NEVADA DEPARTMENT OF WILDLIFE
STATEWIDE FISHERIES MANAGEMENT

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2013

LAHONTAN CUTTHROAT TROUT STUDY
WESTERN REGION

NEVADA DEPARTMENT OF WILDLIFE, FISHERIES DIVISION
ANNUAL PROGRESS REPORT

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NEVADA DEPARTMENT OF WILDLIFE, FISHERIES DIVISION
ANNUAL PROJECT REPORT

State: *Nevada*
Project Title: *Statewide Fisheries Program*
Job Title: *Lahontan Cutthroat Trout Study*
Period Covered: *January 1, 2013 through December 31, 2013*

SUMMARY

Monitoring Quinn-Blackrock/Humboldt LCT populations was conducted among 15 streams in the Jackson, Santa Rosa, Black Rock, Snowstorm, Sonoma, Trout Creek, and Montana mountains. Additionally, stream habitat surveys were conducted on eight of these streams during the 2013 field season.

BACKGROUND

Lahontan cutthroat trout (LCT, *Oncorhynchus clarki henshawi)* is the only native salmonid occurring in the Lahontan basin. LCT were distributed in the drainages of ancient Lake Lahontan and, as conditions became more arid during the last 5,000 to 12,000 years, they survived as small populations in isolated headwater streams of many mountain ranges in Nevada, Oregon, and California.

The settlement of the Great Basin resulted in significant loss of LCT as livestock grazing, urban development, mining, water diversions, and hybridization and competition with non-native trout led to significant declines in the range and numbers of this unique trout species. In response to these declines, Lahontan cutthroat trout were listed as endangered in 1970, but reclassified as threatened in 1975. In January of 1995, the USFWS released a recovery plan for the Lahontan cutthroat trout.

Lahontan cutthroat trout were historically common in the Quinn River, Black Rock, and Little Humboldt subbasins of the Humboldt River system. The Blackrock Drainage may have had as many as 46 streams occupied by LCT. Presently, LCT is thought to occupy only 15% of their historic stream habitat in the Quinn River-Blackrock drainages. Populations have suffered from habitat loss, hybridization with nonnative salmonids, and extended droughts. Recovery action in the Quinn River drainage is the priority in the USFWS Lahontan Cutthroat Trout Recovery Plan.

The final draft of the Lahontan cutthroat trout (LCT) Species Management Plan was completed in 1999. This plan, written under the umbrella of the U.S. Fish and Wildlife LCT Recovery Plan, contains management strategies and objectives that outline the processes that will be used to guide future activities. Nevada Department of Wildlife (NDOW) and the Quinn-Blackrock Geographic Management Unit (GMU) Team have used the plan to guide recovery efforts since its signing.

OBJECTIVES

<u>General Management Objectives:</u>

- Monitor LCT using electroshocking surveys and assess habitat using GAWS Level III habitat survey on the following streams: South Fork Little Humboldt

River, Pole Creek, Snowstorm Creek, Winters Creek, First Creek, Mahogany Creek, Summer Camp Creek, and Rock Creek.

- Continue to work with ODFW to sample LCT within the McDermitt Basin for hybridization with non-native rainbow trout. Use this data to determine a suitable source population for reintroduction into main stem McDermitt Creek.
- Collect genetic samples from fish within the North Fork of Battle Creek and Washburn Creek to determine if they contain a suitable population of LCT for reintroduction into the McDermitt Basin.
- Reintroduce pure LCT into main stem McDermitt Creek from a donor stream to be determined during the summer of 2013.
- Perform presence/absence surveys on Crowley Creek to determine if the 2012 chemical eradication of the lower portion was a success. Genetic samples will be collected concurrently to ensure genetic purity within the system.
- Carry out an intensive LCT population survey on Jackson Creek.
- Work with the NWGMU to work out the final details and install a riparian fence on the headwaters of Crowley Creek.
- Conduct a mechanical eradication of brook trout in the upper 1 mile of Abel Creek.
- Monitor LCT populations in numerous recovery waters throughout their historic range.
- Collect genetic samples from LCT populations throughout the 2013 field season as they are available.
- Monitor LCT populations in Edwards, Willow, Big Den, and Little Den creeks by electroshocking during spring after runoff.

PROCEDURES

General Management Objectives

Monitor LCT using electroshocking surveys and assess habitat using GAWS Level III habitat survey on the following streams: South Fork Little Humboldt River, Pole Creek, Snowstorm Creek, Winters Creek, First Creek, Mahogany Creek, Rock Creek, and Summer Camp Creek. GAWS level III habitat surveys were performed on all of the aforementioned streams.

