NEVADA DEPARTMENT OF WILDLIFE
STATEWIDE FISHERIES MANAGEMENT

FEDERAL AID JOB PROGRESS REPORT
F-20-48
2012

NATIVE SPORT FISHERIES MANAGEMENT
LAHONTAN CUTTHROAT TROUT STUDY
WESTERN REGION

NEVADA DEPARTMENT OF WILDLIFE, FISHERIES DIVISION
ANNUAL PROJECT REPORT

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NEVADA DEPARTMENT OF WILDLIFE, FISHERIES DIVISION
ANNUAL PROJECT REPORT

State: *Nevada*
Project Title: *Statewide Fisheries Program*
Job Title: *Native Sport Fish Management - Lahontan Cutthroat Trout Study*
Period Covered: *January 1, 2012 through December 31, 2012*

SUMMARY

Native Sport Fisheries Management Objective

Monitoring Quinn-Blackrock/Humboldt LCT populations was conducted along six streams in the Jackson Mountains, Santa Rosa Mountains, Trout Creek Mountains, and Montana Mountains. Additionally, stream habitat surveys were conducted on three of these streams during the 2012 field season.

Study Specific Objective – Abel Creek Brook Trout Study

In order to alleviate some of the stress brook trout place upon the native LCT that occupy Abel Creek, 3 days of intensive electroshocking to eradicate brook trout was performed. All necessary precautions were taken to prevent take of LCT during the eradication.

Study Specific Objective – Crowley Creek LCT Population Study

In an attempt to salvage and protect the last pure LCT within the Crowley Creek drainage, extensive genetic sampling and mapping, salvaging pure LCT and reintroducing them into the Pole Creek tributary to Crowley Creek, and chemically eradicating hybridized fish in Crowley Creek.

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

General Management Objectives:

- Monitor LCT using electroshocking surveys and assess habitat using GAWS Level III habitat survey on the following streams: Happy Creek, Indian Creek, South Fork of Indian Creek, Abel Creek, and Rock Creek.
- Continue to work with ODFW to develop and carry out a plan to minimize non-native encroachment in the upper reaches of Sage Creek.
- Augment the Pole Creek LCT population with pure LCT from Crowley Creek.
- Carry out a full system chemical treatment of Crowley Creek.
- Carry out a full system LCT population survey in Jackson Creek
- Work with the NWGMU to secure funding for and install a riparian fence on the headwaters of Crowley Creek.
- Continue to work with all involved parties on the Horse/Falls/McConnell creeks meta-population project in order to address all concerns and move this project forward.
- Monitor LCT populations in numerous recovery waters throughout their historic range as needed.
- Collect genetic samples from existing LCT populations throughout the 2012 field season concurrent to scheduled survey activities or when deemed necessary by the NWGMU team.
- Monitor LCT populations in Edwards, Willow, Big Den, and Little Den creeks by electroshocking during spring after runoff.

Study Specific Objectives - Abel Creek Brook Trout Study:

- Electroshock the upper most 1.5 mi of Abel Creek repeatedly for three days in the fall to remove brook trout.
- Prior to electroshocking surveys, place block nets in the stream to form net pens in which to hold captured LCT so as to not continually shock them during subsequent surveys.
- Remove block nets upon completion of brook trout removal efforts.

Study Specific Objectives – Crowley Creek LCT Population Study:

- Intensively electroshock the entire wetted portion of Crowley Creek, take genetic samples from each fish, and implant them with a P.I.T. tag for future identification.

- Plot location coordinates for each individual fish on GPS.
- Submit all genetic samples to the UNR Genetics Lab for hybrid analysis.
- Once all pure LCT have been identified, they will be recaptured and transported to Pole Creek.
- Once efforts to recapture all the pure LCT have been completed, conduct a full system chemical eradication of non native salmonids from within the Crowley Creek drainage.
- Upon confirmation of the eradication success, reintroduce LCT from Pole Creek into Crowley Creek.

PROCEDURES

General Management Objectives

Monitor LCT using electroshocking surveys and assess habitat using GAWS Level III habitat survey on the following streams: Happy Creek, Indian Creek, South Fork of Indian Creek, Abel Creek, and Rock Creek. GAWS level III habitat surveys were performed on Happy Creek, Indian Creek, South Fork of Indian Creek, and Abel Creek. The Rock Creek survey was not accomplished during the field season due to time spent assisting ODFW with an eradication project at Sage and Line creeks.

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 electroshockers.

Continue to work with ODFW to develop and carry out a plan to minimize non-native encroachment in the upper reaches of Sage Creek. During June, crews from the Nevada Department of Wildlife (NDOW) and the Oregon Department of Fish and Wildlife (ODFW) electroshocked predetermined transects along Sage Creek, Line Creek, and Corral Creek in the Trout Creek Mountains. A fin clip was collected from each fish contacted for genetic evaluation by the University of Nevada. After this evaluation, it was decided that a chemical treatment would be necessary on lower Line and Sage creeks due to the mixing of rainbow trout alleles in some of the samples. This eradication was carried out in September 2012 with help from NDOW, ODFW, and the United States Fish and Wildlife Service. ETS model AbP-3 backpack electroshockers were used for all sampling.

Augment the Pole Creek LCT population with pure LCT from Crowley Creek. During June, the uppermost 1.2 mi of Crowley Creek was intensively electroshocked to capture as many pure LCT as possible. Once captured, LCT were transported in water bladders to trucks that had been fitted with water tanks. The trucks were then driven to Pole Creek and the fish were released into a designated pool that was previously deemed suitable. ETS model AbP-3 backpack electroshockers were used for all sampling.

