquatic life production, waterfowl breeding, and other uses; and
- support greater biodiversity.

PFC is considered the minimum level of physical functioning necessary for a body of water to provide the attributes listed above and does not meet LCT recovery objectives. PFC is generally not considered desired future condition (DFC), which is the LCT recovery standard that provides for other values above proper functionality of the water. PFC definition does not mean potential or optimal conditions for a particular species has been achieved. PFC is a state of resiliency that will allow a riparian/wetland area to hold together during a 25-30 year high flow event with a high degree of reliability. A riparian functionality assessment is a qualitative process based on quantitative science. An interdisciplinary team performs the assessment with local, on-the-ground experience in the kind of quantitative sampling techniques that support the checklist used to make assessments. Riparian functionality assessments are classified into three categories: 1) PFC, 2) functioning at risk (FAR) and 3) not functioning (NF). Riparian functionality assessments that result in a FAR rating must also be given a trend relative to PFC. Trend could be upward, downward, or static to PFC.

Occurrence in the Project Area:

The public lands within the Northwestern Distinct Population Segment (DPS) contain 47 streams of current or recently existing populations administered by the BLM - Winnemucca Field Office or the Santa Rosa Ranger District of the Humboldt-Toiyabe National Forest (USFWS 1995).

Within the Northwestern DPS unit, the BLM-Winnemucca Field Office manages 100% of the public lands within 39 stream systems. Of these systems, the project area contains Happy Creek. Happy Creek is currently unoccupied, but is scheduled to have LCT reintroduced within the next few years.

Happy Creek (unoccupied – Northwestern DPS)

Happy Creek begins on the east slope of the Jackson Mountains, at an elevation near 6,880 feet, in Humboldt County, Nevada. Once the stream leaves the mouth of the canyon, the channel travels northeasterly until its terminus with the Quinn River at an elevation of 4,080 feet. However, surface flowing water is diverted through a pipeline near the elevation of 4,550 feet, and piped to the Happy Creek Ranch for irrigation purposes. The stream is approximately 11.5 miles in length, and flows through 8.4 miles of BLM land and 3.1 miles of land belonging to the private sector.

Happy Creek within the Happy Creek allotment was chemically treated by the NDOW in 1999 and 2000 to remove all non-native salmonids. Tiger trout (cross between a male brook x female brown trout) were added in 2005 to Happy Creek as a forerunner to the reintroduction of LCT. The reintroduction is planned for after NDOW sets up a Safe Harbor agreement with the private landowner.

Stream parameter data was collected by the Nevada Division of Wildlife (NDOW). NDOW uses the General Aquatic Wildlife Survey (GAWS) for analysis of this data and calculates a Habitat Condition Index (HCI) derived by using the six habitat parameters: pool measure, pool structure, stream bottom, bank cover, bank soil stability and bank vegetative stability. Below are the stream survey parameters collected for the portions of Happy Creek within the Happy Creek Allotment.

Table 5. Stream Survey Data for Happy Creek.

Parameter	September 1989	June 1997	June 2001
Pool Measure	60.9	69.4	50.5
Pool Structure	29.2	20.7	34.2
Stream Bottom	85.1	79.5	83.3
Bank Cover	42.9	76.0	73.0
Bank Soil Stability	57.5	53.5	51.5
Bank Vegetation Stability	47.0	64.5	64.5
Habitat Condition Index (HCI)	55.5	60.6	59.3
Discharge	0.60 cfs	8.9 cfs	3.4 cfs
Embeddedness	38.2	36.1	24.0
Ungulate Damage	54.5	26.6	25.5
Spawning Gravel	55.2	47.2	41.4

NDOW's General Aquatic Wildlife Survey (GAWS) parameter descriptions:

- Pool Measure – is a rating derived from the pool to riffle ratio of a given reach. Studies indicate that the optimum pool to riffle ratio for salmonid production and over-winter survival is approximately 1:1. This ratio allows for optimal resting habitat while in close proximity to feeding habitats. Pool measure is rated 100% if the pool to riffle ratio is 1:1 using the GAWS protocols.
- Pool Structure – is a rating based on the quality of a given pool. The quality rating is derived from a pool's size, depth, and availability of cover. These factors are important in determining whether a pool is optimal, marginal, or poor habitat for salmonids, due to its ability to provide forms of refugia.
- Stream Bottom – is derived from the composition of the reaches' substrate, which is composed of those materials found to be beneficial to cold-water aquatics. Optimum substrate composition can be characterized as being relatively silt-free with a complexity of substrate sizes, which includes rubble and gravel.
- Bank Cover – is derived using the riparian vegetative community composition and density within a reach, based on a numerical rating scale.