In conjunction with these surveys, low intensity single pass electroshocking surveys were performed to examine fish populations in these streams. Sampling sites were arranged approximately every half mile along the habitat surveyed portion of a stream and 100 ft sample sites were shocked using an ETS model AbP-3 backpack electroshocker. Winters Creek was the only stream on which an electroshocking survey was not performed due to the absence of flowing water within the surveyed portion of the stream.

Continue to work with ODFW to sample LCT within the McDermitt Basin for hybridization with non-native rainbow trout. Use this data to determine a suitable source population for reintroduction into main stem McDermitt Creek. On three

separate occasions in June, August, and November, crews from the Oregon Division of Fish and Wildlife electroshocked predetermined stream reaches within the McDermitt Basin. A crew from the Nevada Department of Wildlife assisted during the August electroshocking effort. Data from these efforts was used to make the determination that the planned reintroduction of pure LCT into main stem McDermitt Creek should be abandoned. ETS model AbP-3 backpack electroshockers were used for all sampling.

Collect genetic samples from fish within the North Fork of Battle Creek and Washburn Creek to determine if they contain a suitable population of LCT for reintroduction into the McDermitt Basin. During June, electroshocking surveys were carried out on the occupied portions of the North Fork of Battle Creek and Washburn Creek. One hundred feet shocking transects were placed approximately every half mile along the surveyed reaches of the streams. All observed suitable habitat in between transects was shocked as well in order to collect as many genetic samples as possible. In most cases, samples were taken from the lower portion of the caudal fin. All collected samples were stored in coin envelopes and submitted to the University of Nevada, Reno for analysis. ETS model AbP-3 backpack electroshockers were used for all sampling.

Reintroduce pure LCT into main stem McDermitt Creek from a donor stream to be determined during the summer of 2013. Due to the discovery of non-native rainbow trout within the main stem of McDermitt Creek, the reintroduction of pure LCT was postponed during the summer of 2013. While the reintroduction into main stem McDermitt was postponed, the decision was made to reintroduce pure LCT into the Sage Creek tributary to McDermitt Creek. During September of 2013, LCT from the North Fork of Battle Creek were captured by electroshocking and injected subcutaneously with individual PIT tags for identification purposes. Once fitted with the tags, all captured LCT were transported to McDermitt Creek in a Nevada Department of Wildlife fish hauling truck where they were then placed into water bladder bags and packed into the upper reaches of Sage Creek and released unharmed. ETS model AbP-3 backpack electroshockers were used for all sampling.

Perform presence/absence surveys on Crowley Creek to determine if the 2012 chemical eradication of the lower portion was a success. Genetic samples will be collected concurrently to ensure genetic purity within the system. In June, low intensity electroshocking was carried out on numerous reaches of Crowley Creek. Suitable habitat was shocked and all sampled LCT were fin clipped for genetic analysis. In most cases, samples were taken from the lower portion of the caudal fin. Samples were submitted to the University of Nevada, Reno for analysis. ETS model AbP-3 backpack electroshockers were used for all sampling.

Carry out an intensive LCT population survey on Jackson Creek. During June, crews from the Nevada Department of Wildlife and Trout Unlimited electroshocked the entire wetted portion of Jackson Creek that exists on public land. All available habitats were surveyed and all sampled LCT were fin clipped for genetic analysis. In most cases, samples were taken from the lower portion of the caudal fin. Samples were submitted to the University of Nevada, Reno for analysis. ETS model AbP-3 backpack electroshockers were used for all sampling.

Work with the NWGMU to work out the final details and install a riparian fence on the headwaters of Crowley Creek. The NWGMU team met several times during 2013 and discussed all issues relating to the Crowley Creek fencing project. Several issues could not be resolved and the project has been moved to the 2014 field season.

Conduct a mechanical eradication of brook trout in the upper 1 mile of Abel Creek. On three days in June and one in September, crews from the Nevada Department of Wildlife intensively electroshocked the upper one mile of Abel Creek. Block nets were placed at the lower extent of the shocking reach and crews worked upstream removing all brook trout captured. All captured LCT were measured and returned to the habitat in which they were sampled. Extra care was taken not to injure any sampled LCT. ETS model AbP-3 backpack electroshockers were used for all surveys.

Monitor LCT populations in numerous recovery waters throughout their historic range. During August, a crew from the Nevada Department of Wildlife performed a low intensity electroshocking survey on the South Fork of Indian Creek. One hundred foot shocking transects were placed approximately every half mile along the wetted portion of stream. Single pass electroshocking was performed at each of these transects and all sampled fish were measured and released unharmed. ETS model AbP-3 backpack electroshockers were used to capture all fish.