Carry out a full system chemical eradication of Crowley Creek. Crews carried out a chemical treatment on 3.4 mi of Crowley Creek. Rotenone application occurred from 9:00 am to 3:00 pm on August 14 and 15. Approximately 5 gal of CFT Legumine (Prentiss Inc. EPA Reg. # 75338-2) and 7 lbs of Prentox Rotenone Powder (Prentiss Inc. EPA Reg. # 655-691) were directly applied to Crowley Creek during the course of two days.

Carry out a full system LCT population survey on Jackson Creek. In June, a low intensity population survey was conducted on 8.2 mi of Jackson Creek to determine LCT density and distribution. ETS model AbP-3 backpack electroshockers were used to spot shock suitable habitat from the extreme headwaters of both Jackson Creek and the North Fork of Jackson Creek downstream to its terminus.

Work with the NWGMU to secure funding for and install a riparian fence on the headwaters of Crowley Creek. The NWGMU team met several times during 2012 and addressed several issues relating to the riparian fencing project.

Continue to work with all involved parties on the Horse/Falls/McConnell Creeks meta-population project in order to address all concerns and move this project forward. The NWGMU team met several times during 2012 and discussed all issues relating to the Horse/Falls/McConnell creeks project.

Monitor LCT populations in numerous recovery waters throughout their historic range as needed. Presence/absence surveys were conducted on several LCT streams, aside from those mentioned previously in this report. A low intensity presence/absence survey was carried out on the upper 1.23 mi of Pole Creek in the Montana Mountains. Suitable habitat was electroshocked in an effort to determine if the 2011 reintroduction of LCT was a success. In addition, presence/absence surveys were also carried out on Eight Mile and Three Mile creeks in the Santa Rosa Mountains. ETS model AbP-3 backpack electroshockers were used for all surveys.

Collect genetic samples from existing LCT populations throughout the 2012 field season concurrent to scheduled survey activities or when deemed necessary by the NWGMU team. In conjunction with habitat and population surveys on the aforementioned streams, genetic samples were also collected concurrent to LCT management activities. Samples were taken from LCT on Abel Creek, Indian Creek, the South Fork of Indian Creek, Crowley Creek, Sage Creek, Line Creek, Corral Creek, and Jackson 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 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. This objective was not accomplished during the 2012 field season.

Study Specific Objective – Abel Creek Brook Trout Study

Electroshock the upper most 1.5 miles of Abel Creek repeatedly for three days in the fall to remove all brook trout. On three days during September, Abel Creek was shocked using an ETS model AbP-3 backpack electroshocker for approximately 0.81 mi of stream. Block nets were placed directly below a possible upstream migration barrier and shocking commenced from that point upstream. While shocking, all brook trout captured were removed, but extra care was taken while removing Lahontan cutthroat trout so they were not harmed. A predetermined amount of stream was shocked each day until the headwater was reached.

Prior to electroshocking surveys, place block nets in the stream to form net pens in which to hold captured LCT so as to not continually shock them during subsequent surveys. Prior to electroshocking, the upper 0.81 mi of Abel Creek in September, a 10 ft long X 3 ft high block net was installed in the creek where the shocking would begin. All captured LCT were moved downstream of the block net as they were encountered throughout the survey. This prevented repeated shocking of individual LCT.

Remove block nets upon completion of brook trout removal efforts. Block nets were removed upon completion of the project.

Study Specific Objective – Crowley Creek LCT Population Study

Electroshock the entire wetted portion of Crowley Creek; take genetic samples from each individual fish and implant each fish with a P.I.T. tag for future identification. For two days during June, the upper portion of Crowley Creek was intensively electroshocked in an attempt to collect as many fish as possible for identification and genetic evaluation. ETS model AbP-3 backpack electroshockers were used to capture all fish. Once captured, a fish was scanned to determine if a PIT tag had been previously implanted; if not, the fish was measured, a fin clip was taken, and, if the fish was large enough, a uniquely numbered PIT (Passive Integrated Transponder) tag for future identification was implanted. Throughout the course of the effort, fin clips were taken from 61 fish, 30 of these fish were also fitted with PIT tags. All fin clips were delivered to the University of Nevada, Reno for genetic analysis.

Plot location coordinates for each individual fish on GPS. A Garmin 60cs GPS was used to record location coordinates for each fish collected.

Submit all genetic samples to the UNR Genetics Lab for hybrid analysis. A total of 61 samples were submitted for genetic analysis to the University of Nevada Reno.

Transfer pure LCT from Crowley Creek to Pole Creek. Prior to the August chemical treatment of Crowley Creek, crews spent four days electroshocking the upper portion in search of pure LCT containing PIT tags for identification. Once captured, each fish was scanned to detect the presence of a PIT tag; if present, it was checked against the results of the genetic evaluation to determine if the fish was a pure LCT or not. Pure LCT were placed into an Aqua Seal water bladder along with aeration devices and transported out of the drainage to a waiting vehicle that contained 50

gallons of Crowley Creek water in a tank. The tank was also fitted with aeration stones to dispense oxygen into the water. LCT were then driven to Pole Creek and released.

