

RAYMOND MEADOWS CREEK

Alpine County, California

2006 Stream Habitat Survey Report



Prepared By:

Carson Ranger District: Humboldt-Toiyabe National Forest

Introduction

Raymond Meadows Creek is located in Alpine County, California. The mainstem flows approximately 2.1 miles in a northeasterly direction from the base of Reynold's Peak to the confluence with Silver Creek. Raymond Meadows Creek originates at an elevation of approximately 8700 feet and descends to an elevation of approximately 7440 feet at the confluence with Silver Creek. The stream is located entirely within the boundaries of the Humboldt-Toiyabe National Forest, and the upper portion of the stream is located within the Mokelumne Wilderness.

Purpose and Need

The 1995 Lahontan Cutthroat Trout Recovery Plan requires that ecosystem management plans be developed for the Truckee and Walker River basins in order to both determine objectives for the future desired conditions of these watersheds, and to create strategies for achieving these objectives. Similar management plans are recommended for the Carson and Humboldt River basins. In 1998 Truckee and Walker River Basin Recovery Implementation Teams were organized to develop strategies for Lahontan cutthroat trout (LCT) restoration and recovery efforts in the Truckee and Walker River basins. In August 2003 both recovery teams completed Short-Term Action Plans for Lahontan Cutthroat Trout Recovery in the Truckee and Walker River Basins. The short-term action plans outline specific tasks to be completed within five years. Many of the short-term tasks identified in the Truckee and Walker River Basin Short-Term Action Plans are similar to one another and are applicable to recovery of LCT in the Carson River basin. The Carson Ranger District adopted some of the short-term tasks identified in the Truckee and Walker River Basin Short-Term Action Plans and began implementing these actions under an informal plan for the Carson River basin. These tasks include: (1) identifying and evaluating fish passage and existing barriers within the Carson River basin, (2) developing a watershed analysis of the physical components of the Carson River basin, and (3) initiating habitat surveys to evaluate potential LCT introduction streams and validating against existing LCT inhabited streams.

The Carson River watershed historically provided an estimated 405 miles of stream habitat (Kling and Mellison 2008) for the native Lahontan cutthroat trout (*Oncorhynchus clarki henshawi*). Populations of these salmonids within the watershed were interactive and interconnected, and therefore these metapopulations likely had high genetic diversity and were capable of long term persistence through adverse conditions.

At present, no self-sustaining populations of genetically pure LCT are known to occupy historic habitat within the Carson River basin and since all of the drainage has been surveyed it is doubtful that any such populations remain to be discovered. The introduction of nonnative trout before the turn of the century is believed to be largely responsible for the extirpation of LCT within the Carson River drainage.

Although naturally occurring Lahontan cutthroat trout populations have been eliminated from the Carson River drainage, small populations have been established in the formerly fishless headwaters of the East Fork Carson River above Carson Falls and in the tributaries Murray Canyon Creek, Golden Canyon Creek, and Poison Flat Creeks above impassible barriers. Pure populations of LCT also occur in Red Lake, Heenan Lake, Heenan Creek, and possibly in Raymond Meadows Creek. Hybridized populations of LCT occur in Jeff Davis Creek and in Leviathan Creek upstream of Leviathan Mine. The artificially established pure populations of LCT in the East Fork Carson River watershed occupy about 17 miles of stream habitat: approximately 4.2% of the total miles that LCT presumably occupied historically.

The primary causes for the decline of LCT include: 1) reduction and alteration of stream discharge; 2) alteration of stream channels and morphology; 3) degradation of water quality; and 4) introductions of non-native fish species. The Carson River watershed downstream of Carson Falls is primarily inhabited by non-indigenous salmonids which include, but are not limited to: rainbow trout (*Oncorhynchus mykiss*), brook trout (*Salvelinus fontinalis*), and brown trout (*Salmo trutta*). These competitive and aggressive introduced fishes have displaced the endemic Lahontan cutthroat trout.