Collect genetic samples from LCT populations throughout the 2013 field season as they are available. In conjunction with habitat and population surveys on the aforementioned streams, genetic samples were also collected where conditions permitted. Samples were taken from LCT on North Fork of Battle Creek, Washburn Creek, Crowley Creek, Sage Creek, and Abel Creek. In most cases, samples were taken from the lower portion of the caudal fin. All samples have been submitted to the University of Nevada, Reno for analysis. ETS model AbP-3 backpack electroshockers were used to capture all fish.

Monitor LCT populations in Edwards, Willow, Big Den and Little Den creeks by electroshocking during spring after runoff. GAWS level III habitat surveys were performed on all of the aforementioned streams.

In conjunction with these surveys, low intensity single pass electroshocking surveys were performed to examine fish populations in these streams. Sampling sites were arranged approximately every half mile along the habitat surveyed portion of a stream and 100 ft sample sites were shocked using a Halltech model 2000B backpack electroshocker. Willow creek was the only stream on which an electroshocking survey was not performed due to the absence of flowing water within the surveyed portion of the stream.

FINDINGS

General Management Objectives

Monitor LCT using electroshocking surveys and assess habitat using GAWS Level III habitat survey on the following streams: South Fork Little Humboldt River, Pole Creek, Snowstorm Creek, Winters Creek, First Creek, Mahogany Creek, Rock Creek, and Summer Camp Creek. GAWS level III habitat surveys were conducted on South Fork Little Humboldt River, Pole Creek, Snowstorm Creek, Winters Creek, First Creek, Mahogany Creek, Rock Creek, and Summer Camp Creek. Habitat Condition Index (HCI) ratings and fish population estimates are presented in Table 1. Habitat survey reports for each creek will be completed and placed on file in the Western Region fisheries office.

Table 1

GAWS Level III Habitat Survey Results
2013

Stream	Mtn. Range	Surveyed Miles	Stations	Past HCI	2013 HCI	SpeciesPresent	Average Fish/Mile	Estimated pop.
South Fork Little Humboldt	Snowstorm	17	24	61	55.7	LCT	8.1	137.7
Pole Creek	Snowstorm	2.8	56.3	74.5	54.8	N/A	N/A	N/A
Snowstorm Creek	Snowstorm	5.4	7	58.8	44.7	LCT	35.2	190.08
Winters Creek	Snowstorm	1.2	3	62.1	*	N/A	N/A	N/A
First Creek	Snowstorm	1.8	3	68.2	21.3	N/A	N/A	N/A
Mahogany Creek	Black Rock	3.9	8	65.3	54.3	LCT	336.6	1312.74
Summer Camp Creek	Black Rock	1.9	3	59	52.9	LCT	246.4	468.16
Rock Creek	Sonoma	3.1	7	57.7	56.6	BK	226.3	701.53

*HCI data unable to be calculated due to dry channel

Continue to work with ODFW to sample LCT within the McDermitt Basin for hybridization with non-native rainbow trout. Use this data to determine a suitable source population for reintroduction into main stem McDermitt Creek. During June of 2013, an Oregon Division of Fish and Wildlife (ODFW) crew undertook an intensive effort to electroshock large portions of McDermitt Creek in an attempt to verify the absence of non-native trout in the system prior to LCT reintroduction efforts planned for July 2013. This effort yielded numerous non-native brook trout, rainbow trout, and hybridized rainbow/cutthroat trout, as well as Lahontan cutthroat trout within the reaches of stream that had previously been treated with Rotenone. Visual identification of these fish species was supported by genetic samples that were collected during the surveys and analyzed by the University of Nevada. These findings were followed up with additional electroshocking surveys over a larger portion of McDermitt Creek and the lower portion of the Sage Creek tributary in August with the assistance of the Nevada Department of Wildlife. The genetic sampling results from this survey are displayed in Attachment 1. One final shocking effort was carried out by ODFW in November and yielded similar results to that of the earlier survey.

Based on these results, it was determined that a reintroduction of pure LCT into the main stem should be abandoned. The plan for reintroduction was dependent upon the system being barren of competing/hybridizing non-natives and the presence of these species severely hinders the potential for LCT to thrive in the system.

