

Murray Canyon Creek
Alpine County, California

2005 Stream & Riparian Habitat Survey Report



Prepared by:

Carson Ranger District
Humboldt-Toiyabe National Forest

Introduction

Murray Canyon Creek, Alpine County, California, Carson Ranger District, supports an introduced population of Lahontan cutthroat trout (LCT), a federally endangered species. Murray Canyon Creek occurs within the Carson Iceberg Wilderness and is within the Murray Canyon C&H Allotment. Murray Canyon Creek flows for approximately 4 miles in an easterly direction to its confluence with the East Fork Carson River approximately ½ mile downstream of Carson Falls. The Murray Canyon Creek watershed ranges from 7000 feet elevation to 9300 feet elevation. The entire Murray Canyon Creek watershed is managed by the Humboldt-Toiyabe National Forest (HTNF). The Murray Canyon Creek watershed has not been established as a Critical Aquatic Refuge in the 2004 Sierra Nevada Forest Plan Amendment.

In 2005 the HTNF agreed to transfer the Term Grazing Permit for the Murray Canyon C&H Allotment to the Stanislaus National Forest for administration. Prior to transferring the Term Grazing Permit to the Stanislaus National Forest, the HTNF consulted with the U.S. Fish and Wildlife Service (USFWS). The HTNF received a final Biological Opinion from the USFWS on June 3, 2005. In order to meet the terms and conditions of the Biological Opinion for the Murray Canyon C&H Allotment, the HTNF conducted an R1R4 stream habitat survey (Map 2) on Murray Canyon Creek to determine if relevant stream characteristics were within the range of natural variability. The HTNF also took several photos of the vegetative condition of the allotment within the Murray Canyon Creek watershed. The Murray Canyon Creek watershed was also surveyed for presence of Mountain yellow-legged frogs (MYLF) and Yosemite toads (YT). While conducting the R1R4 stream habitat and amphibian surveys, the HTNF also documented any permanent or seasonal fish barriers (Map 1) that were found within the Murray Canyon Creek watershed. All surveys occurred between July 13, 2005 and July 19, 2005.

Methodology

The 2005 Murray Canyon Creek R1R4 Stream Habitat Survey followed the May 1997 R1/R4 (Northern/Intermountain Regions) Fish and Fish Habitat Standard Inventory Procedures Handbook authored by Kerry Overton et al. Due to time constraints, not the entire watershed was surveyed using the R1R4 methodology. The HTNF was only able to survey approximately 0.60 miles of stream habitat. The survey reach site was chosen based on the low gradient and the upland montane meadows in the area. The HTNF felt that if grazing was going to have an affect on the stream condition, the survey reach site would be the best location to document any potential effects or changes.

Seasonal and permanent barriers are referenced within this report. Seasonal barriers are features that appear to be fish barriers under base flow; however, during high flow events fish may be able to migrate up through the seasonal barrier. Permanent barriers are features that are greater than 5 feet high with no plunge pool below, or

are cascades sheeting across bedrock material. These are features that appear to serve as fish barriers during all seasons of the year.

Murray Canyon Creek, springs, seeps, bogs, tributaries, and wet montane meadows within the Murray Canyon Creek watershed were surveyed for the presence of MYLF and YT. Suitable amphibian habitat within the Murray Canyon Creek watershed was minimal. Therefore, as suitable amphibian habitat was found, the entire area was surveyed for presence of MYLF and YT. The HTNF walked along the stream banks of Murray Canyon Creek and tributaries and throughout any wet montane meadows, springs, seeps, bogs, or any other areas that appeared to have potential amphibian habitat looking for presence of amphibians.

Results

The Murray Canyon Creek R1R4 survey reach began just upstream of a permanent fish barrier that is located near Site 6 (Maps 1 and 2). The survey reach was approximately 0.60 miles in length and ended at a tributary that enters Murray Canyon Creek from the river right side. No seasonal or permanent fish barriers were identified within the R1R4 survey reach. Lahontan cutthroat trout were seen throughout the survey area.

Table 1 provides a summary of several habitat variables that were collected as a part of the R1R4 Stream Habitat Survey. Table 2 provides a summary of the range for habitat variables compiled from several different stream habitat surveys (reference streams only) that were conducted within the Pacific Southwest Region of the Forest Service. The width-to-depth ratio, average percent fines <2 mm, and the bank instability (ft/mile) are all within the range of natural variability when compared to reference streams/sites within the Pacific Southwest Region of the Forest Service (Compared Table 1 to Table 2).

Four permanent fish barriers and 3 seasonal fish barriers (Map 1) were identified within the Murray Canyon Creek watershed. The lowermost permanent fish barrier (Photos 1-3) is located just downstream of Site 1. The other permanent fish barriers are located at Site 3 (Photo 9), just upstream of Site 6 (Photo 14), and just downstream of Site 10 (Photo 23). The 3 seasonal fish barriers are located at Site 5 (Photo 12), Site 6 (Photo 13), and just upstream of Site 9 (Photo 22).

Photo documentation of the stream condition and the upland vegetative condition occurred at Site 1 (Photos 4-5), Site 2 (Photo 7-8), Site 4 (Photo 11), Site 7 (Photos 15-17), Site 8 (Photos 18-19), Site 9 (Photos 20-21), and Site 10 (Photo 24). Another photo point occurs between Site 1 and site 2 (Photo 6) and another photo point occurs between Site 3 and Site 4 (Photo 10). Not all the photo points had GPS locations recorded due to the difficulty to receive enough GPS satellites from the Murray Canyon Creek drainage. The vegetative condition appeared to be in good condition for the area. The HTNF did not find any evidence of recent grazing occurring within the Murray Canyon Creek watershed.

No suitable habitat for MYLF was found within the Murray Canyon Creek watershed. No ponds, lakes, or tarns are located within the Murray Canyon Creek watershed. Murray Canyon Creek and its tributaries lacked the slow water/eddy habitat where MYLF could survive and overwinter in.

Minimal habitat for YT was found within the Murray Canyon Creek watershed. Murray Canyon Creek, springs, seeps, bogs, tributaries, and all wet montane meadows within the Murray Canyon Creek watershed were surveyed and no YT were found. Most of the suitable habitat found consisted of wet montane meadows. Most of the wet montane meadows were heavily vegetated with willows, so detecting a YT would have been very difficult.