Long term survival and recovery of LCT within the Carson River watershed will require sustained cooperation and effort from multiple federal and state agencies, including the Forest Service and personnel of the Humboldt-Toiyabe National Forest. Gaining information through immediate action can aid in prioritizing future objectives for the restoration of LCT. The 2006 Carson River watershed surveys are being conducted to gain information about streams in the basin, and furthermore to provide an inventory of potential fish habitat for LCT. The surveys include the tasks of identifying potential fish passage barriers and evaluating physical characteristics that pertain to the success of the native LCT. Should recommendations be made to re-introduce LCT, these surveys can provide baseline information for future management of the fishery. As of 1995, approximately 0.5 miles of Raymond Meadows Creek were occupied by a population of LCT. The 2006 habitat surveys are only visual assessments and therefore fish sightings only confirm the presence of the specified number of fish, and cannot be interpreted as an evaluation of population viability. Raymond Meadows Creek was surveyed on July 24-25, 2006 by members of the Humboldt-Toiyabe National Forest, Carson Ranger District. The surveyors were Brian Hodge and Harrison Davis.

Materials and Methods

Forest Service personnel surveyed Raymond Meadows Creek by hiking the watercourse in an upstream manner. Interesting and relevant features were documented, photographed, and recorded into a Trimble GPS unit. These features included but were not limited to: road crossings, trail crossings, fish sightings, permanent fish barriers, seasonal fish barriers, tributaries, springs, beaver dams, areas of erosion concern, grazing impacts, dispersed campsites, etc.

Fish passage barriers were noted and categorized into one of four categories: natural-permanent, natural-seasonal, artificial-permanent, and artificial-seasonal. A permanent barrier is categorized as an obstacle, waterfall, or drop in excess of 5ft that would prevent passage of fish year-round (specifically LCT). A stadia rod was used to measure barriers where applicable. Barriers categorized as permanent barriers may actually be seasonal barriers, and some seasonal barriers may actually act as a permanent barrier.

Results

Approximately 1.9 miles of Raymond Meadows Creek were surveyed (Sites 1-21). The overall gradient of the surveyed reach is approximately 11.5 percent. Fourteen fish passage barriers were identified throughout the stream, and four of the fourteen were noted as seasonal barriers (Sites 8, 11, 17, & 19). Ten permanent fish passage barriers were documented throughout the stream (Sites 2, 3, 4, 7, 9, 10, 12, 13, 15, & 18). An artificial permanent fish barrier is located at Site 9. In some instances several barriers were assigned a single site number due to their proximity to one another. Each individual barrier within a set is denoted by a lowercase letter (i.e. a, b, c. etc.). Tributaries were located at Site 5 (Eagle Creek) and at Site 16. A road-stream crossing was documented at Site 6. In addition, photos were taken to capture stream characteristics at Sites 14 and 20. No fish were seen while conducting the survey.

Discussion

Prior to surveying Raymond Meadows Creek the location and status of the existing LCT population was unknown. The survey was carried out according to the typical protocol: evaluating the potential habitat for LCT within the stream. During an October 2006 conversation, personnel from the California Department of Fish and Game shared an account of a 1995 electro-fishing survey on Raymond Meadows Creek. In 1995, Lahontan cutthroat trout, which had been planted in the 1980's, were found between the road-stream crossing (Site 6) and the 8000 ft contour level (Site 10-11), a range of about 1500 feet. The reach between Site 6 and Site 11 contains three permanent barriers and one seasonal barrier. The permanent barriers range in height from 4.0 to 12.0 feet, and Site 10 consists of several consecutive barriers. Connectivity within this section is limited and therefore, fish movement is similarly limited.

Approximately 0.50 miles of Raymond Meadows Creek was identified as potential LCT habitat. The 0.5 mile section between Site 19 and Site 21 offers the most favorable habitat. Between Site 1 and including Site 19, the stream contains 13 fish passage barriers and lacks continuity. The places that looked suitable for fish to inhabit were limited in quantity and were disconnected by barriers. Between Site 1 and Site 5 the stream has a very high gradient and the entire reach creates one large fish passage barrier. One short segment of stream between Site 13 and Site 15 flows through a small meadow and contains the only other low-gradient reach.