Collect genetic samples from fish within the North Fork of Battle Creek and Washburn Creek to determine if they contain a suitable population of LCT for reintroduction into the McDermitt Basin. Crews were able to successfully sample the entire occupied portions of the North Fork Battle Creek and Washburn Creek. The data collected is presented below in Table 2. Genetic samples were also collected from all sampled fish. The results from these genetic samples revealed that the LCT in both the North Fork of Battle Creek and Washburn Creek remain genetically pure.

Table 2

Potential LCT Donor Stream Sampling 2013

Stream	Avg Fish/Mile	Est. Pop.	Avg. Fork Length(mm)
Washburn	64.5	309.8	140.1
NF Battle	279.1	731.2	171.4

Based on a combination of the genetic sampling results and the population estimates generated for these streams, the NWGMU determined that the North Fork of Battle Creek would serve as a suitable donor stream for reintroduction into the McDermitt Basin.

Reintroduce pure LCT into main stem McDermitt Creek from a donor stream to be determined during the summer of 2013. Due to the discovery of non-native rainbow and brook trout in main stem McDermitt Creek, the plan to reintroduce LCT into the system was postponed in 2013. While this plan was abandoned in 2013, the NWGMU decided to move forward with the stocking of pure LCT into the Sage Creek tributary to McDermitt Creek.

During September, in conjunction with ODFW, the Nevada Department of Wildlife captured 71 LCT from the North Fork of Battle Creek and fitted them with PIT tags for identification. Once the LCT had been tagged, they were transported to the upper portions of Sage Creek. Of the 71 fish that were captured and transported, 65 were released into Sage Creek unharmed. Six of the captured fish did not survive the PIT tagging and transportation process.

Perform presence/absence surveys on Crowley Creek to determine if the 2012 chemical eradication of the lower portion was a success. Genetic samples will be collected concurrently to ensure genetic purity within the system. Sixteen LCT were sampled upstream of the treated portion of Crowley Creek, this section of stream was not treated as it was believed that non-natives had not invaded this section. The average fork length of these fish was 123 mm. Two of the 16 fish contained PIT tags from pretreatment activities in 2011 and 2012. No fish were sampled within the treated portion of stream and it is believed that the 2012 treatment of Crowley Creek was a success.

Of the 16 fish sampled during the presence/absence survey, fin clips for genetic analysis were taken from 8 of them. All 8 of these samples came back as genetically pure LCT.

Carry out an intensive LCT population survey on Jackson Creek. During June, crews from the Nevada Department of Wildlife and Trout Unlimited performed intensive electroshocking surveys along the entire wetted portion of Jackson Creek and the North Fork of Jackson Creek (3.3 mi). Small pieces of private land within Jackson Creek and NF Jackson Creek were not surveyed.

Crews were able to sample 48 LCT over the surveyed portion of stream with 21 of these fish being fin clipped for genetic analysis. The fish occupied both forks of Jackson Creek and occurred above and below the private portion; therefore, it is believed that these fish also inhabit the portions of the stream that flows through the private property.

Of the 21 fish that were fin clipped for genetic sampling, six were hybridized with rainbow trout at one locus. No other fish showed signs of introgression. A map showing the locations of sampled fish is provided in Attachment 2.

Work with the NWGMU to work out the final details and install a riparian fence on the headwaters of Crowley Creek. The NWGMU met several times during 2013 and worked towards finalizing plans for the riparian fence on the headwaters of Crowley Creek. Several issues arose during the planning stages that could not be resolved during 2013 so the project has been moved to the 2014 season. The NWGMU is optimistic that the issues will be resolved and this project will move forward in 2014.

Conduct a mechanical eradication of brook trout in the upper 1 mile of Abel Creek. During the 2013 field season, on 4 separate days, crews from the Nevada Department of Wildlife and Trout Unlimited conducted a mechanical eradication of the upper most 0.81 mi of Abel Creek. During this eradication, all brook trout captured were removed from the stream while extra care was taken to ensure that none of the native LCT was harmed.

In all, 937 brook trout were captured and removed from Abel Creek during the 2013 field season. This is a 244% increase in the amount of brook trout removed from the system in 2012 (384). This increase can be partly attributed to an increased effort from 2 days in 2012 to 4 days in 2014, along with the extra crew provided by Trout Unlimited. Twenty-six LCT were also captured during the 2013 field season, which is down slightly from the 32 captured in 2012. The LCT had an average fork length of 171 mm.

Monitor LCT populations in numerous recovery waters throughout their historic range. During the 2013 field season, a low intensity population survey was conducted on the South Fork of Indian Creek. For this survey, two 100 ft transects occurred within the wetted portion of the stream. Single pass shocking was then conducted over these 100 foot transects.