FINDINGS

General Management Objectives

Monitor LCT using electroshocking surveys and assess habitat using GAWS Level III habitat survey on the following streams: Happy Creek, Indian Creek, South Fork of Indian Creek, Abel Creek, and Rock Creek. GAWS level III habitat surveys were conducted on Happy Creek, Indian Creek, South Fork Indian Creek, and Abel Creek. Habitat Condition Index (HCI) ratings and fish population estimates are presented in Table 1. Stream 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
2012

Stream	Mtn Range	Surveyed Miles	Stations	Past HCI	2012 HCI	Species	Avg. Fish/mile	Estimated Pop.
Indian Creek	Santa Rosa	7.3	14	73.4	63.8	LCT	117.3	528
South Fork Indian Creek	Santa Rosa	6.2	10	74.5	65.1	LCT	317	1,109
Abel Creek	Santa Rosa	4.4	12	63.7	69.2	LCT/BK	10.6/301	52.8/1,504
Happy Creek	Jackson	2.2	11	59.3	60.8	TT	105.6*	105.6*

*Tiger trout were only found at one transect and are believed to only occupy this small piece of habitat

Continue to work with ODFW to develop and carry out a plan to minimize non-native encroachment in the upper reaches of Sage Creek. During June of 2012, an intensive effort was undertaken to collect genetic samples from as many fish as possible in Sage Creek and tributaries. NDOW was assigned to work Line and Corral creeks (Sage Creek tributaries) and collected samples from 65 fish. A location map of each sampled fish is presented in Attachment 1. Once genetics were analyzed by the University of Nevada, hybridized rainbow/cutthroat trout were found to be occupying stretches of lower Line Creek and the lower main stem of Sage Creek.

In August, the Holloway fire burned approximately 650,000 acres including large portions of Sage, Line, and Corral creeks. It is unknown at this time what the overall effects of this fire will be on LCT populations occupying these streams but extensive mortality was observed post-fire in all of the impacted areas.

Based on the results from the genetic sampling and the opportunity presented by the Holloway fire, two small chemical treatments were carried out in September to remove any remaining hybridized fish from the lower portions of Sage and Line creeks. Post-treatment presence/absence surveys have shown the treatment to be a success and more surveys are planned for 2013.

Augment the Pole Creek LCT population with pure LCT from Crowley Creek. Crews were able to capture 15 pure LCT from the upper reaches of Crowley Creek and transport them to Pole Creek during June of 2012. These fish had previously been tagged in Crowley Creek as part of the Crowley Creek Population Study. All 15 fish were part of a larger group of fish that had been fin clipped for genetic analysis. The results of the genetic analysis revealed certain pure LCT that were candidates for augmenting the Pole Creek population. All 15 of these LCT were pure. Table 2 lists tag numbers and fork lengths for the 15 fish that were transplanted.

Table 2

LCT Transplanted to Pole Creek 2012

Tag #	Fork Length
1363034	116
1364879	125
334098	130
323564	147
332745	146
334115	135
334094	151
1367027	188
1367235	146
1367386	115
1367602	164
333307	125
331110	136
1365536	214
333387	220
Average	150.5

Carry out a full system chemical eradication of Crowley Creek. The chemical eradication of Crowley Creek was carried out on August 14 and 15. Twenty-four people assisted in the eradication of several hundred hybridized rainbow/cutthroat trout from 3.4 mi of Crowley Creek. There was also incidental mortality of Lahontan redside shiners, mountain suckers, and speckled dace as a result of the treatment. Post-treatment surveys showed that the eradication was a success as no fish were found within the treated portion of the stream.

Lahontan cutthroat trout reestablishment in Crowley Creek will occur naturally, as the extreme headwaters were left untreated and contain a viable population of pure LCT. Continued monitoring of the treated reach is planned for 2013.

Carry out a full system LCT population survey on Jackson Creek. In June of 2012, a presence/absence survey of LCT was conducted in Jackson Creek and its north fork tributary. Nine LCT were sampled and fin clipped for genetic sampling. Waypoints were recorded at the location of capture for mapping purposes (Attachment 2). Results of the genetic analysis showed that 4 had limited hybridization with rainbow trout.

Table 3

Jackson Creek June 2012 Genetic Samples

Fish ID	Fork Length	Stream												
JC01	240	Jackson	230	230	242	242	309	309	272	272	174	174	219	219
JC02	208	Jackson	230	230	242	242	309	309	272	272	174	174	219	219
JC03	205	Jackson	230	230	242	242	309	309	272	272	174	174	219	219
JC04	230	Jackson	230	230	242	242	309	309	259	272	174	174	219	219
JC05	150	Jackson	230	230	242	242	309	309	259	272	174	174	219	219
JC06	220	Jackson	230	230	242	242	309	309	259	272	174	174	219	219
JC07	260	Jackson	230	230	242	242	309	309	259	272	174	174	219	219
JC08	155	Jackson	230	230	242	242	309	309	272	272	174	174	219	219
JC09	157	Jackson	230	230	242	242	309	309	272	272	174	174	219	219

RB Allele

CT Allele

Work with the NWGMU to secure funding for and install a riparian fence on the headwaters of Crowley Creek. The NWGMU met several times during 2012 and worked towards putting the Crowley Creek riparian fence project into motion. The Nevada Department of Wildlife developed a map of the proposed fencing location along with species of interest in close proximity. Nevada Department of Wildlife would supply all materials. The next step in the process is for the Bureau of Land Management to determine the best location for offsite watering of cattle. It is anticipated that construction of the fence will take place during the summer of 2013.