Discussion

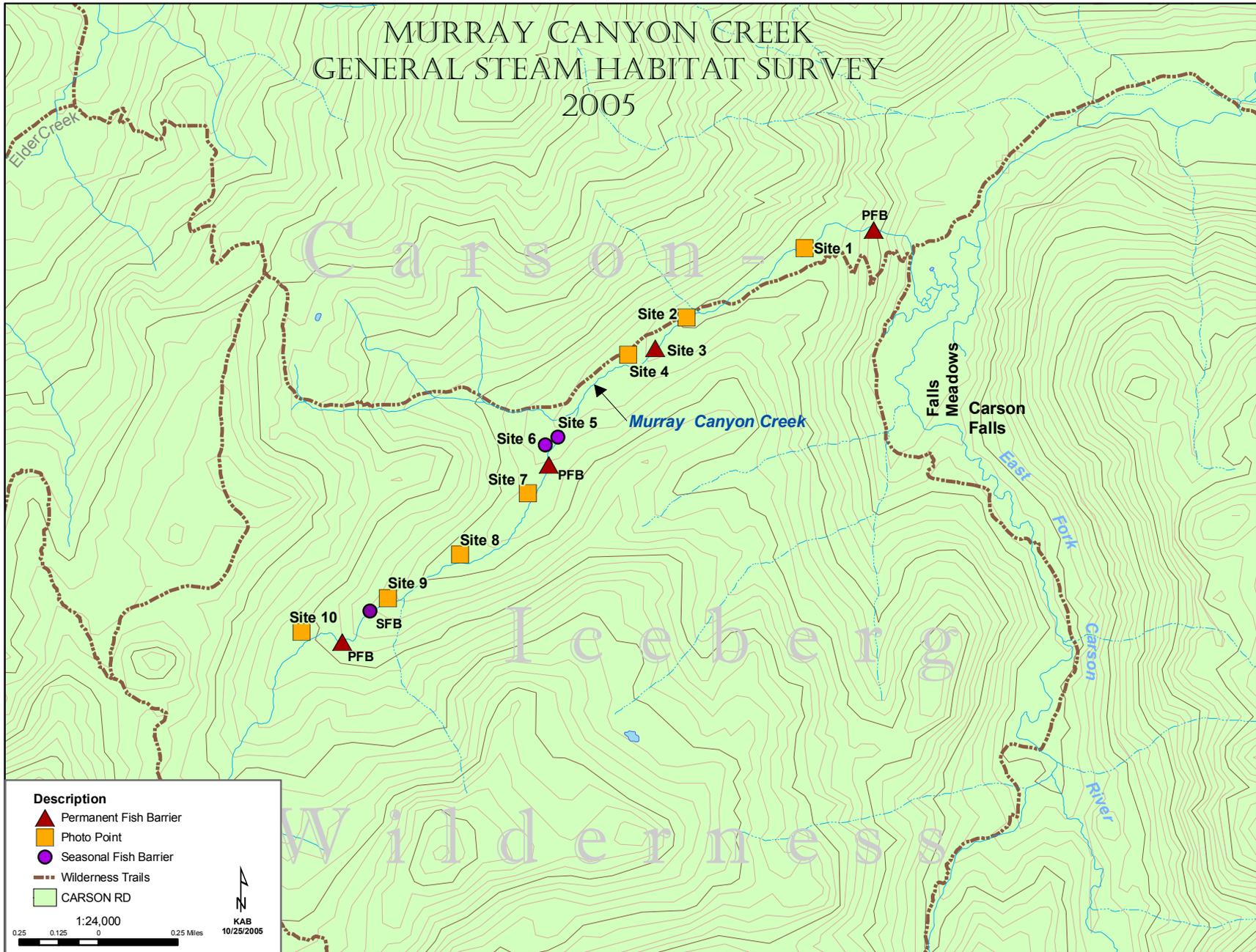
The R1R4 stream survey reach does provide decent LCT habitat. The pool to riffle ratio was low (a pool to riffle ratio of 1 is optimal); however, the channel gradient was low, the percent of unstable banks was low, several pieces of large woody debris, aggregates, and root wads were identified, the percent fines <2mm in length was low, and no permanent or seasonal fish barriers were identified within the survey reach (Table 1). Several LCT were seen throughout the survey reach. The largest overall current impact to the LCT in Murray Canyon Creek is probably the permanent and seasonal fish barriers located up and downstream of the R1R4 survey reach. The four permanent fish barriers and the three seasonal fish barriers are likely resulting in negative impacts to LCT survival, migration, and reproduction within the Murray Canyon Creek watershed. Although the entire Murray Canyon Creek drainage does not provide ideal conditions and habitat for LCT, approximately 4 miles of potential/marginal habitat does occur within the watershed (Map 2). Based on the steep gradient near the bottom of the Murray Canyon Creek drainage, the large number of natural fish barriers, and the high elevation, LCT were probably not native to Murray Canyon Creek upstream of the lowest most permanent fish barrier just downstream of Site 1 (Map 1, Photos 1-3).

The Murray Canyon Creek uplands are characterized as having mostly steep canyon slopes with conifer stands. The riparian areas consisted of mostly steep canyon slopes with thick/dense conifer, willow, and alder vegetation. The few riparian areas that did have gentle montane meadow slopes with grass were photographed and are included in this report (see attached photos). The grass vegetation within the few montane meadows appeared to be in good condition. The HTNF did not find any evidence of recent grazing occurring within the Murray Canyon Creek watershed. Based on the characterization of the watershed and the few gentle wet montane meadows that do exist near water, the HTNF does not expect any significant impacts from grazing to LCT and to the Murray Canyon Creek condition. The amount of gentle slope meadows near water, preferred primarily by livestock, appeared to be minimal.