Seven LCT were sampled at the lower of the two transects, while no LCT were sampled at the upper. This leads to a population estimate of 184.8 fish/mi over the

surveyed portion of the stream. Two other LCT were sampled as part of a spot shocking effort in between transects. The average fork length of the sampled LCT was 141 mm. It should be noted that due to extremely low water conditions, there were only 1.1 miles of suitable habitat during this survey.

LCT populations were also monitored in 15 other streams as part of other ongoing projects that are described in detail under separate headings of this report. These streams were Abel Creek, Jackson Creek, NF Battle Creek, Crowley Creek, Washburn Creek, Pole Creek, Rock Creek, SF Little Humboldt River, Winters Creek, First Creek, Snowstorm Creek, Sage Creek, McDermitt Creek, Summer Camp Creek, and Mahogany Creek.

Collect genetic samples from LCT populations throughout the 2013 field season, as they are available. In conjunction with habitat and population surveys on the aforementioned streams, genetic samples were also collected where conditions permitted. Table 3 displays the results of these genetic samples.

Table 3

Quinn/Blackrock LCT Genetic Sampling Results

Stream	Mountain Range	# of samples	Results
Washburn Creek	Montana	8	LCT
Mahogany Creek	Black Rock	61	LCT
NF Battle Creek	Black Rock	45	LCT
Crowley Creek	Montana	8	LCT
Jackson Creek	Jackson	21	LCT/Hybrid
Abel Creek	Santa Rosa	11	LCT

Monitor LCT populations in Edwards, Willow, Big Den, and Little Den creeks by electroshocking during spring after runoff. Only four of twelve selected stations had flowing water on Edwards Creek during the survey period. Only one of four stations had water on Big Den and Little Den creeks and all four selected stations on Willow Creek were dry. LCT was only encountered on Edwards Creek. Sampling results are included in Table 4. Habitat survey reports for each creek will be completed and placed on file in the Western Region fisheries office.

MANAGEMENT REVIEW

General Management Objectives

Monitor LCT using electroshocking surveys and assess habitat using GAWS Level III habitat survey on the following streams: South Fork Little Humboldt River, Pole Creek, Snowstorm Creek, Winters Creek, First Creek, Mahogany Creek, Rock Creek, and Summer Camp Creek. There was a substantial

decline in habitat conditions across all of the streams associated with the South Fork of the Little Humboldt River. The SFLHR, Winters Creek, Pole Creek, Snowstorm Creek, and First Creek all showed overall declines in the Habitat Condition Index (HCI) numbers that can partially be attributed to the lower then average flow conditions at the time of the survey. While flow conditions played a role in the low HCI numbers, it should be noted that excessive utilization by ungulates in certain areas played a significant role in the overall ratings. Specifically, First Creek, Snowstorm Creek, and the lower reaches of the SFLHR had areas that were being negatively impacted by the over utilization of cattle. It is recommended that the Bureau of Land Management evaluate the grazing practices more closely within the Bullhead allotment.

Table 4

Desatoya Mountains Sampling Results

	Number of stations	Number of Wet Stations	Number of LCT	AVE size	Size Range
Edwards	12	4	8	125 mm	67-187 mm
The Dens	4	1	0	NA	NA
Willow Cr.	4	0	0	NA	NA

Lahontan cutthroat trout population numbers within the SFLHR and its tributaries also showed a substantial decline during the 2013 field season. Again, lower than average flow rates can be attributed to this sharp decline. While only three fish were sampled, it is believed that several fish were missed due to the presence of large beaver dam complexes that hampered survey efforts. Further surveys are needed to understand the population of LCT that inhabit the SFLHR and its tributaries.

While Mahogany Creek, Rock Creek, and Summer Camp Creek all showed declines in HCI numbers, they were fairly small declines and can be attributed to the lower than average flows. The riparian vegetation and uplands appeared to be in good condition and these observations were supported in the data collected.

Lahontan cutthroat trout populations in Mahogany and Summer Camp creeks both showed increases in the estimated fish per mile from the past survey carried out in 2006. Mahogany Creek had the most significant increase from 52.8 fish/mi in 2006 to an estimated 336.6 fish per/mi in 2013. Summer Camp Creek also showed an increase from 105.6 fish/mi in 2006 to 246.4 fish/mi in 2013. These population increases are a result of good cooperative management by the Summit Lake Paiute Tribe and the BLM, which has led to optimum habitat conditions for reproducing LCT.