Continue to work with all involved parties on the Horse/Falls/McConnell Creeks meta-population project in order to address all concerns and move this project forward. The NWGMU met several times during 2012 and decided to postpone the Horse/Falls/McConnell Creeks meta-population project until several issues can be resolved such as acquiring public support.

Monitor LCT populations in numerous recovery waters throughout their historic range as needed. During the 2012 field season, low intensity presence/absence LCT surveys were conducted on Eight Mile Creek, Three Mile Creek, and Pole Creek. No LCT were found in Eight Mile Creek. Only one fish was sampled in Pole Creek and was previously implanted with a PIT tag when it was transplanted from Crowley Creek in 2011. Evidence of spawning was also observed within Pole Creek. A 0.25 mi stretch of Three Mile Creek was surveyed below a seasonal barrier and 8 YOY LCT were observed.

LCT populations were also monitored in nine other streams as part of other ongoing projects that are described in detail under separate headings of this report. These streams were Abel Creek, Indian Creek, South Fork Indian Creek, Jackson

Creek, Crowley Creek, Pole Creek, Sage Creek, Line Canyon Creek, and Corral Canyon Creek.

Collect genetic samples from existing LCT populations throughout the 2012 field season concurrent to scheduled survey activities or when deemed necessary by the NWGMU team. In conjunction with habitat and population surveys, genetic samples were collected from LCT on Abel Creek, Indian Creek, the South Fork of Indian Creek, Crowley Creek, Sage Creek, Line Creek, Corral Creek, and Jackson Creek. All samples were submitted to the University of Nevada for analysis; the results of the samples that have been processed are represented in Table 4.

Table 4

Quinn/Blackrock LCT Genetic Sampling Results

Stream	Mountain Range	# of samples	Results
Jackson Creek	Jackson	9	LCT/Hybrid
Corral Canyon Creek	Trout Creek	5	LCT
Line Canyon	Trout Creek	60	LCT/Hybrid
Abel Creek	Santa Rosa	8	*
Indian Creek	Santa Rosa	9	*
Indian Creek, SF	Santa Rosa	10	*
Crowley Creek	Montana	61	LCT/Hybrid

***Samples not yet analyzed**

Study Specific Objective – Abel Creek Brook Trout Study

Electroshock the upper most 1.5 miles of Abel Creek repeatedly for three days in the fall to remove all brook trout. All recorded data is presented in Table 5. A total of 32 LCT were located within the 0.81 mi of stream shocked. A total of 384 brook trout were removed from the system during the three days of shocking.

Table 5

Abel Creek Electrofishing Results 2012

Species	Transect	Total Fish	Avg. Total Length
LCT	1	15	194.1mm
LCT	2	17	155.9mm
Brook	1	1	184mm
Brook	2	383	*

*fish not measured due to time constraints

Prior to electroshocking surveys, place block nets in the stream to form net pens in which to hold captured LCT so as to not continually shock them during subsequent surveys. The use of block nets on each end of the electroshocked portion

of streams serves two purposes; to allow safe removal of LCT within the transect by insuring that they are not shocked repeatedly, and they also serve to keep brook trout from escaping the area and surviving the eradication.

Remove block nets upon completion of brook trout removal efforts. Block nets were removed once project was complete.

Study Specific Objective – Crowley Creek LCT Population Study

Electroshock the entire wetted portion of Crowley Creek, take genetic samples from each individual fish and implant each fish with a P.I.T. tag for future identification. For two days during June, the upper portion of Crowley Creek was electroshocked to collect fish. Fins were gathered from 61 individuals for genetic analysis and each fish was fitted with its own unique PIT (Passive Integrated Transponder) tag. Collection locations were recorded and PIT tag numbers were matched with genetic sample numbers. Fin clips were delivered to the University of Nevada, Reno for analysis. All data from genetic sampling are presented in Attachment 3.

To plot each individual fish sampled as its own unique waypoint on GPS. A GPS was used to record location coordinates for each fish collected. This data was used to pinpoint areas for salvage attempts in June and October. A map of the distribution of LCT and hybrid rainbow/cutthroat trout is presented in Attachment 4.

Submit all genetic samples to the UNR Genetics Lab for hybrid analysis. All 61 genetic samples collected were submitted to the University of Nevada genetics lab for analysis. Of these, 55 were pure Lahontan cutthroat trout, while 6 were hybridized rainbow/cutthroat trout.

Transfer pure LCT from Crowley Creek to Pole Creek. Prior to the chemical treatment of Crowley Creek in August, four attempts were made to salvage pure LCT and reintroduce them into Pole Creek. In all, 15 LCT were salvaged and placed into Pole Creek. Tag numbers and fork lengths for all transplanted fish can be found in Table 2.

Immediately preceding the chemical treatment of Crowley Creek, one final attempt was made to salvage LCT from the portion of the stream to be treated. Ten more LCT were captured and moved upstream of the treatment reach. In all, 25 LCT were salvaged prior to the chemical treatment. Table 6 lists the 10 LCT that were salvaged and moved upstream of the treatment reach prior to the chemical treatment in Crowley Creek.