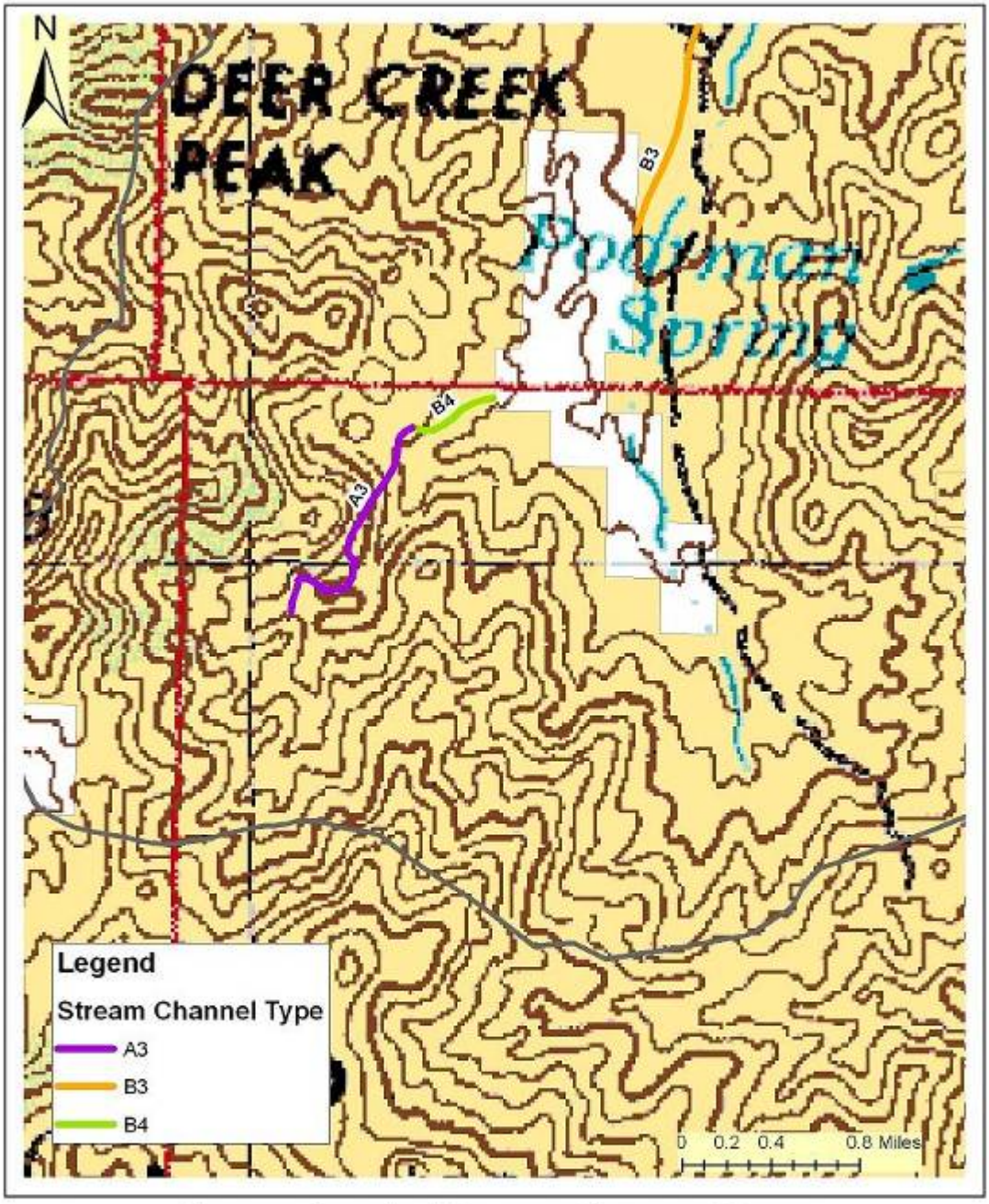
- Bank Soil Stability & Bank Vegetation Stability – are derived using a rating system, which is based on the percentage of the streambank within a reach that are stable and the amount of vegetative soil cover and type of bank material present, respectively
- Habitat Condition Index – this value attempts to qualify the overall condition of a given stream habitat based on the extrapolation of reach based information to the watershed. The conditions of the above described parameters cumulatively affect aquatic habitat conditions within a watershed.
- Ungulate Damage – is determined by assessing the percent of a reach that exhibits ungulate induced streambank damage.