Continue to work with ODFW to sample LCT within the McDermitt Basin for hybridization with non-native rainbow trout. Use this data to determine a suitable source population for reintroduction into main stem McDermitt Creek. With the discovery of large populations of non-native rainbow, brook, and hybrid trout in the main stem of McDermitt Creek in 2013, plans to reintroduce pure LCT have been put on hold. Until a plan to eliminate the non-native trout that persist in McDermitt Creek is developed, it is not recommended that pure LCT be stocked into the main stem of that

system. In the interim, the focus should be placed on securing the headwater populations that exist within the McDermitt Creek tributaries. This will ensure that there are donor populations from within the basin for future reestablishment in the main stem.

Collect genetic samples from fish within the North Fork of Battle Creek and Washburn Creek to determine if they contain a suitable population of LCT for reintroduction into the McDermitt Basin. Sampling in both Washburn Creek and the NF of Battle Creek showed healthy populations of pure LCT. Based on the ease of access to its lower portions and the stable population numbers it is recommended that Battle Creek be the primary donor stream for LCT reintroductions within the NWGMU. Battle Creek provides a unique opportunity in that several fish are lost from the upstream population each year via a large series of waterfalls that are impassable in the upstream direction. This results in a number of LCT stranded in the lower reaches of Battle Creek that could be suitable as donors to streams needing fish.

Washburn Creek also contains a stable population of pure LCT that can serve as a secondary source of donor fish for reintroduction. Access into the occupied portions of Washburn Creek is very limited and safely capturing and transporting fish from within the drainage is far more difficult than in Battle Creek. Fish in Washburn Creek served as the original donors for Battle Creek and therefore there is no substantial genetic difference between the two.

Reintroduce pure LCT into main stem McDermitt Creek from a donor stream to be determined during the summer of 2013. With the discovery of large populations of non-native rainbow, brook, and hybrid trout in the main stem of McDermitt Creek in 2013, plans to reintroduce pure LCT have been put on hold. A secondary plan to augment the existing LCT population in the Sage Creek tributary to McDermitt Creek was carried out using LCT from the NF of Battle Creek. These donor fish will provide genetic variability and an increase in numbers to a population that has suffered a severe bottleneck over the past two years. Future monitoring of this population should be conducted. If population numbers stabilize in Sage Creek, the possibility of using Sage Creek fish as donors for the rest of the McDermitt drainage should be considered.

Perform presence/absence surveys on Crowley Creek to determine if the 2012 chemical eradication of the lower portion was a success. Genetic samples will be collected concurrently to ensure genetic purity within the system. The 2013 presence/absence surveys confirmed the expected results. Pure LCT were found upstream of the treated reach of Crowley Creek while no fish were sampled within the treated portion. It is believed that individual LCT residing in the upper reaches of Crowley Creek will repopulate the treated portion of stream in the next few years. Annual surveys will be conducted to determine if this is taking place.

Carry out an intensive LCT population survey on Jackson Creek. Full system population surveys have shown a stable population of cutthroat trout occupies Jackson Creek. There are some questions pertaining to the origin of these fish based on the low levels of introgression shown in a few individual fish. The possibility of

developing a safe harbor agreement with the private land holder on Jackson Creek should be approached as it provides for some of the best habitat in the system.

Work with the NWGMU to work out the final details and install a riparian fence on the headwaters of Crowley Creek. The Nevada Department of Wildlife has obtained all the materials for this project. This project will move forward as soon as the BLM is able to complete its archaeological surveys and off-site watering structures are developed.

Conduct a mechanical eradication of brook trout in the upper 1 mile of Abel Creek. The mechanical eradication of the upper 1 mi of Abel Creek is serving as a short-term solution to the invasion of brook trout into LCT occupied habitat. While effective at minimizing the effects of the brook trout on the LCT from year to year, mechanical eradications efforts will not result in permanent removal. A new or more intensive method of brook trout removal should be developed in an attempt to secure the few remaining LCT within the system.

Monitor LCT populations in numerous recovery waters throughout their historic range. In all, 16 LCT streams were surveyed during the 2013 field season. A wide range of results was found. Most established populations showed to be increasing or stable with only the South Fork of the Little Humboldt River and its tributaries showing a decline. Newly introduced populations will continue to be monitored throughout the next few field seasons and are expected to thrive. The populations that declined will be more closely monitored and options for recovery will be explored.