Native Sport Fish Management Objective

Monitor LCT using electroshocking surveys and assess habitat using GAWS Level III habitat survey on the following streams: Happy Creek, Indian Creek, South Fork of Indian Creek, Abel Creek, and Rock Creek. While both Indian Creek and South Fork Indian Creek showed a decline in habitat conditions, it can be mostly attributed to the drought conditions exhibited in 2012. Pool structure and pool

measure were the limiting factors on both creeks; lower rating on these attributes were expected considering low flow conditions. Overall, the habitat on both streams was still well above the desired levels for LCT habitat.

Table 6

Crowley Creek LCT August 2012 Salvage

Fish ID	Tag #	FL
F027	321602	149
F005	322292	135
E004	331851	105
F003	332559	185
F013	333248	134
F020	333941	149
C18	334370	125
A12	1364018	194
A7	1364691	200
A24	1367521	121

MANAGEMENT REVIEW

The estimated LCT populations in Indian and South Fork Indian creeks were both slightly lower than found in 2000. This can be attributed to low flow rates during 2012. It appeared fish sampled in South Fork Indian Creek were all pure LCT, while there was some question as to the purity of the LCT in the main stem. Sampling in 2000 revealed some rainbow trout hybridization from the main stem of Indian Creek. Genetic samples were collected in 2012 from numerous fish in both creeks and results are pending.

Abel Creek in 2012 showed an increase of 6% from the 63% HCI in 2008. Abel Creek habitat conditions are well above the desired levels for LCT habitat. Lahontan cutthroat trout population estimates were also up slightly in 2012, at 98%, from the 2008 survey, at 83%. While the LCT population appeared to be relatively stable, the brook trout population declined from an estimated size of 5,325 in 2008 to 2,852 in 2012. The decline in brook trout can be attributed to the Abel Creek Brook Trout Study over the past four years focusing on mechanically removing as many brook trout as possible from the upper reaches. It appears this project is having a positive impact by reducing brook trout within Abel Creek.

Continue to work with ODFW to develop and carry out a plan to minimize non-native encroachment in the upper reaches of Sage Creek. With the completion of the chemical treatments on the lower portions of Sage and Line creeks, the upstream migration of hybridized rainbow/cutthroat trout has been halted. Further genetic surveys are needed in order to monitor the purity of the remaining populations of LCT that are occupying the headwaters of Sage and Line creeks.

This project has been part of a larger ongoing project to restore LCT within the McDermitt Creek drainage. With the monitoring of the Sage Creek and Line Creek populations and the potential reintroduction of LCT into main stem McDermitt Creek during the summer of 2013, future monitoring will be all that is needed to complete a decade long recovery project.

Augment the Pole Creek LCT population with pure LCT from Crowley Creek. A total of 32 pure LCT have been reintroduced into Pole Creek since 2011. While no recruitment was observed in 2012, evidence of spawning was documented (redds). Further monitoring of the introduced LCT population in Pole Creek will be necessary to ensure it is a success. The opportunity for augmentation is limited due to the small population in Crowley Creek, but options will be explored.

Carry out a full system chemical eradication of Crowley Creek. Initial plans for Crowley Creek were to eradicate fish throughout the entire system, but during pretreatment surveys, it was discovered that hybrid fish had not reached the upper portion of the stream and the decision was made to leave a small portion of the headwaters untreated. Leaving it untreated allowed a large number of pure LCT to survive, which will aid in their recovery throughout the stream. Future monitoring is planned, but it is believed that this population of LCT will recover and thrive without the threat of hybridization from rainbow trout.

Work with the NWGMU to secure funding for and install a riparian fence on the headwaters of Crowley Creek. All the materials for this project have been obtained by the Nevada Department of Wildlife. This project will move forward as soon as the BLM is able to locate a suitable site away from the stream for watering livestock.

Continue to work with all involved parties on the Horse/Falls/McConnell Creeks meta-population project in order to address all concerns and move this project forward. While this project has been put on hold, discussions will continue among members of the NWGMU to try and find a resolution to the myriad of issues.

Monitor LCT populations in numerous recovery waters throughout their historic range. In all, 12 LCT occupied streams were surveyed during the 2012 field season. A wide range of results was found, but populations appeared to be relatively stable in streams with established populations. 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 intensively surveyed and options will be explored for recovering individual streams.

Collect genetic samples from numerous LCT populations throughout the 2012 field season as they are available. Genetic samples were gathered from 7 streams. The results were mixed with one stream containing all pure LCT, three with hybridized rainbow/cutthroat trout, and three that have yet to be analyzed but are believed to be pure LCT. This data is invaluable as it allows for basin wide decisions to be made regarding the status and direction of the LCT recovery project. Genetic sampling will continue in the 2013 field season.

Study Specific Objective – Abel Creek Brook Trout Study

All of the approaches of this study were completed during the 2012 field season. It appears that the efforts of this project are having positive impacts on the species assemblages in the drainage. A finalized report will be submitted as this was the final year of the study.

Study Specific Objective – Crowley Creek LCT Population Study

All of the approaches were completed during the 2012 field season. Future monitoring will be necessary to ensure that this project was a success and to determine whether or not future augmentations will be necessary. A finalized completion report will be submitted as this was the final year of the study.

RECOMMENDATIONS

Native Sport Fisheries Management Objectives:

- Perform GAWS level III stream surveys on each of the following streams: South Fork Little Humboldt River, Pole Creek, Snowstorm Creek, Winters Creek, First Creek, Mahogany Creek, Rock Creek, and Summercamp 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 mechanical removal 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.