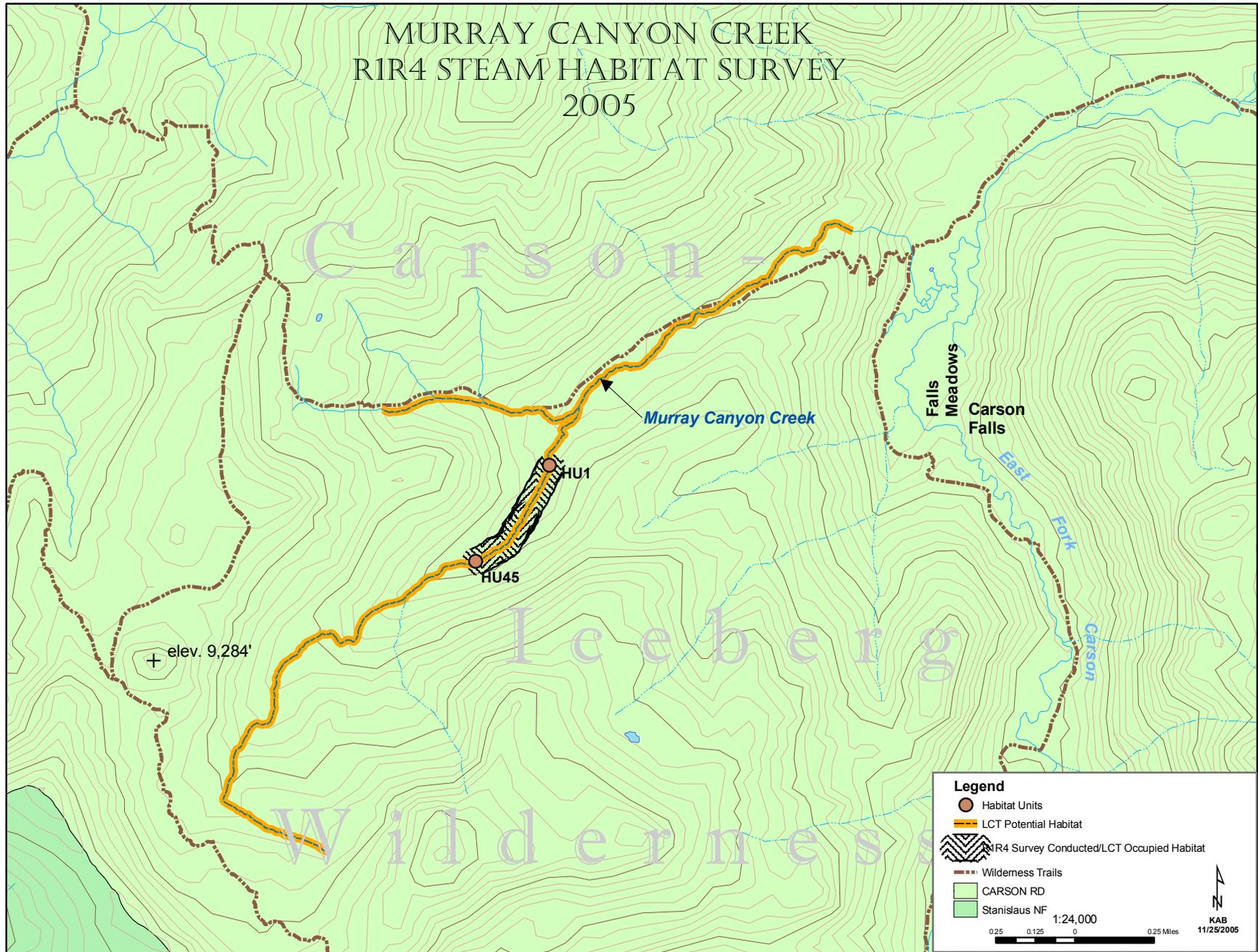
No significant impacts to YT are expected to occur as a result of livestock grazing within the Murray Canyon Creek watershed. In the wet montane meadow areas where YT could still occur, but were never found, the YT will likely be able to find refuge within the thick willow patches while the livestock are grazing nearby.

Recommendations

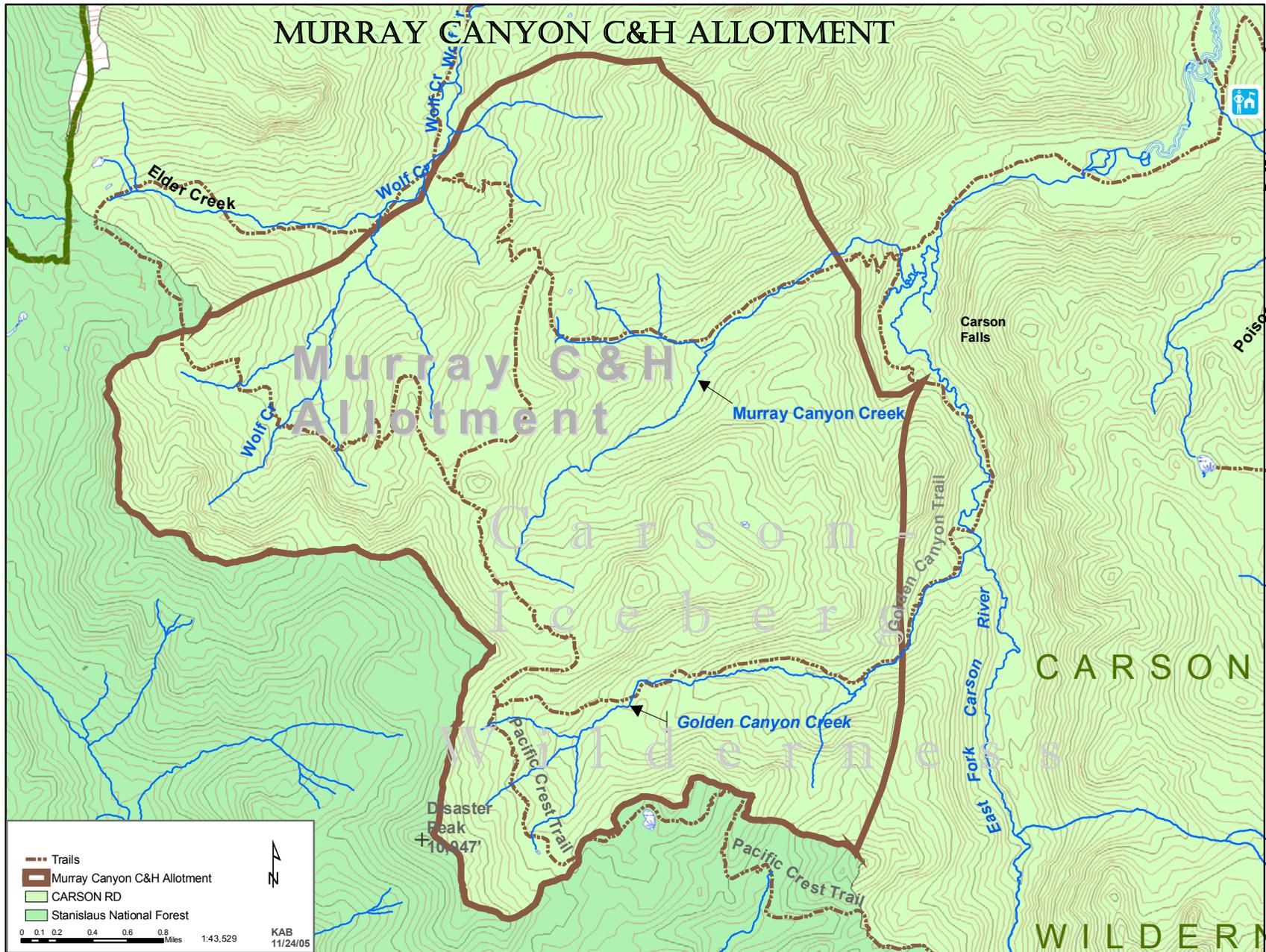
1. Coordinate with the California Department of Fish and Game to conduct a fish distribution and density survey of LCT in the Murray Canyon Creek watershed.
2. Establish the Murray Canyon Creek watershed as a Critical Aquatic Refuge, as described in the 2004 Sierra Nevada Forest Plan Amendment.
3. Conduct some routine trail maintenance on the trail that parallels Murray Canyon Creek. The trail was difficult to find in locations and several logs had fallen across the trail making horse access difficult.



Map 1: Murray Canyon Creek, Carson Ranger District, permanent and seasonal fish barriers, and photo points.



Map 2: Murray Canyon Creek, Carson Ranger District, R1R4 stream survey reach and potential Lahontan cutthroat trout habitat.