Collect genetic samples from LCT populations throughout the 2013 field season as they are available. Fish from a wide range of streams were genetically sampled during the 2013 field season and the results showed very limited introgression across the NWGMU. Only one stream (Jackson Creek) showed hybridization with rainbow trout and it was at very low levels. Genetic sampling should be continued for the next few field seasons as this data is invaluable and allows for basin-wide decisions to be made regarding the status and direction of LCT recovery.

Monitor LCT populations in Edwards, Willow, Big Den, and Little Den creeks by electroshocking during spring after runoff. Below average flows in all three streams contributed to the difficulty in finding fish. In conjunction with population surveys, GAWS level III surveys were also conducted on these streams. The riparian habitat will continue to be monitored as vegetation modification projects take place, particularly on the private property around Edwards Creek. Pinion-Juniper thinning projects on the public land adjacent to these streams should raise the ground water table and allow more flow in the springs that feed these systems. Fish populations as well as riparian habitat will continue to be monitored through other funding sources such as private organization grants, BLM grants, or Section 6 funding.

RECOMMENDATIONS

Native Sport Fisheries Management Objectives:

- Perform GAWS level III stream surveys on each of the following streams: Kings River, Cold Springs Creek, Log Cabin Creek, Raster Creek, Rodeo Creek, House Creek, Bilk Creek, Singas Creek, and Crowley Creek.
- Continue to work with ODFW to sample LCT within the McDermitt Basin for hybridization with non-native rainbow trout. Use this data to determine a suitable source population for reintroduction into main stem McDermitt Creek.
- Collect genetic samples from fish within the North Fork of Battle Creek and Washburn Creek to determine if they contain a suitable population of LCT for reintroduction into the McDermitt Basin.
- Augment the Sage Creek population of LCT with fish from the North Fork of Battle Creek.
- Perform spot shocking surveys on Crowley Creek to monitor and document the expansion of the headwater population.
- Perform a population survey on Pole Creek
- Work with the NWGMU to complete the planning process and install a riparian fence on the headwaters of Crowley Creek.
- Conduct mechanical removal of brook trout in the upper 1 mi of Abel Creek.
- Monitor LCT populations in numerous recovery waters throughout their historic range.
- Collect genetic samples from LCT populations throughout the 2014 field season as they are available.

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Attachment 1

McDermitt Creek 2013 Genetic Samples

Sample #	Species	OCC34		OCC35		OCC36		OCC37		OCC38		OM55	
McD01	lct	230	230	242	242	309	309	272	272	174	174	219	219
McD02	lct	230	230	242	242	309	309	272	272	174	174	219	219
McD03	lct	230	230	242	242	309	309	272	272	174	174	219	219
McD04	rb	224	224	210	210	279	279	259	259	152	152	196	196
McD05	rb	224	224	210	210	279	279	259	259	152	152	196	196
McD06	lct	230	230	242	242	309	309	272	272	174	174	219	219
McD07	lct	230	230	242	242	309	309	272	272	174	174	219	219
McD08	lct	230	230	242	242	309	309	272	272	174	174	219	219
McD09	lct	230	230	242	242	309	309	272	272	174	174	219	219
McD10	lct	230	230	242	242	309	309	272	272	174	174	219	219
McD11	lct	230	230	242	242	309	309	272	272	174	174	219	219
McD12	lct	230	230	242	242	309	309	272	272	174	174	219	219
McD13	lct	230	230	242	242	309	309	272	272	174	174	219	219
McD14	lct	230	230	242	242	309	309	272	272	174	174	219	219
McD15	lct	230	230	242	242	309	309	272	272	174	174	219	219
McD16	rb	224	224	210	210	279	279	259	259	152	152	196	196
McD17	lct	230	230	242	242	309	309	272	272	174	174	219	219
McD18	lct	230	230	242	242	309	309	272	272	174	174	219	219
McD19	lct	230	230	242	242	309	309	272	272	174	174	219	219
McD20	lct	230	230	242	242	309	309	272	272	174	174	219	219
McD21	lct	230	230	242	242	309	309	272	272	174	174	219	219
McD22	lct	230	230	242	242	309	309	272	272	174	174	219	219
McD23	lct	230	230	242	242	309	309	272	272	174	174	219	219
McD24	lct	230	230	242	242	309	309	272	272	174	174	219	219
McD25	lct	230	230	242	242	309	309	272	272	174	174	219	219
McD26	lct	230	230	242	242	309	309	272	272	174	174	219	219
McD27	lct	230	230	242	242	309	309	272	272	174	174	219	219
McD28	lct	230	230	242	242	309	309	272	272	174	174	219	219
McD29	lct	230	230	242	242	309	309	272	272	174	174	219	219
McD30	lct	230	230	242	242	309	309	272	272	174	174	219	219
McD31	lct	230	230	242	242	309	309	272	272	174	174	219	219
McD32	lct	230	230	242	242	309	309	272	272	174	174	219	219
McD33	lct	230	230	242	242	309	309	272	272	174	174	219	219
McD34	rb	224	224	210	210	279	279	259	259	152	152	196	196
McD35	lct	230	230	242	242	309	309	272	272	174	174	219	219
McD36	lct	230	230	242	242	309	309	272	272	174	174	219	219
McD37	lct	230	230	242	242	309	309	272	272	174	174	219	219
McD38	lct	230	230	242	242	309	309	272	272	174	174	219	219
McD39	lct	230	230	242	242	309	309	272	272	174	174	219	219