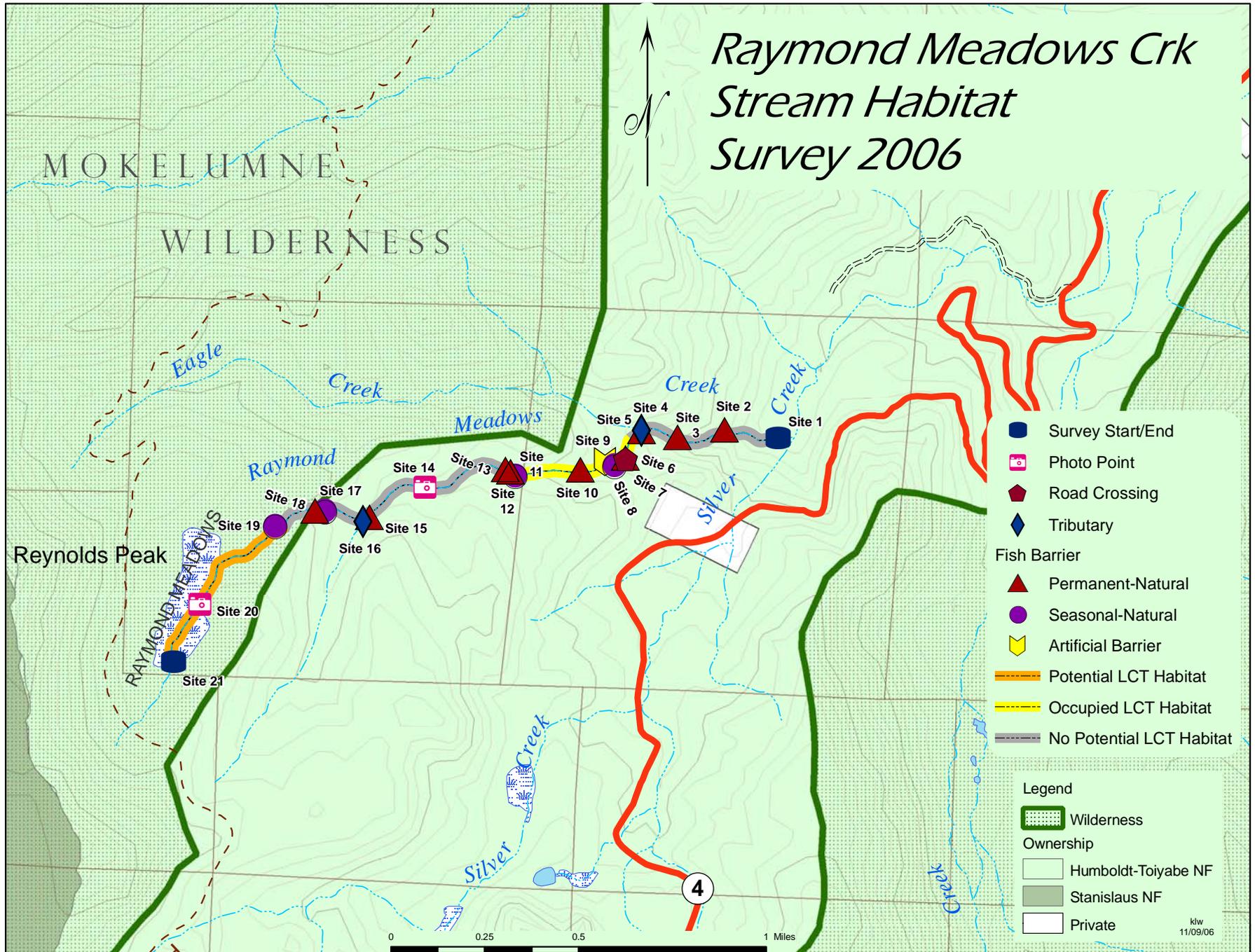
Raymond Meadows Creek is fairly isolated and therefore human impact is minimal. The road that crosses the stream at Site 6 showed little evidence of recent use. Upstream of Site 21 the Pacific Crest Trail crosses the headwaters, though impacts on the stream are negligible.

Based on the criteria of the Carson River Watershed 2006 Stream Habitat Surveys, Raymond Meadows Creek is not favorable for long term persistence of an LCT population. Fish within the stream are susceptible to becoming both physically and genetically isolated, especially outside of the continuous reach between Sites 19-21. In addition, the size and location of the stream may pose threats such as freezing.