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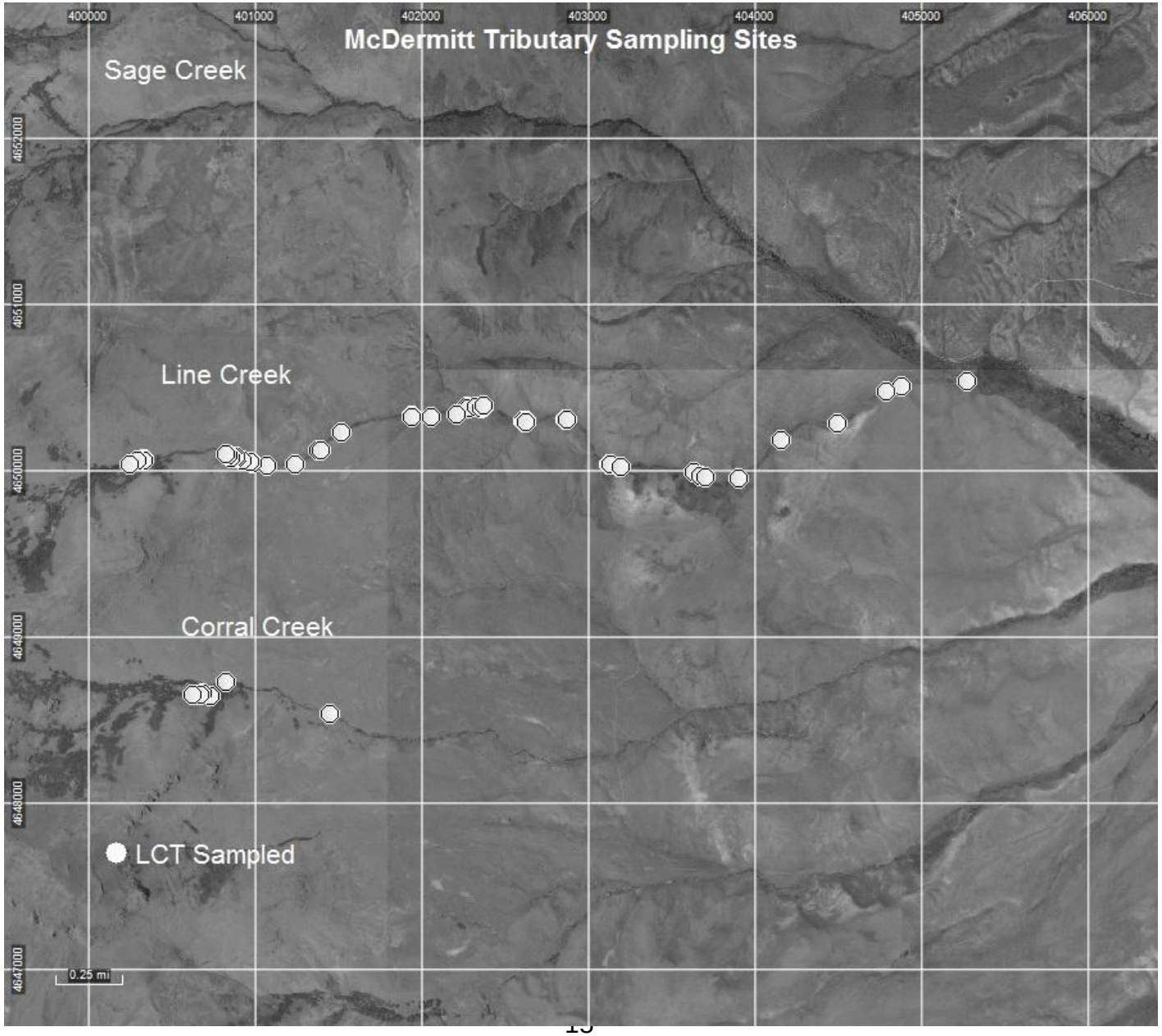
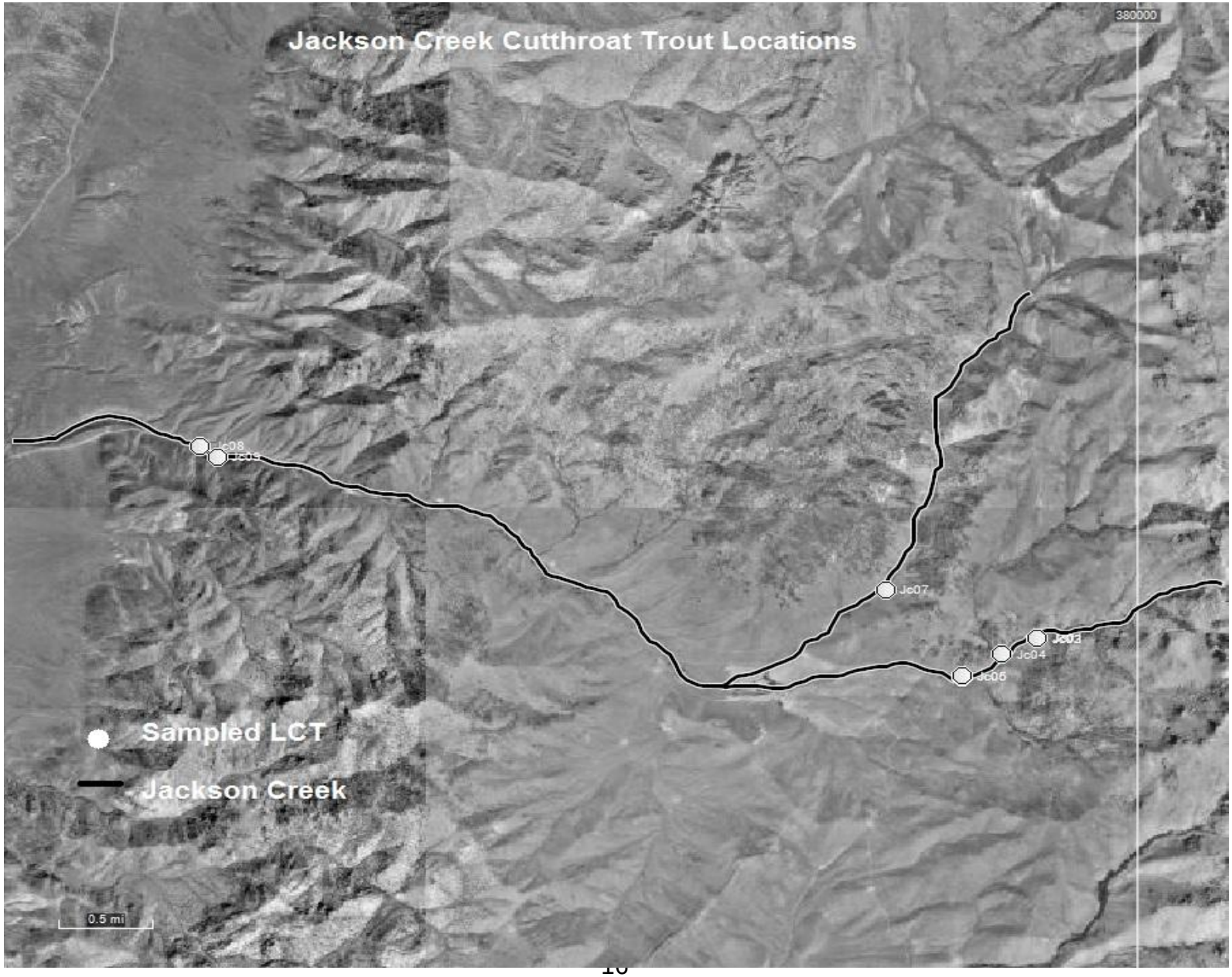
Date: February 27, 2013