The stream channel types (see Rosgen 1994) on the surveyed portion of Happy Creek were B4, B3 and A3 (See Map 4, page 18). Rosgen (1994) interprets the stream channel types as follows: 1) B4 channel types are moderate in sensitivity to disturbance, excellent in recovery potential, moderate in sediment supply, low in streambank erosion potential, and moderate in vegetation controlling influence; 2) B3 channel types are low in sensitivity to disturbance, excellent in recovery potential, low in sediment supply, low in streambank erosion potential, and moderate in vegetation controlling influence; and 3) A3 channel types are very high in sensitivity to disturbance, very poor in recovery potential, very high in sediment supply, high in streambank erosion potential, and negligible in vegetation controlling influence.

In 1997 and 2002, riparian functionality was assessed for Happy Creek. The majority of the stream system was rated as FAR with a static trend (3 reaches). Other segments were assessed at PFC (4 reaches), FAR with a downward trend (1 reach), and NF (1 reach); see Map 3. Jensen (1999) found riparian and stream habitat conditions on Happy Creek to be at 50 and 58 percent, respectively, of the system's potential. These percentages equated to a "poor" and "fair" rating for the stream system for these habitat types. Stream survey data collected in 1989, 1997, and 2001 by NDOW mostly indicate static conditions for salmonids within the main stem of Happy Creek.

Ongoing Conservation Measures: In 1995 the Fish and Wildlife Service published a Recovery Plan for the Lahontan cutthroat trout. The plan identified a recovery strategy for Lahontan cutthroat trout that includes population management for genetic variation, and increasing distribution and abundance through reproduction and reintroductions. The strategy also includes actions designed to improve habitat conditions. In 1999 the Nevada Department of Wildlife published a Species Management Plan for the North Fork of the Little Humboldt River Basin and the Quinn-Blackrock Drainage Basins. This plan identified management strategies, recovery objectives, and reintroduction criteria for Lahontan cutthroat trout.

Map 4. Happy Creek Stream Channel Types.



Happy Creek: Stream Channel Type

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Effects of the Action on LCT

The direct and indirect impacts would be beneficial for the LCT and LCT stream habitat while the Upper Happy Creek pasture is rested until PFC is met on all the reaches of Happy Creek. The beneficial effects would come from no pressure from livestock within the stream or on the streambanks, which could allow opportunity for stream habitat parameters to improve, and no incidental take of LCT. Stuber (1985) found that trout populations often increased in response to reduced or no grazing. Platts and Rinne (1985) found that 16 out of 16 studies demonstrated benefits to the riparian zone from eliminating grazing, and that trout populations had also increased in 12 of the 16 study sites.

The direct and indirect impacts for the years after the Upper Happy Creek pasture has met PFC in all the reaches and have livestock grazing every other year from May 15 to June 15 may include the incidental take of LCT in the form of harm and harassment, through behavioral modification, injury, or death caused by livestock during stream crossings and grazing within and adjacent to Happy Creek. Other impacts to LCT may include stream habitat modifications, such as: a) increased stream temperature due to loss of overhanging vegetation, b) increased sedimentation due to streambank and upland erosion, and c) increased channel width and undercut bank habitat loss due to hoof-induced bank shearing and trampling.

The proposed action includes the following measures that would lessen the impacts to the LCT and stream habitat: a) a 6" stubble height requirement on riparian herbaceous vegetation on Happy Creek reaches 1, 2 & 3; b) maintain a maximum of 30% utilization on woody species in woody dominated portions of Happy Creek reaches 6, 7, 8 & 9; c) a 10% or less limit of annual streambank alteration requirement on herbaceous portions on Happy Creek reaches 1, 2 & 3; and d) Happy Creek reaches 4 & 5 are within an exclosure (Map 3 and Photo 3).

Photo 3. Reach 5 within an exclosure

The cumulative effects are future actions on private land, primarily grazing of livestock within riparian areas, may continue contributing to habitat degradation and loss. Cumulative effects may also result from management activities of NDOW actions related to fishery management. Fish populations within the project area are managed by NDOW, and population sampling with electrofishing gear is a necessary component of population monitoring and effects are expected to be short-term in nature unless the population is at extremely low levels. Recreation is expected to increase an average of 5% annually. Mining has several small (less than 5 acres) gravel prospecting site and pits proposed. Wild horse appropriate management level (AML) for the Happy Creek area (Jackson Mountain Herd Management Area) is 36-60 horses, and several wild horse gathers are expected to occur within the next 10 years including the next gather is planned for September 2007.

Determination

Based on the previous analysis, this proposed action **may affect, and is likely to adversely affect** the threatened LCT in the Happy Creek Allotment.

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