Map 3: Murray Canyon C&H Allotment, Carson Ranger District.

Stream Name Murray Canyon Creek	R1R4 Survey Length (miles) 0.6	Average Wetted Width (ft) 11.60	Average Pool Maximum Depth (ft) 2.00	Average Residual Pool Depth (ft) 0.89	Average Riffle Maximum Depth (ft) 0.95	Average Riffle Depth (ft) 0.92	Sinuosity 1.39	Pool Riffle Ratio (area comparison) 0.19	Average Width To Depth Ratio 14.54
Stream Name Murray Canyon Creek	Channel Gradient 1.94%	Rosgen Channel Type B4	Bank Instability (ft/mile) 63	Bank Undercut (ft/mile) 287.0	Dominant Channel Shape I	Large Woody Debris (pieces/mile) 147	Aggregates (pieces/mile) 10	Root Wads (pieces/mile) 27	Average Percent Fines (<2 mm) 3%

Table 1: Murray Canyon Creek, Carson Ranger District, various habitat characteristics that were collected during the 2005 R1R4 Stream Habitat Survey.

Pacific Southwest Region All Reference Stream Surveys Combined	Width To Depth Ratio	Average Percent Fines (<2 mm)	Bank Instability (ft/mile)
Range	4.9 to 46	0 to 48	0 to 4066

Table 2: Range for stream habitat characteristics compiled from several different stream habitat surveys (reference streams only) that were conducted within the Pacific Southwest Region of the Forest Service. Protocols can be found in the Stream Condition Inventory (SCI) Technical Guide, Pacific Southwest Region, July 2005, Version 5.0 manual.



Photo 1: Murray Canyon Creek, Carson Ranger District, permanent fish barrier, downstream of Site 1. Photo was taken on 16 July 2005.



Photo 2: Murray Canyon Creek, Carson Ranger District, permanent fish barrier, downstream of Site 1. Photo was taken on 16 July 2005.

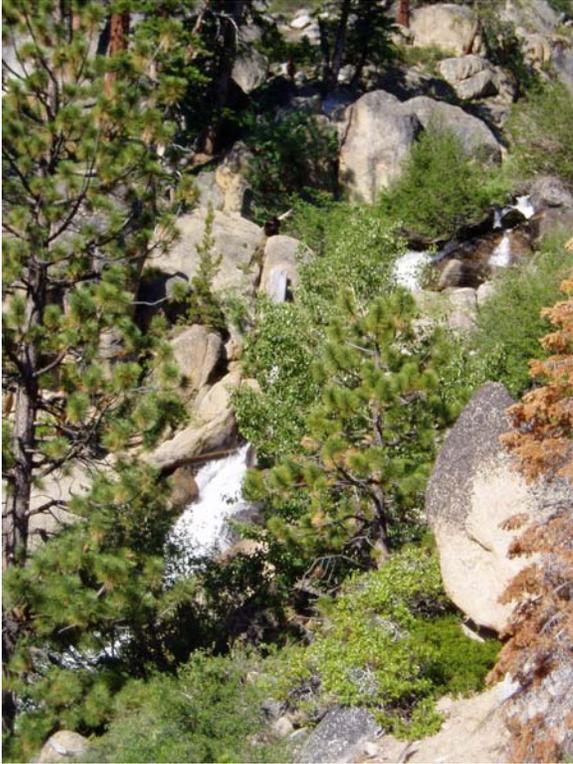


Photo 3: Murray Canyon Creek, Carson Ranger District, permanent fish barrier, downstream of Site 1. Photo was taken on 16 July 2005.

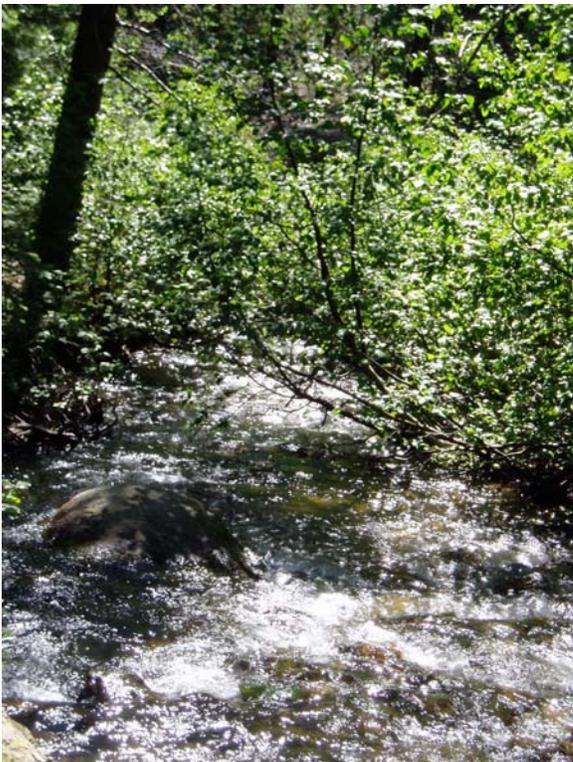


Photo 4: Murray Canyon Creek, Carson Ranger District, looking downstream from Site 1. Trail crosses Murray Canyon Creek here. Photo was taken on 16 July 2005.



Photo 5: Murray Canyon Creek, Carson Ranger District, looking upstream from Site 1. Trail crosses Murray Canyon Creek here. Photo was taken on 16 July 2005.



Photo 6: Murray Canyon Creek, Carson Ranger District, photo point between Site 1 and Site 2. Photo was taken on 16 July 2005.



Photo 7: Murray Canyon Creek, Carson Ranger District, Site 2. Photo was taken on 16 July 2005.



Photo 8: Murray Canyon Creek, Carson Ranger District, Site 2. Photo was taken on 16 July 2005.



Photo 9: Murray Canyon Creek, Carson Ranger District, Site 3, permanent fish barrier. The permanent fish barrier is approximately 10 feet high. Photo was taken on 16 July 2005.



Photo 10: Murray Canyon Creek, Carson Ranger District, photo point between Site 3 and Site 4. Photo was taken on 16 July 2005.



Photo 11: Murray Canyon Creek, Carson Ranger District, upland meadow at Site 4. Photo was taken on 16 July 2005.