Attachment 1



Attachment 2

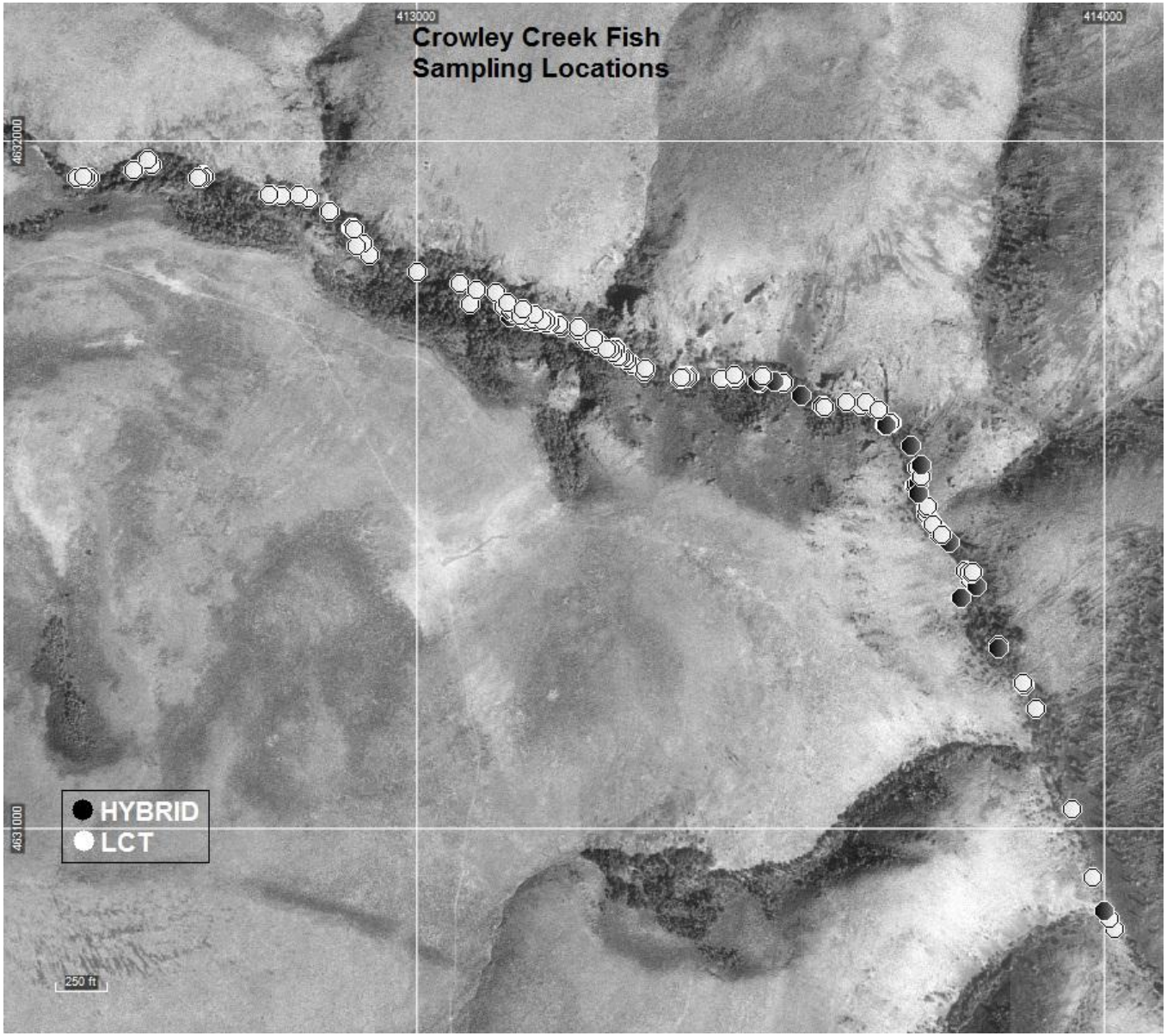


Crowley Creek June 2012 Genetic Samples

Sample	Fork Length												
E001	95	230	230	242	242	309	309	272	272	174	174	219	219
E002	110	230	230	242	242	309	309	272	272	174	174	219	219
E003	106	230	230	242	242	309	309	272	272	174	174	219	219
E004	105	230	230	242	242	309	309	272	272	174	174	219	219
E005	130	230	230	242	242	309	309	272	272	174	174	219	219
E006	134	230	230	242	242	309	309	272	272	174	174	219	219
E007	180	230	230	242	242	309	309	272	272	174	174	219	219
E008	142	230	230	242	242	309	309	272	272	174	174	219	219
E009	141	230	230	242	242	309	309	272	272	174	174	219	219
E010	139	230	230	242	242	309	309	272	272	174	174	219	219
E011	147	230	230	242	242	309	309	272	272	174	174	219	219
E012	147	230	230	242	242	309	309	272	272	174	174	219	219
E013	158	230	230	242	242	309	309	272	272	174	174	219	219
E014	140	230	230	242	242	309	309	272	272	174	174	219	219
E015	150	230	230	242	242	309	309	272	272	174	174	219	219
E016	147	230	230	242	242	309	309	272	272	174	174	219	219
EC001	90	230	230	242	242	309	309	272	272	174	174	219	219
EC002	75	230	230	242	242	309	309	272	272	174	174	219	219
EC003	100	230	230	242	242	309	309	272	272	174	174	219	219
EC004	95	230	230	242	242	309	309	272	272	174	174	219	219
EC005	105	230	230	242	242	309	309	272	272	174	174	219	219
EC006	95	230	230	242	242	309	309	272	272	174	174	219	219
EC007	85	230	230	242	242	309	309	272	272	174	174	219	219
EC008	102	230	230	242	242	309	309	272	272	174	174	219	219
EC009	87	230	230	242	242	309	309	272	272	174	174	219	219
EC010	65	230	230	242	242	309	309	272	272	174	174	219	219
EC011	100	230	230	242	242	309	309	272	272	174	174	219	219
EC012	77	230	230	242	242	309	309	272	272	174	174	219	219
EC013	80	230	230	242	242	309	309	272	272	174	174	219	219
EC014	85	230	230	242	242	309	309	272	272	174	174	219	219