Recommendations

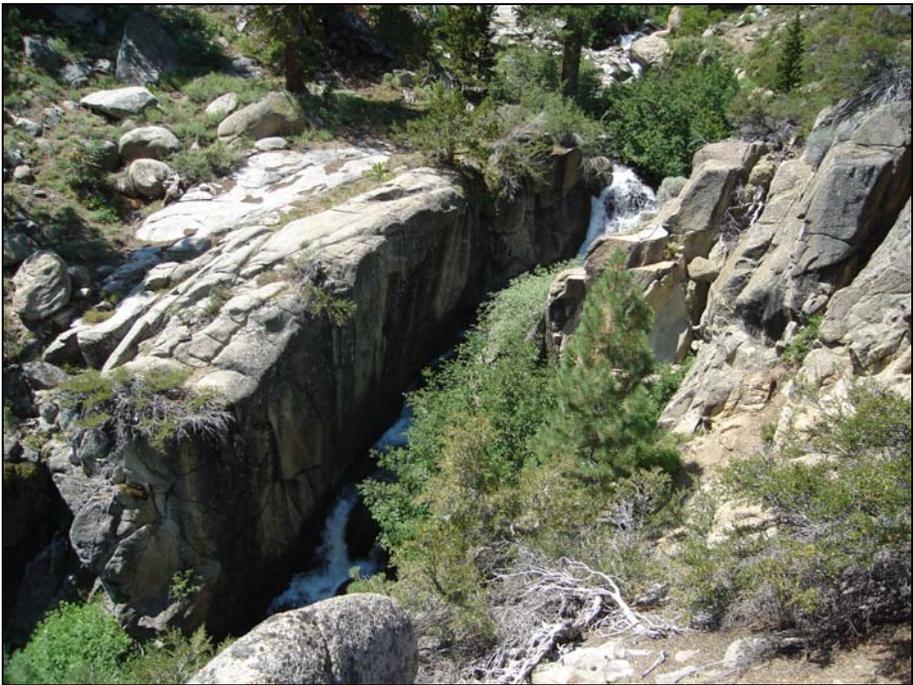
1. Consider the 0.5 mile section of Raymond Meadows Creek between Site 19 and Site 21 as potential LCT habitat. Consider the 0.28 mile section directly upstream of Site 6 as occupied LCT habitat and consider Raymond Meadows Creek a low candidate for restoration.
2. Coordinate with the California Department of Fish and Game to conduct an LCT density and distribution survey in Raymond Meadows Creek.
3. If LCT are found in Raymond Meadows Creek work with the California Department of Fish and Game to enact a closure or strict limitations on fishing in Raymond Meadows Creek. Make these regulations visible through posted signs and by publication in the annual California Department of Fish and Game fishing regulations handbook.
4. Assess the efficiency and impact of the concrete diversion at Site 9 making sure it is not diverting a quantity of water that exceeds the adjudicated rights. Examine the possibilities of altering, enhancing, or replacing the diversion structure to provide fish connectivity through the site.

Raymond Meadows Crk Stream Habitat Survey 2006





Site 1: Raymond Meadows Creek, Carson Ranger District. Upstream photo of Raymond Meadows Creek, taken from the survey start point just above the confluence with Silver Creek. This site is located at UTM: N: 4274220 & E: 256205.



Site 2: Raymond Meadows Creek, Carson Ranger District. Upstream view of a permanent fish barrier with an estimated height of 15.0 feet, and max. pool depth of 2.0-4.0 feet. This site is located at UTM: N: 4274254 & E: 255971, Elev. 7439 feet (2268m).



Site 3: Raymond Meadows Creek, Carson Ranger District. Upstream photo of permanent fish barrier, which is approximately 7.5 ft high, with a pool depth of 1-3 ft deep. This site is located at UTM: N: 4274222 & E: 255770, Elev. 7754 feet (2364m).



Site 4: Raymond Meadows Creek, Carson Ranger District. Photo of a 12-15 ft tall waterfall. Max. pool depth is 0.5 to 1.5 ft. This site is located at UTM: N: 4274249 & E: 255617, Elev. 7728 feet (2356m).



Site 5: Raymond Meadows Creek, Carson Ranger District. Upstream photo of the confluence of Eagle Creek (right) and Raymond Meadows Creek (left). This site is located at UTM: N: 4274250 & E: 255614, Elev. 7705 feet (2349m).



Site 6: Raymond Meadows Creek, Carson Ranger District. This road-stream crossing shows little use, and has a negligible impact on the stream. This site is located at UTM: N: 4274187 & E: 255567, Elev. 7695 feet (2346m).



Site 7: Raymond Meadows Creek, Carson Ranger District. Cross-sectional view of an 8.0 ft high permanent barrier with a maximum pool depth of 1.5-2.0 ft. This site is located at UTM: N: 4274134 & E: 255546, Elev. 7806 feet (2380m).



Site 8: Raymond Meadows Creek, Carson Ranger District. Upstream photo of a seasonal barrier with a height of 4.5 ft and a max. pool depth of 1.3 ft. This site is located at UTM: N: 4274098 & E: 255502.