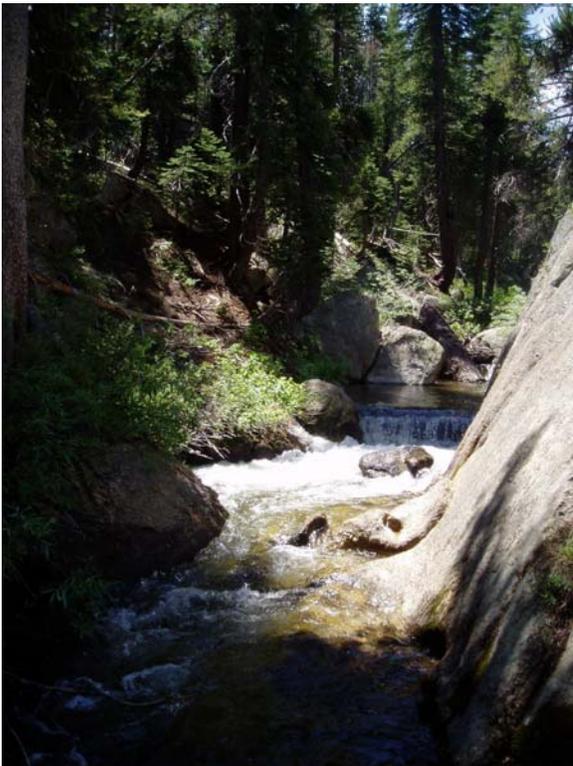


Photo 12: Murray Canyon Creek, Carson Ranger District, Site 5, seasonal fish barrier. The seasonal fish barrier is approximately 3 feet high. Photo was taken on 16 July 2005.



Photo 13: Murray Canyon Creek, Carson Ranger District, Site 6, seasonal fish barrier. The seasonal fish barrier is approximately 3 feet high. Photo was taken on 16 July 2005.



Photo 14: Murray Canyon Creek, Carson Ranger District, permanent fish barrier just upstream of Site 6. The permanent fish barrier is approximately 25 feet high. Photo was taken on 16 July 2005.



Photo 15: Murray Canyon Creek, Carson Ranger District, Site 7. Photo was taken on 16 July 2005.



Photo 16: Murray Canyon Creek, Carson Ranger District, upland meadow at Site 7. Photo was taken on 16 July 2005.



Photo 17: Murray Canyon Creek, Carson Ranger District, upland meadow at Site 7. Photo was taken on 16 July 2005.



Photo 18: Murray Canyon Creek, Carson Ranger District, Site 8. Photo was taken on 16 July 2005.



Photo 19: Murray Canyon Creek, Carson Ranger District, upland meadow at Site 8. Photo was taken on 16 July 2005.

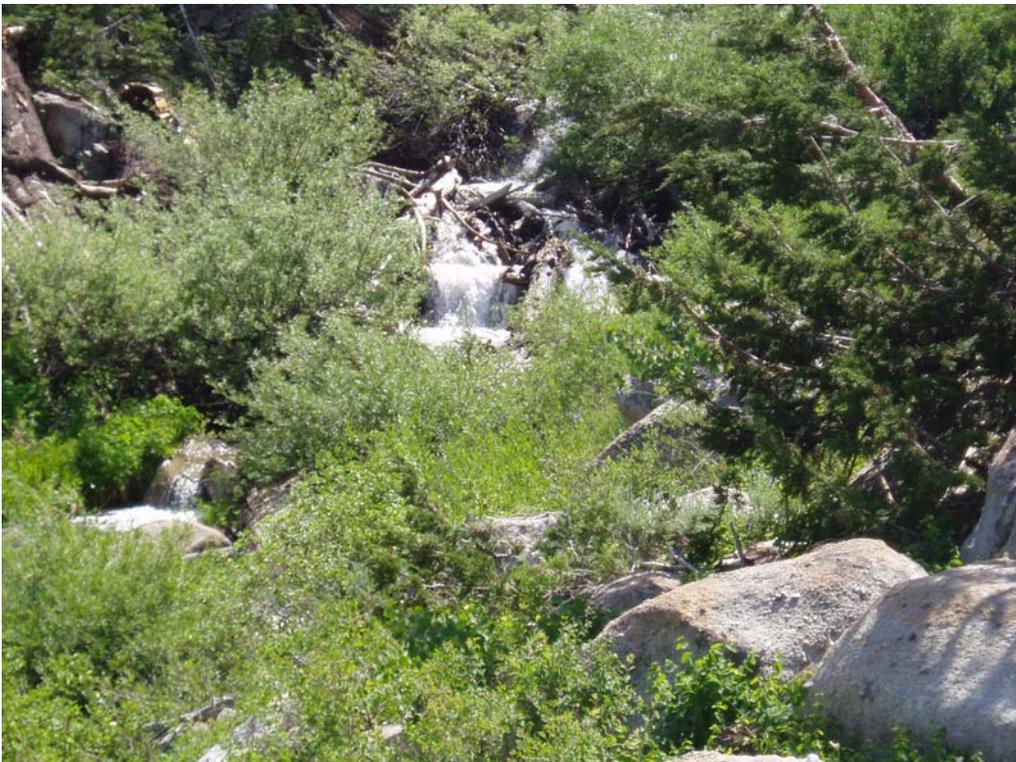


Photo 20: Murray Canyon Creek, Carson Ranger District, looking upstream from Site 9. Photo was taken on 16 July 2005.



Photo 21: Murray Canyon Creek, Carson Ranger District, looking downstream from Site 9. Photo was taken on 16 July 2005.



Photo 22: Murray Canyon Creek, Carson Ranger District, seasonal fish barrier just upstream of Site 9. The seasonal fish barrier is approximately 4 feet high. Photo was taken on 16 July 2005.



Photo 23: Murray Canyon Creek, Carson Ranger District, permanent fish barrier between Site 9 and Site 10. The permanent fish barrier is approximately 100 feet high. Photo was taken on 16 July 2005.



Photo 24: Murray Canyon Creek, Carson Ranger District, Site 10. Photo was taken on 16 July 2005.



Photo 25: Murray Canyon Creek, Carson Ranger District, looking South at the headwaters of the Murray Canyon Creek watershed. Photo was taken on 16 July 2005.



Photo 26: Murray Canyon Creek, Carson Ranger District, looking East at the Murray Canyon Creek watershed. Photo was taken on 16 July 2005.



Photo 27: Murray Canyon Creek, Carson Ranger District, looking North at the Murray Canyon Creek watershed towards the East Fork Carson River. Photo was taken on 16 July 2005.

APPENDIX I

FORM 1, R1/R4 Stream Survey Reach Header Form

Stream Name: Murray Canyon Creek Tributary of: East Carson River

Survey Reach #: 1 Survey Date: 16 July 05

Survey Observer: Jason Kling Survey Recorder: Merri Melde

Forest/District: HTNF/Carson RD Base Quad: Disaster Peak Quad

Survey Reach Lower Boundary General Description: Just upstream of Site 6 – Permanent Fish Barrier

Survey Reach Lower Boundary UTM and Legal Description: Near UTM 11 263998E 4263224N (NAD27)

Survey Reach Upper Boundary General Description: Reach ends at a tributary that enters on river right.