Attachment 1

Sample #	Species	OCC34		OCC35		OCC36		OCC37		OCC38		OM55	
McD40	lct	230	230	242	242	309	309	272	272	174	174	219	219
McD41	rb	224	224	210	210	279	279	259	259	152	152	196	196
McD42	lct	230	230	242	242	309	309	272	272	174	174	219	219
McD43	lct	230	230	242	242	309	309	272	272	174	174	219	219
McD44	rb	224	224	210	210	279	279	259	259	152	152	196	196
McD45	lct	230	230	242	242	309	309	272	272	174	174	219	219
McD46	lct	230	230	242	242	309	309	272	272	174	174	219	219
McD47	?	230	230	242	242	309	309	272	272	152?	174	196?	219
McD48	rb	224	224	210	210	279	279	259	259	152	152	196	196
McD49	lct	230	230	242	242	309	309	272	272	174	174	219	219
McD50	lct	230	230	242	242	309	309	272	272	174	174	219	219
McD51	lct	230	230	242	242	309	309	272	272	174	174	219	219
McD52	lct	230	230	242	242	309	309	272	272	174	174	219	219
McD53	lct	230	230	242	242	309	309	272	272	174	174	219	219
McD54	lct	230	230	242	242	309	309	272	272	174	174	219	219
McD55	?	224	224	210	242?	279	279	259	259	152	174?	196	196
McD56	lct	230	230	242	242	309	309	272	272	174	174	219	219
McD57	lct	230	230	242	242	309	309	272	272	174	174	219	219
McD58	?			242	242			272	272	152?	174	196?	219
McD59	?	230	230	210?	242	279?	309	272	272	152?	174	219	219
McD60	?	224?	230	210?	242	279	309	259	272	152?	174	196?	219
McD61	lct	230	230	242	242	309	309	272	272	174	174	219	219
McD62	rb	224	224	210	210	279	279	259	259	152	152	196	196
McD63	rb	224	224	210	210	279	279	259	259	152	152	196	196
McD64	rb	224	224	210	210	279	279	259	259	152	152	196	196
McD65	lct	230	230	242	242	309	309	272	272	174	174	219	219
McD66	rb	224	224	210	210	279	279	259	259	152	152	196	196
McD67	rb	224	224	210	210	279	279	259	259	152	152	196	196
McD68	rb	224	224	210	210	279	279	259	259	152	152	196	196
McD69	rb	224	224	210	210	279	279	259	259	152	152	196	196
McD70	rb	224	224	210	210	279	279	259	259	152	152	196	196
McD73	rb	224	224	210	210	279	279	259	259	152	152	196	196
McD74	lct	230	230	242	242	309	309	272	272	174	174	219	219
McD75	rb	224	224			279	279	259	259	152	152	196	196
McD76	rb	224	224	210	210	279	279	259	259	152	152	196	196
McD77	lct	230	230	242	242	309	309	272	272	174	174	219	219
McD78	rb	224	224	210	210	279	279	259	259	152	152	196	196
McD80	lct	230	230	242	242	309	309	272	272	174	174	219	219
McD81	lct	230	230	242	242	309	309	272	272	174	174	219	219
McD82	lct	230	230	242	242	309	309	272	272	174	174	219	219

Attachment 1

Sample #	Species	OCC34		OCC35		OCC36		OCC37		OCC38		OM55	
McD83	lct	230	230	242	242	309	309	272	272	174	174	219	219
Sage84	lct	230	230	242	242	309	309	272	272	174	174	219	219
Sage85	lct	230	230	242	242	309	309	272	272	174	174	219	219
Sage86	rbxlct	224	230	242	242	309	309	272	272	152	174	219	219
Sage87	lct			242	242			272	272	174	174	219	219

RB Allele
Degraded
LCT Allele

Attachment 2