Site 9: Raymond Meadows Creek, Carson Ranger District. Cross-sectional photo of an artificial permanent fish barrier. The concrete footings are part of a flashboard dam that can be used to retain water. The barrier height without the board in is 4.0 feet, and the maximum pool depth is 1.4 feet. A pipe on the upstream end of the dam allows for water to be diverted. This site is located at UTM: N: 4274121 & E: 255456, Elev. 7905 feet (2410m).



Site 9 cont: Raymond Meadows Creek, Carson Ranger District. A bird's eye view of the barrier. This site is located at UTM: N: 4274121 & E: 255456, Elev. 7905 feet (2410m).



Site 10a: Raymond Meadows Creek, Carson Ranger District. Photo shows the downstream end of several consecutive drops that form a permanent barrier. This site is located at UTM: N: 4274084 & E: 255352, Elev. 7915 feet (2413m).



Site 10b: Raymond Meadows Creek, Carson Ranger District. This photo is from the river left bank looking at a 12.0 foot waterfall. This site is located at UTM: N: 4274084 & E: 255352, Elev. 7915 feet (2413m).



Site 10c: Raymond Meadows Creek, Carson Ranger District. Upstream photo of a 10.0 foot waterfall. This site is located at UTM: N: 4274084 & E: 255352, Elev. 7915 feet (2413m).



Site 11: Raymond Meadows Creek, Carson Ranger District. Photo of a 4.5 foot seasonal barrier with a maximum pool depth of 1.0 ft. This site is located at UTM: N: 4274059 & E: 255352, Elev. 8069 feet (2460m).



Site 12: Raymond Meadows Creek, Carson Ranger District. Upstream photo of a waterfall with a height of 5.0 feet and a max. pool depth of 1.8 feet. This site is located at UTM: N: 4274073 & E: 255055.



Site 13: Raymond Meadows Creek, Carson Ranger District. Upstream photo of a 9.0 foot waterfall (max. pool depth 1.0 foot). This site is located at UTM: N: 4274087 & E: 255030, Elev. 8144 feet (2483m).



Site 14: Raymond Meadows Creek, Carson Ranger District. Photo of a short section of low gradient stream, bordered by abundant willows. This site is located at UTM: N: 4274008 & E: 254687, Elev. 8233 feet (2510m).



Site 15: Raymond Meadows Creek, Carson Ranger District. Upstream photo of a 13.0 foot waterfall that forms a permanent fish barrier (max. pool depth 1.2 feet). This site is located at UTM: N: 4273879 & E: 254448, Elev. 8243 feet (2513m).



Site 16: Raymond Meadows Creek, Carson Ranger District. Upstream view of a small tributary that enters river right and contributes 30% of the total flow. This site is located at UTM: N: 4273858 & E: 254420, Elev. 8259 feet (2518m.)



Site 17: Raymond Meadows Creek, Carson Ranger District. Photo shows a seasonal barrier with a height of 3.0 ft and maximum pool depth of 1.4ft. This site is located at UTM: N: 4273904 & E: 254262, Elev. 8295 feet (2529m).



Site 18: Raymond Meadows Creek, Carson Ranger District. A 10-12 foot waterfall forms a permanent fish passage barrier (max. pool depth 1.5 feet). This site is located at UTM: N: 4273905 & E: 254217, Elev. 8371 feet (2552m).



Site 18 cont.: Raymond Meadows Creek, Carson Ranger District. Photo shows the lower cascades. This site is located at UTM: N: 4273905 & E: 254217, Elev. 8371 feet (2552m)



Site 19: Raymond Meadows Creek, Carson Ranger District. Cross-sectional view of a 4.2 foot waterfall, which has a pool depth of 1.3 ft. This site is located at UTM: N: 4273840 & E: 254047, Elev. 8439 feet (2573m).



Site 20: Raymond Meadows Creek, Carson Ranger District, photo point. Upstream photo of a brushy, marshy, low-gradient reach. This site is located at UTM: N: 4275304 & E: 253724, Elev. 8541 feet (2604m).



Site 21: Raymond Meadows Creek, Carson Ranger District. Photo taken at the survey end point shows one of several headwater branches that merge in the meadow. Individually these branches do not provide sustainable fish habitat. This site is located at UTM: N: 4273264 & E: 253611, Elev. 8597 feet (2621m).