Survey Reach Upper Boundary UTM and Legal Description: UTM 11 263613E 4262717N (NAD27)

Lower Reach Boundary Elevation: Upper Reach Boundary Elevation:

Map Derived Gradient (rise/run) (Page 15): 2.6% Observed Gradient (Page 15): 1.94%

Thalweg Distance Between Reach Boundaries: 0.60 miles

Linear Distance Between Reach Boundaries: 0.43 miles

Sinuosity (Thalweg Distance/Linear Distance): 1.39

Rosgen Channel Type (Page 16): B4 Valley Segment Type (Handout):

Omernik 1995 Ecoregion (Page 13): Sierra Nevada

Gross Geology/Sub-Geology (Page 14):

Cover Group (Page 16): Meadow

Confinement (Page 17):

Weather: Sunny

Discharge (Page 16) = $(W \times D \times k \times L)/T$

W=average width, D=average depth, k=roughness constant (.8 for rough .9 for smooth bed)

L=length of low gradient riffle T=time.

Note: Report average of 3 measurements.

Measurement #1: Measurement #2: Measurement #3: Average Discharge:

FORM 2, R1/R4 Habitat Form

Stream: Murray Canyon Creek Reach #: 1 Page: 1
 Forest: Humboldt-Toiyabe Observer: Jason Kling Date: 16 July 05
 District: Carson Ranger District Recorder: Merri Melde Weather: Sunny

HABITAT UNIT #	1	2	3	4	5	6	7	8	9	10
CHANNEL CODE	M	M	M	M	M	M	M	M	M	M
SIDE UNIT #	0	0	0	0	0	0	0	0	0	0

HABITAT TYPE	Riffle	SMB	Riffle	SPB	Riffle	SLB	Riffle	SLB	Riffle	SLM
LENGTH (ft)	70	18	81	8	77	20	20	16	64	36
WIDTH (m)	4.75	4.00	4.02	4.50	3.25	1.00	2.58	3.50	4.00	2.65
AVERAGE DEPTH (m)	0.21	0.29	0.34	0.45	0.25	0.40	0.23	0.40	0.22	0.43

FAST TYPE										
# POCKET POOLS	2		4						4	
AVERAGE MAX DEPTH (m)	0.15		0.29						0.34	

SLOW TYPE										
MAX DEPTH (m)		0.56		0.59		0.56		0.65		0.54
CREST DEPTH (m)		0.28		0.37		0.26		0.28		0.23
STP STEP POOL #										
STP # POOLS >1m										
STP AVG. MAX DEPTH (m)										

SURFACE FINES %										
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SUBSTRATE COMP										
SAND (<2 mm) (%)									1	
GRAVEL (2-64 mm) (%)									61	
COBBLE (64-256 mm) (%)									38	
BOULDER (256-4096 mm)									0	
BEDROCK (%)									0	
*Wolmann Pebble Count (X)									X	

Banks										
Left Bank Length (ft)	70	20	91	8	77	20	20	16	62	28
Left Bank Stable (ft)	40	20	91	8	77	20	20	16	62	26
Left Bank Undercut (ft)	0	0	6	0	9	0	0	0	0	7
Right Bank Length (ft)	70	18	71	8	77	20	20	16	75	47
Right Bank Stable (ft)	70	18	71	8	77	20	20	16	75	42
Right Bank Undercut (ft)	0	0	0	0	0	0	0	0	0	0

Left Chan Shape	R	I	I	I	I	I	I	I	I	I
Right Chan Shape	I	I	I	I	I	I	I	I	I	I

Water Temperature C										
Air Temperature C										
Temperature Reading Time										

LWD Singles	3	0	4	1	1	9	0	0	4	1
LWD Aggregates	0	0	0	0	0	0	0	0	0	0
LWD Root Wads	0	0	1	1	2	0	0	0	0	1

RIPARIAN										
Left Bank Dom Species	Grass	Grass	Grass	Grass	Grass	Grass	Grass	Willow	Grass	Willow
Left Bank Subdom Species	LdgePole	Grass	Grass	Grass	LdgePole	Grass	Grass	Willow	Willow	Willow
Right Bank Dom Species	LdgePole	LdgePole	LdgePole	LdgePole	Grass	Grass	LdgePole	Grass	Grass	Grass
Right Bank Subdom Species	Grass	LdgePole	Grass	LdgePole	LdgePole	Grass	Grass	Grass	Willow	Grass

*COMMENTS (X)				X						X
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FORM 2, R1/R4 Habitat Form

Stream: Murray Canyon Creek Reach #: 1 Page: 2
 Forest: Humboldt-Toiyabe Observer: Jason Kling Date: 16 July 05
 District: Carson Ranger District Recorder: Merri Melde Weather: Sunny

HABITAT UNIT #	11	12	13	14	15	16	17	18	19	20
CHANNEL CODE	S	S	M	M	M	M	M	M	S	S
SIDE UNIT #	1	2	0	0	0	0	0	0	0	0

HABITAT TYPE	Riffle	SLM	Riffle	SPW	Riffle	SLM	Riffle	SLM	SMW	Riffle
LENGTH (ft)	34	16	216	12	100	26	75	50	10	16
WIDTH (m)	4.85	4.15	3.2	6.00	2.00	2.25	4.50	2.60	3.00	3.00
AVERAGE DEPTH (m)	0.17	0.26	0.73	0.36	0.43	0.40	0.12	0.38	0.24	0.14

FAST TYPE										
# POCKET POOLS										
AVERAGE MAX DEPTH (m)										

SLOW TYPE										
MAX DEPTH (m)		0.60		0.45		0.86		0.65		
CREST DEPTH (m)		0.26		0.22		0.25		0.22		
STP STEP POOL #										
STP # POOLS >1m										
STP AVG. MAX DEPTH (m)										

SURFACE FINES %										
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SUBSTRATE COMP										
SAND (<2 mm) (%)										
GRAVEL (2-64 mm) (%)										
COBBLE (64-256 mm) (%)										
BOULDER (256-4096 mm)										
BEDROCK (%)										
*Wolmann Pebble Count (X)										

Banks										
Left Bank Length (ft)	34	20	216	12	120	26	65	70	10	16
Left Bank Stable (ft)	34	20	216	12	120	26	65	70	10	16
Left Bank Undercut (ft)	0	2	0	0	0	26	0	0	0	0
Right Bank Length (ft)	34	12	216	12	90	26	90	70	10	16
Right Bank Stable (ft)	34	12	216	12	90	26	90	70	10	16
Right Bank Undercut (ft)	0	0	40	0	3	0	5	0	0	0

Left Chan Shape	I	I	I	I	I	I	I	I	I	I
Right Chan Shape	I	I	I	R	R	I	I	I	I	I

Water Temperature C										
Air Temperature C										
Temperature Reading Time										

LWD Singles	0	2	5	3	3	1	1	0	1	0
LWD Aggregates	0	0	0	0	0	0	0	1	0	0
LWD Root Wads	0	0	3	0	0	0	1	0	0	0

RIPARIAN										
Left Bank Dom Species	Grass	Grass	Grass	Grass	Willow	Grass	Grass	Willow	Grass	Willow
Left Bank Subdom Species	Grass	Grass	LdgePole	LdgePole	Willow	LdgePole	Willow	Willow	Grass	Willow
Right Bank Dom Species	Grass	Grass	Willow	Grass	Willow	Willow	Willow	Grass	Grass	Grass
Right Bank Subdom Species	LdgePole	Grass	Grass	LdgePole	Willow	Willow	Grass	Grass	Grass	Grass