EC015	104	230	230	242	242	309	309	272	272	174	174	219	219
EC016	90	230	230	242	242	309	309	272	272	174	174	219	219
EC017	103	230	230	242	242	309	309	272	272	174	174	219	219
EC018	97	230	230	242	242	309	309	272	272	174	174	219	219
EC019	88	230	230	242	242	309	309	272	272	174	174	219	219
EC020	105	230	230	242	242	309	309	272	272	174	174	219	219
EC021	105	230	230	242	242	309	309	272	272	174	174	219	219
EC022	83	230	230	242	242	309	309	272	272	174	174	219	219
EC023	91	230	230	242	242	309	309	272	272	174	174	219	219
EC024	89	230	230	242	242	309	309	272	272	174	174	219	219
EC025	93	230	230	242	242	309	309	272	272	174	174	219	219
EC026	84	230	230	242	242	309	309	272	272	174	174	219	219
EC031	115	230	230	242	242	309	309	272	272	174	174	219	219

EC032	75	230	230	242	242	309	309	272	272	174	174	219	219
EC048	110	230	230	242	242	309	309	272	272	174	174	219	219
EC049	85	230	230	242	242	309	309	272	272	174	174	219	219
EC060	157	230	230	242	242	309	309	272	272	174	174	219	219
F001	205	230	230	242	242	309	309	259	272	174	174	219	219
F002	210	230	230	242	242	309	309	259	272	174	174	219	219
F003	185	230	230	242	242	309	309	272	272	174	174	219	219
F005	135	230	230	242	242	309	309	272	272	174	174	219	219
F008	180	230	230	242	242	309	309	272	272	174	174	219	219
F010	191	230	230	210	242	309	309	272	272	174	174	219	219
F013	134	230	230	242	242	309	309	272	272	174	174	219	219
F014	161	230	230	242	242	309	309	259	272	174	174	219	219
F015	142	230	230	242	242	309	309	272	272	174	174	219	219
F018	139	230	230	242	242	309	309	259	272	174	174	219	219
F020	149	230	230	242	242	309	309	272	272	174	174	219	219
F021	134	230	230	242	242	309	309	259	272	174	174	219	219
F022	140	230	230	242	242	309	309	272	272	174	174	219	219
F027	149	230	230	242	242	309	309	272	272	174	174	219	219

RB Allele

CT Allele

Attachment 4