*COMMENTS (X)			X	X		X				
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FORM 2, R1/R4 Habitat Form

Stream: Murray Canyon Creek Reach #: 1 Page: 3
 Forest: Humboldt-Toiyabe Observer: Jason Kling Date: 16 July 05
 District: Carson Ranger District Recorder: Merri Melde Weather: Sunny

HABITAT UNIT #	21	22	23	24	25	26	27	28	29	30
CHANNEL CODE	M	M	M	M	M	M	M	M	M	S
SIDE UNIT #	0	0	0	0	0	0	0	0	0	0

HABITAT TYPE	Riffle	SLM	Riffle	SPB	Riffle	SLM	Riffle	SPW	Riffle	Riffle
LENGTH (ft)	374	22	620	10	39	27	77	13	74	109
WIDTH (m)	3.55	4.50	3.10	4.50	3.00	3.00	3.00	4.95	1.75	3.20
AVERAGE DEPTH (m)	0.30	0.26	0.23	0.30	0.30	0.30	0.26	0.30	0.29	0.32

FAST TYPE										
# POCKET POOLS	1		3							
AVERAGE MAX DEPTH (m)	0.22		0.36							

SLOW TYPE										
MAX DEPTH (m)		0.50		0.40		0.73		0.60		
CREST DEPTH (m)		0.25		0.23		0.44		0.30		
STP STEP POOL #										
STP # POOLS >1m										
STP AVG. MAX DEPTH (m)										

SURFACE FINES %										
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SUBSTRATE COMP										
SAND (<2 mm) (%)										
GRAVEL (2-64 mm) (%)										
COBBLE (64-256 mm) (%)										
BOULDER (256-4096 mm)										
BEDROCK (%)										
*Wolmann Pebble Count (X)										

Banks										
Left Bank Length (ft)	425	22	700	10	39	27	77	13	74	109
Left Bank Stable (ft)	425	22	700	10	39	27	77	13	74	109
Left Bank Undercut (ft)	5	0	0	0	0	0	0	0	50	0
Right Bank Length (ft)	425	22	700	10	39	27	77	13	74	109
Right Bank Stable (ft)	425	22	700	10	39	27	77	13	74	109
Right Bank Undercut (ft)	10	0	10	0	0	0	0	0	0	0

Left Chan Shape	I	R	I	I	I	I	I	I	I	I
Right Chan Shape	I	I	I	I	I	I	I	I	I	I

Water Temperature C										
Air Temperature C										
Temperature Reading Time										

LWD Singles	2	0	3	0	0	0	0	1	0	0
LWD Aggregates	1	0	0	0	0	0	0	0	0	0
LWD Root Wads	0	0	2	0	0	0	0	0	0	0

RIPARIAN										
Left Bank Dom Species	Willow	Willow	Willow	Grass	Grass	Grass	Grass	Grass	Grass	Grass
Left Bank Subdom Species	Grass	Willow	Grass	Grass	Grass	Grass	Grass	Grass	Grass	Grass
Right Bank Dom Species	Willow	Grass	Grass							
Right Bank Subdom Species	Grass	Willow	Grass	Willow	Willow	Willow	Willow	Willow	Grass	Grass

*COMMENTS (X)										
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FORM 2, R1/R4 Habitat Form

Stream: Murray Canyon Creek Reach #: 1 Page: 4
 Forest: Humboldt-Toiyabe Observer: Jason Kling Date: 16 July 05
 District: Carson Ranger District Recorder: Merri Melde Weather: Sunny

HABITAT UNIT #	31	32	33	34	35	36	37	38	39	40
CHANNEL CODE	M	M	M	M	M	M	M	M	M	M
SIDE UNIT #	0	0	0	0	0	0	0	0	0	0

HABITAT TYPE	Riffle	SLB	STP	Riffle	SPB	Riffle	SPB	STP	Riffle	SPW
LENGTH (ft)	192	7	32	90	9	123	18	17	23	17
WIDTH (m)	3.50	4.50	4.50	3.45	3.00	3.25	3.35	3.25	3.75	3.25
AVERAGE DEPTH (m)	0.28	0.30	0.14	0.30	0.38	0.36	0.53	0.37	0.27	0.24

FAST TYPE										
# POCKET POOLS	6			3		4			1	
AVERAGE MAX DEPTH (m)	0.39			0.30		0.28			0.27	

SLOW TYPE										
MAX DEPTH (m)		0.62			0.50		0.75	0.70		0.57
CREST DEPTH (m)		0.18			0.30		0.25			0.35
STP STEP POOL #			2					2		
STP # POOLS >1m			0					0		
STP AVG. MAX DEPTH (m)			0.68					0.56		

SURFACE FINES %										
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SUBSTRATE COMP										
SAND (<2 mm) (%)										
GRAVEL (2-64 mm) (%)										
COBBLE (64-256 mm) (%)										
BOULDER (256-4096 mm)										
BEDROCK (%)										
*Wolmann Pebble Count (X)										

Banks										
Left Bank Length (ft)	225	7	37	90	9	123	20	17	23	17
Left Bank Stable (ft)	225	7	37	90	9	123	20	17	23	17
Left Bank Undercut (ft)	0	0	0	0	0	0	0	0	0	0
Right Bank Length (ft)	190	7	32	90	9	123	18	17	30	17
Right Bank Stable (ft)	190	7	32	90	9	123	18	17	30	17
Right Bank Undercut (ft)	0	0	0	0	0	0	0	0	0	0

Left Chan Shape	I	I	I	I	I	I	I	I	I	I
Right Chan Shape	I	I	I	I	I	I	I	R	I	I

Water Temperature C										
Air Temperature C										
Temperature Reading Time										

LWD Singles	0	0	0	2	0	0	5	6	4	4
LWD Aggregates	0	0	0	0	0	2	0	1	0	0
LWD Root Wads	0	0	0	0	0	0	0	0	0	2

RIPARIAN										
Left Bank Dom Species	Grass	Grass	Grass	Grass	Grass	LdgePole	Grass	Grass	Grass	Willow
Left Bank Subdom Species	Grass	Grass	Grass	Grass	Grass	Grass	LdgePole	LdgePole	LdgePole	Grass
Right Bank Dom Species	Grass	Grass	Grass	Grass	Grass	LdgePole	LdgePole	Grass	Willow	Willow
Right Bank Subdom Species	Grass	Grass	Grass	Grass	Grass	Grass	Grass	Willow	Grass	Grass

*COMMENTS (X)										
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FORM 2, R1/R4 Habitat Form

Stream: Murray Canyon Creek Reach #: 1 Page: 5
 Forest: Humboldt-Toiyabe Observer: Jason Kling Date: 16 July 05
 District: Carson Ranger District Recorder: Merri Melde Weather: Sunny

HABITAT UNIT #	41	42	43	44	45					
CHANNEL CODE	M	M	M	M	M					
SIDE UNIT #	0	0	0	0	0					

HABITAT TYPE	Riffle	SMB	Riffle	SPW	SPW					
LENGTH (ft)	16	26	140	16	33					
WIDTH (m)	4.25	3.20	3.85	4	4.5					
AVERAGE DEPTH (m)	0.20	0.64	0.25	0.44	0.56					

FAST TYPE										
# POCKET POOLS	0		4							
AVERAGE MAX DEPTH (m)	0		0.27							

SLOW TYPE										
MAX DEPTH (m)		0.75		0.65	0.67					
CREST DEPTH (m)		0.25		0.30	0.27					
STP STEP POOL #										
STP # POOLS >1m										
STP AVG. MAX DEPTH (m)										

SURFACE FINES %										
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SUBSTRATE COMP										
SAND (<2 mm) (%)			5							
GRAVEL (2-64 mm) (%)			40							
COBBLE (64-256 mm) (%)			53							
BOULDER (256-4096 mm)			2							
BEDROCK (%)			0							
*Wolmann Pebble Count (X)										

Banks										
Left Bank Length (ft)	13	22	132	16	38					
Left Bank Stable (ft)	13	22	132	16	38					
Left Bank Undercut (ft)	0	0	0	0	0					
Right Bank Length (ft)	20	26	145	16	29					
Right Bank Stable (ft)	20	26	145	16	29					
Right Bank Undercut (ft)	0	0	0	5	0					

Left Chan Shape	R	I	I	I	R					
Right Chan Shape	R	I	I	R	R					

Water Temperature C										
Air Temperature C										
Temperature Reading Time										

LWD Singles	2	4	6	3	5					
LWD Aggregates	0	0	1	0	0					
LWD Root Wads	0	0	2	0	1					

RIPARIAN										
Left Bank Dom Species	Willow	Willow	Willow	Grass	Grass					
Left Bank Subdom Species	Grass	LdgePole	Grass	LdgePole	Willow					
Right Bank Dom Species	Grass	Willow	Willow	Willow	Willow					
Right Bank Subdom Species	Willow	Grass	Grass	LdgePole	LdgePole					

*COMMENTS (X)					X					
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**FORM 3, R1/R4 Fish Habitat Inventory
Large Woody Debris Form**

Stream: Murray Canyon Creek Reach #: 1 Date: 16 July 2005 Page: 1

Single Pieces			Single Pieces			Single Pieces		
Hab Unit #	Ln X Dia (m) X (m)	% Submg.	Hab Unit #	Ln X Dia (m) X (m)	% Submg.	Hab Unit #	Ln X Dia (m) X (m)	% Submg.
1	6.85 x 0.11	50	6	3.3 x 0.12	85	15	1.8 x 0.33	45
1	9 x 0.09	50	9	1.18 x 0.3	60	15	6 x 0.35	10
1	3.9 x 0.05	25	9	1.65 x 0.15	100	16	3.3 x 0.15	90
3	1.7 x 0.11	100	9	3 x 0.2	90	17	1.3 x 0.28	30
3	14.4 x 0.39	1	9	1.25 x 0.25	90	19	4.1 x 0.15	70
3	3.85 x 0.2	50	10	2 x 0.8	0.5	21	1.5 x 0.2	0
3	0.83 x 0.17	50	12	4.9 x 0.17	50	21	1.85 x 0.9	85
4	0.68 x 0.11	50	12	1.28 x 0.2	40	23	1.5 x 0.23	20
5	12 x 0.3	1	13	3 x 0.02	5	23	14 x 0.6	0.5
6	12 x 0.15	10	13	2.6 x 0.2	0	23	3 x 0.2	75
6	3.85 x 0.3	90	13	14 x 0.48	1	28	12 x 0.25	75
6	4.5 x 0.34	5	13	2.2 x 0.13	50	34	1.5 x 0.25	100
6	1.5 x 0.46	100	13	6 x 0.15	10	34	2 x 0.35	75
6	2.15 x 0.17	0	14	6 x 0.33	80	37	1.3 x 0.27	2
6	1.5 x 0.24	50	14	2.4 x 0.2	50	37	3 x 0.6	50
6	1.3 x 0.15	25	14	3.6 x 0.25	95	37	2.5 x 0.19	50
6	1.5 x 0.14	100	15	1.5 x 0.15	50	37	4.5 x 0.11	2

**FORM 3, R1/R4 Fish Habitat Inventory
Large Woody Debris Form**

Stream: Murray Canyon Creek

Reach #: 1

Date: 16 July 2005

Page: 2

Single Pieces			Single Pieces			Aggregates		
Hab Unit #	Ln X Dia (m) X (m)	% Submg.	Hab Unit #	Ln X Dia (m) X (m)	% Submg.	Hab Unit #	Number Pieces	
37	9 x 0.25	25	42	12 x 0.15	0	18	9	
38	3.8 x 0.1	50	42	3.55 x 0.14	25	21	4	
38	3 x 0.13	25	42	6 x 0.25	0	36	18	
38	3 x 0.14	80	42	7.5 x 0.18	100	36	4	
38	2.4 x 0.2	95	43	4.5 x 0.2	100	38	5	
38	1.5 x 0.2	100	43	4 x 0.17	100	43	4	
38	4.5 x 0.18	90	43	2.6 x 0.12	20			
39	2.4 x 0.15	100	43	2.6 x 0.05	80			
39	2.2 x 0.2	100	43	8 x 0.15	75			
39	1.5 x 0.17	50	43	4.5 x 0.17	100			
39	3 x 0.12	5	44	3.75 x 0.27	95			
40	4.5 x 0.11	15	44	1.5 x 0.17	25			
40	14 x 0.2	75	44	3.7 x 0.3	100			
40	4 x 0.13	20	45	3.3 x 0.33	100			
40	1.7 x 0.2	30	45	6 x 0.37	2			
41	2 x 0.09	14	45	4.3 x 0.32	75			
41	1.5 x 0.16	25	45	1 x 0.23	10			
			45	3.4 x 0.04	20			

FORM 4, R1/R4 Fish Habitat Inventory Comments

Stream: Murray Canyon Creek Reach #: 1 Date: 16 July 205 Page: 1

Hab. #	Comments:
4	1 LCT observed.
10	3 LCT observed. 2, 3, and 7 inch.
13	2 LCT observed. 5 inch.
14	1 LCT observed. 9 inch.
16	Several LCT observed.
45	Several LCT observed. End of R1R4 survey. Tributary enters river right-5% of overall flow.

PHOTOGRAPHS

<u>Hab. #</u>	<u>R#</u>	<u>EX#</u>	<u>Description</u>	<u>Hab.#</u>	<u>R#</u>	<u>EX#</u>	<u>Description</u>

